

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**SUNDRY NOTICES AND REPORTS ON WELLS**
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.5. Lease Serial No.
NMNM0557391

6. If Indian, Allottee or Tribe Name

SUBMIT IN TRIPLICATE - Other instructions on page 27. If Unit or CA/Agreement, Name and/or No.
NMNM139655

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other8. Well Name and No.
FEDERAL 2407 28M COM 1H2. Name of Operator
LOGOS OPERATING LLCContact: MARIE E FLOREZ
E-Mail: mlflorez@logosresourcesllc.com9. API Well No.
30-039-31380-00-X13a. Address
2010 AFTON PLACE
FARMINGTON, NM 874013b. Phone No. (include area code)
Ph: 505.787.221810. Field and Pool or Exploratory Area
ESCRITO GALLUP

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

Sec 28 T24N R7W SWSW 000FSL 863FWL
36.277359 N Lat, 107.586293 W Lon11. County or Parish, State
RIO ARRIBA 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☐ Subsequent Report☐ Final Abandonment Notice☐ Acidize☐ Alter Casing☐ Casing Repair☐ Change Plans☐ Convert to Injection☐ Deepen☐ Hydraulic Fracturing☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☐ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☒ Other
Change to Original A
PD

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 recompletable 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 recompletable 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 request a name change from Federal 2407 28M Com 1H to Nautilus 2407 28M Com 1H and request a change in plans for the following:

Original TD @ 11991' MD 6052' TVD to new TD @ 11969' MD 6035' TVD.

Geology tops have been updated per changes.

Original KOP @ 5386' MD 5269' TVD to new KOP @ 5364' MD 5246' TVD.

Original Landing point @ 6699' MD 6150' TVD to new Landing point @ 6678' MD 6129' TVD.

Original 7" Casing Intermediate @ 6699' MD to new 6678' MD.

**ADHERE TO PREVIOUS NMOC
CONDITIONS OF APPROVAL****MAR 11 2020****DISTRICT III**

14. I hereby certify that the foregoing is true and correct.

**Electronic Submission #506364 verified by the BLM Well Information System
For LOGOS OPERATING LLC, sent to the Farmington
Committed to AFMSS for processing by JOE KILLINS on 03/10/2020 (20JK0133SE)**

Name (Printed/Typed) MARIE E FLOREZ

Title REGULATORY SPECIALIST

Signature (Electronic Submission)

Date 03/09/2020

THIS SPACE FOR FEDERAL OR STATE OFFICE USEApproved By JOE KILLINSTitle ENGINEERDate 03/10/2020

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 Farmington

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)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ******NMOC**

23

Additional data for EC transaction #506364 that would not fit on the form

32. Additional remarks, continued

Original 4.5" Casing Production @ 6549' - 11991' to new 6578'-11969'.

Attached: New C102 Plat with new name, Operation and Directional Drill plans

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-039-31380		² Pool Code 22619	³ Pool Name ESCRITO GALLUP
⁴ Property Code 327361	⁵ Property Name NAUTILUS 2407 28M COM		⁶ Well Number 1H
⁷ OGRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC		⁹ Elevation 7388

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
M	28	24-N	7-W		0	SOUTH	863	WEST	RIO ARRIBA

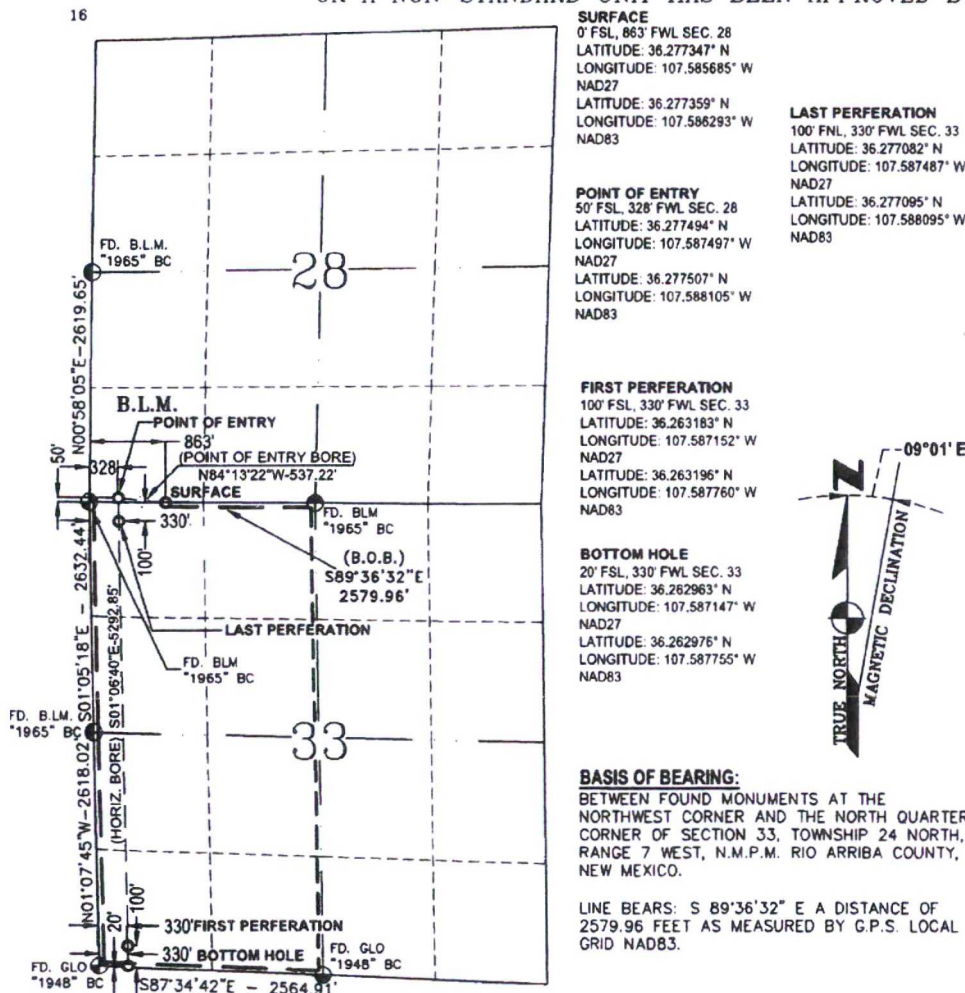
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	33	24-N	7-W		20	SOUTH	330	WEST	RIO ARRIBA

¹² Dedicated Acres EG= W/2 320 ACRE SEC. 33	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
---	-------------------------------	----------------------------------	-------------------------

NO ALLOWANCE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16



17 OPERATOR CERTIFICATION

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

Tamra Sessions 2/13/20
Signature Date
Tamra Sessions
Printed Name
tsessions@logosresourcesllc.com
E-mail Address

18 SURVEYOR CERTIFICATION

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

FEBRUARY 13, 2020

Date of Survey

Signature and Seal of Registered Surveyor



GLEN W. RUSSELL
Certificate Number

15703



LOGOS Operating, LLC Operations Plan

Note: This procedure will be adjusted onsite based upon actual conditions

Date:	February 27, 2020	Pool:	Escrito Gallup
Well Name:	Nautilus 2407 28M Com 1H	Design GL Elevation:	7,385'
Surface Location:	Sec 28, T24N, R7W 0 FNL, 863 FWL (36.277359° N, 107.586293° W – NAD83)	Measured Depth:	11,969'
Bottom Hole Location:	Sec 33, T24N, R7W 20 FSL, 330 FWL (36.262976° N, 107.587755° W – NAD83)	County:	Rio Arriba

Lease Serial #NMNM-0557391

I. GEOLOGY

A. Formation Tops (Design GL): Estimated top of important geological markers:

NOTE: All Formation Tops/Kickoff points/Landing Depths are based on Design Ground Level elevation as a reference point and will be adjusted to actual KB when the actual rig is selected.

SURFACE FORMATION - NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	1845	1845	MENEFEE	4197	4125
KIRTLAND	1985	1985	*POINT LOOKOUT	4924	4824
*FRUITLAND	2191	2190	*MANCOS	5183	5073
*PICTURED CLIFFS	2528	2521	GALLUP	6037	5873
LEWIS	2605	2595	KICKOFF POINT	5,364	5,246
CHACRA	3425	3383	LANDING POINT	6,678	6,129
*CLIFF HOUSE	4106	4038	TD	11,969	6,035

* indicates depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered.

B. **MUD LOGGING PROGRAM:** Mudlogger on location from KOP to TD.

C. **LOGGING PROGRAM:** LWD GR from surface casing to TD.

D. **NATURAL GAUGES:** Gauge any noticeable increases in gas flow. Record all gauges in Tour book and on morning reports.

II. DRILLING

A. **MUD PROGRAM:** LSND mud (WBM) will be used to drill the 12-1/4" Surface hole, the 8 3/4" Directional Vertical hole, and the curve portion of the wellbore. A LSND (WBM) or (OBM) will be used to drill the lateral portion of well. Treat for lost circulation as necessary. Obtain 100% returns prior to cementing. Notify Engineering of any mud losses.

B. **BOP TESTING:** While drill pipe is in use, the pipe rams and the blindrams will be function tested once each trip. The BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Pressure

NAUTILUS 2407 28M 1H



test surface casing to **600 psi for 30 minutes** and intermediate casing to **1500 psi for 30 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. **All tests and inspections will be recorded and logged with time and results.**

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	OH SIZE (IN)	DEPTH (MD)	CSG SIZE (IN)	WEIGHT	GRADE	CONN
SURFACE	12.25"	320'	9.625"	36 LBS	J-55 or equiv	STC or LTC
INTERMEDIATE	8.75"	6,678'	7"	23 LBS	J-55 or equiv	LTC
PRODUCTION	6.125"	6,578' – 11,969'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC
TIE BACK	6.125"	Surf. – 6,578'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC

NOTE: All casing depths are approximate and will be based on drilling conditions +/- 50'. Weights, grades and connections will be based on availability and may vary but will be equivalent or greater.

B. FLOAT EQUIPMENT:

1. SURFACE CASING: 9-5/8" notched regular pattern guide shoe. Run (1) standard centralizer on each of the bottom (4) joints of Surface Casing.
2. INTERMEDIATE CASING: 7" cement nose guide shoe with a self-fill insert float. Place float collar one joint above the shoe. Install (1) centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) centralizer at 2,500 ft., 2,300ft., 2,000ft., 1,500 ft., and 1,000 ft.
3. PRODUCTION LINER: Run 4-1/2" Liner with cement nose guide Float Shoe+ 2jts. of 4-1/2" casing+ Landing Collar+ 4-1/2" pup joint+ 1 RSI (Sliding Sleeve) positioned inside the legal setback. Centralizer program will be determined by wellbore condition. Set seals on Liner Hanger. Liner to be pressure tested during completion operations.

NOTE: Use of DV tool would be considered by operator as back up in case we experience heavy losses and are concerned with cement not reaching surface. If major losses are not encountered we will not run DV tool. Optional use of cancelation plugs for DV tools may be used if losses while cementing are not encountered.

C. CEMENTING:

(Note: Volumes may be adjusted onsite due to actual conditions)

1. SURFACE: 5 bbl Fresh Water Spacer, 100 sx (161 cu.ft.) of 14.5 ppg Type 1-11 (Neat G) + 20% Fly Ash cement w/ 7.41 gal/sack mix water ratio @ 1.61 cu ft/sx yield. Calculated @volume+ 50% excess. WOC 12 hours. Test csg to 600 psi. Total Volume: (160cu-ft/100 sx/ Bbls). TOC at Surface.
2. INTERMEDIATE: Stage 1: Spacer #1: 20 bbl (112 cuft) Chemwash. Lead Cement: 226.5 bbls, 652 sks (1272 cu.ft.), 12.3 ppg@ 1.95 cuft/sk yield. Tail Cement: 58 bbls, 250 sks, (325 cuft), 13.5 ppg@ 1.3 cu'ft/sk yield. Displacement: Displace w/ +/- 262 bbl Drilling mud or water. Total Cement: 284 bbls, 902 sks, (1597 cuft)



3. **PRODUCTION LINER:** Spacer #1: 10 bbl (56 cu-ft) Water Spacer. Spacer #2: 40 bbl 9.5 ppg (224.6 cu-ft) Tuned Spacer III. Spacer #3: 10 bbl Water Spacer. Lead Cement: Extencem TM System. Yield 1.36 cuft/sk 13.3 ppg (491 sx / 668 cuft / 119 bbls). Tail Spacer: 40 BBL of MMCR. Displacement: Displace w/ +/- 155 bbl.

IV. **COMPLETION**

A. **CBL**

CBLs and/or Temperature Surveys Will Be Performed as Needed or Required

B. **PRESSURE TEST**

Pressure test 4-1/2" casing to 4000 psi max, hold at 1500 psi for 30 minutes. Increase pressure to Open RSI sleeves.

C. **STIMULATION**

Stimulate with sand, water and N₂. Isolate stages with flow through frac plugs. Drill out frac plugs and flowback lateral.

D. **PRODUCTION TUBING**

Run 2-7/8", 6.5#, J-55, EUE tubing

*NOTE: Although this horizontal well may be drilled past the applicable setbacks, an unorthodox location application is not required because the completed interval in this well, as defined by 19.15.16.7 8(1) NMAC, will be entirely within the applicable setbacks. This approach complies with all applicable rules, including 19.15.16.14 A(3) NMAC, 19.15.16.14 8(2) NMAC, 19.15.16.15 8(2) NMAC, and 19.15.16.15. 8(4) NMAC.



Company: Logos Operating LLC
 Project: Rio Arriba, NM NAD83
 Site: Nautilus 2407-28M
 Well: Nautilus 2407-28M 1H
 Wellbore: OH
 Design: Plan #3

PROJECT DETAILS: Rio Arriba, NM NAD83

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



Azimuths to True North
 Magnetic North: 8.75°

Magnetic Field
 Strength: 49492.9nT
 Dip Angle: 62.87°
 Date: 12/17/2018
 Model: HDGM

WELL DETAILS: Nautilus 2407-28M 1H

GL 7385' @ 7385.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.00 0.00 1920350.72 2795906.42 36.2773590 -107.5862930

Plan: Plan #3 (Nautilus 2407-28M 1H/OH)

Created By: Janie Collins Date: 9:16, February 19 2020

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Nautilus 28M 1H POE	6129.00	53.88	-534.09	1920403.24	2795372.20	36.2775070	-107.5881050
Nautilus 28M 1H BHL	6035.00	-5235.79	-431.01	1915113.85	2795488.78	36.2631960	-107.5877603
Nautilus 28M 1H FPerf	6035.00	-5155.70	-432.48	1915193.93	2795487.10	36.2631960	-107.5877600
Nautilus 28M 1H LPerf	6129.00	-96.10	-531.14	1920253.27	2795375.53	36.2770950	-107.5880950

SECTION DETAILS

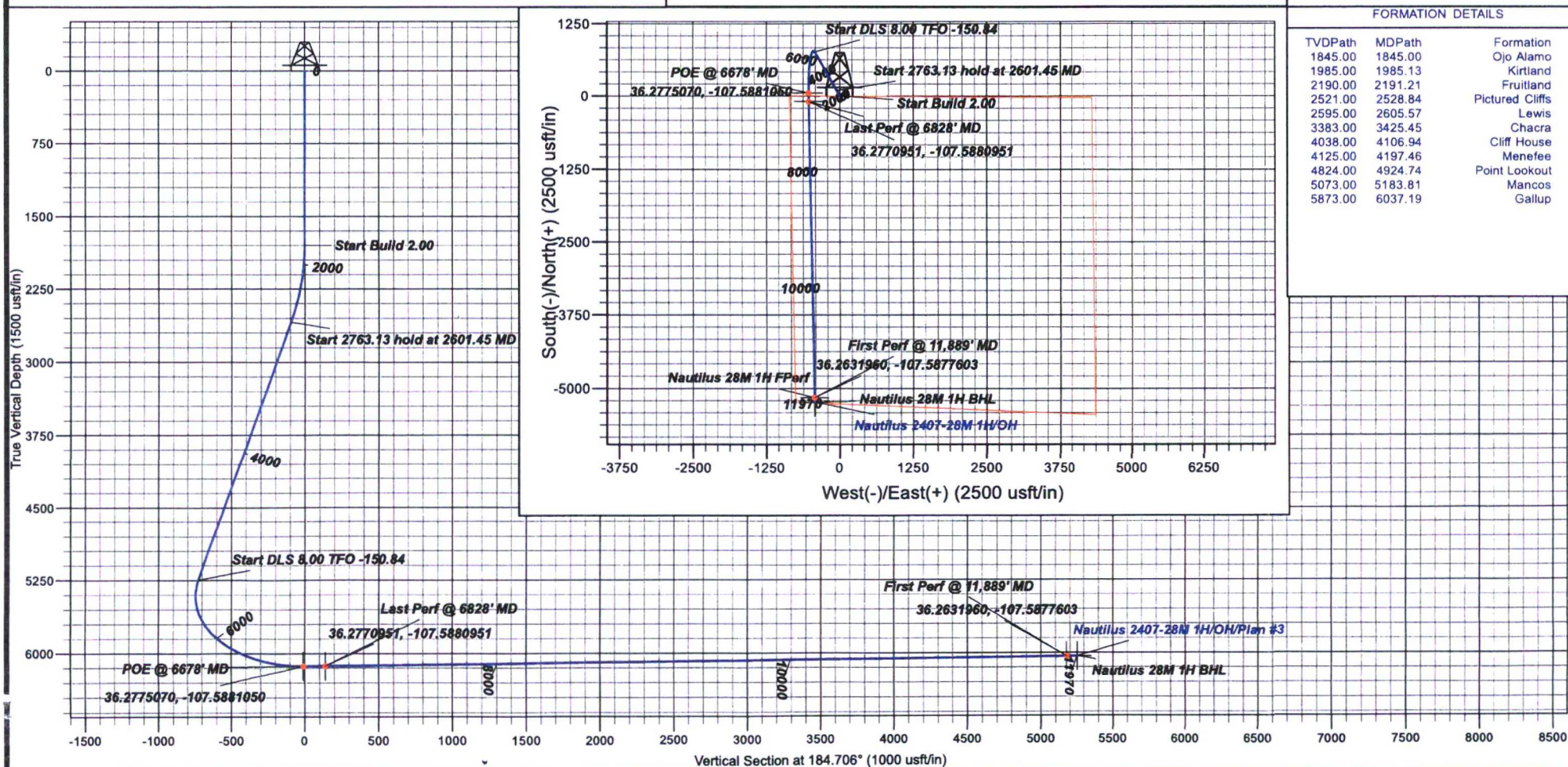
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
1800.00	0.00	0.000	1800.00	0.00	0.00	0.00	0.00	0.00	
2601.45	16.03	330.814	2591.03	97.24	-54.31	2.00	330.81	-92.45	
5364.58	16.03	330.814	5246.74	763.33	-426.37	0.00	0.00	-725.78	
6678.46	91.02	178.884	6129.00	53.88	-534.09	8.00	-150.84	-9.88	Nautilus 28M 1H POE
11969.97	91.02	178.884	6035.00	-5235.79	-431.01	0.00	0.00	5253.50	Nautilus 28M 1H BHL

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
1845.00	1845.00	Ojo Alamo
1985.00	1985.13	Kirtland
2190.00	2191.21	Fruitland
2521.00	2528.84	Pictured Cliffs
2595.00	2605.57	Lewis
3383.00	3425.45	Chacra
4038.00	4106.94	Cliff House
4125.00	4197.46	Menefee
4824.00	4924.74	Point Lookout
5073.00	5183.81	Mancos
5873.00	6037.19	Gallup





Logos Operating LLC

Rio Arriba, NM NAD83

Nautilus 2407-28M

Nautilus 2407-28M 1H

OH

Plan: Plan #3

Standard Planning Report

19 February, 2020



Database:
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Nautilus 2407-28M
Well: Nautilus 2407-28M 1H
Wellbore: OH
Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

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

Site	Nautilus 2407-28M				
Site Position:		Northing:	1,920,350.72 usft	Latitude:	36.2773590
From:	Lat/Long	Easting:	2,795,906.42 usft	Longitude:	-107.5862930
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.15 °

Well	Nautilus 2407-28M 1H					
Well Position	+N/-S	0.00 usft	Northing:	1,920,350.72 usft	Latitude:	36.2773590
	+E/-W	0.00 usft	Easting:	2,795,906.42 usft	Longitude:	-107.5862930
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,385.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/17/2018	8.75	62.87	49,492.90000000

Design	Plan #3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	184.706

Plan Survey Tool Program	Date	2/19/2020		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	11,969.97 Plan #3 (OH)	MWD+HDGM	
			OWSG MWD + HDGM	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.000	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,601.45	16.03	330.814	2,591.03	97.24	-54.31	2.00	2.00	0.00	330.81	
5,364.58	16.03	330.814	5,246.74	763.33	-426.37	0.00	0.00	0.00	0.00	
6,678.46	91.02	178.884	6,129.00	53.88	-534.09	8.00	5.71	-11.56	-150.84	Nautilus 28M 1H POE
11,969.97	91.02	178.884	6,035.00	-5,235.79	-431.01	0.00	0.00	0.00	0.00	Nautilus 28M 1H BHL



Database:
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Nautilus 2407-28M
Well: Nautilus 2407-28M 1H
Wellbore: OH
Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
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 (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.000	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.000	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.000	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.000	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.000	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.000	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.000	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.000	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.000	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.000	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.000	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.000	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.000	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.000	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.000	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.000	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.000	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	2.00	330.814	1,899.98	1.52	-0.85	-1.45	2.00	2.00	0.00
2,000.00	4.00	330.814	1,999.84	6.09	-3.40	-5.79	2.00	2.00	0.00
2,100.00	6.00	330.814	2,099.45	13.70	-7.65	-13.03	2.00	2.00	0.00
2,200.00	8.00	330.814	2,198.70	24.34	-13.60	-23.14	2.00	2.00	0.00
2,300.00	10.00	330.814	2,297.47	38.00	-21.22	-36.13	2.00	2.00	0.00
2,400.00	12.00	330.814	2,395.62	54.65	-30.53	-51.97	2.00	2.00	0.00
2,500.00	14.00	330.814	2,493.06	74.29	-41.50	-70.64	2.00	2.00	0.00
2,600.00	16.00	330.814	2,589.64	96.89	-54.12	-92.12	2.00	2.00	0.00
2,601.45	16.03	330.814	2,591.03	97.24	-54.31	-92.45	2.00	2.00	0.00
2,700.00	16.03	330.814	2,685.76	120.99	-67.58	-115.04	0.00	0.00	0.00
2,800.00	16.03	330.814	2,781.87	145.10	-81.05	-137.96	0.00	0.00	0.00
2,900.00	16.03	330.814	2,877.98	169.21	-94.51	-160.88	0.00	0.00	0.00
3,000.00	16.03	330.814	2,974.09	193.31	-107.98	-183.80	0.00	0.00	0.00
3,100.00	16.03	330.814	3,070.20	217.42	-121.44	-206.72	0.00	0.00	0.00
3,200.00	16.03	330.814	3,166.32	241.53	-134.91	-229.64	0.00	0.00	0.00
3,300.00	16.03	330.814	3,262.43	265.63	-148.37	-252.56	0.00	0.00	0.00
3,400.00	16.03	330.814	3,358.54	289.74	-161.84	-275.49	0.00	0.00	0.00
3,500.00	16.03	330.814	3,454.65	313.85	-175.30	-298.41	0.00	0.00	0.00
3,600.00	16.03	330.814	3,550.77	337.95	-188.77	-321.33	0.00	0.00	0.00
3,700.00	16.03	330.814	3,646.88	362.06	-202.23	-344.25	0.00	0.00	0.00
3,800.00	16.03	330.814	3,742.99	386.17	-215.70	-367.17	0.00	0.00	0.00
3,900.00	16.03	330.814	3,839.10	410.27	-229.17	-390.09	0.00	0.00	0.00
4,000.00	16.03	330.814	3,935.21	434.38	-242.63	-413.01	0.00	0.00	0.00
4,100.00	16.03	330.814	4,031.33	458.49	-256.10	-435.93	0.00	0.00	0.00
4,200.00	16.03	330.814	4,127.44	482.59	-269.56	-458.85	0.00	0.00	0.00
4,300.00	16.03	330.814	4,223.55	506.70	-283.03	-481.77	0.00	0.00	0.00
4,400.00	16.03	330.814	4,319.66	530.81	-296.49	-504.69	0.00	0.00	0.00
4,500.00	16.03	330.814	4,415.78	554.91	-309.96	-527.61	0.00	0.00	0.00
4,600.00	16.03	330.814	4,511.89	579.02	-323.42	-550.53	0.00	0.00	0.00
4,700.00	16.03	330.814	4,608.00	603.13	-336.89	-573.45	0.00	0.00	0.00
4,800.00	16.03	330.814	4,704.11	627.23	-350.35	-596.37	0.00	0.00	0.00
4,900.00	16.03	330.814	4,800.22	651.34	-363.82	-619.29	0.00	0.00	0.00
5,000.00	16.03	330.814	4,896.34	675.45	-377.28	-642.22	0.00	0.00	0.00
5,100.00	16.03	330.814	4,992.45	699.55	-390.75	-665.14	0.00	0.00	0.00
5,200.00	16.03	330.814	5,088.56	723.66	-404.21	-688.06	0.00	0.00	0.00



Database:
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Nautilus 2407-28M
Well: Nautilus 2407-28M 1H
Wellbore: OH
Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
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 (°/100usft)	Turn Rate (°/100usft)
5,300.00	16.03	330.814	5,184.67	747.77	-417.68	-710.98	0.00	0.00	0.00
5,364.58	16.03	330.814	5,246.74	763.33	-426.37	-725.78	0.00	0.00	0.00
5,400.00	13.62	324.943	5,280.98	771.02	-431.16	-733.05	8.00	-6.79	-16.57
5,500.00	8.38	291.899	5,379.20	783.40	-444.71	-744.27	8.00	-5.24	-33.04
5,600.00	9.07	237.324	5,478.20	781.86	-458.13	-741.64	8.00	0.68	-54.58
5,700.00	14.88	209.760	5,576.06	766.44	-471.15	-725.20	8.00	5.81	-27.56
5,800.00	22.08	198.575	5,670.87	737.42	-483.53	-695.27	8.00	7.21	-11.19
5,900.00	29.69	192.803	5,760.78	695.39	-495.03	-652.43	8.00	7.60	-5.77
6,000.00	37.44	189.237	5,844.06	641.15	-505.41	-597.52	8.00	7.76	-3.57
6,100.00	45.27	186.752	5,919.06	575.76	-514.48	-531.61	8.00	7.83	-2.48
6,200.00	53.15	184.864	5,984.34	500.50	-522.06	-455.98	8.00	7.87	-1.89
6,300.00	61.04	183.331	6,038.63	416.82	-528.01	-372.10	8.00	7.90	-1.53
6,400.00	68.95	182.017	6,080.86	326.37	-532.20	-281.60	8.00	7.91	-1.31
6,500.00	76.87	180.837	6,110.22	230.89	-534.56	-186.25	8.00	7.92	-1.18
6,600.00	84.80	179.730	6,126.14	132.24	-535.04	-87.90	8.00	7.93	-1.11
6,678.46	91.02	178.884	6,129.00	53.88	-534.09	-9.88	8.00	7.93	-1.08
6,700.00	91.02	178.884	6,128.62	32.35	-533.67	11.54	0.00	0.00	0.00
6,800.00	91.02	178.884	6,126.84	-67.62	-531.72	111.01	0.00	0.00	0.00
6,900.00	91.02	178.884	6,125.06	-167.58	-529.77	210.48	0.00	0.00	0.00
7,000.00	91.02	178.884	6,123.29	-267.55	-527.82	309.95	0.00	0.00	0.00
7,100.00	91.02	178.884	6,121.51	-367.51	-525.87	409.42	0.00	0.00	0.00
7,200.00	91.02	178.884	6,119.74	-467.48	-523.93	508.89	0.00	0.00	0.00
7,300.00	91.02	178.884	6,117.96	-567.44	-521.98	608.35	0.00	0.00	0.00
7,400.00	91.02	178.884	6,116.18	-667.41	-520.03	707.82	0.00	0.00	0.00
7,500.00	91.02	178.884	6,114.41	-767.37	-518.08	807.29	0.00	0.00	0.00
7,600.00	91.02	178.884	6,112.63	-867.34	-516.13	906.76	0.00	0.00	0.00
7,700.00	91.02	178.884	6,110.85	-967.30	-514.19	1,006.23	0.00	0.00	0.00
7,800.00	91.02	178.884	6,109.08	-1,067.27	-512.24	1,105.70	0.00	0.00	0.00
7,900.00	91.02	178.884	6,107.30	-1,167.23	-510.29	1,205.16	0.00	0.00	0.00
8,000.00	91.02	178.884	6,105.52	-1,267.20	-508.34	1,304.63	0.00	0.00	0.00
8,100.00	91.02	178.884	6,103.75	-1,367.16	-506.39	1,404.10	0.00	0.00	0.00
8,200.00	91.02	178.884	6,101.97	-1,467.13	-504.45	1,503.57	0.00	0.00	0.00
8,300.00	91.02	178.884	6,100.19	-1,567.09	-502.50	1,603.04	0.00	0.00	0.00
8,400.00	91.02	178.884	6,098.42	-1,667.06	-500.55	1,702.51	0.00	0.00	0.00
8,500.00	91.02	178.884	6,096.64	-1,767.03	-498.60	1,801.97	0.00	0.00	0.00
8,600.00	91.02	178.884	6,094.87	-1,866.99	-496.65	1,901.44	0.00	0.00	0.00
8,700.00	91.02	178.884	6,093.09	-1,966.96	-494.71	2,000.91	0.00	0.00	0.00
8,800.00	91.02	178.884	6,091.31	-2,066.92	-492.76	2,100.38	0.00	0.00	0.00
8,900.00	91.02	178.884	6,089.54	-2,166.89	-490.81	2,199.85	0.00	0.00	0.00
9,000.00	91.02	178.884	6,087.76	-2,266.85	-488.86	2,299.32	0.00	0.00	0.00
9,100.00	91.02	178.884	6,085.98	-2,366.82	-486.91	2,398.79	0.00	0.00	0.00
9,200.00	91.02	178.884	6,084.21	-2,466.78	-484.97	2,498.25	0.00	0.00	0.00
9,300.00	91.02	178.884	6,082.43	-2,566.75	-483.02	2,597.72	0.00	0.00	0.00
9,400.00	91.02	178.884	6,080.65	-2,666.71	-481.07	2,697.19	0.00	0.00	0.00
9,500.00	91.02	178.884	6,078.88	-2,766.68	-479.12	2,796.66	0.00	0.00	0.00
9,600.00	91.02	178.884	6,077.10	-2,866.64	-477.17	2,896.13	0.00	0.00	0.00
9,700.00	91.02	178.884	6,075.32	-2,966.61	-475.23	2,995.60	0.00	0.00	0.00
9,800.00	91.02	178.884	6,073.55	-3,066.57	-473.28	3,095.06	0.00	0.00	0.00
9,900.00	91.02	178.884	6,071.77	-3,166.54	-471.33	3,194.53	0.00	0.00	0.00
10,000.00	91.02	178.884	6,070.00	-3,266.50	-469.38	3,294.00	0.00	0.00	0.00
10,100.00	91.02	178.884	6,068.22	-3,366.47	-467.43	3,393.47	0.00	0.00	0.00
10,200.00	91.02	178.884	6,066.44	-3,466.43	-465.49	3,492.94	0.00	0.00	0.00
10,300.00	91.02	178.884	6,064.67	-3,566.40	-463.54	3,592.41	0.00	0.00	0.00
10,400.00	91.02	178.884	6,062.89	-3,666.36	-461.59	3,691.87	0.00	0.00	0.00



Database:
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Nautilus 2407-28M
Well: Nautilus 2407-28M 1H
Wellbore: OH
Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
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 (°/100usft)	Turn Rate (°/100usft)
10,500.00	91.02	178.884	6,061.11	-3,766.33	-459.64	3,791.34	0.00	0.00	0.00
10,600.00	91.02	178.884	6,059.34	-3,866.30	-457.69	3,890.81	0.00	0.00	0.00
10,700.00	91.02	178.884	6,057.56	-3,966.26	-455.75	3,990.28	0.00	0.00	0.00
10,800.00	91.02	178.884	6,055.78	-4,066.23	-453.80	4,089.75	0.00	0.00	0.00
10,900.00	91.02	178.884	6,054.01	-4,166.19	-451.85	4,189.22	0.00	0.00	0.00
11,000.00	91.02	178.884	6,052.23	-4,266.16	-449.90	4,288.69	0.00	0.00	0.00
11,100.00	91.02	178.884	6,050.45	-4,366.12	-447.95	4,388.15	0.00	0.00	0.00
11,200.00	91.02	178.884	6,048.68	-4,466.09	-446.01	4,487.62	0.00	0.00	0.00
11,300.00	91.02	178.884	6,046.90	-4,566.05	-444.06	4,587.09	0.00	0.00	0.00
11,400.00	91.02	178.884	6,045.13	-4,666.02	-442.11	4,686.56	0.00	0.00	0.00
11,500.00	91.02	178.884	6,043.35	-4,765.98	-440.16	4,786.03	0.00	0.00	0.00
11,600.00	91.02	178.884	6,041.57	-4,865.95	-438.21	4,885.50	0.00	0.00	0.00
11,700.00	91.02	178.884	6,039.80	-4,965.91	-436.27	4,984.96	0.00	0.00	0.00
11,800.00	91.02	178.884	6,038.02	-5,065.88	-434.32	5,084.43	0.00	0.00	0.00
11,900.00	91.02	178.884	6,036.24	-5,165.84	-432.37	5,183.90	0.00	0.00	0.00
11,969.97	91.02	178.884	6,035.00	-5,235.79	-431.01	5,253.50	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Nautilus 28M 1H FPerf	0.00	0.000	6,035.00	-5,155.70	-432.48	1,915,193.94	2,795,487.10	36.2631960	-107.5877600
- plan misses target center by 1.43usft at 11889.88usft MD (6036.42 TVD, -5155.73 N, -432.57 E)									
- Point									
Nautilus 28M 1H BHL	0.00	0.000	6,035.00	-5,235.79	-431.01	1,915,113.85	2,795,488.78	36.2629760	-107.5877550
- plan hits target center									
- Point									
Nautilus 28M 1H LPerf	0.00	0.000	6,129.00	-96.10	-531.14	1,920,253.27	2,795,375.53	36.2770950	-107.5880950
- plan misses target center by 2.66usft at 6828.44usft MD (6126.34 TVD, -96.05 N, -531.16 E)									
- Point									
Nautilus 28M 1H POE	0.00	0.000	6,129.00	53.88	-534.09	1,920,403.24	2,795,372.20	36.2775070	-107.5881050
- plan hits target center									
- Point									



Database:
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Nautilus 2407-28M
Well: Nautilus 2407-28M 1H
Wellbore: OH
Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,845.00	1,845.00	Ojo Alamo		0.00	0.000	
1,985.13	1,985.00	Kirtland		0.00	0.000	
2,191.21	2,190.00	Fruitland		0.00	0.000	
2,528.84	2,521.00	Pictured Cliffs		0.00	0.000	
2,605.57	2,595.00	Lewis		0.00	0.000	
3,425.45	3,383.00	Chacra		0.00	0.000	
4,106.94	4,038.00	Cliff House		0.00	0.000	
4,197.46	4,125.00	Menefee		0.00	0.000	
4,924.74	4,824.00	Point Lookout		0.00	0.000	
5,183.81	5,073.00	Mancos		0.00	0.000	
6,037.19	5,873.00	Gallup		0.00	0.000	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,800.00	1,800.00	0.00	0.00	Start Build 2.00	
2,601.45	2,591.03	97.24	-54.31	Start 2763.13 hold at 2601.45 MD	
5,364.58	5,246.74	763.33	-426.37	Start DLS 8.00 TFO -150.84	
6,678.46	6,129.00	53.88	-534.09	36.2775070, -107.5881050	
6,678.46	6,129.00	53.88	-534.09	POE @ 6678' MD	
6,828.46	6,126.34	-96.07	-531.16	Last Perf @ 6828' MD	
6,828.46	6,126.34	-96.07	-531.16	36.2770951, -107.5880951	
11,889.87	6,036.42	-5,155.72	-432.57	First Perf @ 11,889' MD	
11,889.87	6,036.42	-5,155.72	-432.57	36.2631960, -107.5877603	
11,969.97	6,035.00	-5,235.79	-431.01	TD at 11969.97	



Logos Operating LLC

Rio Arriba, NM NAD83

Nautilus 2407-28M

Nautilus 2407-28M 1H

OH

Plan #3

Anticollision Report

19 February, 2020



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Reference	Plan #3
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum centre distance of 10,000.00usft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program		Date	2/19/2020		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	11,969.97	Plan #3 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Summary	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Site Name						
Offset Well - Wellbore - Design						
Nautilus 2407-28M						
Nautilus 2407-28M 2H - OH - Plan #3	1,612.61	1,613.59	15.50	4.01	1.349	Level 3, CC, ES, SF
Nautilus 2407-28M 3H - OH - Plan #3	1,500.00	1,500.00	59.89	49.13	5.569	CC, ES
Nautilus 2407-28M 3H - OH - Plan #3	1,600.00	1,598.52	61.10	49.64	5.331	SF

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 2H - OH - Plan #3													Offset Site Error: 0.00 usft		
Survey Program:		0-MWD+HDGM								Rule Assigned:				Offset Well Error: 0.00 usft	
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(usft)	(usft)	Toolface (°)	+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	79.50	5.46	29.47	29.98						
100.00	100.00	100.00	100.00	0.36	0.36	79.50	5.46	29.47	29.98	29.26	0.72	41.812			
200.00	200.00	200.00	200.00	0.72	0.72	79.50	5.46	29.47	29.98	28.54	1.43	20.906			
300.00	300.00	300.00	300.00	1.08	1.08	79.50	5.46	29.47	29.98	27.83	2.15	13.937			
400.00	400.00	400.00	400.00	1.43	1.43	79.50	5.46	29.47	29.98	27.11	2.87	10.453			
500.00	500.00	500.00	500.00	1.79	1.79	79.50	5.46	29.47	29.98	26.39	3.58	8.362			
600.00	600.00	600.00	600.00	2.15	2.15	79.50	5.46	29.47	29.98	25.67	4.30	6.969			
700.00	700.00	700.00	700.00	2.51	2.51	79.50	5.46	29.47	29.98	24.96	5.02	5.973			
800.00	800.00	800.00	800.00	2.87	2.87	79.50	5.46	29.47	29.98	24.24	5.74	5.226			
900.00	900.00	900.00	900.00	3.23	3.23	79.50	5.46	29.47	29.98	23.52	6.45	4.646			
1,000.00	1,000.00	1,000.00	1,000.00	3.58	3.58	79.50	5.46	29.47	29.98	22.81	7.17	4.181			
1,100.00	1,100.00	1,100.00	1,100.00	3.94	3.94	79.50	5.46	29.47	29.98	22.09	7.89	3.801			
1,200.00	1,200.00	1,200.00	1,200.00	4.30	4.30	79.50	5.46	29.47	29.98	21.37	8.60	3.484			
1,300.00	1,300.00	1,300.86	1,300.84	4.66	4.65	81.35	4.28	28.15	28.48	19.18	9.31	3.061			
1,400.00	1,400.00	1,401.47	1,401.31	5.02	4.98	88.21	0.76	24.18	24.23	14.24	9.99	2.426			
1,500.00	1,500.00	1,501.44	1,500.92	5.38	5.32	105.21	-4.86	17.87	18.54	7.85	10.69	1.735			
1,600.00	1,600.00	1,601.04	1,600.10	5.74	5.66	134.15	-10.83	11.15	15.54	4.15	11.40	1.364	Level 3		
1,612.61	1,612.61	1,613.59	1,612.61	5.78	5.71	138.33	-11.58	10.31	15.50	4.01	11.49	1.349	Level 3, CC, ES, SF		
1,700.00	1,700.00	1,700.63	1,699.29	6.09	6.01	165.21	-16.80	4.44	17.39	5.29	12.10	1.437	Level 3		
1,800.00	1,800.00	1,800.22	1,798.48	6.45	6.36	-174.28	-22.77	-2.28	22.93	10.15	12.78	1.794			
1,900.00	1,899.98	1,899.76	1,897.61	6.81	6.72	-135.63	-28.73	-8.99	31.42	17.94	13.48	2.331			
2,000.00	1,999.84	1,999.11	1,996.55	7.17	7.07	-133.75	-34.69	-15.69	42.72	28.54	14.18	3.012			
2,100.00	2,099.45	2,098.15	2,095.19	7.53	7.43	-135.18	-40.63	-22.37	56.45	41.56	14.89	3.791			
2,200.00	2,198.70	2,196.75	2,193.39	7.88	7.79	-137.86	-46.54	-29.02	72.73	57.13	15.60	4.661			



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 2H - OH - Plan #3

Survey Program: 0-MWD+HDGM										Rule Assigned:		Offset Site Error:
Reference										Distance		Offset Well Error:
Measured	Vertical	Measured	Vertical	Semi Major Axis		Highside	Offset Wellbore Centre		Between	Between	Minimum	Separation
Depth	Depth	Depth	Depth	Reference	Offset	Tooface	+N-S	+E-W	Centres	Ellipses	Separation	Factor
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(")	(usft)	(usft)	(usft)	(usft)	(usft)	
2,300.00	2,297.47	2,294.81	2,291.05	8.25	8.14	-140.89	-52.41	-35.63	91.78	75.46	16.32	5.625
2,400.00	2,395.62	2,392.20	2,388.04	8.62	8.50	-143.84	-58.25	-42.20	113.76	96.73	17.03	6.680
2,500.00	2,493.06	2,488.79	2,484.24	9.00	8.86	-146.55	-64.04	-48.72	138.80	121.06	17.75	7.822
2,601.45	2,591.03	2,585.86	2,580.91	9.40	9.21	-149.00	-69.86	-55.26	167.41	148.94	18.47	9.064
2,700.00	2,685.76	2,679.67	2,674.34	9.81	9.56	-151.16	-75.48	-61.59	196.90	177.73	19.17	10.271
2,800.00	2,781.87	2,774.85	2,769.13	10.23	9.91	-152.79	-81.19	-68.01	227.02	207.14	19.88	11.418
2,900.00	2,877.98	2,870.03	2,863.93	10.66	10.27	-154.03	-86.90	-74.43	257.27	236.68	20.60	12.490
3,000.00	2,974.09	2,965.22	2,958.72	11.10	10.62	-155.02	-92.60	-80.84	287.61	266.29	21.32	13.492
3,100.00	3,070.20	3,060.40	3,053.51	11.55	10.98	-155.81	-98.31	-87.26	318.01	295.97	22.04	14.430
3,200.00	3,166.32	3,155.58	3,148.31	12.01	11.33	-156.47	-104.01	-93.68	348.46	325.69	22.76	15.309
3,300.00	3,262.43	3,250.77	3,243.10	12.47	11.69	-157.02	-109.72	-100.10	378.94	355.45	23.49	16.133
3,400.00	3,358.54	3,345.95	3,337.90	12.94	12.04	-157.49	-115.42	-106.52	409.44	385.23	24.22	16.908
3,500.00	3,454.65	3,441.13	3,432.69	13.41	12.40	-157.89	-121.13	-112.94	439.97	415.03	24.95	17.637
3,600.00	3,550.77	3,536.32	3,527.49	13.89	12.76	-158.24	-126.84	-119.36	470.52	444.84	25.68	18.323
3,700.00	3,646.88	3,631.50	3,622.28	14.37	13.12	-158.55	-132.54	-125.78	501.08	474.67	26.41	18.971
3,800.00	3,742.99	3,726.68	3,717.08	14.86	13.47	-158.83	-138.25	-132.20	531.65	504.50	27.15	19.583
3,900.00	3,839.10	3,821.87	3,811.87	15.34	13.83	-159.07	-143.95	-138.61	562.23	534.35	27.89	20.162
4,000.00	3,935.21	3,917.05	3,906.67	15.84	14.19	-159.29	-149.66	-145.03	592.82	564.20	28.63	20.710
4,100.00	4,031.33	4,012.23	4,001.46	16.33	14.55	-159.49	-155.36	-151.45	623.42	594.06	29.37	21.230
4,200.00	4,127.44	4,107.41	4,096.26	16.83	14.91	-159.66	-161.07	-157.87	654.03	623.92	30.11	21.724
4,300.00	4,223.55	4,202.60	4,191.05	17.33	15.27	-159.83	-166.78	-164.29	684.63	653.78	30.85	22.193
4,400.00	4,319.66	4,297.78	4,285.85	17.83	15.63	-159.98	-172.48	-170.71	715.25	683.65	31.59	22.639
4,500.00	4,415.78	4,392.96	4,380.64	18.33	15.99	-160.11	-178.19	-177.13	745.86	713.53	32.34	23.065
4,600.00	4,511.89	4,488.15	4,475.44	18.84	16.35	-160.24	-183.89	-183.55	776.48	743.40	33.08	23.470
4,700.00	4,608.00	4,583.33	4,570.23	19.34	16.71	-160.35	-189.60	-189.97	807.11	773.28	33.83	23.858
4,800.00	4,704.11	4,678.51	4,665.03	19.85	17.07	-160.46	-195.30	-196.38	837.74	803.16	34.58	24.228
4,900.00	4,800.22	4,773.70	4,759.82	20.36	17.43	-160.56	-201.01	-202.80	868.36	833.04	35.33	24.582
5,000.00	4,896.34	4,868.88	4,854.62	20.87	17.79	-160.66	-206.72	-209.22	899.00	862.92	36.07	24.920
5,100.00	4,992.45	4,964.06	4,949.41	21.38	18.15	-160.74	-212.42	-215.64	929.63	892.80	36.82	25.245
5,200.00	5,088.56	5,059.25	5,044.21	21.90	18.51	-160.83	-218.13	-222.06	960.26	922.69	37.57	25.556
5,300.00	5,184.67	5,154.43	5,139.00	22.41	18.87	-160.90	-223.83	-228.48	990.90	952.58	38.33	25.855
5,364.58	5,246.74	5,215.90	5,200.22	22.74	19.11	-160.95	-227.52	-232.62	1,010.69	971.88	38.81	26.041
5,400.00	5,280.98	5,249.86	5,234.05	22.92	19.24	-155.16	-229.55	-234.91	1,020.71	981.64	39.08	26.121
5,450.00	5,329.87	6,732.46	6,132.96	23.15	29.78	-98.48	392.99	-874.75	992.33	958.34	33.98	29.202
5,500.00	5,379.20	6,740.79	6,133.05	23.35	29.92	-74.07	399.31	-880.17	951.54	916.39	35.16	27.066
5,550.00	5,428.72	6,746.45	6,133.11	23.53	30.01	-41.39	403.61	-883.86	910.01	873.70	36.31	25.063
5,600.00	5,478.20	6,749.43	6,133.14	23.67	30.06	-10.71	405.87	-885.79	867.88	830.44	37.43	23.185
5,650.00	5,527.39	6,749.69	6,133.14	23.80	30.07	11.20	406.07	-885.97	825.31	786.79	38.52	21.423
5,700.00	5,576.06	6,747.25	6,133.12	23.90	30.03	26.49	404.22	-884.38	782.47	742.89	39.58	19.769
5,750.00	5,623.96	6,742.12	6,133.06	23.99	29.94	37.98	400.32	-881.04	739.51	698.91	40.60	18.216
5,800.00	5,670.87	6,734.31	6,132.98	24.06	29.81	47.19	394.40	-875.96	696.57	655.00	41.57	16.757
5,850.00	5,716.55	6,723.88	6,132.86	24.11	29.64	54.85	386.48	-869.16	653.78	611.29	42.49	15.387
5,900.00	5,760.78	6,710.86	6,132.72	24.15	29.42	61.34	376.59	-860.69	611.29	567.94	43.36	14.100
5,950.00	5,803.36	6,695.32	6,132.56	24.18	29.17	66.85	364.80	-850.58	569.21	525.05	44.16	12.889
6,000.00	5,844.06	6,677.34	6,132.36	24.19	28.88	71.51	351.15	-838.88	527.65	482.74	44.91	11.749
6,050.00	5,882.69	6,657.01	6,132.14	24.20	28.57	75.42	335.71	-825.64	486.71	441.12	45.59	10.675
6,100.00	5,919.06	6,634.42	6,131.90	24.19	28.22	78.64	318.56	-810.94	446.47	400.27	46.20	9.664
6,150.00	5,953.00	6,609.68	6,131.63	24.18	27.84	81.27	299.79	-794.84	406.99	360.27	46.72	8.711
6,200.00	5,984.34	6,582.92	6,131.34	24.17	27.44	83.36	279.47	-777.43	368.33	321.16	47.17	7.808
6,250.00	6,012.93	6,554.96	6,131.03	24.15	27.03	85.05	258.25	-759.23	330.52	282.97	47.54	6.952
6,300.00	6,038.63	6,518.48	6,129.88	24.13	26.53	85.34	230.61	-735.45	293.31	245.47	47.85	6.130
6,350.00	6,061.31	6,483.34	6,127.03	24.12	26.05	85.08	204.17	-712.48	256.47	208.33	48.14	5.327



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 2H - OH - Plan #3

Survey Program: 0-MWD+HDGM							Rule Assigned:							Offset Site Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
6,400.00	6,080.86	6,449.22	6,122.63	24.10	25.61	84.02	178.73	-690.19	220.23	171.82	48.41	4.549		
6,450.00	6,097.19	6,415.88	6,116.78	24.10	25.19	81.80	154.13	-668.44	184.91	136.30	48.60	3.804		
6,500.00	6,110.22	6,383.08	6,109.55	24.11	24.80	77.87	130.26	-647.16	151.01	102.44	48.57	3.109		
6,550.00	6,119.89	6,350.67	6,100.98	24.13	24.44	71.36	107.02	-626.25	119.48	71.54	47.94	2.492		
6,600.00	6,126.14	6,318.48	6,091.09	24.17	24.10	61.04	84.35	-605.67	92.26	46.61	45.65	2.021		
6,650.00	6,128.95	6,286.40	6,079.87	24.23	23.78	45.91	62.18	-585.37	73.45	33.93	39.52	1.859		
6,678.46	6,129.00	6,268.13	6,072.89	24.27	23.61	35.46	49.78	-573.92	68.93	34.56	34.37	2.006		
6,686.21	6,128.86	6,263.18	6,070.92	24.29	23.56	32.48	46.44	-570.83	68.69	35.64	33.05	2.078		
6,700.00	6,128.62	6,254.44	6,067.38	24.31	23.49	27.21	40.58	-565.40	69.46	38.34	31.12	2.232		
6,800.00	6,126.84	6,194.35	6,040.41	24.59	22.99	-2.86	1.43	-528.68	110.67	76.53	34.14	3.242		
6,900.00	6,125.06	6,139.97	6,012.22	25.00	22.62	-17.28	-32.18	-496.57	179.36	140.83	38.54	4.654		
7,000.00	6,123.29	6,091.08	5,983.95	25.51	22.33	-23.81	-60.75	-468.75	256.26	215.93	40.34	6.353		
7,100.00	6,121.51	6,050.00	5,958.15	26.13	22.13	-26.83	-83.45	-446.25	337.22	295.86	41.37	8.152		
7,200.00	6,119.74	6,008.07	5,929.98	26.82	21.95	-28.56	-105.30	-424.19	420.86	379.04	41.82	10.064		
7,300.00	6,117.96	5,972.99	5,905.06	27.58	21.82	-29.35	-122.51	-406.50	506.58	464.37	42.20	12.003		
7,400.00	6,116.18	5,950.00	5,888.09	28.41	21.74	-29.64	-133.24	-395.29	594.07	551.41	42.66	13.926		
7,500.00	6,114.41	5,913.34	5,860.04	29.30	21.61	-29.81	-149.42	-378.11	682.76	640.03	42.73	15.979		
7,600.00	6,112.63	5,887.93	5,839.91	30.23	21.53	-29.78	-159.93	-366.72	772.74	729.82	42.92	18.004		
7,700.00	6,110.85	5,865.00	5,821.29	31.22	21.45	-29.66	-168.92	-356.80	863.73	820.65	43.08	20.049		
7,800.00	6,109.08	5,850.00	5,808.89	32.24	21.40	-29.55	-174.54	-350.52	955.64	912.36	43.28	22.082		
7,900.00	6,107.30	5,825.37	5,788.15	33.30	21.32	-29.30	-183.31	-340.54	1,048.23	1,004.89	43.34	24.187		
8,000.00	6,105.52	5,800.00	5,766.32	34.40	21.24	-29.00	-191.74	-330.73	1,141.59	1,098.21	43.38	26.318		
8,100.00	6,103.75	5,800.00	5,766.32	35.53	21.24	-29.00	-191.74	-330.73	1,235.45	1,191.87	43.58	28.348		
8,200.00	6,101.97	5,778.09	5,747.13	36.69	21.16	-28.69	-198.52	-322.64	1,329.79	1,286.18	43.61	30.492		
8,300.00	6,100.19	5,764.86	5,735.38	37.87	21.12	-28.49	-202.39	-317.93	1,424.63	1,380.95	43.68	32.613		
8,400.00	6,098.42	5,750.00	5,722.07	39.08	21.07	-28.26	-206.52	-312.80	1,519.89	1,476.15	43.73	34.753		
8,500.00	6,096.64	5,750.00	5,722.07	40.31	21.07	-28.26	-206.52	-312.80	1,615.55	1,571.71	43.84	36.850		
8,600.00	6,094.87	5,730.96	5,704.81	41.56	21.01	-27.94	-211.51	-306.48	1,711.42	1,667.56	43.86	39.022		
8,700.00	6,093.09	5,721.26	5,695.94	42.82	20.97	-27.77	-213.90	-303.37	1,807.63	1,763.73	43.91	41.170		
8,800.00	6,091.31	5,700.00	5,676.32	44.11	20.90	-27.39	-218.83	-296.82	1,904.22	1,860.31	43.91	43.366		
8,900.00	6,089.54	5,700.00	5,676.32	45.41	20.90	-27.39	-218.83	-296.82	2,000.83	1,956.85	43.98	45.492		
9,000.00	6,087.76	5,700.00	5,676.32	46.72	20.90	-27.39	-218.83	-296.82	2,097.75	2,053.71	44.04	47.629		
9,100.00	6,085.98	5,700.00	5,676.32	48.04	20.90	-27.39	-218.83	-296.82	2,194.95	2,150.85	44.10	49.772		
9,200.00	6,084.21	5,681.66	5,659.21	49.38	20.84	-27.04	-222.70	-291.46	2,292.15	2,248.04	44.11	51.968		
9,300.00	6,082.43	5,675.15	5,653.11	50.73	20.82	-26.91	-224.00	-289.63	2,389.60	2,345.46	44.14	54.135		
9,400.00	6,080.65	5,669.03	5,647.34	52.09	20.80	-26.80	-225.17	-287.93	2,487.20	2,443.03	44.17	56.304		
9,500.00	6,078.88	5,650.00	5,629.32	53.46	20.73	-26.42	-228.58	-282.87	2,585.06	2,540.88	44.18	58.510		
9,600.00	6,077.10	5,650.00	5,629.32	54.83	20.73	-26.42	-228.58	-282.87	2,682.84	2,638.61	44.22	60.664		
9,700.00	6,075.32	5,650.00	5,629.32	56.22	20.73	-26.42	-228.58	-282.87	2,780.77	2,736.51	44.27	62.819		
9,800.00	6,073.55	5,650.00	5,629.32	57.61	20.73	-26.42	-228.58	-282.87	2,878.85	2,834.55	44.31	64.977		
9,900.00	6,071.77	5,650.00	5,629.32	59.01	20.73	-26.42	-228.58	-282.87	2,977.06	2,932.71	44.34	67.136		
10,000.00	6,070.00	5,650.00	5,629.32	60.41	20.73	-26.42	-228.58	-282.87	3,075.38	3,031.00	44.38	69.295		
10,100.00	6,068.22	5,650.00	5,629.32	61.82	20.73	-26.42	-228.58	-282.87	3,173.80	3,129.39	44.42	71.454		
10,200.00	6,066.44	5,630.53	5,610.73	63.24	20.66	-26.02	-231.68	-278.00	3,272.07	3,227.64	44.43	73.651		
10,300.00	6,064.67	5,626.73	5,607.08	64.66	20.65	-25.94	-232.24	-277.09	3,370.57	3,326.11	44.46	75.815		
10,400.00	6,062.89	5,623.10	5,603.60	66.09	20.63	-25.87	-232.76	-276.23	3,469.14	3,424.65	44.49	77.977		
10,500.00	6,061.11	5,600.00	5,581.29	67.52	20.55	-25.39	-235.75	-271.01	3,568.03	3,523.53	44.50	80.184		
10,600.00	6,059.34	5,600.00	5,581.29	68.95	20.55	-25.39	-235.75	-271.01	3,666.64	3,622.11	44.54	82.332		
10,700.00	6,057.56	5,600.00	5,581.29	70.39	20.55	-25.39	-235.75	-271.01	3,765.33	3,720.76	44.57	84.478		
10,800.00	6,055.78	5,600.00	5,581.29	71.83	20.55	-25.39	-235.75	-271.01	3,864.08	3,819.47	44.61	86.622		
10,900.00	6,054.01	5,600.00	5,581.29	73.28	20.55	-25.39	-235.75	-271.01	3,962.90	3,918.25	44.65	88.764		
11,000.00	6,052.23	5,600.00	5,581.29	74.73	20.55	-25.39	-235.75	-271.01	4,061.77	4,017.09	44.68	90.902		



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 3H - OH - Plan #3

Survey Program: 0-MWD+HDGM										Rule Assigned:				Offset Site Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)						
0.00	0.00	0.00	0.00	0.00	0.00	79.85	10.56	58.95	59.89					
100.00	100.00	100.00	100.00	0.36	0.36	79.85	10.56	58.95	59.89	59.17	0.72	83.532		
200.00	200.00	200.00	200.00	0.72	0.72	79.85	10.56	58.95	59.89	58.45	1.43	41.766		
300.00	300.00	300.00	300.00	1.08	1.08	79.85	10.56	58.95	59.89	57.74	2.15	27.844		
400.00	400.00	400.00	400.00	1.43	1.43	79.85	10.56	58.95	59.89	57.02	2.87	20.883		
500.00	500.00	500.00	500.00	1.79	1.79	79.85	10.56	58.95	59.89	56.30	3.58	16.706		
600.00	600.00	600.00	600.00	2.15	2.15	79.85	10.56	58.95	59.89	55.59	4.30	13.922		
700.00	700.00	700.00	700.00	2.51	2.51	79.85	10.56	58.95	59.89	54.87	5.02	11.933		
800.00	800.00	800.00	800.00	2.87	2.87	79.85	10.56	58.95	59.89	54.15	5.74	10.442		
900.00	900.00	900.00	900.00	3.23	3.23	79.85	10.56	58.95	59.89	53.44	6.45	9.281		
1,000.00	1,000.00	1,000.00	1,000.00	3.58	3.58	79.85	10.56	58.95	59.89	52.72	7.17	8.353		
1,100.00	1,100.00	1,100.00	1,100.00	3.94	3.94	79.85	10.56	58.95	59.89	52.00	7.89	7.594		
1,200.00	1,200.00	1,200.00	1,200.00	4.30	4.30	79.85	10.56	58.95	59.89	51.28	8.60	6.961		
1,300.00	1,300.00	1,300.00	1,300.00	4.66	4.66	79.85	10.56	58.95	59.89	50.57	9.32	6.426		
1,400.00	1,400.00	1,400.00	1,400.00	5.02	5.02	79.85	10.56	58.95	59.89	49.85	10.04	5.967		
1,500.00	1,500.00	1,500.00	1,500.00	5.38	5.38	79.85	10.56	58.95	59.89	49.13	10.75	5.569 CC, ES		
1,600.00	1,600.00	1,598.52	1,598.51	5.74	5.73	78.71	11.96	59.90	61.10	49.64	11.46	5.331 SF		
1,700.00	1,700.00	1,696.82	1,696.66	6.09	6.08	75.56	16.16	62.73	64.87	52.71	12.16	5.335		
1,800.00	1,800.00	1,794.65	1,794.13	6.45	6.43	71.09	23.10	67.43	71.52	58.67	12.84	5.569		
1,900.00	1,899.98	1,891.88	1,890.66	6.81	6.78	96.30	32.73	73.93	81.57	68.06	13.51	6.038		
2,000.00	1,999.84	1,988.40	1,986.04	7.17	7.13	94.17	44.97	82.20	95.03	80.87	14.16	6.710		
2,100.00	2,099.45	2,084.05	2,080.01	7.53	7.48	93.36	59.71	92.17	111.62	96.82	14.80	7.540		
2,200.00	2,198.70	2,178.66	2,172.33	7.88	7.84	93.40	76.85	103.75	131.24	115.80	15.44	8.501		
2,300.00	2,297.47	2,275.72	2,266.58	8.25	8.22	94.22	96.06	116.74	152.83	136.69	16.15	9.464		
2,400.00	2,395.62	2,373.08	2,361.11	8.62	8.62	95.88	115.36	129.78	174.85	157.97	16.89	10.354		
2,500.00	2,493.06	2,470.11	2,455.32	9.00	9.01	98.07	134.59	142.77	197.53	179.88	17.65	11.194		
2,601.45	2,591.03	2,568.07	2,550.44	9.40	9.42	100.64	154.01	155.90	221.49	203.06	18.44	12.014		
2,700.00	2,685.76	2,662.97	2,642.59	9.81	9.83	103.43	172.82	168.61	245.64	226.42	19.22	12.780		
2,800.00	2,781.87	2,759.27	2,736.09	10.23	10.24	105.76	191.91	181.51	270.60	250.57	20.03	13.512		
2,900.00	2,877.98	2,855.57	2,829.59	10.66	10.66	107.70	211.00	194.41	295.91	275.07	20.84	14.197		
3,000.00	2,974.09	2,951.86	2,923.09	11.10	11.08	109.33	230.09	207.31	321.50	299.83	21.67	14.838		
3,100.00	3,070.20	3,048.16	3,016.59	11.55	11.51	110.72	249.17	220.21	347.29	324.79	22.50	15.435		
3,200.00	3,166.32	3,144.45	3,110.09	12.01	11.93	111.92	268.26	233.11	373.25	349.91	23.34	15.992		
3,300.00	3,262.43	3,240.75	3,203.59	12.47	12.37	112.96	287.35	246.01	399.34	375.15	24.19	16.511		
3,400.00	3,358.54	3,337.05	3,297.08	12.94	12.80	113.88	306.44	258.91	425.54	400.50	25.04	16.996		
3,500.00	3,454.65	3,433.34	3,390.58	13.41	13.24	114.69	325.53	271.81	451.83	425.93	25.89	17.449		
3,600.00	3,550.77	3,529.64	3,484.08	13.89	13.68	115.41	344.61	284.71	478.19	451.44	26.76	17.873		
3,700.00	3,646.88	3,625.93	3,577.58	14.37	14.12	116.06	363.70	297.60	504.62	477.00	27.62	18.270		
3,800.00	3,742.99	3,722.23	3,671.08	14.86	14.56	116.64	382.79	310.50	531.11	502.62	28.49	18.642		
3,900.00	3,839.10	3,818.53	3,764.58	15.34	15.01	117.17	401.88	323.40	557.63	528.27	29.36	18.991		
4,000.00	3,935.21	3,914.82	3,858.08	15.84	15.45	117.64	420.96	336.30	584.20	553.96	30.24	19.319		
4,100.00	4,031.33	4,011.12	3,951.58	16.33	15.90	118.08	440.05	349.20	610.81	579.69	31.12	19.628		
4,200.00	4,127.44	4,107.41	4,045.08	16.83	16.35	118.48	459.14	362.10	637.44	605.44	32.00	19.920		
4,300.00	4,223.55	4,203.71	4,138.58	17.33	16.80	118.85	478.23	375.00	664.10	631.22	32.89	20.195		
4,400.00	4,319.66	4,300.00	4,232.08	17.83	17.25	119.19	497.31	387.90	690.79	657.01	33.77	20.454		
4,500.00	4,415.78	4,396.30	4,325.58	18.33	17.70	119.51	516.40	400.80	717.49	682.83	34.66	20.700		
4,600.00	4,511.89	4,492.60	4,419.08	18.84	18.15	119.80	535.49	413.70	744.22	708.66	35.55	20.933		
4,700.00	4,608.00	4,588.89	4,512.58	19.34	18.60	120.07	554.58	426.60	770.96	734.51	36.45	21.154		
4,800.00	4,704.11	4,685.19	4,606.08	19.85	19.06	120.33	573.66	439.50	797.71	760.37	37.34	21.364		
4,900.00	4,800.22	4,781.48	4,699.58	20.36	19.51	120.56	592.75	452.40	824.48	786.25	38.24	21.563		
5,000.00	4,896.34	4,877.78	4,793.08	20.87	19.97	120.79	611.84	465.30	851.26	812.13	39.13	21.753		
5,100.00	4,992.45	4,974.08	4,886.58	21.38	20.42	120.99	630.93	478.20	878.06	838.02	40.03	21.933		



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385 00usft
MD Reference: GL 7385' @ 7385 00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 3H - OH - Plan #3

Offset Site Error: 0.00 usft

Offset Well Error: 0.00 usft

Survey Program:		0-MWD+HDGM		Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned:		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Reference (usft)	Offset (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,200.00	5,088.56	5,070.37	4,980.08	21.90	20.88	121.19	650.02	491.10	904.86	863.93	40.93	22.105					
5,300.00	5,184.67	5,166.67	5,073.58	22.41	21.34	121.38	669.10	504.00	931.67	889.84	41.84	22.270					
5,364.58	5,246.74	5,228.86	5,133.96	22.74	21.63	121.49	681.43	512.33	948.99	906.57	42.42	22.372					
5,400.00	5,280.98	5,262.98	5,167.09	22.92	21.80	127.96	688.19	516.90	958.45	915.72	42.73	22.429					
5,450.00	5,329.87	5,311.12	5,213.83	23.15	22.03	141.14	697.74	523.35	971.65	928.50	43.16	22.514					
5,500.00	5,379.20	5,358.99	5,260.31	23.35	22.25	162.08	707.22	529.76	984.64	941.08	43.56	22.605					
5,550.00	5,428.72	5,406.36	5,306.31	23.53	22.48	-169.26	716.62	536.10	997.42	953.49	43.93	22.704					
5,600.00	5,478.20	5,443.29	5,342.31	23.67	22.65	-142.87	723.06	541.19	1,010.23	966.06	44.17	22.869					
5,650.00	5,527.39	5,480.11	5,378.44	23.80	22.81	-125.48	727.63	546.56	1,023.31	978.93	44.38	23.056					
5,700.00	5,576.06	5,517.12	5,414.91	23.90	22.96	-114.83	730.35	552.24	1,036.63	992.06	44.57	23.259					
5,750.00	5,623.96	5,550.00	5,447.35	23.99	23.08	-107.89	731.17	557.50	1,050.14	1,005.45	44.69	23.497					
5,800.00	5,670.87	5,591.90	5,488.64	24.06	23.23	-103.24	730.05	564.50	1,063.78	1,018.91	44.87	23.706					
5,850.00	5,716.55	5,629.78	5,525.81	24.11	23.34	-99.80	726.96	571.08	1,077.54	1,032.55	45.00	23.946					
5,900.00	5,760.78	5,668.06	5,563.12	24.15	23.45	-97.18	721.82	577.97	1,091.37	1,046.26	45.11	24.192					
5,950.00	5,803.36	5,706.83	5,600.51	24.18	23.54	-95.12	714.58	585.15	1,105.22	1,060.01	45.22	24.442					
6,000.00	5,844.06	5,746.15	5,637.94	24.19	23.63	-93.45	705.16	592.64	1,119.06	1,073.74	45.32	24.693					
6,050.00	5,882.69	5,786.12	5,675.36	24.20	23.70	-92.09	693.48	600.43	1,132.84	1,087.43	45.41	24.945					
6,100.00	5,919.06	5,826.82	5,712.68	24.19	23.77	-90.97	679.43	608.54	1,146.52	1,101.01	45.51	25.193					
6,150.00	5,953.00	5,868.37	5,749.85	24.18	23.82	-90.05	662.90	616.95	1,160.06	1,114.45	45.61	25.436					
6,200.00	5,984.34	5,910.87	5,786.77	24.17	23.87	-89.29	643.75	625.68	1,173.40	1,127.69	45.71	25.672					
6,250.00	6,012.93	5,954.46	5,823.34	24.15	23.90	-88.67	621.85	634.73	1,186.51	1,140.69	45.82	25.898					
6,300.00	6,038.63	5,999.27	5,859.43	24.13	23.93	-88.19	597.01	644.09	1,199.33	1,153.40	45.93	26.112					
6,350.00	6,061.31	6,045.45	5,894.88	24.12	23.94	-87.82	569.05	653.78	1,211.82	1,165.77	46.05	26.314					
6,400.00	6,080.86	6,093.18	5,929.50	24.10	23.95	-87.58	537.77	663.78	1,223.91	1,177.73	46.19	26.499					
6,450.00	6,097.19	6,142.63	5,963.05	24.10	23.94	-87.44	502.94	674.08	1,235.56	1,189.23	46.34	26.666					
6,500.00	6,110.22	6,194.01	5,995.22	24.11	23.92	-87.41	464.32	684.68	1,246.70	1,200.20	46.50	26.812					
6,550.00	6,119.89	6,247.51	6,025.65	24.13	23.89	-87.49	421.69	695.53	1,257.26	1,210.58	46.68	26.934					
6,600.00	6,126.14	6,303.37	6,053.90	24.17	23.85	-87.67	374.81	706.60	1,267.17	1,220.28	46.88	27.029					
6,650.00	6,128.95	6,361.78	6,079.40	24.23	23.80	-87.96	323.48	717.82	1,276.35	1,229.24	47.11	27.092					
6,678.46	6,129.00	6,396.27	6,092.44	24.27	23.76	-88.17	292.22	724.24	1,281.22	1,233.96	47.26	27.112					
6,700.00	6,128.62	6,423.13	6,101.55	24.31	23.73	-88.61	267.43	729.13	1,284.77	1,237.39	47.38	27.117					
6,800.00	6,126.84	6,557.40	6,132.76	24.59	23.56	-90.12	139.02	751.79	1,300.05	1,251.98	48.07	27.043					
6,900.00	6,125.06	6,692.84	6,139.66	25.00	24.13	-90.53	5.33	771.15	1,312.44	1,263.47	48.97	26.801					
7,000.00	6,123.29	6,792.21	6,137.81	25.51	24.71	-90.52	-93.15	784.26	1,323.70	1,273.76	49.94	26.506					
7,100.00	6,121.51	6,891.57	6,135.97	26.13	25.36	-90.51	-191.63	797.37	1,334.96	1,283.87	51.09	26.132					
7,200.00	6,119.74	6,990.93	6,134.12	26.82	26.09	-90.50	-290.11	810.48	1,346.22	1,293.82	52.40	25.692					
7,300.00	6,117.96	7,090.30	6,132.28	27.58	26.88	-90.49	-388.58	823.59	1,357.48	1,303.61	53.86	25.202					
7,400.00	6,116.18	7,189.66	6,130.43	28.41	27.74	-90.49	-487.06	836.70	1,368.74	1,313.27	55.47	24.675					
7,500.00	6,114.41	7,289.03	6,128.59	29.30	28.67	-90.48	-585.54	849.81	1,380.00	1,322.79	57.21	24.123					
7,600.00	6,112.63	7,388.39	6,126.74	30.23	29.64	-90.47	-684.02	862.92	1,391.25	1,332.19	59.06	23.557					
7,700.00	6,110.85	7,487.75	6,124.90	31.22	30.67	-90.46	-782.50	876.03	1,402.51	1,341.49	61.02	22.984					
7,800.00	6,109.08	7,587.12	6,123.05	32.24	31.75	-90.45	-880.97	889.14	1,413.77	1,350.69	63.08	22.412					
7,900.00	6,107.30	7,686.48	6,121.21	33.30	32.87	-90.45	-979.45	902.25	1,425.03	1,359.81	65.23	21.848					
8,000.00	6,105.52	7,785.85	6,119.36	34.40	34.03	-90.44	-1,077.93	915.36	1,436.29	1,368.84	67.45	21.294					
8,100.00	6,103.75	7,885.21	6,117.52	35.53	35.23	-90.43	-1,176.41	928.47	1,447.55	1,377.80	69.75	20.754					
8,200.00	6,101.97	7,984.57	6,115.67	36.69	36.46	-90.43	-1,274.89	941.58	1,458.81	1,386.70	72.11	20.230					
8,300.00	6,100.19	8,083.94	6,113.83	37.87	37.72	-90.42	-1,373.36	954.69	1,470.07	1,395.53	74.53	19.724					
8,400.00	6,098.42	8,183.30	6,111.98	39.08	39.00	-90.41	-1,471.84	967.80	1,481.33	1,404.32	77.01	19.236					
8,500.00	6,096.64	8,282.67	6,110.14	40.31	40.31	-90.41	-1,570.32	980.91	1,492.59	1,413.06	79.53	18.767					
8,600.00	6,094.87	8,382.03	6,108.29	41.56	41.64	-90.40	-1,668.80	994.01	1,503.85	1,421.75	82.10	18.318					
8,700.00	6,093.09	8,481.39	6,106.45	42.82	42.99	-90.39	-1,767.28	1,007.12	1,515.11	1,430.40	84.70	17.887					
8,800.00	6,091.31	8,580.76	6,104.60	44.11	44.37	-90.39	-1,865.76	1,020.23	1,526.37	1,439.02	87.35	17.475					



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Offset Design: Nautilus 2407-28M - Nautilus 2407-28M 3H - OH - Plan #3

Survey Program:		0-MWD+HDGM								Rule Assigned:		Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (")	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
8,900.00	6,089.54	8,680.12	6,102.76	45.41	45.75	-90.38	-1,964.23	1,033.34	1,537.62	1,447.60	90.02	17.080			
9,000.00	6,087.76	8,779.49	6,100.92	46.72	47.15	-90.37	-2,062.71	1,046.45	1,548.88	1,456.15	92.73	16.703			
9,100.00	6,085.98	8,878.85	6,099.07	48.04	48.57	-90.37	-2,161.19	1,059.56	1,560.14	1,464.68	95.46	16.343			
9,200.00	6,084.21	8,978.21	6,097.23	49.38	50.00	-90.36	-2,259.67	1,072.67	1,571.40	1,473.18	98.22	15.999			
9,300.00	6,082.43	9,077.58	6,095.38	50.73	51.44	-90.36	-2,358.15	1,085.78	1,582.66	1,481.66	101.00	15.669			
9,400.00	6,080.65	9,176.94	6,093.54	52.09	52.89	-90.35	-2,456.62	1,098.89	1,593.92	1,490.11	103.81	15.355			
9,500.00	6,078.88	9,276.31	6,091.69	53.46	54.36	-90.35	-2,555.10	1,112.00	1,605.18	1,498.55	106.63	15.054			
9,600.00	6,077.10	9,375.67	6,089.85	54.83	55.83	-90.34	-2,653.58	1,125.11	1,616.44	1,506.97	109.47	14.766			
9,700.00	6,075.32	9,475.03	6,088.00	56.22	57.31	-90.33	-2,752.06	1,138.22	1,627.70	1,515.37	112.33	14.490			
9,800.00	6,073.55	9,574.40	6,086.16	57.61	58.80	-90.33	-2,850.54	1,151.33	1,638.96	1,523.76	115.20	14.227			
9,900.00	6,071.77	9,673.76	6,084.31	59.01	60.29	-90.32	-2,949.01	1,164.44	1,650.22	1,532.13	118.09	13.974			
10,000.00	6,070.00	9,773.13	6,082.47	60.41	61.79	-90.32	-3,047.49	1,177.55	1,661.48	1,540.49	120.99	13.732			
10,100.00	6,068.22	9,872.49	6,080.62	61.82	63.30	-90.31	-3,145.97	1,190.66	1,672.74	1,548.83	123.91	13.500			
10,200.00	6,066.44	9,971.85	6,078.78	63.24	64.82	-90.31	-3,244.45	1,203.77	1,684.00	1,557.17	126.83	13.277			
10,300.00	6,064.67	10,071.22	6,076.93	64.66	66.34	-90.30	-3,342.93	1,216.88	1,695.26	1,565.49	129.77	13.064			
10,400.00	6,062.89	10,170.58	6,075.09	66.09	67.86	-90.30	-3,441.40	1,229.99	1,706.52	1,573.80	132.71	12.859			
10,500.00	6,061.11	10,269.95	6,073.24	67.52	69.39	-90.29	-3,539.88	1,243.10	1,717.78	1,582.11	135.67	12.661			
10,600.00	6,059.34	10,369.31	6,071.40	68.95	70.93	-90.29	-3,638.36	1,256.21	1,729.04	1,590.40	138.64	12.472			
10,700.00	6,057.56	10,468.67	6,069.55	70.39	72.47	-90.28	-3,736.84	1,269.32	1,740.30	1,598.69	141.61	12.290			
10,800.00	6,055.78	10,568.04	6,067.71	71.83	74.01	-90.28	-3,835.32	1,282.43	1,751.56	1,606.97	144.59	12.114			
10,900.00	6,054.01	10,667.40	6,065.86	73.28	75.56	-90.27	-3,933.79	1,295.54	1,762.81	1,615.24	147.58	11.945			
11,000.00	6,052.23	10,766.77	6,064.02	74.73	77.11	-90.27	-4,032.27	1,308.65	1,774.07	1,623.50	150.57	11.782			
11,100.00	6,050.45	10,866.13	6,062.17	76.18	78.66	-90.26	-4,130.75	1,321.76	1,785.33	1,631.76	153.57	11.625			
11,200.00	6,048.68	10,965.49	6,060.33	77.64	80.22	-90.26	-4,229.23	1,334.87	1,796.59	1,640.01	156.58	11.474			
11,300.00	6,046.90	11,064.86	6,058.48	79.10	81.78	-90.25	-4,327.71	1,347.98	1,807.85	1,648.26	159.59	11.328			
11,400.00	6,045.13	11,164.22	6,056.64	80.56	83.34	-90.25	-4,426.19	1,361.09	1,819.11	1,656.50	162.61	11.187			
11,500.00	6,043.35	11,263.59	6,054.79	82.03	84.91	-90.25	-4,524.66	1,374.20	1,830.37	1,664.74	165.63	11.051			
11,600.00	6,041.57	11,362.95	6,052.95	83.49	86.47	-90.24	-4,623.14	1,387.31	1,841.63	1,672.97	168.66	10.919			
11,700.00	6,039.80	11,462.31	6,051.10	84.96	88.04	-90.24	-4,721.62	1,400.42	1,852.89	1,681.20	171.70	10.792			
11,800.00	6,038.02	11,561.68	6,049.26	86.43	89.62	-90.23	-4,820.10	1,413.53	1,864.15	1,689.42	174.73	10.669			
11,900.00	6,036.24	11,661.04	6,047.41	87.91	91.19	-90.23	-4,918.58	1,426.64	1,875.41	1,697.64	177.77	10.549			
11,969.97	6,035.00	11,730.56	6,046.12	88.94	92.29	-90.23	-4,987.48	1,435.81	1,883.29	1,703.39	179.90	10.468			

Offset Site Error: 0.00 usft

Offset Well Error: 0.00 usft



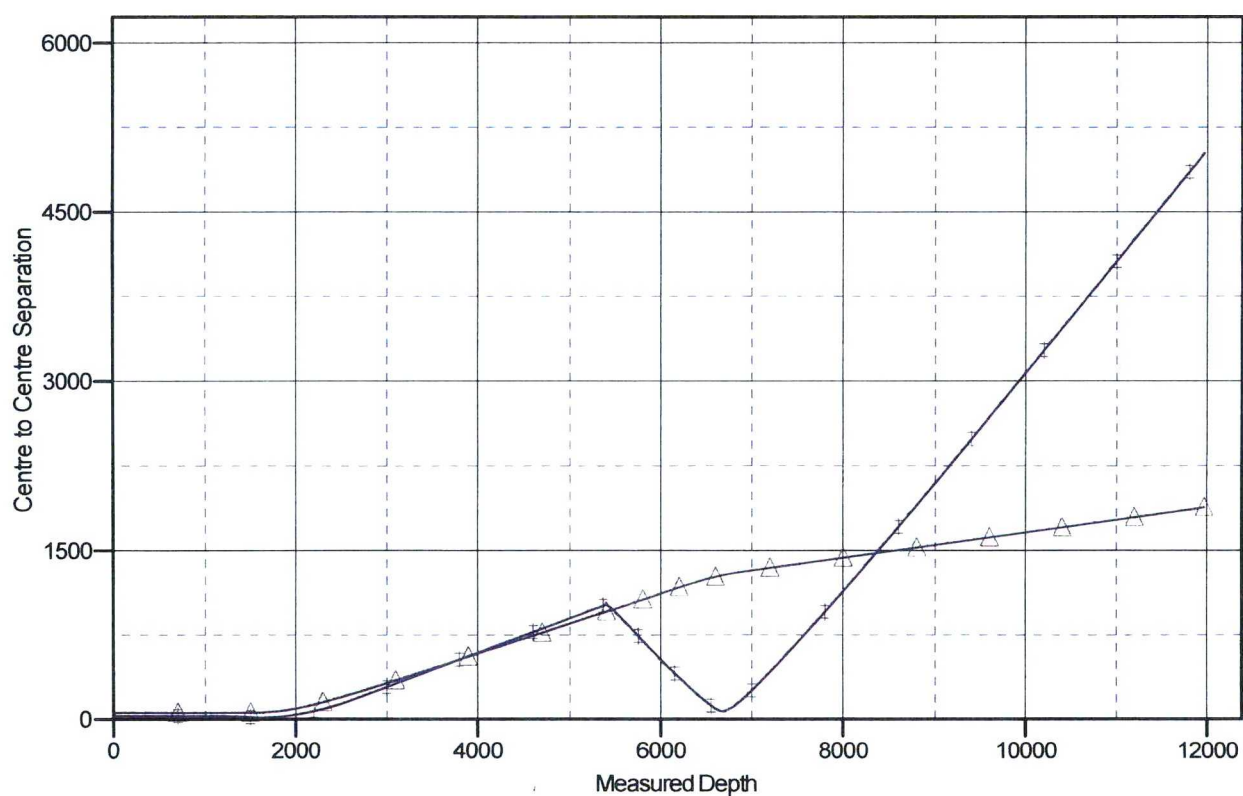
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Reference Depths are relative to GL 7385' @ 7385.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Nautilus 2407-28M 1H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.15°

Ladder Plot



LEGEND

Nautilus2407-28M3H, CH (Plan #3) VO Nautilus2407-28M2H, CH (Plan #3) VO



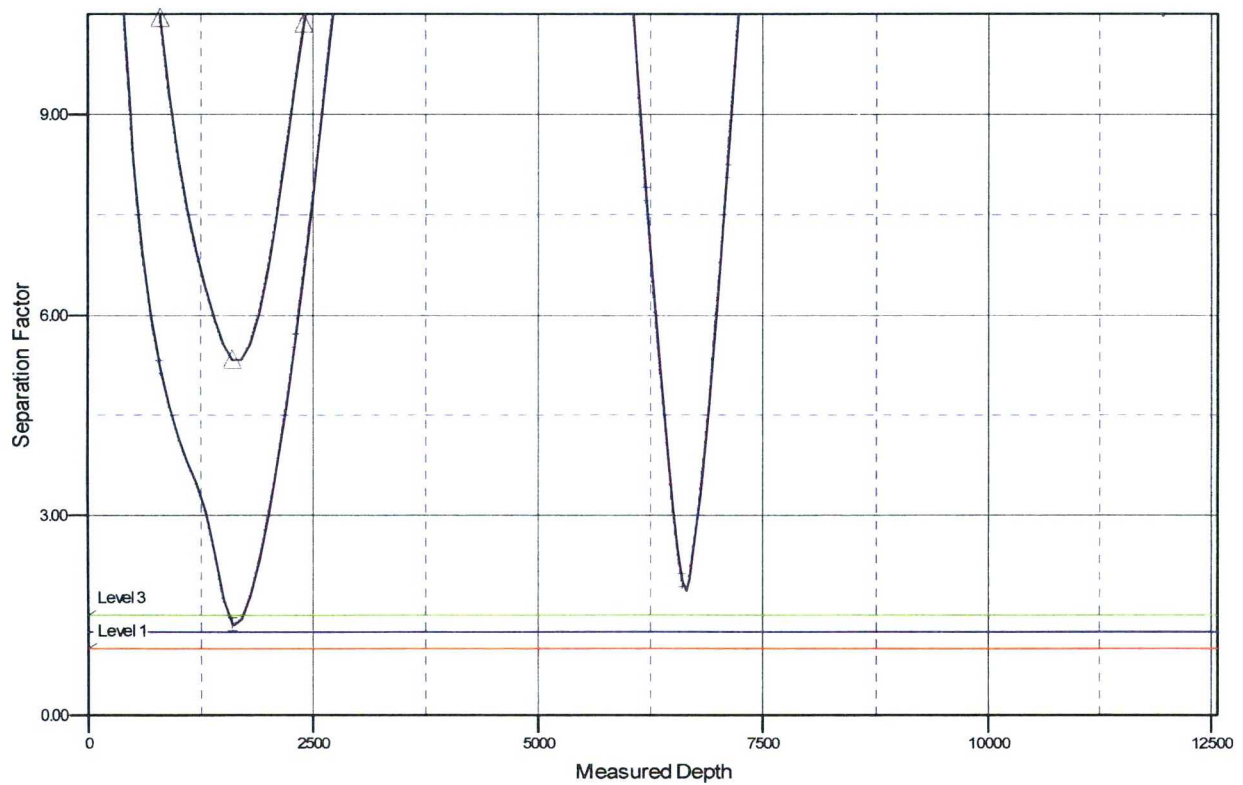
Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Reference Site: Nautilus 2407-28M
Site Error: 0.00 usft
Reference Well: Nautilus 2407-28M 1H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #3

Local Co-ordinate Reference: Well Nautilus 2407-28M 1H
TVD Reference: GL 7385' @ 7385.00usft
MD Reference: GL 7385' @ 7385.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database:
Offset TVD Reference: Offset Datum

Reference Depths are relative to GL 7385' @ 7385.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Nautilus 2407-28M 1H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.15°

Separation Factor Plot



LEGEND

Nautilus2407-28M3H.CH/Plan #3 V0 Nautilus2407-28M2H.CH/Plan #3 V0

Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

