

Form 3160-3
(June 2015)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM0557391
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. OTERO 2407 280 004H
3a. Address , ,	3b. Phone No. (include area code)	9. API Well No. 30 039 31407
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SWSE / 890 FSL / 2426 FEL / LAT 36.27977 / LONG -107.579841 At proposed prod. zone SESE / 21 FSL / 320 FEL / LAT 36.262464 / LONG -107.57259		10. Field and Pool, or Exploratory Wildcat
11. Sec., T. R. M. or Blk. and Survey or Area SEC 28/T24N/R7W/NMP		
14. Distance in miles and direction from nearest town or post office* 47 miles	12. County or Parish RIO ARRIBA	13. State NM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 21 feet	16. No of acres in lease	17. Spacing Unit dedicated to this well 160.0
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 30 feet	19. Proposed Depth 6006 feet / 12248 feet	20. BLM/BIA Bond No. in file FED: NMB001820
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7346 feet	22. Approximate date work will start* 07/09/2021	23. Estimated duration 45 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 06/04/2021
Title Regulatory Specialist		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) DAVE J MANKIEWICZ / Ph: (505) 564-7761	Date 09/29/2021
Title AFM-Minerals Farmington Field Office		

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)



DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30 039 31407		² Pool Code 22619	³ Pool Name ESCRITO GALLUP
⁴ Property Code XXXX 331642	⁵ Property Name OTERO 2407 280		⁶ Well Number 4H
⁷ OGRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC		⁹ Elevation 7346

¹⁰ Surface Location

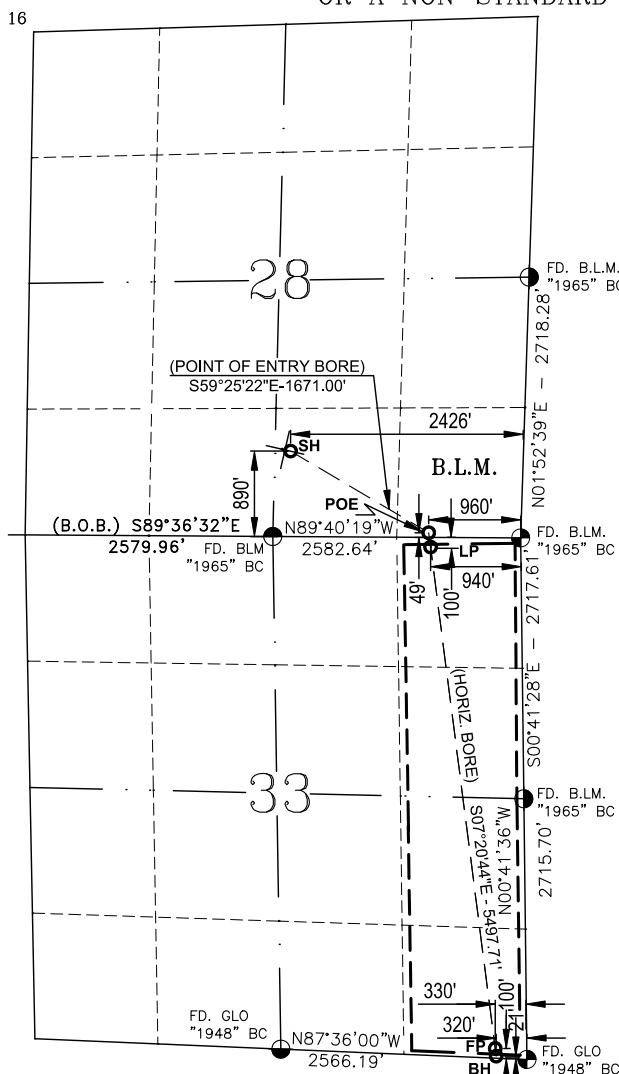
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	28	24-N	7-W		890	SOUTH	2426	EAST	RIO ARRIBA

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
P	33	24-N	7-W		21	SOUTH	320	EAST	RIO ARRIBA

¹² Dedicated Acres SEC 33 E2/E2 (160 ACRES) TOTAL=160 ACRES	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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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



SURFACE
890' FSL, 2426' FEL SEC. 28
LATITUDE: 36°16.7855' N
LONGITUDE: 107°34.7540' W
NAD27

FD. B.L.M.
"1965" BC
LATITUDE: 36.279770° N
LONGITUDE: 107.579841° W
NAD83

POINT OF ENTRY
49' FSL, 960' FEL SEC. 28
LATITUDE: 36°16.6454' N
LONGITUDE: 107°34.4613' W
NAD27

LATITUDE: 36.277436° N
LONGITUDE: 107.574962° W
NAD83

LAST PERFORATION (LP)
100' FSL, 940' FEL SEC. 33
LATITUDE: 36°16.6209' N
LONGITUDE: 107°34.4574' W
NAD27

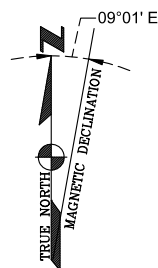
LATITUDE: 36.277028° N
LONGITUDE: 107.574897° W
NAD83

FIRST PERFORATION (FP)
100' FSL, 330' FEL SEC. 33
LATITUDE: 36°15.7601' N
LONGITUDE: 107°34.3204' W
NAD27

LATITUDE: 36.262682° N
LONGITUDE: 107.572614° W
NAD83

BOTTOM HOLE
21' FSL, 320' FEL SEC. 33
LATITUDE: 36°15.7471' N
LONGITUDE: 107°34.3183' W
NAD27

LATITUDE: 36.262464° N
LONGITUDE: 107.572590° W
NAD83



¹⁷ OPERATOR CERTIFICATION

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

Tamra Sessions 4/9/2021

Signature Date
Tamra Sessions

Printed Name
tsessions@logosresourcecells.com

E-mail Address

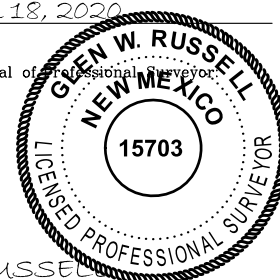
¹⁸ SURVEYOR CERTIFICATION

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.

NOVEMBER 18, 2020

Date of Survey

Signature and Seal of Professional Surveyor



GLEN W. RUSSELL

Certificate Number

15703

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

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

NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

Section 1 – Plan Description Effective May 25, 2021

I. Operator: LOGOS Operating, LLC **OGRID:** 289408 **Date:** 10/04 2021

II. Type: ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: _____

III. Well(s): Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Otero 2407 28O 1H	30-039-	O 28 T24N R7W	904FSL 2485FEL	26120	19590	4964
Otero 2407 28O 2H	30-039-31381	O 28 T24N R7W	910FSL 2515FEL	18521	13891	3354
Otero 2407 28O 3H	30-039-	O 28 T24N R7W	897FSL 2456FEL	21333	15850	3952
Otero 2407 28O 4H	30-039-	O 28 T24N R7W	890FSL 2426FEL	15672	11754	2823

IV. Central Delivery Point Name: Whiptail/Harvest Gathering System [See 19.15.27.9(D)(1) NMAC]

V. Anticipated Schedule: Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Otero 2407 28O 1H	30-039-	2022	Pending	Pending	Pending	Pending
Otero 2407 28O 2H	30-039-31381	2022	Pending	Pending	Pending	Pending
Otero 2407 28O 3H	30-039-	2022	Pending	Pending	Pending	Pending
Otero 2407 28O 4H	30-039-	2022	Pending	Pending	Pending	Pending

VI. Separation Equipment: ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

VII. Operational Practices: ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

VIII. Best Management Practices: ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

Section 3 - Certifications

Effective May 25, 2021

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

If Operator checks this box, Operator will select one of the following:

Well Shut-In. ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

Venting and Flaring Plan. ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

Section 4 - Notices

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature:	
Printed Name:	Etta Trujillo
Title:	Regulatory Specialist
E-mail Address:	etrujillo@logosresourcesllc.com
Date:	10/04/2021
Phone:	(505) 324-4154
OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)	
Approved By:	
Title:	
Approval Date:	
Conditions of Approval:	

LOGOS Operating, LLC

VI. Separation Equipment

The operator will select separation equipment for the maximum anticipated throughput and pressure to optimize gas capture. Separation equipment is sized according to manufacturer's design specifications. Separation vessels are built following the A.S.M.E. section VII division 1 codes for pressure vessel design, fabrication, inspection, testing and certification. Anticipated well pressures and production rates are evaluated to select separation equipment according to the equipment's designed operating pressure and throughput.

After completion, the operator utilizes flowback equipment, including separators, to manage wellbore fluids and solids during the initial separation period. After the initial flowback period is complete the operator utilizes iterative facility separation equipment to ensure that optimal separation is achieved.

VII. Operational Practices 19.15.27.8 NMAC A through F

- A. The operator will maximize the recovery of natural gas and minimize the amount of gas vented or flared when technically and safely feasible as further described and detailed within the following subsections (B-F of 19.15.27.8). In all cases where natural gas venting and flaring requires regulatory reporting, reporting will be submitted accurately and within the required time frames.
- B. Venting and flaring during drilling operations:
 - a. New Drill HZ Gas Wells: The operator drills wells in the area by utilizing a balanced mud to safely drill the wellbore. This technique prevents gas from coming to surface during the drilling process. If there is an emergency or malfunction and natural gas does come to surface the natural gas will be captured and routed to sales if technically and safely feasible.
- C. Venting and flaring during completion or recompletion operations:
 - a. New Drill HZ Gas Wells: The operator's facilities are designed to handle the maximum throughput and pressures from the newly drilled and completed wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible. During initial flowback and initial separation flowback the operator will utilize contracted flowback equipment, including separators, to manage wellbore fluids and solids. The initial flowback period will be minimized and flow will be sent to separation equipment as soon as possible to reduce the amount of gas that is vented to atmosphere. The natural gas will be utilized on site as needed for fuel gas and natural gas will be sold.
- D. Venting and flaring during production operations:
 - a. New Drill HZ Gas Wells: The operator's facilities are designed to handle the maximum throughput and pressures from producing wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible.

Operations will effectively manage the following scenarios to minimize the quantity of natural gas that is vented or flared:

- (a) If there is an emergency or malfunction vented or flared natural gas will be reported, if required, and the emergency or malfunction will be resolved as soon as technically and safely feasible.
- (b) If the wellbore needs to be unloaded to atmosphere the operator will not vent the well after the well has achieved a stabilized rate and pressure. The operator will remain on site during unloading. Plunger lift systems will be optimized to reduce the amount of natural gas venting. Downhole maintenance, such as workovers, swabbing, etc. will only be conducted as needed and best management practices will be utilized to reduce venting of natural gas.
- (c) The operator will minimize the amount of time that natural gas is vented to atmosphere from gauging and sampling a storage tank or low-pressure vessel, automatic tank gauges will be the primary means of gauging. The formation is only anticipated to produce water and therefore tank emissions are anticipated to be negligible.
- (d) The operator will reduce the amount of time needed for loading out liquids from a storage tanks or other low-pressure vessels whenever feasible. Operations will always utilize the water transfer systems when available. Water loading emissions are anticipated to be negligible.
- (e) Equipment will be repaired and maintained routinely to minimize the venting or flaring of natural gas. Repairs and maintenance will be conducted in a manner that minimizes the amount of natural gas vented to atmosphere through the isolation of the equipment that is being repaired or maintained.
- (f) Electric controllers and pumps will be installed to replace pneumatic controllers whenever feasible. Pneumatic controllers and pumps will be inspected frequently to ensure that no excess gas is vented to atmosphere.
- (g) No dehydration or amine units are anticipated to be set on location.
- (h) Compressors, compressor engines, turbines, flanges, connectors, valves, storage tanks, and other low-pressure vessels and flanges will be routinely inspected to ensure that no excess venting occurs outside of normal operations.
- (i) Regulatory required testing, such as bradenhead and packer testing will be performed in a manner that minimizes the amount of natural gas vented to atmosphere.
- (j) If natural gas does not meet gathering pipeline specifications gas samples will be collected twice per week to determine when pipeline specification gas content has been achieved. During this time frame gas will be flared and not vented to atmosphere. Natural gas that meets pipeline specifications will be sold via pipeline and natural gas that can be utilized for fuel gas will be used during this time.
- (k) If pipeline, equipment, or facilities need purged of impurities gas losses will be minimized as much as technically and safely feasible.

E. Performance standards:

- a. The production facilities are designed to handle the maximum throughput and pressures from producing wellbores and will be designed to minimize waste. The amount of gas vented and flared will be minimized when technically and safely feasible.
- b. All tanks that are routed to a control device that is installed after 5/25/2021 will have an automatic gauging system to minimize the amount of vented natural gas.
- c. If a flare stack is installed or replaced after 5/25/2021 it will be equipped with an automatic ignitor or continuous pilot. The flare stack will be properly sized and designed to ensure proper combustion efficiency. The flare stack will be located 100 feet away from the nearest wellhead or storage tank.
- d. AVO inspections will be conducted weekly for the year after completion and for all wells producing greater than 60,000 cubic feet of natural gas daily. The AVO inspection will include all components, including flare stacks, thief hatches, closed vent systems, pumps, compressors, pressure relief devices, valves, lines, flanges, connectors, and associated pipeline to identify any leaks and releases by comprehensive auditory, visual, and olfactory inspection. The AVO inspection records will be maintained for 5 years which will be available at the department's request. Identified leaks will be repaired as soon as feasible to minimize the amount of vented natural gas.

F. Measurement or estimation of vented and flared natural gas.

- a. The volume of natural gas that is vented, flared or consumed for beneficial use will be measured when possible, or estimated, during drilling, completions, or production operations.
- b. Equipment will be installed to measure the volume of natural gas flared for all APD's issued after 5/25/2021 on facilities that will have an average daily gas rate greater than 60,000 cubic feet of natural gas. Measurement equipment will conform to API MPMS Chapter 14.10 regulations. The measurement equipment will not have a manifold that allows the diversion of natural gas around the metering element except for the sole purpose of inspecting and servicing the measurement equipment. If metering is not practical then the volume of gas will be estimated.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Farmington District Office
6251 College Blvd, Suite A
Farmington, New Mexico 87402



In Reply Refer To:
3162.3-1(NMF0110)

* LOGOS OPERATING LLC
#4H OTERO 2407 280
Lease: NMSF78924
SH: SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 28, T.24 N., R.7 W.
Rio Arriba County, New Mexico
BH: SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 33, T.24 N., R.7 W.
Rio Arriba County, New Mexico
***Above Data Required on Well Sign**

GENERAL REQUIREMENTS FOR OIL AND GAS OPERATIONS ON FEDERAL AND INDIAN LEASES

The following special requirements apply and are effective when **checked**:

- A. ☒ Note all surface/drilling conditions of approval attached.
- B. ☒ The required wait on cement (WOC) time will be a minimum of 500 psi compressive strength at 60 degrees. Blowout preventor (BOP) nipple-up operations may then be initiated
- C. ☐ Test the surface casing to a minimum of _____ psi for 30 minutes.
- D. ☐ Test all casing strings below the surface casing to .22 psi/ft. of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield burst) for a minimum of 30 minutes.
- E. ☒ Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the Bureau of Land Management, Farmington District Office, Branch of Reservoir Management, 6251 College Blvd. Suite A, Farmington, New Mexico 87402. The effective date of the agreement must be **prior** to any sales.
- F. ☒ The use of co-flex hose is authorized contingent upon the following:
 1. From the BOP to the choke manifold: the co-flex hose must be hobbled on both ends and saddle to prevent whip.
 2. From the choke manifold to the discharge tank: the co-flex hoses must be as straight as practical, hobbled on both ends and anchored to prevent whip.
 3. The co-flex hose pressure rating must be at least commensurate with approved BOPE.

INTERIOR REGION 7 • UPPER COLORADO BASIN

COLORADO, NEW MEXICO, UTAH, WYOMING

I. GENERAL

- A. Full compliance with all applicable laws, regulations, and Onshore Orders, with the approved Permit to drill, and with the approved Surface Use and Operations Plan is required. Lessees and/or operators are fully accountable for the actions of their contractors and subcontractors. Failure to comply with these requirements and the filing of required reports will result in strict enforcement pursuant to 43 CFR 3163.1 or 3163.2.
- B. Each well shall have a well sign in legible condition from spud date to final abandonment. The sign should show the operator's name, lease serial number, or unit name, well number, location of the well, and whether lease is Tribal or Allotted, (See 43 CFR 3162.6(b)).
- C. A complete copy of the approved Application for Permit to Drill, along with any conditions of approval, shall be available to authorized personnel at the drill site whenever active drilling operations are under way.
- D. For Wildcat wells only, a drilling operations progress report is to be submitted, to the BLM-Field Office, weekly from the spud date until the well is completed and the Well Completion Report (Form 3160-4) is filed. The report should be on 8-1/2 x 11 inch paper, and each page should identify the well by; operator's name, well number, location and lease number.
- E. As soon as practical, notice is required of all blowouts, fires and accidents involving life-threatening injuries or loss of life. (See NTL-3A).
- F. Prior approval by the BLM-Authorized Office (Drilling and Production Section) is required for variance from the approved drilling program and before commencing plugging operations, plug back work casing repair work, corrective cementing operations, or suspending drilling operations indefinitely. Emergency approval may be obtained orally, but such approval is contingent upon filing of a notice of intent (on a Sundry Notice, Form 3160-5) within three business days (original and three copies of Federal leases and an original and four copies on Indian leases). **Any changes to the approved plan or any questions regarding drilling operations should be directed to BLM during regular business hours at 505-564-7600. Emergency program changes after hours should be directed to at Virgil Lucero at 505-793-1836.**
- G. **The Inspection and Enforcement Section (I&E), phone number (505-564-7750) is to be notified at least 24 hours in advance of BOP test, spudding, cementing, or plugging operations so that a BLM representative may witness the operations.**
- H. Unless drilling operations are commenced within two years, approval of the Application for Permit to Drill will expire. A written request for a two years extension may be granted if submitted prior to expiration.
- I. From the time drilling operations are initiated and until drilling operations are completed, a member of the drilling crew or the tool pusher shall maintain rig surveillance at all time, unless the well is secured with blowout preventers or cement plugs.
- J. If for any reason, drilling operations are suspended for more than 90 days, a written notice must be provided to this office outlining your plans for this well.

II. REPORTING REQUIREMENTS

- A. For reporting purposes, all well Sundry notices, well completion and other well actions shall be referenced by the appropriate lease, communitization agreement and/or unit agreement numbers.
- B. The following reports shall be filed with the BLM-Authorized Officer within 30 days after the work is completed.
1. Original and three copies on Federal and an Original and five copies on Indian leases of Sundry Notice (Form 3150-5), giving complete information concerning.
 - a. Setting of each string of casing. Show size and depth of hole, grade and weight of casing, depth set, depth of any and all cementing tools that are used, amount (in cubic feet) and types of cement used, whether cement circulated to surface and all cement tops in the casing annulus, casing test method and results, and the date work was done. Show spud date on first report submitted.
 - b. Intervals tested, perforated (include; size, number and location of perforations), acidized, or fractured; and results obtained. Provide date work was done on well completion report and completion sundry notice.
 - c. Subsequent Report of Abandonment, show the manner in which the well was plugged, including depths where casing was cut and pulled, intervals (by depths) where cement plugs were replaced, and dates of the operations.
 2. Well Completion Report (Form 3160-4) will be submitted with 30 days after well has been completed.
 - a. Initial Bottom Hole Pressure (BHP) for the producing formations. Show the BHP on the completion report. The pressure may be: 1) measured with a bottom hole bomb, or; 2) calculated based on shut in surface pressures (minimum seven day buildup) and fluid level shot.
 3. Submit a cement evaluation log, if cement is not circulated to surface.

III. DRILLER'S LOG

The following shall be entered in the daily driller's log: 1) Blowout preventer pressures tests, including test pressures and results. 2) Blowout preventer tests for proper functioning, 3) Blowout prevention drills conducted, 4) Casing run, including size, grade, weight, and depth set, 5) How pipe was cemented, including amount of cement, type, whether cement circulated to surface, location of cementing tools, etc., 6) Waiting on cement time for each casing string, 7) Casing pressure tests after cementing, including test pressure and results and 8) Estimated amounts of oil and gas recovered and/or produced during drill stem test.

IV. GAS FLARING

Gas produced from this well may not be vented or flared beyond an initial, authorized test period of *** Days or 50 MMCF** following its (completion)(recompletion), whichever first occurs, without the prior, written approval of the authorized officer. Should gas be vented or flared without approval beyond the test period authorized above, you may be directed to shut-in the well until the gas can be captured or approval to continue venting or flaring as uneconomic is granted. You shall be required to compensate the lessor for the portion of the gas vented or flared without approval which is determined to have been avoidably lost.

***30 days**, unless a longer test period is specifically approved by the authorized officer. The 30-day period will commence upon the first gas to surface.

V. SAFETY

- A. All rig heating stoves are to be of the explosion-proof type.
- B. Rig safety lines are to be installed.
- C. Hard hats and other Personal Protective Equipment (PPE) must be utilized.

VI. CHANGE OF PLANS OR ABANDONMENT

- A. Any changes of plans required in order to mitigate unanticipated conditions encountered during drilling operations, will require approval as set forth in Section 1.F.
- B. If the well is dry, it is to be plugged in accordance with 43 CFR 3162.3-4, approval of the proposed plugging program is required as set forth in Section 1.F. The report should show the total depth reached, the reason for plugging, and the proposed intervals, by depths, where cement plugs are to be placed, type of plugging mud, etc. A Subsequent Report of Abandonment is required as set forth in Section II.B.1c.
- C. Unless a well has been properly cased and cemented, or properly plugged, the drilling rig must not be moved from the drill site without prior approval from the BLM-Authorized Officer.

VII. PHONE NUMBERS

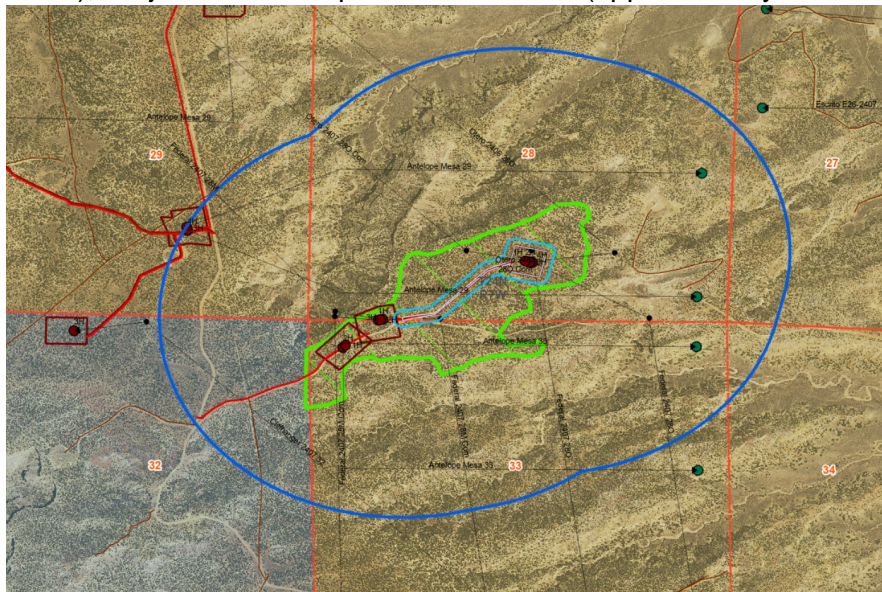
- A. **For BOPE tests, cementing, and plugging operations the phone number is 505-564-7750 and must be called 24 hours in advance in order that a BLM representative may witness the operations.**
- B. Emergency program changes after hours contact:

Virgil Lucero (505) 793-1836

Decisional Documentation**Ryan McBee****8/5/2021****Federal 2407 28O Com H1, H3, H4 APD and Federal 2407 28O H2****Discussion:**

The Federal 2407 28O H2 well pad is located in Crow Mesa Big Game Specially Designated Area (SDA). Logos Operating, LLC is planning to add Federal 2407 28O Com H1, H3, and H4 to the same location. Crow Mesa Big Game Wildlife Area was designated as critical mule deer habitat for North Western, New Mexico. Additionally, the well pad is located on a Habitat Stamp Program (HSP) habitat improvement treatment project. The HSP treatment was conducted in 2014. The treatment was 104 acres with a lop and scatter thinning followed by a prescribed burn. The Federal 2407 28O H2 well pad and access road bisect the entire HSP treatment area, with the well pad located in the middle of the treatment area (see map).

Map of Project Area; HSP Area in Green, Project Direct Impacts in Light Blue (approximately 16 acres), Project Indirect impacts in Dark Blue (approximately 965 acres)



The road and well pad account for approximately 5 acres of actual ground disturbance. With a 100-foot buffer, the direct impact is approximately 16 acres. Mule deer tend to use habitats that are an average of 913 m further from well pads compared with predevelopment patterns of habitat use. Even when most wells are in production and reclamation efforts are underway, mule deer are inclined to remain >1 km away from well pads (Sawyer 2017). Using this 913 m buffer, the indirect impact of the well pad is approximately 965 acres.

Mitigation Measures (from Federal 2407 MDP)

Cumulative/Indirect Impact Mitigation: Increased and improved pre-project planning to include review of the HSP completed project boundary layers in GIS, a review of the Crow Mesa SDA management prescriptions as well is needed to try to avoid these locations and lessen the indirect impacts on future projects.

Direct/Indirect Impact Mitigation: BLM would like to see the following mitigation strategies as outlined in the Federal 2407 MDP EA, approved September 2019:

- 16 acres of lop and scatter thinning in an area to be determined by the FFO
- Gate any new access road at initial point of entry, for the current project, gating before the road enters the HSP area would further reduce the vehicle traffic and indirect impact from greater disturbance to an area of current prime Big Game Habitat.



LOGOS Operating, LLC Operations Plan

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

Date:	July 16, 2020	Pool:	Escrito Gallup
Well Name:	Otero 2407 28O 4H	Elevation:	7,346'
Surface Location:	Sec 28, T24N, R7W 890 FSL, 2426 FEL (36.279770° N, 107.579841° W – NAD83)	Measured Depth:	12,248
Bottom Hole Location:	Sec 33, T24N, R7W 21 FSL, 320 FEL (36.262464° N, 107.572590° W – NAD83)	County:	Rio Arriba

Lease Serial #NM0557391

I. GEOLOGY

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

SURFACE FORMATION - NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	1,839'	1,839'	MENEFEE	4,156'	4,056'
KIRTLAND	1,991'	1,991'	*POINT LOOKOUT	4,973'	4,825'
*FRUITLAND	2,155'	2,154'	*MANCOS	5,227'	5,064'
*PICTURED CLIFFS	2,512'	2,505'	GALLUP	6,083'	5,843'
LEWIS	2,609'	2,598'	KICKOFF POINT	5,693'	5,503'
CHACRA	3,421'	3,364'	LANDING POINT	6,752'	6,118'
*CLIFF HOUSE	4,106'	4,009'	TD	12,248'	6,006'

* 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.

Otero 2407 28O 4H



- B. **BOPE 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	OHSIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CON N
SURFACE	12.25"	320'	9.625"	36 LBS	J-55 or equiv	LTC
INTERMEDIATE	8.75"	6,752	7"	23 LBS	J-55 or equiv	LTC
PRODUCTION	6.125"	6,652' – 12,248'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC
TIE BACK	6.125"	Surf. – 6,652'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC

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

B. **FLOAT EQUIPMENT:**

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

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



C. CEMENTING:

(Note: Cement type and volumes may be adjusted onsite due to actual conditions and availability)

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: ~240 bbls, 690 sks (1346 cu.ft.), 12.3 ppg@ 1.95 cuft/sk yield. Tail Cement: 47 bbls, 203 sks, (264 cuft), 13.5 ppg@ 1.3 cu'ft/sk yield. Displacement: Displace w/ Drilling mud or water. Total Cement: ~287 bbls, 893 sks, (1610 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 (510 sx / 693 cuft /124 bbls). Tail Spacer: 40 BBL of MMCR. Displacement: Displace w/ +/- 155 bbl.

Cement calculations are used for volume estimation. Well conditions will dictate final cement job design. Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected. All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

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.

Otero 2407 280 4H

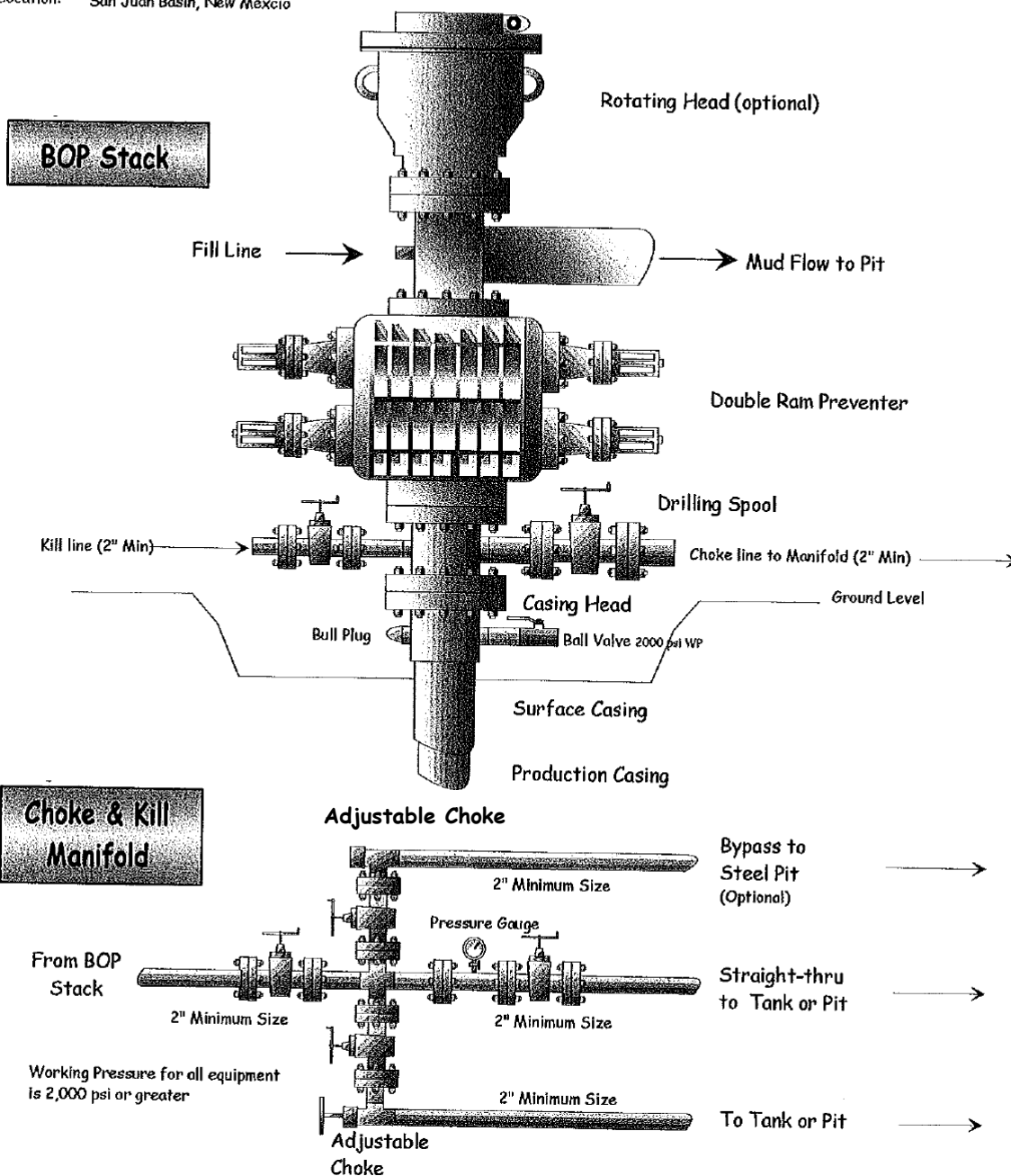


Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico



Otero 2407 280 4H

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

Otero 2407 280 4H

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 12248', TVD 6118'
Collapse	Casing Depth (TVD) 6118	MW in 0.00	MW out 9.00	Pres in 0	Pres out 2863	SF 2.64		
Burst	6118	9.00	0.00	2863 9363	0	1.14	6500	6500 psi frac pressure + no backup Burst pressure = Hyd + frac pressure
Tension	6118	Mud Wt 8.80 BF 0.8656	Air Wt 70,969	Bouy Wt 61,434	BW +100k 161,434	1.72		100k over pull BF= 1- (MW)/65.5

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

Otero 2407 280 4H

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

341 psi (Maximum Estimated SIP)

36 ppf K55 STC

Collapse	Casing Depth	MW in	MW out	Pres in	Pres out	SF	
	320	0	9	0	146	13.79	
Burst	320	9	0	146	0	24.04	
Tension	320	Mud Wt 9 BF 0.8626	Air Wt 11,520	Bouy Wt 9,937	BW +100k 109,937	SF 3.58	100k over pull BF= 1- (MW)/65.5

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

Otero 2407 280 4H

Intermediate Interval 1	Top Interval 0	Btm Interval 6752	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'-6752'
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Collapse

Interval 1	0	6752	Depth TVD 6118	MW in 0	MW out 9	Pres in 0	Pres out 2863	SF - 1.125 1.14
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23 J55

Burst

Interval 1	0	6752	Depth TVD 6118	MW in 9	MW out 0	Pres in 2863 2863	Pres out 0	SF - 1.0 1.52	Frac Pres 0
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23 J55

Tension

Interval 1	0	6752	Depth TVD 6118	Mud Wt 9 BF 0.8626	Air Wt 140,714	Bouy Wt 121,379	BW +100k 221,379	SF - 1.2 1.41
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23 J55

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



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Otero 2407-280
Well: Otero 2407-280 Com 4H
Wellbore: OH
Design: Plan #3

PROJECT DETAILS: Rio Arriba, NM NAD83

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



Azimuths to True North
Magnetic North: 8.5°
Magnetic Field
Strength: 49493.8 nT
Dip Angle: 62.5°
Date: 12/18/2018
Model: HD12M

WELL DETAILS: Otero 2407-280 Com 4H

GL 7346' @ 7346.00usft
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1921233.30 2797805.85 36.2797700 -107.5798410

Plan: Plan #3 (Otero 2407-280 Com 4H/OH)

CASING DETAILS

No casing data is available

DESIGN TARGET DETAILS

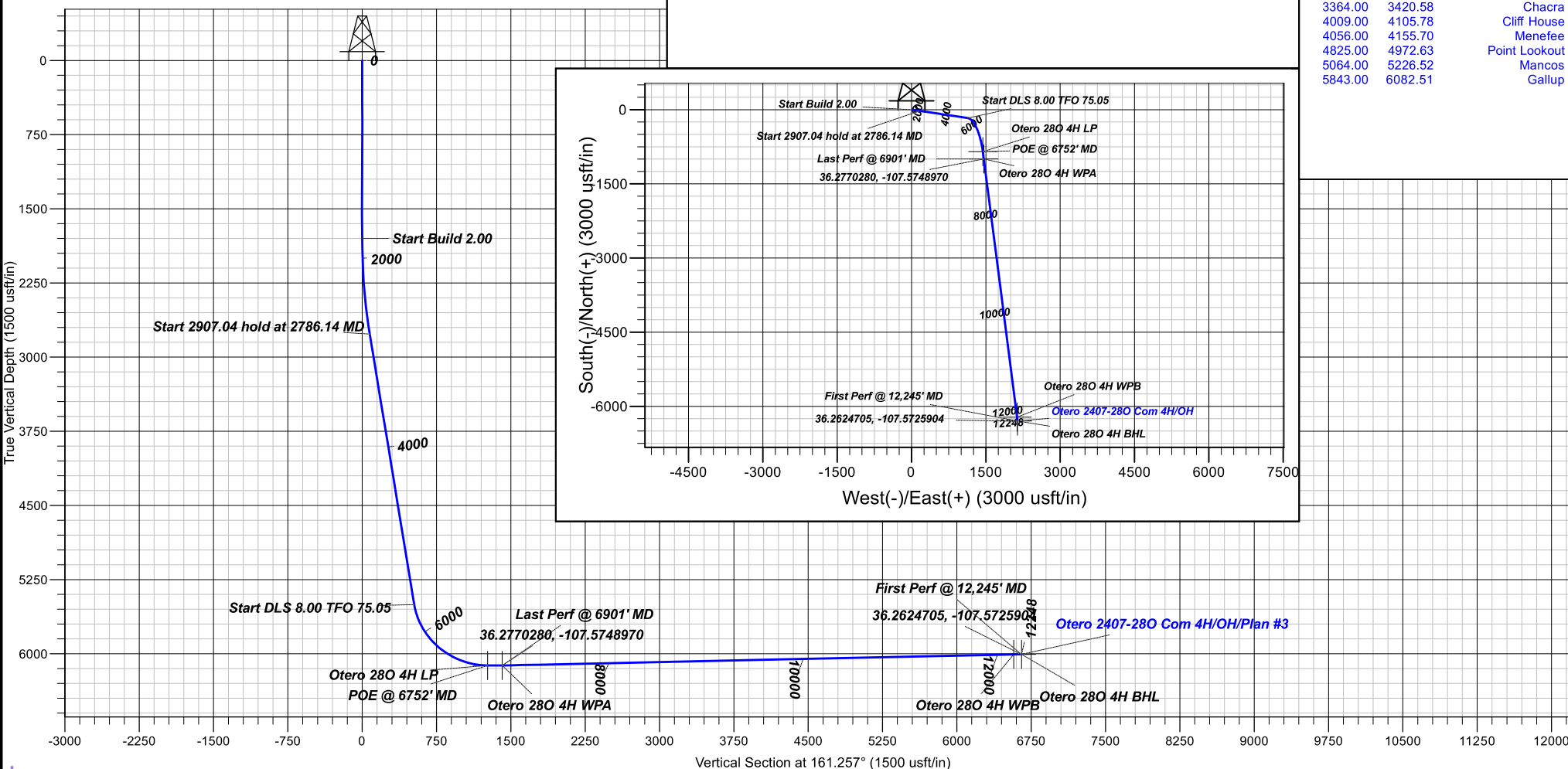
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Otero 280 4H LP	6118.00	-849.60	1438.08	1920387.47	2799246.15	36.2774360	-107.5749620
Otero 280 4H WPA	6118.00	-998.13	1457.25	1920238.99	2799265.70	36.2770280	-107.5748970
Otero 280 4H WPB	6006.00	-6220.41	2130.55	1915018.49	2799952.68	36.2626820	-107.5726140
Otero 280 4H BHL	6006.00	-6299.77	2137.63	1914939.15	2799959.97	36.2624640	-107.5725900

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
1800.00	0.00	0.000	1800.00	0.00	0.00	0.00	0.00	0.00	
2786.14	19.72	98.480	2766.78	-24.78	166.22	2.00	98.48	76.88	
5693.18	19.72	98.480	5503.28	-169.45	1136.54	0.00	0.00	525.66	
6752.14	90.00	172.647	6118.00	-849.60	1438.08	8.00	75.05	1266.64	Otero 280 4H LP
6901.90	90.00	172.647	6118.00	-998.13	1457.25	0.00	0.00	1413.44	Otero 280 4H WPA
6963.18	91.23	172.653	6117.34	-1058.90	1465.09	2.00	0.31	1473.52	
12168.60	91.23	172.653	6006.00	-6220.41	2130.55	0.00	0.00	6575.13	Otero 280 4H WPB
12245.92	88.85	177.018	6005.95	-6297.39	2137.51	6.43	118.59	6650.27	
12248.30	88.85	177.018	6006.00	-6299.77	2137.63	0.00	0.00	6652.56	Otero 280 4H BHL

FORMATION DETAILS

TVDPath	MDPath	Formation
1839.00	1839.00	Ojo Alamo
1991.00	1991.14	Kirtland
2154.00	2154.91	Fruitland
2505.00	2512.32	Pictured Cliffs
2598.00	2608.70	Lewis
3364.00	3420.58	Chacra
4009.00	4105.78	Cliff House
4056.00	4155.70	Menefee
4825.00	4972.63	Point Lookout
5064.00	5226.52	Mancos
5843.00	6082.51	Gallup





Logos Operating LLC

Rio Arriba, NM NAD83

Otero 2407-280

Otero 2407-280 Com 4H

OH

Plan: Plan #3

Standard Planning Report

14 April, 2020



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-28O Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-28O	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-28O Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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		Otero 2407-28O			
Site Position:		Northing:	1,921,253.10 usft	Latitude:	36.2798250
From:	Lat/Long	Easting:	2,797,717.96 usft	Longitude:	-107.5801390
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.15 °

Well	Otero 2407-28O Com 4H					
Well Position	+N/-S	-20.02 usft	Northing:	1,921,233.30 usft	Latitude:	36.2797700
	+E/-W	87.83 usft	Easting:	2,797,805.85 usft	Longitude:	-107.5798410
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,346.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/18/2018	8.75	62.87	49,493.50000000

Design	Plan #3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	161.257

Plan Survey Tool Program	Date	4/14/2020		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	12,248.30 Plan #3 (OH)	MWD+HDGM	
			OWSG MWD + HDGM	



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-28O Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-28O	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-28O Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #3		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.000	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,786.14	19.72	98.480	2,766.78	-24.78	166.22	2.00	2.00	0.00	98.48	
5,693.18	19.72	98.480	5,503.28	-169.45	1,136.54	0.00	0.00	0.00	0.00	
6,752.14	90.00	172.647	6,118.00	-849.60	1,438.08	8.00	6.64	7.00	75.05	Otero 28O 4H LP
6,901.90	90.00	172.647	6,118.00	-998.13	1,457.25	0.00	0.00	0.00	0.00	Otero 28O 4H WPA
6,963.18	91.23	172.653	6,117.34	-1,058.90	1,465.09	2.00	2.00	0.01	0.31	
12,168.60	91.23	172.653	6,006.00	-6,220.41	2,130.55	0.00	0.00	0.00	0.00	Otero 28O 4H WPB
12,245.92	88.85	177.018	6,005.95	-6,297.39	2,137.51	6.43	-3.08	5.64	118.59	
12,248.30	88.85	177.018	6,006.00	-6,299.77	2,137.63	0.00	0.00	0.00	0.00	Otero 28O 4H BHL



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-280 Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-280	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-280 Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.000	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.000	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.000	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.000	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.000	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.000	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.000	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.000	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.000	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.000	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.000	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.000	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.000	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.000	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.000	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.000	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.000	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	2.00	98.480	1,899.98	-0.26	1.73	0.80	2.00	2.00	0.00
2,000.00	4.00	98.480	1,999.84	-1.03	6.90	3.19	2.00	2.00	0.00
2,100.00	6.00	98.480	2,099.45	-2.31	15.52	7.18	2.00	2.00	0.00
2,200.00	8.00	98.480	2,198.70	-4.11	27.58	12.75	2.00	2.00	0.00
2,300.00	10.00	98.480	2,297.47	-6.42	43.05	19.91	2.00	2.00	0.00
2,400.00	12.00	98.480	2,395.62	-9.23	61.92	28.64	2.00	2.00	0.00
2,500.00	14.00	98.480	2,493.06	-12.55	84.17	38.93	2.00	2.00	0.00
2,600.00	16.00	98.480	2,589.64	-16.36	109.76	50.77	2.00	2.00	0.00
2,700.00	18.00	98.480	2,685.27	-20.68	138.68	64.14	2.00	2.00	0.00
2,786.14	19.72	98.480	2,766.78	-24.78	166.22	76.88	2.00	2.00	0.00
2,800.00	19.72	98.480	2,779.83	-25.47	170.85	79.02	0.00	0.00	0.00
2,900.00	19.72	98.480	2,873.96	-30.45	204.23	94.46	0.00	0.00	0.00
3,000.00	19.72	98.480	2,968.09	-35.42	237.60	109.89	0.00	0.00	0.00
3,100.00	19.72	98.480	3,062.23	-40.40	270.98	125.33	0.00	0.00	0.00
3,200.00	19.72	98.480	3,156.36	-45.38	304.36	140.77	0.00	0.00	0.00
3,300.00	19.72	98.480	3,250.49	-50.35	337.74	156.21	0.00	0.00	0.00
3,400.00	19.72	98.480	3,344.63	-55.33	371.12	171.65	0.00	0.00	0.00
3,500.00	19.72	98.480	3,438.76	-60.31	404.49	187.08	0.00	0.00	0.00
3,600.00	19.72	98.480	3,532.90	-65.28	437.87	202.52	0.00	0.00	0.00
3,700.00	19.72	98.480	3,627.03	-70.26	471.25	217.96	0.00	0.00	0.00
3,800.00	19.72	98.480	3,721.16	-75.24	504.63	233.40	0.00	0.00	0.00
3,900.00	19.72	98.480	3,815.30	-80.21	538.01	248.83	0.00	0.00	0.00
4,000.00	19.72	98.480	3,909.43	-85.19	571.39	264.27	0.00	0.00	0.00
4,100.00	19.72	98.480	4,003.56	-90.17	604.76	279.71	0.00	0.00	0.00
4,200.00	19.72	98.480	4,097.70	-95.14	638.14	295.15	0.00	0.00	0.00
4,300.00	19.72	98.480	4,191.83	-100.12	671.52	310.58	0.00	0.00	0.00
4,400.00	19.72	98.480	4,285.96	-105.09	704.90	326.02	0.00	0.00	0.00
4,500.00	19.72	98.480	4,380.10	-110.07	738.28	341.46	0.00	0.00	0.00
4,600.00	19.72	98.480	4,474.23	-115.05	771.65	356.90	0.00	0.00	0.00
4,700.00	19.72	98.480	4,568.37	-120.02	805.03	372.34	0.00	0.00	0.00
4,800.00	19.72	98.480	4,662.50	-125.00	838.41	387.77	0.00	0.00	0.00
4,900.00	19.72	98.480	4,756.63	-129.98	871.79	403.21	0.00	0.00	0.00
5,000.00	19.72	98.480	4,850.77	-134.95	905.17	418.65	0.00	0.00	0.00
5,100.00	19.72	98.480	4,944.90	-139.93	938.55	434.09	0.00	0.00	0.00
5,200.00	19.72	98.480	5,039.03	-144.91	971.92	449.52	0.00	0.00	0.00



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-280 Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-280	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-280 Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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)
5,300.00	19.72	98.480	5,133.17	-149.88	1,005.30	464.96	0.00	0.00	0.00
5,400.00	19.72	98.480	5,227.30	-154.86	1,038.68	480.40	0.00	0.00	0.00
5,500.00	19.72	98.480	5,321.43	-159.83	1,072.06	495.84	0.00	0.00	0.00
5,600.00	19.72	98.480	5,415.57	-164.81	1,105.44	511.28	0.00	0.00	0.00
5,693.18	19.72	98.480	5,503.28	-169.45	1,136.54	525.66	0.00	0.00	0.00
5,700.00	19.87	100.031	5,509.70	-169.82	1,138.82	526.74	8.00	2.16	22.74
5,800.00	23.37	119.698	5,602.77	-182.63	1,172.84	549.80	8.00	3.50	19.67
5,900.00	28.65	133.501	5,692.69	-209.00	1,207.51	585.92	8.00	5.28	13.80
6,000.00	34.90	143.022	5,777.72	-248.42	1,242.17	634.39	8.00	6.25	9.52
6,100.00	41.70	149.869	5,856.18	-300.12	1,276.13	694.26	8.00	6.79	6.85
6,200.00	48.80	155.071	5,926.57	-363.11	1,308.73	764.38	8.00	7.10	5.20
6,300.00	56.09	159.239	5,987.50	-436.14	1,339.35	843.37	8.00	7.29	4.17
6,400.00	63.49	162.742	6,037.80	-517.80	1,367.37	929.71	8.00	7.41	3.50
6,500.00	70.97	165.816	6,076.47	-606.50	1,392.27	1,021.71	8.00	7.48	3.07
6,600.00	78.50	168.624	6,102.78	-700.52	1,413.55	1,117.58	8.00	7.53	2.81
6,700.00	86.06	171.285	6,116.21	-798.01	1,430.80	1,215.45	8.00	7.55	2.66
6,752.14	90.00	172.647	6,118.00	-849.60	1,438.08	1,266.64	8.00	7.56	2.61
6,800.00	90.00	172.647	6,118.00	-897.07	1,444.21	1,313.56	0.00	0.00	0.00
6,900.00	90.00	172.647	6,118.00	-996.24	1,457.01	1,411.59	0.00	0.00	0.00
6,901.90	90.00	172.647	6,118.00	-998.13	1,457.25	1,413.44	0.00	0.00	0.00
6,963.18	91.23	172.653	6,117.34	-1,058.90	1,465.09	1,473.52	2.00	2.00	0.01
7,000.00	91.23	172.653	6,116.56	-1,095.41	1,469.80	1,509.60	0.00	0.00	0.00
7,100.00	91.23	172.653	6,114.42	-1,194.57	1,482.58	1,607.61	0.00	0.00	0.00
7,200.00	91.23	172.653	6,112.28	-1,293.72	1,495.36	1,705.61	0.00	0.00	0.00
7,300.00	91.23	172.653	6,110.14	-1,392.88	1,508.15	1,803.62	0.00	0.00	0.00
7,400.00	91.23	172.653	6,108.00	-1,492.04	1,520.93	1,901.63	0.00	0.00	0.00
7,500.00	91.23	172.653	6,105.86	-1,591.19	1,533.72	1,999.63	0.00	0.00	0.00
7,600.00	91.23	172.653	6,103.72	-1,690.35	1,546.50	2,097.64	0.00	0.00	0.00
7,700.00	91.23	172.653	6,101.58	-1,789.50	1,559.29	2,195.64	0.00	0.00	0.00
7,800.00	91.23	172.653	6,099.45	-1,888.66	1,572.07	2,293.65	0.00	0.00	0.00
7,900.00	91.23	172.653	6,097.31	-1,987.82	1,584.85	2,391.65	0.00	0.00	0.00
8,000.00	91.23	172.653	6,095.17	-2,086.97	1,597.64	2,489.66	0.00	0.00	0.00
8,100.00	91.23	172.653	6,093.03	-2,186.13	1,610.42	2,587.67	0.00	0.00	0.00
8,200.00	91.23	172.653	6,090.89	-2,285.29	1,623.21	2,685.67	0.00	0.00	0.00
8,300.00	91.23	172.653	6,088.75	-2,384.44	1,635.99	2,783.68	0.00	0.00	0.00
8,400.00	91.23	172.653	6,086.61	-2,483.60	1,648.77	2,881.68	0.00	0.00	0.00
8,500.00	91.23	172.653	6,084.47	-2,582.76	1,661.56	2,979.69	0.00	0.00	0.00
8,600.00	91.23	172.653	6,082.33	-2,681.91	1,674.34	3,077.70	0.00	0.00	0.00
8,700.00	91.23	172.653	6,080.19	-2,781.07	1,687.13	3,175.70	0.00	0.00	0.00
8,800.00	91.23	172.653	6,078.05	-2,880.23	1,699.91	3,273.71	0.00	0.00	0.00
8,900.00	91.23	172.653	6,075.92	-2,979.38	1,712.69	3,371.71	0.00	0.00	0.00
9,000.00	91.23	172.653	6,073.78	-3,078.54	1,725.48	3,469.72	0.00	0.00	0.00
9,100.00	91.23	172.653	6,071.64	-3,177.69	1,738.26	3,567.73	0.00	0.00	0.00
9,200.00	91.23	172.653	6,069.50	-3,276.85	1,751.05	3,665.73	0.00	0.00	0.00
9,300.00	91.23	172.653	6,067.36	-3,376.01	1,763.83	3,763.74	0.00	0.00	0.00
9,400.00	91.23	172.653	6,065.22	-3,475.16	1,776.61	3,861.74	0.00	0.00	0.00
9,500.00	91.23	172.653	6,063.08	-3,574.32	1,789.40	3,959.75	0.00	0.00	0.00
9,600.00	91.23	172.653	6,060.94	-3,673.48	1,802.18	4,057.75	0.00	0.00	0.00
9,700.00	91.23	172.653	6,058.80	-3,772.63	1,814.97	4,155.76	0.00	0.00	0.00
9,800.00	91.23	172.653	6,056.66	-3,871.79	1,827.75	4,253.77	0.00	0.00	0.00
9,900.00	91.23	172.653	6,054.53	-3,970.95	1,840.53	4,351.77	0.00	0.00	0.00
10,000.00	91.23	172.653	6,052.39	-4,070.10	1,853.32	4,449.78	0.00	0.00	0.00
10,100.00	91.23	172.653	6,050.25	-4,169.26	1,866.10	4,547.78	0.00	0.00	0.00
10,200.00	91.23	172.653	6,048.11	-4,268.41	1,878.89	4,645.79	0.00	0.00	0.00



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-28O Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-28O	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-28O Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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)	
10,300.00	91.23	172.653	6,045.97	-4,367.57	1,891.67	4,743.80	0.00	0.00	0.00	
10,400.00	91.23	172.653	6,043.83	-4,466.73	1,904.45	4,841.80	0.00	0.00	0.00	
10,500.00	91.23	172.653	6,041.69	-4,565.88	1,917.24	4,939.81	0.00	0.00	0.00	
10,600.00	91.23	172.653	6,039.55	-4,665.04	1,930.02	5,037.81	0.00	0.00	0.00	
10,700.00	91.23	172.653	6,037.41	-4,764.20	1,942.81	5,135.82	0.00	0.00	0.00	
10,800.00	91.23	172.653	6,035.27	-4,863.35	1,955.59	5,233.83	0.00	0.00	0.00	
10,900.00	91.23	172.653	6,033.14	-4,962.51	1,968.37	5,331.83	0.00	0.00	0.00	
11,000.00	91.23	172.653	6,031.00	-5,061.67	1,981.16	5,429.84	0.00	0.00	0.00	
11,100.00	91.23	172.653	6,028.86	-5,160.82	1,993.94	5,527.84	0.00	0.00	0.00	
11,200.00	91.23	172.653	6,026.72	-5,259.98	2,006.73	5,625.85	0.00	0.00	0.00	
11,300.00	91.23	172.653	6,024.58	-5,359.14	2,019.51	5,723.85	0.00	0.00	0.00	
11,400.00	91.23	172.653	6,022.44	-5,458.29	2,032.30	5,821.86	0.00	0.00	0.00	
11,500.00	91.23	172.653	6,020.30	-5,557.45	2,045.08	5,919.87	0.00	0.00	0.00	
11,600.00	91.23	172.653	6,018.16	-5,656.60	2,057.86	6,017.87	0.00	0.00	0.00	
11,700.00	91.23	172.653	6,016.02	-5,755.76	2,070.65	6,115.88	0.00	0.00	0.00	
11,800.00	91.23	172.653	6,013.88	-5,854.92	2,083.43	6,213.88	0.00	0.00	0.00	
11,900.00	91.23	172.653	6,011.75	-5,954.07	2,096.22	6,311.89	0.00	0.00	0.00	
12,000.00	91.23	172.653	6,009.61	-6,053.23	2,109.00	6,409.90	0.00	0.00	0.00	
12,100.00	91.23	172.653	6,007.47	-6,152.39	2,121.78	6,507.90	0.00	0.00	0.00	
12,168.60	91.23	172.653	6,006.00	-6,220.41	2,130.55	6,575.13	0.00	0.00	0.00	
12,200.00	90.26	174.426	6,005.59	-6,251.60	2,134.09	6,605.81	6.43	-3.08	5.65	
12,245.92	88.85	177.018	6,005.95	-6,297.39	2,137.51	6,650.27	6.43	-3.08	5.64	
12,248.30	88.85	177.018	6,006.00	-6,299.77	2,137.63	6,652.56	0.00	0.00	0.00	

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Otero 28O 4H BHL - hit/miss target - Shape - Point	0.00	0.000	6,006.00	-6,299.77	2,137.63	1,914,939.16	2,799,959.97	36.2624640	-107.5725900
Otero 28O 4H WPB - plan hits target center - Point	0.00	0.000	6,006.00	-6,220.41	2,130.55	1,915,018.50	2,799,952.68	36.2626820	-107.5726140
Otero 28O 4H WPA - plan hits target center - Point	0.00	0.000	6,118.00	-998.13	1,457.25	1,920,239.00	2,799,265.71	36.2770280	-107.5748970
Otero 28O 4H LP - plan hits target center - Point	0.00	0.000	6,118.00	-849.60	1,438.08	1,920,387.47	2,799,246.15	36.2774360	-107.5749620



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Otero 2407-280 Com 4H
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 7346' @ 7346.00usft
Site:	Otero 2407-280	MD Reference:	GL 7346' @ 7346.00usft
Well:	Otero 2407-280 Com 4H	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #3		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,839.00	1,839.00	Ojo Alamo		0.00	0.000	
1,991.14	1,991.00	Kirtland		0.00	0.000	
2,154.91	2,154.00	Fruitland		0.00	0.000	
2,512.32	2,505.00	Pictured Cliffs		0.00	0.000	
2,608.70	2,598.00	Lewis		0.00	0.000	
3,420.58	3,364.00	Chacra		0.00	0.000	
4,105.78	4,009.00	Cliff House		0.00	0.000	
4,155.70	4,056.00	Menefee		0.00	0.000	
4,972.63	4,825.00	Point Lookout		0.00	0.000	
5,226.52	5,064.00	Mancos		0.00	0.000	
6,082.51	5,843.00	Gallup		0.00	0.000	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,800.00	1,800.00	0.00	0.00	Start Build 2.00	
2,786.14	2,766.78	-24.78	166.22	Start 2907.04 hold at 2786.14 MD	
5,693.18	5,503.28	-169.45	1,136.54	Start DLS 8.00 TFO 75.05	
6,752.14	6,118.00	-849.60	1,438.08	POE @ 6752' MD	
6,901.90	6,118.00	-998.13	1,457.25	Last Perf @ 6901' MD	
6,901.90	6,118.00	-998.13	1,457.25	36.2770280, -107.5748970	
6,963.18	6,117.34	-1,058.90	1,465.09	Start 5205.42 hold at 6963.18 MD	
12,168.60	6,006.00	-6,220.41	2,130.55	First Perf @ 12,168' MD	
12,168.60	6,006.00	-6,220.41	2,130.55	36.2626820, -107.5726140	
12,245.92	6,005.95	-6,297.39	2,137.51	Start 2.38 hold at 12245.92 MD	
12,248.30	6,006.00	-6,299.77	2,137.63	TD at 12248.30	

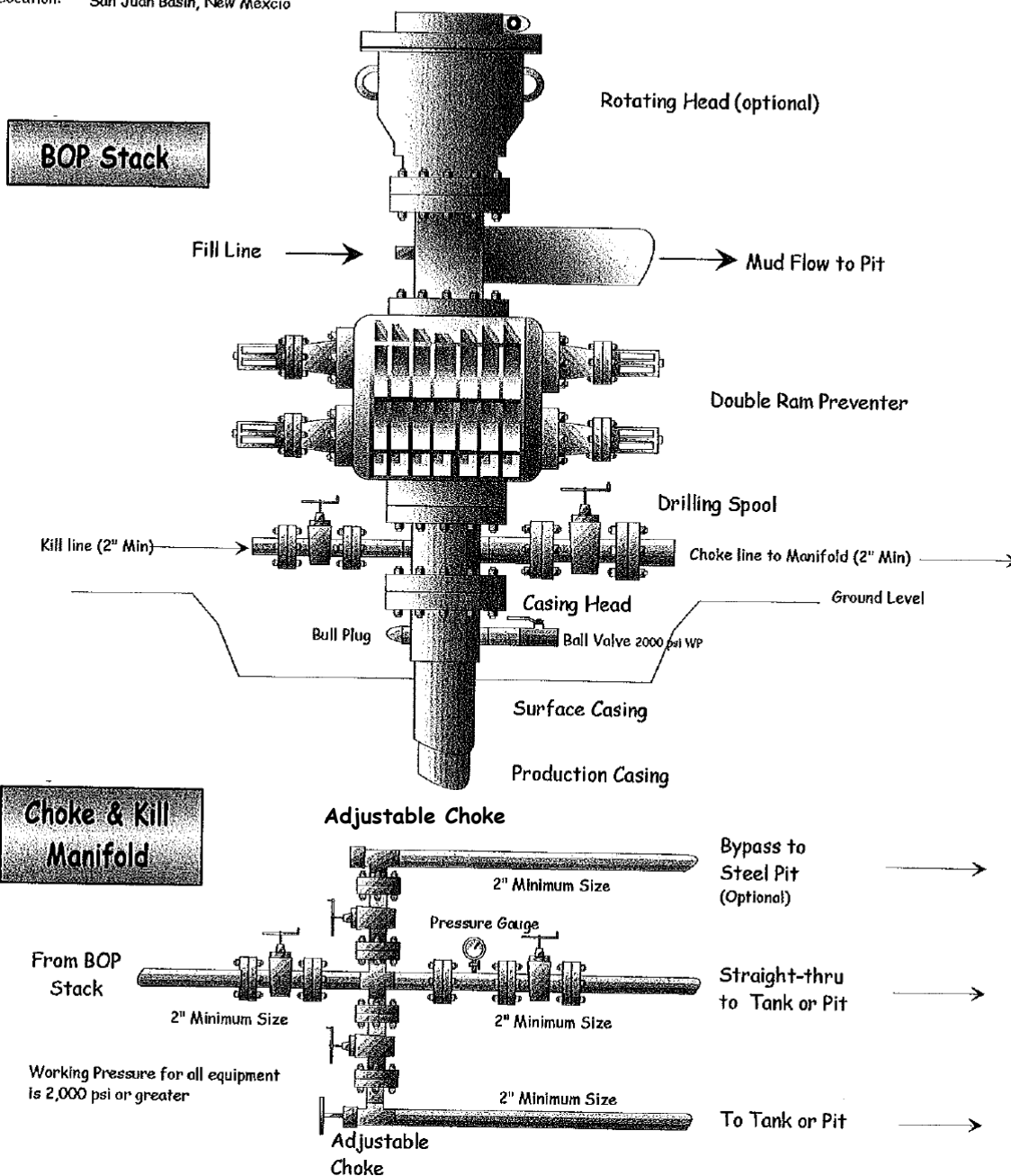


Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico



Otero 2407 280 4H

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

COMMENTS

Action 54919

COMMENTS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID:
	289408
	Action Number:
	54919
Action Type:	
[C-101] BLM - Federal/Indian Land Lease (Form 3160-3)	

COMMENTS

Created By	Comment	Comment Date
kpickford	KP GEO Review 10/13/2021	10/13/2021

District I

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

District II

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

District III

1000 Rio Brazos Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170

District IV

1220 S. St Francis Dr., Santa Fe, NM 87505
 Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 54919

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 54919
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Notify OCD 24 hours prior to casing & cement	10/13/2021
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104	10/13/2021
kpickford	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 fresh water zone or zones and shall immediately set in cement the water protection string	10/13/2021
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing	10/13/2021
kpickford	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	10/13/2021