

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval, Division Director
Oil Conservation Division



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 3H

API 30-039-31397 Section: 29, **Township:** 24N, **Range:** 7 W

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

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

☒ 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

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

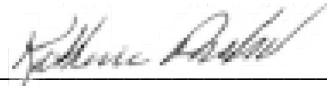
- A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
- A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
- A below grade tank requires a registration be filed prior to the construction or use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

☒ 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

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

☒ 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.

☒ 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.



NMOCD Approved by Signature

10/29/2020

Date

Form 3160-3
(June 2015)FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

| | | |
|---|---|---|
| 1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER | | 5. Lease Serial No. NMNM117567 |
| 1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other | | 6. If Indian, Allottee or Tribe Name |
| 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone | | 7. If Unit or CA Agreement, Name and No. |
| 2. Name of Operator LOGOS OPERATING LLC | | 8. Lease Name and Well No. APOLLO 2407 29E 3H |
| 3a. Address 2010 Afton Place, FARMINGTON, NM 87401 | 3b. Phone No. (include area code) (505) 324-4145 | 9. API Well No. 30-039-31397 |
| 4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SWNW / 2149 FNL / 49 FWL / LAT 36.28622 / LONG -107.606533 At proposed prod. zone NWSW / 2398 FSL / 223 FWL / LAT 36.298896 / LONG -107.624 | | 10. Field and Pool, or Exploratory ESCRITO/ESCRITO-GALLUP ASSOCIAT |
| 14. Distance in miles and direction from nearest town or post office* 47 miles | | 11. Sec., T. R. M. or Blk. and Survey or Area SEC 29/T24N/R7W/NMP |
| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 49 feet | 16. No of acres in lease 1722.45 | 17. Spacing Unit dedicated to this well 361.64 |
| 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 20 feet | 19. Proposed Depth 6089 feet / 12435 feet | 20. BLM/BIA Bond No. in file FED: NMB001387 |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7300 feet | 22. Approximate date work will start* 03/07/2020 | 23. Estimated duration 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. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan. | 5. Operator certification. |
| 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). | 6. Such other site specific information and/or plans as may be requested by the BLM. |

| | | |
|--|--|--------------------|
| 25. Signature (Electronic Submission) | Name (Printed/Typed) MARIE FLOREZ / Ph: (505) 324-4145 | Date 02/06/2020 |
| Title Regulatory Specialist | | |
| Approved by (Signature) (Electronic Submission) | Name (Printed/Typed) Dave Mankiewicz / Ph: (505) 564-7761 | Date 09/16/2020 |
| Title AFM-Minerals Office 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
Approval Date: 09/16/2020

(Continued on page 2)

*(Instructions on page 2)

AV

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

Form C-102
Revised August 1, 2011

Submit one copy to
Appropriate District Office

OIL CONSERVATION DIVISION
1220 South St. Francis Drive
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

| | | | |
|------------------------------------|--|---------------------|---|
| *API Number 30-039-31397 | | *Pool Code 22619 | *Pool Name ESCRITO GALLUP (ASSOCIATED) |
| *Property Code 328118 | *Property Name APOLLO 2407 29E | | *Well Number 3H |
| *GRID No. 289408 | *Operator Name LOGOS OPERATING, LLC | | *Elevation 7300' |

¹⁰ Surface Location

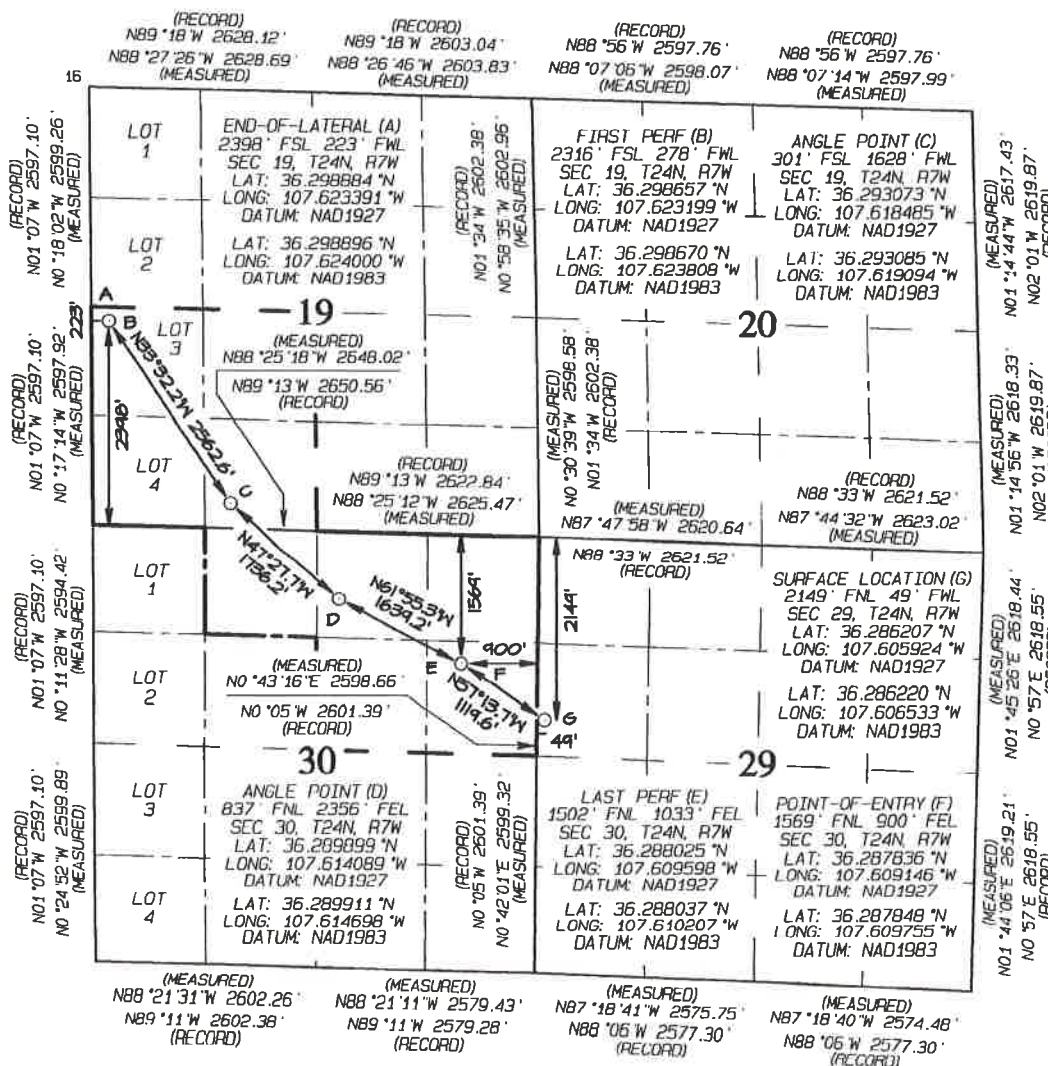
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| E | 29 | 24N | 7W | | 2149 | NORTH | 49 | 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 |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| L | 19 | 24N | 7W | 3 | 2398 | SOUTH | 223 | WEST | RIO ARriba |

| | | | |
|--|-------------------------------|----------------------------------|-------------------------|
| ¹² Dedicated Acres 361.64 W/2 SW/4 (LOTS 3 & 4) E/2 SW/4 - Section 19 NE/4 NW/4, NE/4 - Section 30 | ¹³ Joint or Infill | ¹⁴ Consolidation Code | ¹⁵ Order No. |
|--|-------------------------------|----------------------------------|-------------------------|

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.

Signature *Tamra Sessions* Date *2/4/20*
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
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 Com 3H | Elevation: | 7,300' |
| Surface Location: | Sec 29, T24N, R7W 2149 FNL, 49 FWL (36.286220° N, 107.606533° W – NAD83) | Measured Depth: | 12,435 |
| Bottom Hole Location: | Sec 19, T24N, R7W 2398 FSL, 223 FWL (36.298896° N, 107.624000° 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 | 1744 | 1743 | MENEFEE | 4047 | 4034 |
| KIRTLAND | 1894 | 1892 | *POINT LOOKOUT | 4730 | 4714 |
| *FRUITLAND | 2106 | 2103 | *MANCOS | 5029 | 5011 |
| *PICTURED CLIFFS | 2439 | 2434 | GALLUP | 5855 | 5796 |
| CHACRA | 3312 | 3303 | KICKOFF POINT | 5,430 | 5,410 |
| *CLIFF HOUSE | 3984 | 3971 | LANDING POINT | 6,485 | 6,055 |
| | | | TD | 12,435 | 6,089 |

* 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.

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 | CON N |
|--------------|--------------|------------------|----------|----------|----------------|-------|
| SURFACE | 12.25" | 320' | 9.625" | 36 LBS | J-55 or equiv | STC |
| INTERMEDIATE | 8.75" | 6,485' | 7" | 23 LBS | J-55 or equiv | LTC |
| PRODUCTION | 6.125" | 6,385' – 12,435' | 4.5" | 11.6 LBS | P-110 or equiv | LTC |
| TIE BACK | 6.125" | Surf. – 6,385' | 4.5" | 11.6 LBS | P-110 or equiv | LTC |

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 cancellation 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: 242 bbls, 697 sks (1359 cu.ft.), 12.3 ppg@ 1.95 cuft/sk yield. Tail Cement: 50 bbls, 215 sks, (279 cuft), 13.5 ppg@ 1.3 cu'ft/sk yield. Displacement: Displace w/ drilling mud or water. Total Cement: 292 bbls, 912 sks, (1638 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 (567 sx / 771 cuft /137 bbls). Tail Spacer: 40 BBL of MMCR. Displacement: Displace w/ 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.

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

| Apollo 2407 29E 3H | | | | | | | | | | |
|-------------------------|----------------|-------------------|--------|-----------|-----------|----------|-------------------------|----------------------|--------------------------|----------------|
| Intermediate Interval 1 | Top Interval 0 | Btm Interval 6485 | Size 7 | Weight 23 | Grade J55 | Conn LTC | Collapse 3,270 1.125 | Burst 4,360 1.000 | Tension 313,000 1.200 | Notes 0'-6485' |

Collapse

| Interval 1 | 0 | 6485 | Depth TVD 6055 | MW In 0 | MW out 9 | Pres In 0 | Pres out 2834 | SF - 1.125 1.15 |
|------------|-----|------|----------------|---------|----------|-----------|---------------|--------------------|
| 23 | J55 | | | | | | | |

Burst

| Interval 1 | 0 | 6485 | Depth TVD 6055 | MW In 9 | MW out 0 | Pres In 2834 2834 | Pres out 0 | SF - 1.0 1.54 | Frac Pres 0 |
|------------|-----|------|----------------|---------|----------|----------------------|------------|------------------|-------------|
| 23 | J55 | | | | | | | | |

Tension

| Interval 1 | 0 | 6485 | Depth TVD 6055 | Mud Wt 9 BF 0.8626 | Air Wt 139,265 | Bouy Wt 120,129 | BW +100k 220,129 | SF - 1.2 1.42 |
|------------|-----|------|----------------|--------------------------|----------------|-----------------|------------------|------------------|
| 23 | J55 | | | | | | | |

$$BF = 1 - (MW) / 65.5$$

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

Apollo 2407 29E 3H

| Liner | Size | Weight | Grade | Conn | Collapse | Burst | Tension | Notes |
|------------|----------------------------|--------------------------------|------------------|-------------------|---------------------|-----------------|------------------|--|
| Interval 1 | 4.5 | 11.6 | P-110 | LTC | 7,560 1.125 | 10,690 1.000 | 278,000 1.200 | TD 12435', TVD 6089' |
| Collapse | Casing Depth (TVD) 6089 | MW In 0.00 | MW out 9.00 | Pres in 0 | Pres out 2850 | SF 2.65 | | |
| Burst | 6089 | 9.00 | 0.00 | 2850 9350 | 0 | 1.14 | 6500 | 6500 psi frac pressure + no backup Burst pressure = Hyd + frac pressure |
| Tension | 6089 | Mud Wt 8.80 BF 0.8656 | Alr Wt 70,632 | Bouy Wt 61,143 | BW +100k 161,143 | 1.73 | | 100k over pull BF= 1- (MW)/65.5 |

Apollo 2407 29E 3H

341 psi (Maximum Estimated SIP)

| | | | | | | |
|-----------------|---------------------|--------------|---------------|----------------|-----------------|--------------|
| Collapse | Casing Depth | MW in | MW out | Pres in | Pres out | SF |
| | 320 | 0 | 9 | 0 | 146 | 13.79 |

| | | | | | | | |
|----------------|------------|---------------|---------------|----------------|-----------------|-----------|------------------|
| | | 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 | | | | | |

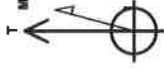


Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Apollo 2407-29E
Well: Apollo 2407-29E 3H
Wellbore: OH
Design: Plan #3

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: 49371.8nT
Dip Angle: 62.83°
Date: 4/30/2020
Model: HDGM_FILE

WELL DETAILS: Apollo 2407-29E 3H

+N/-S +E/-W Northing Easting
0.00 0.00 1923561.75 2789933.15
GL 7300' @ 7300.00usft
Longitude
-107.6065330

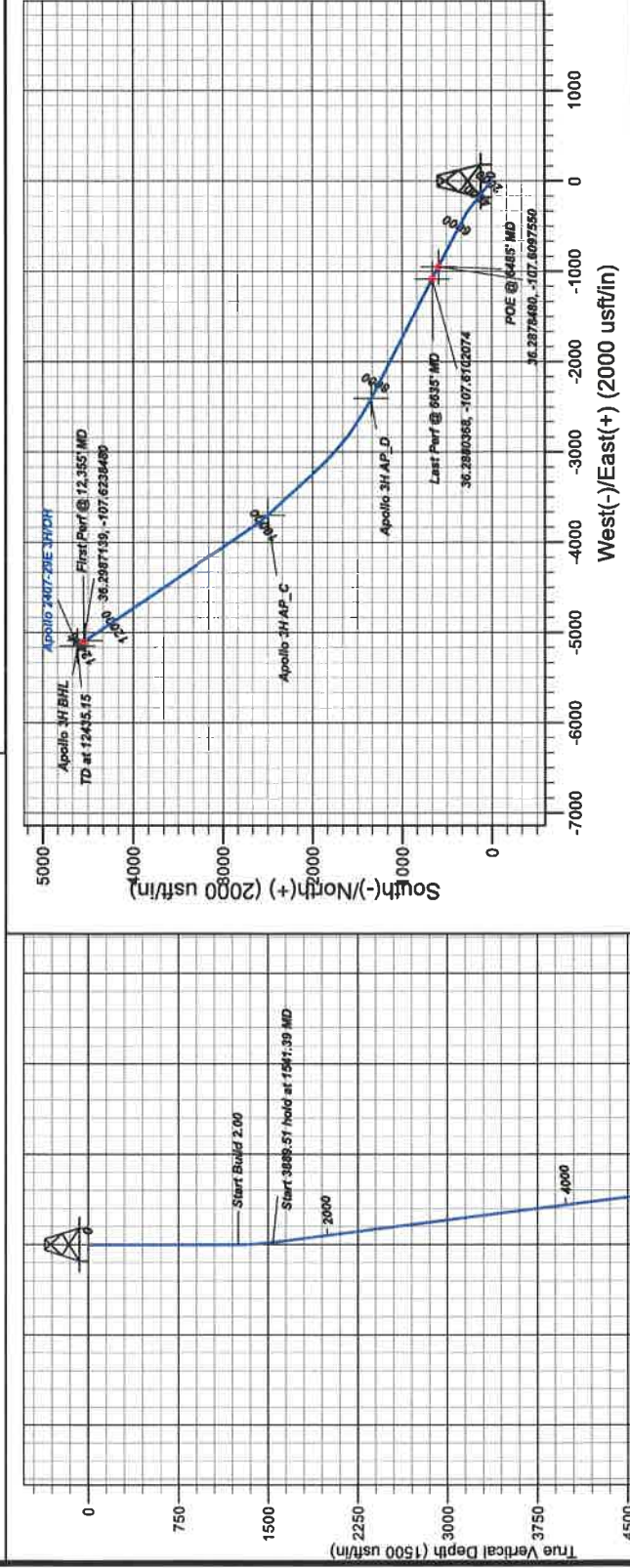
Plan: Plan #3 (Apollo 2407-29E 3H/OH)
Created By: Janie Collins Date: 11:12, January 30 2020

DESIGN TARGET DETAILS

| Name | +N/-S | +E/-W | TVD | MD | Inc | Ad | TVD | +N/-S | +E/-W | Dieg | TFace | VSECT | Target |
|-----------------|---------|------------|---------|----------|-------|---------|---------|---------|----------|------|--------|---------|----------------|
| Apollo 3H POE | 592.65 | 1924152.18 | 6055.00 | 0.00 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Apollo 3H AP_D | 1343.73 | 2406.25 | 6053.00 | 1250.00 | 0.00 | 0.000 | 1250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Apollo 3H AP_C | 2499.29 | 3701.61 | 6065.00 | 5430.89 | 5.83 | 308.380 | 5410.28 | 254.39 | -11.61 | 2.00 | 308.38 | 14.78 | |
| Apollo 3H BHL | 4614.87 | 5146.98 | 6068.00 | 6495.29 | 90.07 | 308.380 | 6055.00 | 1392.95 | -348.56 | 0.00 | 0.00 | 408.97 | Apollo 3H POE |
| Apollo 3H PPert | 4532.59 | 5080.42 | 6055.00 | 6495.29 | 90.07 | 297.276 | 6055.00 | 1392.95 | -348.56 | 0.00 | -0.16 | 102.52 | Apollo 3H AP_D |
| Apollo 3H LPerf | 661.46 | 1062.76 | 6054.00 | 8145.15 | 89.42 | 317.685 | 6057.61 | 1361.68 | -3212.14 | 2.00 | 91.86 | 3701.11 | Apollo 3H AP_C |
| | | | | 8872.25 | 89.42 | 317.685 | 6065.00 | 2499.29 | -3701.61 | 0.00 | 0.00 | 4424.45 | Apollo 3H BHL |
| | | | | 10057.46 | 89.47 | 325.958 | 6066.81 | 2644.75 | -3815.99 | 4.47 | 89.71 | 4806.72 | |
| | | | | 12435.15 | 89.47 | 325.958 | 6089.00 | 4614.87 | -5146.98 | 0.00 | 0.00 | 6912.92 | |

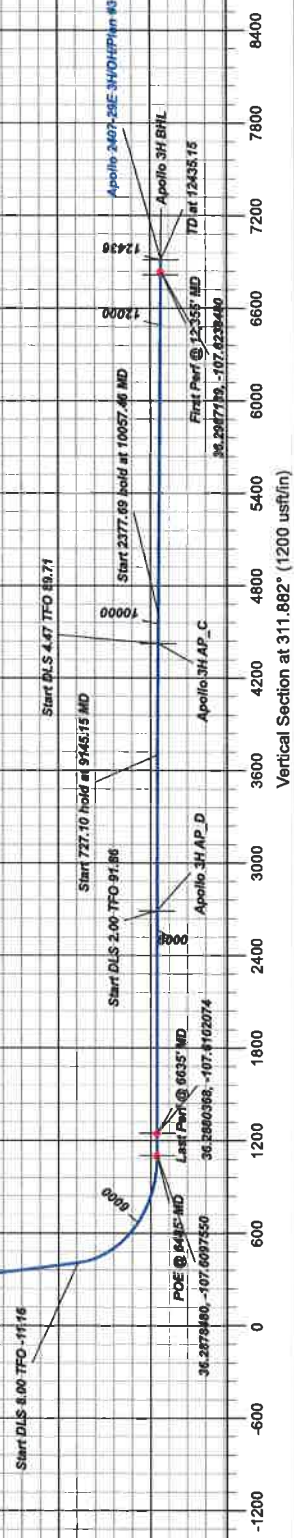
SECTION DETAILS

| Name | +N/-S | +E/-W | TVD | MD | Inc | Ad | TVD | +N/-S | +E/-W | Dieg | TFace | VSECT | Target |
|----------------|---------|----------|---------|----------|-------|---------|---------|---------|----------|------|-------|---------|--------|
| Apollo 3H BHL | 4614.87 | -5146.98 | 6089.00 | 12435.15 | 89.47 | 325.958 | 6089.00 | 4614.87 | -5146.98 | 0.00 | 0.00 | 6912.92 | |
| Apollo 3H AP_C | 2644.75 | -3815.99 | 6066.81 | 10057.46 | 89.47 | 325.958 | 6066.81 | 2644.75 | -3815.99 | 4.47 | 89.71 | 4806.72 | |
| Apollo 3H AP_D | 1392.95 | -348.56 | 6055.00 | 5430.89 | 5.83 | 308.380 | 5410.28 | 1392.95 | -348.56 | 0.00 | 0.00 | 408.97 | |
| Apollo 3H POE | 0.00 | 0.00 | 6055.00 | 0.00 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |



FORMATION DETAILS

| MDPath | Formation |
|---------|-----------------|
| 1743.00 | Ojo Alamo |
| 1892.00 | Kirtland |
| 2103.00 | Fruitland |
| 2434.00 | Pictured Cliffs |
| 3303.00 | Chaco |
| 3971.00 | Cliff House |
| 4034.00 | Manefee |
| 4714.00 | Point Lookout |
| 5011.00 | Mancos |
| 5796.00 | Gallup |





Logos Operating LLC

Rio Arriba, NM NAD83

Apollo 2407-29E

Apollo 2407-29E 3H - Slot D

OH

Plan: Plan #3

Standard Planning Report

30 January, 2020



www.scientificdrilling.com



Scientific Drilling, Intl
Planning Report



| | | | |
|------------------|----------------------|-------------------------------------|----------------------------------|
| Database: | Grand Junction | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 3H - Slot D | | | |
| Well Position | +N/-S | 40.41 usft | Northing: | 1,923,561.76 usft |
| | +E/-W | -44.21 usft | Easting: | 2,789,933.15 usft |
| 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 | 49,371.80000000 |

| | | | | |
|--------------------------|------------------------------------|-------------------------|-------------------------|--------------------------|
| 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 | 311.882 |

| | | | | | | | | | | |
|--------------------------------------|----------------------------|------------------------|--------------------------------------|-------------------------|-------------------------|--|---------------------------------------|--------------------------------------|--------------------|----------------|
| Plan Sections | | | | | | | | | | |
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Bulld 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 | |
| 1,250.00 | 0.00 | 0.000 | 1,250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,541.39 | 5.83 | 308.380 | 1,540.88 | 9.19 | -11.61 | 2.00 | 2.00 | 0.00 | 308.38 | |
| 5,430.89 | 5.83 | 308.380 | 5,410.29 | 254.39 | -321.20 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 6,485.29 | 90.07 | 297.276 | 6,055.00 | 592.65 | -949.56 | 8.00 | 7.99 | -1.05 | -11.16 | Apollo 3H POE |
| 8,124.21 | 90.07 | 297.276 | 6,053.00 | 1,343.73 | -2,406.25 | 0.00 | 0.00 | 0.00 | 0.00 | Apollo 3H AP_D |
| 9,145.15 | 89.42 | 317.684 | 6,057.61 | 1,961.66 | -3,212.14 | 2.00 | -0.06 | 2.00 | 91.86 | |
| 9,872.25 | 89.42 | 317.684 | 6,065.00 | 2,499.29 | -3,701.61 | 0.00 | 0.00 | 0.00 | 0.00 | Apollo 3H AP_C |
| 10,057.46 | 89.47 | 325.958 | 6,066.81 | 2,644.75 | -3,815.99 | 4.47 | 0.03 | 4.47 | 89.71 | |
| 12,435.15 | 89.47 | 325.958 | 6,089.00 | 4,614.87 | -5,146.98 | 0.00 | 0.00 | 0.00 | 0.00 | Apollo 3H BHL |



Scientific Drilling, Intl
Planning Report



| | | | |
|------------------|----------------------|-------------------------------------|----------------------------------|
| Database: | Grand Junction | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 |
| 1,250.00 | 0.00 | 0.000 | 1,250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,300.00 | 1.00 | 308.380 | 1,300.00 | 0.27 | -0.34 | 0.44 | 2.00 | 2.00 | 0.00 |
| 1,400.00 | 3.00 | 308.380 | 1,399.93 | 2.44 | -3.08 | 3.92 | 2.00 | 2.00 | 0.00 |
| 1,500.00 | 5.00 | 308.380 | 1,499.68 | 6.77 | -8.55 | 10.88 | 2.00 | 2.00 | 0.00 |
| 1,541.39 | 5.83 | 308.380 | 1,540.88 | 9.19 | -11.61 | 14.78 | 2.00 | 2.00 | 0.00 |
| 1,600.00 | 5.83 | 308.380 | 1,599.19 | 12.89 | -16.27 | 20.72 | 0.00 | 0.00 | 0.00 |
| 1,700.00 | 5.83 | 308.380 | 1,698.68 | 19.19 | -24.23 | 30.85 | 0.00 | 0.00 | 0.00 |
| 1,800.00 | 5.83 | 308.380 | 1,798.16 | 25.50 | -32.19 | 40.99 | 0.00 | 0.00 | 0.00 |
| 1,900.00 | 5.83 | 308.380 | 1,897.64 | 31.80 | -40.15 | 51.12 | 0.00 | 0.00 | 0.00 |
| 2,000.00 | 5.83 | 308.380 | 1,997.13 | 38.10 | -48.11 | 61.26 | 0.00 | 0.00 | 0.00 |
| 2,100.00 | 5.83 | 308.380 | 2,096.61 | 44.41 | -56.07 | 71.39 | 0.00 | 0.00 | 0.00 |
| 2,200.00 | 5.83 | 308.380 | 2,196.09 | 50.71 | -64.03 | 81.53 | 0.00 | 0.00 | 0.00 |
| 2,300.00 | 5.83 | 308.380 | 2,295.58 | 57.02 | -71.99 | 91.66 | 0.00 | 0.00 | 0.00 |
| 2,400.00 | 5.83 | 308.380 | 2,395.06 | 63.32 | -79.95 | 101.80 | 0.00 | 0.00 | 0.00 |
| 2,500.00 | 5.83 | 308.380 | 2,494.54 | 69.63 | -87.91 | 111.93 | 0.00 | 0.00 | 0.00 |
| 2,600.00 | 5.83 | 308.380 | 2,594.03 | 75.93 | -95.87 | 122.07 | 0.00 | 0.00 | 0.00 |
| 2,700.00 | 5.83 | 308.380 | 2,693.51 | 82.23 | -103.83 | 132.20 | 0.00 | 0.00 | 0.00 |
| 2,800.00 | 5.83 | 308.380 | 2,792.99 | 88.54 | -111.79 | 142.34 | 0.00 | 0.00 | 0.00 |
| 2,900.00 | 5.83 | 308.380 | 2,892.48 | 94.84 | -119.75 | 152.47 | 0.00 | 0.00 | 0.00 |
| 3,000.00 | 5.83 | 308.380 | 2,991.96 | 101.15 | -127.71 | 162.61 | 0.00 | 0.00 | 0.00 |
| 3,100.00 | 5.83 | 308.380 | 3,091.44 | 107.45 | -135.67 | 172.74 | 0.00 | 0.00 | 0.00 |
| 3,200.00 | 5.83 | 308.380 | 3,190.93 | 113.75 | -143.63 | 182.88 | 0.00 | 0.00 | 0.00 |
| 3,300.00 | 5.83 | 308.380 | 3,290.41 | 120.06 | -151.59 | 193.01 | 0.00 | 0.00 | 0.00 |
| 3,400.00 | 5.83 | 308.380 | 3,389.89 | 126.36 | -159.55 | 203.14 | 0.00 | 0.00 | 0.00 |
| 3,500.00 | 5.83 | 308.380 | 3,489.38 | 132.67 | -167.51 | 213.28 | 0.00 | 0.00 | 0.00 |
| 3,600.00 | 5.83 | 308.380 | 3,588.86 | 138.97 | -175.47 | 223.41 | 0.00 | 0.00 | 0.00 |
| 3,700.00 | 5.83 | 308.380 | 3,688.34 | 145.27 | -183.42 | 233.55 | 0.00 | 0.00 | 0.00 |
| 3,800.00 | 5.83 | 308.380 | 3,787.82 | 151.58 | -191.38 | 243.68 | 0.00 | 0.00 | 0.00 |
| 3,900.00 | 5.83 | 308.380 | 3,887.31 | 157.88 | -199.34 | 253.82 | 0.00 | 0.00 | 0.00 |
| 4,000.00 | 5.83 | 308.380 | 3,986.79 | 164.19 | -207.30 | 263.95 | 0.00 | 0.00 | 0.00 |
| 4,100.00 | 5.83 | 308.380 | 4,086.27 | 170.49 | -215.26 | 274.09 | 0.00 | 0.00 | 0.00 |
| 4,200.00 | 5.83 | 308.380 | 4,185.76 | 176.80 | -223.22 | 284.22 | 0.00 | 0.00 | 0.00 |
| 4,300.00 | 5.83 | 308.380 | 4,285.24 | 183.10 | -231.18 | 294.36 | 0.00 | 0.00 | 0.00 |
| 4,400.00 | 5.83 | 308.380 | 4,384.72 | 189.40 | -239.14 | 304.49 | 0.00 | 0.00 | 0.00 |
| 4,500.00 | 5.83 | 308.380 | 4,484.21 | 195.71 | -247.10 | 314.63 | 0.00 | 0.00 | 0.00 |
| 4,600.00 | 5.83 | 308.380 | 4,583.69 | 202.01 | -255.06 | 324.76 | 0.00 | 0.00 | 0.00 |
| 4,700.00 | 5.83 | 308.380 | 4,683.17 | 208.32 | -263.02 | 334.90 | 0.00 | 0.00 | 0.00 |
| 4,800.00 | 5.83 | 308.380 | 4,782.66 | 214.62 | -270.98 | 345.03 | 0.00 | 0.00 | 0.00 |
| 4,900.00 | 5.83 | 308.380 | 4,882.14 | 220.92 | -278.94 | 355.17 | 0.00 | 0.00 | 0.00 |
| 5,000.00 | 5.83 | 308.380 | 4,981.62 | 227.23 | -286.90 | 365.30 | 0.00 | 0.00 | 0.00 |
| 5,100.00 | 5.83 | 308.380 | 5,081.11 | 233.53 | -294.86 | 375.44 | 0.00 | 0.00 | 0.00 |



Scientific Drilling, Intl
Planning Report



| | | | |
|------------------|----------------------|-------------------------------------|----------------------------------|
| Database: | Grand Junction | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 | 5.83 | 308.380 | 5,180.59 | 239.84 | -302.82 | 385.57 | 0.00 | 0.00 | 0.00 | |
| 5,300.00 | 5.83 | 308.380 | 5,280.07 | 246.14 | -310.78 | 395.71 | 0.00 | 0.00 | 0.00 | |
| 5,400.00 | 5.83 | 308.380 | 5,379.56 | 252.45 | -318.74 | 405.84 | 0.00 | 0.00 | 0.00 | |
| 5,430.89 | 5.83 | 308.380 | 5,410.29 | 254.39 | -321.20 | 408.97 | 0.00 | 0.00 | 0.00 | |
| 5,500.00 | 11.30 | 302.921 | 5,478.60 | 260.26 | -329.64 | 419.17 | 8.00 | 7.92 | -7.90 | |
| 5,600.00 | 19.28 | 300.498 | 5,574.98 | 273.98 | -352.13 | 445.08 | 8.00 | 7.98 | -2.42 | |
| 5,700.00 | 27.27 | 299.462 | 5,666.77 | 293.66 | -386.35 | 483.69 | 8.00 | 7.99 | -1.04 | |
| 5,800.00 | 35.26 | 298.870 | 5,752.18 | 318.91 | -431.65 | 534.27 | 8.00 | 7.99 | -0.59 | |
| 5,900.00 | 43.26 | 298.474 | 5,829.55 | 349.23 | -487.14 | 595.83 | 8.00 | 8.00 | -0.40 | |
| 6,000.00 | 51.26 | 298.181 | 5,897.36 | 384.04 | -551.74 | 667.16 | 8.00 | 8.00 | -0.29 | |
| 6,100.00 | 59.25 | 297.947 | 5,954.31 | 422.66 | -624.19 | 746.89 | 8.00 | 8.00 | -0.23 | |
| 6,200.00 | 67.25 | 297.749 | 5,999.28 | 464.33 | -703.09 | 833.45 | 8.00 | 8.00 | -0.20 | |
| 6,300.00 | 75.25 | 297.574 | 6,031.39 | 508.25 | -786.89 | 925.17 | 8.00 | 8.00 | -0.18 | |
| 6,400.00 | 83.25 | 297.410 | 6,050.03 | 553.57 | -873.97 | 1,020.25 | 8.00 | 8.00 | -0.16 | |
| 6,485.29 | 90.07 | 297.276 | 6,055.00 | 592.65 | -949.56 | 1,102.62 | 8.00 | 8.00 | -0.16 | |
| 6,500.00 | 90.07 | 297.276 | 6,054.98 | 599.39 | -962.63 | 1,116.86 | 0.00 | 0.00 | 0.00 | |
| 6,600.00 | 90.07 | 297.276 | 6,054.86 | 645.22 | -1,051.51 | 1,213.63 | 0.00 | 0.00 | 0.00 | |
| 6,700.00 | 90.07 | 297.276 | 6,054.74 | 691.05 | -1,140.39 | 1,310.39 | 0.00 | 0.00 | 0.00 | |
| 6,800.00 | 90.07 | 297.276 | 6,054.62 | 736.88 | -1,229.28 | 1,407.16 | 0.00 | 0.00 | 0.00 | |
| 6,900.00 | 90.07 | 297.276 | 6,054.49 | 782.70 | -1,318.16 | 1,503.93 | 0.00 | 0.00 | 0.00 | |
| 7,000.00 | 90.07 | 297.276 | 6,054.37 | 828.53 | -1,407.04 | 1,600.70 | 0.00 | 0.00 | 0.00 | |
| 7,100.00 | 90.07 | 297.276 | 6,054.25 | 874.36 | -1,495.92 | 1,697.47 | 0.00 | 0.00 | 0.00 | |
| 7,200.00 | 90.07 | 297.276 | 6,054.13 | 920.19 | -1,584.80 | 1,794.24 | 0.00 | 0.00 | 0.00 | |
| 7,300.00 | 90.07 | 297.276 | 6,054.01 | 966.01 | -1,673.68 | 1,891.00 | 0.00 | 0.00 | 0.00 | |
| 7,400.00 | 90.07 | 297.276 | 6,053.88 | 1,011.84 | -1,762.56 | 1,987.77 | 0.00 | 0.00 | 0.00 | |
| 7,500.00 | 90.07 | 297.276 | 6,053.76 | 1,057.67 | -1,851.44 | 2,084.54 | 0.00 | 0.00 | 0.00 | |
| 7,600.00 | 90.07 | 297.276 | 6,053.64 | 1,103.50 | -1,940.32 | 2,181.31 | 0.00 | 0.00 | 0.00 | |
| 7,700.00 | 90.07 | 297.276 | 6,053.52 | 1,149.32 | -2,029.21 | 2,278.08 | 0.00 | 0.00 | 0.00 | |
| 7,800.00 | 90.07 | 297.276 | 6,053.40 | 1,195.15 | -2,118.09 | 2,374.84 | 0.00 | 0.00 | 0.00 | |
| 7,900.00 | 90.07 | 297.276 | 6,053.27 | 1,240.98 | -2,206.97 | 2,471.61 | 0.00 | 0.00 | 0.00 | |
| 8,000.00 | 90.07 | 297.276 | 6,053.15 | 1,286.81 | -2,295.85 | 2,568.38 | 0.00 | 0.00 | 0.00 | |
| 8,100.00 | 90.07 | 297.276 | 6,053.03 | 1,332.63 | -2,384.73 | 2,665.15 | 0.00 | 0.00 | 0.00 | |
| 8,124.21 | 90.07 | 297.276 | 6,053.00 | 1,343.73 | -2,406.25 | 2,688.57 | 0.00 | 0.00 | 0.00 | |
| 8,200.00 | 90.02 | 298.791 | 6,052.94 | 1,379.35 | -2,473.14 | 2,762.16 | 2.00 | -0.06 | 2.00 | |
| 8,300.00 | 89.96 | 300.790 | 6,052.96 | 1,429.03 | -2,559.92 | 2,859.94 | 2.00 | -0.06 | 2.00 | |
| 8,400.00 | 89.89 | 302.789 | 6,053.09 | 1,481.70 | -2,644.92 | 2,958.39 | 2.00 | -0.06 | 2.00 | |
| 8,500.00 | 89.83 | 304.788 | 6,053.34 | 1,537.31 | -2,728.02 | 3,057.38 | 2.00 | -0.06 | 2.00 | |
| 8,600.00 | 89.76 | 306.787 | 6,053.70 | 1,595.79 | -2,809.14 | 3,156.81 | 2.00 | -0.06 | 2.00 | |
| 8,700.00 | 89.70 | 308.786 | 6,054.17 | 1,657.05 | -2,888.16 | 3,256.55 | 2.00 | -0.06 | 2.00 | |
| 8,800.00 | 89.63 | 310.785 | 6,054.75 | 1,721.04 | -2,965.00 | 3,356.48 | 2.00 | -0.06 | 2.00 | |
| 8,900.00 | 89.57 | 312.784 | 6,055.45 | 1,787.67 | -3,039.56 | 3,456.47 | 2.00 | -0.06 | 2.00 | |
| 9,000.00 | 89.51 | 314.783 | 6,056.25 | 1,856.86 | -3,111.75 | 3,556.41 | 2.00 | -0.06 | 2.00 | |
| 9,100.00 | 89.45 | 316.782 | 6,057.16 | 1,928.52 | -3,181.49 | 3,656.17 | 2.00 | -0.06 | 2.00 | |
| 9,145.15 | 89.42 | 317.684 | 6,057.61 | 1,961.66 | -3,212.14 | 3,701.11 | 2.00 | -0.06 | 2.00 | |
| 9,200.00 | 89.42 | 317.684 | 6,058.17 | 2,002.22 | -3,249.07 | 3,755.68 | 0.00 | 0.00 | 0.00 | |
| 9,300.00 | 89.42 | 317.684 | 6,059.19 | 2,076.16 | -3,316.38 | 3,855.17 | 0.00 | 0.00 | 0.00 | |
| 9,400.00 | 89.42 | 317.684 | 6,060.20 | 2,150.10 | -3,383.70 | 3,954.65 | 0.00 | 0.00 | 0.00 | |
| 9,500.00 | 89.42 | 317.684 | 6,061.22 | 2,224.04 | -3,451.02 | 4,054.13 | 0.00 | 0.00 | 0.00 | |
| 9,600.00 | 89.42 | 317.684 | 6,062.23 | 2,297.98 | -3,518.34 | 4,153.61 | 0.00 | 0.00 | 0.00 | |
| 9,700.00 | 89.42 | 317.684 | 6,063.25 | 2,371.93 | -3,585.66 | 4,253.10 | 0.00 | 0.00 | 0.00 | |
| 9,800.00 | 89.42 | 317.684 | 6,064.27 | 2,445.87 | -3,652.97 | 4,352.58 | 0.00 | 0.00 | 0.00 | |
| 9,872.25 | 89.42 | 317.684 | 6,065.00 | 2,499.29 | -3,701.61 | 4,424.45 | 0.00 | 0.00 | 0.00 | |
| 9,900.00 | 89.42 | 318.924 | 6,065.28 | 2,520.01 | -3,720.07 | 4,452.03 | 4.47 | 0.02 | 4.47 | |
| 10,000.00 | 89.45 | 323.391 | 6,066.26 | 2,597.87 | -3,782.77 | 4,550.69 | 4.47 | 0.03 | 4.47 | |



Scientific Drilling, Intl Planning Report



| | | | |
|------------------|----------------------|-------------------------------------|----------------------------------|
| Database: | Grand Junction | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 10,057.46 | 89.47 | 325.958 | 6,066.81 | 2,644.75 | -3,815.99 | 4,606.72 | 4.47 | 0.03 | 4.47 |
| 10,100.00 | 89.47 | 325.958 | 6,067.21 | 2,679.99 | -3,839.80 | 4,647.98 | 0.00 | 0.00 | 0.00 |
| 10,200.00 | 89.47 | 325.958 | 6,068.14 | 2,762.85 | -3,895.78 | 4,744.97 | 0.00 | 0.00 | 0.00 |
| 10,300.00 | 89.47 | 325.958 | 6,069.07 | 2,845.71 | -3,951.76 | 4,841.96 | 0.00 | 0.00 | 0.00 |
| 10,400.00 | 89.47 | 325.958 | 6,070.01 | 2,928.57 | -4,007.73 | 4,938.96 | 0.00 | 0.00 | 0.00 |
| 10,500.00 | 89.47 | 325.958 | 6,070.94 | 3,011.43 | -4,063.71 | 5,035.95 | 0.00 | 0.00 | 0.00 |
| 10,600.00 | 89.47 | 325.958 | 6,071.87 | 3,094.29 | -4,119.69 | 5,132.94 | 0.00 | 0.00 | 0.00 |
| 10,700.00 | 89.47 | 325.958 | 6,072.81 | 3,177.15 | -4,175.67 | 5,229.94 | 0.00 | 0.00 | 0.00 |
| 10,800.00 | 89.47 | 325.958 | 6,073.74 | 3,260.01 | -4,231.65 | 5,326.93 | 0.00 | 0.00 | 0.00 |
| 10,900.00 | 89.47 | 325.958 | 6,074.67 | 3,342.86 | -4,287.63 | 5,423.92 | 0.00 | 0.00 | 0.00 |
| 11,000.00 | 89.47 | 325.958 | 6,075.61 | 3,425.72 | -4,343.60 | 5,520.92 | 0.00 | 0.00 | 0.00 |
| 11,100.00 | 89.47 | 325.958 | 6,076.54 | 3,508.58 | -4,399.58 | 5,617.91 | 0.00 | 0.00 | 0.00 |
| 11,200.00 | 89.47 | 325.958 | 6,077.47 | 3,591.44 | -4,455.56 | 5,714.90 | 0.00 | 0.00 | 0.00 |
| 11,300.00 | 89.47 | 325.958 | 6,078.41 | 3,674.30 | -4,511.54 | 5,811.90 | 0.00 | 0.00 | 0.00 |
| 11,400.00 | 89.47 | 325.958 | 6,079.34 | 3,757.16 | -4,567.52 | 5,908.89 | 0.00 | 0.00 | 0.00 |
| 11,500.00 | 89.47 | 325.958 | 6,080.27 | 3,840.02 | -4,623.50 | 6,005.88 | 0.00 | 0.00 | 0.00 |
| 11,600.00 | 89.47 | 325.958 | 6,081.21 | 3,922.88 | -4,679.47 | 6,102.88 | 0.00 | 0.00 | 0.00 |
| 11,700.00 | 89.47 | 325.958 | 6,082.14 | 4,005.73 | -4,735.45 | 6,199.87 | 0.00 | 0.00 | 0.00 |
| 11,800.00 | 89.47 | 325.958 | 6,083.07 | 4,088.59 | -4,791.43 | 6,296.86 | 0.00 | 0.00 | 0.00 |
| 11,900.00 | 89.47 | 325.958 | 6,084.01 | 4,171.45 | -4,847.41 | 6,393.86 | 0.00 | 0.00 | 0.00 |
| 12,000.00 | 89.47 | 325.958 | 6,084.94 | 4,254.31 | -4,903.39 | 6,490.85 | 0.00 | 0.00 | 0.00 |
| 12,100.00 | 89.47 | 325.958 | 6,085.87 | 4,337.17 | -4,959.36 | 6,587.84 | 0.00 | 0.00 | 0.00 |
| 12,200.00 | 89.47 | 325.958 | 6,086.81 | 4,420.03 | -5,015.34 | 6,684.83 | 0.00 | 0.00 | 0.00 |
| 12,300.00 | 89.47 | 325.958 | 6,087.74 | 4,502.89 | -5,071.32 | 6,781.83 | 0.00 | 0.00 | 0.00 |
| 12,400.00 | 89.47 | 325.958 | 6,088.67 | 4,585.75 | -5,127.30 | 6,878.82 | 0.00 | 0.00 | 0.00 |
| 12,435.15 | 89.47 | 325.958 | 6,089.00 | 4,614.87 | -5,146.98 | 6,912.92 | 0.00 | 0.00 | 0.00 |

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 3H AP_D - plan hits target center - Point | 0.00 | 0.000 | 6,053.00 | 1,343.73 | -2,406.25 | 1,924,899.84 | 2,787,523.76 | 36.2899110 | -107.6146980 |
| Apollo 3H LPerf - plan misses target center by 0.82usft at 6635.22usft MD (6054.82 TVD, 661.36 N, -1082.81 E) - Point | 0.00 | 0.000 | 6,054.00 | 661.46 | -1,082.76 | 1,924,220.68 | 2,788,848.84 | 36.2880370 | -107.6102070 |
| Apollo 3H POE - plan hits target center - Point | 0.00 | 0.000 | 6,055.00 | 592.65 | -949.56 | 1,924,152.18 | 2,788,982.21 | 36.2878480 | -107.6097550 |
| Apollo 3H AP_C - plan hits target center - Point | 0.00 | 0.000 | 6,065.00 | 2,499.29 | -3,701.61 | 1,926,052.36 | 2,786,225.70 | 36.2930850 | -107.6190940 |
| Apollo 3H FPerf - plan misses target center by 0.81usft at 12335.30usft MD (6088.07 TVD, 4532.14 N, -5091.08 E) - Point | 0.00 | 0.000 | 6,088.00 | 4,532.59 | -5,090.42 | 1,928,082.41 | 2,784,832.13 | 36.2986700 | -107.6238080 |
| Apollo 3H BHL - plan hits target center - Point | 0.00 | 0.000 | 6,089.00 | 4,614.87 | -5,146.98 | 1,928,164.56 | 2,784,775.38 | 36.2988960 | -107.6240000 |

| | | | |
|------------------|----------------------|-------------------------------------|----------------------------------|
| Database: | Grand Junction | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | OH | | |
| Design: | Plan #3 | | |

Formations

| Measured Depth (usft) | Vertical Depth (usft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|-----------------------|-----------------------|-----------------|-----------|---------|-------------------|
| 1,744.55 | 1,743.00 | Ojo Alamo | | 0.00 | 0.000 |
| 1,894.33 | 1,892.00 | Kirtland | | 0.00 | 0.000 |
| 2,106.42 | 2,103.00 | Fruitland | | 0.00 | 0.000 |
| 2,439.14 | 2,434.00 | Pictured Cliffs | | 0.00 | 0.000 |
| 3,312.66 | 3,303.00 | Chacra | | 0.00 | 0.000 |
| 3,984.13 | 3,971.00 | Cliff House | | 0.00 | 0.000 |
| 4,047.45 | 4,034.00 | Menefee | | 0.00 | 0.000 |
| 4,730.99 | 4,714.00 | Point Lookout | | 0.00 | 0.000 |
| 5,029.53 | 5,011.00 | Mancos | | 0.00 | 0.000 |
| 5,855.23 | 5,796.00 | Gallup | | 0.00 | 0.000 |

Plan Annotations

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment |
|-----------------------|-----------------------|-------------------|--------------|-----------------------------------|
| | | +N/-S (usft) | +E/-W (usft) | |
| 1,250.00 | 1,250.00 | 0.00 | 0.00 | Start Build 2.00 |
| 1,541.39 | 1,540.88 | 9.19 | -11.61 | Start 3889.51 hold at 1541.39 MD |
| 5,430.89 | 5,410.29 | 254.39 | -321.20 | Start DLS 8.00 TFO -11.16 |
| 6,485.29 | 6,055.00 | 592.65 | -949.56 | POE @ 6485' MD |
| 6,485.29 | 6,055.00 | 592.65 | -949.56 | 36.2878480, -107.6097550 |
| 6,635.29 | 6,054.82 | 661.39 | -1,082.88 | Last Perf @ 6635' MD |
| 6,635.29 | 6,054.82 | 661.39 | -1,082.88 | 36.2880368, -107.6102074 |
| 8,124.21 | 6,053.00 | 1,343.73 | -2,406.25 | Start DLS 2.00 TFO 91.86 |
| 9,145.15 | 6,057.61 | 1,961.66 | -3,212.14 | Start 727.10 hold at 9145.15 MD |
| 9,872.25 | 6,065.00 | 2,499.29 | -3,701.61 | Start DLS 4.47 TFO 89.71 |
| 10,057.46 | 6,066.81 | 2,644.75 | -3,815.99 | Start 2377.69 hold at 10057.46 MD |
| 12,355.15 | 6,088.25 | 4,548.58 | -5,102.19 | First Perf @ 12,355' MD |
| 12,355.15 | 6,088.25 | 4,548.58 | -5,102.19 | 36.2987139, -107.6238480 |
| 12,435.15 | 6,089.00 | 4,614.87 | -5,146.98 | TD at 12435.15 |



Logos Operating LLC

Rio Arriba, NM NAD83

Apollo 2407-29E

Apollo 2407-29E 3H

OH

Plan #3

Anticollision Report

30 January, 2020



Scientific Drilling

www.scientificdrilling.com



Scientific Drilling, Intl
Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 | 12,435.15 | Plan #3 (OH) | MWD+HDGM | OWSG MWD + HDGM | |

| Summary | | | | | | |
|-----------------------------------|---------------------------------|------------------------------|---------------------------------|----------------------------------|-------------------|---------|
| Site Name | Reference Measured Depth (usft) | Offset Measured Depth (usft) | Distance Between Centres (usft) | Distance Between Ellipses (usft) | Separation Factor | Warning |
| Offset Well - Wellbore - Design | | | | | | |
| Apollo 2407-29E | | | | | | |
| Apollo 2407-29E 1H - OH - Plan #3 | 1,250.00 | 1,250.00 | 39.93 | 30.97 | 4.455 | CC, ES |
| Apollo 2407-29E 1H - OH - Plan #3 | 1,300.00 | 1,300.00 | 40.36 | 31.04 | 4.331 | SF |
| Apollo 2407-29E 2H - OH - Plan #3 | 1,250.00 | 1,250.00 | 19.96 | 11.00 | 2.228 | CC, ES |
| Apollo 2407-29E 2H - OH - Plan #3 | 2,000.00 | 2,003.13 | 28.86 | 14.49 | 2.008 | SF |
| Apollo 2407-29E 4H - OH - Plan #3 | 1,100.00 | 1,100.00 | 59.89 | 52.01 | 7.594 | CC, ES |
| Apollo 2407-29E 4H - OH - Plan #3 | 6,050.00 | 8,888.15 | 529.94 | 412.27 | 4.504 | 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) | Vertical Depth (usft) | Offset Measured Depth (usft) | 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 | | |
| 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 4.30 | 4.30 | 132.43 | -26.94 | 29.47 | 39.93 | 31.32 | 8.60 | 4.641 | | |
| 1,250.00 | 1,250.00 | 1,250.00 | 1,250.00 | 4.48 | 4.48 | 132.43 | -26.94 | 29.47 | 39.93 | 30.97 | 8.96 | 4.455 | CC, ES | |
| 1,300.00 | 1,300.00 | 1,300.00 | 1,300.00 | 4.66 | 4.66 | -175.99 | -26.94 | 29.47 | 40.36 | 31.04 | 9.32 | 4.331 | SF | |
| 1,400.00 | 1,399.93 | 1,399.93 | 1,399.93 | 5.01 | 5.02 | -176.31 | -26.94 | 29.47 | 43.85 | 33.82 | 10.03 | 4.372 | | |
| 1,500.00 | 1,499.68 | 1,498.97 | 1,498.95 | 5.37 | 5.37 | -178.57 | -26.19 | 31.01 | 51.49 | 40.76 | 10.73 | 4.797 | | |
| 1,541.39 | 1,540.88 | 1,539.74 | 1,539.68 | 5.52 | 5.51 | 179.74 | -25.45 | 32.54 | 56.13 | 45.10 | 11.02 | 5.092 | | |
| 1,600.00 | 1,599.19 | 1,597.24 | 1,597.09 | 5.73 | 5.71 | 177.01 | -23.97 | 35.58 | 63.65 | 52.23 | 11.43 | 5.570 | | |
| 1,700.00 | 1,698.68 | 1,694.73 | 1,694.21 | 6.09 | 6.06 | 171.94 | -20.32 | 43.10 | 78.20 | 66.09 | 12.11 | 6.458 | | |
| 1,800.00 | 1,798.16 | 1,791.23 | 1,790.02 | 6.45 | 6.40 | 166.90 | -15.29 | 53.47 | 95.22 | 82.44 | 12.78 | 7.451 | | |

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



Scientific Drilling, Intl Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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: O-MWD+HDGM | | | | | | | | | | | | | Offset Well Error: 0.00 usft | |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | Warning | |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | | |
| | | | | | | | | | | | | | | |
| 1,900.00 | 1,897.64 | 1,889.15 | 1,887.01 | 6.82 | 6.76 | 162.70 | -9.45 | 65.51 | 113.92 | 100.45 | 13.47 | 8.458 | | |
| 2,000.00 | 1,997.13 | 1,987.10 | 1,984.04 | 7.19 | 7.12 | 159.69 | -3.60 | 77.55 | 133.05 | 118.88 | 14.17 | 9.391 | | |
| 2,100.00 | 2,096.61 | 2,085.04 | 2,081.07 | 7.56 | 7.48 | 157.43 | 2.24 | 89.60 | 152.44 | 137.57 | 14.87 | 10.253 | | |
| 2,200.00 | 2,196.09 | 2,182.99 | 2,178.10 | 7.93 | 7.85 | 155.69 | 8.09 | 101.64 | 172.01 | 156.44 | 15.57 | 11.046 | | |
| 2,300.00 | 2,295.58 | 2,280.94 | 2,275.13 | 8.30 | 8.22 | 154.30 | 13.93 | 113.68 | 191.70 | 175.42 | 16.28 | 11.775 | | |
| 2,400.00 | 2,395.06 | 2,378.88 | 2,372.15 | 8.67 | 8.59 | 153.17 | 19.78 | 125.73 | 211.48 | 194.49 | 16.99 | 12.447 | | |
| 2,500.00 | 2,494.54 | 2,476.83 | 2,469.18 | 9.05 | 8.97 | 152.23 | 25.62 | 137.77 | 231.32 | 213.62 | 17.70 | 13.068 | | |
| 2,600.00 | 2,594.03 | 2,574.78 | 2,566.21 | 9.42 | 9.34 | 151.44 | 31.47 | 149.81 | 251.22 | 232.80 | 18.42 | 13.641 | | |
| 2,700.00 | 2,693.51 | 2,672.72 | 2,663.24 | 9.80 | 9.72 | 150.77 | 37.32 | 161.86 | 271.15 | 252.02 | 19.13 | 14.173 | | |
| 2,800.00 | 2,792.99 | 2,770.67 | 2,760.26 | 10.17 | 10.10 | 150.19 | 43.16 | 173.90 | 291.12 | 271.27 | 19.85 | 14.667 | | |
| 2,900.00 | 2,892.48 | 2,868.62 | 2,857.29 | 10.55 | 10.48 | 149.68 | 49.01 | 185.95 | 311.11 | 290.54 | 20.57 | 15.127 | | |
| 3,000.00 | 2,991.96 | 2,966.57 | 2,954.32 | 10.93 | 10.86 | 149.24 | 54.85 | 197.99 | 331.12 | 309.83 | 21.29 | 15.555 | | |
| 3,100.00 | 3,091.44 | 3,064.51 | 3,051.35 | 11.31 | 11.25 | 148.84 | 60.70 | 210.03 | 351.14 | 329.14 | 22.01 | 15.956 | | |
| 3,200.00 | 3,190.93 | 3,162.46 | 3,148.38 | 11.69 | 11.63 | 148.49 | 66.54 | 222.08 | 371.19 | 348.46 | 22.73 | 16.332 | | |
| 3,300.00 | 3,290.41 | 3,260.41 | 3,245.40 | 12.07 | 12.02 | 148.18 | 72.39 | 234.12 | 391.24 | 367.79 | 23.45 | 16.684 | | |
| 3,400.00 | 3,389.89 | 3,358.35 | 3,342.43 | 12.44 | 12.40 | 147.89 | 78.23 | 246.17 | 411.30 | 387.13 | 24.17 | 17.015 | | |
| 3,500.00 | 3,489.38 | 3,456.30 | 3,439.46 | 12.82 | 12.79 | 147.63 | 84.08 | 258.21 | 431.38 | 406.48 | 24.90 | 17.327 | | |
| 3,600.00 | 3,588.86 | 3,554.25 | 3,536.49 | 13.20 | 13.18 | 147.40 | 89.92 | 270.25 | 451.46 | 425.84 | 25.62 | 17.621 | | |
| 3,700.00 | 3,688.34 | 3,652.19 | 3,633.52 | 13.58 | 13.56 | 147.18 | 95.77 | 282.30 | 471.54 | 445.20 | 26.35 | 17.898 | | |
| 3,800.00 | 3,787.82 | 3,750.14 | 3,730.54 | 13.96 | 13.95 | 146.99 | 101.62 | 294.34 | 491.64 | 464.57 | 27.07 | 18.161 | | |
| 3,900.00 | 3,887.31 | 3,848.09 | 3,827.57 | 14.34 | 14.34 | 146.80 | 107.46 | 306.38 | 511.73 | 483.94 | 27.80 | 18.410 | | |
| 4,000.00 | 3,986.79 | 3,946.04 | 3,924.60 | 14.73 | 14.73 | 146.63 | 113.31 | 318.43 | 531.84 | 503.31 | 28.52 | 18.646 | | |
| 4,100.00 | 4,086.27 | 4,043.98 | 4,021.63 | 15.11 | 15.12 | 146.48 | 119.15 | 330.47 | 551.94 | 522.69 | 29.25 | 18.870 | | |
| 4,200.00 | 4,185.76 | 4,141.93 | 4,118.65 | 15.49 | 15.51 | 146.33 | 125.00 | 342.52 | 572.05 | 542.08 | 29.98 | 19.083 | | |
| 4,300.00 | 4,285.24 | 4,239.88 | 4,215.68 | 15.87 | 15.90 | 146.20 | 130.84 | 354.56 | 592.17 | 561.46 | 30.70 | 19.286 | | |
| 4,400.00 | 4,384.72 | 4,337.82 | 4,312.71 | 16.25 | 16.29 | 146.07 | 136.69 | 366.60 | 612.29 | 580.85 | 31.43 | 19.479 | | |
| 4,500.00 | 4,484.21 | 4,435.77 | 4,409.74 | 16.63 | 16.68 | 145.95 | 142.53 | 378.65 | 632.40 | 600.24 | 32.16 | 19.664 | | |
| 4,600.00 | 4,583.69 | 4,533.72 | 4,506.77 | 17.01 | 17.07 | 145.84 | 148.38 | 390.69 | 652.53 | 619.64 | 32.89 | 19.840 | | |
| 4,700.00 | 4,683.17 | 4,631.67 | 4,603.79 | 17.40 | 17.46 | 145.74 | 154.22 | 402.74 | 672.65 | 639.03 | 33.62 | 20.008 | | |
| 4,800.00 | 4,782.66 | 4,729.61 | 4,700.82 | 17.78 | 17.85 | 145.64 | 160.07 | 414.78 | 692.78 | 658.43 | 34.35 | 20.170 | | |
| 4,900.00 | 4,882.14 | 4,827.56 | 4,797.85 | 18.16 | 18.25 | 145.55 | 165.92 | 426.82 | 712.90 | 677.83 | 35.08 | 20.324 | | |
| 5,000.00 | 4,981.62 | 4,925.51 | 4,894.88 | 18.54 | 18.64 | 145.46 | 171.76 | 438.87 | 733.03 | 697.23 | 35.81 | 20.472 | | |
| 5,100.00 | 5,081.11 | 5,023.45 | 4,991.90 | 18.92 | 19.03 | 145.38 | 177.61 | 450.91 | 753.17 | 716.63 | 36.54 | 20.614 | | |
| 5,200.00 | 5,180.59 | 5,121.40 | 5,088.93 | 19.31 | 19.42 | 145.30 | 183.45 | 462.95 | 773.30 | 736.03 | 37.27 | 20.751 | | |
| 5,300.00 | 5,280.07 | 5,219.35 | 5,185.96 | 19.69 | 19.82 | 145.22 | 189.30 | 475.00 | 793.43 | 755.44 | 38.00 | 20.882 | | |
| 5,400.00 | 5,379.56 | 5,317.29 | 5,282.99 | 20.07 | 20.21 | 145.15 | 195.14 | 487.04 | 813.57 | 774.84 | 38.73 | 21.008 | | |
| 5,430.89 | 5,410.29 | 5,347.55 | 5,312.96 | 20.19 | 20.33 | 145.13 | 196.95 | 490.76 | 819.79 | 780.83 | 38.95 | 21.046 | | |
| 5,450.00 | 5,429.27 | 5,366.22 | 5,331.45 | 20.26 | 20.40 | 147.29 | 198.06 | 493.06 | 823.86 | 784.77 | 39.09 | 21.074 | | |
| 5,500.00 | 5,478.60 | 5,454.31 | 5,418.65 | 20.47 | 20.76 | 149.93 | 205.88 | 502.51 | 836.08 | 796.34 | 39.75 | 21.035 | | |
| 5,550.00 | 5,527.25 | 5,581.02 | 5,542.13 | 20.68 | 21.23 | 150.10 | 233.14 | 507.26 | 847.43 | 806.96 | 40.47 | 20.940 | | |
| 5,600.00 | 5,574.98 | 5,705.61 | 5,657.97 | 20.92 | 21.67 | 148.74 | 278.17 | 501.34 | 857.50 | 816.56 | 40.95 | 20.943 | | |
| 5,650.00 | 5,621.57 | 5,824.28 | 5,759.96 | 21.16 | 22.04 | 146.39 | 336.62 | 486.09 | 866.69 | 825.41 | 41.28 | 20.994 | | |
| 5,700.00 | 5,666.77 | 5,934.53 | 5,844.92 | 21.43 | 22.36 | 143.41 | 403.11 | 463.88 | 875.57 | 833.95 | 41.62 | 21.037 | | |
| 5,750.00 | 5,710.38 | 6,035.29 | 5,912.54 | 21.71 | 22.65 | 140.08 | 472.79 | 437.27 | 884.73 | 842.66 | 42.07 | 21.030 | | |
| 5,800.00 | 5,752.18 | 6,126.64 | 5,964.42 | 22.02 | 22.96 | 136.58 | 542.12 | 408.38 | 894.72 | 852.03 | 42.69 | 20.957 | | |
| 5,850.00 | 5,791.97 | 6,209.35 | 6,002.92 | 22.35 | 23.34 | 133.01 | 608.99 | 378.72 | 905.99 | 862.50 | 43.49 | 20.832 | | |
| 5,900.00 | 5,829.55 | 6,284.49 | 6,030.47 | 22.72 | 23.80 | 129.41 | 672.33 | 349.23 | 918.84 | 874.40 | 44.44 | 20.674 | | |
| 5,950.00 | 5,864.73 | 6,353.20 | 6,049.20 | 23.13 | 24.31 | 125.79 | 731.80 | 320.42 | 933.45 | 887.94 | 45.51 | 20.512 | | |
| 6,000.00 | 5,897.36 | 6,416.56 | 6,060.84 | 23.58 | 24.86 | 122.15 | 787.47 | 292.54 | 949.89 | 903.24 | 46.64 | 20.365 | | |
| 6,050.00 | 5,927.27 | 6,475.50 | 6,066.74 | 24.08 | 25.43 | 118.47 | 839.57 | 265.66 | 968.12 | 920.29 | 47.84 | 20.238 | | |
| 6,100.00 | 5,954.31 | 6,524.50 | 6,068.10 | 24.63 | 25.94 | 115.00 | 882.87 | 242.77 | 988.11 | 939.12 | 48.99 | 20.172 | | |

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



Scientific Drilling, Intl
Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 2H - OH - Plan #3 | | | | | | | | | | | | | Offset Site Error: 0.00 usft | | | |
|---|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|------------------------------|---------|------------------------------|--|
| Survey Program: 0-MWD+HDGM | | | | | | | | | | | | | | | Offset Well Error: 0.00 usft | |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | | Warning | | |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | | | | |
| 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 | 27.845 | | | | |
| 200.00 | 200.00 | 200.00 | 200.00 | 0.72 | 0.72 | 132.43 | -13.47 | 14.74 | 19.96 | 18.53 | 1.43 | 13.923 | | | | |
| 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 | 6.961 | | | | |
| 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 | 14.94 | 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 | 12.79 | 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 | 2.531 | | | | |
| 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 | 2.320 | | | | |
| 1,250.00 | 1,250.00 | 1,250.00 | 1,250.00 | 4.48 | 4.48 | 132.43 | -13.47 | 14.74 | 19.96 | 11.00 | 8.96 | 2.228 CC, ES | | | | |
| 1,300.00 | 1,300.00 | 1,300.00 | 1,300.00 | 4.66 | 4.66 | -176.04 | -13.47 | 14.74 | 20.40 | 11.08 | 9.32 | 2.189 | | | | |
| 1,400.00 | 1,399.93 | 1,400.32 | 1,400.32 | 5.01 | 5.02 | -176.95 | -13.09 | 14.51 | 23.47 | 13.44 | 10.03 | 2.340 | | | | |
| 1,500.00 | 1,499.68 | 1,501.08 | 1,501.01 | 5.37 | 5.38 | 179.88 | -10.02 | 12.74 | 27.14 | 16.41 | 10.73 | 2.529 | | | | |
| 1,541.39 | 1,540.88 | 1,542.80 | 1,542.66 | 5.52 | 5.53 | 178.05 | -7.85 | 11.49 | 28.76 | 17.74 | 11.02 | 2.610 | | | | |
| 1,600.00 | 1,599.19 | 1,601.92 | 1,601.60 | 5.73 | 5.74 | 175.00 | -3.88 | 9.20 | 30.59 | 19.16 | 11.43 | 2.677 | | | | |
| 1,700.00 | 1,698.68 | 1,702.80 | 1,701.91 | 6.09 | 6.10 | 167.95 | 5.32 | 3.88 | 31.52 | 19.40 | 12.12 | 2.601 | | | | |
| 1,800.00 | 1,798.16 | 1,803.47 | 1,801.58 | 6.45 | 6.47 | 157.11 | 17.54 | -3.18 | 30.27 | 17.45 | 12.82 | 2.361 | | | | |
| 1,900.00 | 1,897.64 | 1,903.68 | 1,900.24 | 6.82 | 6.84 | 139.96 | 32.71 | -11.95 | 28.33 | 14.76 | 13.58 | 2.087 | | | | |
| 1,936.14 | 1,933.59 | 1,939.62 | 1,935.52 | 6.95 | 6.98 | 132.34 | 38.67 | -15.39 | 28.08 | 14.22 | 13.87 | 2.025 | | | | |
| 2,000.00 | 1,997.13 | 2,003.13 | 1,997.86 | 7.19 | 7.22 | 119.04 | 49.18 | -21.47 | 28.86 | 14.49 | 14.37 | 2.008 SF | | | | |
| 2,100.00 | 2,096.61 | 2,102.58 | 2,095.47 | 7.56 | 7.60 | 101.10 | 65.66 | -30.98 | 32.89 | 17.75 | 15.14 | 2.172 | | | | |
| 2,200.00 | 2,196.09 | 2,202.04 | 2,193.09 | 7.93 | 7.99 | 88.01 | 82.13 | -40.50 | 39.36 | 23.48 | 15.88 | 2.478 | | | | |
| 2,300.00 | 2,295.58 | 2,301.49 | 2,290.70 | 8.30 | 8.39 | 78.93 | 98.60 | -50.02 | 47.28 | 30.67 | 16.61 | 2.846 | | | | |
| 2,400.00 | 2,395.06 | 2,400.94 | 2,388.32 | 8.67 | 8.79 | 72.56 | 115.07 | -59.54 | 56.03 | 38.69 | 17.34 | 3.231 | | | | |
| 2,500.00 | 2,494.54 | 2,500.39 | 2,485.93 | 9.05 | 9.20 | 67.94 | 131.54 | -69.05 | 65.29 | 47.22 | 18.07 | 3.613 | | | | |
| 2,600.00 | 2,594.03 | 2,599.85 | 2,583.55 | 9.42 | 9.61 | 64.48 | 148.01 | -78.57 | 74.86 | 56.05 | 18.81 | 3.980 | | | | |
| 2,700.00 | 2,693.51 | 2,699.30 | 2,681.17 | 9.80 | 10.02 | 61.82 | 164.48 | -88.09 | 84.64 | 65.10 | 19.55 | 4.330 | | | | |
| 2,800.00 | 2,792.99 | 2,798.75 | 2,778.78 | 10.17 | 10.43 | 59.71 | 180.95 | -97.61 | 94.57 | 74.28 | 20.29 | 4.661 | | | | |
| 2,900.00 | 2,892.48 | 2,898.20 | 2,876.40 | 10.55 | 10.85 | 58.00 | 197.42 | -107.12 | 104.60 | 83.56 | 21.03 | 4.973 | | | | |
| 3,000.00 | 2,991.96 | 2,997.65 | 2,974.01 | 10.93 | 11.27 | 56.59 | 213.89 | -116.64 | 114.70 | 92.92 | 21.78 | 5.266 | | | | |
| 3,100.00 | 3,091.44 | 3,097.11 | 3,071.63 | 11.31 | 11.69 | 55.41 | 230.36 | -126.16 | 124.86 | 102.34 | 22.53 | 5.543 | | | | |
| 3,200.00 | 3,190.93 | 3,196.56 | 3,169.25 | 11.69 | 12.11 | 54.41 | 246.83 | -135.68 | 135.07 | 111.79 | 23.28 | 5.803 | | | | |
| 3,300.00 | 3,290.41 | 3,296.01 | 3,266.86 | 12.07 | 12.53 | 53.55 | 263.31 | -145.19 | 145.31 | 121.28 | 24.03 | 6.048 | | | | |
| 3,400.00 | 3,389.89 | 3,395.46 | 3,364.48 | 12.44 | 12.96 | 52.80 | 279.78 | -154.71 | 155.58 | 130.80 | 24.78 | 6.279 | | | | |
| 3,500.00 | 3,489.38 | 3,494.91 | 3,462.09 | 12.82 | 13.39 | 52.14 | 296.25 | -164.23 | 165.87 | 140.34 | 25.53 | 6.497 | | | | |
| 3,600.00 | 3,588.86 | 3,594.37 | 3,559.71 | 13.20 | 13.81 | 51.57 | 312.72 | -173.75 | 176.18 | 149.90 | 26.28 | 6.703 | | | | |
| 3,700.00 | 3,688.34 | 3,693.82 | 3,657.33 | 13.58 | 14.24 | 51.05 | 329.19 | -183.26 | 186.51 | 159.47 | 27.04 | 6.898 | | | | |
| 3,800.00 | 3,787.82 | 3,793.27 | 3,754.94 | 13.96 | 14.67 | 50.59 | 345.66 | -192.78 | 196.85 | 169.06 | 27.79 | 7.083 | | | | |
| 3,900.00 | 3,887.31 | 3,892.72 | 3,852.56 | 14.34 | 15.10 | 50.18 | 362.13 | -202.30 | 207.20 | 178.65 | 28.55 | 7.258 | | | | |
| 4,000.00 | 3,986.79 | 3,992.17 | 3,950.17 | 14.73 | 15.53 | 49.80 | 378.60 | -211.82 | 217.57 | 188.26 | 29.31 | 7.424 | | | | |
| 4,100.00 | 4,086.27 | 4,091.63 | 4,047.79 | 15.11 | 15.96 | 49.46 | 395.07 | -221.33 | 227.94 | 197.87 | 30.06 | 7.582 | | | | |
| 4,200.00 | 4,185.76 | 4,191.08 | 4,145.40 | 15.49 | 16.40 | 49.15 | 411.54 | -230.85 | 238.31 | 207.49 | 30.82 | 7.733 | | | | |
| 4,300.00 | 4,285.24 | 4,290.53 | 4,243.02 | 15.87 | 16.83 | 48.86 | 428.01 | -240.37 | 248.70 | 217.12 | 31.58 | 7.876 | | | | |
| 4,400.00 | 4,384.72 | 4,389.98 | 4,340.64 | 16.25 | 17.26 | 48.60 | 444.49 | -249.88 | 259.09 | 226.75 | 32.34 | 8.013 | | | | |
| 4,500.00 | 4,484.21 | 4,489.44 | 4,438.25 | 16.63 | 17.70 | 48.36 | 460.96 | -259.40 | 269.48 | 236.39 | 33.09 | 8.143 | | | | |
| 4,600.00 | 4,583.69 | 4,588.89 | 4,535.87 | 17.01 | 18.13 | 48.13 | 477.43 | -268.92 | 279.88 | 246.03 | 33.85 | 8.268 | | | | |
| 4,700.00 | 4,683.17 | 4,688.34 | 4,633.48 | 17.40 | 18.57 | 47.93 | 493.90 | -278.44 | 290.28 | 255.67 | 34.61 | 8.387 | | | | |
| 4,800.00 | 4,782.66 | 4,787.79 | 4,731.10 | 17.78 | 19.00 | 47.73 | 510.37 | -287.95 | 300.69 | 265.32 | 35.37 | 8.501 | | | | |

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



Scientific Drilling, Intl
Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 2H - OH - Plan #3 | | | | | | | | | | | | Offset Site Error: | 0.00 usft |
|---|-----------------------------|-----------------------------|-----------------------------|---------------------|------------------|-----------------------------|------------------------------|-------------------------------|---------------------------------|----------------------|---------|--------------------|-----------|
| Survey Program: 0-MWD+HDGM | | | | | | | | | | | | Offset Well Error: | 0.00 usft |
| Reference | | Offset | | Semi Major Axis | | Hightide Toolface (°) | Distance | | Minimum Separation (usft) | Separation Factor | Warning | | |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | | Between Centres (usft) | Between Ellipses (usft) | | | | | |
| 4,900.00 | 4,882.14 | 4,887.24 | 4,828.72 | 18.16 | 19.44 | 47.55 | 526.84 | -297.47 | 311.10 | 274.97 | 36.13 | 8.610 | |
| 5,000.00 | 4,981.62 | 4,986.70 | 4,926.33 | 18.54 | 19.87 | 47.38 | 543.31 | -306.99 | 321.51 | 284.62 | 36.89 | 8.715 | |
| 5,100.00 | 5,081.11 | 5,086.15 | 5,023.95 | 18.92 | 20.31 | 47.22 | 559.78 | -316.51 | 331.92 | 294.27 | 37.65 | 8.816 | |
| 5,200.00 | 5,180.59 | 5,185.60 | 5,121.56 | 19.31 | 20.75 | 47.08 | 576.25 | -326.02 | 342.34 | 303.93 | 38.41 | 8.913 | |
| 5,300.00 | 5,280.07 | 5,285.05 | 5,219.18 | 19.69 | 21.18 | 46.93 | 592.72 | -335.54 | 352.76 | 313.59 | 39.17 | 9.006 | |
| 5,400.00 | 5,379.56 | 5,384.50 | 5,316.79 | 20.07 | 21.62 | 46.80 | 609.19 | -345.06 | 363.18 | 323.25 | 39.93 | 9.095 | |
| 5,430.89 | 5,410.29 | 5,415.23 | 5,346.95 | 20.19 | 21.76 | 46.76 | 614.28 | -348.00 | 366.40 | 326.23 | 40.17 | 9.122 | |
| 5,450.00 | 5,429.27 | 5,434.24 | 5,365.62 | 20.26 | 21.84 | 46.95 | 617.43 | -349.82 | 368.26 | 327.94 | 40.31 | 9.135 | |
| 5,500.00 | 5,478.60 | 5,484.06 | 5,414.51 | 20.47 | 22.06 | 52.15 | 625.68 | -354.59 | 371.84 | 331.12 | 40.72 | 9.132 | |
| 5,550.00 | 5,527.25 | 5,533.75 | 5,463.29 | 20.68 | 22.28 | 54.29 | 633.91 | -359.34 | 373.61 | 332.46 | 41.16 | 9.078 | |
| 5,600.00 | 5,574.98 | 5,574.58 | 5,503.31 | 20.92 | 22.46 | 56.10 | 640.88 | -363.39 | 374.00 | 332.49 | 41.51 | 9.009 | |
| 5,650.00 | 5,621.57 | 5,608.67 | 5,536.39 | 21.16 | 22.62 | 57.63 | 647.91 | -367.61 | 374.63 | 332.85 | 41.78 | 8.966 | |
| 5,700.00 | 5,666.77 | 5,650.00 | 5,575.93 | 21.43 | 22.83 | 59.39 | 658.17 | -373.92 | 375.86 | 333.67 | 42.19 | 8.908 | |
| 5,750.00 | 5,710.38 | 5,676.56 | 5,600.94 | 21.71 | 22.98 | 60.63 | 665.74 | -378.65 | 377.50 | 335.18 | 42.33 | 8.919 | |
| 5,800.00 | 5,752.18 | 5,710.35 | 5,632.25 | 22.02 | 23.17 | 62.16 | 676.47 | -385.43 | 379.96 | 337.32 | 42.64 | 8.911 | |
| 5,850.00 | 5,791.97 | 5,750.00 | 5,668.18 | 22.35 | 23.41 | 64.02 | 690.58 | -394.45 | 383.29 | 340.13 | 43.17 | 8.879 | |
| 5,900.00 | 5,829.55 | 5,777.56 | 5,692.59 | 22.72 | 23.59 | 65.29 | 701.35 | -401.38 | 387.43 | 343.99 | 43.44 | 8.919 | |
| 5,950.00 | 5,864.73 | 5,810.98 | 5,721.49 | 23.13 | 23.81 | 66.87 | 715.42 | -410.50 | 392.65 | 348.68 | 43.97 | 8.930 | |
| 6,000.00 | 5,897.36 | 5,850.00 | 5,754.21 | 23.58 | 24.09 | 68.77 | 733.23 | -422.10 | 399.04 | 354.25 | 44.79 | 8.909 | |
| 6,050.00 | 5,927.27 | 5,877.45 | 5,776.51 | 24.08 | 24.30 | 69.96 | 746.62 | -430.87 | 406.52 | 361.15 | 45.37 | 8.960 | |
| 6,100.00 | 5,954.31 | 5,910.53 | 5,802.54 | 24.63 | 24.56 | 71.43 | 763.67 | -442.08 | 415.32 | 369.06 | 46.26 | 8.978 | |
| 6,150.00 | 5,978.35 | 5,943.52 | 5,827.53 | 25.24 | 24.83 | 72.83 | 781.64 | -453.93 | 425.44 | 378.17 | 47.27 | 9.000 | |
| 6,200.00 | 5,999.28 | 5,976.44 | 5,851.46 | 25.91 | 25.12 | 74.14 | 800.50 | -466.41 | 436.89 | 388.50 | 48.39 | 9.028 | |
| 6,250.00 | 6,016.99 | 6,009.34 | 5,874.31 | 26.63 | 25.42 | 75.35 | 820.21 | -479.50 | 449.69 | 400.08 | 49.61 | 9.064 | |
| 6,300.00 | 6,031.39 | 6,042.23 | 5,896.04 | 27.42 | 25.73 | 76.45 | 840.76 | -493.18 | 463.84 | 412.93 | 50.91 | 9.111 | |
| 6,350.00 | 6,042.43 | 6,075.16 | 5,916.65 | 28.26 | 26.06 | 77.44 | 862.13 | -507.44 | 479.30 | 427.04 | 52.26 | 9.171 | |
| 6,400.00 | 6,050.03 | 6,108.19 | 5,936.10 | 29.14 | 26.41 | 78.30 | 884.31 | -522.27 | 496.04 | 442.40 | 53.64 | 9.247 | |
| 6,450.00 | 6,054.17 | 6,141.37 | 5,954.39 | 30.07 | 26.77 | 79.04 | 907.30 | -537.69 | 514.01 | 458.97 | 55.04 | 9.339 | |
| 6,485.29 | 6,055.00 | 6,164.91 | 5,966.58 | 30.74 | 27.04 | 79.49 | 924.02 | -548.92 | 527.38 | 471.37 | 56.02 | 9.415 | |
| 6,500.00 | 6,054.98 | 6,174.84 | 5,971.51 | 31.02 | 27.16 | 80.15 | 931.16 | -553.72 | 533.15 | 476.72 | 56.42 | 9.449 | |
| 6,600.00 | 6,054.86 | 6,246.54 | 6,003.58 | 33.04 | 28.03 | 84.26 | 984.32 | -589.54 | 575.36 | 516.18 | 59.18 | 9.723 | |
| 6,700.00 | 6,054.74 | 6,325.33 | 6,031.23 | 35.18 | 29.08 | 87.51 | 1,045.39 | -630.86 | 621.07 | 559.04 | 62.04 | 10.011 | |
| 6,800.00 | 6,054.62 | 6,410.13 | 6,051.75 | 37.43 | 30.30 | 89.68 | 1,113.41 | -677.07 | 668.37 | 603.25 | 65.12 | 10.263 | |
| 6,900.00 | 6,054.49 | 6,499.06 | 6,062.68 | 39.76 | 31.66 | 90.71 | 1,186.27 | -726.77 | 716.01 | 647.55 | 68.46 | 10.459 | |
| 7,000.00 | 6,054.37 | 6,588.10 | 6,084.41 | 42.16 | 33.09 | 90.82 | 1,259.73 | -777.04 | 763.50 | 691.56 | 71.94 | 10.613 | |
| 7,100.00 | 6,054.25 | 6,676.12 | 6,065.12 | 44.62 | 34.56 | 90.83 | 1,332.36 | -826.76 | 810.96 | 735.45 | 75.51 | 10.740 | |
| 7,200.00 | 6,054.13 | 6,764.14 | 6,065.83 | 47.13 | 36.09 | 90.85 | 1,404.99 | -876.48 | 858.42 | 779.23 | 79.19 | 10.840 | |
| 7,300.00 | 6,054.01 | 6,852.16 | 6,066.54 | 49.68 | 37.67 | 90.86 | 1,477.61 | -926.20 | 905.88 | 822.92 | 82.96 | 10.920 | |
| 7,400.00 | 6,053.88 | 6,940.18 | 6,067.25 | 52.27 | 39.29 | 90.87 | 1,550.24 | -975.93 | 953.34 | 866.53 | 86.81 | 10.982 | |

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



Scientific Drilling, Intl

Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 | | Offset | | Semi Major Axis | | | Distance | | | | | | | |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 132.43 | -40.41 | 44.21 | 59.89 | | | | | |
| 100.00 | 100.00 | 100.00 | 100.00 | 0.36 | 0.36 | 132.43 | -40.41 | 44.21 | 59.89 | 59.17 | 0.72 | 83.537 | | |
| 200.00 | 200.00 | 200.00 | 200.00 | 0.72 | 0.72 | 132.43 | -40.41 | 44.21 | 59.89 | 58.46 | 1.43 | 41.769 | | |
| 300.00 | 300.00 | 300.00 | 300.00 | 1.08 | 1.08 | 132.43 | -40.41 | 44.21 | 59.89 | 57.74 | 2.15 | 27.846 | | |
| 400.00 | 400.00 | 400.00 | 400.00 | 1.43 | 1.43 | 132.43 | -40.41 | 44.21 | 59.89 | 57.02 | 2.87 | 20.884 | | |
| 500.00 | 500.00 | 500.00 | 500.00 | 1.79 | 1.79 | 132.43 | -40.41 | 44.21 | 59.89 | 56.31 | 3.58 | 16.707 | | |
| 600.00 | 600.00 | 600.00 | 600.00 | 2.15 | 2.15 | 132.43 | -40.41 | 44.21 | 59.89 | 55.59 | 4.30 | 13.923 | | |
| 700.00 | 700.00 | 700.00 | 700.00 | 2.51 | 2.51 | 132.43 | -40.41 | 44.21 | 59.89 | 54.87 | 5.02 | 11.934 | | |
| 800.00 | 800.00 | 800.00 | 800.00 | 2.87 | 2.87 | 132.43 | -40.41 | 44.21 | 59.89 | 54.16 | 5.74 | 10.442 | | |
| 900.00 | 900.00 | 900.00 | 900.00 | 3.23 | 3.23 | 132.43 | -40.41 | 44.21 | 59.89 | 53.44 | 6.45 | 9.282 | | |
| 1,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 3.58 | 3.58 | 132.43 | -40.41 | 44.21 | 59.89 | 52.72 | 7.17 | 8.354 | | |
| 1,100.00 | 1,100.00 | 1,100.00 | 1,100.00 | 3.94 | 3.94 | 132.43 | -40.41 | 44.21 | 59.89 | 52.01 | 7.89 | 7.594 CC, ES | | |
| 1,200.00 | 1,200.00 | 1,198.37 | 1,198.35 | 4.30 | 4.29 | 131.42 | -40.49 | 45.89 | 61.23 | 52.64 | 8.59 | 7.131 | | |
| 1,250.00 | 1,250.00 | 1,247.49 | 1,247.42 | 4.48 | 4.46 | 130.23 | -40.60 | 48.00 | 62.92 | 53.99 | 8.93 | 7.045 | | |
| 1,300.00 | 1,300.00 | 1,296.49 | 1,296.33 | 4.66 | 4.62 | -179.71 | -40.76 | 50.93 | 65.77 | 56.50 | 9.27 | 7.094 | | |
| 1,400.00 | 1,399.93 | 1,393.81 | 1,393.29 | 5.01 | 4.96 | 176.60 | -41.19 | 59.24 | 76.36 | 66.42 | 9.94 | 7.678 | | |
| 1,500.00 | 1,499.68 | 1,489.71 | 1,488.51 | 5.37 | 5.31 | 173.04 | -41.78 | 70.64 | 93.55 | 82.95 | 10.61 | 8.821 | | |
| 1,541.39 | 1,540.88 | 1,528.85 | 1,527.25 | 5.52 | 5.45 | 171.74 | -42.07 | 76.20 | 102.59 | 91.71 | 10.88 | 9.431 | | |
| 1,600.00 | 1,599.19 | 1,583.77 | 1,581.48 | 5.73 | 5.65 | 170.13 | -42.53 | 84.90 | 116.71 | 105.46 | 11.25 | 10.374 | | |
| 1,700.00 | 1,698.68 | 1,676.21 | 1,672.34 | 6.09 | 6.00 | 167.73 | -43.41 | 101.88 | 143.24 | 131.37 | 11.87 | 12.068 | | |
| 1,800.00 | 1,798.16 | 1,766.94 | 1,760.93 | 6.45 | 6.36 | 165.71 | -44.43 | 121.39 | 172.80 | 160.33 | 12.47 | 13.852 | | |
| 1,900.00 | 1,897.64 | 1,855.83 | 1,847.09 | 6.82 | 6.73 | 164.01 | -45.56 | 143.20 | 205.33 | 192.27 | 13.06 | 15.720 | | |
| 2,000.00 | 1,997.13 | 1,942.77 | 1,930.67 | 7.19 | 7.11 | 162.57 | -46.81 | 167.11 | 240.72 | 227.09 | 13.63 | 17.660 | | |
| 2,100.00 | 2,096.61 | 2,027.67 | 2,011.55 | 7.56 | 7.51 | 161.33 | -48.15 | 192.90 | 278.90 | 264.72 | 14.18 | 19.665 | | |
| 2,200.00 | 2,196.09 | 2,110.46 | 2,089.64 | 7.93 | 7.92 | 160.26 | -49.58 | 220.33 | 319.77 | 305.05 | 14.72 | 21.729 | | |
| 2,300.00 | 2,295.58 | 2,191.08 | 2,164.89 | 8.30 | 8.36 | 159.33 | -51.08 | 249.20 | 363.22 | 347.99 | 15.23 | 23.843 | | |
| 2,400.00 | 2,395.06 | 2,269.49 | 2,237.28 | 8.67 | 8.82 | 158.52 | -52.65 | 279.30 | 409.15 | 393.42 | 15.73 | 26.003 | | |
| 2,500.00 | 2,494.54 | 2,345.67 | 2,306.79 | 9.05 | 9.29 | 157.80 | -54.27 | 310.43 | 457.47 | 441.25 | 16.22 | 28.205 | | |
| 2,600.00 | 2,594.03 | 2,419.61 | 2,373.44 | 9.42 | 9.79 | 157.17 | -55.93 | 342.39 | 508.06 | 491.37 | 16.69 | 30.446 | | |
| 2,700.00 | 2,693.51 | 2,491.31 | 2,437.26 | 9.80 | 10.30 | 156.61 | -57.63 | 375.02 | 560.83 | 543.69 | 17.14 | 32.721 | | |
| 2,800.00 | 2,792.99 | 2,560.80 | 2,498.31 | 10.17 | 10.84 | 156.10 | -59.36 | 408.15 | 615.67 | 598.09 | 17.58 | 35.024 | | |
| 2,900.00 | 2,892.48 | 2,628.08 | 2,556.64 | 10.55 | 11.39 | 155.65 | -61.10 | 441.64 | 672.50 | 654.50 | 18.00 | 37.357 | | |
| 3,000.00 | 2,991.96 | 2,698.34 | 2,616.76 | 10.93 | 12.00 | 155.21 | -62.99 | 477.96 | 731.12 | 712.63 | 18.49 | 39.542 | | |
| 3,100.00 | 3,091.44 | 2,778.89 | 2,685.47 | 11.31 | 12.73 | 154.77 | -65.18 | 519.93 | 790.20 | 771.05 | 19.15 | 41.273 | | |
| 3,200.00 | 3,190.93 | 2,859.44 | 2,754.19 | 11.69 | 13.48 | 154.39 | -67.37 | 561.90 | 849.30 | 829.50 | 19.81 | 42.878 | | |
| 3,300.00 | 3,290.41 | 2,939.98 | 2,822.90 | 12.07 | 14.24 | 154.06 | -69.55 | 603.87 | 908.43 | 887.95 | 20.47 | 44.369 | | |
| 3,400.00 | 3,389.89 | 3,020.53 | 2,891.61 | 12.44 | 15.02 | 153.78 | -71.74 | 645.85 | 967.57 | 946.42 | 21.15 | 45.756 | | |
| 5,200.00 | 5,180.59 | 8,609.28 | 6,051.28 | 19.31 | 89.33 | -135.97 | -116.75 | -316.56 | 940.98 | 888.45 | 52.53 | 17.913 | | |
| 5,300.00 | 5,280.07 | 8,616.31 | 6,051.21 | 19.69 | 89.52 | -135.00 | -116.65 | -323.59 | 852.31 | 795.73 | 56.58 | 15.065 | | |
| 5,400.00 | 5,379.56 | 8,623.35 | 6,051.14 | 20.07 | 89.71 | -134.04 | -116.55 | -330.63 | 766.37 | 704.78 | 61.59 | 12.444 | | |
| 5,430.89 | 5,410.29 | 8,625.52 | 6,051.11 | 20.19 | 89.76 | -133.74 | -116.52 | -332.80 | 740.52 | 677.16 | 63.36 | 11.687 | | |
| 5,450.00 | 5,429.27 | 8,627.09 | 6,051.10 | 20.26 | 89.81 | -133.07 | -116.50 | -334.37 | 724.81 | 660.27 | 64.54 | 11.231 | | |
| 5,500.00 | 5,478.60 | 8,633.35 | 6,051.04 | 20.47 | 89.97 | -133.33 | -116.41 | -340.63 | 685.33 | 617.39 | 67.95 | 10.086 | | |
| 5,550.00 | 5,527.25 | 8,642.68 | 6,050.94 | 20.68 | 90.22 | -134.09 | -116.29 | -349.96 | 648.67 | 576.80 | 71.87 | 9.026 | | |
| 5,600.00 | 5,574.98 | 8,655.05 | 6,050.82 | 20.92 | 90.55 | -134.53 | -116.12 | -362.32 | 615.38 | 539.09 | 75.29 | 8.066 | | |
| 5,650.00 | 5,621.57 | 8,670.38 | 6,050.66 | 21.16 | 90.95 | -134.47 | -115.91 | -377.65 | 586.02 | 504.87 | 81.15 | 7.221 | | |
| 5,700.00 | 5,666.77 | 8,688.60 | 6,050.47 | 21.43 | 91.44 | -133.89 | -115.66 | -395.87 | 561.12 | 474.78 | 86.34 | 6.499 | | |
| 5,750.00 | 5,710.38 | 8,709.64 | 6,050.26 | 21.71 | 92.00 | -132.80 | -115.37 | -416.90 | 541.14 | 449.44 | 91.70 | 5.901 | | |
| 5,800.00 | 5,752.18 | 8,733.38 | 6,050.02 | 22.02 | 92.63 | -131.21 | -115.04 | -440.64 | 526.40 | 429.37 | 97.03 | 5.425 | | |
| 5,850.00 | 5,791.97 | 8,759.70 | 6,049.75 | 22.35 | 93.34 | -129.15 | -114.68 | -466.96 | 517.07 | 414.94 | 102.13 | 5.063 | | |
| 5,900.00 | 5,829.55 | 8,788.49 | 6,049.46 | 22.72 | 94.11 | -126.64 | -114.28 | -495.74 | 513.11 | 406.28 | 106.82 | 4.803 | | |
| 5,913.36 | 5,839.19 | 8,796.58 | 6,049.38 | 22.83 | 94.32 | -125.91 | -114.17 | -503.83 | 512.93 | 404.93 | 107.99 | 4.750 | | |

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



Scientific Drilling, Intl

Anticollision Report



| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| 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 3H | 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 |

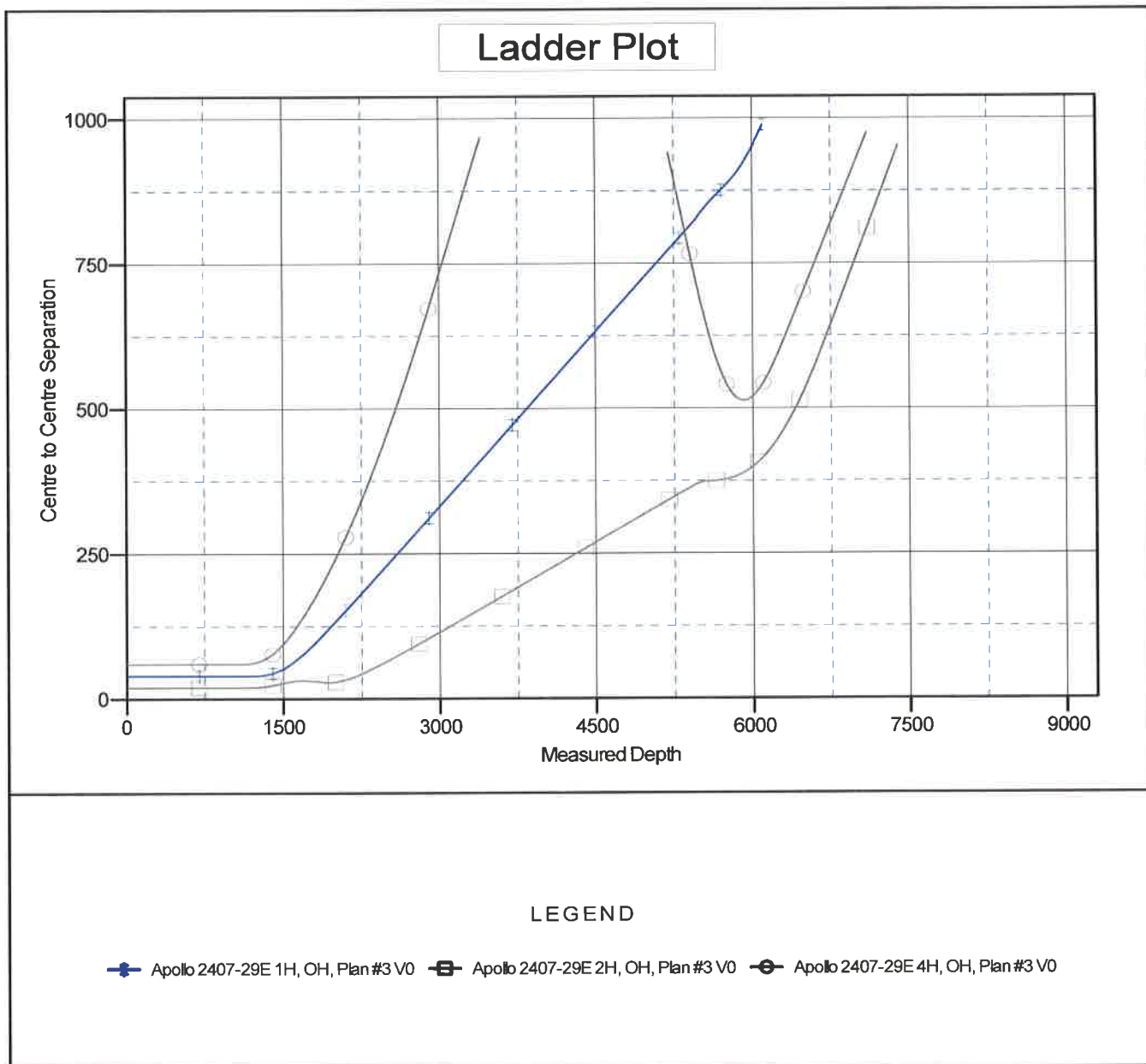
| Offset Design Apollo 2407-29E - Apollo 2407-29E 4H - OH - Plan #3 | | | | | | | | | | | | Offset Site Error: | 0.00 usft |
|---|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|--------------------|-----------|
| Survey Program: 0-MWD+HDGM | | | | | | | | | | | | Offset Well Error: | 0.00 usft |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning |
| 5,950.00 | 5,864.73 | 8,819.59 | 6,049.15 | 23.13 | 94.94 | -123.74 | -113.85 | -526.84 | 514.24 | 403.25 | 110.99 | 4.633 | |
| 6,000.00 | 5,897.36 | 8,852.87 | 6,048.81 | 23.58 | 95.84 | -120.49 | -113.40 | -560.11 | 520.05 | 405.45 | 114.60 | 4.538 | |
| 6,050.00 | 5,927.27 | 8,888.15 | 6,048.45 | 24.08 | 96.79 | -116.97 | -112.91 | -595.39 | 529.94 | 412.27 | 117.67 | 4.504 SF | |
| 6,100.00 | 5,954.31 | 8,925.26 | 6,048.07 | 24.63 | 97.79 | -113.28 | -112.40 | -632.50 | 543.28 | 422.98 | 120.29 | 4.516 | |
| 6,150.00 | 5,978.35 | 8,964.03 | 6,047.68 | 25.24 | 98.84 | -109.51 | -111.87 | -671.26 | 559.41 | 436.82 | 122.58 | 4.563 | |
| 6,200.00 | 5,999.28 | 9,004.27 | 6,047.27 | 25.91 | 99.93 | -105.78 | -111.32 | -711.49 | 577.71 | 453.06 | 124.65 | 4.635 | |
| 6,250.00 | 6,016.99 | 9,045.77 | 6,046.85 | 26.63 | 101.06 | -102.18 | -110.75 | -752.98 | 597.62 | 471.04 | 126.58 | 4.721 | |
| 6,300.00 | 6,031.39 | 9,088.34 | 6,046.42 | 27.42 | 102.22 | -98.80 | -110.16 | -795.55 | 618.66 | 490.19 | 128.46 | 4.816 | |
| 6,350.00 | 6,042.43 | 9,131.76 | 6,045.98 | 28.26 | 103.41 | -95.71 | -109.56 | -838.97 | 640.43 | 510.08 | 130.35 | 4.913 | |
| 6,400.00 | 6,050.03 | 9,175.84 | 6,045.53 | 29.14 | 104.62 | -92.94 | -108.96 | -883.03 | 662.60 | 530.33 | 132.27 | 5.009 | |
| 6,450.00 | 6,054.17 | 9,220.34 | 6,045.08 | 30.07 | 105.84 | -90.53 | -108.35 | -927.54 | 684.94 | 550.70 | 134.24 | 5.102 | |
| 6,485.29 | 6,055.00 | 9,251.90 | 6,044.76 | 30.74 | 106.71 | -89.03 | -107.91 | -959.08 | 700.70 | 565.04 | 135.67 | 5.165 | |
| 6,500.00 | 6,054.98 | 9,265.07 | 6,044.63 | 31.02 | 107.07 | -89.03 | -107.73 | -972.25 | 707.27 | 571.00 | 136.27 | 5.190 | |
| 6,600.00 | 6,054.86 | 9,354.57 | 6,043.72 | 33.04 | 109.55 | -89.02 | -106.50 | -1,061.74 | 751.87 | 611.44 | 140.43 | 5.354 | |
| 6,700.00 | 6,054.74 | 9,444.06 | 6,042.81 | 35.18 | 112.03 | -89.01 | -105.27 | -1,151.22 | 796.48 | 651.76 | 144.72 | 5.504 | |
| 6,800.00 | 6,054.62 | 9,533.56 | 6,041.90 | 37.43 | 114.52 | -89.00 | -104.04 | -1,240.71 | 841.09 | 691.97 | 149.12 | 5.640 | |
| 6,900.00 | 6,054.49 | 9,623.06 | 6,040.99 | 39.76 | 117.02 | -88.99 | -102.81 | -1,330.19 | 885.70 | 732.08 | 153.62 | 5.766 | |
| 7,000.00 | 6,054.37 | 9,712.56 | 6,040.09 | 42.16 | 119.52 | -88.98 | -101.58 | -1,419.68 | 930.31 | 772.12 | 158.19 | 5.881 | |
| 7,100.00 | 6,054.25 | 9,802.06 | 6,039.18 | 44.62 | 122.04 | -88.98 | -100.35 | -1,509.17 | 974.91 | 812.08 | 162.83 | 5.987 | |

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 3H - Slot D |
| 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 3H | 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 3H - Slot D
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.13°

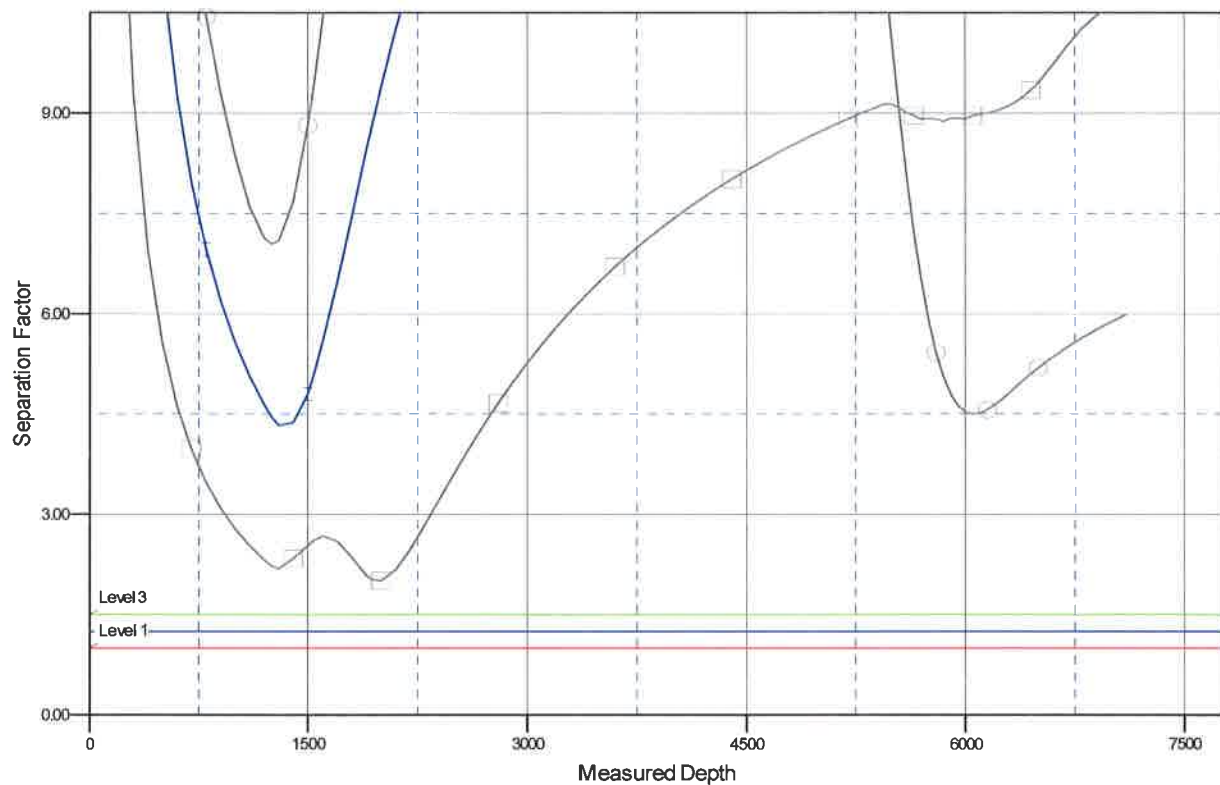


| | | | |
|---------------------------|----------------------|-------------------------------------|----------------------------------|
| Company: | Logos Operating LLC | Local Co-ordinate Reference: | Well Apollo 2407-29E 3H - Slot D |
| Project: | Rio Arriba, NM NAD83 | TVD Reference: | GL 7300' @ 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 3H | 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 3H - Slot D
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.13°

Separation Factor Plot



LEGEND

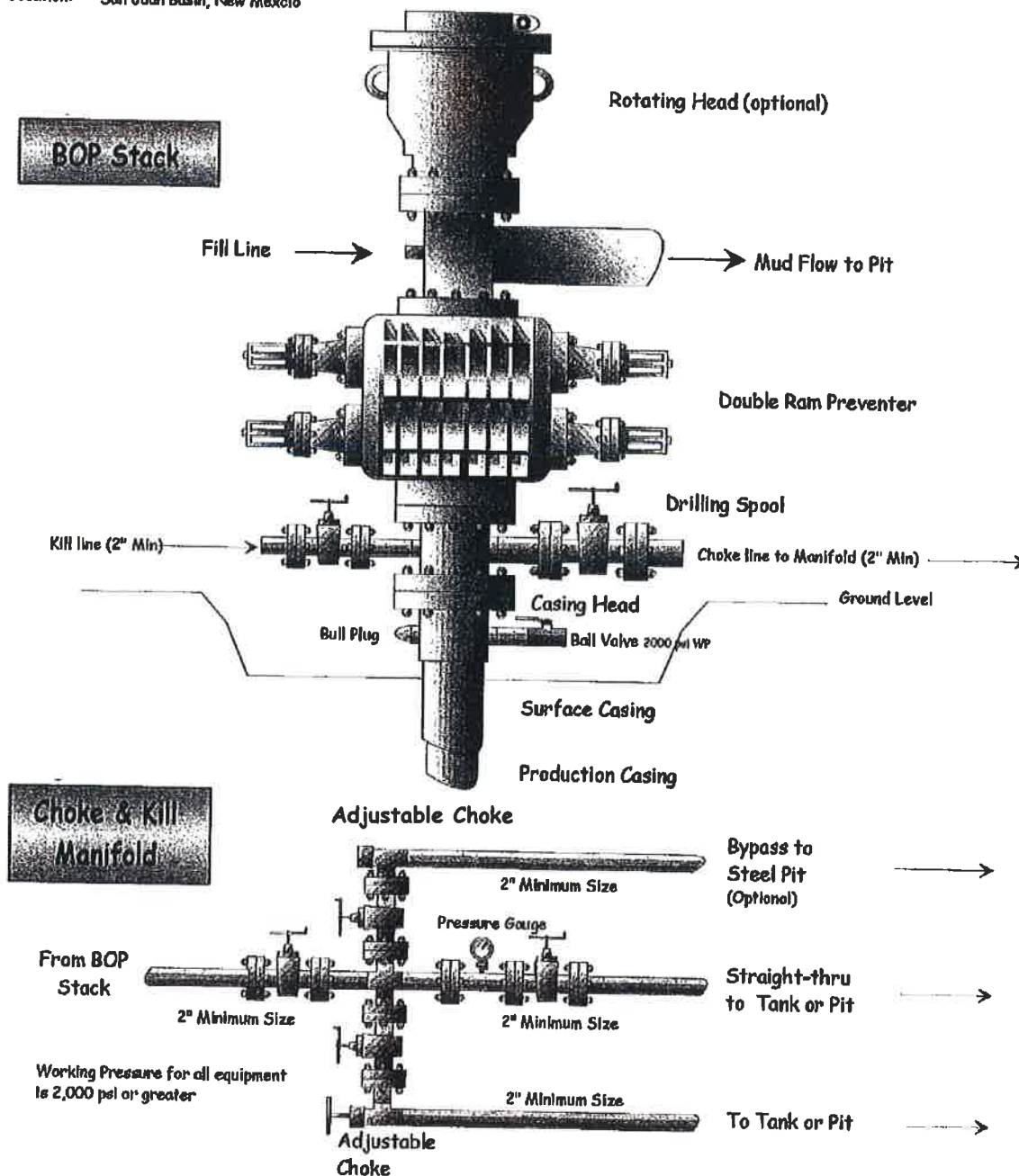
 Apollo 2407-29E 1H, OH, Plan #3 V0
  Apollo 2407-29E 2H, OH, Plan #3 V0
  Apollo 2407-29E 4H, OH, Plan #3 V0

Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico



Directions from the Intersection of US Hwy 550 & US Hwy 64
in Bloomfield, NM to Logos Operating, LLC Apollo 2407 29E #3H
2149' FNL & 49' FWL, Section 29, T24N, R7W, N.M.P.M., Rio Arriba County, NM

Latitude: 36.286220°N Longitude: 107.606533°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 #3H 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

Date February 5, 2020

☐ Original

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

☒ Amended - Reason for Amendment:

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomple 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- | E-29-24N-07W | 2162 FNL, 64 FWL | 516 | Flared | |
| Apollo 2407 29E 3H | 30-039- 30-039-31397 | 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