State of New Mexico
Energy, Minerals and Natural Resources Department

New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 2/6/2020
Operator: LOGOS **Well Name and Number:** Apollo 2407 29E 2H
API#:30-039-31396, **Section:** 29, **Township:** 24N, **Range:** 7 W

Conditions of Approval: (See the below checked and handwritten conditions)

X Notify appropriate OCD district office 24hrs prior to casing & cement.

X If cement doesn't circulate on any casing string or stage tool a CBL will be required. Contact the regulatory agencies prior to proceeding.

☒ Hold C-104 for directional survey & "As Drilled" Plat

☐ Hold C-104 for: ☐ NSL, ☐ NSP, ☐ DHC, ☐ 5.9 Compliance

☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned

X Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:

- A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
- A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
- A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C

X Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the freshwater zone or zones and shall immediately set in cement the water protection string

X Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84

X Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.

X Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

	10/29/2020
NMOCD Approved by Signature	Date

Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM117567

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

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

8. Lease Name and Well No.
APOLLO 2407 29E
2H

2. Name of Operator
LOGOS OPERATING LLC

9. API Well No.
30-039-31396

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
2010 Afton Place, FARMINGTON, NM 87401	(505) 324-4145	ESCRITO/ESCRITO-GALLUP ASSOCIAT

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface SWNW / 2162 FNL / 64 FWL / LAT 36.286183 / LONG -107.606483
At proposed prod. zone NWNW / 283 FNL / 206 FWL / LAT 36.305804 / LONG -107.624221

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 29/T24N/R7W/NMP

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
47 miles	RIO ARRIBA	NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
64 feet	1722.45	402.0

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
20 feet	6127 feet / 13950 feet	FED: NMB001387

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
7300 feet	02/07/2020	30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	MARIE FLOREZ / Ph: (505) 324-4145	02/06/2020

Title
Regulatory Specialist

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Dave Mankiewicz / Ph: (505) 564-7761	09/16/2020

Title	Office
AFM-Minerals	Farmington Field Office

Application approval 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.
Conditions of approval, if any, are attached.

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.

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

AV

Approval Date: 09/16/2020

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

District II
811 S. First Street, Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

District IV
1220 S. St. Francis Drive, 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 Drive
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	2 Pool Code	3 Pool Name
30-039-31396	22619	ESCRITO GALLUP (ASSOCIATED)

4 Property Code	5 Property Name	6 Well Number
328118	APOLLO 2407 29E	2H
7 OGRID No.	**8 Operator Name**	**9 Elevation**
289408	LOGOS OPERATING, LLC	7300'

10 Surface Location

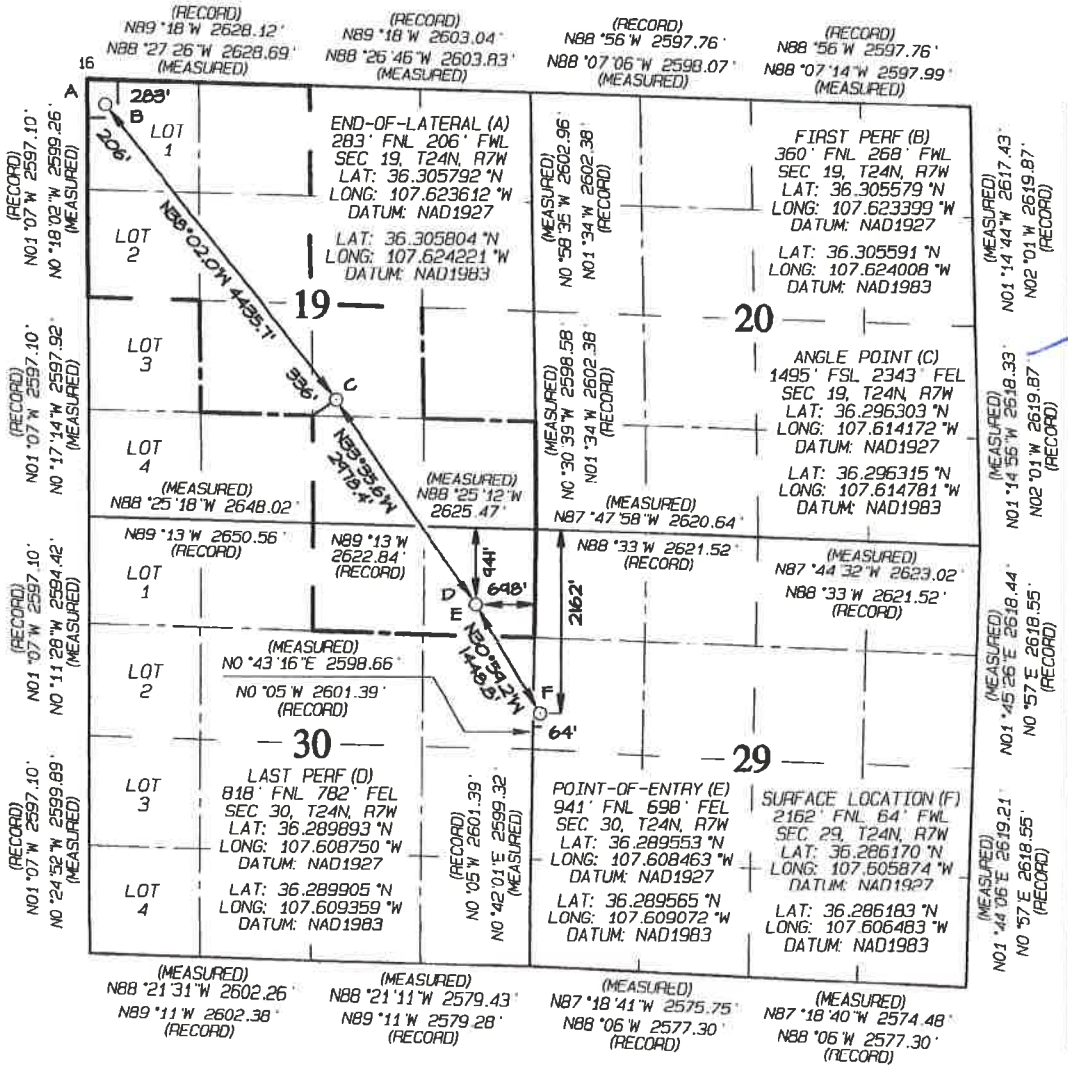
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	29	24N	7W		2162	NORTH	64	WEST	RIO ARRIBA

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
D	19	24N	7W	1	283	NORTH	206	WEST	RIO ARRIBA

12 Dedicated Acres		13 Joint or Infill	14 Consolidation Code	15 Order No.
401.56	N/2 NE/4 - Section 30 W/2 NW/4 (LOTS 1 & 2) E/2 NW/4, NE/4 SW/4, W/2 SE/4 SE/4 SE/4 - Section 19			

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



17 OPERATOR CERTIFICATION

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

Tamra Sessions — 2/4/20
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.

Date Revised: FEBRUARY 3, 2020
Survey Date: OCTOBER 31, 2018

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

LOGOS Operating, LLC
Operations Plan

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

Date:	February 3, 2020	Pool:	Escrito Gallup
Well Name:	**Apollo 2407 29E 2H**	Elevation:	7,300'
Surface Location:	Sec 29, T24N, R7W 2162 FNL, 64 FWL (36.286183° N, 107.606483° W – NAD83)	Measured Depth:	13,950'
Bottom Hole Location:	Sec 19, T24N, R7W 283 FNL, 206 FWL (36.305804° N, 107.624221° W – NAD83)	County:	Rio Arriba

Lease Serial # NMNM-117567

I. GEOLOGY

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

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

SURFACE FORMATION - NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	1753	1752	MENEFEE	4086	4043
KIRTLAND	1904	1901	*POINT LOOKOUT	4834	4777
*FRUITLAND	2119	2112	*MANCOS	5082	5020
*PICTURED CLIFFS	2456	2443	GALLUP	5913	5805
CHACRA	3342	3312	KICKOFF POINT	5,555	5,484
*CLIFF HOUSE	4022	3980	LANDING POINT	6,537	6,064
			TD	13,950	6,127

* 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 ¾" 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.

Above ground steel pits will be used for fluid and cuttings while drilling. In the unlikely event that a tank develops a leak, upon immediate visual discovery, the fluid would be transferred to another tank and contaminated

soil would be removed and disposed. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times.

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 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	WEIGHT	GRADE	CONN
SURFACE	12.25"	320'	9.625"	36 LBS	J-55 or equiv	STC or LTC
INTERMEDIATE	8.75"	6,537'	7"	23 LBS	J-55 or equiv	LTC
PRODUCTION	6.125"	6,437' – 13,950'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC
TIE BACK	6.125"	Surf. – 6,437'	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. Optional use of DV Tool will be considered if losses while drilling are encountered. See note below.
3. PRODUCTION LINER: Run 4-1/2" Liner with cement nose guide Float Shoe+ 1 jnt 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.

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: If deemed necessary, the intermediate casing will be cemented in 1 or 2 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. If losses are not observed a cancelation plug will be pumped and the remaining cement will be pumped during stage 1.

   Stage 1: Spacer #1: 20 bbl (112 cuft) Chemwash. Lead Cement: 248 bbls, 713 sks (1391 cu.ft.), 12.3 ppg@ 1.95 cuft/sk yield. Tail Cement: 46 bbls, 200 sks, (260 cuft), 13.5 ppg@ 1.3 cu'ft/sk yield. Displacement: Displace with drilling mud or water. Total Cement: 294 bbls, 914 sks, (1651 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 Ill. Spacer #3: 10 bbl Water Spacer. Lead Cement: Extencem TM System. Yield 1.36 cuft/sk 13.3 ppg (699 sx / 950 cuft /169 bbls). Tail Spacer: 40 BBL of MMCR. Displacement: Displace with drilling mud or water.

IV. COMPLETION

A. CBL

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

B. PRESSURE TEST

With frac stack installed on wellhead, 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.

Surface Casing Design - Evacuated/Max SICP (collaspe & burst), 100k overpull (tension)

Apollo 2407 29E 2H

	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Surface	9.625	36	J55	STC	2,020	3,520	394,000	0' - 320'
					1.125	1.000	1.200	

341 psi (Maximum Estimated SIP)

36 ppf K55 STC

Collapse	**Casing Depth**	**MW in**	**MW out**	**Pres in**	**Pres out**	**SF**
	320	0	9	0	146	13.79
Burst	**320**	9	0	146	0	24.04

		Mud Wt	**Air Wt**	**Bouy Wt**	**BW +100k**	**SF**	100k over pull
Tension	**320**	9	11,520	9,937	109,937	3.58	
		BF					BF= 1- (MW)/65.5
		0.8626					

Liner Casing Design - Evacuation/Max Mud Wt (collaspe), Max Frac Pres (burst) & 100k overpull (tension)

Apollo 2407 29E 2H

Liner	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Interval 1	4.5	11.6	P-110	LTC	7,560	10,690	278,000	TD 13950', TVD 6127'
					1.125	1.000	1.200	

Collapse	Casing Depth (TVD)	MW in	MW out	Pres in	Pres out	SF
	6127	0.00	9.00	0	2867	2.64

Burst								
	6127	9.00	0.00	2867	0	1.14	6500	6500 psi frac pressure + no backup
				9367				Burst pressure = Hyd + frac pressure

Tension		Mud Wt	Air Wt	Bouy Wt	BW +100k		
	6127	8.80	71,073	61,524	161,524	1.72	100k over pull
		BF					BF= 1- (MW)/65.5
		0.8656					

Intermediate Casing Design - Evacuated/Max Mud Wt (collaspe & burst), 100k overpull (tension)

Apollo 2407 29E 2H

Intermediate	Top Interval	Btm Interval	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Interval 1	0	6537	7	23	J55	LTC	3,270	4,360	313,000	0'-6537'
							1.125	1.000	1.200	

Collapse

			Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.125
Interval 1	0	6537	6064	0	9	0	2838	1.15
23	J55							

Burst

			Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.0	Frac Pres
Interval 1	0	6537	6064	9	0	2838	0	1.54	0
23	J55					2838			

Tension

			Depth TVD	Mud Wt	Air Wt	Bouy Wt	BW +100k	SF - 1.2
Interval 1	0	6537	6064	9	139,472	120,308	220,308	1.42
23	J55			BF				
				0.8626				

BF= 1- (MW)/65.5

LOGOS RESOURCES II, LLC

Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Apollo 2407-29E
Well: Apollo 2407-29E 2H
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

Scientific Drilling

Azimuths to True North
Magnetic North: 8.62°

Magnetic Field
Strength: 49371.5nT
Dip Angle: 62.83°
Date: 4/30/2020
Model: HDGM_FILE

WELL DETAILS: Apollo 2407-29E 2H

GL 7300' @ 7300.00usft

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	1923548.32	2789947.91	36.2861830	-107.6064830	C

Plan: Plan #3 (Apollo 2407-29E 2H/OH)

Created By: Janie Collins Date: 11:27, January 30 2020

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Apollo 2H POE	6064.00	1231.15	-762.99	1924777.68	2789182.04	36.2895650	-107.6090720
Apollo 2H AP_C	6088.00	3688.43	-2445.24	1927231.01	2787494.04	36.2963150	-107.6147810
Apollo 2H BHL	6127.00	7143.06	-5226.37	1930679.11	2784704.82	36.3058040	-107.6242210
Apollo 2H FPerf	6126.00	7065.51	-5163.63	1930601.71	2784767.74	36.3055910	-107.6240080
Apollo 2H LPerf	6065.00	1354.92	-847.56	1924901.25	2789097.18	36.2899050	-107.6093590

SECTION DETAILS

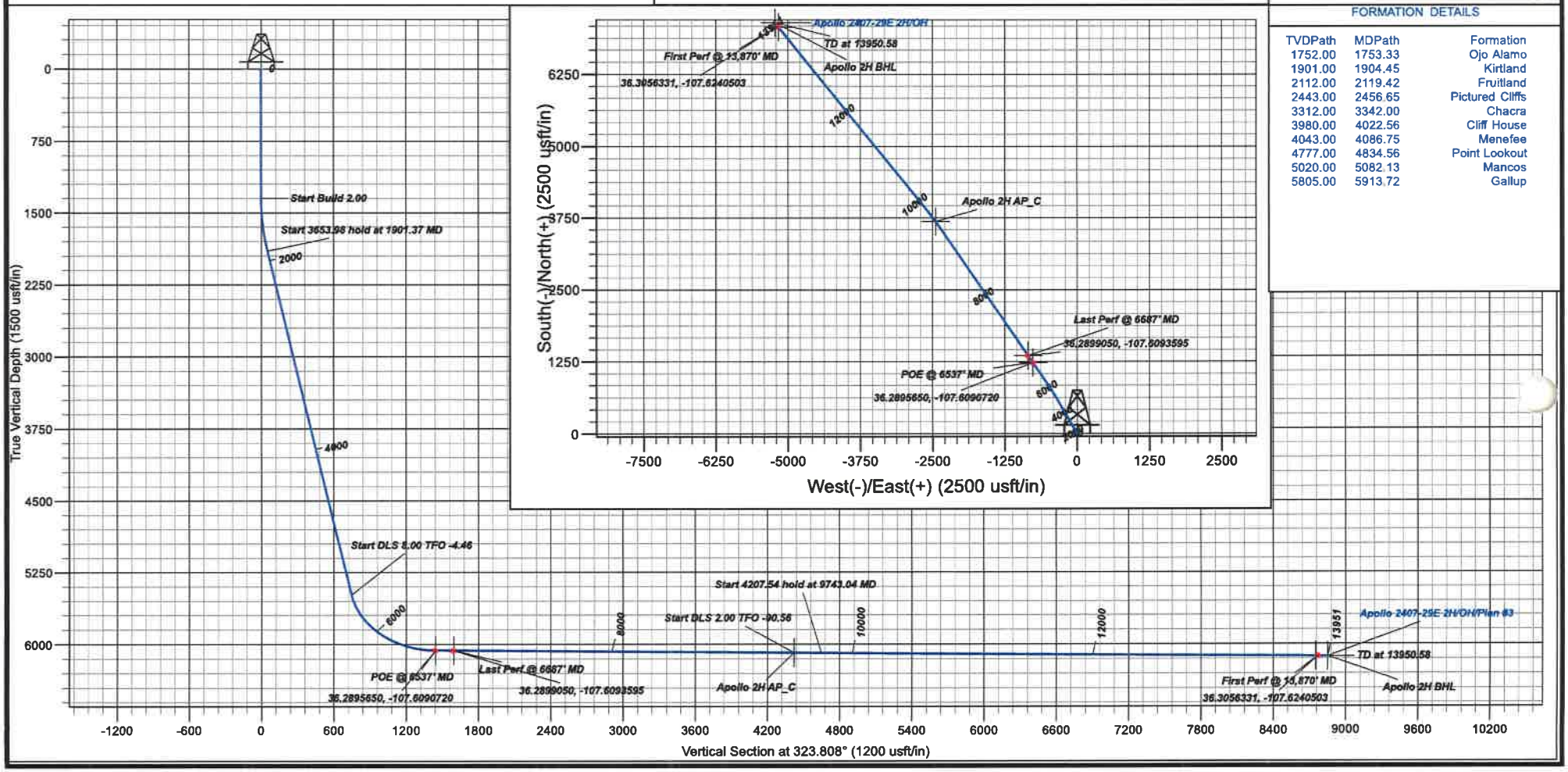
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
1350.00	0.00	0.000	1350.00	0.00	0.00	0.00	0.00	0.00	
1901.37	11.03	329.979	1897.97	45.80	-26.46	2.00	329.98	52.59	
5555.35	11.03	329.979	5484.48	650.96	-376.14	0.00	0.00	747.46	
6537.14	89.54	325.604	6064.00	1231.15	-762.99	8.00	-4.46	1444.13	Apollo 2H POE
9515.19	89.54	325.604	6088.00	3688.43	-2445.24	0.00	0.00	4420.62	Apollo 2H AP_C
9743.04	89.50	321.047	6089.92	3871.12	-2581.29	2.00	-90.56	4648.40	
13950.58	89.50	321.047	6127.00	7143.06	-5226.37	0.00	0.00	8850.89	Apollo 2H BHL

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
1752.00	1753.33	Ojo Alamo
1901.00	1904.45	Kirtland
2112.00	2119.42	Fruitland
2443.00	2456.65	Pictured Cliffs
3312.00	3342.00	Chacra
3980.00	4022.56	Cliff House
4043.00	4086.75	Menefee
4777.00	4834.56	Point Lookout
5020.00	5082.13	Mancos
5805.00	5913.72	Gallup



LOGOS RESOURCES II, LLC

Logos Operating LLC

Rio Arriba, NM NAD83
Apollo 2407-29E
Apollo 2407-29E 2H - Slot C

OH

Plan: Plan #3

Standard Planning Report

30 January, 2020

Scientific Drilling

www.scientificdrilling.com

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Company:	Logos Operating LLC	**TVD Reference:**	GL 7300' @ 7300.00usft
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7300' @ 7300.00usft
Site:	Apollo 2407-29E	**North Reference:**	True
Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

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	Apollo 2407-29E				
Site Position:		**Northing:**	1,923,521.45 usft	**Latitude:**	36.2861090
From:	Lat/Long	**Easting:**	2,789,977.45 usft	**Longitude:**	-107.6063830
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	0.13 °

Well	Apollo 2407-29E 2H - Slot C					
Well Position	**+N/-S**	26.94 usft	**Northing:**	1,923,548.32 usft	**Latitude:**	36.2861830
	+E/-W	-29.47 usft	**Easting:**	2,789,947.92 usft	**Longitude:**	-107.6064830
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	7,300.00 usft

Wellbore	OH			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM_FILE	4/30/2020	8.62	62.83	49,371.50000000

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	323.808	

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	
1,350.00	0.00	0.000	1,350.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,901.37	11.03	329.979	1,897.97	45.80	-26.46	2.00	2.00	0.00	329.98	
5,555.35	11.03	329.979	5,484.48	650.96	-376.14	0.00	0.00	0.00	0.00	
6,537.14	89.54	325.604	6,064.00	1,231.15	-762.99	8.00	8.00	-0.45	-4.46	Apollo 2H POE
9,515.19	89.54	325.604	6,088.00	3,688.43	-2,445.24	0.00	0.00	0.00	0.00	Apollo 2H AP_C
9,743.04	89.50	321.047	6,089.92	3,871.12	-2,581.29	2.00	-0.02	-2.00	-90.56	
13,950.58	89.50	321.047	6,127.00	7,143.06	-5,226.37	0.00	0.00	0.00	0.00	Apollo 2H BHL

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Company:	Logos Operating LLC	**TVD Reference:**	GL 7300' @ 7300.00usft
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7300' @ 7300.00usft
Site:	Apollo 2407-29E	**North Reference:**	True
Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
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 (°/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
1,350.00	0.00	0.000	1,350.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	1.00	329.979	1,400.00	0.38	-0.22	0.43	2.00	2.00	0.00
1,500.00	3.00	329.979	1,499.93	3.40	-1.96	3.90	2.00	2.00	0.00
1,600.00	5.00	329.979	1,599.68	9.44	-5.45	10.84	2.00	2.00	0.00
1,700.00	7.00	329.979	1,699.13	18.49	-10.68	21.23	2.00	2.00	0.00
1,800.00	9.00	329.979	1,798.15	30.54	-17.65	35.07	2.00	2.00	0.00
1,900.00	11.00	329.979	1,896.63	45.57	-26.33	52.33	2.00	2.00	0.00
1,901.37	11.03	329.979	1,897.97	45.80	-26.46	52.59	2.00	2.00	0.00
2,000.00	11.03	329.979	1,994.78	62.13	-35.90	71.35	0.00	0.00	0.00
2,100.00	11.03	329.979	2,092.93	78.70	-45.47	90.36	0.00	0.00	0.00
2,200.00	11.03	329.979	2,191.09	95.26	-55.04	109.38	0.00	0.00	0.00
2,300.00	11.03	329.979	2,289.24	111.82	-64.61	128.40	0.00	0.00	0.00
2,400.00	11.03	329.979	2,387.40	128.38	-74.18	147.41	0.00	0.00	0.00
2,500.00	11.03	329.979	2,485.55	144.94	-83.75	166.43	0.00	0.00	0.00
2,600.00	11.03	329.979	2,583.70	161.50	-93.32	185.45	0.00	0.00	0.00
2,700.00	11.03	329.979	2,681.86	178.07	-102.89	204.46	0.00	0.00	0.00
2,800.00	11.03	329.979	2,780.01	194.63	-112.46	223.48	0.00	0.00	0.00
2,900.00	11.03	329.979	2,878.16	211.19	-122.03	242.50	0.00	0.00	0.00
3,000.00	11.03	329.979	2,976.32	227.75	-131.60	261.51	0.00	0.00	0.00
3,100.00	11.03	329.979	3,074.47	244.31	-141.17	280.53	0.00	0.00	0.00
3,200.00	11.03	329.979	3,172.62	260.87	-150.74	299.55	0.00	0.00	0.00
3,300.00	11.03	329.979	3,270.78	277.44	-160.31	318.56	0.00	0.00	0.00
3,400.00	11.03	329.979	3,368.93	294.00	-169.88	337.58	0.00	0.00	0.00
3,500.00	11.03	329.979	3,467.09	310.56	-179.45	356.60	0.00	0.00	0.00
3,600.00	11.03	329.979	3,565.24	327.12	-189.02	375.62	0.00	0.00	0.00
3,700.00	11.03	329.979	3,663.39	343.68	-198.59	394.63	0.00	0.00	0.00
3,800.00	11.03	329.979	3,761.55	360.24	-208.16	413.65	0.00	0.00	0.00
3,900.00	11.03	329.979	3,859.70	376.80	-217.73	432.67	0.00	0.00	0.00
4,000.00	11.03	329.979	3,957.85	393.37	-227.30	451.68	0.00	0.00	0.00
4,100.00	11.03	329.979	4,056.01	409.93	-236.87	470.70	0.00	0.00	0.00
4,200.00	11.03	329.979	4,154.16	426.49	-246.44	489.72	0.00	0.00	0.00
4,300.00	11.03	329.979	4,252.31	443.05	-256.01	508.73	0.00	0.00	0.00
4,400.00	11.03	329.979	4,350.47	459.61	-265.58	527.75	0.00	0.00	0.00
4,500.00	11.03	329.979	4,448.62	476.17	-275.15	546.77	0.00	0.00	0.00
4,600.00	11.03	329.979	4,546.78	492.74	-284.72	565.78	0.00	0.00	0.00
4,700.00	11.03	329.979	4,644.93	509.30	-294.29	584.80	0.00	0.00	0.00
4,800.00	11.03	329.979	4,743.08	525.86	-303.86	603.82	0.00	0.00	0.00
4,900.00	11.03	329.979	4,841.24	542.42	-313.43	622.83	0.00	0.00	0.00
5,000.00	11.03	329.979	4,939.39	558.98	-323.00	641.85	0.00	0.00	0.00
5,100.00	11.03	329.979	5,037.54	575.54	-332.57	660.87	0.00	0.00	0.00

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Company:	Logos Operating LLC	**TVD Reference:**	GL 7300' @ 7300.00usft
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7300' @ 7300.00usft
Site:	Apollo 2407-29E	**North Reference:**	True
Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
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 (°/100usft)	Turn Rate (°/100usft)
5,200.00	11.03	329.979	5,135.70	592.11	-342.14	679.88	0.00	0.00	0.00
5,300.00	11.03	329.979	5,233.85	608.67	-351.71	698.90	0.00	0.00	0.00
5,400.00	11.03	329.979	5,332.00	625.23	-361.28	717.92	0.00	0.00	0.00
5,500.00	11.03	329.979	5,430.16	641.79	-370.85	736.93	0.00	0.00	0.00
5,555.35	11.03	329.979	5,484.48	650.96	-376.14	747.46	0.00	0.00	0.00
5,600.00	14.59	328.876	5,528.02	659.47	-381.19	757.31	8.00	7.98	-2.47
5,700.00	22.58	327.649	5,622.73	686.52	-398.00	789.07	8.00	7.99	-1.23
5,800.00	30.58	327.041	5,712.08	724.14	-422.15	833.69	8.00	8.00	-0.61
5,900.00	38.57	326.667	5,794.35	771.61	-453.17	890.32	8.00	8.00	-0.37
6,000.00	46.57	326.405	5,867.94	828.00	-490.46	957.84	8.00	8.00	-0.26
6,100.00	54.57	326.204	5,931.39	892.21	-533.28	1,034.95	8.00	8.00	-0.20
6,200.00	62.57	326.040	5,983.50	962.99	-580.81	1,120.14	8.00	8.00	-0.16
6,300.00	70.57	325.898	6,023.23	1,038.97	-632.12	1,211.75	8.00	8.00	-0.14
6,400.00	78.57	325.770	6,049.81	1,118.66	-686.21	1,308.01	8.00	8.00	-0.13
6,500.00	86.57	325.649	6,062.74	1,200.52	-742.03	1,407.03	8.00	8.00	-0.12
6,537.14	89.54	325.604	6,064.00	1,231.15	-762.99	1,444.13	8.00	8.00	-0.12
6,600.00	89.54	325.604	6,064.51	1,283.02	-798.50	1,506.96	0.00	0.00	0.00
6,700.00	89.54	325.604	6,065.31	1,365.53	-854.98	1,606.90	0.00	0.00	0.00
6,800.00	89.54	325.604	6,066.12	1,448.04	-911.47	1,706.85	0.00	0.00	0.00
6,900.00	89.54	325.604	6,066.92	1,530.56	-967.96	1,806.80	0.00	0.00	0.00
7,000.00	89.54	325.604	6,067.73	1,613.07	-1,024.45	1,906.75	0.00	0.00	0.00
7,100.00	89.54	325.604	6,068.54	1,695.58	-1,080.94	2,006.69	0.00	0.00	0.00
7,200.00	89.54	325.604	6,069.34	1,778.10	-1,137.43	2,106.64	0.00	0.00	0.00
7,300.00	89.54	325.604	6,070.15	1,860.61	-1,193.92	2,206.59	0.00	0.00	0.00
7,400.00	89.54	325.604	6,070.95	1,943.12	-1,250.40	2,306.54	0.00	0.00	0.00
7,500.00	89.54	325.604	6,071.76	2,025.63	-1,306.89	2,406.48	0.00	0.00	0.00
7,600.00	89.54	325.604	6,072.57	2,108.15	-1,363.38	2,506.43	0.00	0.00	0.00
7,700.00	89.54	325.604	6,073.37	2,190.66	-1,419.87	2,606.38	0.00	0.00	0.00
7,800.00	89.54	325.604	6,074.18	2,273.17	-1,476.36	2,706.33	0.00	0.00	0.00
7,900.00	89.54	325.604	6,074.98	2,355.69	-1,532.85	2,806.28	0.00	0.00	0.00
8,000.00	89.54	325.604	6,075.79	2,438.20	-1,589.33	2,906.22	0.00	0.00	0.00
8,100.00	89.54	325.604	6,076.60	2,520.71	-1,645.82	3,006.17	0.00	0.00	0.00
8,200.00	89.54	325.604	6,077.40	2,603.23	-1,702.31	3,106.12	0.00	0.00	0.00
8,300.00	89.54	325.604	6,078.21	2,685.74	-1,758.80	3,206.07	0.00	0.00	0.00
8,400.00	89.54	325.604	6,079.01	2,768.25	-1,815.29	3,306.01	0.00	0.00	0.00
8,500.00	89.54	325.604	6,079.82	2,850.77	-1,871.78	3,405.96	0.00	0.00	0.00
8,600.00	89.54	325.604	6,080.62	2,933.28	-1,928.27	3,505.91	0.00	0.00	0.00
8,700.00	89.54	325.604	6,081.43	3,015.79	-1,984.75	3,605.86	0.00	0.00	0.00
8,800.00	89.54	325.604	6,082.24	3,098.30	-2,041.24	3,705.80	0.00	0.00	0.00
8,900.00	89.54	325.604	6,083.04	3,180.82	-2,097.73	3,805.75	0.00	0.00	0.00
9,000.00	89.54	325.604	6,083.85	3,263.33	-2,154.22	3,905.70	0.00	0.00	0.00
9,100.00	89.54	325.604	6,084.65	3,345.84	-2,210.71	4,005.65	0.00	0.00	0.00
9,200.00	89.54	325.604	6,085.46	3,428.36	-2,267.20	4,105.59	0.00	0.00	0.00
9,300.00	89.54	325.604	6,086.27	3,510.87	-2,323.68	4,205.54	0.00	0.00	0.00
9,400.00	89.54	325.604	6,087.07	3,593.38	-2,380.17	4,305.49	0.00	0.00	0.00
9,500.00	89.54	325.604	6,087.88	3,675.90	-2,436.66	4,405.44	0.00	0.00	0.00
9,515.19	89.54	325.604	6,088.00	3,688.43	-2,445.24	4,420.62	0.00	0.00	0.00
9,600.00	89.52	323.908	6,088.70	3,757.69	-2,494.18	4,505.41	2.00	-0.02	-2.00
9,700.00	89.50	321.908	6,089.55	3,837.45	-2,554.48	4,605.39	2.00	-0.02	-2.00
9,743.04	89.50	321.047	6,089.92	3,871.12	-2,581.29	4,648.40	2.00	-0.02	-2.00
9,800.00	89.50	321.047	6,090.43	3,915.42	-2,617.10	4,705.28	0.00	0.00	0.00
9,900.00	89.50	321.047	6,091.31	3,993.18	-2,679.96	4,805.16	0.00	0.00	0.00
10,000.00	89.50	321.047	6,092.19	4,070.94	-2,742.83	4,905.04	0.00	0.00	0.00
10,100.00	89.50	321.047	6,093.07	4,148.71	-2,805.69	5,004.92	0.00	0.00	0.00

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Company:	Logos Operating LLC	**TVD Reference:**	GL 7300' @ 7300.00usft
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7300' @ 7300.00usft
Site:	Apollo 2407-29E	**North Reference:**	True
Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
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 (°/100usft)	Turn Rate (°/100usft)
10,200.00	89.50	321.047	6,093.95	4,226.47	-2,868.56	5,104.80	0.00	0.00	0.00
10,300.00	89.50	321.047	6,094.83	4,304.23	-2,931.42	5,204.68	0.00	0.00	0.00
10,400.00	89.50	321.047	6,095.71	4,382.00	-2,994.29	5,304.57	0.00	0.00	0.00
10,500.00	89.50	321.047	6,096.59	4,459.76	-3,057.15	5,404.45	0.00	0.00	0.00
10,600.00	89.50	321.047	6,097.47	4,537.52	-3,120.02	5,504.33	0.00	0.00	0.00
10,700.00	89.50	321.047	6,098.36	4,615.29	-3,182.88	5,604.21	0.00	0.00	0.00
10,800.00	89.50	321.047	6,099.24	4,693.05	-3,245.75	5,704.09	0.00	0.00	0.00
10,900.00	89.50	321.047	6,100.12	4,770.81	-3,308.61	5,803.97	0.00	0.00	0.00
11,000.00	89.50	321.047	6,101.00	4,848.58	-3,371.48	5,903.85	0.00	0.00	0.00
11,100.00	89.50	321.047	6,101.88	4,926.34	-3,434.34	6,003.73	0.00	0.00	0.00
11,200.00	89.50	321.047	6,102.76	5,004.11	-3,497.21	6,103.61	0.00	0.00	0.00
11,300.00	89.50	321.047	6,103.64	5,081.87	-3,560.08	6,203.49	0.00	0.00	0.00
11,400.00	89.50	321.047	6,104.52	5,159.63	-3,622.94	6,303.37	0.00	0.00	0.00
11,500.00	89.50	321.047	6,105.41	5,237.40	-3,685.81	6,403.25	0.00	0.00	0.00
11,600.00	89.50	321.047	6,106.29	5,315.16	-3,748.67	6,503.13	0.00	0.00	0.00
11,700.00	89.50	321.047	6,107.17	5,392.92	-3,811.54	6,603.01	0.00	0.00	0.00
11,800.00	89.50	321.047	6,108.05	5,470.69	-3,874.40	6,702.89	0.00	0.00	0.00
11,900.00	89.50	321.047	6,108.93	5,548.45	-3,937.27	6,802.77	0.00	0.00	0.00
12,000.00	89.50	321.047	6,109.81	5,626.21	-4,000.13	6,902.65	0.00	0.00	0.00
12,100.00	89.50	321.047	6,110.69	5,703.98	-4,063.00	7,002.53	0.00	0.00	0.00
12,200.00	89.50	321.047	6,111.57	5,781.74	-4,125.86	7,102.41	0.00	0.00	0.00
12,300.00	89.50	321.047	6,112.46	5,859.51	-4,188.73	7,202.29	0.00	0.00	0.00
12,400.00	89.50	321.047	6,113.34	5,937.27	-4,251.59	7,302.17	0.00	0.00	0.00
12,500.00	89.50	321.047	6,114.22	6,015.03	-4,314.46	7,402.05	0.00	0.00	0.00
12,600.00	89.50	321.047	6,115.10	6,092.80	-4,377.32	7,501.93	0.00	0.00	0.00
12,700.00	89.50	321.047	6,115.98	6,170.56	-4,440.19	7,601.81	0.00	0.00	0.00
12,800.00	89.50	321.047	6,116.86	6,248.32	-4,503.05	7,701.69	0.00	0.00	0.00
12,900.00	89.50	321.047	6,117.74	6,326.09	-4,565.92	7,801.57	0.00	0.00	0.00
13,000.00	89.50	321.047	6,118.62	6,403.85	-4,628.79	7,901.45	0.00	0.00	0.00
13,100.00	89.50	321.047	6,119.50	6,481.61	-4,691.65	8,001.33	0.00	0.00	0.00
13,200.00	89.50	321.047	6,120.39	6,559.38	-4,754.52	8,101.21	0.00	0.00	0.00
13,300.00	89.50	321.047	6,121.27	6,637.14	-4,817.38	8,201.09	0.00	0.00	0.00
13,400.00	89.50	321.047	6,122.15	6,714.90	-4,880.25	8,300.97	0.00	0.00	0.00
13,500.00	89.50	321.047	6,123.03	6,792.67	-4,943.11	8,400.85	0.00	0.00	0.00
13,600.00	89.50	321.047	6,123.91	6,870.43	-5,005.98	8,500.73	0.00	0.00	0.00
13,700.00	89.50	321.047	6,124.79	6,948.20	-5,068.84	8,600.61	0.00	0.00	0.00
13,800.00	89.50	321.047	6,125.67	7,025.96	-5,131.71	8,700.49	0.00	0.00	0.00
13,900.00	89.50	321.047	6,126.55	7,103.72	-5,194.57	8,800.37	0.00	0.00	0.00
13,950.58	89.50	321.047	6,127.00	7,143.06	-5,226.37	8,850.89	0.00	0.00	0.00

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Company:	Logos Operating LLC	**TVD Reference:**	GL 7300' @ 7300.00usft
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7300' @ 7300.00usft
Site:	Apollo 2407-29E	**North Reference:**	True
Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Design 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
Apollo 2H POE - plan hits target center - Point	0.00	0.000	6,064.00	1,231.15	-762.99	1,924,777.68	2,789,182.05	36.2895650	-107.6090720
Apollo 2H LPerf - plan misses target center by 0.25usft at 6687.05usft MD (6065.21 TVD, 1354.85 N, -847.67 E) - Point	0.00	0.000	6,065.00	1,354.92	-847.56	1,924,901.26	2,789,097.18	36.2899050	-107.6093590
Apollo 2H AP_C - plan hits target center - Point	0.00	0.000	6,088.00	3,688.43	-2,445.24	1,927,231.01	2,787,494.04	36.2963150	-107.6147810
Apollo 2H FPerf - plan misses target center by 0.13usft at 13850.82usft MD (6126.12 TVD, 7065.48 N, -5163.66 E) - Point	0.00	0.000	6,126.00	7,065.51	-5,163.63	1,930,601.71	2,784,767.75	36.3055910	-107.6240080
Apollo 2H BHL - plan hits target center - Point	0.00	0.000	6,127.00	7,143.06	-5,226.37	1,930,679.12	2,784,704.82	36.3058040	-107.6242210

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,753.33	1,752.00	Ojo Alamo		0.00	0.000
1,904.45	1,901.00	Kirtland		0.00	0.000
2,119.42	2,112.00	Fruitland		0.00	0.000
2,456.65	2,443.00	Pictured Cliffs		0.00	0.000
3,342.00	3,312.00	Chacra		0.00	0.000
4,022.56	3,980.00	Cliff House		0.00	0.000
4,086.75	4,043.00	Menefee		0.00	0.000
4,834.56	4,777.00	Point Lookout		0.00	0.000
5,082.13	5,020.00	Mancos		0.00	0.000
5,913.72	5,805.00	Gallup		0.00	0.000

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,350.00	1,350.00	0.00	0.00	Start Build 2.00
1,901.37	1,897.97	45.80	-26.46	Start 3653.98 hold at 1901.37 MD
5,555.35	5,484.48	650.96	-376.14	Start DLS 8.00 TFO -4.46
6,537.14	6,064.00	1,231.15	-762.99	POE @ 6537' MD
6,537.14	6,064.00	1,231.15	-762.99	36.2895650, -107.6090720
6,687.14	6,065.21	1,354.92	-847.72	Last Perf @ 6687' MD
6,687.14	6,065.21	1,354.92	-847.72	36.2899050, -107.6093595
9,515.19	6,088.00	3,688.43	-2,445.24	Start DLS 2.00 TFO -90.56
9,743.04	6,089.92	3,871.12	-2,581.29	Start 4207.54 hold at 9743.04 MD
13,870.58	6,126.30	7,080.84	-5,176.08	First Perf @ 13,870' MD
13,870.58	6,126.30	7,080.84	-5,176.08	36.3056331, -107.6240503
13,950.58	6,127.00	7,143.06	-5,226.37	TD at 13950.58

LOGOS RESOURCES II, LLC

Logos Operating LLC

Rio Arriba, NM NAD83
Apollo 2407-29E
Apollo 2407-29E 2H

OH
Plan #3

Anticollision Report

30 January, 2020

Scientific Drilling

www.scientificdrilling.com

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference	Plan #3		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum ellipse separation of 1,000.00 usft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 1/30/2020

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	13,950.58	Plan #3 (OH)	MWD+HDGM	OWSG MWD + HDGM

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Apollo 2407-29E						
Apollo 2407-29E 1H - OH - Plan #3	1,350.00	1,350.00	19.96	10.29	2.063	CC, ES
Apollo 2407-29E 1H - OH - Plan #3	1,400.00	1,400.00	20.38	10.34	2.031	SF
Apollo 2407-29E 3H - OH - Plan #3	1,203.34	1,203.34	19.96	11.34	2.314	CC
Apollo 2407-29E 3H - OH - Plan #3	1,300.00	1,299.65	20.40	11.08	2.189	ES
Apollo 2407-29E 3H - OH - Plan #3	2,000.00	1,996.19	28.78	14.44	2.007	SF
Apollo 2407-29E 4H - OH - Plan #3	1,100.00	1,100.00	39.93	32.04	5.063	CC, ES
Apollo 2407-29E 4H - OH - Plan #3	1,200.00	1,198.90	41.28	32.69	4.806	SF

Offset Design Apollo 2407-29E - Apollo 2407-29E 1H - OH - Plan #3 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	132.43	-13.47	14.74	19.96	19.96	0.00	N/A	
100.00	100.00	100.00	100.00	0.36	0.36	132.43	-13.47	14.74	19.96	19.25	0.72	27.847	
200.00	200.00	200.00	200.00	0.72	0.72	132.43	-13.47	14.74	19.96	18.53	1.43	13.924	
300.00	300.00	300.00	300.00	1.08	1.08	132.43	-13.47	14.74	19.96	17.81	2.15	9.282	
400.00	400.00	400.00	400.00	1.43	1.43	132.43	-13.47	14.74	19.96	17.10	2.87	6.962	
500.00	500.00	500.00	500.00	1.79	1.79	132.43	-13.47	14.74	19.96	16.38	3.58	5.569	
600.00	600.00	600.00	600.00	2.15	2.15	132.43	-13.47	14.74	19.96	15.66	4.30	4.641	
700.00	700.00	700.00	700.00	2.51	2.51	132.43	-13.47	14.74	19.96	14.95	5.02	3.978	
800.00	800.00	800.00	800.00	2.87	2.87	132.43	-13.47	14.74	19.96	14.23	5.74	3.481	
900.00	900.00	900.00	900.00	3.23	3.23	132.43	-13.47	14.74	19.96	13.51	6.45	3.094	
1,000.00	1,000.00	1,000.00	1,000.00	3.58	3.58	132.43	-13.47	14.74	19.96	12.80	7.17	2.785	
1,100.00	1,100.00	1,100.00	1,100.00	3.94	3.94	132.43	-13.47	14.74	19.96	12.08	7.89	2.532	
1,200.00	1,200.00	1,200.00	1,200.00	4.30	4.30	132.43	-13.47	14.74	19.96	11.36	8.60	2.321	
1,300.00	1,300.00	1,300.00	1,300.00	4.66	4.66	132.43	-13.47	14.74	19.96	10.64	9.32	2.142	
1,350.00	1,350.00	1,350.00	1,350.00	4.84	4.84	132.43	-13.47	14.74	19.96	10.29	9.68	2.063	CC, ES
1,400.00	1,400.00	1,400.00	1,400.00	5.02	5.02	162.82	-13.47	14.74	20.38	10.34	10.04	2.031	SF
1,500.00	1,499.93	1,499.62	1,499.60	5.38	5.37	161.41	-12.71	16.29	24.35	13.61	10.74	2.267	
1,600.00	1,599.68	1,598.80	1,598.64	5.73	5.72	156.89	-10.46	20.94	33.07	21.63	11.44	2.890	
1,700.00	1,699.13	1,697.13	1,696.60	6.09	6.07	152.40	-6.75	28.59	46.75	34.61	12.14	3.852	
1,800.00	1,798.15	1,794.29	1,793.05	6.46	6.42	148.90	-1.64	39.11	65.44	52.62	12.82	5.105	
1,901.37	1,897.97	1,892.99	1,890.82	6.83	6.77	147.18	4.25	51.25	88.41	74.88	13.53	6.535	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Apollo 2407-29E - Apollo 2407-29E 1H - OH - Plan #3 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,000.00	1,994.78	1,988.71	1,985.65	7.21	7.13	146.85	9.96	63.02	112.21	97.98	14.22	7.888	
2,100.00	2,092.93	2,085.76	2,081.78	7.59	7.49	146.63	15.75	74.95	136.34	121.40	14.93	9.129	
2,200.00	2,191.09	2,182.80	2,177.91	7.99	7.85	146.48	21.55	86.88	160.47	144.82	15.65	10.254	
2,300.00	2,289.24	2,279.85	2,274.05	8.38	8.22	146.36	27.34	98.81	184.60	168.23	16.37	11.277	
2,400.00	2,387.40	2,376.89	2,370.18	8.79	8.59	146.27	33.13	110.75	208.73	191.64	17.09	12.211	
2,500.00	2,485.55	2,473.93	2,466.31	9.20	8.96	146.21	38.92	122.68	232.86	215.04	17.82	13.065	
2,600.00	2,583.70	2,570.98	2,562.45	9.61	9.33	146.15	44.71	134.61	256.99	238.44	18.56	13.850	
2,700.00	2,681.86	2,668.02	2,658.58	10.02	9.70	146.10	50.50	146.54	281.13	261.84	19.29	14.573	
2,800.00	2,780.01	2,765.07	2,754.71	10.44	10.08	146.06	56.29	158.48	305.26	285.23	20.03	15.241	
2,900.00	2,878.16	2,862.11	2,850.85	10.86	10.46	146.03	62.09	170.41	329.39	308.62	20.77	15.860	
3,000.00	2,976.32	2,959.16	2,946.98	11.28	10.84	146.00	67.88	182.34	353.53	332.02	21.51	16.434	
3,100.00	3,074.47	3,056.20	3,043.11	11.70	11.21	145.98	73.67	194.28	377.66	355.40	22.26	16.969	
3,200.00	3,172.62	3,153.24	3,139.25	12.12	11.60	145.95	79.46	206.21	401.79	378.79	23.00	17.467	
3,300.00	3,270.78	3,250.29	3,235.38	12.55	11.98	145.93	85.25	218.14	425.93	402.18	23.75	17.933	
3,400.00	3,368.93	3,347.33	3,331.51	12.98	12.36	145.92	91.04	230.07	450.06	425.56	24.50	18.369	
3,500.00	3,467.09	3,444.38	3,427.65	13.41	12.74	145.90	96.84	242.01	474.19	448.94	25.25	18.779	
3,600.00	3,565.24	3,541.42	3,523.78	13.84	13.12	145.89	102.63	253.94	498.33	472.32	26.00	19.164	
3,700.00	3,663.39	3,638.46	3,619.91	14.27	13.51	145.87	108.42	265.87	522.46	495.70	26.76	19.526	
3,800.00	3,761.55	3,735.51	3,716.05	14.70	13.89	145.86	114.21	277.81	546.59	519.08	27.51	19.868	
3,900.00	3,859.70	3,832.55	3,812.18	15.13	14.28	145.85	120.00	289.74	570.73	542.46	28.27	20.191	
4,000.00	3,957.85	3,929.60	3,908.31	15.56	14.66	145.84	125.79	301.67	594.86	565.84	29.02	20.496	
4,100.00	4,056.01	4,026.64	4,004.45	16.00	15.05	145.83	131.59	313.60	618.99	589.21	29.78	20.785	
4,200.00	4,154.16	4,123.68	4,100.58	16.43	15.43	145.82	137.38	325.54	643.13	612.59	30.54	21.060	
4,300.00	4,252.31	4,220.73	4,196.71	16.87	15.82	145.82	143.17	337.47	667.26	635.96	31.30	21.320	
4,400.00	4,350.47	4,317.77	4,292.85	17.30	16.21	145.81	148.96	349.40	691.40	659.34	32.06	21.568	
4,500.00	4,448.62	4,414.82	4,388.98	17.74	16.60	145.80	154.75	361.34	715.53	682.71	32.82	21.804	
4,600.00	4,546.78	4,511.86	4,485.11	18.18	16.98	145.80	160.54	373.27	739.66	706.09	33.58	22.029	
4,700.00	4,644.93	4,608.91	4,581.25	18.61	17.37	145.79	166.33	385.20	763.80	729.46	34.34	22.243	
4,800.00	4,743.08	4,705.95	4,677.38	19.05	17.76	145.78	172.13	397.13	787.93	752.83	35.10	22.448	
4,900.00	4,841.24	4,802.99	4,773.51	19.49	18.15	145.78	177.92	409.07	812.06	776.20	35.86	22.644	
5,000.00	4,939.39	4,900.04	4,869.65	19.93	18.54	145.77	183.71	421.00	836.20	799.57	36.62	22.832	
5,100.00	5,037.54	4,997.08	4,965.78	20.37	18.92	145.77	189.50	432.93	860.33	822.94	37.39	23.011	
5,200.00	5,135.70	5,094.13	5,061.91	20.81	19.31	145.76	195.29	444.87	884.46	846.31	38.15	23.183	
5,300.00	5,233.85	5,191.17	5,158.05	21.25	19.70	145.76	201.08	456.80	908.60	869.68	38.92	23.348	
5,400.00	5,332.00	5,288.21	5,254.18	21.69	20.09	145.76	206.88	468.73	932.73	893.05	39.68	23.507	
5,500.00	5,430.16	6,575.69	6,068.54	22.13	26.50	103.01	941.52	203.99	909.84	874.54	35.29	25.779	
5,555.35	5,484.48	6,586.73	6,068.63	22.37	26.63	102.09	951.27	198.80	872.91	836.10	36.81	23.712	
5,600.00	5,528.02	6,596.99	6,068.72	22.58	26.74	105.09	960.32	193.99	844.80	806.69	38.11	22.166	
5,650.00	5,575.93	6,611.64	6,068.84	22.83	26.92	107.34	973.26	187.10	815.74	776.08	39.66	20.567	
5,700.00	5,622.73	6,629.56	6,068.99	23.10	27.13	108.75	989.08	178.68	789.47	748.18	41.29	19.118	
5,750.00	5,668.18	6,650.68	6,069.17	23.41	27.39	109.48	1,007.72	168.77	766.18	723.19	42.99	17.823	
5,800.00	5,712.08	6,674.88	6,069.38	23.73	27.69	109.65	1,029.08	157.40	746.01	701.29	44.72	16.682	
5,850.00	5,754.21	6,702.05	6,069.61	24.09	28.03	109.35	1,053.07	144.64	729.01	682.54	46.47	15.688	
5,900.00	5,794.35	6,732.05	6,069.86	24.47	28.43	108.63	1,079.55	130.54	715.16	666.94	48.23	14.829	
5,950.00	5,832.32	6,764.74	6,070.14	24.88	28.87	107.56	1,108.41	115.19	704.38	654.42	49.96	14.099	
6,000.00	5,867.94	6,799.96	6,070.44	25.32	29.34	106.21	1,139.51	98.64	696.48	644.82	51.66	13.482	
6,050.00	5,901.01	6,837.54	6,070.76	25.79	29.88	104.64	1,172.68	80.99	691.23	637.90	53.33	12.961	
6,100.00	5,931.39	6,877.30	6,071.10	26.31	30.45	102.92	1,207.78	62.32	688.36	633.40	54.96	12.524	
6,147.33	5,957.54	6,916.77	6,071.43	26.82	31.03	101.22	1,242.62	43.78	687.53	631.06	56.48	12.174	
6,150.00	5,958.93	6,919.04	6,071.45	26.85	31.07	101.12	1,244.62	42.71	687.53	630.97	56.56	12.156	
6,200.00	5,983.50	6,962.55	6,071.82	27.44	31.73	99.31	1,283.04	22.27	688.43	630.29	58.14	11.841	
6,250.00	6,004.96	7,007.63	6,072.20	28.06	32.42	97.55	1,322.83	1.10	690.73	631.03	59.70	11.570	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Apollo 2407-29E - Apollo 2407-29E 1H - OH - Plan #3

Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
6,300.00	6,023.23	7,054.06	6,072.60	28.71	33.16	95.90	1,363.82	-20.71	694.11	632.84	61.27	11.329	
6,350.00	6,038.20	7,101.61	6,073.00	29.40	33.92	94.41	1,405.79	-43.05	698.30	635.46	62.84	11.113	
6,400.00	6,049.81	7,150.05	6,073.41	30.12	34.71	93.13	1,448.55	-65.80	703.06	638.63	64.43	10.911	
6,450.00	6,058.01	7,199.13	6,073.83	30.87	35.53	92.09	1,491.89	-88.86	708.21	642.17	66.04	10.724	
6,500.00	6,062.74	7,248.64	6,074.25	31.64	36.37	91.31	1,535.59	-112.11	713.59	645.92	67.67	10.545	
6,537.14	6,064.00	7,285.53	6,074.56	32.22	37.00	90.90	1,568.16	-129.44	717.68	648.79	68.89	10.418	
6,600.00	6,064.51	7,348.00	6,075.09	33.24	38.09	90.89	1,623.30	-158.78	724.67	653.68	70.99	10.208	
6,700.00	6,065.31	7,447.39	6,075.93	34.91	39.85	90.88	1,711.03	-205.46	735.77	661.35	74.42	9.886	
6,800.00	6,066.12	7,546.77	6,076.78	36.66	41.64	90.87	1,798.77	-252.14	746.88	668.92	77.97	9.580	
6,900.00	6,066.92	7,646.15	6,077.62	38.47	43.48	90.87	1,886.50	-298.83	757.99	676.39	81.60	9.289	
7,000.00	6,067.73	7,745.53	6,078.46	40.33	45.34	90.86	1,974.23	-345.51	769.10	683.78	85.32	9.014	
7,100.00	6,068.54	7,844.91	6,079.30	42.24	47.22	90.85	2,061.96	-392.19	780.21	691.10	89.11	8.756	
7,200.00	6,069.34	7,944.29	6,080.15	44.19	49.13	90.84	2,149.69	-438.87	791.32	698.36	92.96	8.512	
7,300.00	6,070.15	8,043.67	6,080.99	46.17	51.06	90.83	2,237.42	-485.55	802.43	705.56	96.87	8.284	
7,400.00	6,070.95	8,143.05	6,081.83	48.19	53.00	90.82	2,325.15	-532.23	813.53	712.71	100.82	8.069	
7,500.00	6,071.76	8,242.43	6,082.68	50.23	54.96	90.81	2,412.88	-578.91	824.64	719.83	104.82	7.868	
7,600.00	6,072.57	8,341.81	6,083.52	52.30	56.94	90.81	2,500.61	-625.59	835.75	726.90	108.85	7.678	
7,700.00	6,073.37	8,441.20	6,084.36	54.39	58.93	90.80	2,588.35	-672.28	846.86	733.94	112.92	7.500	
7,800.00	6,074.18	8,540.58	6,085.21	56.50	60.93	90.79	2,676.08	-718.96	857.97	740.95	117.02	7.332	
7,900.00	6,074.98	8,639.96	6,086.05	58.62	62.94	90.79	2,763.81	-765.64	869.08	747.93	121.14	7.174	
8,000.00	6,075.79	8,739.34	6,086.89	60.76	64.96	90.78	2,851.54	-812.32	880.19	754.89	125.29	7.025	
8,100.00	6,076.60	8,838.72	6,087.74	62.91	66.99	90.77	2,939.27	-859.00	891.29	761.83	129.47	6.884	
8,200.00	6,077.40	8,938.10	6,088.58	65.08	69.03	90.77	3,027.00	-905.68	902.40	768.74	133.66	6.752	
8,300.00	6,078.21	9,037.48	6,089.42	67.26	71.07	90.76	3,114.73	-952.36	913.51	775.64	137.87	6.626	
8,400.00	6,079.01	9,136.86	6,090.27	69.44	73.12	90.75	3,202.46	-999.04	924.62	782.53	142.09	6.507	
8,500.00	6,079.82	9,236.24	6,091.11	71.64	75.18	90.75	3,290.19	-1,045.72	935.73	789.39	146.34	6.394	
8,600.00	6,080.62	9,335.62	6,091.95	73.84	77.24	90.74	3,377.93	-1,092.41	946.84	796.25	150.59	6.288	
8,700.00	6,081.43	9,435.01	6,092.80	76.06	79.31	90.74	3,465.66	-1,139.09	957.95	803.09	154.86	6.186	
8,800.00	6,082.24	9,534.39	6,093.64	78.27	81.38	90.73	3,553.39	-1,185.77	969.05	809.92	159.14	6.089	
8,900.00	6,083.04	9,633.77	6,094.48	80.50	83.46	90.72	3,641.12	-1,232.45	980.16	816.74	163.43	5.998	
9,000.00	6,083.85	9,733.15	6,095.32	82.73	85.54	90.72	3,728.85	-1,279.13	991.27	823.55	167.73	5.910	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Apollo 2407-29E - Apollo 2407-29E 3H - OH - Plan #3 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-47.57	13.47	-14.74	19.96	19.96	0.00	N/A	
100.00	100.00	100.00	100.00	0.36	0.36	-47.57	13.47	-14.74	19.96	19.25	0.72	27.845	
200.00	200.00	200.00	200.00	0.72	0.72	-47.57	13.47	-14.74	19.96	18.53	1.43	13.923	
300.00	300.00	300.00	300.00	1.08	1.08	-47.57	13.47	-14.74	19.96	17.81	2.15	9.282	
400.00	400.00	400.00	400.00	1.43	1.43	-47.57	13.47	-14.74	19.96	17.10	2.87	6.961	
500.00	500.00	500.00	500.00	1.79	1.79	-47.57	13.47	-14.74	19.96	16.38	3.58	5.569	
600.00	600.00	600.00	600.00	2.15	2.15	-47.57	13.47	-14.74	19.96	15.66	4.30	4.641	
700.00	700.00	700.00	700.00	2.51	2.51	-47.57	13.47	-14.74	19.96	14.94	5.02	3.978	
800.00	800.00	800.00	800.00	2.87	2.87	-47.57	13.47	-14.74	19.96	14.23	5.74	3.481	
900.00	900.00	900.00	900.00	3.23	3.23	-47.57	13.47	-14.74	19.96	13.51	6.45	3.094	
1,000.00	1,000.00	1,000.00	1,000.00	3.58	3.58	-47.57	13.47	-14.74	19.96	12.79	7.17	2.785	
1,100.00	1,100.00	1,100.00	1,100.00	3.94	3.94	-47.57	13.47	-14.74	19.96	12.08	7.89	2.531	
1,200.00	1,200.00	1,200.00	1,200.00	4.30	4.30	-47.57	13.47	-14.74	19.96	11.36	8.60	2.320	
1,203.34	1,203.34	1,203.34	1,203.34	4.31	4.31	-47.57	13.47	-14.74	19.96	11.34	8.63	2.314 CC	
1,300.00	1,300.00	1,299.65	1,299.65	4.66	4.66	-47.66	13.74	-15.07	20.40	11.08	9.32	2.189 ES	
1,350.00	1,350.00	1,349.27	1,349.25	4.84	4.83	-47.89	14.54	-16.08	21.69	12.02	9.67	2.244	
1,400.00	1,400.00	1,398.85	1,398.78	5.02	5.01	-18.53	15.87	-17.77	23.44	13.42	10.01	2.341	
1,500.00	1,499.93	1,497.90	1,497.59	5.38	5.36	-21.61	20.12	-23.14	27.08	16.39	10.70	2.532	
1,600.00	1,599.68	1,597.38	1,596.59	5.73	5.72	-26.38	26.19	-30.80	30.54	19.15	11.39	2.681	
1,700.00	1,699.13	1,697.30	1,696.00	6.09	6.08	-33.28	32.49	-38.75	31.52	19.42	12.10	2.605	
1,800.00	1,798.15	1,797.13	1,795.30	6.46	6.44	-43.90	38.78	-46.70	30.33	17.51	12.82	2.366	
1,901.37	1,897.97	1,898.09	1,895.75	6.83	6.81	-60.99	45.15	-54.73	28.37	14.79	13.57	2.090	
1,939.65	1,935.54	1,936.16	1,933.62	6.98	6.95	-69.06	47.55	-57.77	28.08	14.22	13.87	2.025	
2,000.00	1,994.78	1,996.19	1,993.33	7.21	7.17	-81.65	51.33	-62.54	28.78	14.44	14.34	2.007 SF	
2,100.00	2,092.93	2,095.64	2,092.27	7.59	7.54	-99.75	57.60	-70.46	32.71	17.59	15.12	2.163	
2,200.00	2,191.09	2,195.09	2,191.21	7.99	7.91	-113.00	63.87	-78.37	39.11	23.22	15.89	2.462	
2,300.00	2,289.24	2,294.54	2,290.15	8.38	8.28	-122.20	70.14	-86.29	46.99	30.35	16.64	2.824	
2,400.00	2,387.40	2,394.00	2,389.09	8.79	8.65	-128.65	76.41	-94.21	55.72	38.34	17.38	3.206	
2,500.00	2,485.55	2,493.45	2,488.02	9.20	9.02	-133.31	82.68	-102.12	64.96	46.84	18.13	3.584	
2,600.00	2,583.70	2,592.90	2,586.96	9.61	9.40	-136.80	88.95	-110.04	74.53	55.66	18.87	3.949	
2,700.00	2,681.86	2,692.35	2,685.90	10.02	9.77	-139.49	95.22	-117.96	84.30	64.69	19.62	4.298	
2,800.00	2,780.01	2,791.80	2,784.84	10.44	10.14	-141.62	101.49	-125.87	94.22	73.86	20.36	4.627	
2,900.00	2,878.16	2,891.26	2,883.78	10.86	10.52	-143.34	107.76	-133.79	104.25	83.14	21.11	4.938	
3,000.00	2,976.32	2,990.71	2,982.72	11.28	10.89	-144.76	114.03	-141.70	114.35	92.49	21.86	5.231	
3,100.00	3,074.47	3,090.16	3,081.65	11.70	11.27	-145.95	120.30	-149.62	124.51	101.90	22.61	5.507	
3,200.00	3,172.62	3,189.61	3,180.59	12.12	11.65	-146.95	126.57	-157.54	134.71	111.35	23.36	5.767	
3,300.00	3,270.78	3,289.06	3,279.53	12.55	12.02	-147.82	132.84	-165.45	144.95	120.84	24.11	6.012	
3,400.00	3,368.93	3,388.52	3,378.47	12.98	12.40	-148.57	139.11	-173.37	155.22	130.36	24.86	6.243	
3,500.00	3,467.09	3,487.97	3,477.41	13.41	12.78	-149.23	145.38	-181.28	165.51	139.90	25.62	6.461	
3,600.00	3,565.24	3,587.42	3,576.34	13.84	13.16	-149.81	151.65	-189.20	175.83	149.45	26.37	6.667	
3,700.00	3,663.39	3,686.87	3,675.28	14.27	13.53	-150.33	157.92	-197.12	186.15	159.03	27.13	6.862	
3,800.00	3,761.55	3,786.33	3,774.22	14.70	13.91	-150.79	164.19	-205.03	196.49	168.61	27.88	7.047	
3,900.00	3,859.70	3,885.78	3,873.16	15.13	14.29	-151.20	170.46	-212.95	206.84	178.21	28.64	7.223	
4,000.00	3,957.85	3,985.23	3,972.10	15.56	14.67	-151.58	176.72	-220.86	217.20	187.81	29.39	7.389	
4,100.00	4,056.01	4,084.68	4,071.03	16.00	15.05	-151.92	182.99	-228.78	227.57	197.42	30.15	7.548	
4,200.00	4,154.16	4,184.13	4,169.97	16.43	15.43	-152.23	189.26	-236.70	237.95	207.04	30.91	7.698	
4,300.00	4,252.31	4,283.59	4,268.91	16.87	15.81	-152.52	195.53	-244.61	248.34	216.67	31.67	7.842	
4,400.00	4,350.47	4,383.04	4,367.85	17.30	16.19	-152.78	201.80	-252.53	258.72	226.30	32.43	7.979	
4,500.00	4,448.62	4,482.49	4,466.79	17.74	16.57	-153.03	208.07	-260.44	269.12	235.93	33.18	8.110	
4,600.00	4,546.78	4,581.94	4,565.73	18.18	16.95	-153.25	214.34	-268.36	279.52	245.57	33.94	8.235	
4,700.00	4,644.93	4,681.39	4,664.66	18.61	17.33	-153.46	220.61	-276.28	289.92	255.22	34.70	8.355	
4,800.00	4,743.08	4,780.85	4,763.60	19.05	17.71	-153.65	226.88	-284.19	300.33	264.86	35.46	8.469	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Apollo 2407-29E - Apollo 2407-29E 3H - OH - Plan #3

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Survey Program: 0-MWD+HDGM

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
4,900.00	4,841.24	4,880.30	4,862.54	19.49	18.09	-153.84	233.15	-292.11	310.74	274.51	36.22	8.579	
5,000.00	4,939.39	4,979.75	4,961.48	19.93	18.47	-154.01	239.42	-300.02	321.15	284.17	36.98	8.684	
5,100.00	5,037.54	5,079.20	5,060.42	20.37	18.85	-154.16	245.69	-307.94	331.56	293.82	37.74	8.785	
5,200.00	5,135.70	5,178.65	5,159.35	20.81	19.23	-154.31	251.96	-315.86	341.98	303.48	38.50	8.882	
5,300.00	5,233.85	5,278.11	5,258.29	21.25	19.61	-154.45	258.23	-323.77	352.40	313.14	39.26	8.975	
5,400.00	5,332.00	5,377.56	5,357.23	21.69	19.99	-154.59	264.50	-331.69	362.82	322.80	40.02	9.065	
5,500.00	5,430.16	5,494.56	5,473.26	22.13	20.45	-154.36	273.15	-343.50	372.15	331.29	40.87	9.106	
5,555.35	5,484.48	5,570.08	5,548.54	22.37	20.78	-153.07	282.71	-358.88	373.84	332.48	41.36	9.039	
5,600.00	5,528.02	5,629.83	5,602.93	22.58	21.06	-150.38	292.71	-375.87	374.37	332.62	41.75	8.966	
5,650.00	5,575.93	5,695.26	5,662.55	22.83	21.40	-147.47	306.07	-399.21	375.84	333.62	42.22	8.901	
5,700.00	5,622.73	5,758.94	5,717.99	23.10	21.77	-144.47	321.36	-426.50	378.45	335.69	42.76	8.850	
5,750.00	5,668.18	5,820.75	5,768.94	23.41	22.16	-141.33	338.27	-457.09	382.42	339.02	43.41	8.810	
5,800.00	5,712.08	5,880.61	5,815.25	23.73	22.58	-138.04	356.45	-490.37	387.94	343.77	44.17	8.784	
5,850.00	5,754.21	5,938.53	5,856.88	24.09	23.04	-134.64	375.61	-525.75	395.16	350.11	45.05	8.771	
5,900.00	5,794.35	5,994.53	5,893.92	24.47	23.53	-131.16	395.50	-562.72	404.20	358.14	46.05	8.776	
5,950.00	5,832.32	6,048.69	5,926.52	24.88	24.07	-127.62	415.88	-600.85	415.10	367.94	47.16	8.802	
6,000.00	5,867.94	6,101.10	5,954.87	25.32	24.65	-124.06	436.57	-639.76	427.86	379.51	48.35	8.849	
6,050.00	5,901.01	6,151.89	5,979.20	25.79	25.27	-120.49	457.42	-679.16	442.43	392.83	49.60	8.920	
6,100.00	5,931.39	6,201.18	5,999.73	26.31	25.93	-116.93	478.31	-718.79	458.69	407.80	50.89	9.013	
6,150.00	5,958.93	6,249.11	6,016.70	26.85	26.63	-113.40	499.14	-758.47	476.51	424.30	52.21	9.127	
6,200.00	5,983.50	6,295.82	6,030.32	27.44	27.37	-109.92	519.85	-798.05	495.73	442.18	53.55	9.257	
6,250.00	6,004.96	6,341.44	6,040.78	28.06	28.13	-106.49	540.38	-837.41	516.18	461.27	54.91	9.401	
6,300.00	6,023.23	6,386.12	6,048.27	28.71	28.91	-103.13	560.69	-876.48	537.66	481.39	56.28	9.554	
6,350.00	6,038.20	6,429.97	6,052.93	29.40	29.71	-99.86	580.76	-915.19	560.00	502.35	57.65	9.713	
6,400.00	6,049.81	6,473.12	6,054.91	30.12	30.53	-96.69	600.55	-953.48	583.01	523.97	59.04	9.876	
6,450.00	6,058.01	6,516.36	6,054.96	30.87	31.37	-93.68	620.36	-991.91	606.50	546.03	60.46	10.031	
6,500.00	6,062.74	6,560.13	6,054.91	31.64	32.26	-91.05	640.42	-1,030.81	630.21	568.26	61.95	10.172	
6,537.14	6,064.00	6,592.79	6,054.87	32.22	32.92	-89.33	655.39	-1,059.84	647.85	584.76	63.09	10.269	
6,600.00	6,064.51	6,648.12	6,054.80	33.24	34.10	-89.32	680.74	-1,109.02	677.68	612.59	65.09	10.412	
6,700.00	6,065.31	6,736.14	6,054.69	34.91	36.02	-89.30	721.08	-1,187.25	725.14	656.75	68.39	10.603	
6,800.00	6,066.12	6,824.16	6,054.59	36.68	38.02	-89.28	761.42	-1,265.48	772.60	700.77	71.83	10.755	
6,900.00	6,066.92	6,912.18	6,054.48	38.47	40.09	-89.26	801.76	-1,343.72	820.06	744.66	75.40	10.876	
7,000.00	6,067.73	7,000.20	6,054.37	40.33	42.21	-89.25	842.09	-1,421.95	867.52	788.44	79.08	10.971	
7,100.00	6,068.54	7,088.22	6,054.26	42.24	44.37	-89.23	882.43	-1,500.18	914.98	832.13	82.85	11.044	
7,200.00	6,069.34	7,176.24	6,054.16	44.19	46.58	-89.22	922.77	-1,578.42	962.44	875.74	86.70	11.101	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

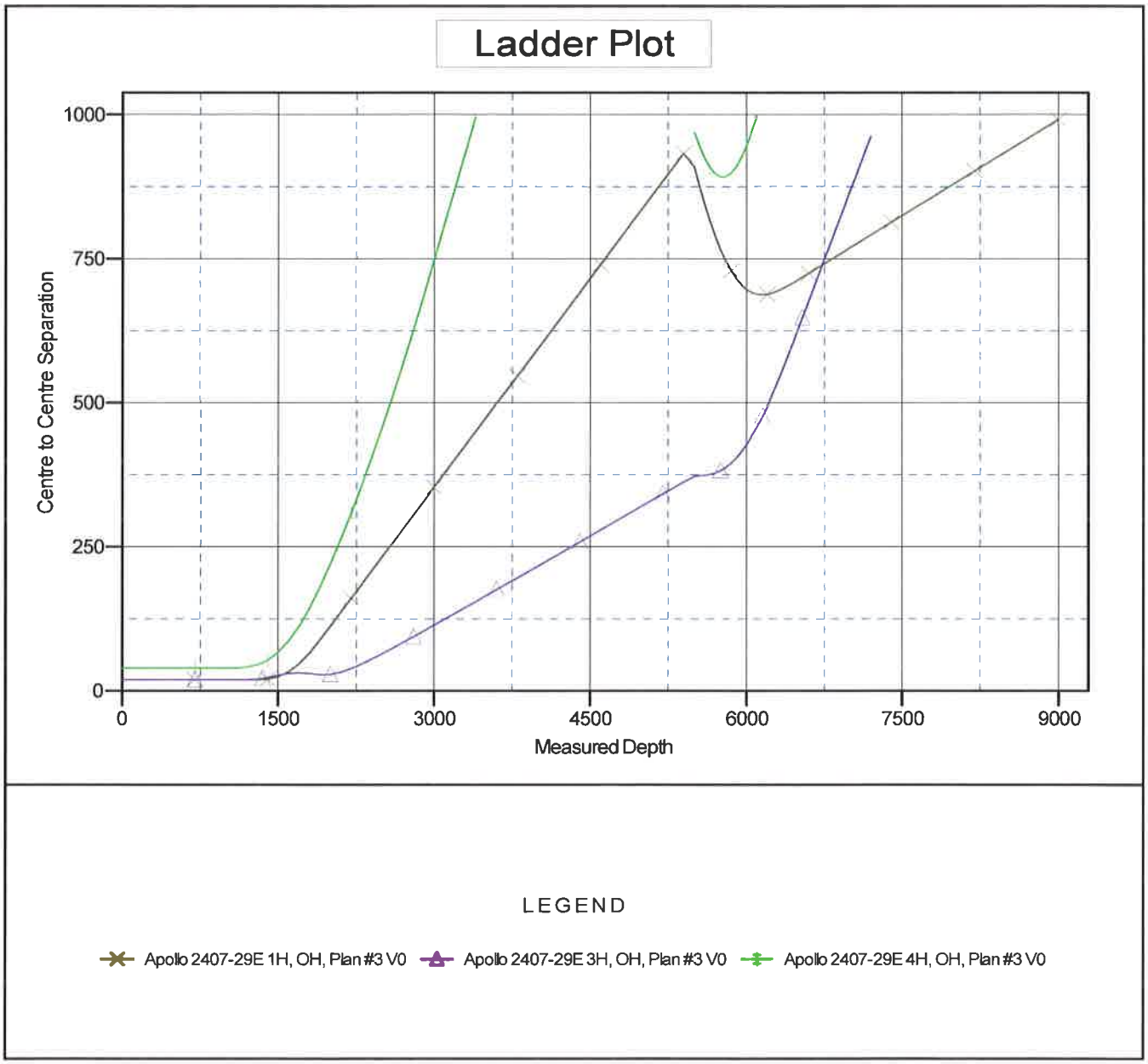
Offset Design Apollo 2407-29E - Apollo 2407-29E 4H - OH - Plan #3 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	132.43	-26.94	29.47	39.93				
100.00	100.00	100.00	100.00	0.36	0.36	132.43	-26.94	29.47	39.93	39.21	0.72	55.692	
200.00	200.00	200.00	200.00	0.72	0.72	132.43	-26.94	29.47	39.93	38.49	1.43	27.846	
300.00	300.00	300.00	300.00	1.08	1.08	132.43	-26.94	29.47	39.93	37.78	2.15	18.564	
400.00	400.00	400.00	400.00	1.43	1.43	132.43	-26.94	29.47	39.93	37.06	2.87	13.923	
500.00	500.00	500.00	500.00	1.79	1.79	132.43	-26.94	29.47	39.93	36.34	3.58	11.138	
600.00	600.00	600.00	600.00	2.15	2.15	132.43	-26.94	29.47	39.93	35.63	4.30	9.282	
700.00	700.00	700.00	700.00	2.51	2.51	132.43	-26.94	29.47	39.93	34.91	5.02	7.956	
800.00	800.00	800.00	800.00	2.87	2.87	132.43	-26.94	29.47	39.93	34.19	5.74	6.962	
900.00	900.00	900.00	900.00	3.23	3.23	132.43	-26.94	29.47	39.93	33.48	6.45	6.188	
1,000.00	1,000.00	1,000.00	1,000.00	3.58	3.58	132.43	-26.94	29.47	39.93	32.76	7.17	5.569	
1,100.00	1,100.00	1,100.00	1,100.00	3.94	3.94	132.43	-26.94	29.47	39.93	32.04	7.89	5.063	CC, ES
1,200.00	1,200.00	1,198.90	1,198.88	4.30	4.29	130.92	-27.03	31.18	41.28	32.69	8.59	4.806	SF
1,300.00	1,300.00	1,297.56	1,297.40	4.66	4.63	126.96	-27.29	36.27	45.47	36.19	9.28	4.902	
1,350.00	1,350.00	1,346.73	1,346.42	4.84	4.80	124.45	-27.49	40.08	48.73	39.11	9.62	5.067	
1,400.00	1,400.00	1,395.72	1,395.20	5.02	4.97	152.01	-27.73	44.70	53.21	43.25	9.95	5.345	
1,500.00	1,499.93	1,492.90	1,491.67	5.38	5.32	148.35	-28.34	56.34	66.89	56.27	10.62	6.299	
1,600.00	1,599.68	1,588.56	1,586.19	5.73	5.67	146.24	-29.10	70.97	86.65	75.38	11.27	7.687	
1,700.00	1,699.13	1,682.23	1,678.23	6.09	6.02	145.15	-30.00	88.35	112.24	100.33	11.91	9.426	
1,800.00	1,798.15	1,773.48	1,767.29	6.46	6.39	144.62	-31.04	108.16	143.43	130.90	12.53	11.449	
1,901.37	1,897.97	1,863.12	1,854.12	6.83	6.76	144.35	-32.19	130.37	180.56	167.42	13.14	13.742	
2,000.00	1,994.78	1,947.81	1,935.49	7.21	7.14	144.46	-33.41	153.84	220.56	206.85	13.72	16.079	
2,100.00	2,092.93	2,031.56	2,015.23	7.59	7.53	144.30	-34.75	179.40	263.58	249.30	14.28	18.452	
2,200.00	2,191.09	2,113.12	2,092.14	7.99	7.94	144.00	-36.16	206.52	308.99	294.15	14.84	20.824	
2,300.00	2,289.24	2,192.45	2,166.16	8.38	8.37	143.62	-37.64	234.98	356.71	341.33	15.38	23.196	
2,400.00	2,387.40	2,269.51	2,237.30	8.79	8.82	143.20	-39.18	264.58	406.65	390.74	15.91	25.567	
2,500.00	2,485.55	2,344.31	2,305.55	9.20	9.28	142.77	-40.77	295.12	458.73	442.31	16.42	27.939	
2,600.00	2,583.70	2,416.83	2,370.95	9.61	9.77	142.34	-42.40	326.43	512.87	495.95	16.92	30.315	
2,700.00	2,681.86	2,487.10	2,433.53	10.02	10.27	141.92	-44.06	358.33	568.97	551.57	17.40	32.692	
2,800.00	2,780.01	2,555.13	2,493.36	10.44	10.79	141.50	-45.75	390.66	626.96	609.08	17.88	35.068	
2,900.00	2,878.16	2,620.96	2,550.51	10.86	11.33	141.11	-47.45	423.30	686.75	668.42	18.34	37.449	
3,000.00	2,976.32	2,687.58	2,607.58	11.28	11.90	140.71	-49.23	457.61	748.24	729.41	18.83	39.735	
3,100.00	3,074.47	2,765.88	2,674.37	11.70	12.61	140.30	-51.36	498.41	810.29	790.77	19.52	41.518	
3,200.00	3,172.62	2,844.17	2,741.16	12.12	13.34	139.94	-53.48	539.21	872.36	852.15	20.21	43.166	
3,300.00	3,270.78	2,922.47	2,807.95	12.55	14.08	139.63	-55.61	580.01	934.45	913.54	20.91	44.691	
3,400.00	3,368.93	3,000.76	2,874.74	12.98	14.83	139.36	-57.73	620.81	996.56	974.94	21.62	46.104	
5,500.00	5,430.16	8,665.37	6,050.71	22.13	90.82	-152.51	-102.51	-387.38	969.19	879.32	89.87	10.784	
5,555.35	5,484.48	8,670.24	6,050.66	22.37	90.95	-152.18	-102.44	-392.25	942.56	849.40	93.16	10.118	
5,600.00	5,528.02	8,674.96	6,050.61	22.58	91.08	-151.65	-102.37	-396.97	923.99	828.15	95.84	9.641	
5,650.00	5,575.93	8,682.11	6,050.54	22.83	91.27	-151.18	-102.28	-404.11	907.99	809.11	98.87	9.184	
5,700.00	5,622.73	8,691.18	6,050.45	23.10	91.51	-150.61	-102.15	-413.19	897.32	795.46	101.86	8.810	
5,750.00	5,668.18	8,702.14	6,050.34	23.41	91.80	-149.82	-102.00	-424.15	892.18	787.46	104.72	8.520	
5,771.01	5,686.84	8,707.30	6,050.29	23.54	91.94	-149.42	-101.93	-429.30	891.69	785.82	105.86	8.423	
5,800.00	5,712.08	8,714.94	6,050.21	23.73	92.14	-148.78	-101.82	-436.94	892.62	785.24	107.38	8.313	
5,850.00	5,754.21	8,729.51	6,050.06	24.09	92.53	-147.44	-101.62	-451.50	898.55	788.74	109.81	8.183	
5,900.00	5,794.35	8,745.77	6,049.89	24.47	92.96	-145.78	-101.40	-467.77	909.76	797.79	111.97	8.125	
5,950.00	5,832.32	8,763.66	6,049.71	24.88	93.44	-143.77	-101.15	-485.65	925.91	812.04	113.86	8.132	
6,000.00	5,867.94	8,783.08	6,049.52	25.32	93.96	-141.36	-100.89	-505.07	946.58	831.06	115.52	8.194	
6,050.00	5,901.01	8,803.94	6,049.30	25.79	94.52	-138.53	-100.60	-525.93	971.30	854.33	116.97	8.304	
6,100.00	5,931.39	8,826.14	6,049.08	26.31	95.12	-135.24	-100.30	-548.12	999.57	881.31	118.25	8.453	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to GL 7300' @ 7300.00usft	Coordinates are relative to: Apollo 2407-29E 2H - Slot C
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, New Mexico Western Zone
Central Meridian is -107.8333334	Grid Convergence at Surface is: 0.13°

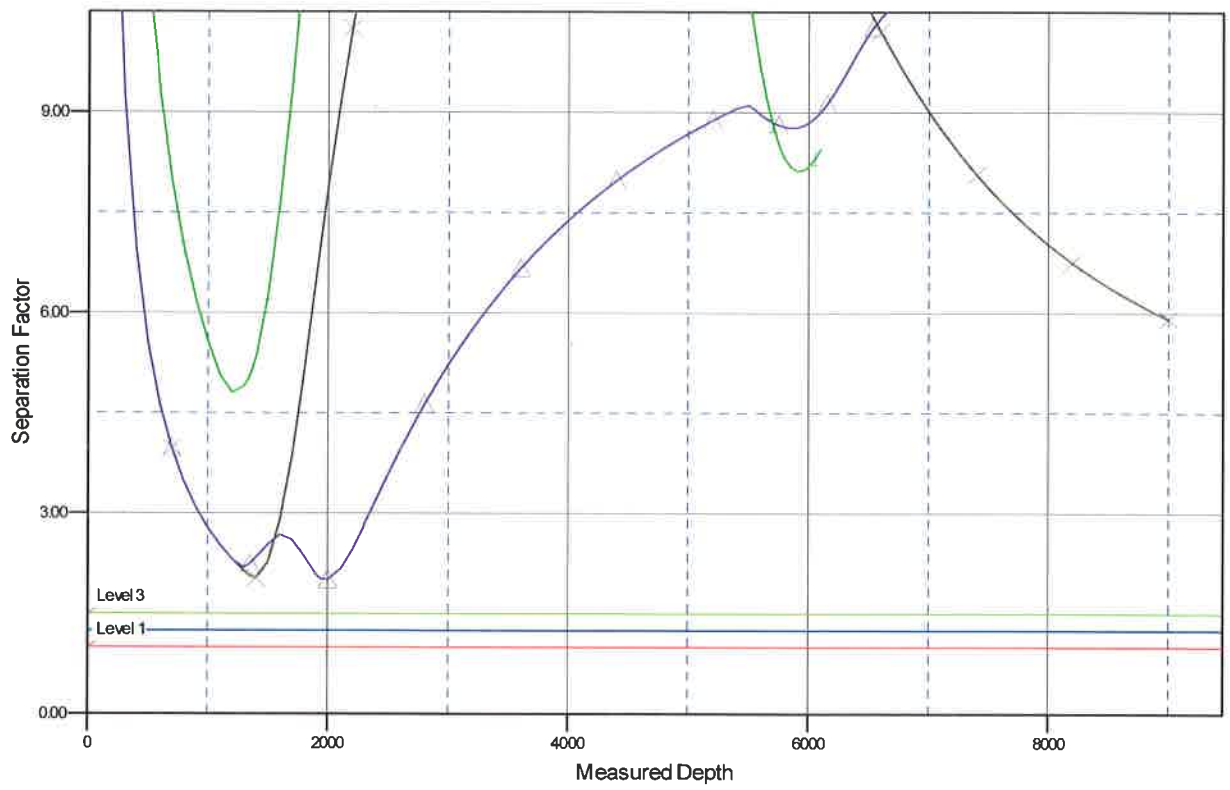


Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Apollo 2407-29E 2H - Slot C
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7300' @ 7300.00usft
Reference Site:	Apollo 2407-29E	**MD Reference:**	GL 7300' @ 7300.00usft
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Apollo 2407-29E 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to GL 7300' @ 7300.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Apollo 2407-29E 2H - Slot C
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.13°

Separation Factor Plot



LEGEND

Apollo 2407-29E 1H, OH, Plan #3 V0 | Apollo 2407-29E 3H, OH, Plan #3 V0 | Apollo 2407-29E 4H, OH, Plan #3 V0

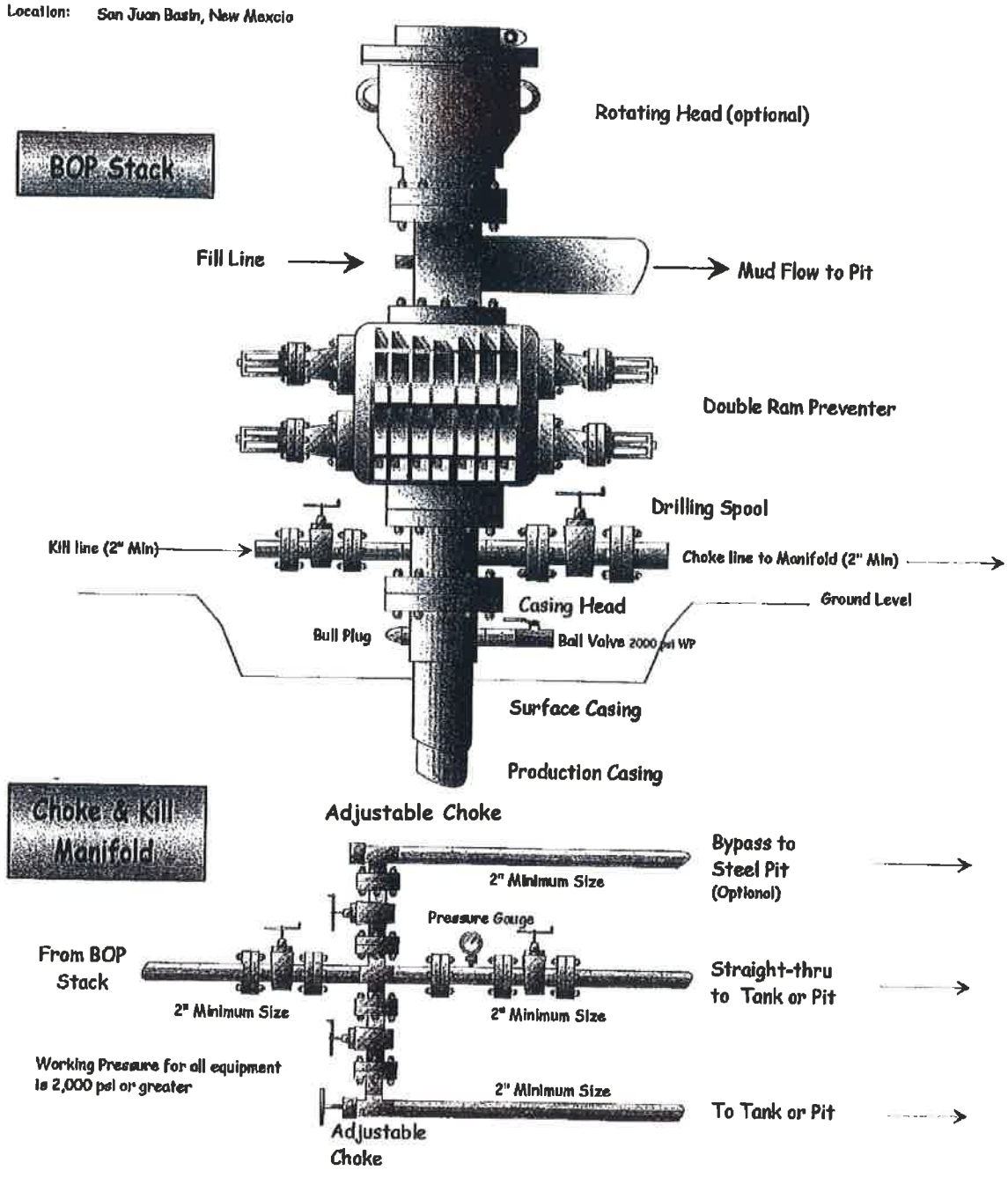
LOGOS RESOURCES II, LLC

Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1
Typical BOP setup

Location: San Juan Basin, New Mexcio



Directions from the Intersection of US Hwy 550 & US Hwy 64

in Bloomfield, NM to Logos Operating, LLC Apollo 2407 29E #2H

2162' FNL & 64' FWL, Section 29, T24N, R7W, N.M.P.M., Rio Arriba County, NM

Latitude: 36.286183°N Longitude: 107.606483°W Datum: NAD1983

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, @ Farmer's Market travel Southerly on US Hwy 550 for 46.8 miles to Mile Marker 104.9;

Go Left (Northerly) on County Road #377 for 0.1 mile to fork in roadway;

Go Left (Northerly) which is straight remaining on County Road #377 for 4.1 miles to fork in roadway;

Go Left (Northerly) which is straight remaining on County Road #377 for 0.6 miles to begin proposed access on left-hand side of roadway which continues for 4599.6' to staked Logos Apollo 2407 29E #2H location.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original to Appropriate District Office

GAS CAPTURE PLAN

Dat February 5, 2020

☐ Original
☒ Amended - Reason for Amendment:

Operator & OGRID No.: LOGOS Operating, LLC / 289408

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.
Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Federal 2407 29E 1H	30-039-31379	E-29-24N-07W	2188 FNL, 93 FWL	439	Flared	
Apollo 2407 29E 2H	30-039-30-039-31396	E-29-24N-07W	2162 FNL, 64 FWL	516	Flared	
Apollo 2407 29E 3H	30-039-	E-29-24N-07W	2149 FNL, 49 FWL	351	Flared	
Apollo 2407 29E 4H	30-039-	E-29-24N-07W	2188 FNL, 93 FWL	469	Flared	

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to Whiptail/Harvest and will be connected to Whiptail/Harvest low/high pressure gathering system located in San Juan County, New Mexico. It will require 250' of pipeline to connect the facility to low/high pressure gathering system. LOGOS provides (periodically) to Whiptail/Harvest a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, LOGOS and Whiptail/Harvest have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at Harvest Ignacio Processing Plant located in Sec. 35/36, Twn. 34N, Rng. 9W, LaPLata County, Colorado. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on Whiptail/Harvest system at that time. Based on current information, it is LOGOS's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
  - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
  - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
  - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines