

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) 478-3460 Fax: (505) 478-3462

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, NM 87505

☒ AMENDED REPORT
AS-DRILLED PLAT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-039-31367		² Pool Code 97232/42289		³ Pool Name BASIN MANCOS/LYBROOK GALLUP	
⁴ Property Code 322501		⁵ Property Name FEDERAL 2307 7P COM			⁶ Well Number 2H
⁷ OGRID No. 289408		⁸ Operator Name LOGOS OPERATING, LLC			⁹ Elevation 7267

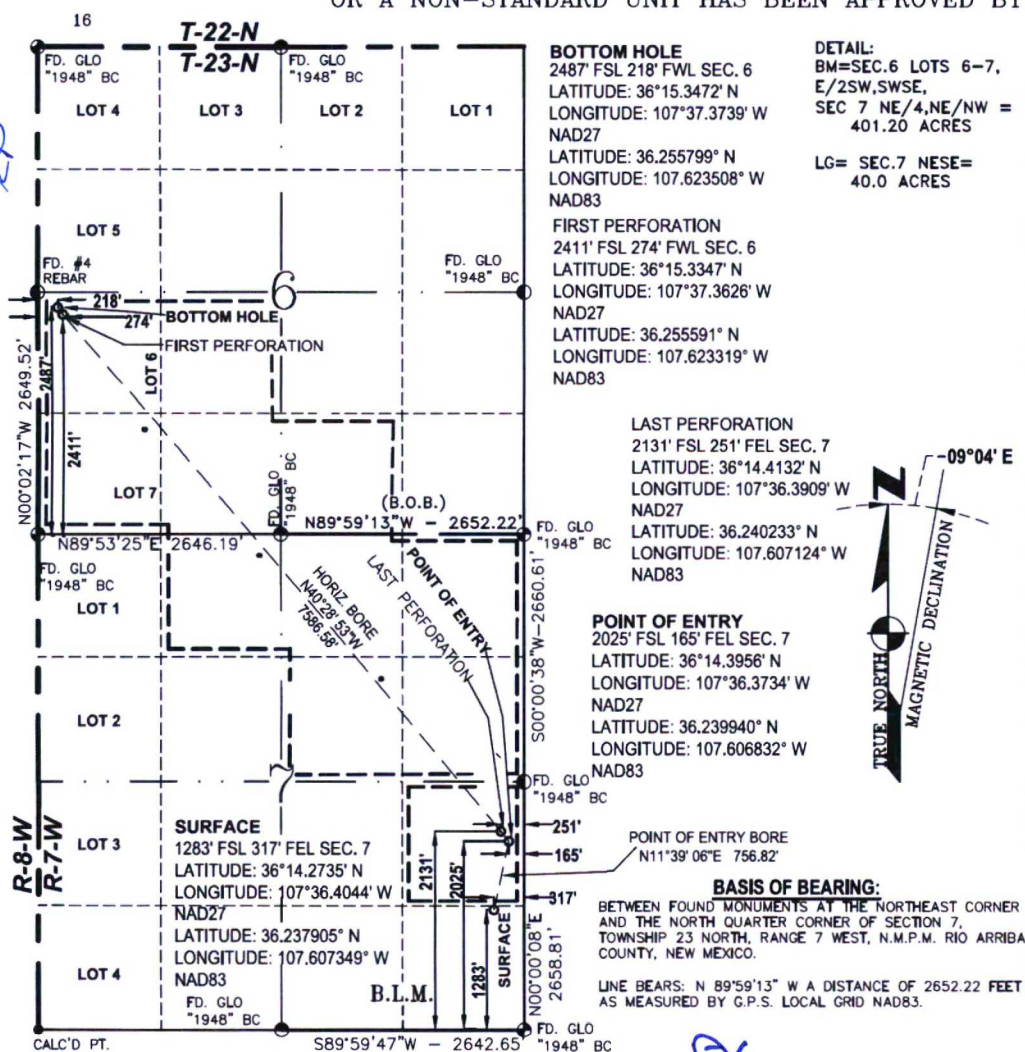
¹⁰ Surface Location DISTRICT III

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		1283	SOUTH	317	EAST	RIO ARriba

¹¹ Bottom Hole Location If Different From Surface

UL or lot no. L	Section 6	Township 23-N	Range 7-W	Lot Idn 6	Feet from the 2487	North/South line SOUTH	Feet from the 218	East/West line WEST	County RIO ARriba
¹² Dedicated Acres PROJECT AREA 441.20 ACRES SEE DETAIL BELOW			¹³ Joint or Infill		¹⁴ Consolidation Code		¹⁵ Order No.		

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



17 OPERATOR CERTIFICATION

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

Signature Walter A. Novak Date 12/12/18

Printed Name _____

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.

DECEMBER 12, 2018

Date of Survey _____

Signature and Seal of Professional Surveyor



GLEN W. RUSS
Certificate Number 15703

CONFIDENTIAL



Logos Operating LLC

Rio Arriba, NM NAD83

Federal 2307-7P

Federal 2307-7P COM 2H - Slot 7P 2H

OH

Design: OH

Standard Survey Report

15 November, 2018

RECORDED
DEC 13 2018
DISTRICT III



www.scientificdrilling.com

CONFIDENTIAL



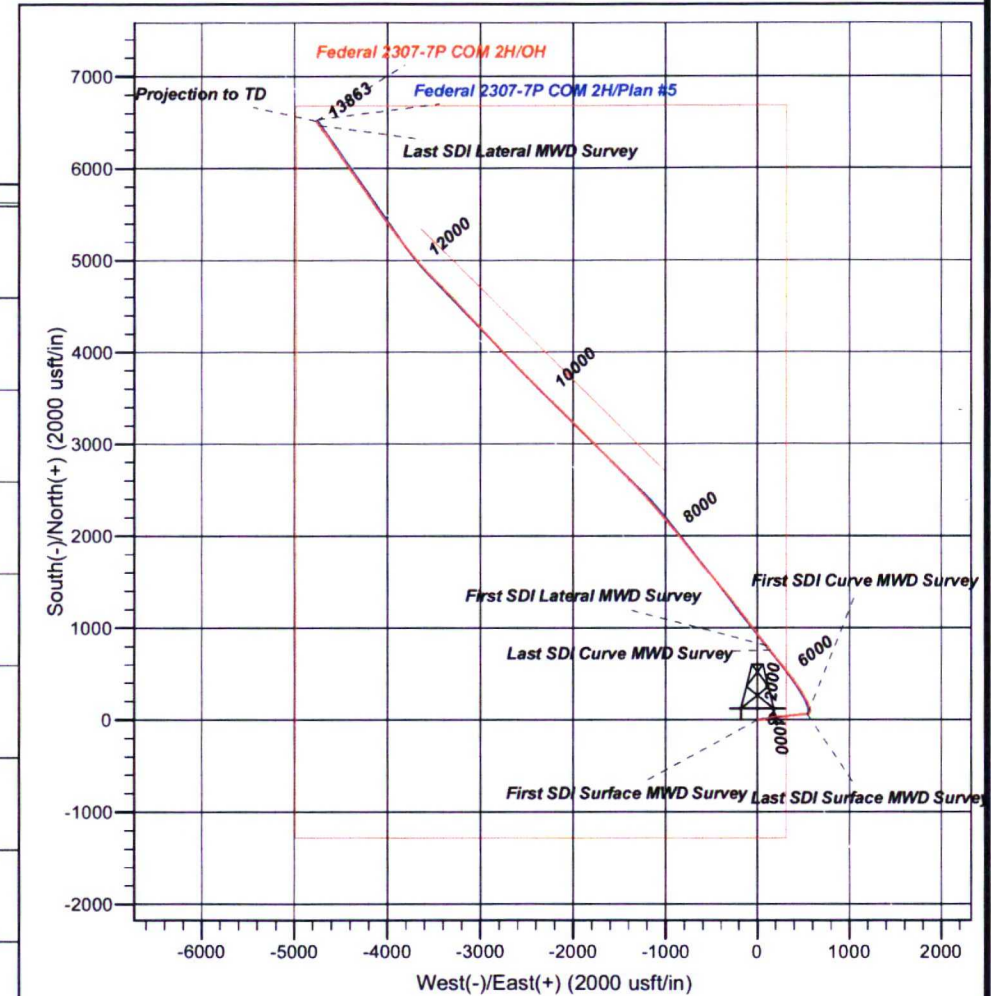
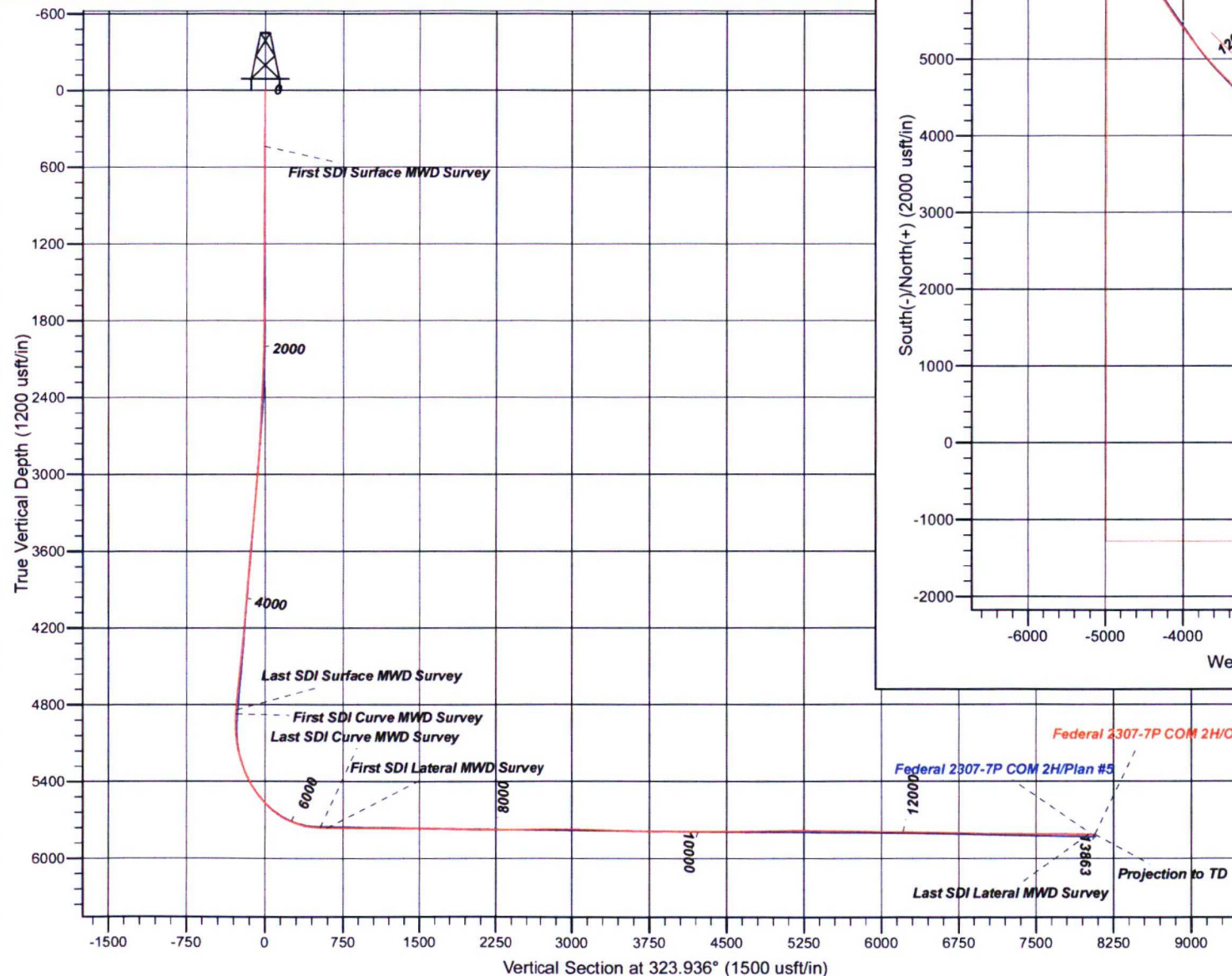
Company Name: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Federal 2307-7P
Well: Federal 2307-7P COM 2H
Wellbore: OH

CONFIDENTIAL



WELL DETAILS: Federal 2307-7P COM 2H

GL 7272' & RKB 14' @ 7286.00usft (Aztec 920) 7272.00						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	1905973.35	2789733.69	36.2379050	-107.6073490	7P 2H



Design: OH (Federal 2307-7P COM 2H/OH)

Created By: Janie Collins Date: 14:21, November 15 2018

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, Intl
Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

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	0.00 usft	Northing:	1,905,973.35 usft	Latitude:	36.2379050
	+E/-W	0.00 usft	Easting:	2,789,733.69 usft	Longitude:	-107.6073490
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,272.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/3/2018	8.80	62.83	49,480

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	323.936	

Survey Program	Date 11/15/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
437.00	4,895.00	Survey #1 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM
4,927.00	6,284.00	Survey #2 - Curve MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM
6,346.00	13,863.00	Survey #3 - Lateral MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM

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	
437.00	1.24	97.040	436.97	-0.58	4.69	-3.23	0.28	0.28	0.00	
First SDI Surface MWD Survey										
499.00	0.79	93.360	498.96	-0.69	5.79	-3.96	0.73	-0.73	-5.94	
562.00	0.45	71.980	561.95	-0.64	6.45	-4.31	0.64	-0.54	-33.94	
624.00	0.47	64.800	623.95	-0.45	6.92	-4.44	0.10	0.03	-11.58	
686.00	0.50	83.220	685.95	-0.31	7.41	-4.62	0.25	0.05	29.71	
748.00	0.37	81.830	747.94	-0.25	7.88	-4.84	0.21	-0.21	-2.24	
811.00	0.27	126.560	810.94	-0.31	8.20	-5.08	0.41	-0.16	71.00	

CONFIDENTIAL



Scientific Drilling, Intl Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

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)
872.00	0.14	99.380	871.94	-0.41	8.39	-5.27	0.26	-0.21	-44.56
934.00	0.17	168.650	933.94	-0.51	8.48	-5.41	0.29	0.05	111.73
996.00	0.33	147.980	995.94	-0.75	8.60	-5.67	0.29	0.26	-33.34
1,057.00	0.44	167.730	1,056.94	-1.13	8.74	-6.06	0.28	0.18	32.38
1,119.00	0.47	175.030	1,118.94	-1.62	8.81	-6.49	0.11	0.05	11.77
1,180.00	0.44	177.400	1,179.94	-2.10	8.84	-6.90	0.06	-0.05	3.89
1,242.00	0.38	208.120	1,241.94	-2.52	8.76	-7.19	0.36	-0.10	49.55
1,303.00	0.42	191.730	1,302.93	-2.92	8.62	-7.43	0.20	0.07	-26.87
1,365.00	0.32	186.260	1,364.93	-3.31	8.55	-7.71	0.17	-0.16	-8.82
1,426.00	0.24	196.070	1,425.93	-3.60	8.50	-7.92	0.15	-0.13	16.08
1,490.00	0.28	219.970	1,489.93	-3.85	8.36	-8.04	0.18	0.06	37.34
1,553.00	0.21	222.530	1,552.93	-4.05	8.18	-8.10	0.11	-0.11	4.06
1,616.00	0.27	214.450	1,615.93	-4.26	8.02	-8.17	0.11	0.10	-12.83
1,679.00	0.21	251.350	1,678.93	-4.42	7.83	-8.18	0.26	-0.10	58.57
1,742.00	0.31	255.670	1,741.93	-4.50	7.55	-8.09	0.16	0.16	6.86
1,805.00	0.24	275.140	1,804.93	-4.53	7.26	-7.94	0.18	-0.11	30.90
1,868.00	0.26	256.950	1,867.93	-4.55	6.99	-7.79	0.13	0.03	-28.87
1,932.00	0.94	102.130	1,931.92	-4.69	7.36	-8.13	1.84	1.06	-241.91
1,995.00	2.35	95.390	1,994.90	-4.92	9.15	-9.37	2.26	2.24	-10.70
2,057.00	3.29	97.120	2,056.82	-5.26	12.18	-11.43	1.52	1.52	2.79
2,120.00	4.11	94.280	2,119.69	-5.66	16.23	-14.13	1.33	1.30	-4.51
2,184.00	5.12	94.660	2,183.48	-6.06	21.36	-17.47	1.58	1.58	0.59
2,247.00	5.53	89.380	2,246.21	-6.26	27.20	-21.07	1.01	0.65	-8.38
2,310.00	5.85	87.030	2,308.90	-6.06	33.44	-24.58	0.63	0.51	-3.73
2,373.00	5.89	86.580	2,371.57	-5.70	39.87	-28.08	0.10	0.06	-0.71
2,436.00	6.67	83.010	2,434.19	-5.06	46.73	-31.60	1.38	1.24	-5.67
2,499.00	7.25	78.280	2,496.72	-3.81	54.25	-35.02	1.29	0.92	-7.51
2,563.00	8.56	75.270	2,560.12	-1.77	62.82	-38.41	2.15	2.05	-4.70
2,626.00	10.04	73.690	2,622.30	0.96	72.62	-41.98	2.38	2.35	-2.51
2,689.00	11.43	71.940	2,684.19	4.44	83.83	-45.76	2.27	2.21	-2.78
2,752.00	12.26	69.930	2,745.85	8.67	96.05	-49.53	1.47	1.32	-3.19
2,815.00	12.68	70.470	2,807.36	13.28	108.85	-53.34	0.69	0.67	0.86
2,878.00	12.90	73.370	2,868.80	17.60	122.10	-57.65	1.08	0.35	4.60
2,942.00	12.74	75.290	2,931.20	21.44	135.77	-62.60	0.71	-0.25	3.00
3,005.00	13.18	76.140	2,992.60	24.92	149.46	-67.84	0.76	0.70	1.35
3,068.00	13.52	77.640	3,053.90	28.22	163.63	-73.52	0.77	0.54	2.38
3,131.00	13.64	78.950	3,115.14	31.22	178.11	-79.62	0.52	0.19	2.08
3,194.00	13.47	82.830	3,176.38	33.56	192.69	-86.31	1.47	-0.27	6.16
3,257.00	12.71	84.690	3,237.75	35.11	206.87	-93.40	1.38	-1.21	2.95
3,320.00	11.86	86.050	3,299.30	36.20	220.23	-100.38	1.43	-1.35	2.16
3,383.00	11.24	90.190	3,361.03	36.63	232.82	-107.45	1.64	-0.98	6.57
3,446.00	11.26	91.280	3,422.82	36.47	245.11	-114.82	0.34	0.03	1.73
3,510.00	10.98	90.570	3,485.61	36.27	257.46	-122.24	0.49	-0.44	-1.11



Scientific Drilling, Intl Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

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)
3,573.00	10.78	89.970	3,547.48	36.21	269.35	-129.29	0.36	-0.32	-0.95
3,636.00	10.38	89.660	3,609.41	36.25	280.91	-136.07	0.64	-0.63	-0.49
3,699.00	9.64	87.020	3,671.45	36.56	291.86	-142.26	1.38	-1.17	-4.19
3,762.00	9.45	87.430	3,733.58	37.06	302.29	-148.00	0.32	-0.30	0.65
3,826.00	10.04	85.650	3,796.66	37.72	313.10	-153.83	1.04	0.92	-2.78
3,889.00	11.10	86.870	3,858.59	38.47	324.63	-160.01	1.72	1.68	1.94
3,952.00	11.76	85.150	3,920.34	39.34	337.09	-166.64	1.18	1.05	-2.73
4,015.00	11.98	84.770	3,981.99	40.48	350.00	-173.31	0.37	0.35	-0.60
4,078.00	12.42	84.480	4,043.57	41.73	363.25	-180.11	0.71	0.70	-0.46
4,141.00	12.55	82.840	4,105.08	43.23	376.78	-186.86	0.60	0.21	-2.60
4,204.00	12.83	82.770	4,166.53	44.97	390.52	-193.54	0.45	0.44	-0.11
4,267.00	12.77	81.250	4,227.97	46.91	404.34	-200.11	0.54	-0.10	-2.41
4,331.00	12.84	80.890	4,290.38	49.11	418.35	-206.58	0.17	0.11	-0.56
4,394.00	13.18	81.070	4,351.76	51.33	432.36	-213.03	0.54	0.54	0.29
4,457.00	13.15	82.520	4,413.11	53.38	446.56	-219.73	0.53	-0.05	2.30
4,520.00	12.82	84.430	4,474.49	54.99	460.62	-226.71	0.86	-0.52	3.03
4,583.00	13.69	87.660	4,535.82	55.98	475.02	-234.39	1.81	1.38	5.13
4,646.00	14.42	89.960	4,596.93	56.28	490.32	-243.15	1.46	1.16	3.65
4,737.00	12.56	89.080	4,685.42	56.45	511.54	-255.51	2.06	-2.04	-0.97
4,768.00	11.79	87.100	4,715.72	56.67	518.08	-259.18	2.83	-2.48	-6.39
4,832.00	11.06	87.050	4,778.45	57.31	530.74	-266.11	1.14	-1.14	-0.08
4,863.00	10.84	86.440	4,808.89	57.65	536.62	-269.30	0.80	-0.71	-1.97
4,895.00	10.17	85.460	4,840.35	58.06	542.44	-272.39	2.17	-2.09	-3.06
Last SDI Surface MWD Survey									
4,927.00	10.34	77.930	4,871.84	58.88	548.06	-275.04	4.22	0.53	-23.53
First SDI Curve MWD Survey									
4,958.00	10.70	68.350	4,902.32	60.53	553.46	-276.89	5.75	1.16	-30.90
4,990.00	11.63	59.570	4,933.72	63.26	559.00	-277.94	6.05	2.91	-27.44
5,021.00	11.99	49.460	4,964.06	66.93	564.14	-278.00	6.77	1.16	-32.61
5,053.00	12.47	39.830	4,995.34	71.75	568.88	-276.90	6.54	1.50	-30.09
5,084.00	12.85	29.040	5,025.59	77.33	572.70	-274.63	7.71	1.23	-34.81
5,116.00	13.38	17.900	5,056.76	83.97	575.56	-270.95	8.06	1.66	-34.81
5,148.00	14.02	6.840	5,087.86	91.34	577.16	-265.94	8.41	2.00	-34.56
5,179.00	14.64	356.120	5,117.90	98.98	577.35	-259.87	8.78	2.00	-34.58
5,211.00	15.54	344.250	5,148.80	107.14	575.91	-252.42	10.04	2.81	-37.09
5,242.00	17.62	339.300	5,178.51	115.53	573.12	-244.00	8.10	6.71	-15.97
5,274.00	19.73	340.790	5,208.83	125.16	569.63	-234.16	6.76	6.59	4.66
5,305.00	21.47	340.530	5,237.84	135.45	566.02	-223.72	5.62	5.61	-0.84
5,337.00	23.01	339.320	5,267.46	146.82	561.86	-212.07	5.02	4.81	-3.78
5,368.00	25.00	336.850	5,295.78	158.52	557.14	-199.85	7.19	6.42	-7.97
5,400.00	27.42	335.270	5,324.49	171.43	551.40	-186.03	7.87	7.56	-4.94
5,431.00	30.02	332.950	5,351.67	184.82	544.89	-171.37	9.12	8.39	-7.48
5,463.00	31.77	332.020	5,379.13	199.39	537.29	-155.12	5.67	5.47	-2.91
5,495.00	33.03	332.170	5,406.15	214.54	529.27	-138.15	3.95	3.94	0.47



Scientific Drilling, Intl Survey Report



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

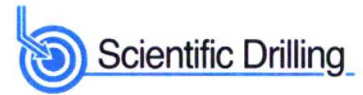
Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,526.00	34.88	331.160	5,431.86	229.78	521.05	-120.99	6.24	5.97	-3.26
5,558.00	37.35	330.910	5,457.71	246.28	511.92	-102.28	7.73	7.72	-0.78
5,589.00	40.29	330.540	5,481.86	263.23	502.41	-82.98	9.51	9.48	-1.19
5,621.00	42.39	329.380	5,505.88	281.52	491.83	-61.96	6.99	6.56	-3.63
5,652.00	44.64	328.580	5,528.36	299.81	480.83	-40.70	7.47	7.26	-2.58
5,684.00	46.93	328.230	5,550.68	319.35	468.81	-17.84	7.20	7.16	-1.09
5,716.00	49.82	328.210	5,571.93	339.68	456.21	6.01	9.03	9.03	-0.06
5,747.00	51.76	327.520	5,591.53	360.01	443.44	29.98	6.49	6.26	-2.23
5,779.00	53.54	326.160	5,610.94	381.31	429.52	55.38	6.51	5.56	-4.25
5,810.00	55.80	324.650	5,628.87	402.12	415.16	80.66	8.30	7.29	-4.87
5,842.00	58.72	323.510	5,646.17	423.91	399.37	107.57	9.60	9.13	-3.56
5,873.00	61.61	323.080	5,661.59	445.47	383.29	134.46	9.40	9.32	-1.39
5,905.00	64.08	323.200	5,676.20	468.25	366.22	162.93	7.73	7.72	0.38
5,937.00	66.20	322.940	5,689.65	491.46	348.77	191.96	6.67	6.63	-0.81
5,968.00	68.51	322.640	5,701.59	514.24	331.47	220.56	7.50	7.45	-0.97
6,000.00	70.88	322.110	5,712.69	538.01	313.15	250.56	7.57	7.41	-1.66
6,031.00	73.23	321.420	5,722.24	561.17	294.90	280.02	7.87	7.58	-2.23
6,063.00	75.30	321.420	5,730.92	585.25	275.69	310.79	6.47	6.47	0.00
6,094.00	77.23	321.330	5,738.28	608.77	256.89	340.88	6.23	6.23	-0.29
6,126.00	79.26	321.520	5,744.80	633.26	237.36	372.17	6.37	6.34	0.59
6,158.00	81.67	321.730	5,750.10	658.00	217.77	403.70	7.56	7.53	0.66
6,189.00	83.81	321.770	5,754.01	682.15	198.73	434.43	6.90	6.90	0.13
6,221.00	85.80	322.060	5,756.91	707.23	179.08	466.28	6.28	6.22	0.91
6,252.00	86.77	321.570	5,758.92	731.55	159.95	497.19	3.50	3.13	-1.58
6,284.00	88.19	321.670	5,760.33	756.61	140.11	529.13	4.45	4.44	0.31
Last SDI Curve MWD Survey									
6,346.00	89.60	321.010	5,761.52	805.01	101.38	591.06	2.51	2.27	-1.06
First SDI Lateral MWD Survey									
6,409.00	89.73	320.290	5,761.89	853.73	61.44	653.95	1.16	0.21	-1.14
6,472.00	90.20	321.880	5,761.93	902.74	21.87	716.87	2.63	0.75	2.52
6,535.00	88.72	322.010	5,762.52	952.35	-16.97	779.83	2.36	-2.35	0.21
6,598.00	89.30	322.790	5,763.61	1,002.25	-55.40	842.80	1.54	0.92	1.24
6,662.00	90.71	323.750	5,763.61	1,053.55	-93.67	906.79	2.67	2.20	1.50
6,724.00	90.07	322.860	5,763.18	1,103.26	-130.72	968.78	1.77	-1.03	-1.44
6,787.00	89.97	323.090	5,763.16	1,153.56	-168.66	1,031.77	0.40	-0.16	0.37
6,851.00	89.66	321.680	5,763.37	1,204.25	-207.72	1,095.75	2.26	-0.48	-2.20
6,914.00	89.43	320.790	5,763.87	1,253.37	-247.16	1,158.68	1.46	-0.37	-1.41
6,977.00	89.87	320.660	5,764.25	1,302.14	-287.04	1,221.58	0.73	0.70	-0.21
7,040.00	90.30	320.860	5,764.16	1,350.93	-326.89	1,284.48	0.75	0.68	0.32
7,103.00	89.63	319.040	5,764.20	1,399.16	-367.43	1,347.32	3.08	-1.06	-2.89
7,166.00	89.56	319.850	5,764.64	1,447.02	-408.39	1,410.13	1.29	-0.11	1.29
7,230.00	90.54	320.980	5,764.59	1,496.34	-449.17	1,474.00	2.34	1.53	1.77
7,293.00	90.00	319.180	5,764.29	1,544.66	-489.60	1,536.86	2.98	-0.86	-2.86
7,356.00	89.06	318.670	5,764.81	1,592.15	-530.99	1,599.61	1.70	-1.49	-0.81



Scientific Drilling, Intl
Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

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)
7,420.00	90.07	320.890	5,765.29	1,641.01	-572.31	1,663.44	3.81	1.58	3.47
7,482.00	89.46	321.970	5,765.55	1,689.48	-610.96	1,725.38	2.00	-0.98	1.74
7,545.00	88.15	321.970	5,766.86	1,739.10	-649.77	1,788.33	2.08	-2.08	0.00
7,609.00	88.12	321.520	5,768.94	1,789.33	-689.37	1,852.25	0.70	-0.05	-0.70
7,671.00	88.52	321.690	5,770.76	1,837.90	-727.86	1,914.17	0.70	0.65	0.27
7,735.00	88.79	321.140	5,772.26	1,887.91	-767.77	1,978.09	0.96	0.42	-0.86
7,798.00	89.03	320.290	5,773.46	1,936.66	-807.65	2,040.98	1.40	0.38	-1.35
7,861.00	89.50	321.220	5,774.27	1,985.45	-847.50	2,103.87	1.65	0.75	1.48
7,924.00	89.70	321.540	5,774.71	2,034.67	-886.82	2,166.81	0.60	0.32	0.51
7,987.00	89.97	321.240	5,774.89	2,083.90	-926.14	2,229.75	0.64	0.43	-0.48
8,050.00	90.10	320.880	5,774.85	2,132.90	-965.73	2,292.67	0.61	0.21	-0.57
8,114.00	89.97	319.740	5,774.82	2,182.15	-1,006.60	2,356.54	1.79	-0.20	-1.78
8,177.00	90.23	319.320	5,774.71	2,230.08	-1,047.49	2,419.35	0.78	0.41	-0.67
8,240.00	90.50	318.940	5,774.30	2,277.71	-1,088.72	2,482.13	0.74	0.43	-0.60
8,303.00	90.27	319.310	5,773.88	2,325.35	-1,129.94	2,544.90	0.69	-0.37	0.59
8,366.00	90.23	318.980	5,773.61	2,373.00	-1,171.15	2,607.68	0.53	-0.06	-0.52
8,427.00	90.24	318.390	5,773.36	2,418.82	-1,211.43	2,668.43	0.97	0.02	-0.97
8,490.00	90.57	317.970	5,772.91	2,465.77	-1,253.43	2,731.11	0.85	0.52	-0.67
8,552.00	89.87	317.310	5,772.67	2,511.58	-1,295.21	2,792.73	1.55	-1.13	-1.06
8,614.00	89.73	316.460	5,772.89	2,556.84	-1,337.58	2,854.26	1.39	-0.23	-1.37
8,676.00	90.50	316.660	5,772.76	2,601.85	-1,380.21	2,915.75	1.28	1.24	0.32
8,737.00	90.13	316.060	5,772.43	2,646.00	-1,422.31	2,976.22	1.16	-0.61	-0.98
8,800.00	89.03	315.680	5,772.89	2,691.22	-1,466.17	3,038.59	1.85	-1.75	-0.60
8,862.00	89.26	315.330	5,773.82	2,735.44	-1,509.62	3,099.91	0.68	0.37	-0.56
8,924.00	89.46	315.660	5,774.51	2,779.65	-1,553.08	3,161.24	0.62	0.32	0.53
8,986.00	88.79	316.520	5,775.46	2,824.31	-1,596.07	3,222.65	1.76	-1.08	1.39
9,048.00	88.32	316.090	5,777.02	2,869.12	-1,638.89	3,284.08	1.03	-0.76	-0.69
9,111.00	87.24	316.100	5,779.46	2,914.48	-1,682.54	3,346.44	1.71	-1.71	0.02
9,173.00	88.42	316.180	5,781.81	2,959.15	-1,725.47	3,407.82	1.91	1.90	0.13
9,234.00	88.39	315.320	5,783.50	3,002.83	-1,768.02	3,468.18	1.41	-0.05	-1.41
9,296.00	88.79	315.070	5,785.03	3,046.81	-1,811.70	3,529.44	0.76	0.65	-0.40
9,357.00	88.89	315.170	5,786.26	3,090.02	-1,854.73	3,589.71	0.23	0.16	0.16
9,419.00	89.09	314.620	5,787.36	3,133.77	-1,898.64	3,650.93	0.94	0.32	-0.89
9,480.00	89.09	314.220	5,788.33	3,176.46	-1,942.21	3,711.08	0.66	0.00	-0.66
9,542.00	89.53	314.990	5,789.07	3,220.00	-1,986.34	3,772.25	1.43	0.71	1.24
9,603.00	89.90	315.120	5,789.38	3,263.17	-2,029.44	3,832.52	0.64	0.61	0.21
9,665.00	89.90	315.610	5,789.48	3,307.29	-2,073.00	3,893.83	0.79	0.00	0.79
9,727.00	89.80	315.470	5,789.65	3,351.54	-2,116.42	3,955.16	0.28	-0.16	-0.23
9,790.00	89.83	314.970	5,789.85	3,396.26	-2,160.80	4,017.44	0.80	0.05	-0.79
9,853.00	89.83	313.980	5,790.04	3,440.40	-2,205.75	4,079.58	1.57	0.00	-1.57
9,916.00	90.60	314.800	5,789.80	3,484.47	-2,250.77	4,141.70	1.79	1.22	1.30
9,979.00	90.87	315.550	5,788.99	3,529.15	-2,295.18	4,203.96	1.27	0.43	1.19
10,042.00	90.94	314.920	5,788.00	3,573.87	-2,339.54	4,266.23	1.01	0.11	-1.00



Scientific Drilling, Intl Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,105.00	89.63	315.080	5,787.68	3,618.42	-2,384.08	4,328.46	2.09	-2.08	0.25
10,168.00	89.87	315.340	5,787.96	3,663.13	-2,428.47	4,390.73	0.56	0.38	0.41
10,231.00	89.66	316.220	5,788.22	3,708.28	-2,472.40	4,453.10	1.44	-0.33	1.40
10,294.00	90.91	317.440	5,787.90	3,754.22	-2,515.50	4,515.61	2.77	1.98	1.94
10,357.00	90.20	316.690	5,787.29	3,800.34	-2,558.41	4,578.15	1.64	-1.13	-1.19
10,420.00	90.30	316.210	5,787.02	3,846.00	-2,601.82	4,640.61	0.78	0.16	-0.76
10,483.00	90.81	315.810	5,786.41	3,891.33	-2,645.57	4,703.01	1.03	0.81	-0.63
10,525.00	90.77	315.150	5,785.83	3,921.27	-2,675.02	4,744.55	1.57	-0.10	-1.57
10,588.00	90.71	316.210	5,785.02	3,966.34	-2,719.03	4,806.89	1.69	-0.10	1.68
10,651.00	89.50	315.670	5,784.90	4,011.61	-2,762.84	4,869.28	2.10	-1.92	-0.86
10,714.00	90.07	316.580	5,785.14	4,057.02	-2,806.50	4,931.69	1.70	0.90	1.44
10,777.00	91.38	317.320	5,784.34	4,103.05	-2,849.50	4,994.22	2.39	2.08	1.17
10,840.00	90.71	317.670	5,783.19	4,149.49	-2,892.06	5,056.81	1.20	-1.06	0.56
10,903.00	90.87	317.310	5,782.32	4,195.93	-2,934.63	5,119.40	0.63	0.25	-0.57
10,966.00	90.87	317.860	5,781.37	4,242.43	-2,977.12	5,182.01	0.87	0.00	0.87
11,029.00	88.86	317.750	5,781.51	4,289.11	-3,019.43	5,244.64	3.20	-3.19	-0.17
11,092.00	88.49	317.840	5,782.97	4,335.76	-3,061.74	5,307.27	0.60	-0.59	0.14
11,155.00	89.23	318.030	5,784.22	4,382.52	-3,103.94	5,369.91	1.21	1.17	0.30
11,218.00	89.76	317.520	5,784.78	4,429.17	-3,146.28	5,432.54	1.17	0.84	-0.81
11,281.00	90.10	316.520	5,784.86	4,475.26	-3,189.23	5,495.08	1.68	0.54	-1.59
11,344.00	88.96	316.230	5,785.37	4,520.86	-3,232.69	5,557.53	1.87	-1.81	-0.46
11,407.00	89.60	316.450	5,786.17	4,566.44	-3,276.18	5,619.97	1.07	1.02	0.35
11,470.00	88.66	316.010	5,787.12	4,611.92	-3,319.76	5,682.40	1.65	-1.49	-0.70
11,533.00	88.59	316.740	5,788.63	4,657.51	-3,363.21	5,744.83	1.16	-0.11	1.16
11,596.00	89.33	316.210	5,789.78	4,703.19	-3,406.59	5,807.29	1.44	1.17	-0.84
11,659.00	90.17	316.090	5,790.05	4,748.62	-3,450.23	5,869.70	1.35	1.33	-0.19
11,723.00	89.09	316.860	5,790.47	4,795.02	-3,494.30	5,933.16	2.07	-1.69	1.20
11,785.00	88.76	317.690	5,791.63	4,840.56	-3,536.36	5,994.73	1.44	-0.53	1.34
11,848.00	89.13	317.310	5,792.79	4,887.00	-3,578.92	6,057.32	0.84	0.59	-0.60
11,912.00	89.50	317.990	5,793.55	4,934.29	-3,622.03	6,120.93	1.21	0.58	1.06
11,975.00	89.60	318.850	5,794.05	4,981.42	-3,663.84	6,183.64	1.37	0.16	1.37
12,038.00	89.26	319.510	5,794.68	5,029.09	-3,705.02	6,246.42	1.18	-0.54	1.05
12,102.00	89.43	320.590	5,795.41	5,078.15	-3,746.11	6,310.26	1.71	0.27	1.69
12,165.00	90.30	320.460	5,795.56	5,126.78	-3,786.16	6,373.15	1.40	1.38	-0.21
12,228.00	89.03	322.890	5,795.92	5,176.20	-3,825.22	6,436.10	4.35	-2.02	3.86
12,291.00	88.46	324.150	5,797.30	5,226.84	-3,862.67	6,499.08	2.19	-0.90	2.00
12,354.00	89.29	323.690	5,798.54	5,277.75	-3,899.76	6,562.06	1.51	1.32	-0.73
12,418.00	88.92	324.160	5,799.54	5,329.47	-3,937.45	6,626.06	0.93	-0.58	0.73
12,481.00	89.13	324.340	5,800.61	5,380.59	-3,974.25	6,689.05	0.44	0.33	0.29
12,544.00	89.90	324.090	5,801.15	5,431.69	-4,011.09	6,752.04	1.29	1.22	-0.40
12,607.00	90.24	323.460	5,801.07	5,482.52	-4,048.32	6,815.04	1.14	0.54	-1.00
12,671.00	88.02	323.070	5,802.04	5,533.80	-4,086.59	6,879.03	3.52	-3.47	-0.61
12,734.00	87.85	325.340	5,804.31	5,584.86	-4,123.41	6,941.98	3.61	-0.27	3.60



Scientific Drilling, Intl
Survey Report



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

Local Co-ordinate Reference: Well Federal 2307-7P COM 2H - Slot 7P 2H
TVD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
MD Reference: GL 7272' & RKB 14' @ 7286.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Grand Junction District

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)
12,797.00	88.15	325.880	5,806.51	5,636.82	-4,158.97	7,004.92	0.98	0.48	0.86
12,860.00	89.87	326.790	5,807.60	5,689.24	-4,193.89	7,067.85	3.09	2.73	1.44
12,923.00	90.77	326.810	5,807.25	5,741.96	-4,228.38	7,130.77	1.43	1.43	0.03
12,986.00	90.23	326.410	5,806.70	5,794.55	-4,263.05	7,193.70	1.07	-0.86	-0.63
13,049.00	89.43	325.300	5,806.88	5,846.69	-4,298.41	7,256.66	2.17	-1.27	-1.76
13,112.00	89.56	325.170	5,807.44	5,898.45	-4,334.33	7,319.64	0.29	0.21	-0.21
13,176.00	90.17	324.570	5,807.59	5,950.79	-4,371.16	7,383.63	1.34	0.95	-0.94
13,239.00	90.27	324.150	5,807.35	6,001.99	-4,407.87	7,446.63	0.69	0.16	-0.67
13,302.00	89.73	325.500	5,807.35	6,053.48	-4,444.16	7,509.62	2.31	-0.86	2.14
13,365.00	88.99	325.500	5,808.05	6,105.40	-4,479.84	7,572.59	1.17	-1.17	0.00
13,428.00	89.09	326.590	5,809.11	6,157.65	-4,515.03	7,635.54	1.74	0.16	1.73
13,491.00	90.23	326.970	5,809.48	6,210.35	-4,549.54	7,698.46	1.91	1.81	0.60
13,554.00	90.60	326.250	5,809.02	6,262.95	-4,584.21	7,761.39	1.28	0.59	-1.14
13,617.00	89.03	325.000	5,809.23	6,314.94	-4,619.78	7,824.36	3.19	-2.49	-1.98
13,680.00	88.79	324.430	5,810.43	6,366.36	-4,656.16	7,887.34	0.98	-0.38	-0.90
13,743.00	89.13	323.730	5,811.57	6,417.37	-4,693.12	7,950.33	1.24	0.54	-1.11
13,804.00	90.10	323.770	5,811.98	6,466.56	-4,729.18	8,011.33	1.59	1.59	0.07
Last SDI Lateral MWD Survey									
13,863.00	90.10	323.770	5,811.88	6,514.15	-4,764.06	8,070.33	0.00	0.00	0.00
Projection to TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
437.00	436.97	-0.58	4.69	First SDI Surface MWD Survey
4,895.00	4,840.35	58.06	542.44	Last SDI Surface MWD Survey
4,927.00	4,871.84	58.88	548.06	First SDI Curve MWD Survey
6,284.00	5,760.33	756.61	140.11	Last SDI Curve MWD Survey
6,346.00	5,761.52	805.01	101.38	First SDI Lateral MWD Survey
13,804.00	5,811.98	6,466.56	-4,729.18	Last SDI Lateral MWD Survey
13,863.00	5,811.88	6,514.15	-4,764.06	Projection to TD

Checked By: _____ Approved By: _____ Date: _____