

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval, Division Director
Oil Conservation Division



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

Operator Signature Date: 9/18/2019

Well information;

Operator LOGOS, Well Name and Number Leus 2308 3 414

API# 30-045-38179, Section 3, Township 23N/S, Range 8 E/W

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

- ☒ Notify Aztec OCD 24hrs prior to casing & cement.
- ☒ If cement doesn't circulate on any casing string or stage tool a CBL will be required. Contact the regulatory agencies prior to proceeding.
- ☒ Hold C-104 for directional survey & "As Drilled" Plat
- ☒ Hold C-104 for: NSL, NSP, DHC, 5.9 Compliance *Based on proposed change of plans*
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
 - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
 - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
 - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ☐ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ☐ 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.


NMOCD Approved by Signature

2/27/20
Date

*- Change of Plans
Next Sunday*

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM120374
1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: ☐ Hydraulic Fracturing ☒ Single Zone ☐ Multiple Zone		7. If Unit or CA Agreement, Name and No.
2. Name of Operator LOGOS OPERATING LLC		8. Lease Name and Well No. ZEUS 2308 03
3a. Address 2010 Afton Place, FARMINGTON, NM 87401		9. API Well No. 30-045-38179
3b. Phone No. (include area code) (505) 324-4145		10. Field and Pool, or Exploratory BASIN/MANCOS
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SENE / 1938 FNL / 224 FEL / LAT 36.258232 / LONG -107.660916 At proposed prod. zone LOT 1 / 753 FNL / 0 FEL / LAT 36.261464 / LONG -107.642245		11. Sec., T. R. M. or Blk. and Survey or Area SEC 3/T23N/R8W/NMP
14. Distance in miles and direction from nearest town or post office* 41 miles		12. County or Parish SAN JUAN
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 0 feet		13. State NM
16. No of acres in lease 483.44		17. Spacing Unit dedicated to this well 323.44
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 22 feet		20. BLM/BIA Bond No. in file FED: NMB001387
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6908 feet		22. Approximate date work will start* 11/02/2019
		23. Estimated duration 45 days
24. Attachments		

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

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

25. Signature (Electronic Submission)	Name (Printed/Typed) Marie Florez / Ph: (505) 324-4145	Date 09/18/2019
Title Regulatory Specialist		
Approved by (Signature)	Name (Printed/Typed)	Date
Title	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: 02/11/2020

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

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

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

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

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-102
Revised August 1, 2011

Submit one copy to
Appropriate District Office

OIL CONSERVATION DIVISION

1220 South St. Francis Drive
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-045-3879	² Pool Code 97232	³ Pool Name BASIN MANCOS
⁴ Property Code 327184	⁵ Property Name ZEUS 2308 03	⁶ Well Number 4H
⁷ GRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC	⁹ Elevation 6908'

¹⁰ Surface Location

UL or Int no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	3	23N	8W		1938	NORTH	224	EAST	SAN JUAN

¹¹ Bottom Hole Location If Different From Surface

UL or Int no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	2	23N	8W	1	753	NORTH	0	EAST	SAN JUAN

¹² Dedicated Acres 323.44 Acres N/2 - Section 2	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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SURFACE LOCATION (A)
1938' FNL 224' FEL
SECTION 3, T23N, R8W
LAT: 36.258220°N
LONG: 107.660305°W
DATUM: NAD1927

LAT: 36.258232°N
LONG: 107.660916°W
DATUM: NAD1983

NOT 206.6'E 195.8'

POINT-OF-ENTRY (B)
753' FNL 50' FEL
SECTION 3, T23N, R8W
LAT: 36.261476°N
LONG: 107.659770°W
DATUM: NAD1927

LAT: 36.261489°N
LONG: 107.660381°W
DATUM: NAD1983

NOT 54.2'E 150.0'

LAST PERFORATION (C)
753' FNL 100' FNL
SECTION 2, T23N, R8W
LAT: 36.261475°N
LONG: 107.659262°W
DATUM: NAD1927

LAT: 36.261488°N
LONG: 107.659872°W
DATUM: NAD1983

NOT 54.2'E 509.66'

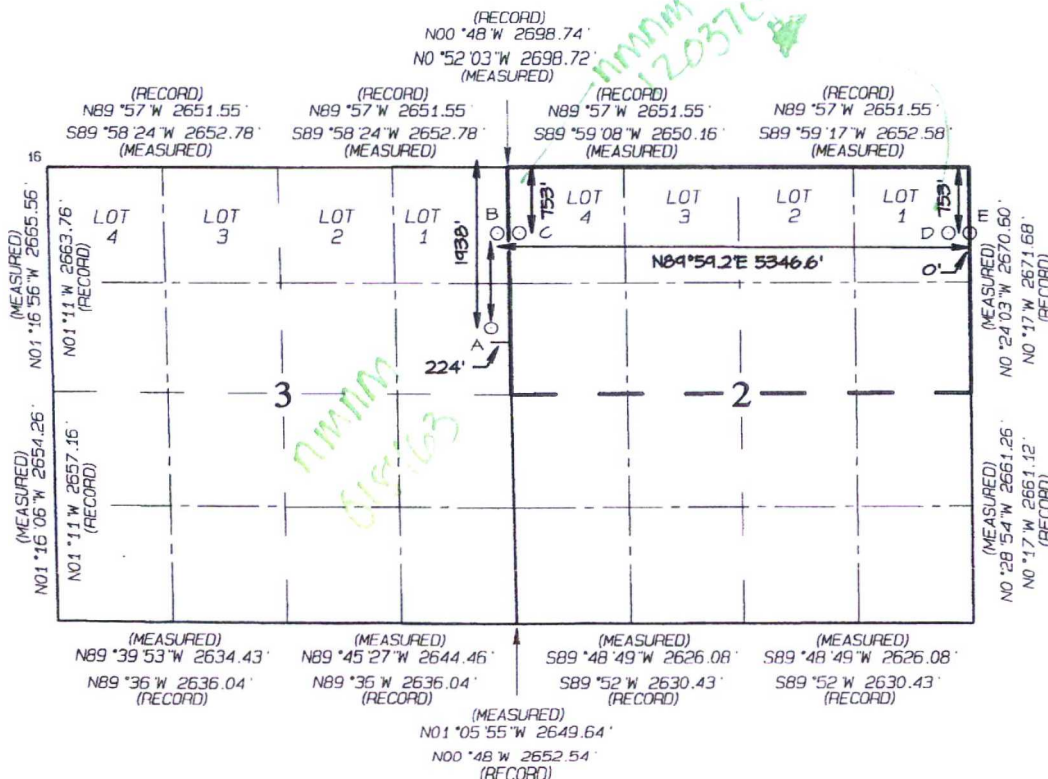
FIRST PERFORATION (D)
753' FNL 100' FEL
SECTION 2, T23N, R8W
LAT: 36.261452°N
LONG: 107.641974°W
DATUM: NAD1927

LAT: 36.261465°N
LONG: 107.642584°W
DATUM: NAD1983

NOT 54.2'E 100.0'

END-OF-LATERAL (E)
753' FNL 0' FEL
SECTION 2, T23N, R8W
LAT: 36.261452°N
LONG: 107.641635°W
DATUM: NAD1927

LAT: 36.261464°N
LONG: 107.642245°W
DATUM: NAD1983



NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION
UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A
NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

¹⁷ OPERATOR CERTIFICATION
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom-hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Marie E. Florez Date 9/16/2019
Printed Name Marie E. Florez
E-mail Address mflorez@logosresourcesllc.com

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: AUGUST 28, 2019
Date of Survey: MAY 4, 2019

Signature and Seal of Professional Surveyor



JASON C. EDWARDS
Certificate Number 15269



LOGOS Operating, LLC Operations Plan

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

Date:	September 12, 2019	Pool:	Basin Mancos
Well Name:	Zeus 2308 03 4H	Elevation:	6,908
Surface Location:	Sec 3, T23N, R8W 1938' FNL, 224' FEL (36.258232° N, -107.660916° W – NAD83)	Measured Depth:	11,436
Bottom Hole Location:	Sec 2, T23N, R8W 753' FNL, 0' FEL (36.261464° N, -107.642245° W – NAD83)	County:	San Juan

Lease Serial #NMNM 120374

I. GEOLOGY

A. Formation Tops (KB): Estimated top of important geological markers:
SURFACE FORMATION - NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	1,059	1,059	MENEFEE	3,389	3,296
KIRTLAND	1,228	1,228	*POINT LOOKOUT	4,301	4,153
*FRUITLAND	1,372	1,372	*MANCOS	4,518	4,356
*PICTURED CLIFFS	1,775	1,771	GALLUP	5,402	5,169
CHACRA	2,636	2,589	KICKOFF POINT	4,842	4,661
*CLIFF HOUSE	3,335	3,246	LANDING POINT	6,090	5,463
			TD	11,437	5,483

* indicates depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered.

B. MUD LOGGING PROGRAM: Mudlogger on location from KOP to TD.

C. LOGGING PROGRAM: LWD GR from surface casing to TD.

D. NATURAL GAUGES: Gauge any noticeable increases in gas flow. Record all gauges in Tour book and on morning reports.

II. DRILLING

A. MUD PROGRAM: LSND mud (WBM) will be used to drill the 12-1/4" Surface hole, the 8 3/4" Directional Vertical hole, and the curve portion of the wellbore. A LSND (WBM) or (OBM) will be used to drill the lateral portion of well. Treat for lost circulation as necessary. Obtain 100% returns prior to cementing. Notify Engineering of any mud losses.

Above ground steel pits will be used for fluid and cuttings while drilling. In the unlikely event that a tank develops a leak, upon immediate visual discovery, the fluid would be transferred to another tank and contaminated soil would be removed and disposed. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times.

Zeus 2308 03 4H



- B. **BOP TESTING:** While drill pipe is in use, the pipe rams and the blindrams will be function tested once each trip. The BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Pressure test surface casing to **600 psi for 30 minutes** and intermediate casing to **1500 psi for 30 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. **All tests and inspections will be recorded and logged with time and results.**

III. **MATERIALS**

A. **CASING EQUIPMENT:**

CASING TYPE	OH SIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CON N
SURFACE	12.25"	320' or greater	9.625"	36 LBS	J-55 or equiv	LTC
INTERMEDIATE	8.75"	6,090'	7"	23 LBS	J-55 or equiv	LTC
PRODUCTION	6.125"	5,990' – 11,437'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC
TIE BACK	6.125"	Surf. – 5,990'	4.5"	11.6 LBS	P-110 or equiv	LTC or BTC

B. **FLOAT EQUIPMENT:**

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

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

C. **CEMENTING:**

(Note: Volumes may be adjusted onsite due to actual conditions)

1. **SURFACE:** 5 bbl Fresh Water Spacer, 100 sx (161 cu.ft.) of 14.5 ppg Type I-11 (Neat G) + 20% Fly Ash cement w/ 7.41 gal/sack mix water ratio @ 1.61 cu ft/sx yield. Calculated @volume+ 30% excess. WOC 12 hours. Test csg to 600 psi. Total Volume: (160cu-ft/100 sx/ Bbls). TOC at Surface.
2. **INTERMEDIATE:** If deemed necessary, the intermediate casing will be cemented in 1 or 2 stages using DV/STAGE tools in order to reduce cement losses and maximize cement



coverage. If losses are not observed a cancelation plug will be pumped and the remaining cement will be pumped during stage 1.

Stage 1: Spacer #1: 20 bbl (112 cuft) Chemwash. Lead Cement: 231.7 bbls, 667.2 sks, 12.3 ppg@ 1.95 cuft/sk yield. Tail Cement: 58 bbls, 252.4 sks, 13.5 ppg@ 1.3 cu'ft/sk yield. Displacement: Displace w/ Drilling mud or water. Total Cement: 290 bbls, 919 sks.

3. **PRODUCTION LINER:** Spacer #1: 10 bbl (56 cu-ft) Water Spacer. Spacer #2: 40 bbl 9.5 ppg (224.6 cu-ft) Tuned Spacer III. Spacer #3: 10 bbl Water Spacer. Lead Cement: Extencem TM System. Yield 1.36 cuft/sk 13.3 ppg (489 sx / 118.6 bbls). Tail Spacer: 40 BBL of MMCR. Displacement: Displace w/ drilling mud or water.

IV. **COMPLETION**

A. **CBL**

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

B. **PRESSURE TEST**

With frac stack installed on wellhead, pressure test 4-1/2" casing to 4000 psi max, hold at 1500 psi for 15 minutes. Increase pressure to Open RSI sleeves.

C. **STIMULATION**

Stimulate with sand, water and N2. Isolate stages with flow through frac plugs. Drill out frac plugs and flowback lateral.

D. **PRODUCTION TUBING**

Run 2-7/8", 6.5#, J-55, EUE tubing

*NOTE: Although this horizontal well may be drilled past the applicable setbacks, an unorthodox location application is not required because the completed interval in this well, as defined by 19.15.16.7 8(1) NMAC, will be entirely within the applicable setbacks. This approach complies with all applicable rules, including 19.15.16.14 A(3) NMAC, 19.15.16.14 8(2) NMAC, 19.15.16.15 8(2)NMAC, and 19.15.16.15. 8(4) NMAC.



Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

PROJECT DETAILS: San Juan, NM NAD83

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



Azimuths to True North
Magnetic North: 8.73°

Magnetic Field
Strength: 49433.3nT
Dip Angle: 62.82°
Date: 8/29/2019
Model: HDGM

WELL DETAILS: Zeus 2308-03 4H

GL 6908' & RKB 14' @ 6922.00usft
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1913340.39 2773923.78 36.2582320 -107.6609160

Plan: Plan #1 (Zeus 2308-03 4H/OH)

Created By: Janie Collins Date: 9:30, September 16 2019

DESIGN TARGET DETAILS

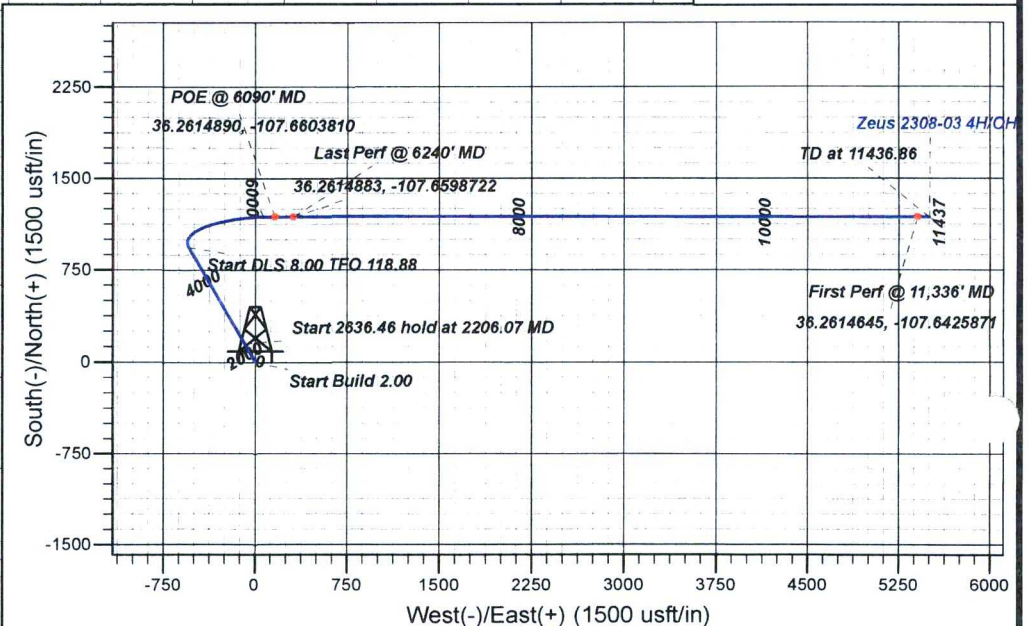
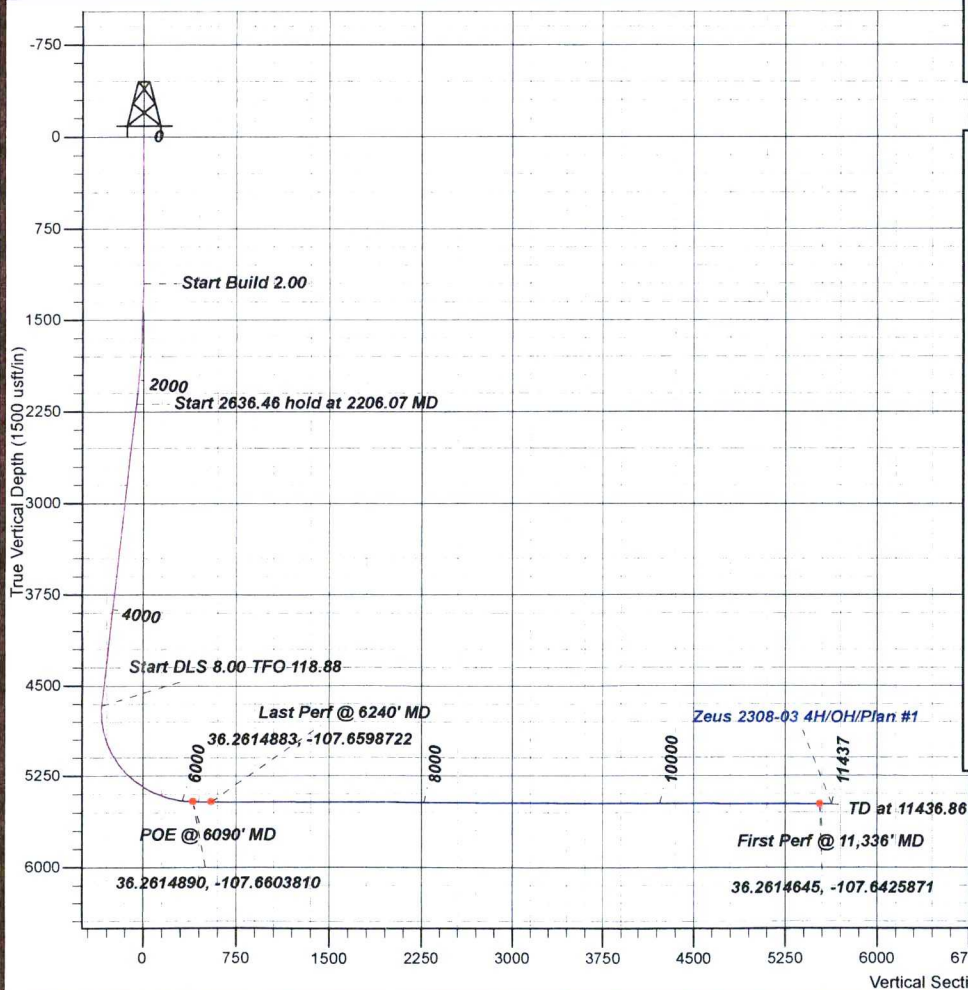
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Zeus 4H POE	5463.00	1185.63	157.72	1914526.29	2774079.39	36.2614890	-107.6603810
Zeus 4H BHL	5483.00	1177.06	5504.38	1914527.24	2779426.05	36.2614640	-107.6422450
Zeus 4H FPerf	5483.00	1177.40	5404.44	1914527.41	2779326.11	36.2614650	-107.6425840
Zeus 4H LPerf	5463.00	1185.27	307.78	1914526.20	2774229.45	36.2614880	-107.6598720

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
1200.00	0.00	0.000	1200.00	0.00	0.00	0.00	0.00	0.00	
2206.07	20.12	329.724	2185.51	151.00	-88.15	2.00	329.72	-54.63	
4842.53	20.12	329.724	4661.06	934.26	-545.41	0.00	0.00	-337.98	
6090.16	89.79	90.092	5463.00	1185.63	157.72	8.00	118.88	402.17	Zeus 4H POE
11436.86	89.79	90.092	5483.00	1177.06	5504.38	0.00	0.00	5628.82	Zeus 4H BHL

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
310.00	1059.00	Ojo Alamo
479.00	1228.00	Kirtland
623.00	1372.10	Fruitland
1022.00	1774.85	Pictured Cliffs
1840.00	2635.78	Chlorine
2497.00	3335.49	Cliff House
2547.00	3388.74	Menace
3404.00	4301.44	Point Lookout
3607.00	4517.64	Mancos
4420.00	5401.91	Gallup





Logos Operating LLC

San Juan, NM NAD83
Chaco 2308-03 Pad
Zeus 2308-03 4H

OH

Plan: Plan #1

Standard Planning Report

16 September, 2019



www.scientificdrilling.com



Scientific Drilling, Intl
Planning Report



Database: Grand Junction District
Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well Zeus 2308-03 4H
TVD Reference: GL 6908' & RKB 14' @ 6922.00usft
MD Reference: GL 6908' & RKB 14' @ 6922.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

Project	San Juan, 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	Chaco 2308-03 Pad				
Site Position:		Northing:	1,913,296.34 usft	Latitude:	36.2581110
From:	Lat/Long	Easting:	2,773,925.33 usft	Longitude:	-107.6609110
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.10 °

Well	Zeus 2308-03 4H				
Well Position	+N/-S	44.05 usft	Northing:	1,913,340.39 usft	Latitude: 36.2582320
	+E/-W	-1.47 usft	Easting:	2,773,923.78 usft	Longitude: -107.6609160
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft	Ground Level: 6,908.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/29/2019	8.73	62.82	49,433

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	77.930	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.000	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,206.07	20.12	329.724	2,185.51	151.00	-88.15	2.00	2.00	0.00	329.72	
4,842.53	20.12	329.724	4,661.06	934.26	-545.41	0.00	0.00	0.00	0.00	
6,090.16	89.79	90.092	5,463.00	1,185.63	157.72	8.00	5.58	9.65	118.88	Zeus 4H POE
11,436.86	89.79	90.092	5,483.00	1,177.06	5,504.38	0.00	0.00	0.00	0.00	Zeus 4H BHL



Scientific Drilling, Intl
Planning Report



Database: Grand Junction District
Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Zeus 2308-03 4H
GL 6908' & RKB 14' @ 6922 00usft
GL 6908' & RKB 14' @ 6922 00usft
True
Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.000	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.000	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.000	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.000	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.000	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.000	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.000	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.000	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.000	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.000	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.000	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,300.00	2.00	329.724	1,299.98	1.51	-0.88	-0.55	2.00	2.00	0.00
1,400.00	4.00	329.724	1,399.84	6.03	-3.52	-2.18	2.00	2.00	0.00
1,500.00	6.00	329.724	1,499.45	13.55	-7.91	-4.90	2.00	2.00	0.00
1,600.00	8.00	329.724	1,598.70	24.08	-14.06	-8.71	2.00	2.00	0.00
1,700.00	10.00	329.724	1,697.47	37.59	-21.94	-13.60	2.00	2.00	0.00
1,800.00	12.00	329.724	1,795.62	54.06	-31.56	-19.56	2.00	2.00	0.00
1,900.00	14.00	329.724	1,893.06	73.49	-42.90	-26.59	2.00	2.00	0.00
2,000.00	16.00	329.724	1,989.64	95.84	-55.95	-34.67	2.00	2.00	0.00
2,100.00	18.00	329.724	2,085.27	121.09	-70.69	-43.81	2.00	2.00	0.00
2,200.00	20.00	329.724	2,179.82	149.20	-87.10	-53.98	2.00	2.00	0.00
2,206.07	20.12	329.724	2,185.51	151.00	-88.15	-54.63	2.00	2.00	0.00
Start 2636.46 hold at 2206.07 MD									
2,300.00	20.12	329.724	2,273.71	178.91	-104.44	-64.72	0.00	0.00	0.00
2,400.00	20.12	329.724	2,367.61	208.62	-121.79	-75.47	0.00	0.00	0.00
2,500.00	20.12	329.724	2,461.51	238.33	-139.13	-86.22	0.00	0.00	0.00
2,600.00	20.12	329.724	2,555.40	268.03	-156.47	-96.97	0.00	0.00	0.00
2,700.00	20.12	329.724	2,649.30	297.74	-173.82	-107.71	0.00	0.00	0.00
2,800.00	20.12	329.724	2,743.20	327.45	-191.16	-118.46	0.00	0.00	0.00
2,900.00	20.12	329.724	2,837.09	357.16	-208.51	-129.21	0.00	0.00	0.00
3,000.00	20.12	329.724	2,930.99	386.87	-225.85	-139.96	0.00	0.00	0.00
3,100.00	20.12	329.724	3,024.89	416.58	-243.19	-150.70	0.00	0.00	0.00
3,200.00	20.12	329.724	3,118.78	446.29	-260.54	-161.45	0.00	0.00	0.00
3,300.00	20.12	329.724	3,212.68	476.00	-277.88	-172.20	0.00	0.00	0.00
3,400.00	20.12	329.724	3,306.58	505.71	-295.22	-182.95	0.00	0.00	0.00
3,500.00	20.12	329.724	3,400.47	535.41	-312.57	-193.69	0.00	0.00	0.00
3,600.00	20.12	329.724	3,494.37	565.12	-329.91	-204.44	0.00	0.00	0.00
3,700.00	20.12	329.724	3,588.27	594.83	-347.25	-215.19	0.00	0.00	0.00
3,800.00	20.12	329.724	3,682.16	624.54	-364.60	-225.94	0.00	0.00	0.00
3,900.00	20.12	329.724	3,776.06	654.25	-381.94	-236.69	0.00	0.00	0.00
4,000.00	20.12	329.724	3,869.96	683.96	-399.28	-247.43	0.00	0.00	0.00
4,100.00	20.12	329.724	3,963.85	713.67	-416.63	-258.18	0.00	0.00	0.00
4,200.00	20.12	329.724	4,057.75	743.38	-433.97	-268.93	0.00	0.00	0.00
4,300.00	20.12	329.724	4,151.65	773.09	-451.32	-279.68	0.00	0.00	0.00
4,400.00	20.12	329.724	4,245.54	802.80	-468.66	-290.42	0.00	0.00	0.00
4,500.00	20.12	329.724	4,339.44	832.50	-486.00	-301.17	0.00	0.00	0.00
4,600.00	20.12	329.724	4,433.34	862.21	-503.35	-311.92	0.00	0.00	0.00
4,700.00	20.12	329.724	4,527.23	891.92	-520.69	-322.67	0.00	0.00	0.00
4,800.00	20.12	329.724	4,621.13	921.63	-538.03	-333.41	0.00	0.00	0.00
4,842.53	20.12	329.724	4,661.06	934.26	-545.41	-337.98	0.00	0.00	0.00



Scientific Drilling, Intl
Planning Report



Database: Grand Junction District
Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well Zeus 2308-03 4H
TVD Reference: GL 6908' & RKB 14' @ 6922 00usft
MD Reference: GL 6908' & RKB 14' @ 6922 00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

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 DLS 8.00 TFO 118.88									
4,900.00	18.33	342.621	4,715.35	951.44	-553.10	-341.91	8.00	-3.12	22.44
5,000.00	17.71	8.610	4,810.60	981.53	-555.52	-337.99	8.00	-0.62	25.99
5,100.00	20.38	31.918	4,905.25	1,011.40	-544.02	-320.49	8.00	2.67	23.31
5,200.00	25.32	48.268	4,997.47	1,040.46	-518.81	-289.77	8.00	4.94	16.35
5,300.00	31.47	59.090	5,085.46	1,068.14	-480.40	-246.42	8.00	6.15	10.82
5,400.00	38.25	66.542	5,167.50	1,093.92	-429.52	-191.27	8.00	6.78	7.45
5,500.00	45.39	72.000	5,242.00	1,117.28	-367.17	-125.42	8.00	7.13	5.46
5,600.00	52.72	76.245	5,307.51	1,137.77	-294.56	-50.13	8.00	7.33	4.24
5,700.00	60.18	79.726	5,362.76	1,155.00	-213.10	33.13	8.00	7.46	3.48
5,800.00	67.71	82.720	5,406.66	1,168.62	-124.39	122.74	8.00	7.54	2.99
5,900.00	75.30	85.405	5,438.37	1,178.37	-30.14	216.94	8.00	7.58	2.68
6,000.00	82.91	87.908	5,457.26	1,184.07	67.82	313.92	8.00	7.61	2.50
6,090.16	89.79	90.092	5,463.00	1,185.63	157.72	402.17	8.00	7.63	2.42
36.2614890, -107.6603810 - POE @ 6090' MD									
6,100.00	89.79	90.092	5,463.04	1,185.61	167.56	411.78	0.00	0.00	0.00
6,200.00	89.79	90.092	5,463.41	1,185.45	267.56	509.54	0.00	0.00	0.00
6,240.00	89.79	90.092	5,463.56	1,185.39	307.56	548.64	0.00	0.00	0.00
Last Perf @ 6240' MD									
6,240.16	89.79	90.092	5,463.56	1,185.39	307.72	548.79	0.00	0.00	0.00
36.2614883, -107.6598722									
6,300.00	89.79	90.092	5,463.79	1,185.29	367.56	607.29	0.00	0.00	0.00
6,400.00	89.79	90.092	5,464.16	1,185.13	467.56	705.05	0.00	0.00	0.00
6,500.00	89.79	90.092	5,464.53	1,184.97	567.56	802.80	0.00	0.00	0.00
6,600.00	89.79	90.092	5,464.91	1,184.81	667.56	900.56	0.00	0.00	0.00
6,700.00	89.79	90.092	5,465.28	1,184.65	767.55	998.31	0.00	0.00	0.00
6,800.00	89.79	90.092	5,465.66	1,184.49	867.55	1,096.07	0.00	0.00	0.00
6,900.00	89.79	90.092	5,466.03	1,184.33	967.55	1,193.82	0.00	0.00	0.00
7,000.00	89.79	90.092	5,466.40	1,184.17	1,067.55	1,291.57	0.00	0.00	0.00
7,100.00	89.79	90.092	5,466.78	1,184.01	1,167.55	1,389.33	0.00	0.00	0.00
7,200.00	89.79	90.092	5,467.15	1,183.85	1,267.55	1,487.08	0.00	0.00	0.00
7,300.00	89.79	90.092	5,467.53	1,183.69	1,367.55	1,584.84	0.00	0.00	0.00
7,400.00	89.79	90.092	5,467.90	1,183.53	1,467.55	1,682.59	0.00	0.00	0.00
7,500.00	89.79	90.092	5,468.27	1,183.37	1,567.55	1,780.35	0.00	0.00	0.00
7,600.00	89.79	90.092	5,468.65	1,183.21	1,667.55	1,878.10	0.00	0.00	0.00
7,700.00	89.79	90.092	5,469.02	1,183.05	1,767.55	1,975.86	0.00	0.00	0.00
7,800.00	89.79	90.092	5,469.40	1,182.89	1,867.55	2,073.61	0.00	0.00	0.00
7,900.00	89.79	90.092	5,469.77	1,182.73	1,967.54	2,171.37	0.00	0.00	0.00
8,000.00	89.79	90.092	5,470.14	1,182.57	2,067.54	2,269.12	0.00	0.00	0.00
8,100.00	89.79	90.092	5,470.52	1,182.41	2,167.54	2,366.88	0.00	0.00	0.00
8,200.00	89.79	90.092	5,470.89	1,182.25	2,267.54	2,464.63	0.00	0.00	0.00
8,300.00	89.79	90.092	5,471.27	1,182.09	2,367.54	2,562.39	0.00	0.00	0.00
8,400.00	89.79	90.092	5,471.64	1,181.93	2,467.54	2,660.14	0.00	0.00	0.00
8,500.00	89.79	90.092	5,472.01	1,181.77	2,567.54	2,757.90	0.00	0.00	0.00
8,600.00	89.79	90.092	5,472.39	1,181.61	2,667.54	2,855.65	0.00	0.00	0.00
8,700.00	89.79	90.092	5,472.76	1,181.44	2,767.54	2,953.41	0.00	0.00	0.00
8,800.00	89.79	90.092	5,473.14	1,181.28	2,867.54	3,051.16	0.00	0.00	0.00
8,900.00	89.79	90.092	5,473.51	1,181.12	2,967.54	3,148.92	0.00	0.00	0.00
9,000.00	89.79	90.092	5,473.88	1,180.96	3,067.54	3,246.67	0.00	0.00	0.00
9,100.00	89.79	90.092	5,474.26	1,180.80	3,167.53	3,344.43	0.00	0.00	0.00
9,200.00	89.79	90.092	5,474.63	1,180.64	3,267.53	3,442.18	0.00	0.00	0.00
9,300.00	89.79	90.092	5,475.01	1,180.48	3,367.53	3,539.94	0.00	0.00	0.00
9,400.00	89.79	90.092	5,475.38	1,180.32	3,467.53	3,637.69	0.00	0.00	0.00



Scientific Drilling, Intl
Planning Report



Database: Grand Junction District
Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well Zeus 2308-03 4H
TVD Reference: GL 6908' & RKB 14' @ 6922.00usft
MD Reference: GL 6908' & RKB 14' @ 6922.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

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)
9,500.00	89.79	90.092	5,475.76	1,180.16	3,567.53	3,735.45	0.00	0.00	0.00
9,600.00	89.79	90.092	5,476.13	1,180.00	3,667.53	3,833.20	0.00	0.00	0.00
9,700.00	89.79	90.092	5,476.50	1,179.84	3,767.53	3,930.96	0.00	0.00	0.00
9,800.00	89.79	90.092	5,476.88	1,179.68	3,867.53	4,028.71	0.00	0.00	0.00
9,900.00	89.79	90.092	5,477.25	1,179.52	3,967.53	4,126.46	0.00	0.00	0.00
10,000.00	89.79	90.092	5,477.63	1,179.36	4,067.53	4,224.22	0.00	0.00	0.00
10,100.00	89.79	90.092	5,478.00	1,179.20	4,167.53	4,321.97	0.00	0.00	0.00
10,200.00	89.79	90.092	5,478.37	1,179.04	4,267.53	4,419.73	0.00	0.00	0.00
10,300.00	89.79	90.092	5,478.75	1,178.88	4,367.52	4,517.48	0.00	0.00	0.00
10,400.00	89.79	90.092	5,479.12	1,178.72	4,467.52	4,615.24	0.00	0.00	0.00
10,500.00	89.79	90.092	5,479.50	1,178.56	4,567.52	4,712.99	0.00	0.00	0.00
10,600.00	89.79	90.092	5,479.87	1,178.40	4,667.52	4,810.75	0.00	0.00	0.00
10,700.00	89.79	90.092	5,480.24	1,178.24	4,767.52	4,908.50	0.00	0.00	0.00
10,800.00	89.79	90.092	5,480.62	1,178.08	4,867.52	5,006.26	0.00	0.00	0.00
10,900.00	89.79	90.092	5,480.99	1,177.92	4,967.52	5,104.01	0.00	0.00	0.00
11,000.00	89.79	90.092	5,481.37	1,177.76	5,067.52	5,201.77	0.00	0.00	0.00
11,100.00	89.79	90.092	5,481.74	1,177.60	5,167.52	5,299.52	0.00	0.00	0.00
11,200.00	89.79	90.092	5,482.11	1,177.44	5,267.52	5,397.28	0.00	0.00	0.00
11,300.00	89.79	90.092	5,482.49	1,177.28	5,367.52	5,495.03	0.00	0.00	0.00
11,336.00	89.79	90.092	5,482.62	1,177.22	5,403.52	5,530.22	0.00	0.00	0.00
36.2614645, -107.6425871 - First Perf @ 11,336' MD									
11,400.00	89.79	90.092	5,482.86	1,177.12	5,467.52	5,592.79	0.00	0.00	0.00
11,436.86	89.79	90.092	5,483.00	1,177.06	5,504.38	5,628.82	0.00	0.00	0.00
TD at 11436.86									

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N-S (usft)	+E-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Zeus 4H LPerf	0.00	0.000	5,463.00	1,185.27	307.78	1,914,526.20	2,774,229.45	36.2614880	-107.6598720
- plan misses target center by 0.57usft at 6240.22usft MD (5463.56 TVD, 1185.39 N, 307.78 E)									
- Point									
Zeus 4H POE	0.00	0.000	5,463.00	1,185.63	157.72	1,914,526.30	2,774,079.39	36.2614890	-107.6603810
- plan hits target center									
- Point									
Zeus 4H FPerf	0.00	0.000	5,483.00	1,177.40	5,404.44	1,914,527.41	2,779,326.11	36.2614650	-107.6425840
- plan misses target center by 0.42usft at 11336.92usft MD (5482.63 TVD, 1177.22 N, 5404.44 E)									
- Point									
Zeus 4H BHL	0.00	0.000	5,483.00	1,177.06	5,504.38	1,914,527.24	2,779,426.05	36.2614640	-107.6422450
- plan hits target center									
- Point									



Scientific Drilling, Intl
Planning Report



Database: Grand Junction District
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Project: San Juan, NM NAD83
Site: Chaco 2308-03 Pad
Well: Zeus 2308-03 4H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well Zeus 2308-03 4H
TVD Reference: GL 6908' & RKB 14' @ 6922.00usft
MD Reference: GL 6908' & RKB 14' @ 6922.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,059.00	310.00	Ojo Alamo		0.00	0.000
1,228.00	479.00	Kirtland		0.00	0.000
1,372.10	623.00	Fruitland		0.00	0.000
1,774.85	1,022.00	Pictured Cliffs		0.00	0.000
2,635.78	1,840.00	Chacra		0.00	0.000
3,335.49	2,497.00	Cliff House		0.00	0.000
3,388.74	2,547.00	Menefee		0.00	0.000
4,301.44	3,404.00	Point Lookout		0.00	0.000
4,517.64	3,607.00	Mancos		0.00	0.000
5,401.91	4,420.00	Gallup		0.00	0.000

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,200.00	1,200.00	0.00	0.00	Start Build 2.00
2,206.07	2,185.51	151.00	-88.15	Start 2636.46 hold at 2206.07 MD
4,842.53	4,661.06	934.26	-545.41	Start DLS 8.00 TFO 118.88
6,090.16	5,463.00	1,185.63	157.72	36.2614890, -107.6603810
6,090.16	5,463.00	1,185.63	157.72	POE @ 6090' MD
6,240.00	5,463.56	1,185.39	307.56	Last Perf @ 6240' MD
6,240.16	5,463.56	1,185.39	307.72	36.2614883, -107.6598722
11,336.00	5,482.62	1,177.22	5,403.52	36.2614645, -107.6425871
11,336.00	5,482.62	1,177.22	5,403.52	First Perf @ 11,336' MD
11,436.86	5,483.00	1,177.06	5,504.38	TD at 11436.86



Logos Operating LLC

San Juan, NM NAD83

Chaco 2308-03 Pad

Zeus 2308-03 4H

OH

Plan #1

Anticollision Report

03 September, 2019



www.scientificdrilling.com



Scientific Drilling, Intl

Anticollision Report



Company: Logos Operating LLC
Project: San Juan, NM NAD83
Reference Site: Chaco 2308-03 Pad
Site Error: 0.00 usft
Reference Well: Zeus 2308-03 4H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well Zeus 2308-03 4H
TVD Reference: GL 6908' & RKB 14' @ 6922.00usft
MD Reference: GL 6908' & RKB 14' @ 6922.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Grand Junction District
Offset TVD Reference: Offset Datum

Reference	Plan #1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD + Stations Interval 100.00usft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 15,000.00 usft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic
Casing Method:	Not applied

Survey Tool Program		Date	9/3/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	11,436.86	Plan #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Chaco 2308-03 Pad						
Chaco 2308-03 3H - OH - Plan #3	1,200.00	1,200.00	44.07	35.88	5.378	CC, ES
Chaco 2308-03 3H - OH - Plan #3	5,575.34	6,650.78	527.97	403.09	4.228	SF
Chaco 2308-03E 403H - OH - OH	4,945.07	4,784.00	4,225.66	4,183.24	99.618	CC
Chaco 2308-03E 403H - OH - OH	4,950.00	4,784.00	4,225.68	4,183.23	99.543	ES
Chaco 2308-03E 403H - OH - OH	5,250.00	4,847.00	4,297.62	4,253.51	97.433	SF
Chaco 23-08-3 #1H - OH - OH	1,043.81	1,053.42	54.69	48.95	9.528	CC, ES
Chaco 23-08-3 #1H - OH - OH	6,050.00	5,833.96	400.35	355.50	8.926	SF
Chaco 23-08-3 #2H - OH - OH	0.00	6.80	126.45			
Chaco 23-08-3 #2H - OH - OH	455.50	462.30	126.51	124.52	63.638	ES
Chaco 23-08-3 #2H - OH - OH	1,400.00	1,394.86	196.60	189.17	26.461	SF
Omega 2308-03 5H - OH - Plan #1	1,200.00	1,200.00	21.86	13.66	2.668	CC, ES
Omega 2308-03 5H - OH - Plan #1	1,300.00	1,300.06	23.23	14.32	2.609	SF

Offset Design												Offset Site Error: 0.00 usft	
Survey Program: O-MWD+HDGM												Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor
0.00	0.00	0.00	0.00	0.00	0.00	178.08	-44.05	1.47	44.07				
100.00	100.00	100.00	100.00	0.15	0.15	178.08	-44.05	1.47	44.07	43.76	0.31	142.957	
200.00	200.00	200.00	200.00	0.51	0.51	178.08	-44.05	1.47	44.07	43.05	1.03	42.987	
300.00	300.00	300.00	300.00	0.87	0.87	178.08	-44.05	1.47	44.07	42.33	1.74	25.297	
400.00	400.00	400.00	400.00	1.23	1.23	178.08	-44.05	1.47	44.07	41.61	2.46	17.922	
500.00	500.00	500.00	500.00	1.59	1.59	178.08	-44.05	1.47	44.07	40.90	3.18	13.876	
600.00	600.00	600.00	600.00	1.95	1.95	178.08	-44.05	1.47	44.07	40.18	3.89	11.321	
700.00	700.00	700.00	700.00	2.30	2.30	178.08	-44.05	1.47	44.07	39.46	4.61	9.560	
800.00	800.00	800.00	800.00	2.66	2.66	178.08	-44.05	1.47	44.07	38.74	5.33	8.273	
900.00	900.00	900.00	900.00	3.02	3.02	178.08	-44.05	1.47	44.07	38.03	6.04	7.292	
1,000.00	1,000.00	1,000.00	1,000.00	3.38	3.38	178.08	-44.05	1.47	44.07	37.31	6.76	6.519	
1,100.00	1,100.00	1,100.00	1,100.00	3.74	3.74	178.08	-44.05	1.47	44.07	36.59	7.48	5.894	
1,200.00	1,200.00	1,200.00	1,200.00	4.10	4.10	178.08	-44.05	1.47	44.07	35.88	8.19	5.378	CC, ES
1,300.00	1,299.98	1,300.62	1,300.60	4.45	4.45	-154.72	-43.21	3.03	44.90	35.99	8.91	5.038	
1,400.00	1,399.84	1,400.86	1,400.69	4.81	4.81	-163.18	-40.73	7.68	48.08	38.46	9.63	4.996	
1,500.00	1,499.45	1,500.33	1,499.79	5.17	5.18	-174.56	-36.63	15.34	55.31	44.96	10.35	5.346	

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

Fresh water for drilling and completion operations will be stored on location in a lake tank. Produced water from nearby existing gas wells will be utilized for completions operations if such activity proves practicable.

The water hauler(s) will access the proposed well pad via the roads described in Section A: *Existing Access Roads*.

No water supply well will be drilled on this lease.

F. Construction Plan and Materials

The BLM-FFO (505-564-7600) will be notified at least 48 hours prior to the start of construction activities; upon receipt of the approved APDs and ROW; approximately 2-3 days of construction will be required for the pipeline infrastructure.

The proposed projects would use existing well pad and access road. The additional two 2-inch to 6-inch steel / poly pipeline infrastructure would follow previously approved right-of-way (ROW) (NMMN 134451) from the BLM-FFO for Shiprock San Juan, LLC. (SSJ), to construct new disturbance of 503.18' (0.462 Acres) within a 40-foot-wide ROW corridor including a one 6-inch steel natural gas pipeline to the existing Chaco 2308 3 pad. All project features would be off lease and ROW grants would be required for all pipeline

Activity will cease when construction equipment cause ruts in the soil 6 inches in depth and/or when equipment can no longer move or operate under its own power on access road surfaces. Construction plats are provided in the APD and ROW grant permit packages.

G. Methods for Handling Waste

Drilling operations will utilize a closed-loop system. Drilling of the horizontal lateral will be done using water or oil-based system. All water or oil 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 for water or oil-based. If oil-based mud, the operator will comply with rule 19.15.34.12 NMOCD for a 30-mil flexible PVC or equivalent. The size of the liner will fit the rig facilities. 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.

H. Ancillary Facilities

No new ancillary facilities will be associated with the new wells.

I. Well Site Layout

The approximate cuts, fills, and orientation for the existing Chaco 2308 03 1H & 2H well pad in addition to the proposed placement of the Zeus 2308 03 4H and Omega 2308 03 5H are depicted on the construction plats in the APD package. The location of drilling equipment, rig orientation, and the location of topsoil stockpiles are provided in on well site layout attachment.

J. Plans for Surface Reclamation

Please see Appendix A: *Reclamation Plan*.

An updated reclamation plan to cover both the existing disturbance associated with the initial Chaco 2308 03 1H, 2H & 3H development as well as the proposed addition of the Zeus 2308 03 4H and Omega 2308 03 5H Surface Reclamation Plan.

Well Control Equipment Schematic for 2M Service

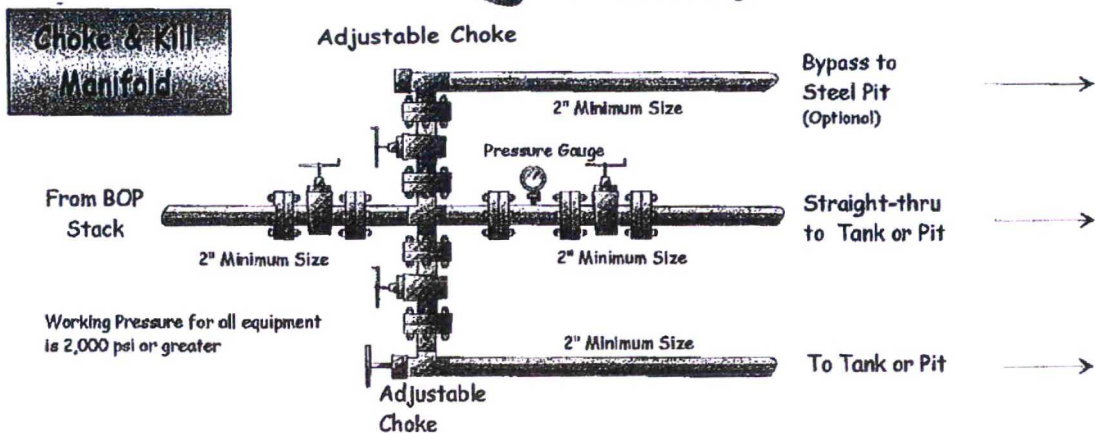
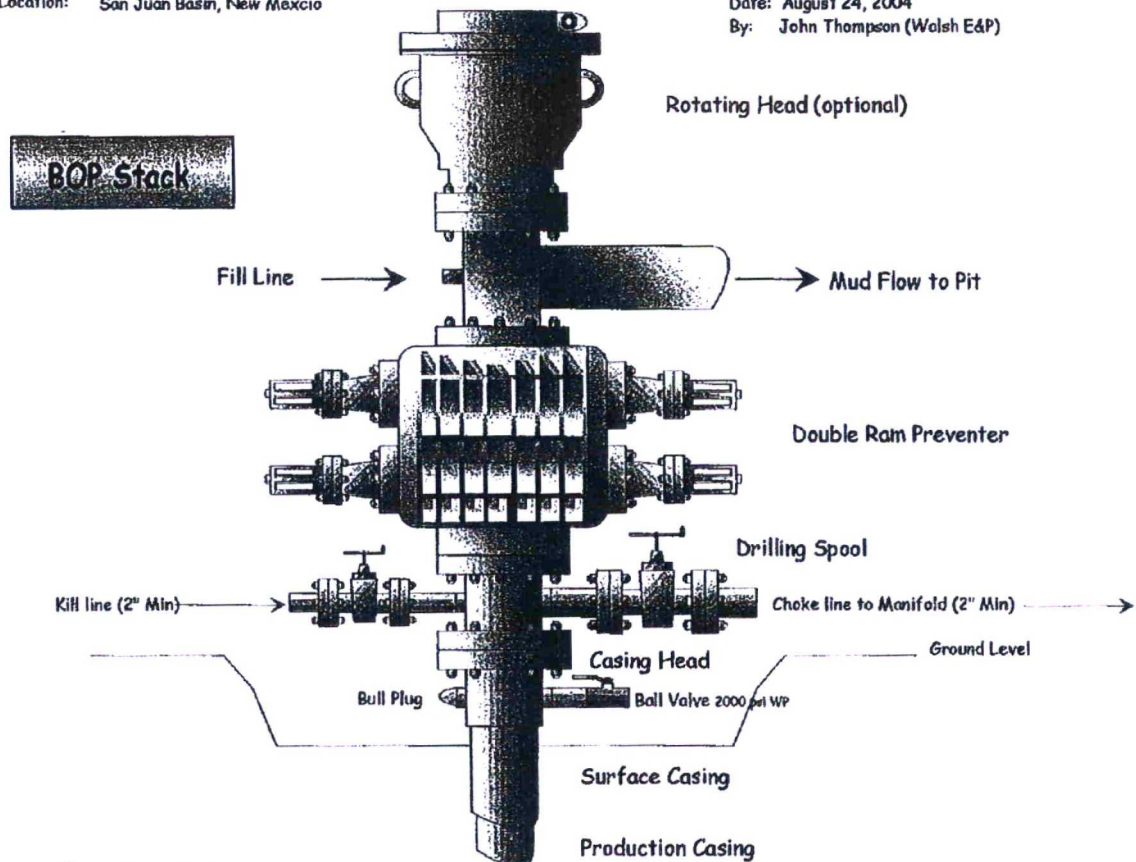
Attachment to Drilling Technical Program

Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Walsh E&P)



Directions from the Intersection of US Hwy 550 & US Hwy 64
in Bloomfield, NM to Logos Operating, LLC Zeus 2308 03 #4H
1938' FNL & 224' FEL, Section 3, T23N, R8W, N.M.P.M., San Juan County, NM

Latitude: 36.258232°N Longitude: 107.660916°W Datum: NAD1983

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, travel Southerly on US Hwy 550 for 41.1 miles to Mile Marker 110.6;

Go Left (Northerly) on existing roadway for 0.2 miles to fork in roadway;

Go Right (Easterly) on existing roadway for 0.4 miles to fork in roadway;

Go Left (Easterly) which is straight for 0.4 miles to existing Logos Chaco 23-08-3 #1H & #2H wellpad, on which is staked Logos Zeus 2308 03 #4H location.