State of New Mexico
Energy, Minerals and Natural Resources Department

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

Operator Signature Date: 5/31/2018
Well information;
Operator LOGOS, Well Name and Number Federal 2307 7P Com #2H

API# 30-039-31367, Section 7, Township 23 N/S, Range 7 E/W

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

- ✓ Notify Aztec OCD 24hrs prior to casing & cement.
- ✓ Hold C-104 for directional survey & "As Drilled" Plat
- ✓ Hold C-104 for NSL, NSP, DHC
- o Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- o Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
  - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
  - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
  - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- o 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
- o Submit Gas Capture Plan form prior to spudding or initiating recompletion operations
- ✓ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ✓ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ✓ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

Charles Perrin
NMOCD Approved by Signature

10-2-2018
Date

Form 3160-3
(March 2012)

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM136672

6. If Indian, Allotee or Tribe Name:

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

8. Lease Name and Well No.: FEDERAL 2307 07P COM 2H

2. Name of Operator: LOGOS OPERATING LLC

9. API Well No.: 30-039-31367

3a. Address: 2010 Afton Place FARMINGTON NM 87401

3b. Phone No. *(include area code)*: (505)324-4145

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

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

At surface: P SESE / 1286 FSL / 327 FEL / LAT 36.23791 / LONG -107.607381

At proposed prod. zone: L NWSW / 2374 FSL / 274 FWL / LAT 36.255494 / LONG -107.623319

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 7 / T23N / R7W / NMP

14. Distance in miles and direction from nearest town or post office*: 47 miles

12. County or Parish: RIO ARRIBA

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 327 feet

16. No. of acres in lease: 441.5

17. Spacing Unit dedicated to this well: 602.72

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 2540 feet

19. Proposed Depth: 5577 feet / 13195 feet

20. BLM/BIA Bond No. on file: FED: NMB001387

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 7267 feet

22. Approximate date work will start*: 07/15/2018

23. Estimated duration: 45 days

KP

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

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 required by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Marie Florez / Ph: (505)419-8420	05/31/2018

Title: Regulatory Specialist

Approved by *(Signature)*	Name *(Printed/Typed)*	Date

Title	Office
	FARMINGTON

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

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

(Continued on page 2)

*(Instructions on page 2)

NMOCD

SEP 24 2018

DISTRICT III

This action is subject to technical and procedural review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3165.4

BLM'S APPROVAL OR ACCEPTANCE OF THIS ACTION DOES NOT RELIEVE THE LESSEE AND OPERATOR FROM OBTAINING ANY OTHER AUTHORIZATION REQUIRED FOR OPERATIONS ON FEDERAL AND INDIAN LANDS

DRILLING OPERATIONS AUTHORIZED ARE SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS"

NMOCD

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.
NMNM136672

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

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

8. Lease Name and Well No.
FEDERAL 2307 07P COM
2H

2. Name of Operator
LOGOS OPERATING LLC

9. API Well No.

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

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

At surface SESE / 1286 FSL / 327 FEL / LAT 36.23791 / LONG -107.607381

At proposed prod. zone NWSW / 2374 FSL / 274 FWL / LAT 36.255494 / LONG -107.623319

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 7 / T23N / R7W / NMP

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

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
327 feet	441.5	602.72

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
2540 feet	5577 feet / 13195 feet	FED: NMB001387

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
7267 feet	07/15/2018	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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Marie Florez / Ph: (505)419-8420	05/31/2018

Title
Regulatory Specialist

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Richard Fields / Ph: (505)564-7612	09/21/2018

Title	Office
Field Manager	FARMINGTON

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

Approval Date: 09/21/2018

(Continued on page 2)

*(Instructions on page 2)

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

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

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

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

State of New Mexico
Energy, Minerals & Natural Resources Department

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-039-31367	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	FEDERAL 2307 7P COM	2H

[7] OGRID No.	[8] Operator Name	[9] Elevation
289408	LOGOS OPERATING, LLC	7267

[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
P	7	23-N	7-W		1286	SOUTH	327	EAST	RIO ARRIBA

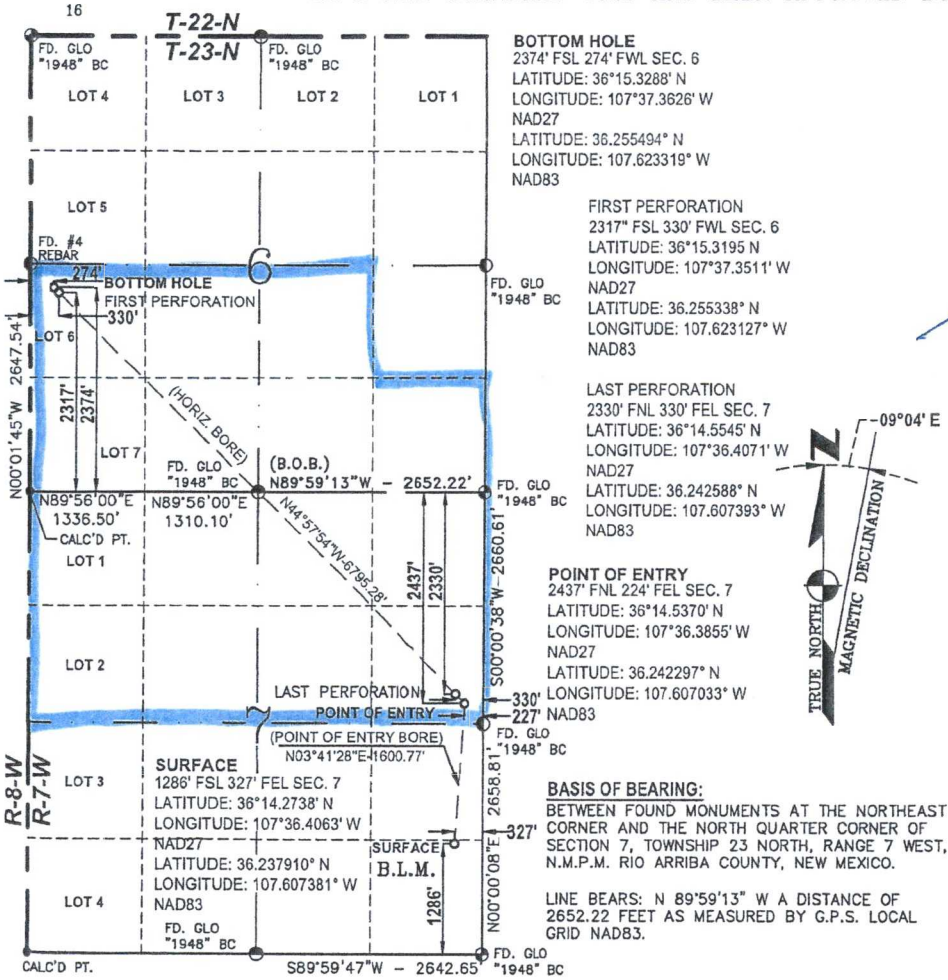
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	6	23-N	7-W		2374	SOUTH	274	WEST	RIO ARRIBA

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
Sec 6: Lots 6,7, E2SW, W2SE,SESE = 281.20 acres Sec 7: Lots 1,2, E2NW, NE = 321.52 acres Total acres 602.72			

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

16



BOTTOM HOLE
2374' FSL 274' FWL SEC. 6
LATITUDE: 36°15.3288' N
LONGITUDE: 107°37.3626' W
NAD27
LATITUDE: 36.255494° N
LONGITUDE: 107.623319° W
NAD83

FIRST PERFORATION
2317" FSL 330' FWL SEC. 6
LATITUDE: 36°15.3195 N
LONGITUDE: 107°37.3511' W
NAD27
LATITUDE: 36.255338° N
LONGITUDE: 107.623127° W
NAD83

LAST PERFORATION
2330' FNL 330' FEL SEC. 7
LATITUDE: 36°14.5545' N
LONGITUDE: 107°36.4071' W
NAD27
LATITUDE: 36.242588° N
LONGITUDE: 107.607393° W
NAD83

POINT OF ENTRY
2437' FNL 224' FEL SEC. 7
LATITUDE: 36°14.5370' N
LONGITUDE: 107°36.3855' W
NAD27
LATITUDE: 36.242297° N
LONGITUDE: 107.607033° W
NAD83

BASIS OF BEARING:
BETWEEN FOUND MONUMENTS AT THE NORTHEAST CORNER AND THE NORTH QUARTER CORNER OF SECTION 7, TOWNSHIP 23 NORTH, RANGE 7 WEST, N.M.P.M. RIO ARRIBA COUNTY, NEW MEXICO.

LINE BEARS: N 89°59'13" W A DISTANCE OF 2652.22 FEET AS MEASURED BY G.P.S. LOCAL GRID NAD83.

[17] OPERATOR CERTIFICATION

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

Tamra Sessions 5/31/18
Signature Date

Tamra Sessions
Printed Name

tsessions@logosresourcesllc.com
E-mail Address

[18] SURVEYOR CERTIFICATION

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

MAY 16, 2018
Date of Survey

Signature and Seal of Professional Surveyor:

GLEN W. RUSSELL
Certificate Number 15703

Directions from the Intersection of
Highway 550 and Highway 64 in Bloomfield, NM
to

LOGOS OPERATING, LLC

FEDERAL 2307 7P COM #2H
1286' FSL 327' FEL,
Section 7, T23N, R7W, N.M.P.M.,
Rio Arriba County, New Mexico
Latitude: 36° 14'16.477" N
Longitude: 107° 36' 26.572" W
Nad 1983

From the Intersection of Highway 550 & Highway 64
Go South on Hwy 550 for 46.8 miles,
turn right (southerly) thru a locked gate for 0.1 miles,
stay right (westerly) over a cattle guard 0.2 miles,
then left (south- southwesterly) 0.2 miles,
stay right (west-northwesterly) 1.2 miles,
to the beginning of new access
on the right (north) side of the field road, which begins and continues northerly for 210.88'
to the new location.

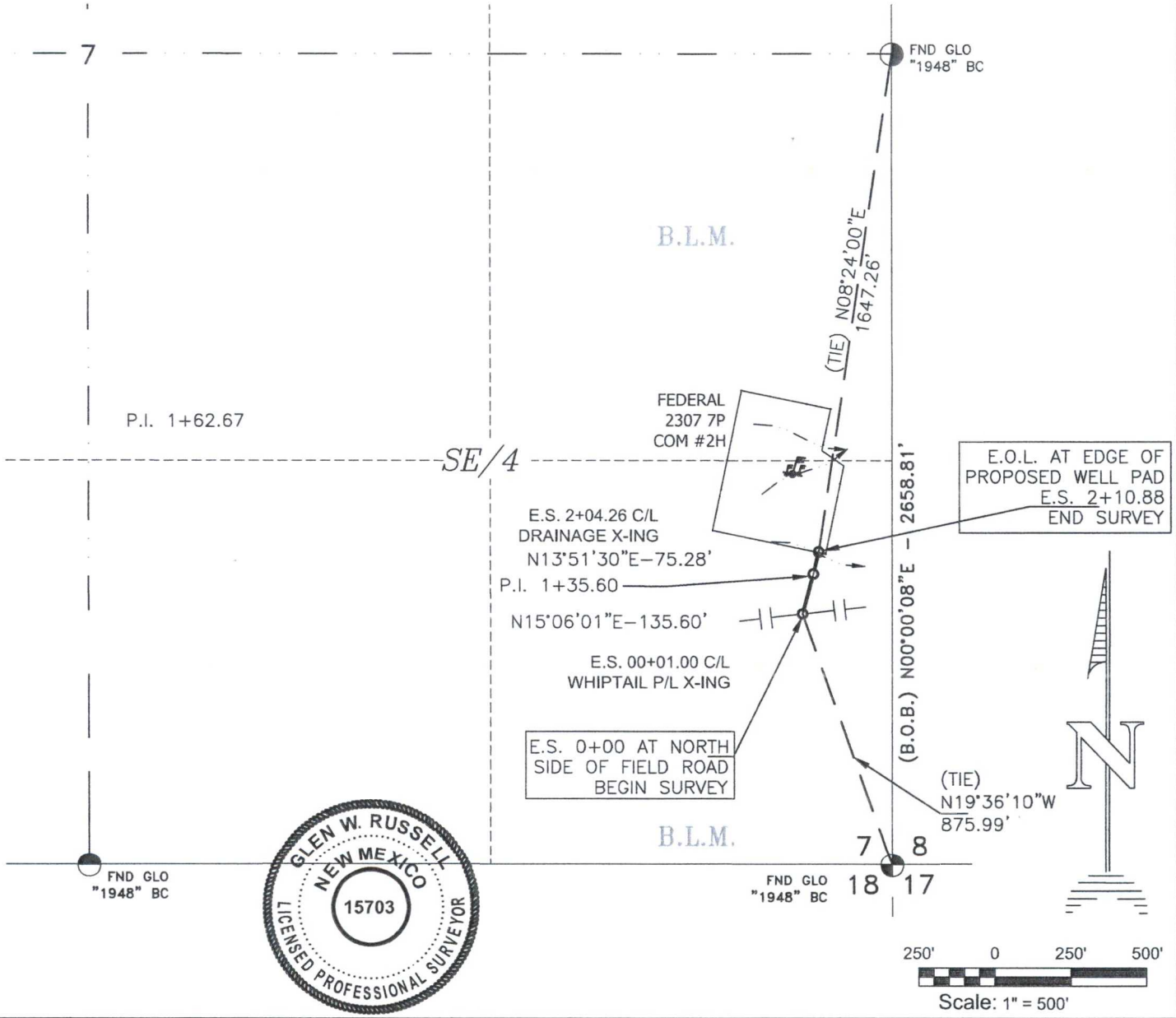
LOGOS OPERATING, LLC

FEDERAL 2307 7P COM #2H

210.88' PROPOSED ACCESS ROAD

LOCATED IN THE SE/4 OF SECTION 7, T-23-N, R-7-W, N.M.P.M.

RIO ARRIBA COUNTY, NEW MEXICO



GLEN W. RUSSELL NEW MEXICO 15703 LICENSED PROFESSIONAL SURVEYOR

OWNERSHIP			
LOCATION	OWNER	STATION	FT./RODS
SE S7, T23N, R7W	B.L.M.	E.S. 0+00 TO E.S. 2+10.88	210.88/12.78

BASIS OF BEARING: AS MEASURED BY GPS BETWEEN FOUND MONUMENTS AT THE SOUTHEAST CORNER AND THE EAST QUARTER CORNER OF SECTION 7, TOWNSHIP 23 NORTH, RANGE 7 WEST, N.M.P.M., RIO ARRIBA COUNTY, NEW MEXICO. BEARS N00°00'08"E, A DISTANCE OF 2658.81' AS MEASURED BY G.P.S. LOCAL GRID NAD83.

DATE OF SURVEY:	GWR	DRAWN BY:	TD
SURVEY CREW:	4/26/18	DATE:	5/5/18

REV.	
1	
2	

I, GLEN W. RUSSELL, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

GLEN W. RUSSELL DATE MAY 7, 2018

GLEN W. RUSSELL, PLS
NEW MEXICO L.S. #15703

VECTOR SURVEYS, LLC
Professional Land Surveys, Mapping,
GPS Surveys & Oil Field Services
122 N Wall Avenue, Farmington, NM 87401
Phone (505) 320-9595
E-Mail: vectorgr001@msn.com

WORK ORDER NO.:	LOGOS065	CAD FILE:	LOGOS065

APD Drilling Plan
LOGOS Operating, LLC

May 23, 2018

Federal 2307 7P Com 2H
Lease Serial # NMNM136672

Surface Location: 1286 FSL, 327 FEL
Legal Description: Sec 7, T23N, R7W (36.237910° N, 107.607381° W – NAD83)
Bottom Hole Location: 2374 FSL, 274 FWL
Legal Description: Sec 6, T23N, R7W (36.255494° N, 107.623319° W – NAD83)
Rio Arriba County, NM

1. The elevation of the unprepared ground is 7,267 feet above sea level.
2. The geological name of the surface formation is the Nacimiento.
3. A rotary rig will be used to drill the well to a Proposed Total Depth of 5,577' TVD/13,195' MD.
4. Estimated top of important geological markers:

Formation	Depth (TVD)(ft)	Depth (MD)(ft)
Nacimiento	Surface	Surface
Ojo Alamo	1465	1469
Kirtland	1617	1625
Fruitland	1814	1830
Pictured Cliffs	2151	2194
Chacra	3002	3122
Cliff House	3653	3831
Menefee	3743	3928
Point Lookout	4520	4728
Mancos	4720	4928
Gallup	5417	5757

5. Estimated depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered:

Formation	Depth (TVD)(ft)	Water/HydroCarbon
Fruitland	1646	Gas
Pictured Cliffs	2151	Gas
Cliffhouse	3469	Gas
Point Lookout	4326	Gas
Mancos	4544	Oil/Gas

6. All proposed casing is new and the program is as follows:

Casing	Size	Depth		Grade	Weight	Connection	PSI		x1000 lbs
		MD	TVD				Burst	Collapse	Tension
Surface	9-5/8"	0-320'	0-320'	J-55	36.00	STC	3520	2020	394
Intermediate	7"	0-6,402'	0-5,557'	J-55	23.00	LTC	4360	3270	313
Production	4-1/2"	6,252'-13,195'	5,557'-5,577'	P-110	11.60	LTC	10690	7560	279

7. Cementing Program:

a. 12-1/4" hole x 9-5/8" casing at **320'** will have cement circulated to surface with **100 sks** (100% excess true hole) Class H Cement with 1.0 % $CaCl_2$, ½ #/sk Poly-E-Flake15.8 ppg, 1.17 ft^3/sk. Note: CEMENT MUST BE CIRCULATED TO SURFACE. STANDARD BOW SPRING CENTRALIZERS SHALL BE PLACED ON THE FIRST 3 (BOTTOM 3) JOINTS OF CASING (1 PER JOINT) AND 1 EVERY 3^{RD} JOINT TO SURFACE. 20 BBLS OF WATER FOLLOWED BY 20 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Surface Casing to 1500psi.

a. 8-3/4" hole x 7" casing at **6,402'**. Cement will be circulated to surface in a single stage with **538** sks (60% excess true hole) of HALCEM with 1.0 % CaC2. ¼ #/sk Poly-E-Flake, 5 #/sk Kol-Seal (Gilsonite) – 12.3 ppg, 1.95 ft^3/sk followed by **366** sks (60% excess true hole) VARICEM with 0.15% Versaset, 0.30% HALAD-9, 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal – 13.5 ppg, 1.3 ft3/sk. ONE CENTRALIZER PER JOINT FOR THE FIRST 3 JOINTS, THEN EVERY OTHER JOINT TO KOP, THEN ONE EVERY 3RD JOINT TO SURFACE. 20 BBLS OF WATER FOLLOWED BY 30 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER Test Intermediate Casing to 1500 psi. Cement additives subject to change based on wellbore conditions and cement design criteria.

a. **6-1/8"** hole x 4-1/2" liner at **13,195'MD** in a single stage using excess of approximately 30% for TOC at **6,252'**. Base slurry to consist of **625** sks EXTENDACEM -13.3 ppg, 1.36 fl3/sk. CENTRALIZERS TO BE USED AT DISCRETION IN LATERAL TO ACHIEVE 70% STAND OFF. CENTRALIZERS TO BE USED TO TIE BACK DEPTH OF 6000' TO ACHIEVE 70% STAND OFF. PACKOFF SEAL ASSEMBLY TO BE USED FOR LINER TOP ISOLATION. Cement additives subject to change based on wellbore conditions and cement design criteria. Liner to be pressure tested during completion operations.

8. Pressure Control Equipment

a. BOPE to be installed prior to Surface Casing drillout.
b. Pressure control equipment will be used to meet 2,000 (2M) psi specifications.
c. BOPE working pressure of 3,000 psi.
d. Function test and visual inspection to be done at each casing size change prior to drill out.
e. BOP annular to be tested to 50% of working pressure.
f. All BOP and related equipment will be tested in accordance with the requirements outlined in Onshore Order No. 2 and Notice to Operators dated May 27, 2005.
g. BOP remote controls to be located on rig floor and readily accessible, master control on ground at accumulator will be able to function all preventors.
h. Kill line will be 2 in min and have two kill line valves, one being a check valve.
i. Choke line will be 2 in min and have two choke line valves, choke manifold with have two adjustable chokes, one manual and one remote. All choke lines will be as straight as possible. Any turns will be properly targeted using block and/or running tees. Choke line and manifold to be pressure tested to 1,500 psi.
j. Float sub and TIW valve will be on the rig floor at all times.
k. If high pressure co-flex hoses are used, they will be run as straight as possible and anchored to prevent whip.
l. The main discharge line (panic line) will be at least 100' from the choke manifold and discharged into an appropriately sized discharge facility.

9. Mud Program:

0' - 320'	Fresh water/Spud Mud. Paper for losses and seepage. 8.4 to 8.8 ppg, 32 to 44 vis, PV <8, YP 2 to 13, FLNC, LGS < 3%
320' – 6,402'	KCL WBM. As needed LCM for losses and seepage. 9.0 to 9.5 ppg, pH 9.0-9.5, 38 to 45 vis. PV 8-14 . YP 8-14 . FL <20cc/30min. LGS<6%
6,402'– 13,195'	LSND WBM. As needed LCM for losses and seepage. 8.8 to 9.0 ppg, PH 9.0-9.5, 34 to 38 vis, PV 4-8 YP 6-8, FL<8cc/30min, LGS < 4%

****During drilling operations, all necessary products will be sufficiently stored on location for abnormal situations. The characteristics, use, testing of drilling mud and the implementation of related drilling procedures shall be designed to prevent the loss of well control. Sufficient quantities of mud materials shall be maintained or readily accessible for the purpose of assuring well control.**
****A pH of 10 or above in the fresh water base mud system shall be maintained to control the effects corrosion has on metallurgy of equipment used.**

Operating and Maintenance

LOGOS Operating, LLC will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. 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. A trip/surge tank will be used to monitor returns for any "kicks" of formation fluids.

Equipment:

2-Mongoose Shale Shakers

2-3400 High Speed Centrifuges with stands and pumps

2- three- high sided cuttings catch tank

2-Roll off bins with track

2-200 bbl Open top Frac tanks

1-Mud/Gas Separator and Degasser 1-

Trip/Surge Tank

Electronic or Visual monitoring system to indicate lost returns and gas detection sensors

10. Testing, Logging and Coring Program:

    a. Testing Program: No drillstem tests are anticipated
    b. Electric Logging Program: TBD
    c. LWD Program: TBD
    d. Coring Program: None.
    e. CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.

11. Bottom Hole Pressure expected to be 2,500 +/- psi
12. Bottom Hole Temperature expected to be 160 deg F.

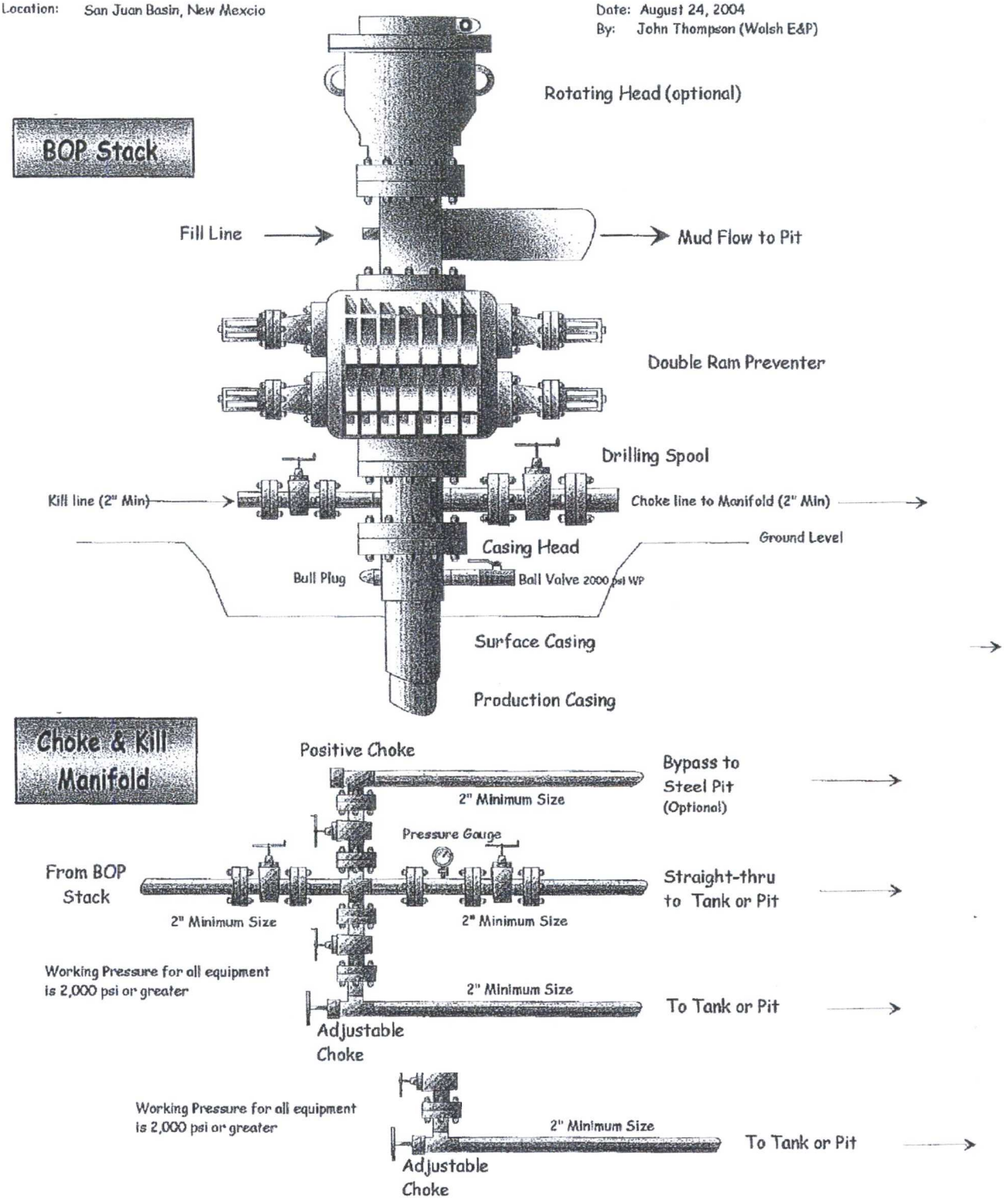
Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1
Typical BOP setup

Location: San Juan Basin, New Mexcio

Date: August 24, 2004
By: John Thompson (Walsh E&P)



LOGOS RESOURCES II, LLC

Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Federal 2307-7P
Well: Federal 2307-7P COM 2H
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

Scientific Drilling

Azimuths to True North
Magnetic North: 8.83°

Magnetic Field
Strength: 49534.1snT
Dip Angle: 62.85°
Date: 5/17/2018
Model: HDGM

WELL DETAILS: Federal 2307-7P COM 2H

GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	1905975.15	2789724.25	36.2379100	-107.6073810	7P 2H

Plan: Plan #1 (Federal 2307-7P COM 2H/OH)

Created By: Janie Collins Date: 19:14, May 20 2018

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
Fed 2H LP	5557.00	1596.97	102.62	1907572.36	2789823.15
Fed 2H BHL	5577.00	6401.39	-4699.03	1912365.57	2785010.31
Fed 2H FPerf	5577.00	6344.59	-4642.43	1912308.90	2785067.04
Fed 2H LPerf	5557.00	1702.90	-3.54	1907678.04	2789716.74

SECTION DETAILS

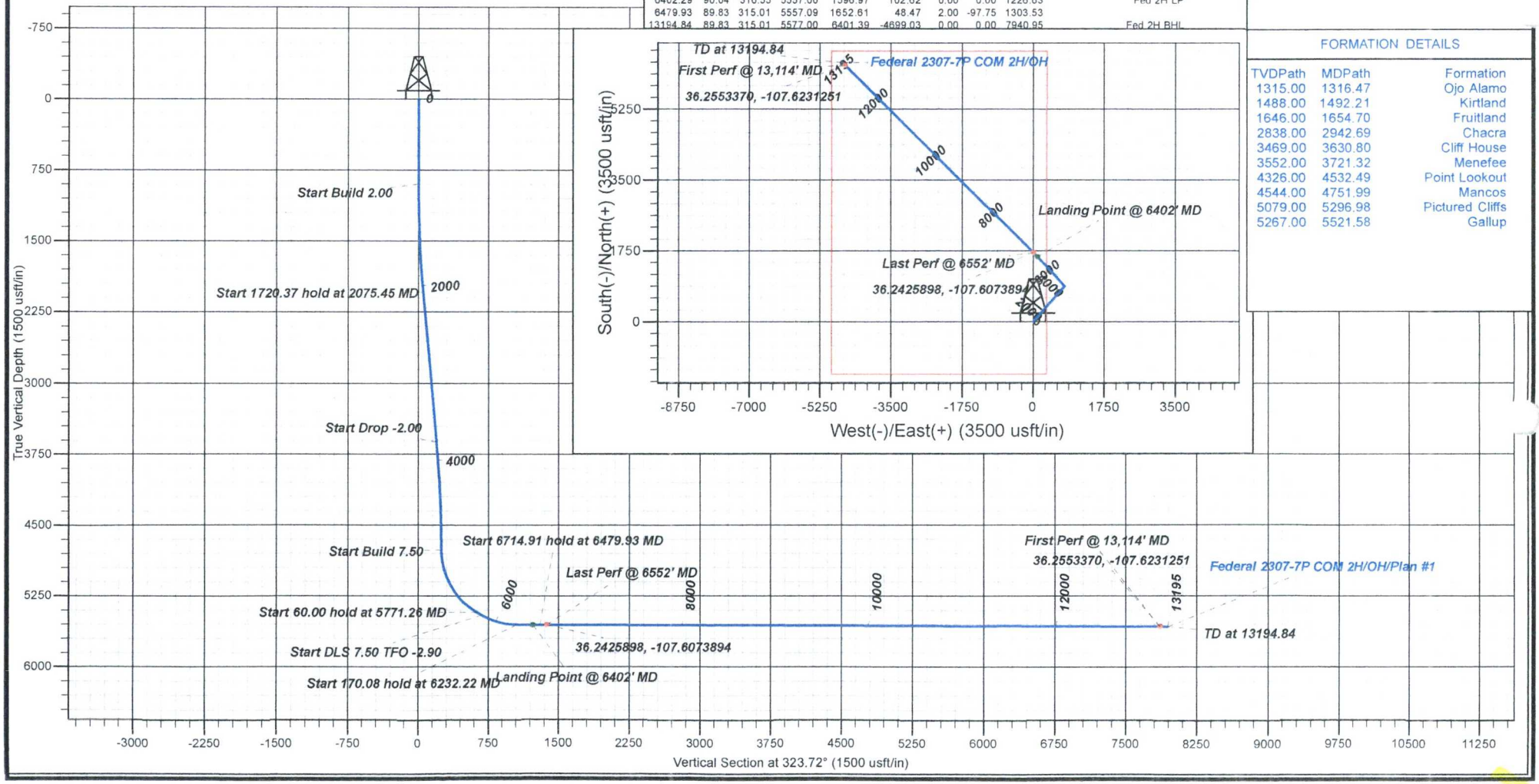
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	
2075.45	23.51	41.51	2042.74	178.06	157.59	2.00	41.51	50.28	
3795.82	23.51	41.51	3620.32	691.94	612.41	0.00	0.00	195.40	
4971.26	0.00	0.00	4763.06	870.00	770.00	2.00	180.00	245.68	
5771.26	60.00	318.00	5424.65	1153.86	514.41	7.50	318.00	625.75	
5831.26	60.00	318.00	5454.65	1192.48	479.64	0.00	0.00	677.46	
6232.22	90.04	316.55	5557.12	1473.51	219.59	7.50	-2.90	1057.89	
6402.29	90.04	316.55	5557.00	1596.97	102.62	0.00	0.00	1226.63	Fed 2H LP
6479.93	89.83	315.01	5557.09	1652.61	48.47	2.00	-97.75	1303.53	
13194.84	89.83	315.01	5577.00	6401.39	-4699.03	0.00	0.00	7940.95	Fed 2H BHL

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
1315.00	1316.47	Ojo Alamo
1488.00	1492.21	Kirtland
1646.00	1654.70	Fruitland
2838.00	2942.69	Chacra
3469.00	3630.80	Cliff House
3552.00	3721.32	Menefee
4326.00	4532.49	Point Lookout
4544.00	4751.99	Mancos
5079.00	5296.98	Pictured Cliffs
5267.00	5521.58	Gallup



LOGOS RESOURCES II, LLC

Logos Operating LLC

Rio Arriba, NM NAD83
Federal 2307-7P
Federal 2307-7P COM 2H - Slot 7P 2H

OH

Plan: Plan #1

Standard Planning Report

20 May, 2018

Scientific Drilling

www.scientificdrilling.com

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Company:	Logos Operating LLC	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**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	Federal 2307-7P				
Site Position:		**Northing:**	1,905,969.03 usft	**Latitude:**	36.2378930
From:	Lat/Long	**Easting:**	2,789,753.17 usft	**Longitude:**	-107.6072830
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	0.13 °

Well	Federal 2307-7P COM 2H - Slot 7P 2H					
Well Position	**+N/-S**	6.19 usft	**Northing:**	1,905,975.15 usft	**Latitude:**	36.2379100
	+E/-W	-28.90 usft	**Easting:**	2,789,724.25 usft	**Longitude:**	-107.6073810
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	7,267.00 usft

Wellbore	OH				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	5/17/2018	8.83	62.85	49,534

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	323.72	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,075.45	23.51	41.51	2,042.74	178.06	157.59	2.00	2.00	0.00	41.51	
3,795.82	23.51	41.51	3,620.32	691.94	612.41	0.00	0.00	0.00	0.00	
4,971.26	0.00	0.00	4,763.06	870.00	770.00	2.00	-2.00	0.00	180.00	
5,771.26	60.00	318.00	5,424.65	1,153.86	514.41	7.50	7.50	0.00	318.00	
5,831.26	60.00	318.00	5,454.65	1,192.48	479.64	0.00	0.00	0.00	0.00	
6,232.22	90.04	316.55	5,557.12	1,473.51	219.59	7.50	7.49	-0.36	-2.90	
6,402.29	90.04	316.55	5,557.00	1,596.97	102.62	0.00	0.00	0.00	0.00	Fed 2H LP
6,479.93	89.83	315.01	5,557.09	1,652.61	48.47	2.00	-0.27	-1.98	-97.75	
13,194.84	89.83	315.01	5,577.00	6,401.39	-4,699.03	0.00	0.00	0.00	0.00	Fed 2H BHL

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Company:	Logos Operating LLC	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	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	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,000.00	2.00	41.51	999.98	1.31	1.16	0.37	2.00	2.00	0.00
1,100.00	4.00	41.51	1,099.84	5.23	4.63	1.48	2.00	2.00	0.00
1,200.00	6.00	41.51	1,199.45	11.75	10.40	3.32	2.00	2.00	0.00
1,300.00	8.00	41.51	1,298.70	20.88	18.48	5.90	2.00	2.00	0.00
1,316.47	8.33	41.51	1,315.00	22.63	20.03	6.39	2.00	2.00	0.00
Ojo Alamo									
1,400.00	10.00	41.51	1,397.47	32.59	28.85	9.20	2.00	2.00	0.00
1,492.21	11.84	41.51	1,488.00	45.67	40.42	12.90	2.00	2.00	0.00
Kirtland									
1,500.00	12.00	41.51	1,495.62	46.88	41.49	13.24	2.00	2.00	0.00
1,600.00	14.00	41.51	1,593.06	63.72	56.40	17.99	2.00	2.00	0.00
1,654.70	15.09	41.51	1,646.00	74.01	65.50	20.90	2.00	2.00	0.00
Fruitland									
1,700.00	16.00	41.51	1,689.64	83.10	73.55	23.47	2.00	2.00	0.00
1,800.00	18.00	41.51	1,785.27	105.00	92.93	29.65	2.00	2.00	0.00
1,900.00	20.00	41.51	1,879.82	129.37	114.50	36.53	2.00	2.00	0.00
2,000.00	22.00	41.51	1,973.17	156.21	138.25	44.11	2.00	2.00	0.00
2,075.45	23.51	41.51	2,042.74	178.06	157.59	50.28	2.00	2.00	0.00
Start 1720.37 hold at 2075.45 MD									
2,100.00	23.51	41.51	2,065.26	185.39	164.08	52.35	0.00	0.00	0.00
2,200.00	23.51	41.51	2,156.96	215.26	190.52	60.79	0.00	0.00	0.00
2,300.00	23.51	41.51	2,248.66	245.13	216.96	69.22	0.00	0.00	0.00
2,400.00	23.51	41.51	2,340.36	275.01	243.40	77.66	0.00	0.00	0.00
2,500.00	23.51	41.51	2,432.06	304.88	269.83	86.10	0.00	0.00	0.00
2,600.00	23.51	41.51	2,523.76	334.75	296.27	94.53	0.00	0.00	0.00
2,700.00	23.51	41.51	2,615.46	364.62	322.71	102.97	0.00	0.00	0.00
2,800.00	23.51	41.51	2,707.16	394.49	349.14	111.40	0.00	0.00	0.00
2,900.00	23.51	41.51	2,798.86	424.36	375.58	119.84	0.00	0.00	0.00
2,942.69	23.51	41.51	2,838.00	437.11	386.87	123.44	0.00	0.00	0.00
Chacra									
3,000.00	23.51	41.51	2,890.56	454.23	402.02	128.27	0.00	0.00	0.00
3,100.00	23.51	41.51	2,982.25	484.10	428.45	136.71	0.00	0.00	0.00
3,200.00	23.51	41.51	3,073.95	513.97	454.89	145.14	0.00	0.00	0.00
3,300.00	23.51	41.51	3,165.65	543.84	481.33	153.58	0.00	0.00	0.00
3,400.00	23.51	41.51	3,257.35	573.71	507.76	162.01	0.00	0.00	0.00
3,500.00	23.51	41.51	3,349.05	603.58	534.20	170.45	0.00	0.00	0.00
3,600.00	23.51	41.51	3,440.75	633.45	560.64	178.88	0.00	0.00	0.00
3,630.80	23.51	41.51	3,469.00	642.65	568.78	181.48	0.00	0.00	0.00
Cliff House									
3,700.00	23.51	41.51	3,532.45	663.32	587.08	187.32	0.00	0.00	0.00

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Company:	Logos Operating LLC	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,721.32	23.51	41.51	3,552.00	669.69	592.71	189.12	0.00	0.00	0.00
Menefee									
3,795.82	23.51	41.51	3,620.32	691.94	612.41	195.40	0.00	0.00	0.00
Start Drop -2.00									
3,800.00	23.43	41.51	3,624.15	693.19	613.51	195.75	2.00	-2.00	0.00
3,900.00	21.43	41.51	3,716.59	721.75	638.79	203.82	2.00	-2.00	0.00
4,000.00	19.43	41.51	3,810.30	747.88	661.92	211.20	2.00	-2.00	0.00
4,100.00	17.43	41.51	3,905.16	771.55	682.87	217.88	2.00	-2.00	0.00
4,200.00	15.43	41.51	4,001.08	792.72	701.61	223.86	2.00	-2.00	0.00
4,300.00	13.43	41.51	4,097.92	811.38	718.12	229.13	2.00	-2.00	0.00
4,400.00	11.43	41.51	4,195.57	827.49	732.38	233.68	2.00	-2.00	0.00
4,500.00	9.43	41.51	4,293.92	841.04	744.37	237.50	2.00	-2.00	0.00
4,532.49	8.78	41.51	4,326.00	844.89	747.77	238.59	2.00	-2.00	0.00
Point Lookout									
4,600.00	7.43	41.51	4,392.83	852.01	754.08	240.60	2.00	-2.00	0.00
4,700.00	5.43	41.51	4,492.20	860.39	761.49	242.97	2.00	-2.00	0.00
4,751.99	4.39	41.51	4,544.00	863.72	764.44	243.91	2.00	-2.00	0.00
Mancos									
4,800.00	3.43	41.51	4,591.90	866.17	766.61	244.60	2.00	-2.00	0.00
4,900.00	1.43	41.51	4,691.80	869.34	769.41	245.50	2.00	-2.00	0.00
4,971.26	0.00	0.00	4,763.06	870.00	770.00	245.68	2.00	-2.00	0.00
Start Build 7.50									
5,000.00	2.16	318.00	4,791.79	870.40	769.64	246.22	7.50	7.50	0.00
5,100.00	9.66	318.00	4,891.19	878.04	762.76	256.45	7.50	7.50	0.00
5,200.00	17.16	318.00	4,988.39	895.26	747.26	279.50	7.50	7.50	0.00
5,296.98	24.43	318.00	5,079.00	920.83	724.24	313.73	7.50	7.50	0.00
Pictured Cliffs									
5,300.00	24.66	318.00	5,081.74	921.76	723.40	314.98	7.50	7.50	0.00
5,400.00	32.16	318.00	5,169.64	957.08	691.59	362.28	7.50	7.50	0.00
5,500.00	39.66	318.00	5,250.58	1,000.63	652.38	420.59	7.50	7.50	0.00
5,521.58	41.27	318.00	5,267.00	1,011.04	643.01	434.53	7.50	7.50	0.00
Gallup									
5,600.00	47.16	318.00	5,323.18	1,051.66	606.43	488.92	7.50	7.50	0.00
5,700.00	54.66	318.00	5,386.20	1,109.30	554.54	566.09	7.50	7.50	0.00
5,771.26	60.00	318.00	5,424.65	1,153.86	514.41	625.75	7.50	7.50	0.00
Start 60.00 hold at 5771.26 MD									
5,800.00	60.00	318.00	5,439.02	1,172.35	497.76	650.52	0.00	0.00	0.00
5,831.26	60.00	318.00	5,454.65	1,192.48	479.64	677.46	0.00	0.00	0.00
Start DLS 7.50 TFO -2.90									
5,900.00	65.15	317.71	5,486.30	1,237.69	438.72	738.13	7.50	7.49	-0.42
6,000.00	72.64	317.33	5,522.29	1,306.45	375.76	830.81	7.50	7.49	-0.38
6,100.00	80.13	316.99	5,545.81	1,377.66	309.71	927.29	7.50	7.49	-0.35
6,200.00	87.63	316.65	5,556.46	1,450.11	241.72	1,025.93	7.50	7.49	-0.33
6,232.22	90.04	316.55	5,557.12	1,473.51	219.59	1,057.89	7.50	7.49	-0.33
Start 170.08 hold at 6232.22 MD									
6,300.00	90.04	316.55	5,557.07	1,522.72	172.97	1,125.14	0.00	0.00	0.00
6,400.00	90.04	316.55	5,557.00	1,595.31	104.20	1,224.36	0.00	0.00	0.00
6,402.29	90.04	316.55	5,557.00	1,596.97	102.62	1,226.63	0.00	0.00	0.00
Landing Point @ 6402' MD - Fed 2H LP									
6,479.93	89.83	315.01	5,557.09	1,652.61	48.47	1,303.53	2.00	-0.27	-1.98

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Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Start 6714.91 hold at 6479.93 MD									
6,500.00	89.83	315.01	5,557.15	1,666.80	34.28	1,323.36	0.00	0.00	0.00
6,552.00	89.83	315.01	5,557.30	1,703.58	-2.48	1,374.76	0.00	0.00	0.00
Last Perf @ 6552' MD - 36.2425898, -107.6073894									
6,552.27	89.83	315.01	5,557.30	1,703.77	-2.67	1,375.03	0.00	0.00	0.00
Fed 2H LPerf									
6,600.00	89.83	315.01	5,557.44	1,737.52	-36.42	1,422.21	0.00	0.00	0.00
6,700.00	89.83	315.01	5,557.74	1,808.24	-107.12	1,521.06	0.00	0.00	0.00
6,800.00	89.83	315.01	5,558.04	1,878.96	-177.82	1,619.90	0.00	0.00	0.00
6,900.00	89.83	315.01	5,558.33	1,949.68	-248.52	1,718.75	0.00	0.00	0.00
7,000.00	89.83	315.01	5,558.63	2,020.40	-319.22	1,817.59	0.00	0.00	0.00
7,100.00	89.83	315.01	5,558.93	2,091.12	-389.92	1,916.44	0.00	0.00	0.00
7,200.00	89.83	315.01	5,559.22	2,161.84	-460.62	2,015.29	0.00	0.00	0.00
7,300.00	89.83	315.01	5,559.52	2,232.56	-531.32	2,114.13	0.00	0.00	0.00
7,400.00	89.83	315.01	5,559.82	2,303.28	-602.03	2,212.98	0.00	0.00	0.00
7,500.00	89.83	315.01	5,560.11	2,374.00	-672.73	2,311.82	0.00	0.00	0.00
7,600.00	89.83	315.01	5,560.41	2,444.72	-743.43	2,410.67	0.00	0.00	0.00
7,700.00	89.83	315.01	5,560.71	2,515.44	-814.13	2,509.52	0.00	0.00	0.00
7,800.00	89.83	315.01	5,561.00	2,586.16	-884.83	2,608.36	0.00	0.00	0.00
7,900.00	89.83	315.01	5,561.30	2,656.88	-955.53	2,707.21	0.00	0.00	0.00
8,000.00	89.83	315.01	5,561.60	2,727.60	-1,026.23	2,806.05	0.00	0.00	0.00
8,100.00	89.83	315.01	5,561.89	2,798.32	-1,096.93	2,904.90	0.00	0.00	0.00
8,200.00	89.83	315.01	5,562.19	2,869.04	-1,167.63	3,003.75	0.00	0.00	0.00
8,300.00	89.83	315.01	5,562.49	2,939.76	-1,238.33	3,102.59	0.00	0.00	0.00
8,400.00	89.83	315.01	5,562.78	3,010.48	-1,309.03	3,201.44	0.00	0.00	0.00
8,500.00	89.83	315.01	5,563.08	3,081.20	-1,379.74	3,300.28	0.00	0.00	0.00
8,600.00	89.83	315.01	5,563.38	3,151.92	-1,450.44	3,399.13	0.00	0.00	0.00
8,700.00	89.83	315.01	5,563.67	3,222.64	-1,521.14	3,497.98	0.00	0.00	0.00
8,800.00	89.83	315.01	5,563.97	3,293.36	-1,591.84	3,596.82	0.00	0.00	0.00
8,900.00	89.83	315.01	5,564.26	3,364.08	-1,662.54	3,695.67	0.00	0.00	0.00
9,000.00	89.83	315.01	5,564.56	3,434.80	-1,733.24	3,794.51	0.00	0.00	0.00
9,100.00	89.83	315.01	5,564.86	3,505.52	-1,803.94	3,893.36	0.00	0.00	0.00
9,200.00	89.83	315.01	5,565.15	3,576.24	-1,874.64	3,992.21	0.00	0.00	0.00
9,300.00	89.83	315.01	5,565.45	3,646.96	-1,945.34	4,091.05	0.00	0.00	0.00
9,400.00	89.83	315.01	5,565.75	3,717.68	-2,016.04	4,189.90	0.00	0.00	0.00
9,500.00	89.83	315.01	5,566.04	3,788.40	-2,086.74	4,288.74	0.00	0.00	0.00
9,600.00	89.83	315.01	5,566.34	3,859.12	-2,157.44	4,387.59	0.00	0.00	0.00
9,700.00	89.83	315.01	5,566.64	3,929.84	-2,228.15	4,486.44	0.00	0.00	0.00
9,800.00	89.83	315.01	5,566.93	4,000.56	-2,298.85	4,585.28	0.00	0.00	0.00
9,900.00	89.83	315.01	5,567.23	4,071.28	-2,369.55	4,684.13	0.00	0.00	0.00
10,000.00	89.83	315.01	5,567.53	4,142.00	-2,440.25	4,782.97	0.00	0.00	0.00
10,100.00	89.83	315.01	5,567.82	4,212.72	-2,510.95	4,881.82	0.00	0.00	0.00
10,200.00	89.83	315.01	5,568.12	4,283.44	-2,581.65	4,980.67	0.00	0.00	0.00
10,300.00	89.83	315.01	5,568.42	4,354.16	-2,652.35	5,079.51	0.00	0.00	0.00
10,400.00	89.83	315.01	5,568.71	4,424.88	-2,723.05	5,178.36	0.00	0.00	0.00
10,500.00	89.83	315.01	5,569.01	4,495.60	-2,793.75	5,277.20	0.00	0.00	0.00
10,600.00	89.83	315.01	5,569.31	4,566.32	-2,864.45	5,376.05	0.00	0.00	0.00
10,700.00	89.83	315.01	5,569.60	4,637.04	-2,935.15	5,474.90	0.00	0.00	0.00
10,800.00	89.83	315.01	5,569.90	4,707.76	-3,005.85	5,573.74	0.00	0.00	0.00
10,900.00	89.83	315.01	5,570.20	4,778.48	-3,076.56	5,672.59	0.00	0.00	0.00
11,000.00	89.83	315.01	5,570.49	4,849.20	-3,147.26	5,771.43	0.00	0.00	0.00

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Company:	Logos Operating LLC	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,100.00	89.83	315.01	5,570.79	4,919.92	-3,217.96	5,870.28	0.00	0.00	0.00
11,200.00	89.83	315.01	5,571.08	4,990.64	-3,288.66	5,969.13	0.00	0.00	0.00
11,300.00	89.83	315.01	5,571.38	5,061.36	-3,359.36	6,067.97	0.00	0.00	0.00
11,400.00	89.83	315.01	5,571.68	5,132.08	-3,430.06	6,166.82	0.00	0.00	0.00
11,500.00	89.83	315.01	5,571.97	5,202.80	-3,500.76	6,265.66	0.00	0.00	0.00
11,600.00	89.83	315.01	5,572.27	5,273.52	-3,571.46	6,364.51	0.00	0.00	0.00
11,700.00	89.83	315.01	5,572.57	5,344.24	-3,642.16	6,463.36	0.00	0.00	0.00
11,800.00	89.83	315.01	5,572.86	5,414.96	-3,712.86	6,562.20	0.00	0.00	0.00
11,900.00	89.83	315.01	5,573.16	5,485.68	-3,783.56	6,661.05	0.00	0.00	0.00
12,000.00	89.83	315.01	5,573.46	5,556.40	-3,854.27	6,759.89	0.00	0.00	0.00
12,100.00	89.83	315.01	5,573.75	5,627.12	-3,924.97	6,858.74	0.00	0.00	0.00
12,200.00	89.83	315.01	5,574.05	5,697.84	-3,995.67	6,957.59	0.00	0.00	0.00
12,300.00	89.83	315.01	5,574.35	5,768.56	-4,066.37	7,056.43	0.00	0.00	0.00
12,400.00	89.83	315.01	5,574.64	5,839.28	-4,137.07	7,155.28	0.00	0.00	0.00
12,500.00	89.83	315.01	5,574.94	5,910.00	-4,207.77	7,254.12	0.00	0.00	0.00
12,600.00	89.83	315.01	5,575.24	5,980.72	-4,278.47	7,352.97	0.00	0.00	0.00
12,700.00	89.83	315.01	5,575.53	6,051.44	-4,349.17	7,451.82	0.00	0.00	0.00
12,800.00	89.83	315.01	5,575.83	6,122.16	-4,419.87	7,550.66	0.00	0.00	0.00
12,900.00	89.83	315.01	5,576.13	6,192.88	-4,490.57	7,649.51	0.00	0.00	0.00
13,000.00	89.83	315.01	5,576.42	6,263.60	-4,561.27	7,748.35	0.00	0.00	0.00
13,100.00	89.83	315.01	5,576.72	6,334.32	-4,631.97	7,847.20	0.00	0.00	0.00
13,114.00	89.83	315.01	5,576.76	6,344.22	-4,641.87	7,861.04	0.00	0.00	0.00
First Perf @ 13,114' MD - 36.2553370, -107.6231251 - Fed 2H FPerf									
13,194.84	89.83	315.01	5,577.00	6,401.39	-4,699.03	7,940.94	0.00	0.00	0.00
TD at 13194.84 - Fed 2H BHL									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Fed 2H LP - plan hits target center - Point	0.00	0.00	5,557.00	1,596.97	102.62	1,907,572.36	2,789,823.15	36.2422970	-107.6070330
Fed 2H LPerf - plan misses target center by 1.26usft at 6552.27usft MD (5557.30 TVD, 1703.77 N, -2.67 E) - Point	0.00	0.00	5,557.00	1,702.90	-3.54	1,907,678.04	2,789,716.74	36.2425880	-107.6073930
Fed 2H BHL - plan hits target center - Point	0.00	0.00	5,577.00	6,401.39	-4,699.03	1,912,365.57	2,785,010.31	36.2554940	-107.6233190
Fed 2H FPerf - plan misses target center by 0.72usft at 13114.00usft MD (5576.76 TVD, 6344.22 N, -4641.87 E) - Point	0.00	0.00	5,577.00	6,344.59	-4,642.43	1,912,308.90	2,785,067.04	36.2553380	-107.6231270

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Company:	Logos Operating LLC	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Project:	Rio Arriba, NM NAD83	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site:	Federal 2307-7P	**North Reference:**	True
Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,316.47	1,315.00	Ojo Alamo		0.00	0.00
1,492.21	1,488.00	Kirtland		0.00	0.00
1,654.70	1,646.00	Fruitland		0.00	0.00
2,942.69	2,838.00	Chacra		0.00	0.00
3,630.80	3,469.00	Cliff House		0.00	0.00
3,721.32	3,552.00	Menefee		0.00	0.00
4,532.49	4,326.00	Point Lookout		0.00	0.00
4,751.99	4,544.00	Mancos		0.00	0.00
5,296.98	5,079.00	Pictured Cliffs		0.00	0.00
5,521.58	5,267.00	Gallup		0.00	0.00

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
900.00	900.00	0.00	0.00	Start Build 2.00
2,075.45	2,042.74	178.06	157.59	Start 1720.37 hold at 2075.45 MD
3,795.82	3,620.32	691.94	612.41	Start Drop -2.00
4,971.26	4,763.06	870.00	770.00	Start Build 7.50
5,771.26	5,424.65	1,153.86	514.41	Start 60.00 hold at 5771.26 MD
5,831.26	5,454.65	1,192.48	479.64	Start DLS 7.50 TFO -2.90
6,232.22	5,557.12	1,473.51	219.59	Start 170.08 hold at 6232.22 MD
6,402.29	5,557.00	1,596.97	102.62	Landing Point @ 6402' MD
6,479.93	5,557.09	1,652.61	48.47	Start 6714.91 hold at 6479.93 MD
6,552.00	5,557.30	1,703.58	-2.48	Last Perf @ 6552' MD
6,552.00	5,557.30	1,703.58	-2.48	36.2425898, -107.6073894
13,114.00	5,576.76	6,344.22	-4,641.87	First Perf @ 13,114' MD
13,114.00	5,576.76	6,344.22	-4,641.87	36.2553370, -107.6231251
13,194.84	5,577.00	6,401.39	-4,699.03	TD at 13194.84

LOGOS RESOURCES II, LLC

Logos Operating LLC

Rio Arriba, NM NAD83
Federal 2307-7P
Federal 2307-7P COM 2H

OH
Plan #1

Anticollision Report

20 May, 2018

Scientific Drilling

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
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 100.00usft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 15,000.00 usft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 5/20/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	13,194.84	Plan #1 (OH)	MWD+HDGM	OWSG MWD + HDGM

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Federal 2307-7P						
Federal 2307-7P COM 1H - OH - Plan #1	500.00	500.00	29.56	26.42	9.423	CC
Federal 2307-7P COM 1H - OH - Plan #1	600.00	599.62	30.15	26.30	7.819	ES
Federal 2307-7P COM 1H - OH - Plan #1	12,100.00	11,650.58	1,267.17	947.66	3.966	SF
Federal 2307-7P COM 3H - OH - Plan #1	800.00	800.00	30.13	24.84	5.699	CC, ES
Federal 2307-7P COM 3H - OH - Plan #1	12,117.58	10,857.77	1,066.91	742.45	3.288	SF

Offset Design Federal 2307-7P - Federal 2307-7P COM 1H - OH - Plan #1 — Offset Site Error: 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	102.09	-6.19	28.90	29.56				
100.00	100.00	100.00	100.00	0.13	0.13	102.09	-6.19	28.90	29.56	29.29	0.27	109.931	
200.00	200.00	200.00	200.00	0.49	0.49	102.09	-6.19	28.90	29.56	28.57	0.99	29.981	
300.00	300.00	300.00	300.00	0.85	0.85	102.09	-6.19	28.90	29.56	27.85	1.70	17.358	
400.00	400.00	400.00	400.00	1.21	1.21	102.09	-6.19	28.90	29.56	27.14	2.42	12.215	
500.00	500.00	500.00	500.00	1.57	1.57	102.09	-6.19	28.90	29.56	26.42	3.14	9.423	CC
600.00	600.00	599.62	599.57	1.93	1.93	97.23	-3.80	29.91	30.15	26.30	3.86	7.819	ES
700.00	700.00	698.70	698.34	2.29	2.29	84.23	3.32	32.92	33.13	28.50	4.62	7.166	
800.00	800.00	796.72	795.53	2.64	2.65	68.38	15.00	37.85	40.96	35.45	5.51	7.439	
900.00	900.00	893.19	890.42	3.00	3.01	55.23	30.96	44.59	55.13	48.66	6.47	8.526	
1,000.00	999.98	988.05	982.76	3.36	3.40	4.72	50.94	53.03	73.84	66.43	7.41	9.968	
1,100.00	1,099.84	1,081.51	1,072.57	3.72	3.81	-1.42	74.73	63.08	94.83	86.52	8.31	11.416	
1,200.00	1,199.45	1,173.50	1,159.63	4.07	4.24	-5.90	102.08	74.64	117.77	108.60	9.17	12.841	
1,300.00	1,298.70	1,263.99	1,243.78	4.44	4.71	-9.35	132.71	87.57	142.47	132.47	10.00	14.249	
1,400.00	1,397.47	1,352.94	1,324.86	4.81	5.22	-12.09	166.36	101.79	168.78	157.99	10.79	15.641	
1,500.00	1,495.62	1,440.32	1,402.79	5.19	5.75	-14.33	202.78	117.17	196.60	185.05	11.55	17.022	
1,600.00	1,593.06	1,526.14	1,477.48	5.59	6.32	-16.20	241.70	133.62	225.82	213.54	12.28	18.391	
1,700.00	1,689.64	1,610.40	1,548.89	6.02	6.92	-17.78	282.88	151.01	256.36	243.38	12.98	19.748	
1,800.00	1,785.27	1,696.96	1,620.13	6.46	7.58	-19.20	328.17	170.14	288.17	274.51	13.65	21.105	
1,900.00	1,879.82	1,787.20	1,693.21	6.94	8.31	-20.54	376.92	190.74	319.23	304.90	14.33	22.271	
2,000.00	1,973.17	1,882.73	1,770.59	7.45	9.10	-21.90	428.53	212.54	347.44	332.39	15.06	23.074	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 1H - OH - Plan #1

Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,100.00	2,065.26	1,978.98	1,848.55	8.00	9.90	-23.29	480.53	234.51	372.87	357.03	15.83	23.547	
2,200.00	2,156.96	2,075.42	1,926.66	8.57	10.72	-24.70	532.64	256.52	397.64	380.98	16.66	23.864	
2,300.00	2,248.66	2,171.86	2,004.78	9.17	11.55	-25.94	584.74	278.53	422.61	405.09	17.53	24.113	
2,400.00	2,340.36	2,268.31	2,082.89	9.77	12.39	-27.05	636.85	300.54	447.76	429.33	18.42	24.304	
2,500.00	2,432.06	2,364.75	2,161.01	10.39	13.23	-28.03	688.95	322.55	473.04	453.69	19.35	24.448	
2,600.00	2,523.76	2,461.20	2,239.12	11.01	14.07	-28.92	741.06	344.57	498.44	478.14	20.30	24.553	
2,700.00	2,615.46	2,557.64	2,317.24	11.64	14.92	-29.73	793.17	366.58	523.94	502.67	21.27	24.627	
2,800.00	2,707.16	2,654.08	2,395.35	12.28	15.77	-30.45	845.27	388.59	549.53	527.26	22.27	24.676	
2,900.00	2,798.86	2,750.53	2,473.47	12.93	16.62	-31.12	897.38	410.60	575.20	551.92	23.28	24.706	
3,000.00	2,890.56	2,846.97	2,551.58	13.58	17.48	-31.72	949.48	432.61	600.93	576.62	24.31	24.719	
3,100.00	2,982.25	2,943.42	2,629.70	14.23	18.34	-32.28	1,001.59	454.62	626.72	601.37	25.35	24.720	
3,200.00	3,073.95	3,039.86	2,707.81	14.89	19.20	-32.80	1,053.69	476.63	652.56	626.15	26.41	24.710	
3,300.00	3,165.65	3,136.30	2,785.93	15.55	20.06	-33.27	1,105.80	498.64	678.45	650.98	27.47	24.693	
3,400.00	3,257.35	3,232.75	2,864.04	16.22	20.92	-33.71	1,157.91	520.66	704.38	675.83	28.55	24.670	
3,500.00	3,349.05	3,329.19	2,942.16	16.88	21.79	-34.12	1,210.01	542.67	730.34	700.70	29.64	24.643	
3,600.00	3,440.75	3,425.64	3,020.27	17.55	22.65	-34.50	1,262.12	564.68	756.34	725.61	30.73	24.612	
3,700.00	3,532.45	3,522.08	3,098.39	18.22	23.52	-34.85	1,314.22	586.69	782.36	750.53	31.83	24.578	
3,800.00	3,624.15	3,618.52	3,176.50	18.89	24.39	-35.20	1,366.33	608.70	808.42	775.48	32.94	24.542	
3,900.00	3,716.59	3,714.59	3,254.31	19.55	25.25	-35.77	1,418.23	630.63	835.97	801.95	34.03	24.569	
4,000.00	3,810.30	3,809.89	3,331.50	20.16	26.11	-36.22	1,469.72	652.38	866.25	831.18	35.06	24.707	
4,100.00	3,905.16	3,904.30	3,407.96	20.74	26.96	-36.56	1,520.72	673.92	899.19	863.15	36.04	24.949	
4,200.00	4,001.08	3,997.70	3,483.61	21.27	27.80	-36.82	1,571.18	695.24	934.78	897.81	36.97	25.287	
4,300.00	4,097.92	4,089.98	3,558.36	21.77	28.63	-37.00	1,621.04	716.30	972.98	935.14	37.84	25.715	
4,400.00	4,195.57	4,181.03	3,632.11	22.23	29.45	-37.12	1,670.23	737.08	1,013.77	975.12	38.65	26.227	
4,500.00	4,293.92	4,355.07	3,776.88	22.65	30.94	-36.81	1,759.12	774.63	1,054.10	1,013.72	40.37	26.109	
4,600.00	4,392.83	4,556.17	3,954.23	23.04	32.45	-36.49	1,846.25	811.44	1,088.20	1,046.21	41.99	25.918	
4,700.00	4,492.20	4,769.71	4,152.33	23.39	33.78	-36.24	1,919.43	842.35	1,115.18	1,072.00	43.18	25.824	
4,800.00	4,591.90	4,993.57	4,368.14	23.71	34.86	-36.06	1,973.79	865.31	1,134.30	1,090.45	43.85	25.870	
4,900.00	4,691.80	5,224.57	4,596.48	23.99	35.63	-35.96	2,005.11	878.54	1,144.98	1,101.10	43.88	26.096	
5,000.00	4,791.79	5,400.00	4,771.70	24.24	36.00	47.58	2,011.85	881.35	1,147.08	1,103.25	43.83	26.172	
5,100.00	4,891.19	5,450.00	4,821.64	24.49	36.09	47.86	2,013.51	879.90	1,143.61	1,098.96	44.65	25.613	
5,200.00	4,988.39	5,500.00	4,871.33	24.75	36.20	48.51	2,017.64	876.33	1,135.83	1,090.54	45.29	25.080	
5,300.00	5,081.74	5,550.00	4,920.56	25.01	36.32	49.55	2,024.22	870.63	1,123.87	1,078.10	45.77	24.554	
5,400.00	5,169.64	5,600.00	4,969.11	25.25	36.45	50.98	2,033.21	862.84	1,107.97	1,061.83	46.14	24.014	
5,500.00	5,250.58	5,650.00	5,016.79	25.48	36.60	52.81	2,044.59	852.98	1,088.46	1,042.01	46.45	23.434	
5,600.00	5,323.18	5,700.00	5,063.37	25.70	36.75	55.06	2,058.30	841.11	1,065.78	1,019.01	46.77	22.788	
5,700.00	5,386.20	5,750.00	5,108.67	25.90	36.91	57.73	2,074.28	827.26	1,040.48	993.29	47.19	22.050	
5,800.00	5,439.02	5,800.00	5,152.49	26.09	37.08	60.25	2,092.47	811.51	1,013.49	965.68	47.80	21.201	
5,900.00	5,486.30	5,850.00	5,194.64	26.30	37.25	62.87	2,112.78	793.91	988.44	939.72	48.72	20.290	
6,000.00	5,522.29	5,900.00	5,234.94	26.59	37.43	66.29	2,135.14	774.55	963.50	913.51	49.98	19.276	
6,100.00	5,545.81	5,950.00	5,273.23	27.11	37.62	69.86	2,159.44	753.50	939.37	887.71	51.66	18.183	
6,200.00	5,556.46	6,000.00	5,309.32	28.10	37.81	73.48	2,185.58	730.85	917.19	863.44	53.75	17.064	
6,300.00	5,557.07	6,050.00	5,343.08	29.51	38.02	76.07	2,213.45	706.71	898.77	842.57	56.20	15.992	
6,399.99	5,557.00	6,115.73	5,383.66	31.17	38.29	78.67	2,252.52	672.87	886.21	827.33	58.88	15.052	
6,500.00	5,557.15	6,183.03	5,420.45	32.99	38.59	81.06	2,295.09	635.99	880.62	818.85	61.77	14.257	
6,567.57	5,557.35	6,239.77	5,448.86	34.29	38.86	82.92	2,332.21	603.84	879.96	816.23	63.73	13.808	
6,600.00	5,557.44	6,265.79	5,461.75	34.93	38.99	83.76	2,349.30	589.04	880.13	815.43	64.69	13.604	
6,700.00	5,557.74	6,346.61	5,497.02	36.96	39.42	86.06	2,404.22	541.45	882.90	815.15	67.75	13.031	
6,800.00	5,558.04	6,435.23	5,526.63	39.06	39.94	87.98	2,467.29	486.77	888.14	817.23	70.91	12.524	
6,900.00	5,558.33	6,530.15	5,547.41	41.22	40.59	89.31	2,537.22	426.12	894.69	820.44	74.25	12.050	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 1H - OH - Plan #1

Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
7,000.00	5,558.63	6,628.91	5,556.67	43.43	41.37	89.89	2,611.44	361.73	901.68	823.83	77.85	11.582	
7,100.00	5,558.93	6,728.66	5,557.00	45.69	42.28	89.89	2,686.76	296.36	908.72	826.95	81.76	11.114	
7,200.00	5,559.22	6,828.41	5,557.00	47.97	43.33	89.87	2,762.10	230.97	915.76	830.08	85.67	10.689	
7,300.00	5,559.52	6,928.16	5,557.00	50.29	44.50	89.86	2,837.43	165.59	922.80	833.04	89.75	10.281	
7,400.00	5,559.82	7,027.91	5,557.00	52.64	45.81	89.84	2,912.76	100.20	929.84	835.86	93.98	9.894	
7,500.00	5,560.11	7,126.71	5,557.36	55.00	47.23	89.84	2,987.43	35.51	936.96	838.72	98.25	9.537	
7,600.00	5,560.41	7,226.45	5,557.79	57.39	48.78	89.85	3,062.83	-29.79	944.11	841.51	102.60	9.202	
7,700.00	5,560.71	7,326.20	5,558.23	59.79	50.43	89.86	3,138.22	-95.09	951.25	844.23	107.02	8.889	
7,800.00	5,561.00	7,425.94	5,558.66	62.21	52.17	89.87	3,213.62	-160.39	958.39	846.90	111.49	8.596	
7,900.00	5,561.30	7,525.68	5,559.09	64.64	54.00	89.88	3,289.01	-225.69	965.53	849.52	116.02	8.322	
8,000.00	5,561.60	7,625.43	5,559.53	67.08	55.89	89.89	3,364.41	-291.00	972.68	852.09	120.59	8.066	
8,100.00	5,561.89	7,725.17	5,559.96	69.54	57.85	89.90	3,439.81	-356.30	979.82	854.62	125.20	7.826	
8,200.00	5,562.19	7,824.92	5,560.39	72.00	59.85	89.91	3,515.20	-421.60	986.96	857.12	129.85	7.601	
8,300.00	5,562.49	7,924.66	5,560.82	74.47	61.91	89.92	3,590.60	-486.90	994.10	859.58	134.52	7.390	
8,400.00	5,562.78	8,024.41	5,561.26	76.95	64.00	89.92	3,665.99	-552.20	1,001.25	862.02	139.23	7.191	
8,500.00	5,563.08	8,124.15	5,561.69	79.44	66.13	89.93	3,741.39	-617.50	1,008.39	864.43	143.96	7.005	
8,600.00	5,563.38	8,223.90	5,562.12	81.93	68.28	89.94	3,816.78	-682.80	1,015.53	866.82	148.71	6.829	
8,700.00	5,563.67	8,323.64	5,562.56	84.43	70.47	89.95	3,892.18	-748.11	1,022.67	869.18	153.49	6.663	
8,800.00	5,563.97	8,423.38	5,562.99	86.93	72.68	89.96	3,967.58	-813.41	1,029.82	871.53	158.28	6.506	
8,900.00	5,564.26	8,523.13	5,563.42	89.44	74.91	89.97	4,042.97	-878.71	1,036.96	873.86	163.10	6.358	
9,000.00	5,564.56	8,622.87	5,563.86	91.95	77.16	89.97	4,118.37	-944.01	1,044.10	876.18	167.92	6.218	
9,100.00	5,564.86	8,722.62	5,564.29	94.47	79.42	89.98	4,193.76	-1,009.31	1,051.24	878.48	172.76	6.085	
9,200.00	5,565.15	8,822.36	5,564.72	96.99	81.71	89.99	4,269.16	-1,074.61	1,058.39	880.77	177.62	5.959	
9,300.00	5,565.45	8,922.11	5,565.15	99.52	84.00	90.00	4,344.56	-1,139.91	1,065.53	883.04	182.49	5.839	
9,400.00	5,565.75	9,021.85	5,565.59	102.05	86.31	90.00	4,419.95	-1,205.21	1,072.67	885.31	187.36	5.725	
9,500.00	5,566.04	9,121.60	5,566.02	104.58	88.63	90.01	4,495.35	-1,270.52	1,079.82	887.56	192.25	5.617	
9,600.00	5,566.34	9,221.34	5,566.45	107.11	90.96	90.02	4,570.74	-1,335.82	1,086.96	889.81	197.15	5.513	
9,700.00	5,566.64	9,321.09	5,566.89	109.65	93.30	90.03	4,646.14	-1,401.12	1,094.10	892.05	202.06	5.415	
9,800.00	5,566.93	9,420.83	5,567.32	112.19	95.64	90.03	4,721.53	-1,466.42	1,101.24	894.27	206.97	5.321	
9,900.00	5,567.23	9,520.57	5,567.75	114.73	98.00	90.04	4,796.93	-1,531.72	1,108.39	896.50	211.89	5.231	
10,000.00	5,567.53	9,620.32	5,568.19	117.27	100.36	90.05	4,872.33	-1,597.02	1,115.53	898.71	216.82	5.145	
10,100.00	5,567.82	9,720.06	5,568.62	119.81	102.73	90.05	4,947.72	-1,662.32	1,122.67	900.92	221.76	5.063	
10,200.00	5,568.12	9,819.81	5,569.05	122.36	105.11	90.06	5,023.12	-1,727.62	1,129.82	903.12	226.70	4.984	
10,300.00	5,568.42	9,919.55	5,569.49	124.91	107.49	90.07	5,098.51	-1,792.93	1,136.96	905.31	231.64	4.908	
10,400.00	5,568.71	10,019.30	5,569.92	127.46	109.87	90.07	5,173.91	-1,858.23	1,144.10	907.50	236.60	4.836	
10,500.00	5,569.01	10,119.04	5,570.35	130.01	112.26	90.08	5,249.30	-1,923.53	1,151.24	909.69	241.55	4.766	
10,600.00	5,569.31	10,218.79	5,570.78	132.57	114.66	90.09	5,324.70	-1,988.83	1,158.39	911.87	246.52	4.699	
10,700.00	5,569.60	10,318.53	5,571.22	135.12	117.06	90.09	5,400.10	-2,054.13	1,165.53	914.05	251.48	4.635	
10,800.00	5,569.90	10,418.27	5,571.65	137.68	119.46	90.10	5,475.49	-2,119.43	1,172.67	916.22	256.45	4.573	
10,900.00	5,570.20	10,518.02	5,572.08	140.23	121.87	90.10	5,550.89	-2,184.73	1,179.82	918.39	261.43	4.513	
11,000.00	5,570.49	10,617.76	5,572.52	142.79	124.28	90.11	5,626.28	-2,250.03	1,186.96	920.55	266.40	4.455	
11,100.00	5,570.79	10,717.51	5,572.95	145.35	126.69	90.12	5,701.68	-2,315.34	1,194.10	922.72	271.39	4.400	
11,200.00	5,571.08	10,817.25	5,573.38	147.91	129.11	90.12	5,777.07	-2,380.64	1,201.24	924.87	276.37	4.346	
11,300.00	5,571.38	10,917.00	5,573.82	150.47	131.53	90.13	5,852.47	-2,445.94	1,208.39	927.03	281.36	4.295	
11,400.00	5,571.68	11,016.74	5,574.25	153.03	133.95	90.13	5,927.87	-2,511.24	1,215.53	929.18	286.35	4.245	
11,500.00	5,571.97	11,116.49	5,574.68	155.60	136.38	90.14	6,003.26	-2,576.54	1,222.67	931.33	291.34	4.197	
11,600.00	5,572.27	11,216.23	5,575.11	158.16	138.81	90.14	6,078.66	-2,641.84	1,229.82	933.48	296.34	4.150	
11,700.00	5,572.57	11,315.98	5,575.55	160.73	141.24	90.15	6,154.05	-2,707.14	1,236.96	935.62	301.34	4.105	
11,800.00	5,572.86	11,415.72	5,575.98	163.29	143.67	90.16	6,229.45	-2,772.45	1,244.10	937.76	306.34	4.061	
11,900.00	5,573.16	11,515.46	5,576.41	165.86	146.10	90.16	6,304.84	-2,837.75	1,251.25	939.90	311.34	4.019	
12,000.00	5,573.46	11,615.21	5,576.85	168.42	148.54	90.17	6,380.24	-2,903.05	1,258.39	942.04	316.35	3.978	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 1H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,100.00	5,573.75	11,650.58	5,577.00	170.99	149.40	90.17	6,406.98	-2,926.21	1,267.17	947.66	319.50	3.966	SF
12,200.00	5,574.05	11,650.58	5,577.00	173.56	149.40	90.17	6,406.98	-2,926.21	1,283.21	963.13	320.08	4.009	
12,300.00	5,574.35	11,650.58	5,577.00	176.13	149.40	90.17	6,406.98	-2,926.21	1,306.74	987.85	318.88	4.098	
12,400.00	5,574.64	11,650.58	5,577.00	178.70	149.40	90.17	6,406.98	-2,926.21	1,337.34	1,021.23	316.11	4.231	
12,500.00	5,574.94	11,650.58	5,577.00	181.27	149.40	90.17	6,406.98	-2,926.21	1,374.55	1,062.53	312.02	4.405	
12,600.00	5,575.24	11,650.58	5,577.00	183.84	149.40	90.17	6,406.98	-2,926.21	1,417.86	1,110.97	306.89	4.620	
12,700.00	5,575.53	11,650.58	5,577.00	186.41	149.40	90.17	6,406.98	-2,926.21	1,466.71	1,165.74	300.97	4.873	
12,800.00	5,575.83	11,650.58	5,577.00	188.98	149.40	90.17	6,406.98	-2,926.21	1,520.58	1,226.07	294.51	5.163	
12,900.00	5,576.13	11,650.58	5,577.00	191.55	149.40	90.17	6,406.98	-2,926.21	1,578.95	1,291.24	287.71	5.488	
13,000.00	5,576.42	11,650.58	5,577.00	194.12	149.40	90.17	6,406.98	-2,926.21	1,641.34	1,360.58	280.76	5.846	
13,100.00	5,576.72	11,650.58	5,577.00	196.70	149.40	90.17	6,406.98	-2,926.21	1,707.31	1,433.53	273.78	6.236	
13,194.84	5,577.00	11,650.58	5,577.00	199.14	149.40	90.17	6,406.98	-2,926.21	1,772.83	1,505.59	267.24	6.634	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 3H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-78.15	6.19	-29.49	30.13				
100.00	100.00	100.00	100.00	0.13	0.13	-78.15	6.19	-29.49	30.13	29.86	0.27	112.075	
200.00	200.00	200.00	200.00	0.49	0.49	-78.15	6.19	-29.49	30.13	29.15	0.99	30.566	
300.00	300.00	300.00	300.00	0.85	0.85	-78.15	6.19	-29.49	30.13	28.43	1.70	17.696	
400.00	400.00	400.00	400.00	1.21	1.21	-78.15	6.19	-29.49	30.13	27.71	2.42	12.453	
500.00	500.00	500.00	500.00	1.57	1.57	-78.15	6.19	-29.49	30.13	27.00	3.14	9.606	
600.00	600.00	600.00	600.00	1.93	1.93	-78.15	6.19	-29.49	30.13	26.28	3.85	7.819	
700.00	700.00	700.00	700.00	2.29	2.29	-78.15	6.19	-29.49	30.13	25.56	4.57	6.593	
800.00	800.00	800.00	800.00	2.64	2.64	-78.15	6.19	-29.49	30.13	24.84	5.29	5.699	CC, ES
900.00	900.00	898.48	898.43	3.00	2.99	-76.44	7.62	-31.58	32.53	26.50	6.03	5.393	
1,000.00	999.98	996.39	996.04	3.36	3.34	-116.14	11.88	-37.82	40.57	33.76	6.82	5.950	
1,100.00	1,099.84	1,093.08	1,091.93	3.72	3.70	-116.42	18.86	-48.02	54.95	47.33	7.62	7.210	
1,200.00	1,199.45	1,187.89	1,185.23	4.07	4.05	-117.43	28.34	-61.89	75.53	67.11	8.42	8.974	
1,300.00	1,298.70	1,280.27	1,275.23	4.44	4.42	-118.46	40.09	-79.08	102.16	92.97	9.19	11.120	
1,400.00	1,397.47	1,369.72	1,361.31	4.81	4.81	-119.28	53.80	-99.12	134.65	124.71	9.94	13.545	
1,500.00	1,495.62	1,455.83	1,443.02	5.19	5.22	-119.83	69.12	-121.53	172.74	162.07	10.67	16.194	
1,600.00	1,593.06	1,538.30	1,520.05	5.59	5.66	-120.14	85.74	-145.83	216.13	204.76	11.37	19.011	
1,700.00	1,689.64	1,617.81	1,593.05	6.02	6.11	-120.24	103.51	-171.82	264.48	252.44	12.04	21.963	
1,800.00	1,785.27	1,703.48	1,671.14	6.46	6.65	-120.51	123.39	-200.90	315.75	303.04	12.71	24.844	
1,900.00	1,879.82	1,787.99	1,748.18	6.94	7.20	-120.91	143.01	-229.60	368.67	355.26	13.41	27.488	
2,000.00	1,973.17	1,871.25	1,824.07	7.45	7.77	-121.37	162.34	-257.86	423.29	409.15	14.15	29.917	
2,100.00	2,065.26	1,953.19	1,898.76	8.00	8.34	-122.11	181.36	-285.68	479.61	464.69	14.92	32.147	
2,200.00	2,156.96	2,034.74	1,973.09	8.57	8.91	-123.50	200.29	-313.37	536.60	520.89	15.71	34.155	
2,300.00	2,248.66	2,116.28	2,047.41	9.17	9.50	-124.62	219.22	-341.05	593.76	577.23	16.53	35.927	
2,400.00	2,340.36	2,197.83	2,121.74	9.77	10.09	-125.55	238.15	-368.74	651.04	633.68	17.36	37.496	
2,500.00	2,432.06	2,279.37	2,196.07	10.39	10.69	-126.33	257.08	-396.42	708.43	690.21	18.22	38.888	
2,600.00	2,523.76	2,360.91	2,270.40	11.01	11.29	-126.99	276.01	-424.11	765.89	746.80	19.09	40.129	
2,700.00	2,615.46	2,442.46	2,344.72	11.64	11.90	-127.56	294.94	-451.79	823.41	803.44	19.97	41.239	
2,800.00	2,707.16	2,524.00	2,419.05	12.28	12.52	-128.06	313.87	-479.48	880.97	860.11	20.86	42.236	
2,900.00	2,798.86	2,605.54	2,493.38	12.93	13.13	-128.50	332.80	-507.16	938.58	916.82	21.76	43.134	
3,000.00	2,890.56	2,687.09	2,567.71	13.58	13.75	-128.88	351.73	-534.85	996.22	973.55	22.67	43.946	
3,100.00	2,982.25	2,768.63	2,642.03	14.23	14.37	-129.23	370.66	-562.53	1,053.88	1,030.30	23.59	44.683	
3,200.00	3,073.95	2,850.17	2,716.36	14.89	15.00	-129.54	389.59	-590.22	1,111.57	1,087.06	24.51	45.353	
3,300.00	3,165.65	2,931.72	2,790.69	15.55	15.62	-129.81	408.52	-617.90	1,169.28	1,143.84	25.44	45.966	
3,400.00	3,257.35	3,013.26	2,865.02	16.22	16.25	-130.07	427.45	-645.59	1,227.00	1,200.63	26.37	46.528	
3,500.00	3,349.05	3,094.80	2,939.34	16.88	16.88	-130.30	446.38	-673.27	1,284.74	1,257.43	27.31	47.043	
3,600.00	3,440.75	3,176.35	3,013.67	17.55	17.51	-130.51	465.31	-700.95	1,342.49	1,314.24	28.25	47.518	
3,700.00	3,532.45	3,257.89	3,088.00	18.22	18.14	-130.70	484.24	-728.64	1,400.26	1,371.06	29.20	47.957	
3,800.00	3,624.15	3,339.44	3,162.33	18.89	18.77	-130.92	503.17	-756.32	1,458.03	1,427.88	30.15	48.364	
3,900.00	3,716.59	3,421.74	3,237.35	19.55	19.41	-132.05	522.28	-784.27	1,514.78	1,483.69	31.09	48.720	
4,000.00	3,810.30	3,505.37	3,313.57	20.16	20.06	-132.99	541.69	-812.66	1,569.60	1,537.57	32.02	49.012	
4,100.00	3,905.16	3,590.22	3,390.92	20.74	20.72	-133.77	561.39	-841.47	1,622.41	1,589.46	32.95	49.244	
4,200.00	4,001.08	3,676.20	3,469.29	21.27	21.39	-134.40	581.35	-870.66	1,673.17	1,639.32	33.85	49.422	
4,300.00	4,097.92	3,763.20	3,548.59	21.77	22.07	-134.89	601.54	-900.20	1,721.84	1,687.09	34.75	49.553	
4,400.00	4,195.57	3,851.11	3,628.72	22.23	22.76	-135.25	621.95	-930.04	1,768.39	1,732.77	35.62	49.642	
4,500.00	4,293.92	3,939.83	3,709.59	22.65	23.45	-135.51	642.55	-960.16	1,812.81	1,776.33	36.48	49.694	
4,600.00	4,392.83	4,029.24	3,791.09	23.04	24.15	-135.66	663.30	-990.52	1,855.08	1,817.77	37.31	49.716	
4,700.00	4,492.20	4,119.24	3,873.12	23.39	24.86	-135.72	684.20	-1,021.07	1,895.22	1,857.09	38.13	49.710	
4,800.00	4,591.90	4,209.72	3,955.59	23.71	25.56	-135.68	705.20	-1,051.79	1,933.23	1,894.32	38.91	49.683	
4,900.00	4,691.80	4,625.15	4,348.21	23.99	28.16	-133.95	780.45	-1,161.85	1,963.60	1,920.97	42.63	46.064	
5,000.00	4,791.79	5,050.00	4,769.72	24.24	29.52	-49.87	806.21	-1,199.51	1,970.32	1,925.67	44.65	44.128	

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

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 3H - OH - Plan #1

Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,100.00	4,891.19	5,100.00	4,819.67	24.49	29.65	-50.18	807.79	-1,200.85	1,966.17	1,921.06	45.11	43.588	
5,200.00	4,988.39	5,130.91	4,850.44	24.75	29.74	-50.83	810.01	-1,202.74	1,956.73	1,911.19	45.54	42.970	
5,300.00	5,081.74	5,168.91	4,888.06	25.01	29.88	-51.89	814.03	-1,206.16	1,942.24	1,896.24	46.00	42.222	
5,400.00	5,169.64	5,200.00	4,918.62	25.25	30.00	-53.27	818.38	-1,209.86	1,922.95	1,876.52	46.44	41.409	
5,500.00	5,250.58	5,250.00	4,967.21	25.48	30.23	-55.24	827.36	-1,217.48	1,899.13	1,852.09	47.04	40.373	
5,600.00	5,323.18	5,280.41	4,996.34	25.70	30.40	-57.41	833.99	-1,223.12	1,871.22	1,823.64	47.58	39.329	
5,700.00	5,386.20	5,316.30	5,030.25	25.90	30.61	-60.06	842.95	-1,230.74	1,839.80	1,791.52	48.27	38.112	
5,800.00	5,439.02	5,350.00	5,061.55	26.09	30.83	-62.33	852.46	-1,238.82	1,805.70	1,756.58	49.12	36.761	
5,900.00	5,486.30	5,400.00	5,106.90	26.30	31.20	-64.74	868.48	-1,252.44	1,772.08	1,721.75	50.33	35.206	
6,000.00	5,522.29	5,422.24	5,126.62	26.59	31.39	-67.66	876.32	-1,259.11	1,736.19	1,684.67	51.52	33.701	
6,100.00	5,545.81	5,450.00	5,150.79	27.11	31.62	-71.01	886.72	-1,267.96	1,698.85	1,645.79	53.06	32.017	
6,200.00	5,556.46	5,487.62	5,182.72	28.10	31.97	-74.90	901.87	-1,280.84	1,660.85	1,605.77	55.08	30.154	
6,300.00	5,557.07	5,518.68	5,208.31	29.51	32.28	-76.77	915.27	-1,292.22	1,624.01	1,566.71	57.30	28.340	
6,399.99	5,557.00	5,550.00	5,233.39	31.17	32.60	-77.68	929.57	-1,304.38	1,591.24	1,531.50	59.74	26.635	
6,500.00	5,557.15	5,600.00	5,271.75	32.99	33.17	-78.93	953.99	-1,325.14	1,561.28	1,498.64	62.64	24.925	
6,600.00	5,557.44	5,636.98	5,298.73	34.93	33.63	-79.93	973.25	-1,341.52	1,534.38	1,468.88	65.50	23.425	
6,700.00	5,557.74	5,687.33	5,333.44	36.96	34.29	-81.23	1,001.03	-1,365.14	1,511.46	1,442.77	68.69	22.004	
6,800.00	5,558.04	5,750.00	5,373.17	39.06	35.17	-82.74	1,037.94	-1,396.52	1,492.22	1,420.05	72.17	20.677	
6,900.00	5,558.33	5,808.60	5,406.61	41.22	36.08	-84.01	1,074.59	-1,427.68	1,476.21	1,400.55	75.67	19.510	
7,000.00	5,558.63	5,886.90	5,446.43	43.43	37.36	-85.55	1,125.94	-1,471.33	1,462.87	1,383.33	79.55	18.390	
7,100.00	5,558.93	5,958.46	5,480.48	45.69	38.59	-86.87	1,173.77	-1,512.22	1,451.63	1,368.28	83.36	17.415	
7,200.00	5,559.22	6,032.23	5,509.43	47.97	39.95	-88.00	1,224.94	-1,556.73	1,442.81	1,355.56	87.25	16.537	
7,300.00	5,559.52	6,111.69	5,533.18	50.29	41.49	-88.94	1,281.70	-1,606.95	1,435.90	1,344.61	91.29	15.729	
7,400.00	5,559.82	6,195.63	5,549.60	52.64	43.20	-89.58	1,342.85	-1,662.00	1,430.42	1,334.96	95.46	14.985	
7,500.00	5,560.11	6,282.30	5,557.01	55.00	45.02	-89.87	1,406.49	-1,720.29	1,426.00	1,326.29	99.71	14.302	
7,600.00	5,560.41	6,378.87	5,557.23	57.39	47.08	-89.87	1,477.30	-1,785.96	1,422.25	1,318.07	104.18	13.652	
7,700.00	5,560.71	6,478.79	5,557.08	59.79	49.25	-89.85	1,550.55	-1,853.93	1,418.53	1,309.76	108.77	13.042	
7,800.00	5,561.00	6,621.28	5,557.06	62.21	52.38	-89.83	1,655.87	-1,949.88	1,414.14	1,299.92	114.22	12.380	
7,900.00	5,561.30	6,740.86	5,557.58	64.64	55.01	-89.83	1,745.84	-2,027.49	1,406.16	1,286.94	119.22	11.795	
8,000.00	5,561.60	6,840.52	5,558.05	67.08	57.22	-89.84	1,822.82	-2,091.99	1,398.03	1,274.14	123.89	11.284	
8,100.00	5,561.89	6,940.19	5,558.52	69.54	59.45	-89.85	1,898.80	-2,156.49	1,389.90	1,261.31	128.59	10.809	
8,200.00	5,562.19	7,039.86	5,558.99	72.00	61.70	-89.85	1,974.78	-2,221.00	1,381.78	1,248.46	133.31	10.365	
8,300.00	5,562.49	7,139.53	5,559.46	74.47	63.97	-89.86	2,050.76	-2,285.50	1,373.65	1,235.58	138.06	9.949	
8,400.00	5,562.78	7,239.20	5,559.93	76.95	66.25	-89.87	2,126.73	-2,350.01	1,365.52	1,222.69	142.83	9.560	
8,500.00	5,563.08	7,338.87	5,560.40	79.44	68.54	-89.87	2,202.71	-2,414.51	1,357.39	1,209.77	147.62	9.195	
8,600.00	5,563.38	7,438.54	5,560.87	81.93	70.85	-89.88	2,278.69	-2,479.02	1,349.26	1,196.83	152.43	8.852	
8,700.00	5,563.67	7,538.21	5,561.34	84.43	73.17	-89.89	2,354.67	-2,543.52	1,341.14	1,183.89	157.25	8.529	
8,800.00	5,563.97	7,637.88	5,561.81	86.93	75.49	-89.89	2,430.65	-2,608.03	1,333.01	1,170.92	162.09	8.224	
8,900.00	5,564.26	7,737.55	5,562.28	89.44	77.83	-89.90	2,506.63	-2,672.53	1,324.88	1,157.94	166.94	7.936	
9,000.00	5,564.56	7,837.21	5,562.75	91.95	80.18	-89.91	2,582.61	-2,737.04	1,316.75	1,144.95	171.80	7.664	
9,100.00	5,564.86	7,936.88	5,563.22	94.47	82.53	-89.91	2,658.59	-2,801.54	1,308.63	1,131.95	176.67	7.407	
9,200.00	5,565.15	8,036.55	5,563.69	96.99	84.89	-89.92	2,734.57	-2,866.05	1,300.50	1,118.94	181.55	7.163	
9,300.00	5,565.45	8,136.22	5,564.16	99.52	87.25	-89.93	2,810.55	-2,930.55	1,292.37	1,105.93	186.45	6.932	
9,400.00	5,565.75	8,235.89	5,564.63	102.05	89.63	-89.94	2,886.53	-2,995.06	1,284.24	1,092.90	191.35	6.712	
9,500.00	5,566.04	8,335.56	5,565.10	104.58	92.00	-89.94	2,962.51	-3,059.56	1,276.12	1,079.86	196.25	6.502	
9,600.00	5,566.34	8,435.23	5,565.57	107.11	94.38	-89.95	3,038.48	-3,124.06	1,267.99	1,066.82	201.17	6.303	
9,700.00	5,566.64	8,534.90	5,566.04	109.65	96.77	-89.96	3,114.46	-3,188.57	1,259.86	1,053.77	206.09	6.113	
9,800.00	5,566.93	8,634.57	5,566.51	112.19	99.16	-89.97	3,190.44	-3,253.07	1,251.73	1,040.71	211.02	5.932	
9,900.00	5,567.23	8,734.24	5,566.98	114.73	101.56	-89.97	3,266.42	-3,317.58	1,243.61	1,027.65	215.95	5.759	
10,000.00	5,567.53	8,833.91	5,567.45	117.27	103.95	-89.98	3,342.40	-3,382.08	1,235.48	1,014.59	220.89	5.593	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Federal 2307-7P - Federal 2307-7P COM 3H - OH - Plan #1

Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM

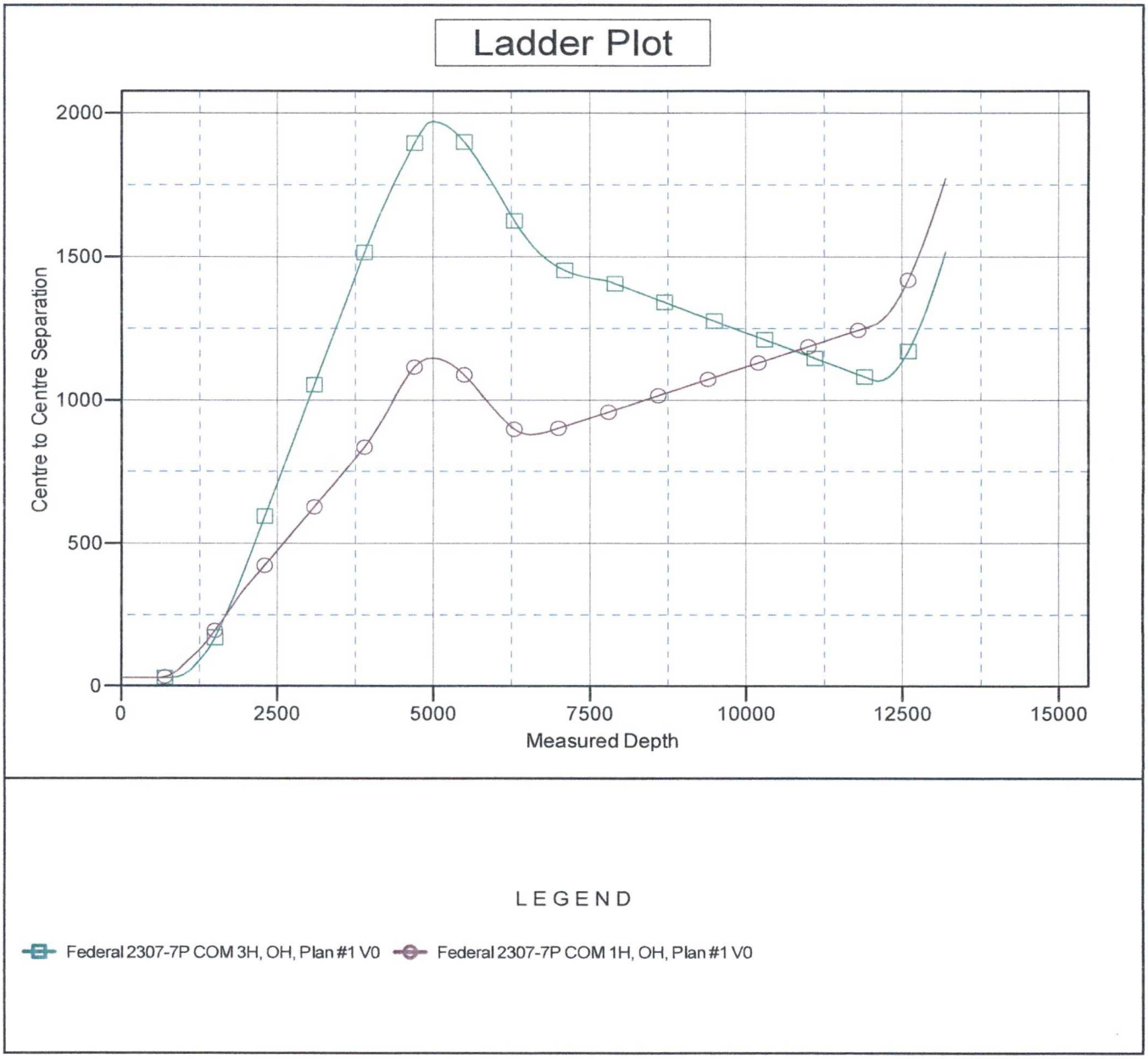
Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,100.00	5,567.82	8,933.57	5,567.92	119.81	106.36	-89.99	3,418.38	-3,446.59	1,227.35	1,001.51	225.84	5.435	
10,200.00	5,568.12	9,033.24	5,568.39	122.36	108.76	-90.00	3,494.36	-3,511.09	1,219.23	988.44	230.79	5.283	
10,300.00	5,568.42	9,132.91	5,568.86	124.91	111.17	-90.01	3,570.34	-3,575.60	1,211.10	975.36	235.74	5.137	
10,400.00	5,568.71	9,232.58	5,569.33	127.46	113.58	-90.02	3,646.32	-3,640.10	1,202.97	962.27	240.70	4.998	
10,500.00	5,569.01	9,332.25	5,569.80	130.01	115.99	-90.02	3,722.30	-3,704.61	1,194.84	949.18	245.66	4.864	
10,600.00	5,569.31	9,431.92	5,570.27	132.57	118.41	-90.03	3,798.28	-3,769.11	1,186.72	936.09	250.63	4.735	
10,700.00	5,569.60	9,531.59	5,570.74	135.12	120.83	-90.04	3,874.26	-3,833.62	1,178.59	922.99	255.60	4.611	
10,800.00	5,569.90	9,631.26	5,571.21	137.68	123.25	-90.05	3,950.24	-3,898.12	1,170.46	909.89	260.57	4.492	
10,900.00	5,570.20	9,730.93	5,571.68	140.23	125.67	-90.06	4,026.21	-3,962.63	1,162.34	896.79	265.54	4.377	
11,000.00	5,570.49	9,830.60	5,572.15	142.79	128.09	-90.07	4,102.19	-4,027.13	1,154.21	883.69	270.52	4.267	
11,100.00	5,570.79	9,930.26	5,572.62	145.35	130.52	-90.08	4,178.17	-4,091.64	1,146.08	870.58	275.50	4.160	
11,200.00	5,571.08	10,029.93	5,573.10	147.91	132.95	-90.09	4,254.15	-4,156.14	1,137.95	857.47	280.49	4.057	
11,300.00	5,571.38	10,129.60	5,573.57	150.47	135.38	-90.10	4,330.13	-4,220.64	1,129.83	844.35	285.47	3.958	
11,400.00	5,571.68	10,229.27	5,574.04	153.03	137.81	-90.11	4,406.11	-4,285.15	1,121.70	831.24	290.46	3.862	
11,500.00	5,571.97	10,328.94	5,574.51	155.60	140.24	-90.12	4,482.09	-4,349.65	1,113.57	818.12	295.45	3.769	
11,600.00	5,572.27	10,428.61	5,574.98	158.16	142.67	-90.13	4,558.07	-4,414.16	1,105.45	805.00	300.45	3.679	
11,700.00	5,572.57	10,528.28	5,575.45	160.73	145.11	-90.14	4,634.05	-4,478.66	1,097.32	791.88	305.44	3.593	
11,800.00	5,572.86	10,627.95	5,575.92	163.29	147.55	-90.15	4,710.03	-4,543.17	1,089.19	778.75	310.44	3.509	
11,900.00	5,573.16	10,727.62	5,576.39	165.86	149.98	-90.16	4,786.01	-4,607.67	1,081.07	765.63	315.44	3.427	
12,000.00	5,573.46	10,827.29	5,576.86	168.42	152.42	-90.17	4,861.99	-4,672.18	1,072.94	752.50	320.44	3.348	
12,100.00	5,573.75	10,857.77	5,577.00	170.99	153.17	-90.17	4,885.23	-4,691.91	1,067.06	742.93	324.13	3.292	
12,117.58	5,573.81	10,857.77	5,577.00	171.44	153.17	-90.17	4,885.23	-4,691.91	1,066.91	742.45	324.46	3.288	SF
12,200.00	5,574.05	10,857.77	5,577.00	173.56	153.17	-90.17	4,885.23	-4,691.91	1,070.09	745.19	324.90	3.294	
12,300.00	5,574.35	10,857.77	5,577.00	176.13	153.17	-90.17	4,885.23	-4,691.91	1,082.40	759.44	322.95	3.352	
12,400.00	5,574.64	10,857.77	5,577.00	178.70	153.17	-90.17	4,885.23	-4,691.91	1,103.66	785.15	318.51	3.465	
12,500.00	5,574.94	10,857.77	5,577.00	181.27	153.17	-90.17	4,885.23	-4,691.91	1,133.38	821.41	311.96	3.633	
12,600.00	5,575.24	10,857.77	5,577.00	183.84	153.17	-90.17	4,885.23	-4,691.91	1,170.91	867.14	303.78	3.855	
12,700.00	5,575.53	10,857.77	5,577.00	186.41	153.17	-90.17	4,885.23	-4,691.91	1,215.53	921.10	294.43	4.128	
12,800.00	5,575.83	10,857.77	5,577.00	188.98	153.17	-90.17	4,885.23	-4,691.91	1,266.49	982.12	284.38	4.454	
12,900.00	5,576.13	10,857.77	5,577.00	191.55	153.17	-90.17	4,885.23	-4,691.91	1,323.06	1,049.07	273.99	4.829	
13,000.00	5,576.42	10,857.77	5,577.00	194.12	153.17	-90.17	4,885.23	-4,691.91	1,384.55	1,120.98	263.57	5.253	
13,100.00	5,576.72	10,857.77	5,577.00	196.70	153.17	-90.17	4,885.23	-4,691.91	1,450.33	1,197.00	253.33	5.725	
13,194.84	5,577.00	10,857.77	5,577.00	199.14	153.17	-90.17	4,885.23	-4,691.91	1,516.18	1,272.25	243.93	6.216	

Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
Project:	Rio Arriba, NM NAD83	**TVD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Reference Site:	Federal 2307-7P	**MD Reference:**	GL 7267' & RKB 25' @ 7292.00usft (Aztec 1000)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	Federal 2307-7P COM 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	Grand Junction District
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to GL 7267' & RKB 25' @ 7292.00usft (A
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Federal 2307-7P COM 2H - Slot 7P 2H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.13°



Company:	Logos Operating LLC	**Local Co-ordinate Reference:**	Well Federal 2307-7P COM 2H - Slot 7P 2H
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Reference Depths are relative to GL 7267' & RKB 25' @ 7292.00usft (A
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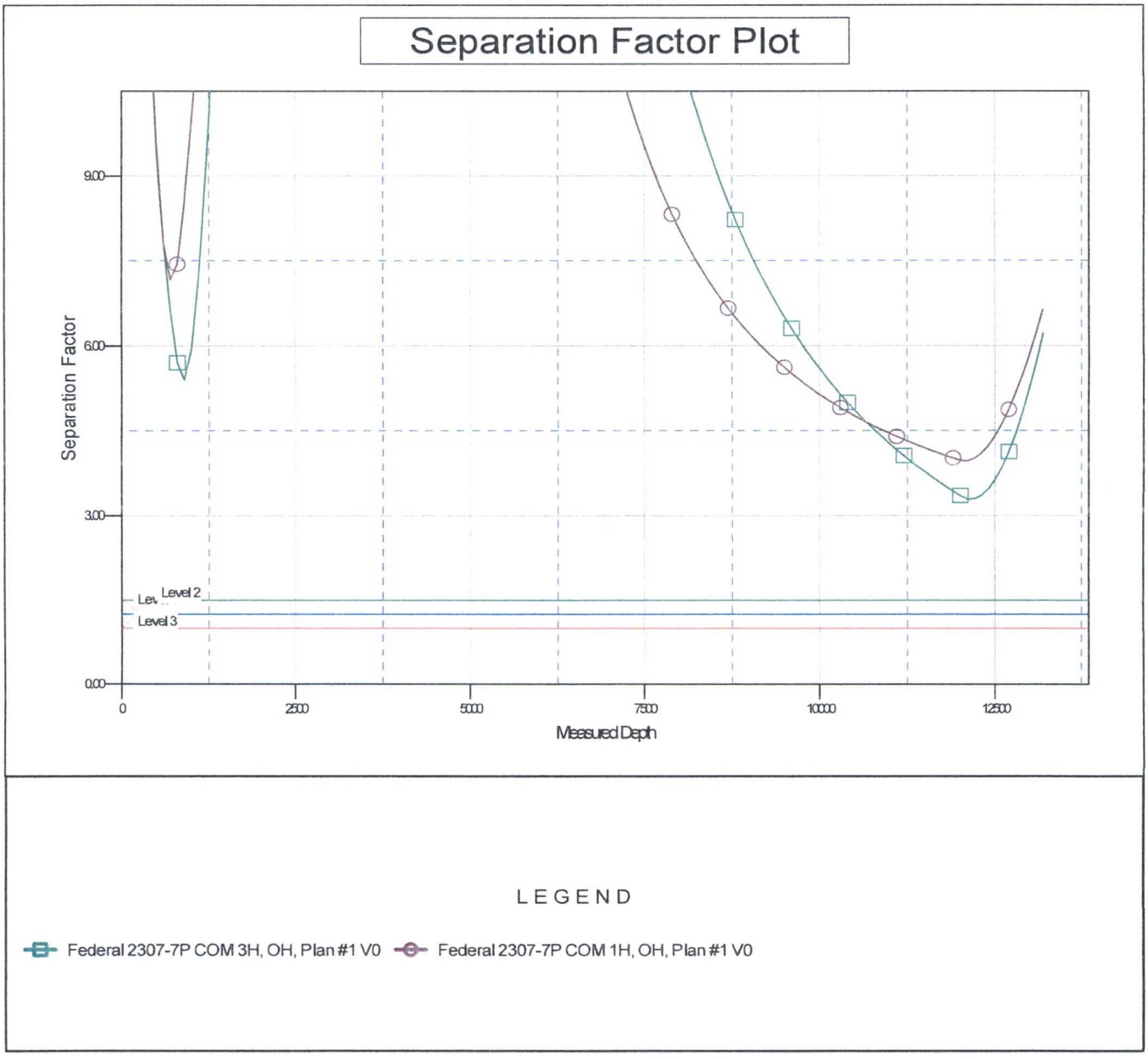

where the buffer would be reduced to 20-foot. The construction buffer would create an additional 1.8 acres of new surface disturbance. The total permitted area for the construction of the well pad would be 5.6 acres.

6. The well pad would be constructed from the earthen materials present on-site or imported from a predetermined borrow pit. Imported fill material would be weed-free and authorized. The additional fill would be brought in from off-site. No concrete or other foreign materials would be brought in for use in construction of the well pad.
7. Stormwater would be diverted to flow from the northern side of the well pad along the northern portion of the well pad and back into the natural drainage to the east.
8. Construction of the well pad would take approximately 7-10 days.

7. Methods for Handling Waste

Drilling operations will utilize a closed-loop system. Drilling of the horizontal lateral will be done using a water-based mud system. All water-based mud cuttings will be stored in metal containment bins until hauled to a commercial disposal facility. No reserve pit will be needed for this project. The drilling operations area will be enclosed by a containment berm and ditches, and the containment berm will be ramped to allow access to the solids control area. The contained operations area will drain gradually to one area of the pad which will be contoured for spill prevention and control.

LOGOS will follow New Mexico Oil Conservation Division Pit Rule and Onshore Orders No. 1 and No. 7 regarding placement, operation, and closure of the closed-loop system. No blow pit will be used. All refuse will be placed in metal trash basket and will be hauled off site and properly disposed in an approved landfill. Portable toilets will be provided and maintained during all construction, drilling and completion operations.

8. Ancillary Facilities

No additional ancillary facilities will be associated with the Federal 2307 7P Com #1H, #2H, and #3H project.

9. Well Site Layout

The cuts, fills, and orientation for the proposed Federal 2307 7P Com #1H, #2H, and #3H well pad are depicted on the construction plats included in the APD package.

10. Plans for Surface Reclamation

A surface reclamation plan has been created to cover the proposed disturbances associated with the Federal 2307 7P Com #1H, #2H, and #3H development (the well pad and access road constructed and maintained by LOGOS and the associated pipeline infrastructure constructed and maintained by Whiptail Midstream LLC.).