Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMSF78768

6. If Indian, Allotee or Tribe Name:

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

7. If Unit or CA Agreement, Name and No.: ROSA UNIT- MANCOS PA / NMNM 078

8. Lease Name and Well No.: ROSA UNIT 832H

2. Name of Operator: LOGOS OPERATING LLC

9. API Well No.: 30-039-31420

3a. Address: 2010 AFTON PLACE, FARMINGTON, NM 87401

3b. Phone No. *(include area code)*: (505) 278-8720

10. Field and Pool, or Exploratory: BASIN MANCOS/BASIN MANCOS

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: NWNW / 604 FNL / 448 FWL / LAT 36.861707 / LONG -107.321042

At proposed prod. zone: SWNE / 1879 FNL / 1592 FEL / LAT 36.858202 / LONG -107.346059

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 36/T31N/R5W/NMP

14. Distance in miles and direction from nearest town or post office*: 38 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): 448 feet

16. No of acres in lease:

17. Spacing Unit dedicated to this well: 960.0

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 9 feet

19. Proposed Depth: 7152 feet / 14965 feet

20. BLM/BIA Bond No. in file: FED: NMB001821

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 6563 feet

22. Approximate date work will start*: 01/03/2022

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

25. Signature: (Electronic Submission)

Name *(Printed/Typed)*: ETTA TRUJILLO / Ph: (505) 324-4145

Date: 12/10/2021

Title: Regulatory Specialist

Approved by *(Signature)*: (Electronic Submission)

Name *(Printed/Typed)*: DAVE J MANKIEWICZ / Ph: (505) 564-7761

Date: 03/31/2022

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: 03/31/2022

(Continued on page 2)

*(Instructions on page 2)

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the wen, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionany drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service wen or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record win be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM conects this information to anow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Approval Date: 03/31/2022

Additional Operator Remarks

Location of Well

0. SHL: NWNW / 604 FNL / 448 FWL / TWSP: 31N / RANGE: 5W / SECTION: 36 / LAT: 36.861707 / LONG: -107.321042 (TVD: 0 feet, MD: 0 feet)

PPP: SENE / 0 FNL / 0 FWL / TWSP: 31N / RANGE: 5W / SECTION: 34 / LAT: 0.0 / LONG: 0.0 (TVD: 0 feet, MD: 0 feet)

PPP: SENE / 0 FNL / 0 FWL / TWSP: 31N / RANGE: 5W / SECTION: 35 / LAT: 0.0 / LONG: 0.0 (TVD: 0 feet, MD: 0 feet)

PPP: SWNW / 1845 FNL / 446 FWL / TWSP: 31N / RANGE: 5W / SECTION: 36 / LAT: 36.858299 / LONG: -107.321051 (TVD: 7135 feet, MD: 7649 feet)

BHL: SWNE / 1879 FNL / 1592 FEL / TWSP: 31N / RANGE: 5W / SECTION: 34 / LAT: 36.858202 / LONG: -107.346059 (TVD: 7152 feet, MD: 14965 feet)

BLM Point of Contact

Name: RYAN JOYNER
Title: Physical Scientist
Phone: (970) 385-1242
Email: rjoyner@blm.gov

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First Street, Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Drive, Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

1220 South St. Francis Drive
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to Appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-039-31420	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
320608	ROSA UNIT	832H

[7] OGRID No.	[8] Operator Name	[9] Elevation
289408	LOGOS OPERATING, LLC	6563'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	36	31N	5W		604	NORTH	448	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
G	34	31N	5W		1879	NORTH	1592	EAST	RIO ARRIBA

[12] Dedicated Acres		[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
960.00	N/2 - Section 34 N/2 - Section 35 N/2 - Section 36			R-13457

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.

Etta Trujillo — 11/24/2021
Signature — Date

Etta Trujillo
Printed Name

etrujillo@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: NOVEMBER 23, 2021
Date of Survey: APRIL 20, 2016

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

LAST TAKE POINT
1879' FNL 1592' FEL
SEC 34, T31N, R5W
LAT: 36.858195 °N
LONG: 107.345457 °W
DATUM: NAD1927

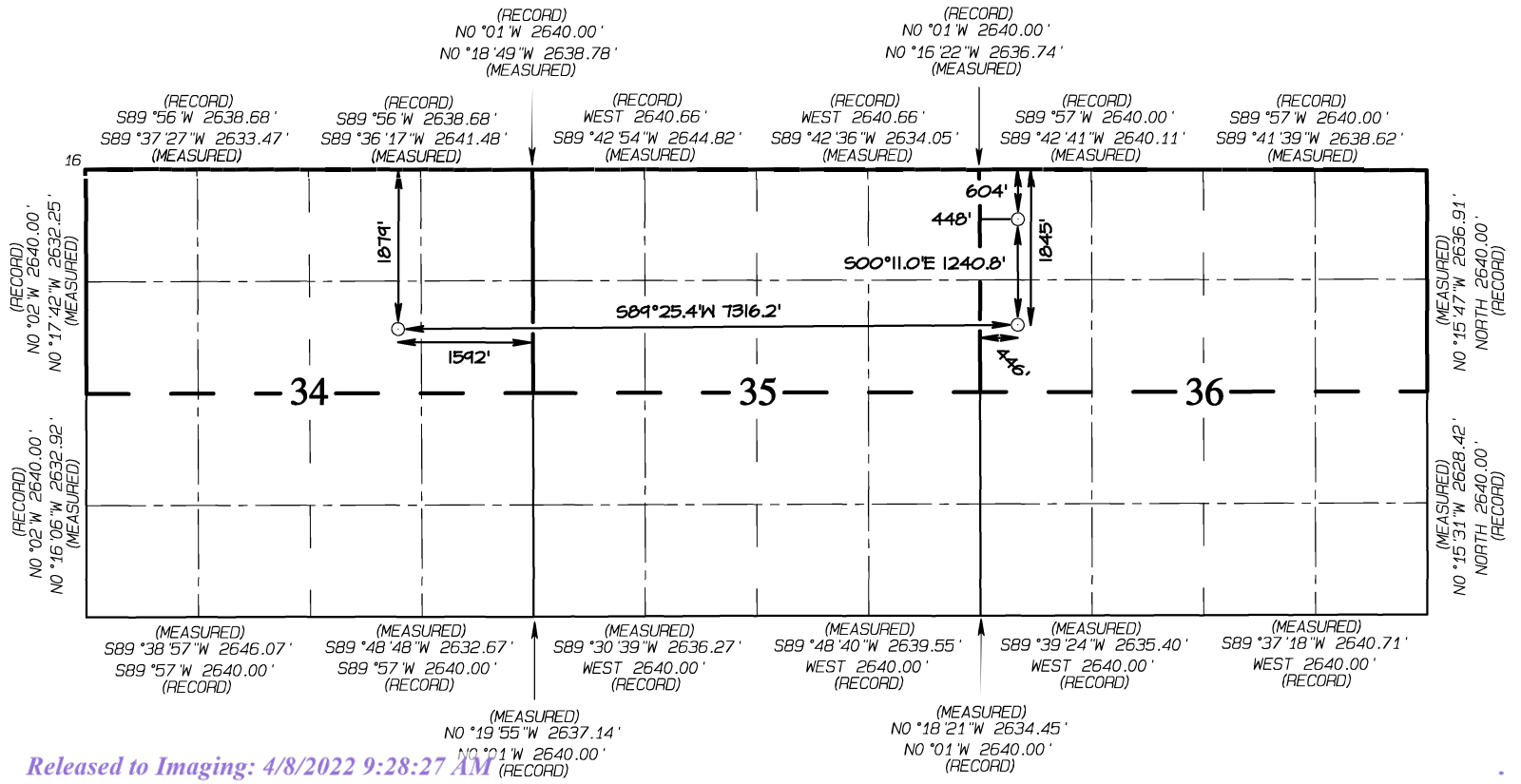
LAT: 36.858202 °N
LONG: 107.346059 °W
DATUM: NAD1983

FIRST TAKE POINT
1845' FNL 446' FWL
SEC 36, T31N, R5W
LAT: 36.858292 °N
LONG: 107.320451 °W
DATUM: NAD1927

LAT: 36.858299 °N
LONG: 107.321051 °W
DATUM: NAD1983

SURFACE LOCATION
604' FNL 448' FWL
SEC 36, T31N, R5W
LAT: 36.861701 °N
LONG: 107.320441 °W
DATUM: NAD1927

LAT: 36.861707 °N
LONG: 107.321042 °W
DATUM: NAD1983



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:** 12/03/2021

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
Rosa Unit 832H	30-039-	D 36 T31N R5W	604FNL 448FWL	N/A	8,286	454
Rosa Unit 834H	30-039-	D 36 T31N R5W	617FNL 440FWL	N/A	10,651	520
Rosa Unit 836H	30-039-	D 36 T31N R5W	537FNL 483FWL	N/A	9,068	520

IV. Central Delivery Point Name: 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
Rosa Unit 832H	30-039-	Pending	Pending	Pending	Pending	Pending
Rosa Unit 834H	30-039-	Pending	Pending	Pending	Pending	Pending
Rosa Unit 836H	30-039-	Pending	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:	Etta Trujillo
Printed Name:	Etta Trujillo
Title:	Regulatory Specialist
E-mail Address:	etrujillo@logosresourcesllc.com
Date:	12/03/2021
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.

LOGOS Operating, LLC
Operations Plan

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

Date:	December 1, 2021	Pool:	Basin Mancos
Well Name:	**Rosa Unit 832H**	GL Elevation:	6,563'
Surface Location:	Sec 36, T31N, R5W 604 FNL, 448 FWL (36.861707º N, 107.321042º W – NAD83)	Measured Depth:	14,965' (GL)
Bottom Hole Location:	Sec 34, T31N, R5W 1879 FNL, 1592 FEL (36.858202º N, 107.346059º W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF078768, CA Serial #NMNM78407E

I. GEOLOGY

A. Formation Tops (Based on GL Elevation): Estimated top of important geological markers:
SURFACE FORMATION – NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2764	2719	*POINT LOOKOUT	5963	5839
KIRTLAND	2891	2843	*MANCOS	6461	6325
*FRUITLAND	3317	3258	KICKOFF POINT	6581	6443
*PICTURED CLIFFS	3637	3570	LANDING POINT	7649	7135
LEWIS	3733	3664			
CHACRA	4861	4764			
*CLIFF HOUSE	5722	5604			
MENEFEE	5761	5642	TD	14,965	7,152

* 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 17-1/2" surface hole as well as the 12-1/4" directional vertical hole. A LSND (WBM) or (OBM) will be used to drill the 8-3/4" curve and lateral portion of the wellbore. Treat for lost circulation as necessary. Obtain 100% returns prior to cementing. Notify Engineering of any mud losses. Mud weights of 8.8-13 ppg will be used as necessary to maintain sufficient overbalance of reservoir pressure.

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:** 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. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe and blind rams shall be activated each trip or but not more than once a day. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE. **All tests and inspections will be recorded and logged with time and results.** A full BOP test will be conducted when initially installed for the first well on the pad or if seals subject to test pressure are broken, following related repairs and at a minimum of 30 day intervals. A BOPE Shell Test only will be conducted for subsequent wells on the pad when seals subject to pressure have not been broken or repaired and fall within the 30 day interval of first full test.

C. **GeoHazards:** There are no Geohazards

D. **Maximum Anticipated Pressure:** 7152' TVD x 0.43 = 3075 psi

E. **H2S Concerns**: There is no record of any naturally occurring H2S in any formation in the Rosa Unit. No H2S is anticipated in this formation or this well.

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	OH SIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CONN
SURFACE	17.5"	320' or greater	13.375"	54.5 LBS	J-55 or equiv	LTC/BTC
INTERMEDIATE	12.25"	6,536'	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.5"	14,965'	5.5"	20 LBS	P-110 or equiv	LTC/BTC

NOTE: All casing depths are approximate, based on GL elevation 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: 13-3/8" notched regular pattern guide shoe. Run (1) standard centralizer on each of the bottom (3) joints of Surface Casing.
2. INTERMEDIATE CASING: 9-5/8" 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 Tools (2) will be strategically placed above loss circulation zones anticipated in the Mesaverde and Fruitland Coal. Optional use of cancelation plugs for DV tools may be used if losses while cementing are not encountered.
3. PRODUCTION CASING: Run 5-1/2" casing with cement nose guide Float Shoe, 5-1/2" full or pup joints as necessary, Landing Collar, 5-1/2" full or pup joints as necessary, at least (1) one Toe Sleeve (Sliding Sleeve) positioned inside the applicable production area. Centralizer program will be determined by wellbore conditions. Production casing to be pressure tested during completion operations with frac stack installed.

C. CEMENTING:

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

1. SURFACE: Casing shall be set at ~ 320' and cemented to surface. TOC at Surface. 263 sks of 15.8 ppg Type Neat G, 1.18 cuft/sk yield or equivalent 223 sks of 14.6 ppg Type III with 1.39 cuf/sk yield, 30% excess.

2. INTERMEDIATE: Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. The intermediate casing will be cemented in 2 or 3 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. Operator proposes optional DV tools above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal. If losses are not observed during the second stage a cancelation plug will be pumped and the remaining cement will be pumped during stage 2. If cement does not circulate to the DV tool(s) or to surface, a CBL will be run to determine TOC.

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	6,063	473	0.31318	1.3	210	37	1.15	183	15.8
Stage 1 Lead	4,912	1,151	0.31318	1.3	469	83	2.30	204	12.3
					679	121		386	
Stage 2 Tail	3,837	1,075	0.31318	1.3	438	78	1.50	292	13.5
Stage 2 Lead	3,468	369	0.31318	1.3	150	27	2.30	65	12.3
					588	105		357	
Stage 3 Tail	2,718	750	0.31318	1.3	305	54	1.99	153	12.8
Stage 3 Lead	320	2,398	0.31318	1.3	976	174	2.53	386	12
Stage 3 Lead	-	320	0.36268	1	116	21	2.53	46	12
					1,398	249		585	
All Stage Totals					**2,664**	**475**		**1,329**	

Calculations based on 30% excess for open hole and cement to surface. Actual excess pumped will be determined by well conditions.

3. PRODUCTION: Production casing will be cemented in 1 stage with 100' of cement overlap above intermediate shoe. A CBL, or alternatively, a Temperature Survey will be used to determine TOC.

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Cased Lead	6,436	100	0.2531	1	25	5	1.56	16	13
Open Hole Lead	6,536	8,429	0.2291	1.15	2,231	397	1.56	1,430	13
					2,256	402		1,446	

Calculations based on 15% excess for open hole and 100' overlap into intermediate casing. Actual volumes will vary.

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

ROSA UNIT 832H

CBLs and/or Temperature Surveys will be performed as needed or required to determine cement top if cement is not circulated.

B. PRESSURE TEST

C. Pressure test 5-1/2" casing to 1575 psi (0.22 psi/ft * 7,097' TVD) for 30 minutes. Increase pressure to Open Toe sleeves.

D. STIMULATION

Stimulate with sand and water. Isolate stages with flow through or dissolvable frac plugs. Drill out frac plugs as required and flowback lateral.

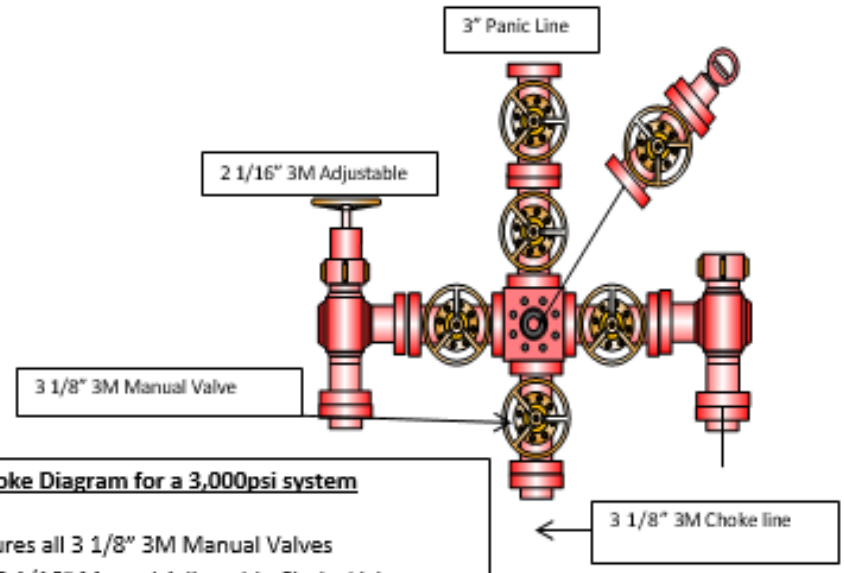
E. PRODUCTION TUBING

2-7/8", 6.5#, J-55 or L-80, EUE tubing will be run once volumes and pressures dictate. Due to the extremely high initial flow rates and pressures seen in offset wells, tubing will be installed once it is safe to do so, typically 12-18 months after completion.

*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.

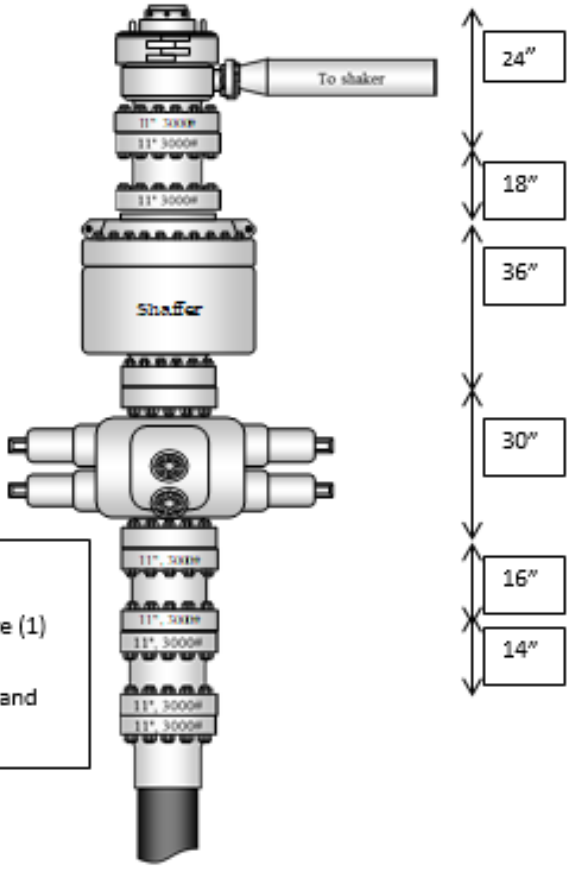
LOGOS RESOURCES II, LLC

3M 11" B.O.P.E Diagram



Choke Diagram for a 3,000psi system

- Features all 3 1/8" 3M Manual Valves
- Two 2 1/16" Manual Adjustable Choke Valves
- 3" Panic Line and 2" Vent lines
- (2) 3 1/8" 3M Coflex Hose f/Choke to BOP



11" 3,000psi BOP

- Choke Side has (1) manual 3 1/8" Valve (1) HCR
- Kill Side has (2) 2 1/16" Manual Valve and (1) check valve

ROSA UNIT 832H

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

					1.125	1.000		1.400
	Size	**Weight**	**Grade**	**Conn**	**Collapse**	**Burst**	**70% Burst**	**Tension (Body)**
Surface	13.375	54.5	J-55	BTC	1,130	2,730	1,911	853,000

Collapse							
	Casing Depth TVD	**MW in**	**MW out**	**Pres in**	**Pres out**	**SF**	
54.5 J-55 BTC	320	0.00	15.80	0	263	4.30	full evacuation with 15.8 ppg m

Burst							
54.5 J-55 BTC	320	9.00	0.00	1650	0	1.65	1500 psi casing test

Tension							
54.5 J-55 BTC		**Mud Wt**	**Air Wt**	**Bouy Wt**	**BW +100k**	**SF**	
Tension (Body)	320	9.00	17,440	15,044	115,044	7.41	100k over pull
Tension (Conn)	320	9.00	17,440	15,044	115,044	7.90	100k over pull
		BF					BF= 1- (MW)/65.5
		0.8626					

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

					1.125	1.000		1.400
	Size	**Weight**	**Grade**	**Conn**	**Collapse**	**Burst**	**80% Burst**	**Tension (Body)**
Intermediate	9.625	43.5	N-80 or L-80	LTC	3,810	6,330	5,064	1,005,000
	9.625	43.5	N-80 or L-80	BTC	3,810	6,330	5,064	1,005,000
	9.625	43.5	P-110	BTC	4,420	8,700	6,960	1,381,000

Collapse							
	Casing Depth TVD	**MW in**	**MW out**	**Pres in**	**Pres out**	**SF**	
43.5 N-80 or L-80 L	6,398	0.00	9.50	0	3161	1.21	full evacuation with 9.4 ppg mu
43.5 N-80 or L-80 E	6,398	0.00	9.50	0	3161	1.21	full evacuation with 9.4 ppg mu

Burst							
43.5 N-80 or L-80 L	6,398	9.50	0.00	4661	0	1.36	Casing full with 9.5 ppg mud , a
43.5 N-80 or L-80 E	6,398	9.50	0.00	4661	0	1.36	Casing full with 9.5 ppg mud , a

Tension							
43.5 N-80 or L-80 LTC		**Mud Wt**	**Air Wt**	**Bouy Wt**	**BW +100k**	**SF**	
Tension (Body)	6,398	9.50	278,313	237,947	337,947	2.97	100k over pull
Tension (Conn)	6,398	9.50	278,313	237,947	337,947	2.44	100k over pull
		BF					BF= 1- (MW)/65.5
		0.8550					
43.5 N-80 or L-80 BTC							
Tension (Body)	6,398	9.50	278,313	237,947	337,947	2.97	100k over pull
Tension (Conn)	6,398	9.50	278,313	237,947	337,947	3.18	100k over pull
		BF					BF= 1- (MW)/65.5
		0.8550					

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

					1.125	1.000		1.400
	Size	**Weight**	**Grade**	**Conn**	**Collapse**	**Burst**	**80% Burst**	**Tension (Body)**
Production	5.5	20	P110	LTC	11,080	12,630	10,104	641,000
	5.5	20	P110	BTC	11,080	12,360	9,888	641,000

Collapse							
	Casing Depth TVD	**MW in**	**MW out**	**Pres in**	**Pres out**	**SF**	
20 P110 LTC	7,152	0.00	13.30	0	4946	2.24	full evacuation with 13.3 ppg m
20 P110 BTC	7,152	0.00	13.30	0	4946	2.24	full evacuation with 13.3 ppg m

Burst							
20 P110 LTC	7,152	13.30	0.00	11446	0	1.10	6500 psi casing test
20 P110 BTC	7,152	13.30	0.00	11446	0	1.08	6500 psi casing test

Tension							
20 P110 LTC		**Mud Wt**	**Air Wt**	**Bouy Wt**	**BW +100k**	**SF**	
Tension (Body)	7,152	13.30	143,040	113,995	213,995	3.00	100k over pull
Tension (Conn)	7,152	13.30	143,040	113,995	213,995	2.56	100k over pull
		BF					BF= 1- (MW)/65.5
		0.7969					
20 P110 BTC		**Mud Wt**	**Air Wt**	**Bouy Wt**	**BW +100k**	**SF**	
Tension (Body)	7,152	13.30	143,040	113,995	213,995	3.00	100k over pull
Tension (Conn)	7,152	13.30	143,040	113,995	213,995	3.12	100k over pull
		BF					BF= 1- (MW)/65.5

LOGOS RESOURCES II, LLC

Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Rosa Unit 42
Well: Rosa Unit #832H
Wellbore: OH
Design: Plan #1

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

LONESTAR CONSULTING

WELL DETAILS: Rosa Unit #832H

WELL @ 6563.00ft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	2133387.21	2872955.91	36.8617070	-107.3210421	B7

Plan: Plan #1 (Rosa Unit #832H/OH)

Created By: Janie Collins Date: 13:18, August 03 2021

Azimuths to True North
Magnetic North: 8.58°
Magnetic Field
Strength: 49655.3nT
Dip Angle: 63.33°
Date: 7/26/2021
Model: HDGM2021_FILE

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rosa 832H POE	7135.00	-1240.71	-2.69	2132146.50	2872959.88	36.8582991	-107.3210513
Rosa 832H BHL	7152.00	-1275.17	-7318.78	2132072.80	2865644.09	36.8582018	-107.3460587

SECTION DETAILS

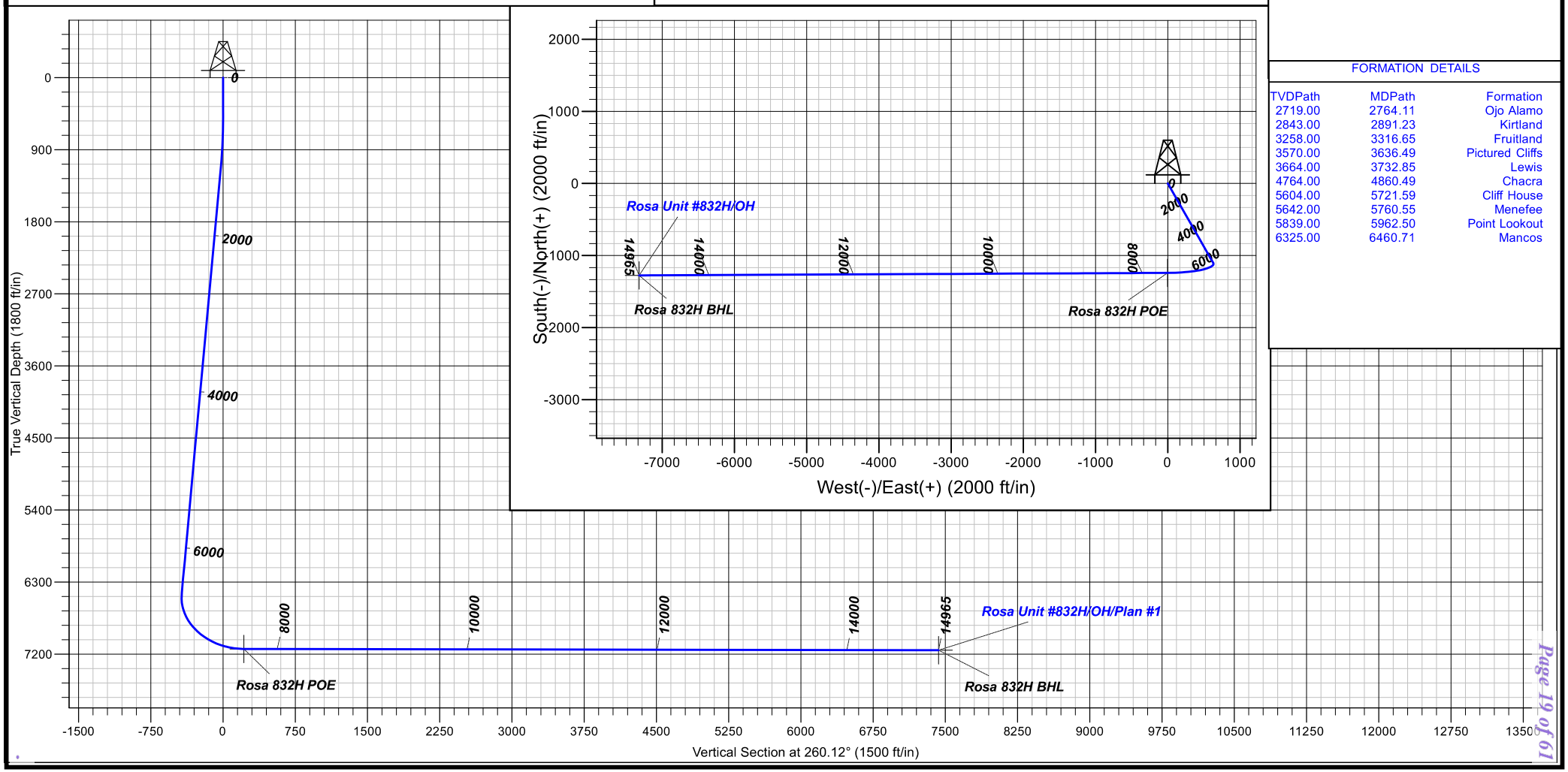
MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00
1135.54	12.71	150.32	1130.34	-61.00	34.76	2.00	150.32	-23.78
6581.43	12.71	150.32	6442.77	-1102.05	628.11	0.00	0.00	-429.62
7648.90	89.87	269.73	7135.00	-1240.71	-2.69	9.00	118.83	215.61
14965.10	89.87	269.73	7152.00	-1275.17	-7318.78	0.00	0.00	7429.04

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
2719.00	2764.11	Ojo Alamo
2843.00	2891.23	Kirtland
3258.00	3316.65	Fruitland
3570.00	3636.49	Pictured Cliffs
3664.00	3732.85	Lewis
4764.00	4860.49	Chacra
5604.00	5721.59	Cliff House
5642.00	5760.55	Menefee
5839.00	5962.50	Point Lookout
6325.00	6460.71	Mancos



Logos Operating LLC

Rio Arriba, NM NAD83
Rosa Unit 42
Rosa Unit #832H - Slot B7

OH

Plan: Plan #1

Standard Planning Report

03 August, 2021

Lonestar Consulting, LLC
Planning Report

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Company:	Logos Operating LLC	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site:	Rosa Unit 42	**North Reference:**	True
Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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 Rosa Unit 42

Site Position:		**Northing:**	2,133,466.81 usft	**Latitude:**	36.8619250
From:	Lat/Long	**Easting:**	2,872,998.82 usft	**Longitude:**	-107.3208940
Position Uncertainty:	0.00 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.31 °

Well Rosa Unit #832H - Slot B7

Well Position	**+N/-S**	-79.37 ft	**Northing:**	2,133,387.20 usft	**Latitude:**	36.8617070
	+E/-W	-43.33 ft	**Easting:**	2,872,955.92 usft	**Longitude:**	-107.3210422
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	6,563.00 ft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2021_FILE	7/26/2021	8.58	63.35	49,655.30000000

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	260.12

Plan Survey Tool Program **Date** 7/26/2021

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	14,965.10	Plan #1 (OH)	MWD+HDGM	
				OWSG MWD + HDGM	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,135.54	12.71	150.32	1,130.34	-61.00	34.76	2.00	2.00	0.00	150.32	
6,581.43	12.71	150.32	6,442.77	-1,102.05	628.11	0.00	0.00	0.00	0.00	
7,648.90	89.87	269.73	7,135.00	-1,240.71	-2.69	9.00	7.23	11.19	118.83	Rosa 832H POE
14,965.10	89.87	269.73	7,152.00	-1,275.17	-7,318.78	0.00	0.00	0.00	0.00	Rosa 832H BHL

Lonestar Consulting, LLC

Planning Report

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Company:	Logos Operating LLC	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site:	Rosa Unit 42	**North Reference:**	True
Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	2.00	150.32	599.98	-1.52	0.86	-0.59	2.00	2.00	0.00
700.00	4.00	150.32	699.84	-6.06	3.46	-2.36	2.00	2.00	0.00
800.00	6.00	150.32	799.45	-13.63	7.77	-5.32	2.00	2.00	0.00
900.00	8.00	150.32	898.70	-24.22	13.81	-9.44	2.00	2.00	0.00
1,000.00	10.00	150.32	997.47	-37.81	21.55	-14.74	2.00	2.00	0.00
1,100.00	12.00	150.32	1,095.63	-54.39	31.00	-21.20	2.00	2.00	0.00
1,135.54	12.71	150.32	1,130.34	-61.00	34.76	-23.78	2.00	2.00	0.00
1,200.00	12.71	150.32	1,193.22	-73.32	41.79	-28.58	0.00	0.00	0.00
1,300.00	12.71	150.32	1,290.77	-92.43	52.68	-36.03	0.00	0.00	0.00
1,400.00	12.71	150.32	1,388.32	-111.55	63.58	-43.49	0.00	0.00	0.00
1,500.00	12.71	150.32	1,485.87	-130.67	74.47	-50.94	0.00	0.00	0.00
1,600.00	12.71	150.32	1,583.42	-149.78	85.37	-58.39	0.00	0.00	0.00
1,700.00	12.71	150.32	1,680.97	-168.90	96.26	-65.84	0.00	0.00	0.00
1,800.00	12.71	150.32	1,778.52	-188.02	107.16	-73.30	0.00	0.00	0.00
1,900.00	12.71	150.32	1,876.07	-207.13	118.05	-80.75	0.00	0.00	0.00
2,000.00	12.71	150.32	1,973.62	-226.25	128.95	-88.20	0.00	0.00	0.00
2,100.00	12.71	150.32	2,071.17	-245.37	139.84	-95.65	0.00	0.00	0.00
2,200.00	12.71	150.32	2,168.72	-264.48	150.74	-103.11	0.00	0.00	0.00
2,300.00	12.71	150.32	2,266.27	-283.60	161.64	-110.56	0.00	0.00	0.00
2,400.00	12.71	150.32	2,363.82	-302.71	172.53	-118.01	0.00	0.00	0.00
2,500.01	12.71	150.32	2,461.37	-321.83	183.43	-125.46	0.00	0.00	0.00
2,600.01	12.71	150.32	2,558.92	-340.95	194.32	-132.91	0.00	0.00	0.00
2,700.01	12.71	150.32	2,656.46	-360.06	205.22	-140.37	0.00	0.00	0.00
2,800.01	12.71	150.32	2,754.01	-379.18	216.11	-147.82	0.00	0.00	0.00
2,900.01	12.71	150.32	2,851.56	-398.30	227.01	-155.27	0.00	0.00	0.00
3,000.01	12.71	150.32	2,949.11	-417.41	237.90	-162.72	0.00	0.00	0.00
3,100.01	12.71	150.32	3,046.66	-436.53	248.80	-170.18	0.00	0.00	0.00
3,200.01	12.71	150.32	3,144.21	-455.64	259.69	-177.63	0.00	0.00	0.00
3,300.01	12.71	150.32	3,241.76	-474.76	270.59	-185.08	0.00	0.00	0.00
3,400.01	12.71	150.32	3,339.31	-493.88	281.48	-192.53	0.00	0.00	0.00
3,500.01	12.71	150.32	3,436.86	-512.99	292.38	-199.99	0.00	0.00	0.00
3,600.01	12.71	150.32	3,534.41	-532.11	303.27	-207.44	0.00	0.00	0.00
3,700.01	12.71	150.32	3,631.96	-551.23	314.17	-214.89	0.00	0.00	0.00
3,800.01	12.71	150.32	3,729.51	-570.34	325.06	-222.34	0.00	0.00	0.00
3,900.01	12.71	150.32	3,827.06	-589.46	335.96	-229.79	0.00	0.00	0.00
4,000.01	12.71	150.32	3,924.61	-608.58	346.85	-237.25	0.00	0.00	0.00
4,100.01	12.71	150.32	4,022.16	-627.69	357.75	-244.70	0.00	0.00	0.00
4,200.01	12.71	150.32	4,119.71	-646.81	368.65	-252.15	0.00	0.00	0.00
4,300.01	12.71	150.32	4,217.26	-665.92	379.54	-259.60	0.00	0.00	0.00
4,400.01	12.71	150.32	4,314.81	-685.04	390.44	-267.06	0.00	0.00	0.00
4,500.01	12.71	150.32	4,412.36	-704.16	401.33	-274.51	0.00	0.00	0.00
4,600.01	12.71	150.32	4,509.90	-723.27	412.23	-281.96	0.00	0.00	0.00
4,700.01	12.71	150.32	4,607.45	-742.39	423.12	-289.41	0.00	0.00	0.00
4,800.01	12.71	150.32	4,705.00	-761.51	434.02	-296.87	0.00	0.00	0.00
4,900.01	12.71	150.32	4,802.55	-780.62	444.91	-304.32	0.00	0.00	0.00
5,000.01	12.71	150.32	4,900.10	-799.74	455.81	-311.77	0.00	0.00	0.00
5,100.01	12.71	150.32	4,997.65	-818.85	466.70	-319.22	0.00	0.00	0.00
5,200.01	12.71	150.32	5,095.20	-837.97	477.60	-326.67	0.00	0.00	0.00

Lonestar Consulting, LLC

Planning Report

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Company:	Logos Operating LLC	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site:	Rosa Unit 42	**North Reference:**	True
Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,300.01	12.71	150.32	5,192.75	-857.09	488.49	-334.13	0.00	0.00	0.00
5,400.01	12.71	150.32	5,290.30	-876.20	499.39	-341.58	0.00	0.00	0.00
5,500.01	12.71	150.32	5,387.85	-895.32	510.28	-349.03	0.00	0.00	0.00
5,600.01	12.71	150.32	5,485.40	-914.44	521.18	-356.48	0.00	0.00	0.00
5,700.01	12.71	150.32	5,582.95	-933.55	532.07	-363.94	0.00	0.00	0.00
5,800.01	12.71	150.32	5,680.50	-952.67	542.97	-371.39	0.00	0.00	0.00
5,900.01	12.71	150.32	5,778.05	-971.79	553.86	-378.84	0.00	0.00	0.00
6,000.01	12.71	150.32	5,875.60	-990.90	564.76	-386.29	0.00	0.00	0.00
6,100.01	12.71	150.32	5,973.15	-1,010.02	575.66	-393.75	0.00	0.00	0.00
6,200.01	12.71	150.32	6,070.70	-1,029.13	586.55	-401.20	0.00	0.00	0.00
6,300.01	12.71	150.32	6,168.25	-1,048.25	597.45	-408.65	0.00	0.00	0.00
6,400.01	12.71	150.32	6,265.80	-1,067.37	608.34	-416.10	0.00	0.00	0.00
6,500.01	12.71	150.32	6,363.34	-1,086.48	619.24	-423.55	0.00	0.00	0.00
6,581.43	12.71	150.32	6,442.77	-1,102.05	628.11	-429.62	0.00	0.00	0.00
6,600.01	11.99	157.38	6,460.92	-1,105.61	629.86	-430.74	8.99	-3.86	38.01
6,700.01	11.97	201.80	6,558.94	-1,124.86	630.01	-427.58	9.00	-0.03	44.42
6,800.01	17.39	230.92	6,655.77	-1,143.95	614.52	-409.05	9.00	5.43	29.12
6,900.01	24.93	244.76	6,749.02	-1,162.40	583.79	-375.60	9.00	7.54	13.84
7,000.01	33.18	252.27	6,836.38	-1,179.75	538.56	-328.07	9.00	8.24	7.51
7,100.01	41.71	257.02	6,915.72	-1,195.59	479.96	-267.62	9.00	8.53	4.75
7,200.01	50.38	260.40	6,985.08	-1,209.51	409.43	-195.74	9.00	8.67	3.37
7,300.01	59.12	263.01	7,042.75	-1,221.18	328.69	-114.20	9.00	8.74	2.61
7,400.01	67.91	265.18	7,087.30	-1,230.31	239.75	-25.01	9.00	8.79	2.17
7,500.02	76.72	267.10	7,117.65	-1,236.68	144.79	69.63	9.00	8.81	1.92
7,600.02	85.55	268.88	7,133.05	-1,240.12	46.14	167.40	9.00	8.83	1.78
7,648.90	89.87	269.73	7,135.00	-1,240.71	-2.69	215.61	9.00	8.83	1.74
7,700.02	89.87	269.73	7,135.12	-1,240.95	-53.80	266.01	0.00	0.00	0.00
7,800.02	89.87	269.73	7,135.35	-1,241.42	-153.80	364.60	0.00	0.00	0.00
7,900.02	89.87	269.73	7,135.58	-1,241.89	-253.80	463.20	0.00	0.00	0.00
8,000.02	89.87	269.73	7,135.82	-1,242.37	-353.80	561.79	0.00	0.00	0.00
8,100.02	89.87	269.73	7,136.05	-1,242.84	-453.80	660.39	0.00	0.00	0.00
8,200.02	89.87	269.73	7,136.28	-1,243.31	-553.79	758.98	0.00	0.00	0.00
8,300.02	89.87	269.73	7,136.51	-1,243.78	-653.79	857.58	0.00	0.00	0.00
8,400.02	89.87	269.73	7,136.75	-1,244.25	-753.79	956.18	0.00	0.00	0.00
8,500.02	89.87	269.73	7,136.98	-1,244.72	-853.79	1,054.77	0.00	0.00	0.00
8,600.02	89.87	269.73	7,137.21	-1,245.19	-953.79	1,153.37	0.00	0.00	0.00
8,700.02	89.87	269.73	7,137.44	-1,245.66	-1,053.79	1,251.96	0.00	0.00	0.00
8,800.02	89.87	269.73	7,137.67	-1,246.13	-1,153.79	1,350.56	0.00	0.00	0.00
8,900.02	89.87	269.73	7,137.91	-1,246.60	-1,253.79	1,449.15	0.00	0.00	0.00
9,000.02	89.87	269.73	7,138.14	-1,247.08	-1,353.78	1,547.75	0.00	0.00	0.00
9,100.02	89.87	269.73	7,138.37	-1,247.55	-1,453.78	1,646.34	0.00	0.00	0.00
9,200.02	89.87	269.73	7,138.60	-1,248.02	-1,553.78	1,744.94	0.00	0.00	0.00
9,300.02	89.87	269.73	7,138.84	-1,248.49	-1,653.78	1,843.54	0.00	0.00	0.00
9,400.02	89.87	269.73	7,139.07	-1,248.96	-1,753.78	1,942.13	0.00	0.00	0.00
9,500.02	89.87	269.73	7,139.30	-1,249.43	-1,853.78	2,040.73	0.00	0.00	0.00
9,600.02	89.87	269.73	7,139.53	-1,249.90	-1,953.78	2,139.32	0.00	0.00	0.00
9,700.02	89.87	269.73	7,139.77	-1,250.37	-2,053.78	2,237.92	0.00	0.00	0.00
9,800.02	89.87	269.73	7,140.00	-1,250.84	-2,153.78	2,336.51	0.00	0.00	0.00
9,900.02	89.87	269.73	7,140.23	-1,251.31	-2,253.77	2,435.11	0.00	0.00	0.00
10,000.02	89.87	269.73	7,140.46	-1,251.78	-2,353.77	2,533.70	0.00	0.00	0.00
10,100.02	89.87	269.73	7,140.70	-1,252.26	-2,453.77	2,632.30	0.00	0.00	0.00
10,200.02	89.87	269.73	7,140.93	-1,252.73	-2,553.77	2,730.90	0.00	0.00	0.00
10,300.02	89.87	269.73	7,141.16	-1,253.20	-2,653.77	2,829.49	0.00	0.00	0.00
10,400.02	89.87	269.73	7,141.39	-1,253.67	-2,753.77	2,928.09	0.00	0.00	0.00

Lonestar Consulting, LLC

Planning Report

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Company:	Logos Operating LLC	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site:	Rosa Unit 42	**North Reference:**	True
Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,500.02	89.87	269.73	7,141.63	-1,254.14	-2,853.77	3,026.68	0.00	0.00	0.00
10,600.02	89.87	269.73	7,141.86	-1,254.61	-2,953.77	3,125.28	0.00	0.00	0.00
10,700.02	89.87	269.73	7,142.09	-1,255.08	-3,053.76	3,223.87	0.00	0.00	0.00
10,800.02	89.87	269.73	7,142.32	-1,255.55	-3,153.76	3,322.47	0.00	0.00	0.00
10,900.02	89.87	269.73	7,142.55	-1,256.02	-3,253.76	3,421.06	0.00	0.00	0.00
11,000.02	89.87	269.73	7,142.79	-1,256.49	-3,353.76	3,519.66	0.00	0.00	0.00
11,100.02	89.87	269.73	7,143.02	-1,256.96	-3,453.76	3,618.26	0.00	0.00	0.00
11,200.02	89.87	269.73	7,143.25	-1,257.44	-3,553.76	3,716.85	0.00	0.00	0.00
11,300.02	89.87	269.73	7,143.48	-1,257.91	-3,653.76	3,815.45	0.00	0.00	0.00
11,400.02	89.87	269.73	7,143.72	-1,258.38	-3,753.76	3,914.04	0.00	0.00	0.00
11,500.02	89.87	269.73	7,143.95	-1,258.85	-3,853.76	4,012.64	0.00	0.00	0.00
11,600.02	89.87	269.73	7,144.18	-1,259.32	-3,953.75	4,111.23	0.00	0.00	0.00
11,700.02	89.87	269.73	7,144.41	-1,259.79	-4,053.75	4,209.83	0.00	0.00	0.00
11,800.02	89.87	269.73	7,144.65	-1,260.26	-4,153.75	4,308.42	0.00	0.00	0.00
11,900.02	89.87	269.73	7,144.88	-1,260.73	-4,253.75	4,407.02	0.00	0.00	0.00
12,000.02	89.87	269.73	7,145.11	-1,261.20	-4,353.75	4,505.61	0.00	0.00	0.00
12,100.02	89.87	269.73	7,145.34	-1,261.67	-4,453.75	4,604.21	0.00	0.00	0.00
12,200.02	89.87	269.73	7,145.58	-1,262.14	-4,553.75	4,702.81	0.00	0.00	0.00
12,300.02	89.87	269.73	7,145.81	-1,262.62	-4,653.75	4,801.40	0.00	0.00	0.00
12,400.03	89.87	269.73	7,146.04	-1,263.09	-4,753.74	4,900.00	0.00	0.00	0.00
12,500.03	89.87	269.73	7,146.27	-1,263.56	-4,853.74	4,998.59	0.00	0.00	0.00
12,600.03	89.87	269.73	7,146.50	-1,264.03	-4,953.74	5,097.19	0.00	0.00	0.00
12,700.03	89.87	269.73	7,146.74	-1,264.50	-5,053.74	5,195.78	0.00	0.00	0.00
12,800.03	89.87	269.73	7,146.97	-1,264.97	-5,153.74	5,294.38	0.00	0.00	0.00
12,900.03	89.87	269.73	7,147.20	-1,265.44	-5,253.74	5,392.97	0.00	0.00	0.00
13,000.03	89.87	269.73	7,147.43	-1,265.91	-5,353.74	5,491.57	0.00	0.00	0.00
13,100.03	89.87	269.73	7,147.67	-1,266.38	-5,453.74	5,590.17	0.00	0.00	0.00
13,200.03	89.87	269.73	7,147.90	-1,266.85	-5,553.74	5,688.76	0.00	0.00	0.00
13,300.03	89.87	269.73	7,148.13	-1,267.32	-5,653.73	5,787.36	0.00	0.00	0.00
13,400.03	89.87	269.73	7,148.36	-1,267.80	-5,753.73	5,885.95	0.00	0.00	0.00
13,500.03	89.87	269.73	7,148.60	-1,268.27	-5,853.73	5,984.55	0.00	0.00	0.00
13,600.03	89.87	269.73	7,148.83	-1,268.74	-5,953.73	6,083.14	0.00	0.00	0.00
13,700.03	89.87	269.73	7,149.06	-1,269.21	-6,053.73	6,181.74	0.00	0.00	0.00
13,800.03	89.87	269.73	7,149.29	-1,269.68	-6,153.73	6,280.33	0.00	0.00	0.00
13,900.03	89.87	269.73	7,149.53	-1,270.15	-6,253.73	6,378.93	0.00	0.00	0.00
14,000.03	89.87	269.73	7,149.76	-1,270.62	-6,353.73	6,477.53	0.00	0.00	0.00
14,100.03	89.87	269.73	7,149.99	-1,271.09	-6,453.72	6,576.12	0.00	0.00	0.00
14,200.03	89.87	269.73	7,150.22	-1,271.56	-6,553.72	6,674.72	0.00	0.00	0.00
14,300.03	89.87	269.73	7,150.45	-1,272.03	-6,653.72	6,773.31	0.00	0.00	0.00
14,400.03	89.87	269.73	7,150.69	-1,272.50	-6,753.72	6,871.91	0.00	0.00	0.00
14,500.03	89.87	269.73	7,150.92	-1,272.98	-6,853.72	6,970.50	0.00	0.00	0.00
14,600.03	89.87	269.73	7,151.15	-1,273.45	-6,953.72	7,069.10	0.00	0.00	0.00
14,700.03	89.87	269.73	7,151.38	-1,273.92	-7,053.72	7,167.69	0.00	0.00	0.00
14,800.03	89.87	269.73	7,151.62	-1,274.39	-7,153.72	7,266.29	0.00	0.00	0.00
14,900.03	89.87	269.73	7,151.85	-1,274.86	-7,253.72	7,364.89	0.00	0.00	0.00
14,965.10	89.87	269.73	7,152.00	-1,275.17	-7,318.78	7,429.04	0.00	0.00	0.00

Lonestar Consulting, LLC

Planning Report

Database:	Grand Junction	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Company:	Logos Operating LLC	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site:	Rosa Unit 42	**North Reference:**	True
Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Rosa 832H POE - plan hits target center - Point	0.00	0.00	7,135.00	-1,240.71	-2.69	2,132,146.50	2,872,959.88	36.8582991	-107.3210513
Rosa 832H BHL - plan hits target center - Point	0.00	0.00	7,152.00	-1,275.17	-7,318.78	2,132,072.79	2,865,644.09	36.8582018	-107.3460587

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,764.11	2,719.00	Ojo Alamo		0.00	0.00
2,891.23	2,843.00	Kirtland		0.00	0.00
3,316.65	3,258.00	Fruitland		0.00	0.00
3,636.49	3,570.00	Pictured Cliffs		0.00	0.00
3,732.85	3,664.00	Lewis		0.00	0.00
4,860.49	4,764.00	Chacra		0.00	0.00
5,721.59	5,604.00	Cliff House		0.00	0.00
5,760.55	5,642.00	Menefee		0.00	0.00
5,962.50	5,839.00	Point Lookout		0.00	0.00
6,460.71	6,325.00	Mancos		0.00	0.00

Logos Operating LLC

Rio Arriba, NM NAD83
Rosa Unit 42
Rosa Unit #832H

OH
Plan #1

Anticollision Report

03 August, 2021

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Plan #1

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum centre distance of 2,000.00ft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 7/26/2021

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	14,965.10	Plan #1 (OH)	MWD+HDGM	OWSG MWD + HDGM

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Rosa Unit 42						
Rosa Unit #184C - OH - OH	14,965.10	7,371.32	1,364.86	960.51	3.375	CC, ES, SF
Rosa Unit # 830H - OH - Plan #1	500.00	500.00	90.43	86.84	25.226	CC, ES
Rosa Unit # 830H - OH - Plan #1	14,965.10	14,846.58	1,361.43	887.42	2.872	SF
Rosa Unit # 831H - OH - Plan #1	500.00	500.00	90.03	86.45	25.115	CC
Rosa Unit # 831H - OH - Plan #1	600.00	600.63	90.44	86.17	21.164	ES
Rosa Unit # 831H - OH - Plan #1	14,965.10	15,174.25	715.59	277.23	1.632	SF
Rosa Unit #184 - OH - OH						Out of range
Rosa Unit #184A - OH - OH	14,698.29	6,504.00	964.65	745.60	4.404	CC
Rosa Unit #184A - OH - OH	14,700.00	6,504.00	964.66	745.58	4.403	ES
Rosa Unit #184A - OH - OH	14,900.00	6,504.00	985.52	759.91	4.368	SF
Rosa Unit #184B - OH - OH						Out of range
Rosa Unit #188 - OH - OH						Out of range
Rosa Unit #188A - OH - OH						Out of range
Rosa Unit #188B - OH - OH						Out of range
Rosa Unit #188C - OH - OH						Out of range
Rosa Unit #269 - OH - OH						Out of range
Rosa Unit #269A - OH - OH						Out of range
Rosa Unit #270 - OH - OH						Out of range
Rosa Unit #270A - OH - OH						Out of range
Rosa Unit #55 - OH - OH	14,535.67	7,164.41	1,899.91	1,458.17	4.301	CC
Rosa Unit #55 - OH - OH	14,600.00	7,164.56	1,901.00	1,457.31	4.285	ES
Rosa Unit #55 - OH - OH	14,700.00	7,164.79	1,907.00	1,460.81	4.274	SF
Rosa Unit #834H - OH - Plan #1	500.00	500.00	14.98	11.40	4.180	CC, ES
Rosa Unit #834H - OH - Plan #1	7,474.15	7,581.51	98.25	38.26	1.638	SF
Rosa Unit #835H - OH - Plan #1	500.00	500.00	17.50	13.91	4.882	CC, ES
Rosa Unit #835H - OH - Plan #1	600.00	599.39	19.30	15.03	4.522	SF
Rosa Unit #836H - OH - Plan #1	500.00	500.00	75.54	71.95	21.071	CC
Rosa Unit #836H - OH - Plan #1	600.00	600.97	75.84	71.55	17.711	ES
Rosa Unit #836H - OH - Plan #1	900.00	898.88	92.73	86.36	14.549	SF

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #184C - OH - OH

Offset Site Error: 0.00 ft

Survey Program: 159-INCLINOMETER

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
14,200.00	7,150.22	7,369.54	7,363.22	214.14	223.77	89.78	-263.10	-8,234.51	1,960.14	1,618.69	341.45	5.741	
14,300.00	7,150.45	7,369.78	7,363.45	217.13	223.78	89.79	-263.10	-8,234.51	1,875.35	1,527.57	347.78	5.392	
14,400.00	7,150.69	7,370.01	7,363.69	220.13	223.79	89.81	-263.10	-8,234.51	1,792.13	1,437.50	354.62	5.054	
14,500.00	7,150.92	7,370.24	7,363.92	223.13	223.79	89.82	-263.10	-8,234.51	1,710.71	1,348.68	362.02	4.725	
14,600.00	7,151.15	7,370.47	7,364.15	226.14	223.80	89.83	-263.10	-8,234.51	1,631.35	1,261.35	370.00	4.409	
14,700.00	7,151.38	7,370.70	7,364.38	229.14	223.81	89.85	-263.10	-8,234.51	1,554.38	1,175.78	378.60	4.106	
14,800.00	7,151.62	7,370.94	7,364.62	232.14	223.81	89.86	-263.10	-8,234.51	1,480.17	1,092.35	387.81	3.817	
14,900.00	7,151.85	7,371.17	7,364.85	235.14	223.82	89.87	-263.10	-8,234.51	1,409.14	1,011.50	397.64	3.544	
14,965.10	7,152.00	7,371.32	7,365.00	237.10	223.83	89.88	-263.10	-8,234.51	1,364.86	960.51	404.35	3.375	CC, ES, SF

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 830H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	28.63	79.37	43.33	90.43				
100.00	100.00	100.00	100.00	0.36	0.36	28.63	79.37	43.33	90.43	89.71	0.72	126.129	
200.00	200.00	200.00	200.00	0.72	0.72	28.63	79.37	43.33	90.43	88.99	1.43	63.064	
300.00	300.00	300.00	300.00	1.08	1.08	28.63	79.37	43.33	90.43	88.28	2.15	42.043	
400.00	400.00	400.00	400.00	1.43	1.43	28.63	79.37	43.33	90.43	87.56	2.87	31.532	
500.00	500.00	500.00	500.00	1.79	1.79	28.63	79.37	43.33	90.43	86.84	3.58	25.226	CC, ES
600.00	599.98	598.83	598.81	2.14	2.14	-121.59	79.16	45.02	91.98	87.70	4.27	21.524	
700.00	699.84	697.53	697.37	2.47	2.48	-121.30	78.52	50.08	96.62	91.67	4.95	19.516	
800.00	799.45	795.96	795.44	2.82	2.83	-120.88	77.47	58.48	104.34	98.70	5.64	18.486	
900.00	898.70	895.44	894.39	3.17	3.19	-121.19	76.19	68.60	114.48	108.12	6.36	17.998	
1,000.00	997.47	994.64	993.07	3.55	3.55	-122.75	74.93	78.69	126.47	119.38	7.09	17.829	
1,100.00	1,095.62	1,093.46	1,091.36	3.94	3.92	-125.15	73.66	88.74	140.53	132.69	7.84	17.922	
1,200.00	1,193.22	1,191.88	1,189.27	4.36	4.29	-128.02	72.41	98.75	156.51	147.91	8.60	18.196	
1,300.00	1,290.77	1,290.27	1,287.14	4.79	4.66	-130.49	71.15	108.76	172.97	163.60	9.36	18.470	
1,400.00	1,388.32	1,388.66	1,385.01	5.23	5.03	-132.53	69.89	118.76	189.68	179.55	10.13	18.721	
1,500.00	1,485.87	1,487.04	1,482.88	5.68	5.41	-134.24	68.63	128.77	206.59	195.68	10.90	18.949	
1,600.00	1,583.42	1,585.43	1,580.75	6.14	5.78	-135.69	67.38	138.77	223.65	211.97	11.68	19.156	
1,700.00	1,680.97	1,683.82	1,678.62	6.59	6.15	-136.93	66.12	148.78	240.83	228.38	12.45	19.344	
1,800.00	1,778.52	1,782.21	1,776.49	7.06	6.53	-138.01	64.86	158.79	258.10	244.88	13.23	19.516	
1,900.00	1,876.07	1,880.59	1,874.36	7.52	6.91	-138.95	63.61	168.79	275.46	261.45	14.00	19.673	
2,000.00	1,973.61	1,978.98	1,972.23	7.99	7.28	-139.78	62.35	178.80	292.87	278.09	14.78	19.816	
2,100.00	2,071.16	2,077.37	2,070.09	8.46	7.66	-140.52	61.09	188.80	310.34	294.79	15.56	19.948	
2,200.00	2,168.71	2,175.76	2,167.96	8.93	8.04	-141.18	59.83	198.81	327.86	311.52	16.34	20.069	
2,300.00	2,266.26	2,274.15	2,265.83	9.40	8.42	-141.77	58.58	208.82	345.41	328.29	17.12	20.181	
2,400.00	2,363.81	2,372.53	2,363.70	9.88	8.79	-142.30	57.32	218.82	363.00	345.10	17.90	20.284	
2,500.00	2,461.36	2,470.92	2,461.57	10.35	9.17	-142.79	56.06	228.83	380.61	361.93	18.68	20.379	
2,600.00	2,558.91	2,569.31	2,559.44	10.83	9.55	-143.23	54.80	238.83	398.25	378.79	19.46	20.468	
2,700.00	2,656.46	2,667.70	2,657.31	11.30	9.93	-143.64	53.55	248.84	415.90	395.67	20.24	20.551	
2,800.00	2,754.01	2,766.09	2,755.18	11.78	10.31	-144.01	52.29	258.85	433.58	412.56	21.02	20.628	
2,900.00	2,851.56	2,864.47	2,853.05	12.26	10.69	-144.35	51.03	268.85	451.27	429.47	21.80	20.700	
3,000.00	2,949.11	2,962.86	2,950.92	12.74	11.07	-144.67	49.77	278.86	468.98	446.40	22.58	20.768	
3,100.00	3,046.66	3,061.25	3,048.79	13.22	11.45	-144.96	48.52	288.87	486.70	463.34	23.36	20.832	
3,200.00	3,144.21	3,159.64	3,146.66	13.70	11.83	-145.24	47.26	298.87	504.43	480.29	24.15	20.891	
3,300.00	3,241.75	3,258.02	3,244.53	14.18	12.21	-145.49	46.00	308.88	522.18	497.25	24.93	20.947	
3,400.00	3,339.30	3,356.41	3,342.40	14.66	12.59	-145.73	44.75	318.88	539.93	514.22	25.71	21.001	
3,500.00	3,436.85	3,454.80	3,440.27	15.14	12.97	-145.95	43.49	328.89	557.69	531.19	26.49	21.051	
3,600.00	3,534.40	3,553.19	3,538.14	15.62	13.34	-146.16	42.23	338.90	575.46	548.18	27.28	21.098	
3,700.00	3,631.95	3,651.58	3,636.01	16.10	13.72	-146.36	40.97	348.90	593.23	565.17	28.06	21.143	
3,800.00	3,729.50	3,749.96	3,733.88	16.58	14.10	-146.54	39.72	358.91	611.01	582.17	28.84	21.186	
3,900.00	3,827.05	3,848.35	3,831.75	17.06	14.48	-146.72	38.46	368.91	628.80	599.17	29.62	21.226	
4,000.00	3,924.60	3,946.74	3,929.62	17.55	14.86	-146.88	37.20	378.92	646.59	616.18	30.41	21.265	
4,100.00	4,022.15	4,045.13	4,027.49	18.03	15.24	-147.04	35.94	388.93	664.39	633.20	31.19	21.301	
4,200.00	4,119.70	4,143.51	4,125.36	18.51	15.62	-147.19	34.69	398.93	682.19	650.22	31.97	21.336	
4,300.00	4,217.25	4,241.90	4,223.23	18.99	16.01	-147.33	33.43	408.94	700.00	667.24	32.76	21.370	
4,400.00	4,314.80	4,340.29	4,321.10	19.48	16.39	-147.46	32.17	418.94	717.81	684.27	33.54	21.401	
4,500.00	4,412.35	4,438.68	4,418.97	19.96	16.77	-147.59	30.91	428.95	735.62	701.30	34.32	21.432	
4,600.00	4,509.90	4,537.07	4,516.84	20.44	17.15	-147.71	29.66	438.96	753.44	718.33	35.11	21.461	
4,700.00	4,607.44	4,635.45	4,614.70	20.92	17.53	-147.83	28.40	448.96	771.26	735.36	35.89	21.489	
4,800.00	4,704.99	4,733.84	4,712.57	21.41	17.91	-147.94	27.14	458.97	789.08	752.40	36.67	21.516	
4,900.00	4,802.54	4,832.23	4,810.44	21.89	18.29	-148.04	25.89	468.98	806.90	769.45	37.46	21.541	
5,000.00	4,900.09	4,930.62	4,908.31	22.37	18.67	-148.14	24.63	478.98	824.73	786.49	38.24	21.566	
5,100.00	4,997.64	5,029.01	5,006.18	22.86	19.05	-148.24	23.37	488.99	842.56	803.54	39.03	21.590	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 830H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Rule Assigned: Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.00	5,095.19	5,127.39	5,104.05	23.34	19.43	-148.33	22.11	498.99	860.39	820.58	39.81	21.612	
5,300.00	5,192.74	5,225.78	5,201.92	23.83	19.81	-148.42	20.86	509.00	878.23	837.64	40.59	21.634	
5,400.00	5,290.29	5,324.17	5,299.79	24.31	20.19	-148.51	19.60	519.01	896.07	854.69	41.38	21.655	
5,500.00	5,387.84	5,422.56	5,397.66	24.79	20.57	-148.59	18.34	529.01	913.90	871.74	42.16	21.676	
5,600.00	5,485.39	5,520.94	5,495.53	25.28	20.95	-148.67	17.08	539.02	931.74	888.80	42.95	21.695	
5,700.00	5,582.94	5,619.33	5,593.40	25.76	21.33	-148.74	15.83	549.02	949.59	905.86	43.73	21.714	
5,800.00	5,680.49	5,717.72	5,691.27	26.24	21.71	-148.81	14.57	559.03	967.43	922.91	44.52	21.732	
5,900.00	5,778.04	5,816.11	5,789.14	26.73	22.09	-148.89	13.31	569.04	985.28	939.98	45.30	21.750	
6,000.00	5,875.59	5,914.50	5,887.01	27.21	22.47	-148.95	12.06	579.04	1,003.12	957.04	46.08	21.767	
6,100.00	5,973.13	6,012.88	5,984.88	27.70	22.85	-149.02	10.80	589.05	1,020.97	974.10	46.87	21.784	
6,200.00	6,070.68	6,111.27	6,082.75	28.18	23.23	-149.08	9.54	599.05	1,038.82	991.16	47.65	21.799	
6,300.00	6,168.23	6,209.66	6,180.62	28.67	23.61	-149.14	8.28	609.06	1,056.67	1,008.23	48.44	21.815	
6,400.00	6,265.78	6,308.05	6,278.49	29.15	24.00	-149.20	7.03	619.07	1,074.52	1,025.30	49.22	21.830	
6,500.00	6,363.33	6,406.43	6,376.36	29.63	24.38	-149.26	5.77	629.07	1,092.37	1,042.36	50.01	21.844	
6,600.00	6,460.91	6,504.64	6,474.11	30.12	24.75	-156.54	4.52	638.38	1,110.24	1,059.45	50.78	21.862	
6,700.00	6,558.93	6,602.15	6,571.49	30.54	25.05	158.14	3.41	636.31	1,128.35	1,076.93	51.42	21.944	
6,800.00	6,655.76	6,699.35	6,667.12	30.86	25.30	128.16	2.48	619.49	1,146.49	1,094.55	51.93	22.076	
6,900.00	6,749.00	6,796.42	6,758.96	31.11	25.52	113.55	1.75	588.37	1,164.20	1,111.83	52.37	22.229	
7,000.00	6,836.37	6,893.53	6,845.05	31.30	25.73	105.42	1.25	543.64	1,181.04	1,128.26	52.79	22.374	
7,100.00	6,915.71	6,990.83	6,923.49	31.43	25.97	100.24	0.98	486.23	1,196.61	1,143.36	53.25	22.473	
7,200.00	6,985.07	7,088.43	6,992.47	31.52	26.29	96.67	0.96	417.31	1,210.51	1,156.65	53.87	22.473	
7,300.00	7,042.74	7,186.42	7,050.33	31.58	26.75	94.14	1.17	338.34	1,222.41	1,167.64	54.77	22.318	
7,400.00	7,087.30	7,284.82	7,095.55	31.63	27.42	92.37	1.63	251.07	1,232.02	1,175.92	56.09	21.964	
7,500.00	7,117.65	7,383.62	7,126.90	31.69	28.34	91.22	2.32	157.48	1,239.09	1,181.18	57.91	21.396	
7,600.00	7,133.04	7,482.77	7,143.43	31.88	29.51	90.61	3.23	59.82	1,243.46	1,183.23	60.24	20.643	
7,700.00	7,135.12	7,582.41	7,146.09	32.48	30.91	90.51	4.32	-39.73	1,245.40	1,182.40	63.00	19.768	
7,800.00	7,135.35	7,682.39	7,146.30	33.74	32.53	90.51	5.44	-139.72	1,247.00	1,180.80	66.20	18.837	
7,900.00	7,135.58	7,782.38	7,146.51	35.42	34.34	90.50	6.57	-239.70	1,248.59	1,178.82	69.77	17.896	
8,000.00	7,135.82	7,882.37	7,146.72	37.32	36.31	90.50	7.70	-339.68	1,250.19	1,176.52	73.67	16.971	
8,100.00	7,136.05	7,982.35	7,146.92	39.39	38.42	90.50	8.82	-439.66	1,251.79	1,173.95	77.84	16.082	
8,200.00	7,136.28	8,082.34	7,147.13	41.58	40.64	90.50	9.95	-539.64	1,253.38	1,171.14	82.25	15.240	
8,300.00	7,136.51	8,182.33	7,147.34	43.87	42.96	90.50	11.08	-639.62	1,254.98	1,168.13	86.85	14.450	
8,400.00	7,136.75	8,282.32	7,147.55	46.25	45.37	90.49	12.20	-739.60	1,256.58	1,164.95	91.62	13.714	
8,500.00	7,136.98	8,382.30	7,147.76	48.70	47.85	90.49	13.33	-839.58	1,258.17	1,161.63	96.54	13.032	
8,600.00	7,137.21	8,482.29	7,147.96	51.22	50.39	90.49	14.45	-939.56	1,259.77	1,158.19	101.58	12.401	
8,700.00	7,137.44	8,582.28	7,148.17	53.78	52.98	90.49	15.58	-1,039.54	1,261.37	1,154.64	106.73	11.818	
8,800.00	7,137.67	8,682.27	7,148.38	56.39	55.61	90.49	16.71	-1,139.52	1,262.97	1,151.00	111.96	11.280	
8,900.00	7,137.91	8,782.25	7,148.59	59.04	58.29	90.49	17.83	-1,239.50	1,264.56	1,147.28	117.28	10.782	
9,000.00	7,138.14	8,882.24	7,148.80	61.72	60.99	90.48	18.96	-1,339.48	1,266.16	1,143.50	122.66	10.322	
9,100.00	7,138.37	8,982.23	7,149.00	64.44	63.73	90.48	20.08	-1,439.46	1,267.76	1,139.65	128.11	9.896	
9,200.00	7,138.60	9,082.21	7,149.21	67.18	66.49	90.48	21.21	-1,539.45	1,269.35	1,135.75	133.60	9.501	
9,300.00	7,138.84	9,182.20	7,149.42	69.94	69.28	90.48	22.34	-1,639.43	1,270.95	1,131.80	139.15	9.134	
9,400.00	7,139.07	9,282.19	7,149.63	72.72	72.08	90.48	23.46	-1,739.41	1,272.55	1,127.82	144.73	8.793	
9,500.00	7,139.30	9,382.18	7,149.84	75.53	74.90	90.48	24.59	-1,839.39	1,274.14	1,123.80	150.35	8.475	
9,600.00	7,139.53	9,482.16	7,150.04	78.34	77.74	90.47	25.72	-1,939.37	1,275.74	1,119.74	156.00	8.178	
9,700.00	7,139.77	9,582.15	7,150.25	81.18	80.59	90.47	26.84	-2,039.35	1,277.34	1,115.66	161.68	7.900	
9,800.00	7,140.00	9,682.14	7,150.46	84.02	83.45	90.47	27.97	-2,139.33	1,278.93	1,111.55	167.39	7.640	
9,900.00	7,140.23	9,782.12	7,150.67	86.88	86.33	90.47	29.09	-2,239.31	1,280.53	1,107.41	173.12	7.397	
10,000.00	7,140.46	9,882.11	7,150.88	89.75	89.21	90.47	30.22	-2,339.29	1,282.13	1,103.26	178.87	7.168	
10,100.00	7,140.70	9,982.10	7,151.08	92.63	92.11	90.47	31.35	-2,439.27	1,283.73	1,099.08	184.64	6.952	
10,200.00	7,140.93	10,082.09	7,151.29	95.52	95.01	90.46	32.47	-2,539.25	1,285.32	1,094.89	190.43	6.749	
10,300.00	7,141.16	10,182.07	7,151.50	98.41	97.92	90.46	33.60	-2,639.23	1,286.92	1,090.68	196.24	6.558	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 830H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Rule Assigned: Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,400.00	7,141.39	10,282.06	7,151.71	101.32	100.84	90.46	34.73	-2,739.21	1,288.52	1,086.46	202.06	6.377	
10,500.00	7,141.63	10,382.05	7,151.92	104.23	103.76	90.46	35.85	-2,839.19	1,290.11	1,082.22	207.89	6.206	
10,600.00	7,141.86	10,482.04	7,152.12	107.14	106.69	90.46	36.98	-2,939.17	1,291.71	1,077.98	213.74	6.044	
10,700.00	7,142.09	10,582.02	7,152.33	110.07	109.62	90.46	38.10	-3,039.16	1,293.31	1,073.72	219.59	5.890	
10,800.00	7,142.32	10,682.01	7,152.54	112.99	112.57	90.45	39.23	-3,139.14	1,294.90	1,069.45	225.46	5.743	
10,900.00	7,142.55	10,782.00	7,152.75	115.93	115.51	90.45	40.36	-3,239.12	1,296.50	1,065.17	231.33	5.604	
11,000.00	7,142.79	10,881.98	7,152.96	118.86	118.46	90.45	41.48	-3,339.10	1,298.10	1,060.88	237.22	5.472	
11,100.00	7,143.02	10,981.97	7,153.16	121.80	121.41	90.45	42.61	-3,439.08	1,299.70	1,056.58	243.11	5.346	
11,200.00	7,143.25	11,081.96	7,153.37	124.75	124.37	90.45	43.74	-3,539.06	1,301.29	1,052.28	249.02	5.226	
11,300.00	7,143.48	11,181.95	7,153.58	127.70	127.33	90.45	44.86	-3,639.04	1,302.89	1,047.97	254.92	5.111	
11,400.00	7,143.72	11,281.93	7,153.79	130.65	130.29	90.44	45.99	-3,739.02	1,304.49	1,043.65	260.84	5.001	
11,500.00	7,143.95	11,381.92	7,154.00	133.61	133.26	90.44	47.11	-3,839.00	1,306.08	1,039.32	266.76	4.896	
11,600.00	7,144.18	11,481.91	7,154.20	136.57	136.23	90.44	48.24	-3,938.98	1,307.68	1,034.99	272.69	4.796	
11,700.00	7,144.41	11,581.90	7,154.41	139.53	139.20	90.44	49.37	-4,038.96	1,309.28	1,030.66	278.62	4.699	
11,800.00	7,144.65	11,681.88	7,154.62	142.49	142.17	90.44	50.49	-4,138.94	1,310.87	1,026.32	284.56	4.607	
11,900.00	7,144.88	11,781.87	7,154.83	145.46	145.15	90.44	51.62	-4,238.92	1,312.47	1,021.97	290.50	4.518	
12,000.00	7,145.11	11,881.86	7,155.04	148.43	148.13	90.43	52.74	-4,338.90	1,314.07	1,017.62	296.45	4.433	
12,100.00	7,145.34	11,981.84	7,155.24	151.40	151.11	90.43	53.87	-4,438.88	1,315.67	1,013.27	302.40	4.351	
12,200.00	7,145.58	12,081.83	7,155.45	154.37	154.09	90.43	55.00	-4,538.87	1,317.26	1,008.91	308.35	4.272	
12,300.00	7,145.81	12,181.82	7,155.66	157.35	157.08	90.43	56.12	-4,638.85	1,318.86	1,004.55	314.31	4.196	
12,400.00	7,146.04	12,281.81	7,155.87	160.32	160.06	90.43	57.25	-4,738.83	1,320.46	1,000.18	320.27	4.123	
12,500.00	7,146.27	12,381.79	7,156.08	163.30	163.05	90.43	58.38	-4,838.81	1,322.05	995.81	326.24	4.052	
12,600.00	7,146.50	12,481.78	7,156.28	166.28	166.04	90.43	59.50	-4,938.79	1,323.65	991.44	332.21	3.984	
12,700.00	7,146.74	12,581.77	7,156.49	169.26	169.03	90.42	60.63	-5,038.77	1,325.25	987.07	338.18	3.919	
12,800.00	7,146.97	12,681.75	7,156.70	172.25	172.02	90.42	61.75	-5,138.75	1,326.84	982.69	344.16	3.855	
12,900.00	7,147.20	12,781.74	7,156.91	175.23	175.02	90.42	62.88	-5,238.73	1,328.44	978.31	350.13	3.794	
13,000.00	7,147.43	12,881.73	7,157.12	178.22	178.01	90.42	64.01	-5,338.71	1,330.04	973.92	356.11	3.735	
13,100.00	7,147.67	12,981.72	7,157.32	181.21	181.01	90.42	65.13	-5,438.69	1,331.63	969.54	362.10	3.678	
13,200.00	7,147.90	13,081.70	7,157.53	184.19	184.00	90.42	66.26	-5,538.67	1,333.23	965.15	368.08	3.622	
13,300.00	7,148.13	13,181.69	7,157.74	187.18	187.00	90.41	67.39	-5,638.65	1,334.83	960.76	374.07	3.568	
13,400.00	7,148.36	13,281.68	7,157.95	190.18	190.00	90.41	68.51	-5,738.63	1,336.43	956.37	380.06	3.516	
13,500.00	7,148.60	13,381.67	7,158.16	193.17	193.00	90.41	69.64	-5,838.61	1,338.02	951.97	386.05	3.466	
13,600.00	7,148.83	13,481.65	7,158.36	196.16	196.00	90.41	70.76	-5,938.60	1,339.62	947.58	392.04	3.417	
13,700.00	7,149.06	13,581.64	7,158.57	199.15	199.00	90.41	71.89	-6,038.58	1,341.22	943.18	398.04	3.370	
13,800.00	7,149.29	13,681.63	7,158.78	202.15	202.00	90.41	73.02	-6,138.56	1,342.81	938.78	404.03	3.324	
13,900.00	7,149.53	13,781.61	7,158.99	205.14	205.01	90.41	74.14	-6,238.54	1,344.41	934.38	410.03	3.279	
14,000.00	7,149.76	13,881.60	7,159.20	208.14	208.01	90.40	75.27	-6,338.52	1,346.01	929.97	416.03	3.235	
14,100.00	7,149.99	13,981.59	7,159.41	211.14	211.02	90.40	76.39	-6,438.50	1,347.60	925.57	422.03	3.193	
14,200.00	7,150.22	14,081.58	7,159.61	214.14	214.02	90.40	77.52	-6,538.48	1,349.20	921.16	428.04	3.152	
14,300.00	7,150.45	14,181.56	7,159.82	217.13	217.03	90.40	78.65	-6,638.46	1,350.80	916.76	434.04	3.112	
14,400.00	7,150.69	14,281.55	7,160.03	220.13	220.03	90.40	79.77	-6,738.44	1,352.40	912.35	440.05	3.073	
14,500.00	7,150.92	14,381.54	7,160.24	223.13	223.04	90.40	80.90	-6,838.42	1,353.99	907.94	446.06	3.035	
14,600.00	7,151.15	14,481.53	7,160.45	226.14	226.05	90.39	82.03	-6,938.40	1,355.59	903.53	452.06	2.999	
14,700.00	7,151.38	14,581.51	7,160.65	229.14	229.06	90.39	83.15	-7,038.38	1,357.19	899.11	458.07	2.963	
14,800.00	7,151.62	14,681.50	7,160.86	232.14	232.07	90.39	84.28	-7,138.36	1,358.78	894.70	464.08	2.928	
14,900.00	7,151.85	14,781.49	7,161.07	235.14	235.08	90.39	85.40	-7,238.34	1,360.38	890.29	470.10	2.894	
14,965.10	7,152.00	14,846.58	7,161.20	237.10	237.04	90.39	86.14	-7,303.43	1,361.43	887.42	474.01	2.872	SF

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 831H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	34.35	74.33	50.80	90.03				
100.00	100.00	100.00	100.00	0.36	0.36	34.35	74.33	50.80	90.03	89.31	0.72	125.576	
200.00	200.00	200.00	200.00	0.72	0.72	34.35	74.33	50.80	90.03	88.60	1.43	62.788	
300.00	300.00	300.00	300.00	1.08	1.08	34.35	74.33	50.80	90.03	87.88	2.15	41.859	
400.00	400.00	400.00	400.00	1.43	1.43	34.35	74.33	50.80	90.03	87.16	2.87	31.394	
500.00	500.00	500.00	500.00	1.79	1.79	34.35	74.33	50.80	90.03	86.45	3.58	25.115	CC
600.00	599.98	600.63	600.61	2.14	2.14	-115.87	73.06	52.03	90.44	86.17	4.27	21.164	ES
700.00	699.84	701.25	701.09	2.47	2.48	-115.56	69.25	55.71	91.68	86.73	4.95	18.529	
800.00	799.45	801.85	801.29	2.82	2.83	-115.07	62.91	61.85	93.74	88.10	5.64	16.613	
900.00	898.70	902.36	901.04	3.17	3.19	-114.42	54.07	70.41	96.64	90.28	6.36	15.190	
1,000.00	997.47	1,002.27	1,000.01	3.55	3.56	-114.76	44.20	79.96	100.72	93.61	7.11	14.175	
1,100.00	1,095.62	1,102.04	1,098.83	3.94	3.94	-116.74	34.35	89.49	106.33	98.46	7.87	13.511	
1,200.00	1,193.22	1,201.61	1,197.45	4.36	4.33	-119.80	24.52	99.01	113.42	104.77	8.65	13.111	
1,300.00	1,290.77	1,301.16	1,296.06	4.79	4.72	-122.61	14.69	108.52	120.92	111.49	9.44	12.813	
1,400.00	1,388.32	1,400.72	1,394.67	5.23	5.11	-125.10	4.87	118.03	128.68	118.45	10.23	12.580	
1,500.00	1,485.87	1,500.27	1,493.28	5.68	5.50	-127.30	-4.96	127.54	136.65	125.63	11.02	12.398	
1,600.00	1,583.42	1,599.82	1,591.89	6.14	5.90	-129.25	-14.79	137.06	144.80	132.98	11.81	12.256	
1,700.00	1,680.97	1,699.37	1,690.49	6.59	6.30	-130.99	-24.62	146.57	153.10	140.49	12.61	12.143	
1,800.00	1,778.52	1,798.93	1,789.10	7.06	6.70	-132.56	-34.45	156.08	161.52	148.12	13.40	12.053	
1,900.00	1,876.07	1,898.48	1,887.71	7.52	7.10	-133.97	-44.28	165.60	170.05	155.86	14.19	11.981	
2,000.00	1,973.61	1,998.03	1,986.32	7.99	7.50	-135.24	-54.11	175.11	178.68	163.69	14.98	11.924	
2,100.00	2,071.16	2,097.58	2,084.93	8.46	7.91	-136.39	-63.93	184.62	187.38	171.61	15.77	11.878	
2,200.00	2,168.71	2,197.14	2,183.54	8.93	8.31	-137.45	-73.76	194.13	196.15	179.59	16.56	11.842	
2,300.00	2,266.26	2,296.69	2,282.14	9.40	8.71	-138.41	-83.59	203.65	204.99	187.63	17.35	11.812	
2,400.00	2,363.81	2,396.24	2,380.75	9.88	9.12	-139.29	-93.42	213.16	213.87	195.73	18.14	11.788	
2,500.00	2,461.36	2,495.79	2,479.36	10.35	9.52	-140.10	-103.25	222.67	222.81	203.87	18.93	11.770	
2,600.00	2,558.91	2,595.35	2,577.97	10.83	9.93	-140.85	-113.08	232.19	231.78	212.06	19.72	11.754	
2,700.00	2,656.46	2,694.90	2,676.58	11.30	10.34	-141.55	-122.91	241.70	240.79	220.28	20.51	11.743	
2,800.00	2,754.01	2,794.45	2,775.19	11.78	10.74	-142.19	-132.73	251.21	249.83	228.54	21.29	11.733	
2,900.00	2,851.56	2,894.00	2,873.79	12.26	11.15	-142.79	-142.56	260.72	258.90	236.82	22.08	11.726	
3,000.00	2,949.11	2,993.56	2,972.40	12.74	11.56	-143.35	-152.39	270.24	268.00	245.14	22.86	11.721	
3,100.00	3,046.66	3,093.11	3,071.01	13.22	11.96	-143.87	-162.22	279.75	277.12	253.47	23.65	11.717	
3,200.00	3,144.21	3,192.66	3,169.62	13.70	12.37	-144.36	-172.05	289.26	286.26	261.83	24.44	11.715	
3,300.00	3,241.75	3,292.21	3,268.23	14.18	12.78	-144.81	-181.88	298.77	295.43	270.20	25.22	11.713	
3,400.00	3,339.30	3,391.77	3,366.84	14.66	13.18	-145.24	-191.70	308.29	304.60	278.60	26.01	11.713	
3,500.00	3,436.85	3,491.32	3,465.44	15.14	13.59	-145.65	-201.53	317.80	313.80	287.01	26.79	11.713	
3,600.00	3,534.40	3,590.87	3,564.05	15.62	14.00	-146.03	-211.36	327.31	323.01	295.43	27.58	11.713	
3,700.00	3,631.95	3,690.42	3,662.66	16.10	14.41	-146.39	-221.19	336.83	332.23	303.87	28.36	11.715	
3,800.00	3,729.50	3,789.98	3,761.27	16.58	14.82	-146.73	-231.02	346.34	341.47	312.32	29.15	11.716	
3,900.00	3,827.05	3,889.53	3,859.88	17.06	15.22	-147.06	-240.85	355.85	350.72	320.79	29.93	11.718	
4,000.00	3,924.60	3,989.08	3,958.49	17.55	15.63	-147.36	-250.68	365.36	359.97	329.26	30.71	11.720	
4,100.00	4,022.15	4,088.63	4,057.10	18.03	16.04	-147.66	-260.50	374.88	369.24	337.74	31.50	11.723	
4,200.00	4,119.70	4,188.19	4,155.70	18.51	16.45	-147.93	-270.33	384.39	378.52	346.24	32.28	11.725	
4,300.00	4,217.25	4,287.74	4,254.31	18.99	16.86	-148.20	-280.16	393.90	387.80	354.74	33.07	11.728	
4,400.00	4,314.80	4,387.29	4,352.92	19.48	17.27	-148.45	-289.99	403.41	397.10	363.25	33.85	11.731	
4,500.00	4,412.35	4,486.84	4,451.53	19.96	17.68	-148.69	-299.82	412.93	406.40	371.76	34.63	11.734	
4,600.00	4,509.90	4,586.40	4,550.14	20.44	18.08	-148.92	-309.65	422.44	415.70	380.28	35.42	11.737	
4,700.00	4,607.44	4,685.95	4,648.75	20.92	18.49	-149.14	-319.48	431.95	425.02	388.81	36.20	11.740	
4,800.00	4,704.99	4,785.50	4,747.35	21.41	18.90	-149.35	-329.30	441.47	434.33	397.35	36.99	11.743	
4,900.00	4,802.54	4,885.05	4,845.96	21.89	19.31	-149.55	-339.13	450.98	443.66	405.89	37.77	11.747	
5,000.00	4,900.09	4,984.61	4,944.57	22.37	19.72	-149.74	-348.96	460.49	452.99	414.44	38.55	11.750	
5,100.00	4,997.64	5,084.16	5,043.18	22.86	20.13	-149.92	-358.79	470.00	462.32	422.99	39.34	11.753	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 831H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Rule Assigned: Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.00	5,095.19	5,183.71	5,141.79	23.34	20.54	-150.10	-368.62	479.52	471.66	431.54	40.12	11.756	
5,300.00	5,192.74	5,283.26	5,240.40	23.83	20.95	-150.27	-378.45	489.03	481.01	440.10	40.90	11.759	
5,400.00	5,290.29	5,382.82	5,339.00	24.31	21.36	-150.44	-388.28	498.54	490.35	448.67	41.69	11.763	
5,500.00	5,387.84	5,482.37	5,437.61	24.79	21.76	-150.60	-398.10	508.05	499.70	457.23	42.47	11.766	
5,600.00	5,485.39	5,581.92	5,536.22	25.28	22.17	-150.75	-407.93	517.57	509.06	465.80	43.25	11.769	
5,700.00	5,582.94	5,681.47	5,634.83	25.76	22.58	-150.89	-417.76	527.08	518.42	474.38	44.04	11.772	
5,800.00	5,680.49	5,781.03	5,733.44	26.24	22.99	-151.04	-427.59	536.59	527.78	482.96	44.82	11.775	
5,900.00	5,778.04	5,880.58	5,832.05	26.73	23.40	-151.17	-437.42	546.11	537.14	491.54	45.61	11.778	
6,000.00	5,875.59	5,980.13	5,930.65	27.21	23.81	-151.30	-447.25	555.62	546.51	500.12	46.39	11.781	
6,100.00	5,973.13	6,079.68	6,029.26	27.70	24.22	-151.43	-457.08	565.13	555.88	508.71	47.17	11.784	
6,200.00	6,070.68	6,179.24	6,127.87	28.18	24.63	-151.55	-466.90	574.64	565.25	517.30	47.96	11.787	
6,300.00	6,168.23	6,278.79	6,226.48	28.67	25.04	-151.67	-476.73	584.16	574.63	525.89	48.74	11.790	
6,400.00	6,265.78	6,378.34	6,325.09	29.15	25.45	-151.79	-486.56	593.67	584.01	534.48	49.52	11.793	
6,500.00	6,363.33	6,477.89	6,423.70	29.63	25.86	-151.90	-496.39	603.18	593.39	543.08	50.31	11.795	
6,600.00	6,460.91	6,577.45	6,522.31	30.12	26.27	-159.04	-506.22	612.70	602.77	551.67	51.09	11.798	
6,700.00	6,558.93	6,676.46	6,620.38	30.54	26.67	157.48	-515.99	622.16	612.01	560.08	51.93	11.785	
6,800.00	6,655.76	6,772.77	6,715.78	30.86	27.07	130.61	-525.50	631.36	621.58	568.72	52.86	11.760	
6,900.00	6,749.00	6,870.76	6,813.09	31.11	27.44	119.82	-535.21	636.03	632.60	578.77	53.83	11.752	
7,000.00	6,836.37	6,975.73	6,916.81	31.30	27.76	115.40	-545.61	624.69	644.99	590.31	54.68	11.795	
7,100.00	6,915.71	7,088.28	7,024.31	31.43	28.03	113.70	-556.45	593.73	658.20	602.85	55.36	11.890	
7,200.00	6,985.07	7,209.53	7,132.10	31.52	28.25	113.31	-567.37	539.68	671.50	615.70	55.80	12.034	
7,300.00	7,042.74	7,340.35	7,234.67	31.58	28.45	113.56	-577.85	459.54	683.98	627.90	56.08	12.197	
7,400.00	7,087.30	7,480.81	7,324.17	31.63	28.67	114.05	-587.10	352.06	694.58	638.15	56.43	12.308	
7,500.00	7,117.65	7,629.74	7,391.06	31.69	29.17	114.50	-594.16	219.55	702.26	644.92	57.34	12.248	
7,600.00	7,133.04	7,784.38	7,426.20	31.88	30.45	114.70	-598.10	69.40	706.17	646.87	59.29	11.910	
7,700.00	7,135.12	7,909.18	7,430.08	32.48	32.06	114.67	-598.84	-55.26	706.62	644.61	62.01	11.395	
7,800.00	7,135.35	8,009.18	7,430.23	33.74	33.62	114.66	-599.14	-155.26	706.74	641.84	64.90	10.889	
7,900.00	7,135.58	8,109.18	7,430.38	35.42	35.39	114.65	-599.44	-255.26	706.87	638.74	68.13	10.376	
8,000.00	7,135.82	8,209.18	7,430.54	37.32	37.32	114.64	-599.74	-355.26	706.99	635.35	71.64	9.869	
8,100.00	7,136.05	8,309.18	7,430.69	39.39	39.40	114.63	-600.04	-455.26	707.11	631.72	75.39	9.380	
8,200.00	7,136.28	8,409.18	7,430.84	41.58	41.59	114.61	-600.34	-555.26	707.23	627.88	79.35	8.913	
8,300.00	7,136.51	8,509.18	7,430.99	43.87	43.88	114.60	-600.63	-655.25	707.36	623.86	83.49	8.472	
8,400.00	7,136.75	8,609.18	7,431.14	46.25	46.26	114.59	-600.93	-755.25	707.48	619.69	87.79	8.059	
8,500.00	7,136.98	8,709.18	7,431.29	48.70	48.71	114.58	-601.23	-855.25	707.60	615.38	92.22	7.673	
8,600.00	7,137.21	8,809.18	7,431.44	51.22	51.22	114.57	-601.53	-955.25	707.72	610.95	96.77	7.314	
8,700.00	7,137.44	8,909.18	7,431.59	53.78	53.78	114.55	-601.83	-1,055.25	707.84	606.43	101.41	6.980	
8,800.00	7,137.67	9,009.18	7,431.74	56.39	56.39	114.54	-602.13	-1,155.25	707.97	601.82	106.15	6.670	
8,900.00	7,137.91	9,109.18	7,431.89	59.04	59.04	114.53	-602.43	-1,255.25	708.09	597.13	110.96	6.382	
9,000.00	7,138.14	9,209.18	7,432.04	61.72	61.72	114.52	-602.72	-1,355.25	708.21	592.38	115.83	6.114	
9,100.00	7,138.37	9,309.18	7,432.19	64.44	64.44	114.51	-603.02	-1,455.25	708.34	587.57	120.77	5.865	
9,200.00	7,138.60	9,409.18	7,432.34	67.18	67.18	114.50	-603.32	-1,555.25	708.46	582.70	125.76	5.634	
9,300.00	7,138.84	9,509.18	7,432.49	69.94	69.94	114.48	-603.62	-1,655.25	708.58	577.79	130.79	5.418	
9,400.00	7,139.07	9,609.18	7,432.64	72.72	72.72	114.47	-603.92	-1,755.25	708.70	572.84	135.86	5.216	
9,500.00	7,139.30	9,709.18	7,432.79	75.53	75.53	114.46	-604.22	-1,855.25	708.83	567.85	140.97	5.028	
9,600.00	7,139.53	9,809.18	7,432.94	78.34	78.35	114.45	-604.52	-1,955.25	708.95	562.83	146.12	4.852	
9,700.00	7,139.77	9,909.18	7,433.09	81.18	81.18	114.44	-604.82	-2,055.24	709.07	557.78	151.29	4.687	
9,800.00	7,140.00	10,009.18	7,433.24	84.02	84.03	114.42	-605.11	-2,155.24	709.19	552.70	156.49	4.532	
9,900.00	7,140.23	10,109.18	7,433.39	86.88	86.89	114.41	-605.41	-2,255.24	709.32	547.60	161.72	4.386	
10,000.00	7,140.46	10,209.18	7,433.54	89.75	89.76	114.40	-605.71	-2,355.24	709.44	542.48	166.96	4.249	
10,100.00	7,140.70	10,309.18	7,433.69	92.63	92.64	114.39	-606.01	-2,455.24	709.56	537.33	172.23	4.120	
10,200.00	7,140.93	10,409.18	7,433.84	95.52	95.52	114.38	-606.31	-2,555.24	709.69	532.17	177.52	3.998	
10,300.00	7,141.16	10,509.18	7,433.99	98.41	98.42	114.37	-606.61	-2,655.24	709.81	526.99	182.82	3.883	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit # 831H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,400.00	7,141.39	10,609.18	7,434.14	101.32	101.33	114.35	-606.91	-2,755.24	709.93	521.79	188.14	3.773	
10,500.00	7,141.63	10,709.18	7,434.29	104.23	104.24	114.34	-607.21	-2,855.24	710.06	516.58	193.47	3.670	
10,600.00	7,141.86	10,809.18	7,434.44	107.14	107.15	114.33	-607.50	-2,955.24	710.18	511.36	198.82	3.572	
10,700.00	7,142.09	10,909.18	7,434.59	110.07	110.08	114.32	-607.80	-3,055.24	710.30	506.12	204.18	3.479	
10,800.00	7,142.32	11,009.18	7,434.74	112.99	113.01	114.31	-608.10	-3,155.24	710.42	500.88	209.55	3.390	
10,900.00	7,142.55	11,109.18	7,434.89	115.93	115.94	114.29	-608.40	-3,255.24	710.55	495.62	214.93	3.306	
11,000.00	7,142.79	11,209.18	7,435.04	118.86	118.88	114.28	-608.70	-3,355.23	710.67	490.35	220.32	3.226	
11,100.00	7,143.02	11,309.18	7,435.19	121.80	121.82	114.27	-609.00	-3,455.23	710.79	485.07	225.72	3.149	
11,200.00	7,143.25	11,409.18	7,435.34	124.75	124.77	114.26	-609.30	-3,555.23	710.92	479.79	231.13	3.076	
11,300.00	7,143.48	11,509.18	7,435.49	127.70	127.72	114.25	-609.59	-3,655.23	711.04	474.49	236.55	3.006	
11,400.00	7,143.72	11,609.18	7,435.64	130.65	130.67	114.24	-609.89	-3,755.23	711.16	469.19	241.97	2.939	
11,500.00	7,143.95	11,709.18	7,435.79	133.61	133.63	114.22	-610.19	-3,855.23	711.29	463.88	247.41	2.875	
11,600.00	7,144.18	11,809.18	7,435.94	136.57	136.59	114.21	-610.49	-3,955.23	711.41	458.56	252.85	2.814	
11,700.00	7,144.41	11,909.18	7,436.09	139.53	139.55	114.20	-610.79	-4,055.23	711.53	453.24	258.29	2.755	
11,800.00	7,144.65	12,009.18	7,436.24	142.49	142.52	114.19	-611.09	-4,155.23	711.66	447.91	263.74	2.698	
11,900.00	7,144.88	12,109.18	7,436.39	145.46	145.48	114.18	-611.39	-4,255.23	711.78	442.58	269.20	2.644	
12,000.00	7,145.11	12,209.18	7,436.54	148.43	148.45	114.17	-611.69	-4,355.23	711.90	437.24	274.67	2.592	
12,100.00	7,145.34	12,309.18	7,436.70	151.40	151.43	114.15	-611.98	-4,455.23	712.03	431.89	280.14	2.542	
12,200.00	7,145.58	12,409.17	7,436.85	154.37	154.40	114.14	-612.28	-4,555.23	712.15	426.54	285.61	2.493	
12,300.00	7,145.81	12,509.17	7,437.00	157.35	157.38	114.13	-612.58	-4,655.23	712.28	421.19	291.09	2.447	
12,400.00	7,146.04	12,609.17	7,437.15	160.32	160.35	114.12	-612.88	-4,755.22	712.40	415.83	296.57	2.402	
12,500.00	7,146.27	12,709.17	7,437.30	163.30	163.33	114.11	-613.18	-4,855.22	712.52	410.46	302.06	2.359	
12,600.00	7,146.50	12,809.17	7,437.45	166.28	166.31	114.10	-613.48	-4,955.22	712.65	405.10	307.55	2.317	
12,700.00	7,146.74	12,909.17	7,437.60	169.26	169.30	114.08	-613.78	-5,055.22	712.77	399.72	313.05	2.277	
12,800.00	7,146.97	13,009.17	7,437.75	172.25	172.28	114.07	-614.08	-5,155.22	712.89	394.35	318.55	2.238	
12,900.00	7,147.20	13,109.17	7,437.90	175.23	175.27	114.06	-614.37	-5,255.22	713.02	388.97	324.05	2.200	
13,000.00	7,147.43	13,209.17	7,438.05	178.22	178.25	114.05	-614.67	-5,355.22	713.14	383.58	329.56	2.164	
13,100.00	7,147.67	13,309.17	7,438.20	181.21	181.24	114.04	-614.97	-5,455.22	713.26	378.20	335.07	2.129	
13,200.00	7,147.90	13,409.17	7,438.35	184.19	184.23	114.03	-615.27	-5,555.22	713.39	372.81	340.58	2.095	
13,300.00	7,148.13	13,509.17	7,438.50	187.18	187.22	114.01	-615.57	-5,655.22	713.51	367.41	346.10	2.062	
13,400.00	7,148.36	13,609.17	7,438.65	190.18	190.22	114.00	-615.87	-5,755.22	713.64	362.02	351.62	2.030	
13,500.00	7,148.60	13,709.17	7,438.80	193.17	193.21	113.99	-616.17	-5,855.22	713.76	356.62	357.14	1.999	
13,600.00	7,148.83	13,809.17	7,438.95	196.16	196.20	113.98	-616.46	-5,955.22	713.88	351.22	362.67	1.968	
13,700.00	7,149.06	13,909.17	7,439.10	199.15	199.20	113.97	-616.76	-6,055.21	714.01	345.81	368.20	1.939	
13,800.00	7,149.29	14,009.17	7,439.25	202.15	202.19	113.96	-617.06	-6,155.21	714.13	340.40	373.73	1.911	
13,900.00	7,149.53	14,109.17	7,439.40	205.14	205.19	113.94	-617.36	-6,255.21	714.26	334.99	379.26	1.883	
14,000.00	7,149.76	14,209.17	7,439.55	208.14	208.19	113.93	-617.66	-6,355.21	714.38	329.58	384.80	1.856	
14,100.00	7,149.99	14,309.17	7,439.70	211.14	211.18	113.92	-617.96	-6,455.21	714.50	324.17	390.34	1.830	
14,200.00	7,150.22	14,409.17	7,439.85	214.14	214.18	113.91	-618.26	-6,555.21	714.63	318.75	395.88	1.805	
14,300.00	7,150.45	14,509.17	7,440.00	217.13	217.18	113.90	-618.56	-6,655.21	714.75	313.33	401.43	1.781	
14,400.00	7,150.69	14,609.17	7,440.15	220.13	220.18	113.89	-618.85	-6,755.21	714.88	307.91	406.97	1.757	
14,500.00	7,150.92	14,709.17	7,440.30	223.13	223.18	113.87	-619.15	-6,855.21	715.00	302.48	412.52	1.733	
14,600.00	7,151.15	14,809.17	7,440.45	226.14	226.19	113.86	-619.45	-6,955.21	715.13	297.05	418.07	1.711	
14,700.00	7,151.38	14,909.17	7,440.60	229.14	229.19	113.85	-619.75	-7,055.21	715.25	291.63	423.62	1.688	
14,800.00	7,151.62	15,009.17	7,440.75	232.14	232.19	113.84	-620.05	-7,155.21	715.37	286.20	429.18	1.667	
14,900.00	7,151.85	15,109.15	7,440.90	235.14	235.19	113.83	-620.35	-7,255.19	715.50	280.76	434.74	1.646	
14,965.10	7,152.00	15,174.25	7,441.00	237.10	237.15	113.82	-620.54	-7,320.28	715.59	277.23	438.35	1.632	SF

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #184A - OH - OH

Offset Site Error: 0.00 ft

Survey Program: 290-INCLINOMETER

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
13,000.00	7,147.43	6,504.00	6,503.12	178.22	197.52	29.18	-803.66	-7,056.15	1,953.14	1,719.15	233.99	8.347	
13,100.00	7,147.67	6,504.00	6,503.12	181.21	197.52	29.18	-803.66	-7,056.15	1,866.84	1,632.35	234.49	7.961	
13,200.00	7,147.90	6,504.00	6,503.12	184.19	197.52	29.18	-803.66	-7,056.15	1,781.98	1,547.02	234.96	7.584	
13,300.00	7,148.13	6,504.00	6,503.12	187.18	197.52	29.18	-803.66	-7,056.15	1,698.76	1,463.38	235.38	7.217	
13,400.00	7,148.36	6,504.00	6,503.12	190.18	197.52	29.18	-803.66	-7,056.15	1,617.44	1,381.73	235.71	6.862	
13,500.00	7,148.60	6,504.00	6,503.12	193.17	197.52	29.18	-803.66	-7,056.15	1,538.33	1,302.41	235.92	6.520	
13,600.00	7,148.83	6,504.00	6,503.12	196.16	197.52	29.18	-803.66	-7,056.15	1,461.78	1,225.83	235.95	6.195	
13,700.00	7,149.06	6,504.00	6,503.12	199.15	197.52	29.18	-803.66	-7,056.15	1,388.22	1,152.47	235.74	5.889	
13,800.00	7,149.29	6,504.00	6,503.12	202.15	197.52	29.18	-803.66	-7,056.15	1,318.14	1,082.92	235.22	5.604	
13,900.00	7,149.53	6,504.00	6,503.12	205.14	197.52	29.18	-803.66	-7,056.15	1,252.13	1,017.84	234.29	5.344	
14,000.00	7,149.76	6,504.00	6,503.12	208.14	197.52	29.18	-803.66	-7,056.15	1,190.87	957.99	232.88	5.114	
14,100.00	7,149.99	6,504.00	6,503.12	211.14	197.52	29.18	-803.66	-7,056.15	1,135.13	904.19	230.94	4.915	
14,200.00	7,150.22	6,504.00	6,503.12	214.14	197.52	29.18	-803.66	-7,056.15	1,085.75	857.29	228.46	4.752	
14,300.00	7,150.45	6,504.00	6,503.12	217.13	197.52	29.18	-803.66	-7,056.15	1,043.65	818.06	225.58	4.626	
14,400.00	7,150.69	6,504.00	6,503.12	220.13	197.52	29.18	-803.66	-7,056.15	1,009.72	787.11	222.61	4.536	
14,500.00	7,150.92	6,504.00	6,503.12	223.13	197.52	29.18	-803.66	-7,056.15	984.82	764.75	220.07	4.475	
14,600.00	7,151.15	6,504.00	6,503.12	226.14	197.52	29.18	-803.66	-7,056.15	969.65	750.97	218.68	4.434	
14,698.29	7,151.38	6,504.00	6,503.12	229.09	197.52	29.18	-803.66	-7,056.15	964.65	745.60	219.05	4.404	CC
14,700.00	7,151.38	6,504.00	6,503.12	229.14	197.52	29.18	-803.66	-7,056.15	964.66	745.58	219.08	4.403	ES
14,800.00	7,151.62	6,504.00	6,503.12	232.14	197.52	29.18	-803.66	-7,056.15	970.00	748.51	221.49	4.379	
14,900.00	7,151.85	6,504.00	6,503.12	235.14	197.52	29.18	-803.66	-7,056.15	985.52	759.91	225.60	4.368	SF
14,965.10	7,152.00	6,504.00	6,503.12	237.10	197.52	29.18	-803.66	-7,056.15	1,000.87	772.02	228.86	4.373	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #55 - OH - OH

Offset Site Error: 0.00 ft

Survey Program: 58-INCLINOMETER

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
14,000.00	7,149.76	7,163.17	7,162.76	208.14	217.53	-89.96	-3,173.03	-6,880.42	1,973.98	1,557.02	416.96	4.734	
14,100.00	7,149.99	7,163.40	7,162.99	211.14	217.54	-89.97	-3,173.03	-6,880.42	1,949.22	1,526.67	422.55	4.613	
14,200.00	7,150.22	7,163.63	7,163.22	214.14	217.55	-89.98	-3,173.03	-6,880.42	1,929.33	1,501.56	427.78	4.510	
14,300.00	7,150.45	7,163.86	7,163.45	217.13	217.56	-89.98	-3,173.03	-6,880.42	1,914.47	1,481.91	432.56	4.426	
14,400.00	7,150.69	7,164.10	7,163.69	220.13	217.56	-89.99	-3,173.03	-6,880.42	1,904.75	1,467.91	436.83	4.360	
14,500.00	7,150.92	7,164.33	7,163.92	223.13	217.57	-90.00	-3,173.03	-6,880.42	1,900.24	1,459.69	440.56	4.313	
14,535.67	7,151.00	7,164.41	7,164.00	224.20	217.57	-90.00	-3,173.03	-6,880.42	1,899.91	1,458.17	441.74	4.301	CC
14,600.00	7,151.15	7,164.56	7,164.15	226.14	217.58	-90.00	-3,173.03	-6,880.42	1,901.00	1,457.31	443.68	4.285	ES
14,700.00	7,151.38	7,164.79	7,164.38	229.14	217.58	-90.01	-3,173.03	-6,880.42	1,907.00	1,460.81	446.19	4.274	SF
14,800.00	7,151.62	7,165.03	7,164.62	232.14	217.59	-90.02	-3,173.03	-6,880.42	1,918.21	1,470.14	448.07	4.281	
14,900.00	7,151.85	7,165.26	7,164.85	235.14	217.60	-90.03	-3,173.03	-6,880.42	1,934.53	1,485.20	449.33	4.305	
14,965.10	7,152.00	7,165.41	7,165.00	237.10	217.60	-90.03	-3,173.03	-6,880.42	1,947.83	1,498.00	449.82	4.330	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #834H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-145.58	-12.36	-8.47	14.98	14.98	0.00	N/A	
100.00	100.00	100.00	100.00	0.36	0.36	-145.58	-12.36	-8.47	14.98	14.27	0.72	20.899	
200.00	200.00	200.00	200.00	0.72	0.72	-145.58	-12.36	-8.47	14.98	13.55	1.43	10.450	
300.00	300.00	300.00	300.00	1.08	1.08	-145.58	-12.36	-8.47	14.98	12.83	2.15	6.966	
400.00	400.00	400.00	400.00	1.43	1.43	-145.58	-12.36	-8.47	14.98	12.12	2.87	5.225	
500.00	500.00	500.00	500.00	1.79	1.79	-145.58	-12.36	-8.47	14.98	11.40	3.58	4.180	CC, ES
600.00	599.98	599.47	599.45	2.14	2.13	68.46	-13.95	-9.14	15.97	11.70	4.27	3.743	
700.00	699.84	698.79	698.63	2.47	2.47	78.61	-18.71	-11.16	19.37	14.44	4.93	3.929	
800.00	799.45	797.83	797.30	2.82	2.81	88.99	-26.60	-14.51	25.87	20.26	5.61	4.614	
900.00	898.70	896.46	895.20	3.17	3.16	96.78	-37.57	-19.17	35.75	29.44	6.31	5.668	
1,000.00	997.47	994.53	992.08	3.55	3.52	101.99	-51.56	-25.10	48.93	41.90	7.03	6.959	
1,100.00	1,095.62	1,092.62	1,088.50	3.94	3.91	105.76	-68.15	-32.14	65.02	57.22	7.79	8.342	
1,200.00	1,193.22	1,190.97	1,185.10	4.36	4.30	109.75	-85.12	-39.34	82.39	73.80	8.59	9.589	
1,300.00	1,290.77	1,289.29	1,281.68	4.79	4.71	112.54	-102.08	-46.54	100.11	90.70	9.40	10.645	
1,400.00	1,388.32	1,387.61	1,378.26	5.23	5.12	114.48	-119.04	-53.74	117.99	107.76	10.23	11.535	
1,500.00	1,485.87	1,485.93	1,474.84	5.68	5.53	115.92	-136.01	-60.94	135.97	124.90	11.06	12.290	
1,600.00	1,583.42	1,584.25	1,571.42	6.14	5.95	117.02	-152.97	-68.14	154.01	142.10	11.91	12.936	
1,700.00	1,680.97	1,682.57	1,668.00	6.59	6.38	117.89	-169.93	-75.34	172.09	159.34	12.75	13.493	
1,800.00	1,778.52	1,780.89	1,764.57	7.06	6.80	118.59	-186.90	-82.53	190.21	176.60	13.61	13.977	
1,900.00	1,876.07	1,879.22	1,861.15	7.52	7.23	119.17	-203.86	-89.73	208.35	193.88	14.47	14.402	
2,000.00	1,973.61	1,977.54	1,957.73	7.99	7.66	119.66	-220.82	-96.93	226.50	211.17	15.33	14.777	
2,100.00	2,071.16	2,075.86	2,054.31	8.46	8.09	120.07	-237.78	-104.13	244.67	228.48	16.19	15.109	
2,200.00	2,168.71	2,174.18	2,150.89	8.93	8.53	120.43	-254.75	-111.33	262.85	245.79	17.06	15.407	
2,300.00	2,266.26	2,272.50	2,247.47	9.40	8.96	120.74	-271.71	-118.53	281.04	263.11	17.93	15.674	
2,400.00	2,363.81	2,370.82	2,344.05	9.88	9.39	121.02	-288.67	-125.72	299.24	280.44	18.80	15.915	
2,500.00	2,461.36	2,469.14	2,440.63	10.35	9.83	121.26	-305.64	-132.92	317.44	297.76	19.68	16.134	
2,600.00	2,558.91	2,567.46	2,537.21	10.83	10.26	121.47	-322.60	-140.12	335.65	315.10	20.55	16.333	
2,700.00	2,656.46	2,665.78	2,633.78	11.30	10.70	121.67	-339.56	-147.32	353.86	332.43	21.43	16.516	
2,800.00	2,754.01	2,764.11	2,730.36	11.78	11.14	121.84	-356.53	-154.52	372.07	349.77	22.30	16.683	
2,900.00	2,851.56	2,862.43	2,826.94	12.26	11.58	122.00	-373.49	-161.72	390.29	367.11	23.18	16.837	
3,000.00	2,949.11	2,960.75	2,923.52	12.74	12.01	122.15	-390.45	-168.91	408.51	384.45	24.06	16.979	
3,100.00	3,046.66	3,059.07	3,020.10	13.22	12.45	122.28	-407.42	-176.11	426.73	401.79	24.94	17.111	
3,200.00	3,144.21	3,157.39	3,116.68	13.70	12.89	122.40	-424.38	-183.31	444.96	419.14	25.82	17.233	
3,300.00	3,241.75	3,255.71	3,213.26	14.18	13.33	122.51	-441.34	-190.51	463.18	436.48	26.70	17.347	
3,400.00	3,339.30	3,354.03	3,309.84	14.66	13.77	122.61	-458.30	-197.71	481.41	453.83	27.58	17.453	
3,500.00	3,436.85	3,452.35	3,406.42	15.14	14.21	122.71	-475.27	-204.91	499.64	471.18	28.47	17.553	
3,600.00	3,534.40	3,550.68	3,502.99	15.62	14.65	122.80	-492.23	-212.10	517.87	488.52	29.35	17.646	
3,700.00	3,631.95	3,649.00	3,599.57	16.10	15.09	122.88	-509.19	-219.30	536.10	505.87	30.23	17.734	
3,800.00	3,729.50	3,747.32	3,696.15	16.58	15.53	122.96	-526.16	-226.50	554.34	523.22	31.11	17.816	
3,900.00	3,827.05	3,845.64	3,792.73	17.06	15.97	123.03	-543.12	-233.70	572.57	540.57	32.00	17.894	
4,000.00	3,924.60	3,943.96	3,889.31	17.55	16.41	123.10	-560.08	-240.90	590.80	557.92	32.88	17.967	
4,100.00	4,022.15	4,042.28	3,985.89	18.03	16.85	123.16	-577.05	-248.10	609.04	575.27	33.77	18.036	
4,200.00	4,119.70	4,140.60	4,082.47	18.51	17.29	123.22	-594.01	-255.29	627.27	592.62	34.65	18.102	
4,300.00	4,217.25	4,238.92	4,179.05	18.99	17.73	123.28	-610.97	-262.49	645.51	609.97	35.54	18.164	
4,400.00	4,314.80	4,337.24	4,275.63	19.48	18.17	123.34	-627.93	-269.69	663.75	627.32	36.42	18.223	
4,500.00	4,412.35	4,435.57	4,372.20	19.96	18.61	123.39	-644.90	-276.89	681.99	644.68	37.31	18.279	
4,600.00	4,509.90	4,533.89	4,468.78	20.44	19.05	123.43	-661.86	-284.09	700.22	662.03	38.20	18.333	
4,700.00	4,607.44	4,632.21	4,565.36	20.92	19.50	123.48	-678.82	-291.29	718.46	679.38	39.08	18.384	
4,800.00	4,704.99	4,730.53	4,661.94	21.41	19.94	123.52	-695.79	-298.48	736.70	696.73	39.97	18.432	
4,900.00	4,802.54	4,828.85	4,758.52	21.89	20.38	123.57	-712.75	-305.68	754.94	714.09	40.85	18.479	
5,000.00	4,900.09	4,927.17	4,855.10	22.37	20.82	123.60	-729.71	-312.88	773.18	731.44	41.74	18.523	
5,100.00	4,997.64	5,025.49	4,951.68	22.86	21.26	123.64	-746.68	-320.08	791.42	748.79	42.63	18.565	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #834H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.00	5,095.19	5,123.81	5,048.26	23.34	21.70	123.68	-763.64	-327.28	809.66	766.14	43.52	18.606	
5,300.00	5,192.74	5,222.13	5,144.84	23.83	22.15	123.71	-780.60	-334.48	827.90	783.50	44.40	18.645	
5,400.00	5,290.29	5,320.46	5,241.41	24.31	22.59	123.75	-797.57	-341.67	846.14	800.85	45.29	18.683	
5,500.00	5,387.84	5,418.78	5,337.99	24.79	23.03	123.78	-814.53	-348.87	864.38	818.20	46.18	18.718	
5,600.00	5,485.39	5,517.10	5,434.57	25.28	23.47	123.81	-831.49	-356.07	882.62	835.56	47.07	18.753	
5,700.00	5,582.94	5,615.42	5,531.15	25.76	23.91	123.84	-848.45	-363.27	900.87	852.91	47.95	18.786	
5,800.00	5,680.49	5,713.74	5,627.73	26.24	24.36	123.86	-865.42	-370.47	919.11	870.27	48.84	18.818	
5,900.00	5,778.04	5,812.06	5,724.31	26.73	24.80	123.89	-882.38	-377.67	937.35	887.62	49.73	18.849	
6,000.00	5,875.59	5,910.38	5,820.89	27.21	25.24	123.92	-899.34	-384.86	955.59	904.97	50.62	18.878	
6,100.00	5,973.13	6,008.70	5,917.47	27.70	25.68	123.94	-916.31	-392.06	973.83	922.33	51.51	18.907	
6,200.00	6,070.68	6,107.02	6,014.05	28.18	26.12	123.96	-933.27	-399.26	992.08	939.68	52.40	18.934	
6,300.00	6,168.23	8,006.41	7,136.09	28.67	37.90	158.95	-1,146.61	595.74	972.84	948.94	23.90	40.704	
6,400.00	6,265.78	8,017.61	7,136.09	29.15	38.14	162.01	-1,146.78	606.95	873.92	849.71	24.22	36.086	
6,500.00	6,363.33	8,028.82	7,136.09	29.63	38.39	165.49	-1,146.95	618.15	775.12	750.55	24.57	31.545	
6,600.00	6,460.91	8,039.75	7,136.10	30.12	38.63	170.81	-1,147.11	629.08	676.46	651.48	24.99	27.072	
6,700.00	6,558.93	8,040.21	7,136.10	30.54	38.64	-175.49	-1,147.12	629.54	577.59	552.13	25.47	22.680	
6,800.00	6,655.76	8,025.04	7,136.09	30.86	38.31	-179.11	-1,146.89	614.37	480.34	454.25	26.09	18.411	
6,900.00	6,749.00	7,994.61	7,136.09	31.11	37.65	175.15	-1,146.43	583.95	387.41	360.31	27.10	14.297	
7,000.00	6,836.37	7,949.68	7,136.08	31.30	36.72	169.44	-1,145.75	539.02	301.63	272.66	28.97	10.413	
7,100.00	6,915.71	7,891.34	7,136.06	31.43	35.54	162.44	-1,144.87	480.69	226.11	193.54	32.57	6.943	
7,200.00	6,985.07	7,821.04	7,136.05	31.52	34.19	152.45	-1,143.81	410.40	164.65	125.47	39.19	4.202	
7,300.00	7,042.74	7,740.51	7,136.03	31.58	32.75	137.70	-1,142.59	329.87	121.99	72.91	49.07	2.486	
7,400.00	7,087.30	7,651.72	7,136.01	31.63	31.29	118.66	-1,141.25	241.10	101.52	43.82	57.70	1.760	
7,474.15	7,111.21	7,581.51	7,135.33	31.67	30.27	104.76	-1,140.07	170.91	98.25	38.26	59.99	1.638	SF
7,500.00	7,117.65	7,556.90	7,133.74	31.69	30.01	100.02	-1,139.42	146.36	98.59	38.53	60.06	1.641	
7,600.00	7,133.04	7,464.41	7,119.47	31.88	29.84	83.08	-1,135.52	55.14	105.86	47.81	58.05	1.824	
7,700.00	7,135.12	7,376.28	7,093.90	32.48	29.85	69.67	-1,129.73	-28.92	121.19	66.76	54.43	2.227	
7,800.00	7,135.35	7,296.37	7,061.02	33.74	29.83	57.91	-1,122.83	-101.37	149.46	98.78	50.67	2.949	
7,900.00	7,135.58	7,226.06	7,024.89	35.42	29.79	48.74	-1,115.54	-161.20	191.81	143.05	48.76	3.934	
8,000.00	7,135.82	7,165.13	6,988.47	37.32	29.75	42.20	-1,108.37	-209.50	245.93	197.19	48.74	5.045	
8,100.00	7,136.05	7,112.73	6,953.63	39.39	29.69	37.62	-1,101.63	-248.04	309.10	259.40	49.70	6.219	
8,200.00	7,136.28	7,067.76	6,921.33	41.58	29.63	34.36	-1,095.46	-278.69	379.13	328.17	50.96	7.440	
8,300.00	7,136.51	7,029.11	6,891.91	43.87	29.57	31.98	-1,089.89	-303.12	454.39	402.20	52.19	8.707	
8,400.00	7,136.75	7,000.00	6,868.82	46.25	29.53	30.41	-1,085.55	-320.30	533.73	480.25	53.48	9.980	
8,500.00	7,136.98	6,966.86	6,841.61	48.70	29.46	28.82	-1,080.47	-338.53	616.19	561.96	54.23	11.363	
8,600.00	7,137.21	6,950.00	6,827.43	51.22	29.43	28.08	-1,077.83	-347.24	701.32	646.04	55.28	12.686	
8,700.00	7,137.44	6,919.55	6,801.24	53.78	29.36	26.86	-1,072.98	-362.00	788.29	732.60	55.69	14.154	
8,800.00	7,137.67	6,900.00	6,784.07	56.39	29.32	26.14	-1,069.81	-370.80	877.02	820.77	56.25	15.590	
8,900.00	7,137.91	6,882.75	6,768.71	59.04	29.28	25.55	-1,066.99	-378.11	967.13	910.40	56.73	17.048	
9,000.00	7,138.14	6,867.33	6,754.81	61.72	29.24	25.05	-1,064.44	-384.29	1,058.39	1,001.26	57.13	18.526	
9,100.00	7,138.37	6,850.00	6,739.02	64.44	29.20	24.51	-1,061.55	-390.82	1,150.62	1,093.20	57.42	20.037	
9,200.00	7,138.60	6,850.00	6,739.02	67.18	29.20	24.51	-1,061.55	-390.82	1,243.74	1,185.85	57.88	21.488	
9,300.00	7,138.84	6,829.77	6,720.38	69.94	29.14	23.93	-1,058.14	-397.89	1,337.37	1,279.35	58.02	23.049	
9,400.00	7,139.07	6,819.54	6,710.86	72.72	29.11	23.65	-1,056.41	-401.23	1,431.70	1,373.46	58.24	24.581	
9,500.00	7,139.30	6,800.00	6,692.56	75.53	29.06	23.14	-1,053.09	-407.19	1,526.66	1,468.32	58.35	26.166	
9,600.00	7,139.53	6,800.00	6,692.56	78.34	29.06	23.14	-1,053.09	-407.19	1,621.85	1,563.26	58.60	27.679	
9,700.00	7,139.77	6,800.00	6,692.56	81.18	29.06	23.14	-1,053.09	-407.19	1,717.59	1,658.78	58.81	29.207	
9,800.00	7,140.00	6,800.00	6,692.56	84.02	29.06	23.14	-1,053.09	-407.19	1,813.78	1,754.80	58.99	30.749	
9,900.00	7,140.23	6,779.88	6,673.52	86.88	29.00	22.65	-1,049.64	-412.72	1,909.95	1,850.93	59.02	32.363	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #835H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-114.37	-7.22	-15.94	17.50	17.50	0.00	N/A	
100.00	100.00	100.00	100.00	0.36	0.36	-114.37	-7.22	-15.94	17.50	16.78	0.72	24.408	
200.00	200.00	200.00	200.00	0.72	0.72	-114.37	-7.22	-15.94	17.50	16.07	1.43	12.204	
300.00	300.00	300.00	300.00	1.08	1.08	-114.37	-7.22	-15.94	17.50	15.35	2.15	8.136	
400.00	400.00	400.00	400.00	1.43	1.43	-114.37	-7.22	-15.94	17.50	14.63	2.87	6.102	
500.00	500.00	500.00	500.00	1.79	1.79	-114.37	-7.22	-15.94	17.50	13.91	3.58	4.882	CC, ES
600.00	599.98	599.39	599.37	2.14	2.13	98.50	-8.46	-17.13	19.30	15.03	4.27	4.522	SF
700.00	699.84	698.53	698.37	2.47	2.47	105.19	-12.18	-20.70	24.96	20.03	4.93	5.058	
800.00	799.45	797.31	796.79	2.82	2.81	111.38	-18.31	-26.57	34.76	29.15	5.62	6.189	
900.00	898.70	896.43	895.42	3.17	3.16	117.63	-25.31	-33.28	47.21	40.89	6.32	7.468	
1,000.00	997.47	995.15	993.68	3.55	3.52	123.90	-32.28	-39.95	61.87	54.82	7.04	8.783	
1,100.00	1,095.62	1,093.37	1,091.43	3.94	3.88	129.63	-39.21	-46.60	79.18	71.40	7.78	10.177	
1,200.00	1,193.22	1,191.11	1,188.69	4.36	4.25	134.53	-46.11	-53.21	98.92	90.39	8.52	11.604	
1,300.00	1,290.77	1,288.80	1,285.92	4.79	4.61	137.94	-53.01	-59.82	119.31	110.04	9.27	12.870	
1,400.00	1,388.32	1,386.50	1,383.15	5.23	4.98	140.35	-59.91	-66.43	139.98	129.96	10.02	13.969	
1,500.00	1,485.87	1,484.19	1,480.37	5.68	5.35	142.14	-66.80	-73.03	160.83	150.06	10.78	14.926	
1,600.00	1,583.42	1,581.89	1,577.60	6.14	5.71	143.51	-73.70	-79.64	181.80	170.27	11.53	15.763	
1,700.00	1,680.97	1,679.58	1,674.82	6.59	6.09	144.61	-80.60	-86.25	202.85	190.55	12.29	16.500	
1,800.00	1,778.52	1,777.27	1,772.05	7.06	6.46	145.49	-87.49	-92.86	223.95	210.89	13.06	17.152	
1,900.00	1,876.07	1,874.97	1,869.28	7.52	6.83	146.23	-94.39	-99.47	245.10	231.28	13.82	17.732	
2,000.00	1,973.61	1,972.66	1,966.50	7.99	7.20	146.85	-101.29	-106.08	266.28	251.69	14.59	18.252	
2,100.00	2,071.16	2,070.36	2,063.73	8.46	7.58	147.37	-108.18	-112.69	287.48	272.12	15.36	18.720	
2,200.00	2,168.71	2,168.05	2,160.96	8.93	7.95	147.83	-115.08	-119.29	308.71	292.58	16.13	19.142	
2,300.00	2,266.26	2,265.75	2,258.18	9.40	8.32	148.22	-121.98	-125.90	329.95	313.05	16.90	19.526	
2,400.00	2,363.81	2,363.44	2,355.41	9.88	8.70	148.57	-128.87	-132.51	351.20	333.53	17.67	19.876	
2,500.00	2,461.36	2,461.14	2,452.63	10.35	9.07	148.88	-135.77	-139.12	372.46	354.02	18.44	20.196	
2,600.00	2,558.91	2,558.83	2,549.86	10.83	9.45	149.16	-142.67	-145.73	393.74	374.52	19.22	20.490	
2,700.00	2,656.46	2,656.52	2,647.09	11.30	9.82	149.40	-149.56	-152.34	415.02	395.03	19.99	20.762	
2,800.00	2,754.01	2,754.22	2,744.31	11.78	10.20	149.62	-156.46	-158.95	436.31	415.54	20.76	21.012	
2,900.00	2,851.56	2,851.91	2,841.54	12.26	10.57	149.83	-163.36	-165.55	457.60	436.06	21.54	21.244	
3,000.00	2,949.11	2,949.61	2,938.77	12.74	10.95	150.01	-170.25	-172.16	478.90	456.59	22.32	21.460	
3,100.00	3,046.66	3,047.30	3,035.99	13.22	11.32	150.18	-177.15	-178.77	500.20	477.11	23.09	21.661	
3,200.00	3,144.21	3,145.00	3,133.22	13.70	11.70	150.33	-184.05	-185.38	521.51	497.64	23.87	21.849	
3,300.00	3,241.75	3,242.69	3,230.45	14.18	12.08	150.48	-190.94	-191.99	542.82	518.18	24.65	22.025	
3,400.00	3,339.30	3,340.38	3,327.67	14.66	12.45	150.61	-197.84	-198.60	564.14	538.71	25.42	22.190	
3,500.00	3,436.85	3,438.08	3,424.90	15.14	12.83	150.73	-204.74	-205.21	585.45	559.25	26.20	22.345	
3,600.00	3,534.40	3,535.77	3,522.12	15.62	13.21	150.84	-211.64	-211.81	606.77	579.79	26.98	22.491	
3,700.00	3,631.95	3,633.47	3,619.35	16.10	13.58	150.95	-218.53	-218.42	628.09	600.33	27.76	22.628	
3,800.00	3,729.50	3,731.16	3,716.58	16.58	13.96	151.05	-225.43	-225.03	649.41	620.88	28.54	22.758	
3,900.00	3,827.05	3,828.86	3,813.80	17.06	14.34	151.14	-232.33	-231.64	670.74	641.42	29.31	22.881	
4,000.00	3,924.60	3,926.55	3,911.03	17.55	14.71	151.23	-239.22	-238.25	692.06	661.97	30.09	22.998	
4,100.00	4,022.15	4,024.25	4,008.26	18.03	15.09	151.31	-246.12	-244.86	713.39	682.52	30.87	23.108	
4,200.00	4,119.70	4,121.94	4,105.48	18.51	15.47	151.39	-253.02	-251.47	734.72	703.07	31.65	23.213	
4,300.00	4,217.25	4,219.63	4,202.71	18.99	15.84	151.46	-259.91	-258.07	756.05	723.62	32.43	23.313	
4,400.00	4,314.80	4,317.33	4,299.94	19.48	16.22	151.53	-266.81	-264.68	777.38	744.17	33.21	23.408	
4,500.00	4,412.35	4,415.02	4,397.16	19.96	16.60	151.59	-273.71	-271.29	798.71	764.72	33.99	23.498	
4,600.00	4,509.90	4,512.72	4,494.39	20.44	16.97	151.65	-280.60	-277.90	820.04	785.27	34.77	23.585	
4,700.00	4,607.44	4,610.41	4,591.61	20.92	17.35	151.71	-287.50	-284.51	841.38	805.83	35.55	23.667	
4,800.00	4,704.99	4,708.11	4,688.84	21.41	17.73	151.77	-294.40	-291.12	862.71	826.38	36.33	23.746	
4,900.00	4,802.54	4,805.80	4,786.07	21.89	18.11	151.82	-301.29	-297.73	884.05	846.93	37.11	23.822	
5,000.00	4,900.09	4,903.50	4,883.29	22.37	18.48	151.87	-308.19	-304.33	905.38	867.49	37.89	23.894	
5,100.00	4,997.64	5,001.19	4,980.52	22.86	18.86	151.92	-315.09	-310.94	926.72	888.05	38.67	23.963	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #835H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

Rule Assigned:

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.00	5,095.19	5,098.88	5,077.75	23.34	19.24	151.97	-321.98	-317.55	948.05	908.60	39.45	24.030	
5,300.00	5,192.74	5,196.58	5,174.97	23.83	19.61	152.01	-328.88	-324.16	969.39	929.16	40.23	24.094	
5,400.00	5,290.29	5,294.27	5,272.20	24.31	19.99	152.05	-335.78	-330.77	990.73	949.71	41.02	24.155	
5,500.00	5,387.84	5,391.97	5,369.42	24.79	20.37	152.09	-342.67	-337.38	1,012.07	970.27	41.80	24.214	
5,600.00	5,485.39	5,489.66	5,466.65	25.28	20.75	152.13	-349.57	-343.99	1,033.41	990.83	42.58	24.271	
5,700.00	5,582.94	5,587.36	5,563.88	25.76	21.12	152.17	-356.47	-350.59	1,054.75	1,011.39	43.36	24.326	
5,800.00	5,680.49	5,685.05	5,661.10	26.24	21.50	152.20	-363.36	-357.20	1,076.09	1,031.95	44.14	24.379	
5,900.00	5,778.04	5,782.74	5,758.33	26.73	21.88	152.24	-370.26	-363.81	1,097.43	1,052.51	44.92	24.430	
6,000.00	5,875.59	5,880.44	5,855.56	27.21	22.26	152.27	-377.16	-370.42	1,118.77	1,073.06	45.70	24.479	
6,100.00	5,973.13	5,978.13	5,952.78	27.70	22.63	152.30	-384.05	-377.03	1,140.11	1,093.62	46.49	24.526	
6,200.00	6,070.68	6,075.83	6,050.01	28.18	23.01	152.33	-390.95	-383.64	1,161.45	1,114.18	47.27	24.572	
6,300.00	6,168.23	6,173.52	6,147.24	28.67	23.39	152.36	-397.85	-390.25	1,182.79	1,134.74	48.05	24.616	
6,400.00	6,265.78	6,271.22	6,244.46	29.15	23.77	152.39	-404.74	-396.85	1,204.13	1,155.30	48.83	24.659	
6,500.00	6,363.33	8,250.96	7,430.58	29.63	38.54	-157.74	-504.60	628.53	1,215.60	1,174.52	41.08	29.589	
6,600.00	6,460.91	8,261.76	7,430.57	30.12	38.77	-162.05	-504.75	639.33	1,140.77	1,097.04	43.73	26.088	
6,700.00	6,558.93	8,262.08	7,430.57	30.54	38.78	163.50	-504.76	639.65	1,069.75	1,023.22	46.53	22.991	
6,800.00	6,655.76	8,246.77	7,430.58	30.86	38.45	141.83	-504.54	624.34	1,004.63	955.32	49.31	20.372	
6,900.00	6,749.00	8,216.21	7,430.61	31.11	37.79	132.94	-504.11	593.78	947.64	895.74	51.91	18.257	
7,000.00	6,836.37	8,171.15	7,430.66	31.30	36.86	128.27	-503.47	548.73	900.35	846.21	54.14	16.630	
7,100.00	6,915.71	8,112.70	7,430.71	31.43	35.67	124.72	-502.65	490.29	863.42	807.58	55.84	15.462	
7,200.00	6,985.07	8,042.30	7,430.78	31.52	34.34	121.41	-501.65	419.89	836.56	779.58	56.98	14.681	
7,300.00	7,042.74	7,961.69	7,430.86	31.58	32.90	118.24	-500.51	339.29	818.61	761.00	57.61	14.210	
7,400.00	7,087.30	7,872.84	7,430.95	31.63	31.44	115.40	-499.25	250.45	807.87	749.98	57.90	13.954	
7,500.00	7,117.65	7,745.29	7,425.98	31.69	29.66	112.32	-497.09	123.13	801.58	743.91	57.67	13.899	
7,600.00	7,133.04	7,598.42	7,391.08	31.88	28.13	108.69	-492.55	-19.13	793.54	735.58	57.95	13.692	
7,700.00	7,135.12	7,470.54	7,334.90	32.48	27.42	104.82	-486.89	-133.62	784.16	725.13	59.03	13.284	
7,800.00	7,135.35	7,367.53	7,273.75	33.74	27.16	100.31	-481.32	-216.19	775.12	714.59	60.53	12.806	
7,900.00	7,135.58	7,287.28	7,217.37	35.42	27.02	96.10	-476.46	-273.02	770.04	707.90	62.13	12.393	
7,928.36	7,135.65	7,267.97	7,202.77	35.95	26.99	95.00	-475.23	-285.60	769.74	707.14	62.60	12.296	
8,000.00	7,135.82	7,224.84	7,168.82	37.32	26.91	92.46	-472.41	-312.05	771.79	708.11	63.69	12.119	
8,100.00	7,136.05	7,175.74	7,128.11	39.39	26.82	89.43	-469.10	-339.27	782.21	717.11	65.09	12.017	
8,200.00	7,136.28	7,136.56	7,094.20	41.58	26.74	86.93	-466.38	-358.68	802.15	735.86	66.29	12.100	
8,300.00	7,136.51	7,100.00	7,061.53	43.87	26.67	84.55	-463.80	-374.88	831.73	764.52	67.20	12.376	
8,400.00	7,136.75	7,078.63	7,042.02	46.25	26.62	83.14	-462.28	-383.47	870.39	802.43	67.96	12.808	
8,500.00	7,136.98	7,050.00	7,015.45	48.70	26.55	81.25	-460.22	-393.93	917.42	849.05	68.37	13.418	
8,600.00	7,137.21	7,050.00	7,015.45	51.22	26.55	81.25	-460.22	-393.93	971.82	902.98	68.83	14.118	
8,700.00	7,137.44	7,022.50	6,989.52	53.78	26.48	79.43	-458.23	-402.85	1,032.30	963.42	68.88	14.987	
8,800.00	7,137.67	7,000.00	6,968.03	56.39	26.43	77.94	-456.59	-409.30	1,098.36	1,029.52	68.84	15.956	
8,900.00	7,137.91	7,000.00	6,968.03	59.04	26.43	77.94	-456.59	-409.30	1,168.80	1,099.91	68.89	16.966	
9,000.00	7,138.14	7,000.00	6,968.03	61.72	26.43	77.94	-456.59	-409.30	1,243.31	1,174.45	68.86	18.056	
9,100.00	7,138.37	6,977.19	6,946.02	64.44	26.37	76.44	-454.93	-415.06	1,320.66	1,252.03	68.63	19.243	
9,200.00	7,138.60	6,968.92	6,937.99	67.18	26.34	75.90	-454.32	-416.96	1,400.90	1,332.43	68.48	20.458	
9,300.00	7,138.84	6,950.00	6,919.54	69.94	26.29	74.67	-452.94	-420.89	1,483.56	1,415.32	68.24	21.740	
9,400.00	7,139.07	6,950.00	6,919.54	72.72	26.29	74.67	-452.94	-420.89	1,567.92	1,499.81	68.11	23.021	
9,500.00	7,139.30	6,950.00	6,919.54	75.53	26.29	74.67	-452.94	-420.89	1,654.03	1,586.06	67.97	24.336	
9,600.00	7,139.53	6,950.00	6,919.54	78.34	26.29	74.67	-452.94	-420.89	1,741.61	1,673.80	67.82	25.680	
9,700.00	7,139.77	6,950.00	6,919.54	81.18	26.29	74.67	-452.94	-420.89	1,830.48	1,762.81	67.67	27.050	
9,800.00	7,140.00	6,950.00	6,919.54	84.02	26.29	74.67	-452.94	-420.89	1,920.43	1,852.91	67.52	28.441	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #836H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Rule Assigned:

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	27.48	67.01	34.86	75.54				
100.00	100.00	100.00	100.00	0.36	0.36	27.48	67.01	34.86	75.54	74.82	0.72	105.357	
200.00	200.00	200.00	200.00	0.72	0.72	27.48	67.01	34.86	75.54	74.10	1.43	52.679	
300.00	300.00	300.00	300.00	1.08	1.08	27.48	67.01	34.86	75.54	73.38	2.15	35.119	
400.00	400.00	400.00	400.00	1.43	1.43	27.48	67.01	34.86	75.54	72.67	2.87	26.339	
500.00	500.00	500.00	500.00	1.79	1.79	27.48	67.01	34.86	75.54	71.95	3.58	21.071	CC
600.00	599.98	600.97	600.95	2.14	2.15	-125.18	67.13	33.08	75.84	71.55	4.28	17.711	ES
700.00	699.84	701.37	701.21	2.47	2.50	-131.99	67.48	27.80	77.48	72.51	4.97	15.599	
800.00	799.45	800.47	800.00	2.82	2.85	-141.60	67.99	20.10	82.55	76.88	5.67	14.569	
900.00	898.70	898.88	898.10	3.17	3.20	-150.97	68.50	12.33	92.73	86.36	6.37	14.549	SF
1,000.00	997.47	996.65	995.57	3.55	3.56	-158.97	69.01	4.62	108.17	101.09	7.09	15.267	
1,100.00	1,095.62	1,093.67	1,092.28	3.94	3.92	-165.29	69.51	-3.03	128.53	120.74	7.80	16.488	
1,200.00	1,193.22	1,190.01	1,188.32	4.36	4.27	-170.10	70.02	-10.63	152.70	144.19	8.50	17.955	
1,300.00	1,290.77	1,286.29	1,284.31	4.79	4.62	-173.63	70.52	-18.22	177.83	168.62	9.21	19.315	
1,400.00	1,388.32	1,382.58	1,380.29	5.23	4.98	-176.29	71.02	-25.82	203.44	193.53	9.91	20.521	
1,500.00	1,485.87	1,478.86	1,476.27	5.68	5.34	-178.35	71.52	-33.41	229.37	218.75	10.62	21.590	
1,600.00	1,583.42	1,575.15	1,572.26	6.14	5.70	-179.99	72.02	-41.01	255.53	244.19	11.34	22.537	
1,700.00	1,680.97	1,671.43	1,668.24	6.59	6.05	178.67	72.53	-48.60	281.84	269.79	12.05	23.380	
1,800.00	1,778.52	1,767.72	1,764.23	7.06	6.41	177.56	73.03	-56.20	308.28	295.50	12.77	24.132	
1,900.00	1,876.07	1,864.00	1,860.21	7.52	6.77	176.62	73.53	-63.79	334.80	321.30	13.50	24.807	
2,000.00	1,973.61	1,960.29	1,956.19	7.99	7.13	175.82	74.03	-71.39	361.40	347.18	14.22	25.415	
2,100.00	2,071.16	2,056.57	2,052.18	8.46	7.49	175.14	74.53	-78.98	388.05	373.10	14.95	25.964	
2,200.00	2,168.71	2,152.86	2,148.16	8.93	7.85	174.54	75.04	-86.58	414.74	399.07	15.67	26.463	
2,300.00	2,266.26	2,249.14	2,244.14	9.40	8.21	174.01	75.54	-94.17	441.48	425.08	16.40	26.918	
2,400.00	2,363.81	2,345.43	2,340.13	9.88	8.57	173.54	76.04	-101.77	468.24	451.11	17.13	27.334	
2,500.00	2,461.36	2,441.71	2,436.11	10.35	8.93	173.12	76.54	-109.36	495.04	477.18	17.86	27.716	
2,600.00	2,558.91	2,538.00	2,532.09	10.83	9.29	172.75	77.04	-116.95	521.85	503.26	18.59	28.068	
2,700.00	2,656.46	2,634.28	2,628.08	11.30	9.65	172.41	77.55	-124.55	548.68	529.36	19.32	28.393	
2,800.00	2,754.01	2,730.57	2,724.06	11.78	10.01	172.10	78.05	-132.14	575.53	555.47	20.06	28.694	
2,900.00	2,851.56	2,826.85	2,820.05	12.26	10.37	171.82	78.55	-139.74	602.39	581.60	20.79	28.973	
3,000.00	2,949.11	2,923.14	2,916.03	12.74	10.73	171.57	79.05	-147.33	629.27	607.74	21.53	29.233	
3,100.00	3,046.66	3,019.42	3,012.01	13.22	11.09	171.34	79.55	-154.93	656.15	633.89	22.26	29.476	
3,200.00	3,144.21	3,115.71	3,108.00	13.70	11.45	171.12	80.06	-162.52	683.04	660.05	23.00	29.703	
3,300.00	3,241.75	3,211.99	3,203.98	14.18	11.81	170.92	80.56	-170.12	709.95	686.22	23.73	29.916	
3,400.00	3,339.30	3,308.28	3,299.96	14.66	12.18	170.73	81.06	-177.71	736.86	712.39	24.47	30.115	
3,500.00	3,436.85	3,404.56	3,395.95	15.14	12.54	170.56	81.56	-185.31	763.77	738.57	25.20	30.303	
3,600.00	3,534.40	3,500.85	3,491.93	15.62	12.90	170.40	82.06	-192.90	790.70	764.75	25.94	30.480	
3,700.00	3,631.95	3,597.13	3,587.92	16.10	13.26	170.25	82.56	-200.50	817.62	790.94	26.68	30.647	
3,800.00	3,729.50	3,693.42	3,683.90	16.58	13.62	170.11	83.07	-208.09	844.56	817.14	27.42	30.805	
3,900.00	3,827.05	3,789.70	3,779.88	17.06	13.98	169.98	83.57	-215.68	871.49	843.34	28.15	30.954	
4,000.00	3,924.60	3,885.99	3,875.87	17.55	14.34	169.86	84.07	-223.28	898.43	869.54	28.89	31.096	
4,100.00	4,022.15	3,982.27	3,971.85	18.03	14.70	169.74	84.57	-230.87	925.38	895.75	29.63	31.230	
4,200.00	4,119.70	4,078.56	4,067.83	18.51	15.07	169.63	85.07	-238.47	952.33	921.96	30.37	31.358	
4,300.00	4,217.25	4,174.84	4,163.82	18.99	15.43	169.53	85.58	-246.06	979.28	948.17	31.11	31.479	
4,400.00	4,314.80	4,271.13	4,259.80	19.48	15.79	169.43	86.08	-253.66	1,006.23	974.38	31.85	31.595	
4,500.00	4,412.35	4,367.41	4,355.78	19.96	16.15	169.34	86.58	-261.25	1,033.19	1,000.60	32.59	31.705	
4,600.00	4,509.90	4,463.70	4,451.77	20.44	16.51	169.25	87.08	-268.85	1,060.15	1,026.82	33.33	31.811	
4,700.00	4,607.44	4,559.98	4,547.75	20.92	16.87	169.16	87.58	-276.44	1,087.11	1,053.04	34.07	31.911	
4,800.00	4,704.99	4,656.27	4,643.74	21.41	17.23	169.08	88.09	-284.04	1,114.07	1,079.26	34.81	32.007	
4,900.00	4,802.54	4,752.55	4,739.72	21.89	17.60	169.01	88.59	-291.63	1,141.04	1,105.49	35.55	32.100	
5,000.00	4,900.09	4,848.84	4,835.70	22.37	17.96	168.94	89.09	-299.23	1,168.00	1,131.72	36.29	32.188	
5,100.00	4,997.64	4,945.12	4,931.69	22.86	18.32	168.87	89.59	-306.82	1,194.97	1,157.94	37.03	32.272	

Lonestar Consulting, LLC

Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit #836H - OH - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 ft

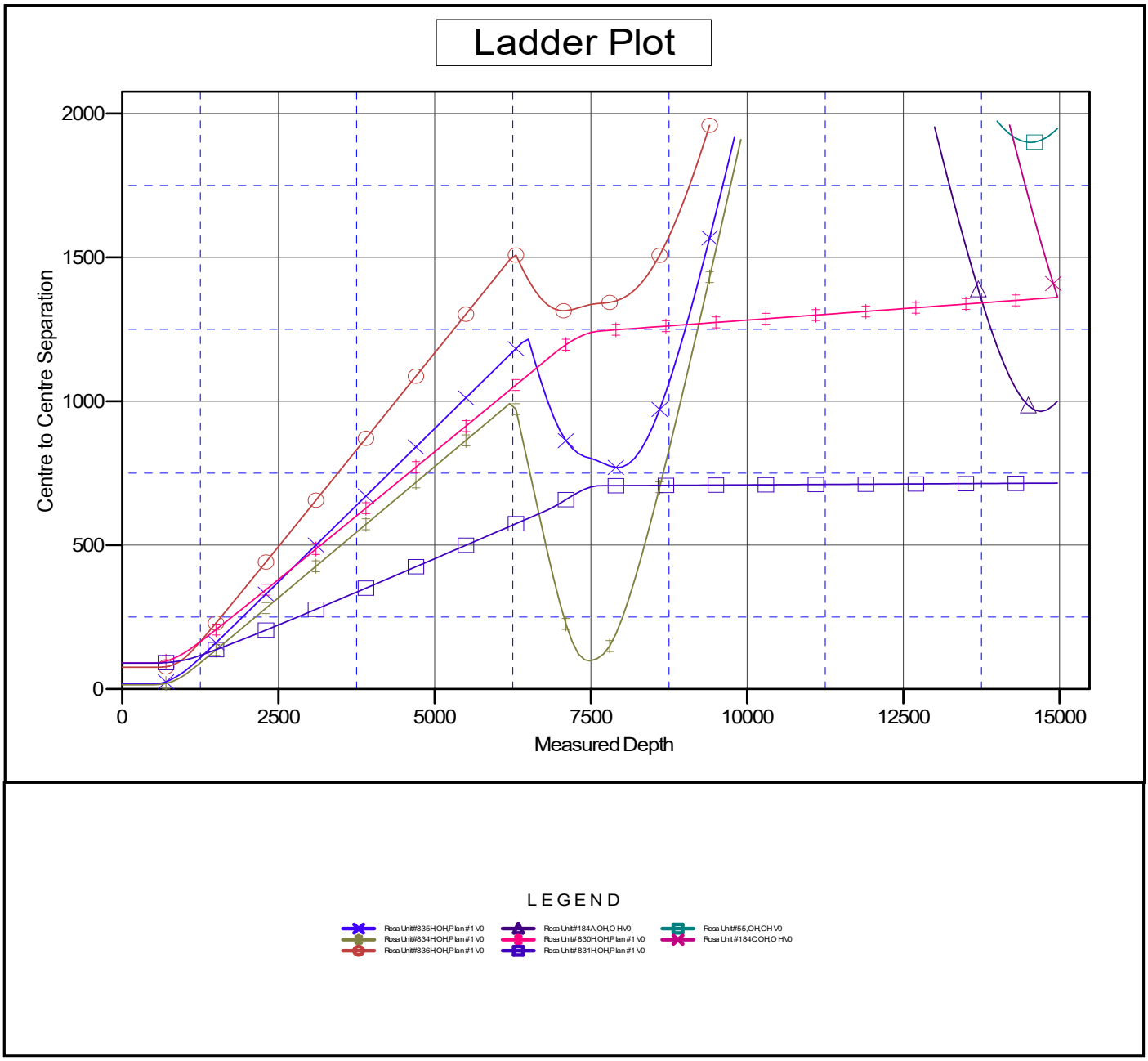
Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Rule Assigned: Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.00	5,095.19	5,041.41	5,027.67	23.34	18.68	168.80	90.09	-314.42	1,221.94	1,184.17	37.77	32.354	
5,300.00	5,192.74	5,137.69	5,123.65	23.83	19.04	168.74	90.60	-322.01	1,248.91	1,210.40	38.51	32.432	
5,400.00	5,290.29	5,233.98	5,219.64	24.31	19.40	168.68	91.10	-329.60	1,275.89	1,236.64	39.25	32.506	
5,500.00	5,387.84	5,330.26	5,315.62	24.79	19.77	168.62	91.60	-337.20	1,302.86	1,262.87	39.99	32.579	
5,600.00	5,485.39	5,426.55	5,411.61	25.28	20.13	168.56	92.10	-344.79	1,329.84	1,289.10	40.73	32.648	
5,700.00	5,582.94	5,522.83	5,507.59	25.76	20.49	168.51	92.60	-352.39	1,356.81	1,315.34	41.47	32.715	
5,800.00	5,680.49	5,619.12	5,603.57	26.24	20.85	168.46	93.11	-359.98	1,383.79	1,341.57	42.22	32.779	
5,900.00	5,778.04	5,715.40	5,699.56	26.73	21.21	168.41	93.61	-367.58	1,410.77	1,367.81	42.96	32.841	
6,000.00	5,875.59	5,811.69	5,795.54	27.21	21.57	168.36	94.11	-375.17	1,437.75	1,394.05	43.70	32.901	
6,100.00	5,973.13	5,907.97	5,891.52	27.70	21.94	168.31	94.61	-382.77	1,464.73	1,420.29	44.44	32.959	
6,200.00	6,070.68	6,004.26	5,987.51	28.18	22.30	168.27	95.11	-390.36	1,491.71	1,446.53	45.18	33.014	
6,300.00	6,168.23	7,923.12	7,148.00	28.67	37.19	-154.32	98.55	600.24	1,508.34	1,457.00	51.34	29.377	
6,400.00	6,265.78	7,934.06	7,148.00	29.15	37.43	-153.85	98.52	611.18	1,462.05	1,408.36	53.69	27.232	
6,500.00	6,363.33	7,945.00	7,148.00	29.63	37.67	-153.38	98.49	622.12	1,421.22	1,365.20	56.03	25.367	
6,600.00	6,460.91	7,955.67	7,148.00	30.12	37.90	-159.24	98.47	632.79	1,386.32	1,328.02	58.30	23.778	
6,700.00	6,558.93	7,955.86	7,148.00	30.54	37.90	159.91	98.47	632.99	1,357.77	1,297.55	60.22	22.546	
6,800.00	6,655.76	7,940.43	7,148.00	30.86	37.57	132.98	98.50	617.55	1,336.41	1,274.85	61.56	21.709	
6,900.00	6,749.00	7,909.74	7,148.00	31.11	36.90	120.02	98.58	586.86	1,322.59	1,260.34	62.25	21.246	
7,000.00	6,836.37	7,864.56	7,148.00	31.30	35.97	112.29	98.69	541.69	1,315.87	1,253.54	62.34	21.110	
7,063.93	6,888.15	7,828.58	7,148.00	31.38	35.23	108.46	98.78	505.70	1,314.79	1,252.68	62.10	21.172	
7,100.00	6,915.71	7,806.00	7,148.00	31.43	34.77	106.52	98.83	483.13	1,315.09	1,253.22	61.87	21.255	
7,200.00	6,985.07	7,735.50	7,148.00	31.52	33.43	101.69	99.00	412.63	1,318.62	1,257.54	61.08	21.588	
7,300.00	7,042.74	7,654.80	7,148.00	31.58	31.99	97.58	99.20	331.92	1,324.57	1,264.42	60.15	22.020	
7,400.00	7,087.30	7,565.88	7,148.00	31.63	30.53	94.29	99.42	243.00	1,331.11	1,271.80	59.31	22.442	
7,500.00	7,117.65	7,467.50	7,144.97	31.69	29.12	91.81	99.64	144.72	1,336.60	1,277.87	58.72	22.761	
7,600.00	7,133.04	7,370.17	7,128.12	31.88	27.94	89.89	99.79	48.96	1,339.92	1,281.32	58.60	22.865	
7,700.00	7,135.12	7,278.13	7,098.95	32.48	27.05	88.46	99.85	-38.25	1,341.38	1,282.42	58.97	22.747	
7,800.00	7,135.35	7,195.60	7,062.33	33.74	26.43	86.89	99.85	-112.16	1,343.90	1,284.14	59.76	22.487	
7,900.00	7,135.58	7,123.84	7,022.96	35.42	26.02	85.21	99.80	-172.11	1,348.89	1,288.00	60.89	22.153	
8,000.00	7,135.82	7,062.35	6,984.04	37.32	25.75	83.56	99.72	-219.67	1,357.28	1,295.07	62.21	21.817	
8,100.00	7,136.05	7,010.01	6,947.42	39.39	25.56	82.02	99.62	-257.05	1,369.85	1,306.20	63.65	21.522	
8,200.00	7,136.28	6,965.48	6,913.93	41.58	25.42	80.62	99.53	-286.39	1,387.13	1,322.01	65.13	21.299	
8,300.00	7,136.51	6,927.48	6,883.80	43.87	25.31	79.37	99.43	-309.52	1,409.46	1,342.87	66.59	21.167	
8,400.00	7,136.75	6,900.00	6,861.17	46.25	25.24	78.43	99.35	-325.11	1,437.00	1,368.96	68.04	21.121	
8,500.00	7,136.98	6,866.79	6,832.96	48.70	25.15	77.28	99.26	-342.63	1,469.68	1,400.37	69.31	21.204	
8,600.00	7,137.21	6,850.00	6,818.36	51.22	25.11	76.69	99.20	-350.92	1,507.48	1,436.89	70.58	21.357	
8,700.00	7,137.44	6,821.04	6,792.68	53.78	25.04	75.65	99.11	-364.30	1,550.04	1,478.43	71.61	21.644	
8,800.00	7,137.67	6,800.00	6,773.66	56.39	24.99	74.89	99.03	-373.29	1,597.23	1,524.66	72.57	22.011	
8,900.00	7,137.91	6,800.00	6,773.66	59.04	24.99	74.89	99.03	-373.29	1,648.84	1,575.29	73.54	22.420	
9,000.00	7,138.14	6,770.87	6,746.85	61.72	24.92	73.83	98.92	-384.67	1,704.10	1,629.93	74.17	22.976	
9,100.00	7,138.37	6,750.00	6,727.33	64.44	24.87	73.06	98.84	-392.08	1,763.21	1,688.46	74.74	23.590	
9,200.00	7,138.60	6,750.00	6,727.33	67.18	24.87	73.06	98.84	-392.08	1,825.57	1,750.20	75.37	24.222	
9,300.00	7,138.84	6,750.00	6,727.33	69.94	24.87	73.06	98.84	-392.08	1,891.16	1,815.28	75.89	24.921	
9,400.00	7,139.07	6,725.23	6,703.88	72.72	24.81	72.15	98.74	-400.02	1,959.16	1,883.00	76.16	25.725	

Lonestar Consulting, LLC
Anticollision Report

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Rosa Unit #832H - Slot B7
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Reference Site:	Rosa Unit 42	**MD Reference:**	WELL @ 6563.00ft (Original Well Elev)
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 6563.00ft (Original Well Elev
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Rosa Unit #832H - Slot B7
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.31°



Lonestar Consulting, LLC

Anticollision Report

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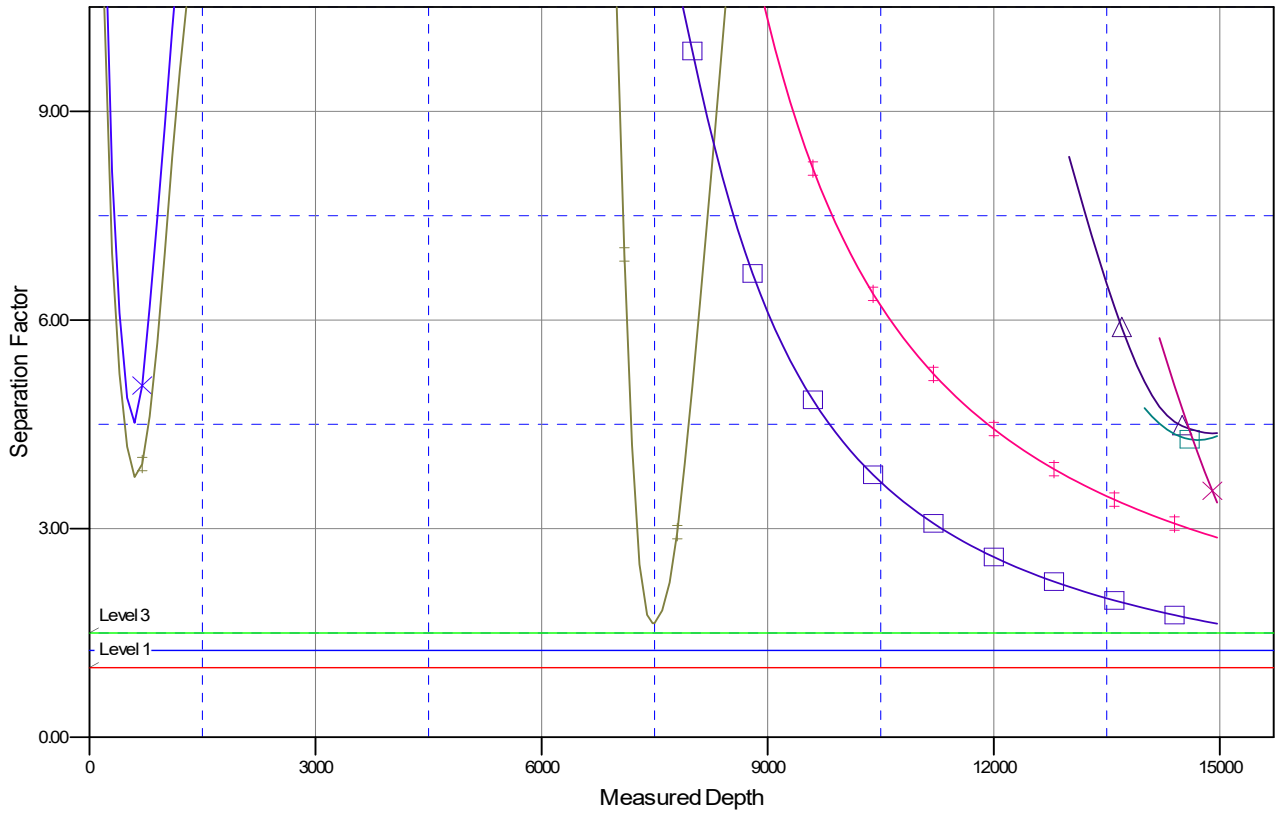
Site Error:	0.00 ft	**North Reference:**	True
Reference Well:	Rosa Unit #832H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 6563.00ft (Original Well Elev
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Rosa Unit #832H - Slot B7
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.31°

Separation Factor Plot



LEGEND

Rosa Unit#835H,OH,Plan#1 V0
Rosa Unit#834H,OH,Plan#1 V0
Rosa Unit#836H,OH,Plan#1 V0
Rosa Unit#184A,OH,O HV0
Rosa Unit#830H,OH,Plan#1 V0
Rosa Unit#831H,OH,Plan#1 V0
Rosa Unit#55,OH,OH V0
Rosa Unit#184C,OH,O HV0

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
#832H Rosa Unit
Lease: NMSF78768 Unit: NMNM78407E
SH: NW¼NW¼ Section 36, T.31 N., R.5 W.
BH: SW¼NE¼ Section 34, T.31 N., R.5 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, New Mexico State Office, Reservoir Management Group, 301 Dinosaur Trail, Santa Fe, New Mexico 87508.
The effective date of the agreement must be **prior** to any sales.

Approval Date: 03/31/2022

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.

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.

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
BLM 24 Hour Number (505) 564-7750

Approval Date: 03/31/2022

Jicarilla Ranger District, Carson National Forest
Energy Policy Act, Section 390 Review & Decision Form

Project Title: WPX Energy Production, LLC Proposed Well Pads and Ancillary Facilities
PALS #: 51676

FS Decision Date: **08/01/2017**

Archeological Clearance Date: **04/12/2017**

Wildlife Report Date: **05/03/2017**

Comments: **See Figures 1 and 2 for project overview and attached location and pipeline plats for approved project areas.**

PROPOSED PROJECT INFORMATION

Operator: **WPX Energy LLC**
Well/Pad Name(s) and Number(s): **Pad #42 and all included wells, (See Figure 1)**
Proposed Well(s): ☐ New ☒ Twinned ☐ Other _____
Surface Ownership: USDA – Forest Service
Well Location: Township **31** N; Range **5** W; Section **36**
Ancillary Facilities Location: Township _____ N; Range _____ W; Section(s) _____
Facility Type: _____
Formation: **Basin Mancos**
6th Code Watershed: **140801010902 Cabresto Canyon**
Refer to plat for additional information regarding project location and layout

OTHER SECTION 390 PROJECTS

Operator: _____
Project Name: _____
Location: Township _____ N; Range _____ W; Section(s) _____
Comments: _____

LEASE TERMS & CONDITIONS

Lease No. **NMSF 0078768**

Exceptions to Standard Lease Terms & Stipulations (if applicable)

☐ No Surface Occupancy (NSO) Stipulation
☐ Controlled Surface Use Stipulation
☐ Timing Restriction
☐ Cultural Resource Lease Notice
☐ Other: _____

Comments: _____

ONSITE

1. Onsite Date **11/14/2016**
   Representatives/Attendees:

Forest Service	Company	Other
J.J. Miller	Mark Lepitch	Mindy Paulek
	Debbie Watson	Casey Haga
		Steve Fuller
		Elliot Ryan

2. **Surface Disturbance on National Forest System (NFS) lands:**

   Access Road Length: **56.5** feet Access Road Width: **50** feet (Total road/pipeline corridor)

   Pad Size: **655** x **410** feet (approximate size, includes construction zone)

   Estimated maximum cut: **7.0** feet Estimated maximum fill: **5.0** feet

   Estimated New Ground Disturbance: **6.23** acres

   Comments: **See Figure 1 for total surface disturbance.**

3. **Archeology:**

   ☒ Negative Survey ☐ Refer to Archeological Record of Review for Stipulations
   ☐ Additional Fieldwork required

   Comments: _____

4. Wildlife (Refer to Wildlife Specialist Report for Additional Information):

Winter Wildlife Areas

Yes	No	N/A	Item
☒	☐	☐	1. Proposal is within Primary Big Game Winter Range.
☒	☐	☐	2. Proposal is within Big Game Winter Range.

Mexican Spotted Owl

Yes	No	N/A	Item
☐	☒	☐	1. Proposal is within or is within ½-mile of PAC.
☐	☒	☐	2. Proposal is within or is within ½-mile of Designated Critical Habitat.
☐	☒	☐	2. Proposal is within or is within ½-mile of –Potential MSO Habitat.

Management Indicator Species (MIS)

Species checked are the MIS for the proposed project

☐ Hairy Woodpecker	☐ Turkey
☐ Brewer's Sparrow	☐ Abert's Squirrel
☒ Juniper (Plain) Titmouse	☒ Elk

Threatened, Endangered, and Forest Service Sensitive Species:

TES Species	No Surveys Needed	Survey Completed	Survey Required	Mitigation Required	Not In or Near Suitable Habitat
Mexican Spotted Owl	☒	☐	☐	☐	☒
Black-footed Ferret	☒	☐	☐	☐	☒
Apache Northern Goshawk	☒	☐	☐	☐	☒
American Peregrine Falcon	☒	☐	☐	☐	☒
Bald Eagle	☒	☐	☐	☐	☒
Grey Vireo	☒	☐	☐	☐	☐
Townsend's Big-Eared Bat	☒	☐	☐	☐	☐
Spotted Bat	☒	☐	☐	☐	☐
Burrowing Owl	☒	☐	☐	☐	☒
Gunnison's Prairie Dog	☒	☐	☐	☐	☐
Northern Leopard Frog	☒	☐	☐	☐	☒
Pagosa Milkvetch	☒	☐	☐	☐	☒

Comments: Refer to the site-specific COAs for details regarding mitigation to offset habitat loss and disturbance.

PIPELINE

Gas Carrier: **WPX Energy LLC and existing pipeline system under special use authorization.**

Length **56.5** feet x 40 foot corridor width.

Location: ☒ Parallels proposed access road ☒ Parallels/within existing cross-country corridor

☐ Parallels existing road ☐ New cross country corridor

☐ Entirely on existing location/no new surface disturbance

☐ Existing pipeline to be stripped (removed) across well pad and construction zone, and reconstructed/replaced after drilling

Authorization: ☒ Special Use Authorization ☒ Lease

Comments: **See attached pipeline plat. This corridor will include buried water, electric, and natural gas lines. One 56.5 ft. pipeline corridor will connect this location to an existing water and gas pipeline system and electric distribution system, the remainder of the pipeline corridor will be on the location, approximately 410.5 feet. All additional well-tie pipelines will be within the Pad #42 location. An existing special use authorization will be amended to reflect the addition of the pipelines.**

In addition, this decision will authorize the construction of a temporary water pipeline, see Figure 2 and attached pipeline plat. Pipeline length and disturbance, on NFS lands, is approximately 4,860 ft. x 40 ft., 4.46 acres. This water pipeline may be installed on a temporary basis on the ground surface, or if long term needs warrant it may be buried within the approved corridor along with an additional natural gas pipeline and buried electric line.

SITE SPECIFIC COAs

1. **Seed Mixture: See attached BLM-FFO pinyon-juniper community guidelines for seed mixture and specifications. Mulching and the sterile cover crop option is required. These requirements apply to pad and pipeline seeding.**
2. **As a mitigation requirement for Pad #42, a 160-acre archeological survey will be conducted in an area specified by the Forest Service. The survey and report is to be completed by the end of the calendar year in which any ground disturbing activities are initiated.**

JICARILLA RD EIS STANDARDS & GUIDELINES

1. **General Administration for Development**

Yes	No	N/A	Item
☒	☐	☐	1. Proposal minimizes surface disturbance by using unconventional drilling techniques directional drilling or co-location).
☒	☐	☐	2. Encourage use of existing well pads, roads, and pipeline corridors for new facilities.
☒	☐	☐	3. Proposal utilizes established Best Management Practices found in most current version of the Gold Book.
☒	☐	☐	4. Timing Restriction – New drilling activity and completions is limited to April 1 through October 31. Normal recurring production and day-to-day operations will continue to occur year-round.

Comments: _____

2. Construction Techniques

Yes	No	N/A	Item
☒	☐	☐	1. Exclude well pad construction in riparian areas. If there are no other options other than to construct a well pad within a riparian area, additional NEPA analysis to approve a surface use plan of operations will be required and a site specific amendment to the forest plan would be required.
☒	☐	☐	2. When possible, exclude well pad construction on slopes greater than 20%, with cuts over 15 feet.
☒	☐	☐	3. Avoid new roads crossing slopes greater than 40%. Require an engineering design approved by the Forest Service to support road construction on slopes greater than 40%.
☒	☐	☐	4. Limit maximum grades to 8% for new roads, unless pitches are less than 300 feet (up to 10% permitted in some cases).
☒	☐	☐	5. Locate pipelines to minimize surface disturbance, such as aligning along existing roads and corridors.
☒	☐	☐	6. Minimize surface disturbance by putting pipes deep enough to allow other surface uses to occur on top of these lines.
☒	☐	☐	7. Encourage centralized collection points and water pipelines for produced water.

Comments: _____

3. Roads

Yes	No	N/A	Item
☐	☐	☒	1. Close all new lease roads over 300 feet in length to public motorized access, except where other resource needs dictate that a road should be left open to the public.
☐	☐	☒	2. Permit loop roads to access leases in cases only where a transportation proposal developed by the operator and approved by the Forest Service demonstrates that there would be a benefit to surface resources.

Comments: _____

4. Reclamation

Yes	No	N/A	Item
☒	☐	☐	1. Complete restoration and reclamation of surface disturbance to achieve 70% of the ground cover (compared to nearby undisturbed areas) with permanent native vegetation within 3 growing seasons.
☒	☐	☐	2. Bare ground necessary to conduct day-to-day operations must be kept to a minimum.
☒	☐	☐	3. Monitor the success of ground cover establishment until 70% of the ground cover is attained.
☒	☐	☐	4. Reclamation meeting the same standard is required for redisturbance of revegetated areas.
☒	☐	☐	5. Monitor and maintain reclaimed areas to minimize the establishment of invasive plants during the reclamation period.

Comments: _____

5. Air Quality

Yes	No	N/A	Item
☒	☐	☐	1. All newly developed facilities will utilize the air quality mitigation as set forth by the New Mexico Air Quality Bureau.
☒	☐	☐	2. When existing facilities are updated, industry will also follow New Mexico Air Quality Bureau mitigation measures.

Comments: _____

6. Noise

Yes	No	N/A	Item
☒	☐	☐	1. Comply with BLM's management of sound generated by oil and gas production and transportation in the San Juan Basin described in the "Notice to Lessees and Operators on Onshore Oil and Gas Leases Within the Jurisdiction of the Farmington Field Office (NTL-04-2-FFO)". As changes occur over time, the Forest Service will continue to adopt the BLM standards as they develop.
☐	☐	☒	2. Receptor Focused 48.6 dB(A)Leq will be achieved at Buzzard Park and Cedar Springs Campgrounds, Gasbuggy, and Carracas Mesa Administrative Site.
☐	☐	☒	3. Boundary Focused 48.6 dB(A)Leq will be achieved inside Middle Mesa Raptor Area, Ulibarri Raptor Area, and Muñoz Canyon Raptor Area at 400 feet in all directions from the noise source.
☐	☐	☒	4. Stricter noise standards may be applied to Gasbuggy, Buzzard Park, and Cedar Springs Campgrounds, if warranted.
☐	☐	☒	5. Additional noise sensitive areas such as changes in primary winter big game range, or new camping, picnic, or trail areas, may be identified and/or developed by the Forest Service. Any new policy would be implemented after a 30-day notice to the affected parties.

Comments: _____

7. Visual Impacts

Yes	No	N/A	Item
☐	☐	☒	1. Manage Vaqueros Canyon for a visual quality objective (VQO) or scenic integrity level of partial retention. This objective may be reduced by one level to other resource goals on a case-by-case basis.
☒	☐	☐	2. Employ design criteria for visual elements that adhere to the natural characteristics dominating the landscape to the extent possible.

Comments: _____

8. Areas of Resource Concern

Yes	No	N/A	Item
☐	☒	☐	1. Proposal is within an Area of Resource Concern (Bancos Canyon, La Jara Canyon, Valencia Canyon, Fierro Mesa, Fierro Canyon, and Vaqueros Canyon). Within these areas, apply current forest plan direction for Management Areas 4, 7, 8, 12, and 13 and manage for protecting, maintaining, and enhancing the resource values for which they are identified.
☐	☐	☒	2. Prior to developing any new well sites, associated roads, and pipelines within an area of resource concern, consider alternative drilling technology and various site locations to minimize the impacts to surface resources.
☐	☐	☒	3. A 5-year development strategy will be encouraged prior to development in areas of resource concern.

Area of Resource Concern	Resource Values	
Bancos Canyon	Cultural Resources Watershed	Wildlife Habitat Seclusion
La Jara Canyon Valencia Canyon	Undeveloped Characteristics Cultural Resources	Wildlife Security Seclusion
Fierro Canyon Fierro Mesa	Undeveloped Characteristics	
Vaqueros Canyon	Visual Resources	Wildlife Habitat

Management Area	Forest Plan Direction
4 – Ponderosa Pine under 40%	• Improve drainage and surfacing on existing roads that will not be closed to improve riparian areas and reduce stream sedimentation with a guideline of 3.0 miles annually. • Lands which have the VQO of foreground retention and are located within the immediate foreground (100 to 300 feet)of a sensitive travel route, use area, or water body will be managed for the following: entry period will equal 20 years; 30-inch diameter pines with yellow deep fissured bark; stand age replacement will be 240 years. • Activities and uses remain visually subordinate to the characteristic landscape (partial retention VQO) or they may visually dominate the original characteristic of the landscape. However, they must borrow from the form, line, color, and texture of the landscape (modification VQO).
5 –Mixed Conifer & Ponderosa Pine over 40%	• Activities and uses retain form, line, color, and texture which are characteristic of the landscape (retention VQO) or are visually subordinate to the characteristic landscape (partial retention VQO).
7 – Unsuitable Timber	• Activities and uses the form, line, color, and texture which are characteristic of the landscape (retention VQO) or are visually subordinate to the characteristic landscape (partial retention VQO).

8 – Piñon/Juniper	• Unless other management objectives are determined to have priority, as determined by interdisciplinary team review, manage the juniper (Rocky Mountain and Utah) components to provide for habitat diversity. The following guidelines will be used on those areas where juniper diversity is to be maintained:
	  ◦ In areas where juniper comprises less than 10 trees/acre retain all live trees.
	  ◦ In areas where juniper comprises more than 10 trees/acre retain at least 10 of the largest live juniper trees. Trees retained should have greater than 25 percent living crown.
	• Maintain juniper and other species as a component when they are in piñon stands.

12 - Sagebrush	• Activities and uses remain visually subordinate to the characteristic landscape (partial retention VQO) or they may visually dominate the original characteristic of the landscape. However, they must borrow from the form, line, color, and texture of the landscape (modification VQO).
13 – Oak	• Activities and uses remain visually subordinate to the characteristic landscape (partial retention VQO) or they may visually dominate the original characteristic of the landscape. However, they must borrow from the form, line, color, and texture of the landscape (modification VQO).

Comments: _____

OTHER RESOURCE CONCERNS & ISSUES

1. Gasbuggy

Yes	No	N/A	Item
☐	☒	☐	1. Proposed well occurs within Gasbuggy Withdrawn Area (Section 36, T29N, R4W).
☐	☒	☐	2. Proposed well occurs within Gasbuggy Area of Review (Sections 25, 26, 35, and 36 T29N, R4W; Sections 30 and 31, T29N, R3W; Sections 11, 12, 13, and 14, T28N, R4W; and Section 6, T28N, R3W). Includes any directional or horizontal wells that originate outside the "area of review", but have bottom hole completions within the "area of review". *Requires notification DOE for any NOSs and APDs for oil and gas.*
☐	☒	☐	3. Proposed well occurs within Gasbuggy Area of Interest (Section 36 and the east ½ of Section 35, T29N, R4W; and Section 12 and the east ½ of Section 11, T28N, R4W). *May require further environmental analysis prior to well drilling.*

Comments: _____

2. Wild & Scenic River Act

Yes	No	N/A	Item
☐	☒	☐	1. Proposed well occurs within potentially eligible (recreation) Carracas Canyon Wild & Scenic River Area.
☐	☒	☐	2. Proposed well occurs within potentially eligible (wild) Bancos Canyon Wild & Scenic River Area.
☒	☐	☐	3. Proposed well occurs within potentially eligible (recreation) Cabresto Canyon Wild & Scenic River Area.
☐	☒	☐	4. Proposed well occurs within potentially eligible (recreation) Vaqueros Canyon Wild & Scenic River Area.
☐	☒	☐	5. Proposed well occurs within potentially eligible (recreation) La Jara Canyon Wild & Scenic River Area.

Under Section 12(b) "Management Policies" of the 1968 Wild and Scenic Rivers Act as amended it states:

Nothing in this section shall be construed to abrogate any existing rights, privileges, or contracts affecting Federal lands held by any private party without the consent of said party.

Comments: **The temporary waterline does fall within the Cabresto Canyon Wild & Scenic River Area, but will be placed along existing corridors to minimize impacts.**

3. Travel Management

Yes	No	N/A	Item
☒	☐	☐	1. The proposed access road will be designated as a single-purpose road not open to public motorized use. This road designation is made pursuant to 36 CFR Part 212 – Travel Management as amended December 9, 2005. The following vehicles are exempt from this designation: aircraft, watercraft, limited administrative use by the Forest Service, use of any fire, military, emergency, or law enforcement vehicle for emergency purposes, authorized use of any combat or combat support vehicle for national defense purposes, law enforcement response to violations of law, including pursuit, and motor vehicle use that is specifically authorized under a written authorization issued under Federal laws or regulations.

4. Compliance with Other Laws and Regulations

Clean Water Act – Sections 401 and 404: **The temporary waterline would cross potential waters of the U.S. (e.g. Cabresto Canyon and unnamed drainages). The operator must consult with applicable agencies (e.g. U.S. Army Corps of Engineers and New Mexico Environment Department) and obtain necessary permits prior to construction of the temporary waterline.**

Other: _____

ENERGY POLICY ACT CATEGORY

Section 390 Categorical Exclusion (CE)

Applicable CE	Description
☒	1. Individual surface disturbances of less than 5 acres so long as the total surface disturbance on the lease is not greater than 150 acres and site-specific analysis in a document prepared pursuant to NEPA has been previously completed.
☐	2. Drilling an oil or gas well at a location or well pad site at which drilling has occurred previously within 5 years prior to the date of spudding the well.
☐	3. Drilling an oil or gas well within a developed field for which an approved land use plan or any environmental document prepared pursuant to NEPA analyzed such drilling as a reasonably foreseeable activity, so long as such plan or document was approved within 5 years prior to the date of spudding the well.
☐	4. Placement of a pipeline in an approved right-of-way corridor, so long as the corridor was approved within 5 years prior to the date of placement of the pipeline.
☐	5. Maintenance or a minor activity, other than any construction or major renovation of a building or facility.

DECISION

Background

Lease **NMSF 0078768** was acquired by **WPX Energy LLC**. Under the authority of the 1920 Mineral Leasing Act as amended, a Federal mineral lease conveys the right to use, in an environmentally responsible manner, the portion of the surface necessary to efficiently develop the leased Federal minerals. The Forest Service is the surface management agency for proposed gas wells on NFS lands and has authority over surface management, in accordance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (codified in 36 CFR 228.107).

WPX Energy LLC proposed development of natural gas well. The proposed gas wells are within an existing developed oil/gas field in the San Juan Basin of northwestern New Mexico. Continued development of this existing field was analyzed in the Carson National Forest's Final Environmental Impact Statement (FEIS) for Surface Management of Gas Leasing and Development on the Jicarilla Ranger District. The FEIS was approved as a Carson National Forest Land and Resource Management Plan (Forest Plan) amendment and implemented on April 9, 2009. The FEIS analyzed full field development at 1,509 wells, with 4,198 acres of bare ground. There are currently **794** wells and **1,838** acres of bare ground associated with natural gas development on NFS lands within the Jicarilla Ranger District. Therefore, the proposed development is within the scope analyzed under the FEIS.

Decision

I have reviewed the project record and the information contained in this project review form, and decided to approve the proposed **Pad #42 (sixteen wells within the approved location)** natural gas well(s), which will allow **WPX Energy LLC** continuing development of existing mineral lease rights, while protecting surface resources through the use of reasonable conditions of approval (COAs). The life expectancy of the proposed well is approximately thirty years. Upon completion of construction and drilling activities, all areas not required for well production and operation would be reclaimed and seeded. Pipeline disturbance would be reclaimed to the maximum extent practical.

My decision allows the approval of the surface use plan of operations (SUPO) with COAs. This includes construction, drilling, completion, interim reclamation, operation, maintenance, well re-entry, abandonment, and final reclamation of the approved well, well pad, access road, well-tie pipeline, and ancillary facilities. In addition, my decision allows, throughout the life of the well, the operator to install, maintain, replace, and update equipment and associated ancillary facilities within the footprint of the approved well pad, road, pipeline corridor, and ancillary facility locations as necessary, as well as take the actions necessary to ensure well and pipeline safety, production, and efficiency. This will allow for the repair and replacement of damaged or outdated equipment and facilities, as well as the addition of equipment or facilities to meet future regulatory requirements or technological advancements. Upon well abandonment, all surface facilities would be removed and the surface disturbance associated with the well pad, access road, well-tie pipeline, and ancillary facilities would be reclaimed and returned to as natural condition as possible.

This decision does not limit or diminish the Forest Service's substantive authority or responsibility regarding review and approval of a SUPO conducted pursuant to 36 CFR 228.107-108. I assure operations related to this decision will minimize impacts on surface resources and prevent unnecessary or unreasonable surface resource disturbance; including impacts to cultural and historical resources, fisheries, wildlife, and plant habitat. Best management practices are to be applied as necessary to reduce impacts of any approved actions.

Reasons for Categorically Excluding the Decision

This decision is categorically excluded from documentation in an environmental impact statement or an environmental assessment, because it is consistent with Categorical Exclusion #**1** of Section 390 of the Energy Policy Act of 2005, which is described as:

> **Individual surface disturbances of less than 5 acres so long as the total surface disturbance on the lease is not greater than 150 acres and site-specific analysis in a document prepared pursuant to NEPA has been previously completed.**

Use of Categorical Exclusion #**1** of Section 390 of the Energy Policy Act of 2005 is appropriate for this project because:

- **The project is under the 5-acre limitation. See Figure 1 for total project disturbance.**
- **The project will not increase the total lease disturbance over 150 acres. See Figure 1 for total lease surface disturbance.**
- **The project is tiered to the FEIS for Surface Management of Gas Leasing and Development on the Jicarilla Ranger District. Refer to the above discussion regarding the FEIS.**

Public Involvement

Public notification was conducted by posting the Notice of Staking (NOS) or Application for Permit to Drill (APD) at the Jicarilla Ranger District office in Bloomfield, NM for 30 days per Onshore Order #1. In addition, the project proposal was also posted on the Carson National Forest's internet web page, https://www.fs.usda.gov/projects/carson/landmanagement/projects.

Additionally, a scoping letter requesting feedback on the project was sent to various interested and affected parties.

Findings Required by Other Laws

This decision is consistent with the Carson National Forest Land and Resource Management Plan as required by the 1976 National Forest Management Act as amended.

This decision is consistent with the 1973 Endangered Species Act as amended, as documented in the Biological Assessment/Evaluation (in project record). Populations of management indicator species will not be affected by this decision, as documented in the Wildlife Specialist's Report, (in project record).

The decision is consistent with the National Historic Preservation Act as amended, as documented in the Heritage Resources Inventory report and Inventory Standards and Accounting form (in project record). Tribal consultation is documented in the Tribal Consultation report for the project (in the project record).

This decision is consistent with the National Forest Service Minerals Program Policy (1995) and Executive Order #12898 pertaining to minority and low-income communities. This decision will not have any disparate impacts on individual groups of people or communities.

Administrative Appeal Opportunities and Implementation Date

This decision is not subject to administrative appeal and can be implemented immediately.

Contact Person

For additional information concerning this decision, contact:
Richard A. Rymerson
District Ranger
Jicarilla Ranger District
1110 Rio Vista Lane, Unit #2, Bloomfield, NM 87413
(505) 632-2956

Richard A. Rymerson
District Ranger, Jicarilla Ranger District

1AUG17
Date

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Approval Date: 03/31/2022

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District IV
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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 96222

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 96222
	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	4/8/2022
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104	4/8/2022
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	4/8/2022
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing	4/8/2022
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	4/8/2022