

Form 3160-5
(June 2019)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB No. 1004-0137
Expires: October 31, 2021**SUNDRY NOTICES AND REPORTS ON WELLS**
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.5. Lease Serial No. **NMSF078764**

6. If Indian, Allottee or Tribe Name

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☐ Oil Well ☐ Gas Well ☒ Other2. Name of Operator **LOGOS OPERATING LLC**3a. Address **2010 AFTON PLACE, FARMINGTON, NM 87401** 3b. Phone No. (include area code)
(505) 278-87204. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SEC 3/T31N/R5W/NMP7. If Unit of CA/Agreement, Name and/or No.
ROSA UNIT- MANCOS PA/NMNM78407E8. Well Name and No. **ROSA UT/665H**9. API Well No. **3003931358**10. Field and Pool or Exploratory Area
BASIN MANCOS/MANCOS W11. Country or Parish, State
RIO ARRIBA/NM**12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA**

TYPE OF SUBMISSION	TYPE OF ACTION				
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off	
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity	
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other	
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon		
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal		

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has detennined that the site is ready for final inspection.)

LOGOS Operating request a change in plans for the following:

Original TD @ 17,449' MD 6,954' TVD to new TD @ 17,957' MD 6,974' TVD.

Geology tops have been updated per changes.

Original KOP @ 6,557' MD 6,359' TVD to new KOP @ 6,514' MD 6,335' TVD

Original Landing point @ 7,560' MD 6,973' TVD to new Landing point @ 7,562' MD 6,999' TVD

Original 9.625" casing Intermediate @ 6,415' MD to 6,419' MD 6,288' TVD

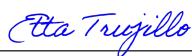
Original 5.5" casing Production @ 17,449' MD to 17,957' MD 6,974' TVD

Original 9.625" Intermediate & 5.5" production cementing bbls and sacks have been update per casing depth changes.

Attached: New C102, Operation and Directional Drill plans.

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)
ETTA TRUJILLO / Ph: (505) 324-4154Title **Regulatory Specialist**

Signature



Date

04/21/2022**THE SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved by

Title

Date

Conditions of approval, if any, are attached. Approval of this notice 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.

Office

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.

(Instructions on page 2)

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

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

Etta Trujillo 4/21/2022
Signature Date
Etta Trujillo
Printed Name
etrujillo@logosresourcesllc.com
E-mail Address

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

Date Revised: APRIL 12, 2022
Survey Date: SEPTEMBER 3, 2015

Signature and Seal of Professional Surveyor



JASON C. EDWARDS
Certificate Number 15269

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-039-31358	² Pool Code 97232	³ Pool Name BASIN MANCOS
⁴ Property Code 320608	⁵ Property Name ROSA UNIT	⁶ Well Number 665H
⁷ OGRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC	⁹ Elevation 6394'

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
K	30	31N	5W	3	2277	SOUTH	967	WEST	RIO ARriba

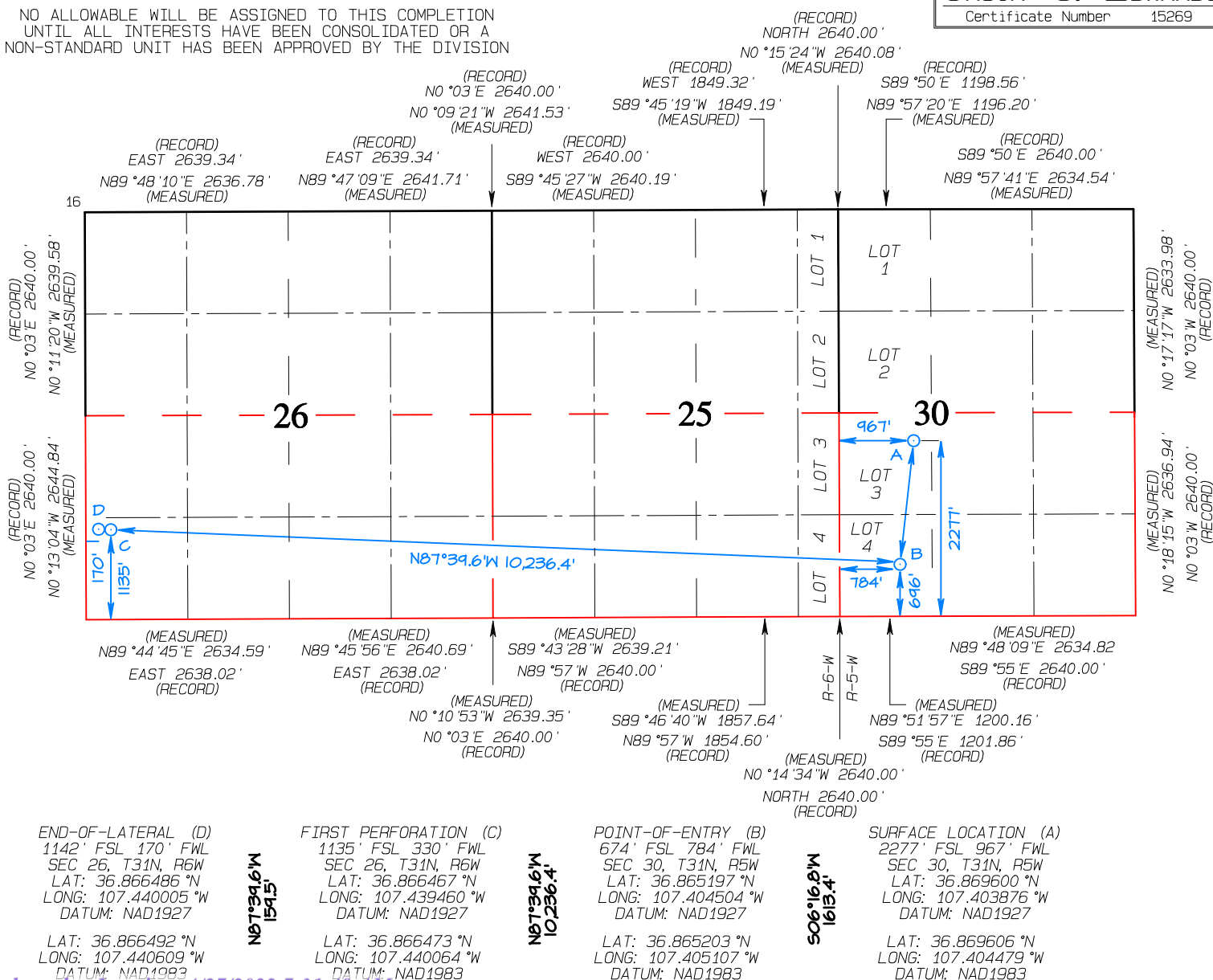
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	26	31N	6W		1142	SOUTH	170	WEST	RIO ARriba

¹² Dedicated Acres	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
825.11 REFER TO DESCRIPTION BELOW			R-13457

T31N R5W, Section 30 : Lot 3 & 4, SE/4
T31N R6W, Section 25 : Lot 3 & 4, W/2 SE/4, SW/4
T31N R6W, Section 26 : S/2

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





Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 30

Rosa Unit #665H

OH

Plan #10

Anticollision Report

12 April, 2022





Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Reference	Plan #10		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum centre distance of 2,500.00ft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	4/12/2022		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	17,956.80	Plan #10 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 30						
Rosa Unit #658H - OH - Plan #4	400.00	400.00	45.13	42.44	16.763	CC
Rosa Unit #658H - OH - Plan #4	500.00	500.00	45.56	42.16	13.397	ES
Rosa Unit #658H - OH - Plan #4	17,956.80	17,206.02	1,498.09	858.93	2.344	SF
Rosa Unit #662H - OH - Plan #4	400.00	400.00	31.26	28.57	11.612	CC
Rosa Unit #662H - OH - Plan #4	500.00	500.00	31.66	28.26	9.309	ES
Rosa Unit #662H - OH - Plan #4	600.00	599.93	34.85	30.76	8.517	SF
Rosa Unit #664H - OH - Plan #4	756.12	755.54	6.33	1.14	1.219	Level 3, CC, ES, SF
Rosa Unit 160 - OH - OH	5,700.01	5,568.19	2,152.95	1,957.50	11.015	SF
Rosa Unit 160 - OH - OH	9,167.96	5,573.01	1,524.95	1,443.32	18.681	CC
Rosa Unit 160 - OH - OH	9,200.02	5,573.01	1,525.29	1,443.22	18.585	ES
Rosa Unit 160A - OH - OH	11,400.02	6,109.01	916.10	794.92	7.560	CC, ES
Rosa Unit 160A - OH - OH	12,000.02	6,109.01	1,086.62	917.99	6.444	SF
Rosa Unit 160D - OH - OH	12,150.74	7,096.79	234.25	54.44	1.303	Level 3, CC, ES, SF
Rosa Unit 162 - OH - OH	2,219.34	2,161.20	310.69	235.79	4.148	CC
Rosa Unit 162 - OH - OH	2,400.00	2,336.70	313.74	232.62	3.868	ES
Rosa Unit 162 - OH - OH	2,900.01	2,820.68	353.41	255.48	3.609	SF
Rosa Unit 162C - OH - OH	6,545.53	6,380.09	214.71	-10.07	0.955	Level 3, CC
Rosa Unit 162C - OH - OH	6,600.01	6,432.93	216.20	-10.59	0.953	Level 3, ES, SF
Rosa Unit 233 - OH - OH	3,060.70	2,976.37	119.72	-8.36	0.935	Level 3, CC
Rosa Unit 233 - OH - OH	3,100.01	3,014.46	120.11	-9.66	0.926	Level 3, ES, SF
Rosa Unit 59 - OH - OH	11,300.02	6,975.23	270.43	-68.84	0.797	Level 3, CC, ES, SF
Rosa Unit 5A - OH - OH	14,000.03	6,031.01	968.78	880.13	10.928	CC
Rosa Unit 5A - OH - OH	14,100.03	6,031.01	976.07	877.35	9.887	ES
Rosa Unit 5A - OH - OH	14,700.03	6,031.01	1,207.42	1,032.29	6.894	SF
Rosa Unit 8 - OH - OH	17,200.03	5,865.01	1,121.92	1,032.20	12.505	CC
Rosa Unit 8 - OH - OH	17,500.04	5,865.01	1,152.80	1,013.19	8.257	ES
Rosa Unit 8 - OH - OH	17,956.80	5,865.01	1,334.76	1,127.52	6.441	SF
Rosa Unit 8C - OH - OH	16,089.10	6,100.01	972.33	767.27	4.742	CC
Rosa Unit 8C - OH - OH	16,100.03	6,100.01	972.39	767.06	4.736	ES
Rosa Unit 8C - OH - OH	16,400.03	6,100.01	1,020.84	798.49	4.591	SF
Rosa Unit 99 - OH - OH	16,296.62	6,995.88	240.18	-313.98	0.433	Level 3, CC
Rosa Unit 99 - OH - OH	16,300.03	6,995.87	240.21	-314.15	0.433	Level 3, ES, SF
Rosa Unit 99Y - OH - OH	16,329.40	6,995.80	205.46	-349.67	0.370	Level 3, CC, ES, SF



Lonestar Consulting, LLC

Anticollision Report



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Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - Plan #4												Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (ft)		Minimum Separation (ft)	Separation Factor	Warning
+N/-S (ft)	+E/-W (ft)												
0.00	0.00	0.00	0.00	0.00	0.00	-27.33	40.09	-20.72	45.13				
100.00	100.00	100.00	100.00	0.27	0.27	-27.33	40.09	-20.72	45.13	44.59	0.54	83.370	
200.00	200.00	200.00	200.00	0.63	0.63	-27.33	40.09	-20.72	45.13	43.87	1.26	35.866	
300.00	300.00	300.00	300.00	0.99	0.99	-27.33	40.09	-20.72	45.13	43.15	1.98	22.847	
400.00	400.00	400.00	400.00	1.35	1.35	-27.33	40.09	-20.72	45.13	42.44	2.69	16.763 CC	
404.45	404.45	404.45	404.45	1.36	1.36	170.96	40.09	-20.72	45.13	42.41	2.72	16.569	
500.00	500.00	500.00	500.00	1.70	1.70	171.04	40.09	-20.72	45.56	42.16	3.40	13.397 ES	
600.00	599.93	599.93	599.93	2.03	2.06	171.67	40.09	-20.72	49.01	44.92	4.09	11.976	
700.00	699.68	699.68	699.68	2.37	2.42	172.68	40.09	-20.72	55.92	51.13	4.79	11.666	
800.00	799.13	799.13	799.13	2.73	2.78	173.81	40.09	-20.72	66.30	60.80	5.50	12.054	
900.00	898.15	898.15	898.15	3.09	3.13	174.86	40.09	-20.72	80.15	73.94	6.21	12.906	
1,000.00	996.63	996.63	996.63	3.48	3.48	175.75	40.09	-20.72	97.46	90.54	6.92	14.079	
1,100.00	1,094.44	1,092.44	1,092.43	3.89	3.83	176.38	41.10	-21.29	119.37	111.74	7.63	15.650	
1,200.00	1,191.49	1,189.07	1,189.05	4.33	4.17	176.87	42.53	-22.10	145.06	136.72	8.34	17.392	
1,300.00	1,288.28	1,285.43	1,285.39	4.79	4.52	177.25	43.95	-22.90	171.78	162.74	9.04	18.996	
1,400.00	1,385.07	1,381.79	1,381.74	5.25	4.86	177.52	45.37	-23.70	198.50	188.75	9.75	20.359	
1,500.00	1,481.86	1,478.15	1,478.09	5.73	5.20	177.73	46.80	-24.51	225.23	214.77	10.46	21.531	
1,600.00	1,578.66	1,574.51	1,574.43	6.21	5.55	177.90	48.22	-25.31	251.96	240.78	11.17	22.548	
1,700.00	1,675.45	1,670.87	1,670.78	6.70	5.89	178.03	49.65	-26.12	278.69	266.79	11.89	23.438	
1,800.00	1,772.24	1,767.23	1,767.12	7.19	6.24	178.14	51.07	-26.92	305.42	292.81	12.61	24.223	
1,900.00	1,869.03	1,863.59	1,863.47	7.68	6.58	178.24	52.50	-27.72	332.15	318.82	13.33	24.921	
2,000.00	1,965.83	1,959.95	1,959.82	8.17	6.93	178.32	53.92	-28.53	358.88	344.83	14.05	25.544	
2,100.00	2,062.62	2,056.31	2,056.16	8.67	7.27	178.38	55.35	-29.33	385.61	370.84	14.77	26.105	
2,200.00	2,159.41	2,152.67	2,152.51	9.17	7.62	178.44	56.77	-30.14	412.34	396.85	15.50	26.611	
2,300.00	2,256.20	2,249.03	2,248.85	9.67	7.96	178.49	58.20	-30.94	439.08	422.86	16.22	27.071	
2,400.00	2,352.99	2,345.39	2,345.20	10.18	8.31	178.54	59.62	-31.75	465.81	448.87	16.94	27.490	
2,500.01	2,449.79	2,441.75	2,441.55	10.68	8.66	178.58	61.04	-32.55	492.55	474.87	17.67	27.874	
2,600.01	2,546.58	2,538.11	2,537.89	11.18	9.00	178.62	62.47	-33.35	519.28	500.88	18.40	28.226	
2,700.01	2,643.37	2,634.47	2,634.24	11.69	9.35	178.65	63.89	-34.16	546.01	526.89	19.12	28.551	
2,800.01	2,740.16	2,730.83	2,730.59	12.20	9.69	178.68	65.32	-34.96	572.75	552.90	19.85	28.852	
2,900.01	2,836.96	2,827.19	2,826.93	12.70	10.04	178.71	66.74	-35.77	599.48	578.90	20.58	29.130	
3,000.01	2,933.75	2,923.55	2,923.28	13.21	10.38	178.73	68.17	-36.57	626.22	604.91	21.31	29.389	
3,100.01	3,030.54	3,019.91	3,019.62	13.72	10.73	178.76	69.59	-37.38	652.95	630.92	22.04	29.630	
3,200.01	3,127.33	3,116.27	3,115.97	14.23	11.07	178.78	71.02	-38.18	679.69	656.92	22.77	29.856	
3,300.01	3,224.13	3,212.63	3,212.32	14.74	11.42	178.80	72.44	-38.98	706.42	682.93	23.49	30.067	
3,400.01	3,320.92	3,308.99	3,308.66	15.25	11.76	178.82	73.87	-39.79	733.16	708.93	24.22	30.265	
3,500.01	3,417.71	3,405.35	3,405.01	15.75	12.11	178.83	75.29	-40.59	759.89	734.94	24.95	30.451	
3,600.01	3,514.50	3,501.71	3,501.35	16.26	12.46	178.85	76.71	-41.40	786.63	760.94	25.68	30.626	
3,700.01	3,611.30	3,598.07	3,597.70	16.77	12.80	178.86	78.14	-42.20	813.36	786.95	26.42	30.791	
3,800.01	3,708.09	3,694.43	3,694.05	17.29	13.15	178.88	79.56	-43.01	840.10	812.95	27.15	30.948	
3,900.01	3,804.88	3,790.79	3,790.39	17.80	13.49	178.89	80.99	-43.81	866.83	838.96	27.88	31.095	
4,000.01	3,901.67	3,887.15	3,886.74	18.31	13.84	178.90	82.41	-44.61	893.57	864.96	28.61	31.235	
4,100.01	3,998.46	3,983.51	3,983.08	18.82	14.18	178.91	83.84	-45.42	920.30	890.96	29.34	31.368	
4,200.01	4,095.26	4,079.87	4,079.43	19.33	14.53	178.92	85.26	-46.22	947.04	916.97	30.07	31.494	
4,300.01	4,192.05	4,176.23	4,175.78	19.84	14.88	178.93	86.69	-47.03	973.77	942.97	30.80	31.614	
4,400.01	4,288.84	4,272.59	4,272.12	20.35	15.22	178.94	88.11	-47.83	1,000.51	968.98	31.53	31.728	
4,500.01	4,385.63	4,368.95	4,368.47	20.86	15.57	178.95	89.54	-48.64	1,027.24	994.98	32.27	31.837	
4,600.01	4,482.43	4,465.31	4,464.81	21.38	15.91	178.96	90.96	-49.44	1,053.98	1,020.98	33.00	31.941	
4,700.01	4,579.22	4,561.67	4,561.16	21.89	16.26	178.97	92.38	-50.24	1,080.72	1,046.99	33.73	32.041	
4,800.01	4,676.01	4,658.03	4,657.51	22.40	16.60	178.98	93.81	-51.05	1,107.45	1,072.99	34.46	32.136	



Lonestar Consulting, LLC

Anticollision Report



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Site Error:	0.00 ft	North Reference:	True
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Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - Plan #4													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
							+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
14,500.03	6,983.10	13,750.02	6,996.30	221.40	211.25	90.48	287.67	-7,079.76	1,571.24	1,138.61	432.63	3.632		
14,600.03	6,982.84	13,850.00	6,996.15	224.34	214.26	90.49	289.94	-7,179.71	1,569.12	1,130.53	438.59	3.578		
14,700.03	6,982.57	13,949.98	6,996.00	227.29	217.28	90.49	292.21	-7,279.67	1,567.00	1,122.45	444.55	3.525		
14,800.03	6,982.31	14,049.96	6,995.85	230.24	220.29	90.50	294.48	-7,379.62	1,564.89	1,114.37	450.51	3.474		
14,900.03	6,982.05	14,149.94	6,995.70	233.19	223.30	90.50	296.74	-7,479.57	1,562.77	1,106.29	456.48	3.424		
15,000.03	6,981.78	14,249.91	6,995.54	236.15	226.32	90.51	299.01	-7,579.52	1,560.66	1,098.21	462.45	3.375		
15,100.03	6,981.52	14,349.89	6,995.39	239.10	229.33	90.51	301.28	-7,679.47	1,558.54	1,090.13	468.41	3.327		
15,200.03	6,981.26	14,449.87	6,995.24	242.05	232.34	90.52	303.55	-7,779.43	1,556.42	1,082.04	474.38	3.281		
15,300.03	6,980.99	14,549.85	6,995.09	245.00	235.36	90.52	305.82	-7,879.38	1,554.31	1,073.96	480.35	3.236		
15,400.03	6,980.73	14,649.82	6,994.94	247.96	238.38	90.53	308.09	-7,979.33	1,552.19	1,065.87	486.32	3.192		
15,500.03	6,980.47	14,749.80	6,994.78	250.91	241.39	90.53	310.36	-8,079.28	1,550.08	1,057.79	492.29	3.149		
15,600.03	6,980.20	14,849.78	6,994.63	253.86	244.41	90.54	312.63	-8,179.23	1,547.96	1,049.70	498.26	3.107		
15,700.03	6,979.94	14,949.76	6,994.48	256.82	247.43	90.54	314.90	-8,279.18	1,545.84	1,041.61	504.23	3.066		
15,800.03	6,979.68	15,049.73	6,994.33	259.77	250.44	90.55	317.17	-8,379.14	1,543.73	1,033.52	510.20	3.026		
15,900.03	6,979.41	15,149.71	6,994.18	262.73	253.46	90.55	319.44	-8,479.09	1,541.61	1,025.43	516.18	2.987		
16,000.03	6,979.15	15,249.69	6,994.02	265.68	256.48	90.56	321.70	-8,579.04	1,539.50	1,017.34	522.15	2.948		
16,100.03	6,978.89	15,349.67	6,993.87	268.64	259.50	90.56	323.97	-8,678.99	1,537.38	1,009.25	528.13	2.911		
16,200.03	6,978.63	15,449.65	6,993.72	271.60	262.52	90.57	326.24	-8,778.94	1,535.26	1,001.16	534.10	2.874		
16,300.03	6,978.36	15,549.62	6,993.57	274.55	265.54	90.57	328.51	-8,878.90	1,533.15	993.07	540.08	2.839		
16,400.03	6,978.10	15,649.60	6,993.42	277.51	268.56	90.58	330.78	-8,978.85	1,531.03	984.98	546.05	2.804		
16,500.03	6,977.84	15,749.58	6,993.26	280.47	271.58	90.58	333.05	-9,078.80	1,528.92	976.88	552.03	2.770		
16,600.03	6,977.57	15,849.56	6,993.11	283.43	274.60	90.59	335.32	-9,178.75	1,526.80	968.79	558.01	2.736		
16,700.03	6,977.31	15,949.53	6,992.96	286.38	277.62	90.59	337.59	-9,278.70	1,524.68	960.70	563.99	2.703		
16,800.03	6,977.05	16,049.51	6,992.81	289.34	280.64	90.60	339.86	-9,378.66	1,522.57	952.60	569.97	2.671		
16,900.03	6,976.78	16,149.49	6,992.66	292.30	283.66	90.60	342.13	-9,478.61	1,520.45	944.51	575.95	2.640		
17,000.03	6,976.52	16,249.47	6,992.50	295.26	286.68	90.61	344.40	-9,578.56	1,518.34	936.41	581.93	2.609		
17,100.03	6,976.26	16,349.45	6,992.35	298.22	289.70	90.61	346.66	-9,678.51	1,516.22	928.31	587.91	2.579		
17,200.03	6,975.99	16,449.42	6,992.20	301.18	292.72	90.62	348.93	-9,778.46	1,514.11	920.22	593.89	2.549		
17,300.03	6,975.73	16,549.40	6,992.05	304.14	295.74	90.62	351.20	-9,878.41	1,511.99	912.12	599.87	2.521		
17,400.04	6,975.47	16,649.38	6,991.90	307.10	298.77	90.63	353.47	-9,978.37	1,509.87	904.02	605.85	2.492		
17,500.04	6,975.20	16,749.36	6,991.75	310.06	301.79	90.63	355.74	-10,078.32	1,507.76	895.92	611.84	2.464		
17,600.04	6,974.94	16,849.33	6,991.59	313.02	304.81	90.64	358.01	-10,178.27	1,505.64	887.82	617.82	2.437		
17,700.04	6,974.68	16,949.31	6,991.44	315.98	307.83	90.64	360.28	-10,278.22	1,503.53	879.73	623.80	2.410		
17,800.04	6,974.41	17,049.29	6,991.29	318.94	310.86	90.65	362.55	-10,378.17	1,501.41	871.63	629.78	2.384		
17,900.04	6,974.15	17,149.27	6,991.14	321.90	313.88	90.65	364.82	-10,478.13	1,499.30	863.53	635.77	2.358		
17,956.80	6,974.00	17,206.02	6,991.05	323.59	315.60	90.66	366.11	-10,534.86	1,498.09	858.93	639.17	2.344 SF		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #662H - OH - Plan #4													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (ft)		Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-43.70	22.60	-21.60	31.26					
100.00	100.00	100.00	100.00	0.27	0.27	-43.70	22.60	-21.60	31.26	30.72	0.54	57.754		
200.00	200.00	200.00	200.00	0.63	0.63	-43.70	22.60	-21.60	31.26	30.00	1.26	24.846		
300.00	300.00	300.00	300.00	0.99	0.99	-43.70	22.60	-21.60	31.26	29.29	1.98	15.827		
400.00	400.00	400.00	400.00	1.35	1.35	-43.70	22.60	-21.60	31.26	28.57	2.69	11.612 CC		
404.45	404.45	404.45	404.45	1.36	1.36	154.59	22.60	-21.60	31.26	28.54	2.72	11.479		
500.00	500.00	500.00	500.00	1.70	1.70	154.92	22.60	-21.60	31.66	28.26	3.40	9.309 ES		
600.00	599.93	599.93	599.93	2.03	2.06	157.33	22.60	-21.60	34.85	30.76	4.09	8.517 SF		
700.00	699.68	699.68	699.68	2.37	2.42	161.01	22.60	-21.60	41.37	36.58	4.79	8.632		
800.00	799.13	799.13	799.13	2.73	2.78	164.75	22.60	-21.60	51.37	45.87	5.50	9.340		
900.00	898.15	898.15	898.15	3.09	3.13	167.93	22.60	-21.60	64.91	58.70	6.21	10.451		
1,000.00	996.63	996.63	996.63	3.48	3.48	170.41	22.60	-21.60	81.98	75.05	6.92	11.841		
1,100.00	1,094.44	1,094.44	1,094.44	3.89	3.84	172.29	22.60	-21.60	102.54	94.91	7.64	13.427		
1,200.00	1,191.49	1,191.49	1,191.49	4.33	4.18	173.71	22.60	-21.60	126.48	118.13	8.36	15.138		
1,300.00	1,288.28	1,285.52	1,285.51	4.79	4.52	175.12	23.71	-20.97	152.29	143.24	9.05	16.831		
1,400.00	1,385.07	1,380.44	1,380.35	5.25	4.86	176.78	26.98	-19.12	179.72	169.98	9.75	18.442		
1,500.00	1,481.86	1,476.44	1,476.27	5.73	5.20	178.06	30.46	-17.15	207.39	196.94	10.45	19.842		
1,600.00	1,578.66	1,572.45	1,572.19	6.21	5.54	179.04	33.93	-15.19	235.14	223.98	11.16	21.065		
1,700.00	1,675.45	1,668.45	1,668.11	6.70	5.89	179.82	37.41	-13.22	262.93	251.06	11.88	22.140		
1,800.00	1,772.24	1,764.46	1,764.04	7.19	6.23	-179.56	40.89	-11.25	290.76	278.17	12.59	23.092		
1,900.00	1,869.03	1,860.46	1,859.96	7.68	6.58	-179.04	44.37	-9.28	318.62	305.31	13.31	23.940		
2,000.00	1,965.83	1,956.47	1,955.88	8.17	6.92	-178.61	47.85	-7.31	346.50	332.47	14.03	24.699		
2,100.00	2,062.62	2,052.47	2,051.80	8.67	7.27	-178.24	51.33	-5.34	374.39	359.64	14.75	25.383		
2,200.00	2,159.41	2,148.48	2,147.73	9.17	7.61	-177.92	54.81	-3.37	402.30	386.82	15.47	26.001		
2,300.00	2,256.20	2,244.49	2,243.65	9.67	7.96	-177.65	58.29	-1.40	430.21	414.02	16.20	26.564		
2,400.00	2,352.99	2,340.49	2,339.57	10.18	8.31	-177.40	61.77	0.56	458.14	441.22	16.92	27.077		
2,500.01	2,449.79	2,436.50	2,435.49	10.68	8.65	-177.19	65.25	2.53	486.07	468.42	17.65	27.547		
2,600.01	2,546.58	2,532.50	2,531.42	11.18	9.00	-177.00	68.73	4.50	514.00	495.63	18.37	27.979		
2,700.01	2,643.37	2,628.51	2,627.34	11.69	9.35	-176.83	72.20	6.47	541.94	522.84	19.10	28.377		
2,800.01	2,740.16	2,724.51	2,723.26	12.20	9.69	-176.67	75.68	8.44	569.89	550.06	19.82	28.746		
2,900.01	2,836.96	2,820.52	2,819.18	12.70	10.04	-176.53	79.16	10.41	597.83	577.28	20.55	29.088		
3,000.01	2,933.75	2,916.52	2,915.11	13.21	10.39	-176.40	82.64	12.38	625.78	604.50	21.28	29.406		
3,100.01	3,030.54	3,012.53	3,011.03	13.72	10.73	-176.29	86.12	14.35	653.74	631.73	22.01	29.702		
3,200.01	3,127.33	3,108.54	3,106.95	14.23	11.08	-176.18	89.60	16.31	681.69	658.96	22.74	29.979		
3,300.01	3,224.13	3,204.54	3,202.87	14.74	11.43	-176.08	93.08	18.28	709.65	686.18	23.47	30.239		
3,400.01	3,320.92	3,300.55	3,298.79	15.25	11.78	-175.99	96.56	20.25	737.61	713.41	24.20	30.482		
3,500.01	3,417.71	3,396.55	3,394.72	15.75	12.12	-175.91	100.04	22.22	765.57	740.64	24.93	30.711		
3,600.01	3,514.50	3,492.56	3,490.64	16.26	12.47	-175.83	103.52	24.19	793.54	767.88	25.66	30.926		
3,700.01	3,611.30	3,588.56	3,586.56	16.77	12.82	-175.75	106.99	26.16	821.50	795.11	26.39	31.129		
3,800.01	3,708.09	3,684.57	3,682.48	17.29	13.17	-175.68	110.47	28.13	849.46	822.34	27.12	31.321		
3,900.01	3,804.88	3,780.57	3,778.41	17.80	13.52	-175.62	113.95	30.10	877.43	849.58	27.85	31.503		
4,000.01	3,901.67	3,876.58	3,874.33	18.31	13.86	-175.56	117.43	32.06	905.40	876.81	28.58	31.675		
4,100.01	3,998.46	3,972.59	3,970.25	18.82	14.21	-175.50	120.91	34.03	933.37	904.05	29.32	31.839		
4,200.01	4,095.26	4,068.59	4,066.17	19.33	14.56	-175.45	124.39	36.00	961.33	931.29	30.05	31.994		
4,300.01	4,192.05	4,164.60	4,162.10	19.84	14.91	-175.40	127.87	37.97	989.30	958.52	30.78	32.142		
4,400.01	4,288.84	4,260.60	4,258.02	20.35	15.26	-175.35	131.35	39.94	1,017.27	985.76	31.51	32.282		
4,500.01	4,385.63	4,356.61	4,353.94	20.86	15.60	-175.31	134.83	41.91	1,045.25	1,013.00	32.24	32.416		
4,600.01	4,482.43	4,452.61	4,449.86	21.38	15.95	-175.26	138.31	43.88	1,073.22	1,040.24	32.98	32.544		
4,700.01	4,579.22	4,548.62	4,545.78	21.89	16.30	-175.22	141.78	45.85	1,101.19	1,067.48	33.71	32.667		
4,800.01	4,676.01	4,644.63	4,641.71	22.40	16.65	-175.19	145.26	47.81	1,129.16	1,094.72	34.44	32.784		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #662H - OH - Plan #4													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
4,900.01	4,772.80	4,740.63	4,737.63	22.91	17.00	-175.15	148.74	49.78	1,157.13	1,121.96	35.18	32.896		
5,000.01	4,869.60	4,836.64	4,833.55	23.42	17.34	-175.11	152.22	51.75	1,185.11	1,149.20	35.91	33.003		
5,100.01	4,966.39	4,932.64	4,929.47	23.94	17.69	-175.08	155.70	53.72	1,213.08	1,176.44	36.64	33.106		
5,200.01	5,063.18	5,028.65	5,025.40	24.45	18.04	-175.05	159.18	55.69	1,241.05	1,203.68	37.38	33.204		
5,300.01	5,159.97	5,124.65	5,121.32	24.96	18.39	-175.02	162.66	57.66	1,269.03	1,230.92	38.11	33.299		
5,400.01	5,256.76	5,220.66	5,217.24	25.47	18.74	-174.99	166.14	59.63	1,297.00	1,258.16	38.84	33.390		
5,500.01	5,353.56	5,316.66	5,313.16	25.99	19.09	-174.96	169.62	61.60	1,324.98	1,285.40	39.58	33.477		
5,600.01	5,450.35	5,412.67	5,409.09	26.50	19.43	-174.94	173.10	63.56	1,352.95	1,312.64	40.31	33.562		
5,700.01	5,547.14	5,508.68	5,505.01	27.01	19.78	-174.91	176.57	65.53	1,380.93	1,339.88	41.05	33.643		
5,800.01	5,643.93	5,604.68	5,600.93	27.53	20.13	-174.89	180.05	67.50	1,408.90	1,367.12	41.78	33.721		
5,900.01	5,740.73	5,700.69	5,696.85	28.04	20.48	-174.86	183.53	69.47	1,436.88	1,394.36	42.52	33.796		
6,000.01	5,837.52	5,796.69	5,792.77	28.55	20.83	-174.84	187.01	71.44	1,464.86	1,421.61	43.25	33.869		
6,100.01	5,934.31	5,892.70	5,888.70	29.06	21.18	-174.82	190.49	73.41	1,492.83	1,448.85	43.99	33.939		
6,200.01	6,031.10	5,988.70	5,984.62	29.58	21.52	-174.80	193.97	75.38	1,520.81	1,476.09	44.72	34.007		
6,300.01	6,127.90	6,084.71	6,080.54	30.09	21.87	-174.78	197.45	77.35	1,548.79	1,503.33	45.46	34.073		
6,400.01	6,224.69	6,180.71	6,176.46	30.60	22.22	-174.76	200.93	79.31	1,576.76	1,530.57	46.19	34.136		
6,500.01	6,321.48	6,276.72	6,272.39	31.12	22.57	-174.74	204.41	81.28	1,604.74	1,557.81	46.93	34.197		
6,600.01	6,418.44	6,372.77	6,368.35	31.60	22.92	152.77	207.89	83.25	1,631.52	1,583.87	47.65	34.237		
6,700.01	6,514.48	6,566.30	6,559.20	32.01	23.63	125.79	214.50	110.09	1,652.74	1,603.74	49.01	33.725		
6,800.01	6,607.22	6,719.04	6,698.91	32.35	24.25	113.27	218.80	170.76	1,666.72	1,616.62	50.10	33.268		
6,900.01	6,694.40	6,799.13	6,765.28	32.61	24.61	106.49	220.63	215.45	1,679.41	1,628.59	50.82	33.043		
7,000.01	6,773.86	6,833.65	6,792.06	32.81	24.79	101.57	221.32	237.22	1,694.06	1,642.78	51.28	33.036		
7,100.01	6,843.65	6,841.54	6,798.01	32.96	24.83	97.28	221.46	242.39	1,711.58	1,660.03	51.55	33.199		
7,200.01	6,902.05	6,833.44	6,791.90	33.06	24.79	93.26	221.31	237.08	1,731.75	1,679.97	51.78	33.444		
7,300.01	6,947.62	6,815.27	6,777.95	33.11	24.69	89.44	220.96	225.45	1,753.81	1,701.74	52.07	33.681		
7,400.01	6,979.23	6,790.50	6,758.40	33.13	24.57	85.87	220.45	210.23	1,776.79	1,724.27	52.52	33.830		
7,500.02	6,996.12	6,761.22	6,734.56	33.12	24.43	82.64	219.80	193.25	1,799.66	1,746.49	53.17	33.846		
7,600.02	6,999.00	6,729.36	6,707.77	33.11	24.29	80.54	219.05	176.05	1,821.87	1,767.85	54.02	33.727		
7,700.02	6,999.00	6,700.00	6,682.34	33.30	24.16	79.73	218.32	161.39	1,847.29	1,792.27	55.02	33.574		
7,800.02	6,999.00	6,676.36	6,661.40	34.62	24.07	79.06	217.70	150.45	1,877.03	1,820.86	56.17	33.419		
7,900.02	6,999.00	6,650.00	6,637.57	36.46	23.96	78.31	216.98	139.18	1,911.02	1,853.69	57.32	33.337		
8,000.02	6,999.00	6,650.00	6,637.57	38.46	23.96	78.31	216.98	139.18	1,949.20	1,890.45	58.74	33.182		
8,100.02	6,999.00	6,620.31	6,610.22	40.59	23.84	77.44	216.13	127.68	1,991.14	1,931.28	59.87	33.259		
8,200.02	6,999.00	6,600.00	6,591.21	42.81	23.76	76.85	215.53	120.56	2,036.98	1,975.94	61.04	33.369		
8,300.02	6,999.00	6,600.00	6,591.21	45.11	23.76	76.85	215.53	120.56	2,086.37	2,024.02	62.35	33.461		
8,400.02	6,999.00	6,581.56	6,573.76	47.49	23.69	76.36	214.97	114.62	2,138.99	2,075.55	63.44	33.718		
8,500.02	6,998.88	6,571.20	6,563.89	49.92	23.65	76.31	214.66	111.50	2,192.77	2,128.22	64.55	33.968		
8,600.02	6,998.63	6,550.00	6,543.53	52.41	23.57	75.81	213.99	105.63	2,247.29	2,181.75	65.54	34.289		
8,700.02	6,998.37	6,550.00	6,543.53	54.95	23.57	75.81	213.99	105.63	2,304.29	2,237.66	66.64	34.580		
8,800.02	6,998.11	6,550.00	6,543.53	57.52	23.57	75.81	213.99	105.63	2,364.15	2,296.49	67.66	34.943		
8,900.02	6,997.84	6,550.00	6,543.53	60.14	23.57	75.81	213.99	105.63	2,426.66	2,358.05	68.61	35.371		
9,000.02	6,997.58	6,550.00	6,543.53	62.78	23.57	75.81	213.99	105.63	2,491.61	2,422.13	69.48	35.860		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #4													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
9,600.02	6,996.00	6,725.11	6,568.52	79.13	31.60	48.28	-1,081.12	-682.18	1,649.79	1,588.06	61.72	26.729		
9,700.02	6,995.74	6,700.01	6,544.93	81.92	31.55	47.01	-1,076.60	-689.44	1,742.40	1,680.63	61.76	28.211		
9,800.02	6,995.47	6,700.01	6,544.93	84.72	31.55	47.01	-1,076.60	-689.44	1,835.17	1,773.18	61.99	29.602		
9,900.02	6,995.21	6,700.01	6,544.93	87.53	31.55	47.01	-1,076.60	-689.44	1,928.67	1,866.47	62.19	31.010		
10,000.02	6,994.95	6,700.01	6,544.93	90.35	31.55	47.01	-1,076.60	-689.44	2,022.79	1,960.42	62.37	32.433		
10,100.02	6,994.68	6,700.01	6,544.93	93.17	31.55	47.01	-1,076.60	-689.44	2,117.44	2,054.92	62.52	33.867		
10,200.02	6,994.42	6,700.01	6,544.93	96.01	31.55	47.01	-1,076.60	-689.44	2,212.57	2,149.91	62.66	35.311		
10,300.02	6,994.16	6,676.73	6,522.81	98.86	31.49	45.89	-1,072.34	-695.33	2,307.57	2,244.91	62.66	36.824		
10,400.02	6,993.89	6,671.57	6,517.88	101.71	31.47	45.64	-1,071.39	-696.52	2,403.22	2,340.46	62.76	38.293		
10,500.02	6,993.63	6,650.01	6,497.19	104.57	31.42	44.66	-1,067.38	-701.06	2,499.43	2,436.66	62.77	39.818		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 160 - OH - OH													Offset Site Error: 0.00 ft	
Survey Program: 123-INCLINOMETER		Reference Offset		Semi Major Axis		Offset Wellbore Centre			Rule Assigned: Distance				Offset Well Error: 0.00 ft	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,785.03	6,998.15	5,573.01	5,571.16	57.14	169.23	18.58	-1,031.77	-1,763.37	1,572.29	1,481.38	90.92	17.294		
8,800.02	6,998.11	5,573.01	5,571.16	57.52	169.23	18.58	-1,031.77	-1,763.37	1,568.71	1,478.53	90.18	17.396		
8,883.31	6,997.89	5,573.01	5,571.16	59.70	169.23	18.58	-1,031.77	-1,763.37	1,551.29	1,464.82	86.46	17.942		
8,900.02	6,997.84	5,573.01	5,571.16	60.14	169.23	18.58	-1,031.77	-1,763.37	1,548.31	1,462.50	85.81	18.043		
8,981.55	6,997.63	5,573.01	5,571.16	62.29	169.23	18.58	-1,031.77	-1,763.37	1,536.30	1,453.11	83.19	18.467		
9,000.02	6,997.58	5,573.01	5,571.16	62.78	169.23	18.58	-1,031.77	-1,763.37	1,534.17	1,451.43	82.74	18.541		
9,079.75	6,997.37	5,573.01	5,571.16	64.91	169.23	18.58	-1,031.77	-1,763.37	1,527.50	1,445.98	81.52	18.738		
9,100.02	6,997.32	5,573.01	5,571.16	65.45	169.23	18.58	-1,031.77	-1,763.37	1,526.46	1,445.06	81.40	18.752		
9,167.96	6,997.14	5,573.01	5,571.16	67.29	169.23	18.58	-1,031.77	-1,763.37	1,524.95	1,443.32	81.63	18.681	CC	
9,200.02	6,997.05	5,573.01	5,571.16	68.15	169.23	18.58	-1,031.77	-1,763.37	1,525.29	1,443.22	82.07	18.585	ES	
9,300.02	6,996.79	5,573.01	5,571.16	70.87	169.23	18.58	-1,031.77	-1,763.37	1,530.66	1,445.89	84.76	18.058		
9,400.02	6,996.53	5,573.01	5,571.16	73.61	169.23	18.58	-1,031.77	-1,763.37	1,542.51	1,453.30	89.21	17.291		
9,500.02	6,996.26	5,573.01	5,571.16	76.36	169.23	18.58	-1,031.77	-1,763.37	1,560.68	1,465.73	94.95	16.437		
9,600.02	6,996.00	5,573.01	5,571.16	79.13	169.23	18.58	-1,031.77	-1,763.37	1,584.98	1,483.46	101.51	15.614		
9,700.02	6,995.74	5,573.01	5,571.16	81.92	169.23	18.58	-1,031.77	-1,763.37	1,615.10	1,506.63	108.48	14.889		
9,800.02	6,995.47	5,573.01	5,571.16	84.72	169.23	18.58	-1,031.77	-1,763.37	1,650.75	1,535.22	115.53	14.288		
9,900.02	6,995.21	5,573.01	5,571.16	87.53	169.23	18.58	-1,031.77	-1,763.37	1,691.56	1,569.11	122.46	13.814		
10,000.02	6,994.95	5,573.01	5,571.16	90.35	169.23	18.58	-1,031.77	-1,763.37	1,737.18	1,608.09	129.10	13.456		
10,100.02	6,994.68	5,573.01	5,571.16	93.17	169.23	18.58	-1,031.77	-1,763.37	1,787.24	1,651.87	135.36	13.203		
10,200.02	6,994.42	5,573.01	5,571.16	96.01	169.23	18.58	-1,031.77	-1,763.37	1,841.37	1,700.16	141.21	13.040		
10,300.02	6,994.16	5,573.01	5,571.16	98.86	169.23	18.58	-1,031.77	-1,763.37	1,899.22	1,752.61	146.61	12.954		
10,400.02	6,993.89	5,573.01	5,571.16	101.71	169.23	18.58	-1,031.77	-1,763.37	1,960.47	1,808.90	151.57	12.934		
10,500.02	6,993.63	5,573.01	5,571.16	104.57	169.23	18.58	-1,031.77	-1,763.37	2,024.81	1,868.71	156.11	12.971		
10,600.02	6,993.37	5,573.01	5,571.16	107.43	169.23	18.58	-1,031.77	-1,763.37	2,091.96	1,931.72	160.24	13.055		
10,700.02	6,993.10	5,573.01	5,571.16	110.30	169.23	18.58	-1,031.77	-1,763.37	2,161.64	1,997.65	164.00	13.181		
10,800.02	6,992.84	5,573.01	5,571.16	113.18	169.23	18.58	-1,031.77	-1,763.37	2,233.63	2,066.22	167.41	13.342		
10,900.02	6,992.58	5,573.01	5,571.16	116.06	169.23	18.58	-1,031.77	-1,763.37	2,307.71	2,137.21	170.50	13.535		
11,000.02	6,992.31	5,573.01	5,571.16	118.95	169.23	18.58	-1,031.77	-1,763.37	2,383.68	2,210.37	173.31	13.754		
11,100.02	6,992.05	5,573.01	5,571.16	121.84	169.23	18.58	-1,031.77	-1,763.37	2,461.37	2,285.51	175.86	13.996		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 160A - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 125-INCLINOMETER													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
13,200.03	6,986.52	6,109.01	6,106.71	183.13	185.50	20.49	-1,098.20	-4,017.47	2,005.93	1,793.70	212.23	9.452		
13,300.03	6,986.26	6,109.01	6,106.71	186.07	185.50	20.49	-1,098.20	-4,017.47	2,095.40	1,882.09	213.31	9.823		
13,400.03	6,986.00	6,109.01	6,106.71	189.01	185.50	20.49	-1,098.20	-4,017.47	2,185.77	1,971.53	214.24	10.202		
13,500.03	6,985.73	6,109.01	6,106.71	191.95	185.50	20.49	-1,098.20	-4,017.47	2,276.96	2,061.90	215.05	10.588		
13,600.03	6,985.47	6,109.01	6,106.71	194.89	185.50	20.49	-1,098.20	-4,017.47	2,368.85	2,153.08	215.77	10.979		
13,700.03	6,985.21	6,109.01	6,106.71	197.83	185.50	20.49	-1,098.20	-4,017.47	2,461.37	2,244.98	216.39	11.375		



Lonestar Consulting, LLC Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 160D - OH - OH												Offset Site Error:	0.00 ft
Survey Program: 349-MWD												Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning	
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside		Between	Between	Separation	Factor		
Depth	Depth	Depth	Depth			Toolface	+N/-S	+E/-W	Centres	Ellipses			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
14,600.03	6,982.84	7,108.18	6,969.45	224.34	29.07	-91.63	-1,620.35	-4,778.73	2,460.44	2,388.49	71.95	34.199	



Lonestar Consulting, LLC Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 162 - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 260-INCLINOMETER													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning				
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside								
Depth	Depth	Depth	Depth			Toolface	+N/-S	+E/-W	Between	Between	Minimum	Separation		
(ft)	(ft)	(ft)	(ft)			(°)	(ft)	(ft)	Centres	Ellipses	Separation	Factor		
				(ft)	(ft)				(ft)	(ft)	(ft)			
9,600.02	6,996.00	6,109.01	6,105.80	79.13	185.48	52.62	-436.03	-183.27	2,457.63	2,242.74	214.89	11.437		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 162C - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 290-INCLINOMETER													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
5,000.01	4,869.60	4,884.08	4,883.11	23.42	148.32	-25.87	-1,352.64	664.81	486.74	318.73	168.01	2.897		
5,100.01	4,966.39	4,980.87	4,979.90	23.94	151.26	-27.21	-1,352.64	664.81	464.12	292.66	171.46	2.707		
5,200.01	5,063.18	5,077.67	5,076.69	24.45	154.20	-28.69	-1,352.64	664.81	441.77	266.84	174.93	2.525		
5,300.01	5,159.97	5,174.46	5,173.49	24.96	157.14	-30.32	-1,352.64	664.81	419.73	241.31	178.42	2.353		
5,400.01	5,256.76	5,271.25	5,270.28	25.47	160.08	-32.13	-1,352.64	664.81	398.06	216.13	181.93	2.188		
5,500.01	5,353.56	5,368.04	5,367.07	25.99	163.02	-34.15	-1,352.64	664.81	376.82	191.34	185.48	2.032		
5,600.01	5,450.35	5,464.83	5,463.86	26.50	165.96	-36.39	-1,352.64	664.81	356.08	167.03	189.06	1.883		
5,700.01	5,547.14	5,561.63	5,560.65	27.01	168.90	-38.90	-1,352.64	664.81	335.94	143.27	192.67	1.744		
5,800.01	5,643.93	5,658.42	5,657.45	27.53	171.84	-41.72	-1,352.64	664.81	316.52	120.19	196.33	1.612		
5,900.01	5,740.73	5,755.21	5,754.24	28.04	174.77	-44.88	-1,352.64	664.81	297.95	97.91	200.04	1.489 Level 3		
6,000.01	5,837.52	5,852.00	5,851.03	28.55	177.71	-48.45	-1,352.64	664.81	280.41	76.60	203.80	1.376 Level 3		
6,100.01	5,934.31	5,948.80	5,947.82	29.06	180.65	-52.45	-1,352.64	664.81	264.09	56.47	207.61	1.272 Level 3		
6,200.01	6,031.10	6,045.59	6,044.62	29.58	183.59	-56.93	-1,352.64	664.81	249.24	37.77	211.47	1.179 Level 3		
6,300.01	6,127.90	6,142.38	6,141.41	30.09	186.53	-61.91	-1,352.64	664.81	236.13	20.79	215.35	1.097 Level 3		
6,400.01	6,224.69	6,239.17	6,238.20	30.60	189.47	-67.41	-1,352.64	664.81	225.08	5.86	219.23	1.027 Level 3		
6,500.01	6,321.48	6,335.97	6,334.99	31.12	192.41	-73.38	-1,352.64	664.81	216.40	-6.67	223.06	0.970 Level 3		
6,545.53	6,365.61	6,380.09	6,379.12	31.34	193.75	-90.00	-1,352.64	664.81	214.71	-10.07	224.78	0.955 Level 3, CC		
6,600.01	6,418.44	6,432.93	6,431.96	31.60	195.36	-110.22	-1,352.64	664.81	216.20	-10.59	226.79	0.953 Level 3, ES, SF		
6,700.01	6,514.48	6,528.96	6,527.99	32.01	198.27	-143.22	-1,352.64	664.81	233.76	3.49	230.26	1.015 Level 3		
6,800.01	6,607.22	6,621.71	6,620.73	32.35	201.09	-162.54	-1,352.64	664.81	267.57	34.14	233.43	1.146 Level 3		
6,900.01	6,694.40	6,708.88	6,707.91	32.61	203.74	-174.02	-1,352.64	664.81	315.64	79.31	236.33	1.336 Level 3		
7,000.01	6,773.86	6,788.34	6,787.37	32.81	206.15	178.36	-1,352.64	664.81	376.16	137.23	238.93	1.574		
7,100.01	6,843.65	6,858.13	6,857.16	32.96	208.27	172.38	-1,352.64	664.81	447.52	206.34	241.18	1.856		
7,200.01	6,902.05	6,916.53	6,915.56	33.06	210.04	166.39	-1,352.64	664.81	528.11	285.05	243.05	2.173		
7,300.01	6,947.62	6,962.10	6,961.13	33.11	211.43	158.44	-1,352.64	664.81	616.14	371.66	244.49	2.520		
7,400.01	6,979.23	6,993.72	6,992.75	33.13	212.39	144.67	-1,352.64	664.81	709.67	464.21	245.46	2.891		
7,500.02	6,996.12	7,010.61	7,009.64	33.12	212.90	116.34	-1,352.64	664.81	806.56	560.61	245.96	3.279		
7,600.02	6,999.00	7,013.49	7,012.51	33.11	212.99	90.00	-1,352.64	664.81	904.64	658.64	246.00	3.677		
7,700.02	6,999.00	7,013.49	7,012.51	33.30	212.99	90.00	-1,352.64	664.81	1,003.06	757.09	245.97	4.078		
7,800.02	6,999.00	7,013.49	7,012.51	34.62	212.99	90.00	-1,352.64	664.81	1,101.76	855.82	245.94	4.480		
7,900.02	6,999.00	7,013.49	7,012.51	36.46	212.99	90.00	-1,352.64	664.81	1,200.68	954.76	245.91	4.883		
8,000.02	6,999.00	7,013.49	7,012.51	38.46	212.99	90.00	-1,352.64	664.81	1,299.76	1,053.87	245.89	5.286		
8,100.02	6,999.00	7,013.49	7,012.51	40.59	212.99	90.00	-1,352.64	664.81	1,398.97	1,153.10	245.88	5.690		
8,200.02	6,999.00	7,013.49	7,012.51	42.81	212.99	90.00	-1,352.64	664.81	1,498.29	1,252.43	245.86	6.094		
8,300.02	6,999.00	7,013.49	7,012.51	45.11	212.99	90.00	-1,352.64	664.81	1,597.69	1,351.84	245.85	6.499		
8,400.02	6,999.00	7,013.48	7,012.51	47.49	212.99	89.80	-1,352.64	664.81	1,697.15	1,451.31	245.84	6.903		
8,500.02	6,998.88	7,013.37	7,012.39	49.92	212.98	89.19	-1,352.64	664.81	1,796.41	1,550.58	245.83	7.308		
8,600.02	6,998.63	7,013.12	7,012.15	52.41	212.97	88.96	-1,352.64	664.81	1,895.37	1,649.56	245.81	7.711		
8,700.02	6,998.37	7,012.85	7,011.88	54.95	212.97	88.90	-1,352.64	664.81	1,994.39	1,748.59	245.80	8.114		
8,800.02	6,998.11	7,012.59	7,011.62	57.52	212.96	88.85	-1,352.64	664.81	2,093.50	1,847.72	245.78	8.518		
8,900.02	6,997.84	7,012.33	7,011.36	60.14	212.95	88.79	-1,352.64	664.81	2,192.69	1,946.92	245.77	8.922		
9,000.02	6,997.58	7,012.06	7,011.09	62.78	212.94	88.74	-1,352.64	664.81	2,291.95	2,046.19	245.76	9.326		
9,100.02	6,997.32	7,011.80	7,010.83	65.45	212.93	88.68	-1,352.64	664.81	2,391.28	2,145.53	245.75	9.730		
9,200.02	6,997.05	7,011.54	7,010.57	68.15	212.93	88.63	-1,352.64	664.81	2,490.65	2,244.91	245.74	10.135		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 233 - OH - OH														Offset Site Error:	0.00 ft
Survey Program: 225-UNKNOWN														Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
4,900.01	4,772.80	3,254.00	3,253.62	22.91	125.76	123.61	-566.58	66.29	1,576.28	1,531.52	44.77	35.212			
5,000.01	4,869.60	3,254.00	3,253.62	23.42	125.76	123.61	-566.58	66.29	1,675.92	1,631.45	44.47	37.688			
5,100.01	4,966.39	3,254.00	3,253.62	23.94	125.76	123.61	-566.58	66.29	1,775.60	1,731.37	44.23	40.145			
5,200.01	5,063.18	3,254.00	3,253.62	24.45	125.76	123.61	-566.58	66.29	1,875.32	1,831.27	44.04	42.580			
5,300.01	5,159.97	3,254.00	3,253.62	24.96	125.76	123.61	-566.58	66.29	1,975.06	1,931.16	43.90	44.995			
5,400.01	5,256.76	3,254.00	3,253.62	25.47	125.76	123.61	-566.58	66.29	2,074.83	2,031.04	43.78	47.387			
5,500.01	5,353.56	3,254.00	3,253.62	25.99	125.76	123.61	-566.58	66.29	2,174.62	2,130.91	43.71	49.756			
5,600.01	5,450.35	3,254.00	3,253.62	26.50	125.76	123.61	-566.58	66.29	2,274.42	2,230.77	43.65	52.102			
5,700.01	5,547.14	3,254.00	3,253.62	27.01	125.76	123.61	-566.58	66.29	2,374.25	2,330.62	43.62	54.424			
5,800.01	5,643.93	3,254.00	3,253.62	27.53	125.76	123.61	-566.58	66.29	2,474.09	2,430.47	43.62	56.723			



Lonestar Consulting, LLC
Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 5A - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 122-INCLINOMETER													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
15,800.03	6,979.68	6,031.01	6,029.33	259.77	183.14	-6.84	-1,421.29	-6,597.48	2,062.52	1,847.00	215.52	9.570		
15,900.03	6,979.41	6,031.01	6,029.33	262.73	183.14	-6.84	-1,421.29	-6,597.48	2,151.32	1,934.64	216.67	9.929		
16,000.03	6,979.15	6,031.01	6,029.33	265.68	183.14	-6.84	-1,421.29	-6,597.48	2,241.06	2,023.40	217.67	10.296		
16,100.03	6,978.89	6,031.01	6,029.33	268.64	183.14	-6.84	-1,421.29	-6,597.48	2,331.64	2,113.12	218.52	10.670		
16,200.03	6,978.63	6,031.01	6,029.33	271.60	183.14	-6.84	-1,421.29	-6,597.48	2,422.96	2,203.69	219.27	11.050		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 8 - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 100-UNKNOWN													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
15,000.03	6,981.78	5,865.01	5,865.01	236.15	234.60	0.37	-1,156.13	-9,842.41	2,498.70	2,248.02	250.68	9.968		
15,100.03	6,981.52	5,865.01	5,865.01	239.10	234.60	0.37	-1,156.13	-9,842.41	2,409.76	2,160.30	249.46	9.660		
15,200.03	6,981.26	5,865.01	5,865.01	242.05	234.60	0.37	-1,156.13	-9,842.41	2,321.71	2,073.62	248.09	9.358		
15,300.03	6,980.99	5,865.01	5,865.01	245.00	234.60	0.37	-1,156.13	-9,842.41	2,234.67	1,988.13	246.54	9.064		
15,400.03	6,980.73	5,865.01	5,865.01	247.96	234.60	0.37	-1,156.13	-9,842.41	2,148.76	1,903.97	244.79	8.778		
15,500.03	6,980.47	5,865.01	5,865.01	250.91	234.60	0.37	-1,156.13	-9,842.41	2,064.12	1,821.32	242.80	8.501		
15,600.03	6,980.20	5,865.01	5,865.01	253.86	234.60	0.37	-1,156.13	-9,842.41	1,980.91	1,740.39	240.53	8.236		
15,700.03	6,979.94	5,865.01	5,865.01	256.82	234.60	0.37	-1,156.13	-9,842.41	1,899.32	1,661.41	237.91	7.983		
15,800.03	6,979.68	5,865.01	5,865.01	259.77	234.60	0.37	-1,156.13	-9,842.41	1,819.57	1,584.68	234.90	7.746		
15,900.03	6,979.41	5,865.01	5,865.01	262.73	234.60	0.37	-1,156.13	-9,842.41	1,741.91	1,510.51	231.40	7.528		
16,000.03	6,979.15	5,865.01	5,865.01	265.68	234.60	0.37	-1,156.13	-9,842.41	1,666.64	1,439.30	227.34	7.331		
16,100.03	6,978.89	5,865.01	5,865.01	268.64	234.60	0.37	-1,156.13	-9,842.41	1,594.08	1,371.48	222.60	7.161		
16,198.61	6,978.63	5,865.01	5,865.01	271.55	234.60	0.37	-1,156.13	-9,842.41	1,525.60	1,308.45	217.15	7.025		
16,200.03	6,978.63	5,865.01	5,865.01	271.60	234.60	0.37	-1,156.13	-9,842.41	1,524.64	1,307.57	217.07	7.024		
16,297.05	6,978.37	5,865.01	5,865.01	274.47	234.60	0.37	-1,156.13	-9,842.41	1,460.65	1,249.85	210.80	6.929		
16,300.03	6,978.36	5,865.01	5,865.01	274.55	234.60	0.37	-1,156.13	-9,842.41	1,458.74	1,248.15	210.60	6.927		
16,395.43	6,978.11	5,865.01	5,865.01	277.37	234.60	0.37	-1,156.13	-9,842.41	1,399.65	1,196.25	203.40	6.881		
16,400.03	6,978.10	5,865.01	5,865.01	277.51	234.60	0.37	-1,156.13	-9,842.41	1,396.91	1,193.88	203.03	6.880		
16,493.74	6,977.85	5,865.01	5,865.01	280.28	234.60	0.37	-1,156.13	-9,842.41	1,343.14	1,148.34	194.80	6.895		
16,500.03	6,977.84	5,865.01	5,865.01	280.47	234.60	0.37	-1,156.13	-9,842.41	1,339.69	1,145.48	194.20	6.898		
16,591.96	6,977.59	5,865.01	5,865.01	283.19	234.60	0.37	-1,156.13	-9,842.41	1,291.69	1,106.84	184.85	6.988		
16,600.03	6,977.57	5,865.01	5,865.01	283.43	234.60	0.37	-1,156.13	-9,842.41	1,287.71	1,103.74	183.97	7.000		
16,690.08	6,977.33	5,865.01	5,865.01	286.09	234.60	0.37	-1,156.13	-9,842.41	1,245.92	1,072.50	173.42	7.184		
16,700.03	6,977.31	5,865.01	5,865.01	286.38	234.60	0.37	-1,156.13	-9,842.41	1,241.61	1,069.44	172.17	7.212		
16,788.09	6,977.08	5,865.01	5,865.01	288.99	234.60	0.37	-1,156.13	-9,842.41	1,206.44	1,046.02	160.42	7.520		
16,800.03	6,977.05	5,865.01	5,865.01	289.34	234.60	0.37	-1,156.13	-9,842.41	1,202.09	1,043.36	158.73	7.573		
16,885.99	6,976.82	5,865.01	5,865.01	291.89	234.60	0.37	-1,156.13	-9,842.41	1,173.88	1,028.05	145.83	8.049		
16,900.03	6,976.78	5,865.01	5,865.01	292.30	234.60	0.37	-1,156.13	-9,842.41	1,169.80	1,026.19	143.61	8.146		
16,983.77	6,976.56	5,865.01	5,865.01	294.78	234.60	0.37	-1,156.13	-9,842.41	1,148.78	1,019.06	129.72	8.856		
17,000.03	6,976.52	5,865.01	5,865.01	295.26	234.60	0.37	-1,156.13	-9,842.41	1,145.36	1,018.47	126.90	9.026		
17,081.43	6,976.30	5,865.01	5,865.01	297.67	234.60	0.37	-1,156.13	-9,842.41	1,131.62	1,019.37	112.25	10.081		
17,100.03	6,976.26	5,865.01	5,865.01	298.22	234.60	0.37	-1,156.13	-9,842.41	1,129.28	1,020.49	108.79	10.380		
17,178.84	6,976.05	5,865.01	5,865.01	300.55	234.60	0.37	-1,156.13	-9,842.41	1,122.74	1,028.95	93.79	11.971		
17,200.03	6,975.99	5,865.01	5,865.01	301.18	234.60	0.37	-1,156.13	-9,842.41	1,121.92	1,032.20	89.71	12.505 CC		
17,300.03	6,975.73	5,865.01	5,865.01	304.14	234.60	0.37	-1,156.13	-9,842.41	1,123.44	1,024.47	98.97	11.351		
17,400.04	6,975.47	5,865.01	5,865.01	307.10	234.60	0.37	-1,156.13	-9,842.41	1,133.81	1,013.88	119.93	9.454		
17,500.04	6,975.20	5,865.01	5,865.01	310.06	234.60	0.37	-1,156.13	-9,842.41	1,152.80	1,013.19	139.61	8.257 ES		
17,600.04	6,974.94	5,865.01	5,865.01	313.02	234.60	0.37	-1,156.13	-9,842.41	1,179.99	1,022.32	157.67	7.484		
17,700.04	6,974.68	5,865.01	5,865.01	315.98	234.60	0.37	-1,156.13	-9,842.41	1,214.82	1,040.90	173.92	6.985		
17,800.04	6,974.41	5,865.01	5,865.01	318.94	234.60	0.37	-1,156.13	-9,842.41	1,256.67	1,068.36	188.31	6.674		
17,900.04	6,974.15	5,865.01	5,865.01	321.90	234.60	0.37	-1,156.13	-9,842.41	1,304.85	1,103.98	200.87	6.496		
17,956.80	6,974.00	5,865.01	5,865.01	323.59	234.60	0.37	-1,156.13	-9,842.41	1,334.76	1,127.52	207.24	6.441 SF		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 8C - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 280-INCLINOMETER													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
17,800.04	6,974.41	6,100.01	6,099.14	318.94	185.25	-23.70	-1,604.05	-8,717.74	1,967.93	1,713.18	254.74	7.725		
17,900.04	6,974.15	6,100.01	6,099.14	321.90	185.25	-23.70	-1,604.05	-8,717.74	2,055.46	1,801.11	254.36	8.081		
17,956.80	6,974.00	6,100.01	6,099.14	323.59	185.25	-23.70	-1,604.05	-8,717.74	2,105.64	1,851.54	254.11	8.286		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 99 - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 100-UNKNOWN													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
13,900.03	6,984.68	7,002.19	7,002.19	203.72	280.09	-91.50	-1,444.27	-8,920.79	2,408.58	2,092.43	316.16	7.618		
14,000.03	6,984.42	7,001.93	7,001.93	206.66	280.08	-91.44	-1,444.27	-8,920.79	2,309.11	1,992.51	316.59	7.294		
14,100.03	6,984.15	7,001.67	7,001.67	209.61	280.07	-91.38	-1,444.27	-8,920.79	2,209.67	1,892.57	317.10	6.968		
14,200.03	6,983.89	7,001.40	7,001.40	212.55	280.06	-91.32	-1,444.27	-8,920.79	2,110.29	1,792.59	317.70	6.642		
14,300.03	6,983.63	7,001.14	7,001.14	215.50	280.05	-91.25	-1,444.27	-8,920.79	2,010.97	1,692.58	318.40	6.316		
14,400.03	6,983.36	7,000.88	7,000.88	218.45	280.04	-91.19	-1,444.27	-8,920.79	1,911.73	1,592.51	319.22	5.989		
14,500.03	6,983.10	7,000.61	7,000.61	221.40	280.02	-91.13	-1,444.27	-8,920.79	1,812.56	1,492.37	320.20	5.661		
14,600.03	6,982.84	7,000.35	7,000.35	224.34	280.01	-91.07	-1,444.27	-8,920.79	1,713.50	1,392.14	321.36	5.332		
14,700.03	6,982.57	7,000.09	7,000.09	227.29	280.00	-91.00	-1,444.27	-8,920.79	1,614.55	1,291.81	322.74	5.003		
14,800.03	6,982.31	6,999.82	6,999.82	230.24	279.99	-90.94	-1,444.27	-8,920.79	1,515.73	1,191.34	324.39	4.672		
14,900.03	6,982.05	6,999.56	6,999.56	233.19	279.98	-90.88	-1,444.27	-8,920.79	1,417.08	1,090.70	326.39	4.342		
15,000.03	6,981.78	6,999.30	6,999.30	236.15	279.97	-90.81	-1,444.27	-8,920.79	1,318.64	989.84	328.80	4.010		
15,100.03	6,981.52	6,999.03	6,999.03	239.10	279.96	-90.75	-1,444.27	-8,920.79	1,220.45	888.70	331.75	3.679		
15,200.03	6,981.26	6,998.77	6,998.77	242.05	279.95	-90.69	-1,444.27	-8,920.79	1,122.58	787.21	335.37	3.347		
15,300.03	6,980.99	6,998.51	6,998.51	245.00	279.94	-90.63	-1,444.27	-8,920.79	1,025.12	685.25	339.86	3.016		
15,400.03	6,980.73	6,998.24	6,998.24	247.96	279.93	-90.56	-1,444.27	-8,920.79	928.20	582.70	345.50	2.687		
15,500.03	6,980.47	6,997.98	6,997.98	250.91	279.92	-90.50	-1,444.27	-8,920.79	832.00	479.35	352.65	2.359		
15,600.03	6,980.20	6,997.72	6,997.72	253.86	279.91	-90.44	-1,444.27	-8,920.79	736.83	374.95	361.88	2.036		
15,700.03	6,979.94	6,997.45	6,997.45	256.82	279.90	-90.37	-1,444.27	-8,920.79	643.12	269.12	373.99	1.720		
15,800.03	6,979.68	6,997.19	6,997.19	259.77	279.89	-90.31	-1,444.27	-8,920.79	551.62	161.39	390.22	1.414	Level 3	
15,900.03	6,979.41	6,996.93	6,996.93	262.73	279.88	-90.25	-1,444.27	-8,920.79	463.64	51.25	412.40	1.124	Level 3	
16,000.03	6,979.15	6,996.66	6,996.66	265.68	279.87	-90.19	-1,444.27	-8,920.79	381.64	-61.33	442.97	0.862	Level 3	
16,100.03	6,978.89	6,996.40	6,996.40	268.64	279.86	-90.12	-1,444.27	-8,920.79	310.37	-173.33	483.71	0.642	Level 3	
16,200.03	6,978.63	6,996.14	6,996.14	271.60	279.85	-90.06	-1,444.27	-8,920.79	258.87	-270.15	529.02	0.489	Level 3	
16,296.62	6,978.37	6,995.88	6,995.88	274.45	279.84	-90.00	-1,444.27	-8,920.79	240.18	-313.98	554.16	0.433	Level 3, CC	
16,300.03	6,978.36	6,995.87	6,995.87	274.55	279.83	-90.00	-1,444.27	-8,920.79	240.21	-314.15	554.35	0.433	Level 3, ES, SF	
16,400.03	6,978.10	6,995.61	6,995.61	277.51	279.82	-89.94	-1,444.27	-8,920.79	261.50	-276.70	538.20	0.486	Level 3	
16,500.03	6,977.84	6,995.35	6,995.35	280.47	279.81	-89.87	-1,444.27	-8,920.79	314.75	-185.47	500.21	0.629	Level 3	
16,600.03	6,977.57	6,995.08	6,995.08	283.43	279.80	-89.81	-1,444.27	-8,920.79	386.97	-77.18	464.16	0.834	Level 3	
16,700.03	6,977.31	6,994.82	6,994.82	286.38	279.79	-89.75	-1,444.27	-8,920.79	469.50	33.23	436.27	1.076	Level 3	
16,800.03	6,977.05	6,994.56	6,994.56	289.34	279.78	-89.68	-1,444.27	-8,920.79	557.78	142.21	415.56	1.342	Level 3	
16,900.03	6,976.78	6,994.30	6,994.30	292.30	279.77	-89.62	-1,444.27	-8,920.79	649.46	249.38	400.08	1.623		
17,000.03	6,976.52	6,994.03	6,994.03	295.26	279.76	-89.56	-1,444.27	-8,920.79	743.29	355.01	388.28	1.914		
17,100.03	6,976.26	6,993.77	6,993.77	298.22	279.75	-89.50	-1,444.27	-8,920.79	838.55	459.46	379.09	2.212		
17,200.03	6,975.99	6,993.51	6,993.51	301.18	279.74	-89.43	-1,444.27	-8,920.79	934.80	563.01	371.79	2.514		
17,300.03	6,975.73	6,993.24	6,993.24	304.14	279.73	-89.37	-1,444.27	-8,920.79	1,031.76	665.88	365.88	2.820		
17,400.04	6,975.47	6,992.98	6,992.98	307.10	279.72	-89.31	-1,444.27	-8,920.79	1,129.25	768.23	361.03	3.128		
17,500.04	6,975.20	6,992.72	6,992.72	310.06	279.71	-89.24	-1,444.27	-8,920.79	1,227.15	870.16	356.99	3.438		
17,600.04	6,974.94	6,992.45	6,992.45	313.02	279.70	-89.18	-1,444.27	-8,920.79	1,325.36	971.78	353.58	3.748		
17,700.04	6,974.68	6,992.19	6,992.19	315.98	279.69	-89.12	-1,444.27	-8,920.79	1,423.82	1,073.14	350.68	4.060		
17,800.04	6,974.41	6,991.93	6,991.93	318.94	279.68	-89.06	-1,444.27	-8,920.79	1,522.48	1,174.29	348.19	4.373		
17,900.04	6,974.15	6,991.66	6,991.66	321.90	279.67	-88.99	-1,444.27	-8,920.79	1,621.30	1,275.27	346.03	4.685		
17,956.80	6,974.00	6,991.51	6,991.51	323.59	279.66	-88.96	-1,444.27	-8,920.79	1,677.46	1,332.53	344.93	4.863		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 99Y - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 100-UNKNOWN													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
13,900.03	6,984.68	7,002.19	7,002.19	203.72	280.09	-91.78	-1,408.14	-8,952.02	2,438.04	2,122.79	315.25	7.734		
14,000.03	6,984.42	7,001.93	7,001.93	206.66	280.08	-91.71	-1,408.14	-8,952.02	2,338.41	2,022.87	315.54	7.411		
14,100.03	6,984.15	7,001.67	7,001.67	209.61	280.07	-91.64	-1,408.14	-8,952.02	2,238.81	1,922.93	315.88	7.087		
14,200.03	6,983.89	7,001.40	7,001.40	212.55	280.06	-91.56	-1,408.14	-8,952.02	2,139.25	1,822.97	316.29	6.764		
14,300.03	6,983.63	7,001.14	7,001.14	215.50	280.05	-91.49	-1,408.14	-8,952.02	2,039.74	1,722.97	316.77	6.439		
14,400.03	6,983.36	7,000.88	7,000.88	218.45	280.04	-91.42	-1,408.14	-8,952.02	1,940.27	1,622.94	317.34	6.114		
14,500.03	6,983.10	7,000.61	7,000.61	221.40	280.02	-91.34	-1,408.14	-8,952.02	1,840.87	1,522.85	318.01	5.789		
14,600.03	6,982.84	7,000.35	7,000.35	224.34	280.01	-91.27	-1,408.14	-8,952.02	1,741.53	1,422.70	318.83	5.462		
14,700.03	6,982.57	7,000.09	7,000.09	227.29	280.00	-91.20	-1,408.14	-8,952.02	1,642.27	1,322.46	319.81	5.135		
14,800.03	6,982.31	6,999.82	6,999.82	230.24	279.99	-91.12	-1,408.14	-8,952.02	1,543.11	1,222.11	320.99	4.807		
14,900.03	6,982.05	6,999.56	6,999.56	233.19	279.98	-91.05	-1,408.14	-8,952.02	1,444.06	1,121.63	322.43	4.479		
15,000.03	6,981.78	6,999.30	6,999.30	236.15	279.97	-90.98	-1,408.14	-8,952.02	1,345.15	1,020.95	324.20	4.149		
15,100.03	6,981.52	6,999.03	6,999.03	239.10	279.96	-90.90	-1,408.14	-8,952.02	1,246.42	920.04	326.37	3.819		
15,200.03	6,981.26	6,998.77	6,998.77	242.05	279.95	-90.83	-1,408.14	-8,952.02	1,147.90	818.82	329.08	3.488		
15,300.03	6,980.99	6,998.51	6,998.51	245.00	279.94	-90.76	-1,408.14	-8,952.02	1,049.67	717.20	332.47	3.157		
15,400.03	6,980.73	6,998.24	6,998.24	247.96	279.93	-90.68	-1,408.14	-8,952.02	951.81	615.03	336.78	2.826		
15,500.03	6,980.47	6,997.98	6,997.98	250.91	279.92	-90.61	-1,408.14	-8,952.02	854.44	512.12	342.31	2.496		
15,600.03	6,980.20	6,997.72	6,997.72	253.86	279.91	-90.54	-1,408.14	-8,952.02	757.75	408.22	349.54	2.168		
15,700.03	6,979.94	6,997.45	6,997.45	256.82	279.90	-90.46	-1,408.14	-8,952.02	662.06	302.91	359.14	1.843		
15,800.03	6,979.68	6,997.19	6,997.19	259.77	279.89	-90.39	-1,408.14	-8,952.02	567.84	195.62	372.22	1.526		
15,900.03	6,979.41	6,996.93	6,996.93	262.73	279.88	-90.32	-1,408.14	-8,952.02	475.99	85.48	390.51	1.219	Level 3	
16,000.03	6,979.15	6,996.66	6,996.66	265.68	279.87	-90.24	-1,408.14	-8,952.02	388.20	-28.60	416.80	0.931	Level 3	
16,100.03	6,978.89	6,996.40	6,996.40	268.64	279.86	-90.17	-1,408.14	-8,952.02	307.93	-146.99	454.92	0.677	Level 3	
16,200.03	6,978.63	6,996.14	6,996.14	271.60	279.85	-90.09	-1,408.14	-8,952.02	242.80	-263.22	506.01	0.480	Level 3	
16,300.03	6,978.36	6,995.87	6,995.87	274.55	279.83	-90.02	-1,408.14	-8,952.02	207.55	-342.85	550.40	0.377	Level 3	
16,329.40	6,978.28	6,995.80	6,995.80	275.42	279.83	-90.00	-1,408.14	-8,952.02	205.46	-349.67	555.13	0.370	Level 3, CC, ES, SF	
16,400.03	6,978.10	6,995.61	6,995.61	277.51	279.82	-89.95	-1,408.14	-8,952.02	217.26	-327.78	545.05	0.399	Level 3	
16,500.03	6,977.84	6,995.35	6,995.35	280.47	279.81	-89.87	-1,408.14	-8,952.02	267.08	-234.78	501.86	0.532	Level 3	
16,600.03	6,977.57	6,995.08	6,995.08	283.43	279.80	-89.80	-1,408.14	-8,952.02	339.79	-120.06	459.85	0.739	Level 3	
16,700.03	6,977.31	6,994.82	6,994.82	286.38	279.79	-89.73	-1,408.14	-8,952.02	423.77	-5.24	429.01	0.988	Level 3	
16,800.03	6,977.05	6,994.56	6,994.56	289.34	279.78	-89.65	-1,408.14	-8,952.02	513.53	106.28	407.24	1.261	Level 3	
16,900.03	6,976.78	6,994.30	6,994.30	292.30	279.77	-89.58	-1,408.14	-8,952.02	606.49	214.89	391.61	1.549		
17,000.03	6,976.52	6,994.03	6,994.03	295.26	279.76	-89.51	-1,408.14	-8,952.02	701.40	321.35	380.04	1.846		
17,100.03	6,976.26	6,993.77	6,993.77	298.22	279.75	-89.43	-1,408.14	-8,952.02	797.55	426.30	371.25	2.148		
17,200.03	6,975.99	6,993.51	6,993.51	301.18	279.74	-89.36	-1,408.14	-8,952.02	894.55	530.15	364.40	2.455		
17,300.03	6,975.73	6,993.24	6,993.24	304.14	279.73	-89.29	-1,408.14	-8,952.02	992.14	633.20	358.94	2.764		
17,400.04	6,975.47	6,992.98	6,992.98	307.10	279.72	-89.21	-1,408.14	-8,952.02	1,090.17	735.66	354.51	3.075		
17,500.04	6,975.20	6,992.72	6,992.72	310.06	279.71	-89.14	-1,408.14	-8,952.02	1,188.52	837.66	350.87	3.387		
17,600.04	6,974.94	6,992.45	6,992.45	313.02	279.70	-89.07	-1,408.14	-8,952.02	1,287.13	939.30	347.83	3.700		
17,700.04	6,974.68	6,992.19	6,992.19	315.98	279.69	-88.99	-1,408.14	-8,952.02	1,385.94	1,040.68	345.27	4.014		
17,800.04	6,974.41	6,991.93	6,991.93	318.94	279.68	-88.92	-1,408.14	-8,952.02	1,484.91	1,141.83	343.08	4.328		
17,900.04	6,974.15	6,991.66	6,991.66	321.90	279.67	-88.85	-1,408.14	-8,952.02	1,584.01	1,242.81	341.20	4.642		
17,956.80	6,974.00	6,991.51	6,991.51	323.59	279.66	-88.81	-1,408.14	-8,952.02	1,640.31	1,300.06	340.25	4.821		



Lonestar Consulting, LLC

Anticollision Report

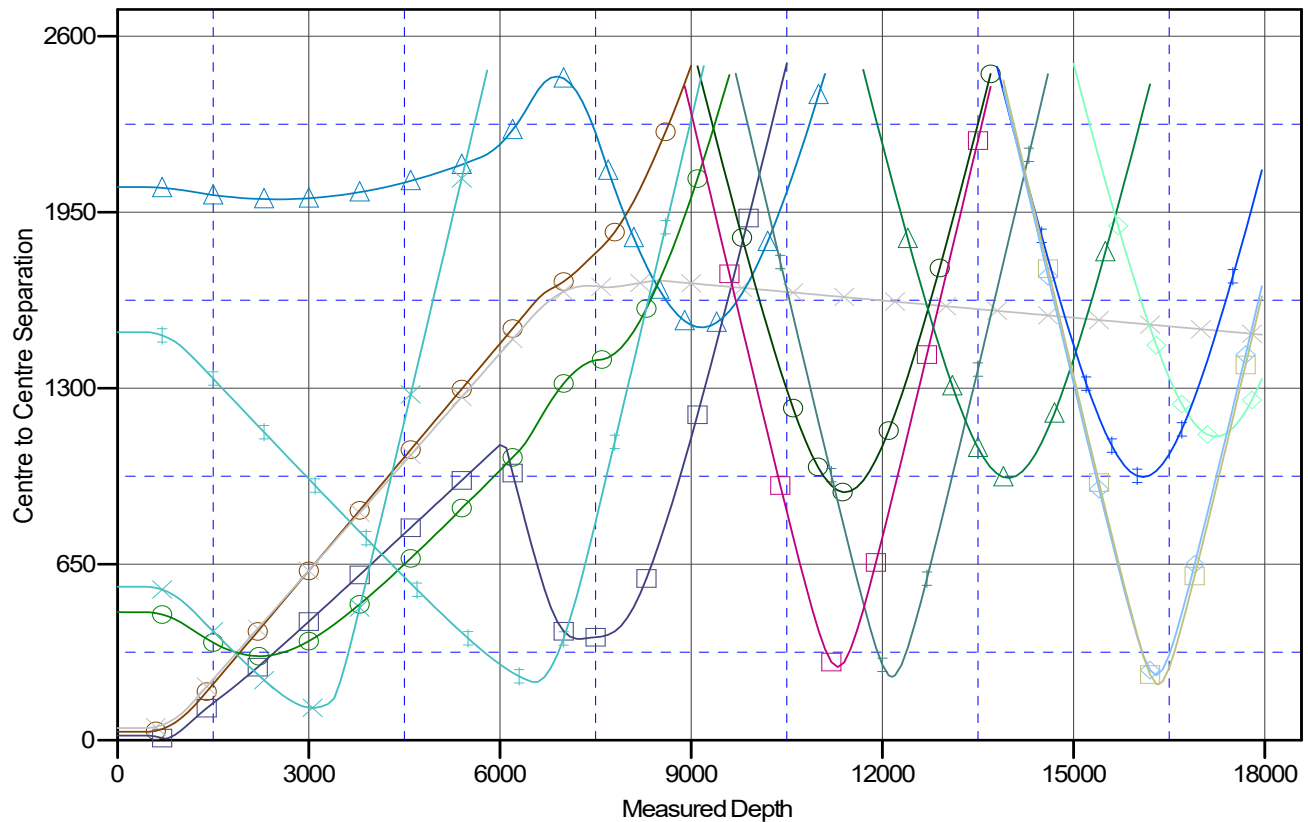


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6394' & RKB 24.5' @ 6418.50ft (E)
 Offset Depths are relative to Offset Datum
 Central Meridian is -107.8333334

Coordinates are relative to: Rosa Unit #665H - Slot A4 (665H)
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.26°

Ladder Plot



LEGEND

Rosa Unit#664H,OH,Plan #4 V0	Rosa Unit160D,OH,OH V0	Rosa Unit5A,OH,OH V0
Rosa Unit#662H,OH,Plan #4 V0	Rosa Unit162,OH,OH V0	Rosa Unit8,OH,OH V0
Rosa Unit#658H,OH,Plan #4 V0	Rosa Unit162C,OH,OH V0	Rosa Unit8C,OH,OH V0
Rosa Unit160,OH,OH V0	Rosa Unit233,OH,OH V0	Rosa Unit99,OH,OH V0
Rosa Unit160A,OH,OH V0	Rosa Unit59,OH,OH V0	Rosa Unit99Y,OH,OH V0



Lonestar Consulting, LLC

Anticollision Report

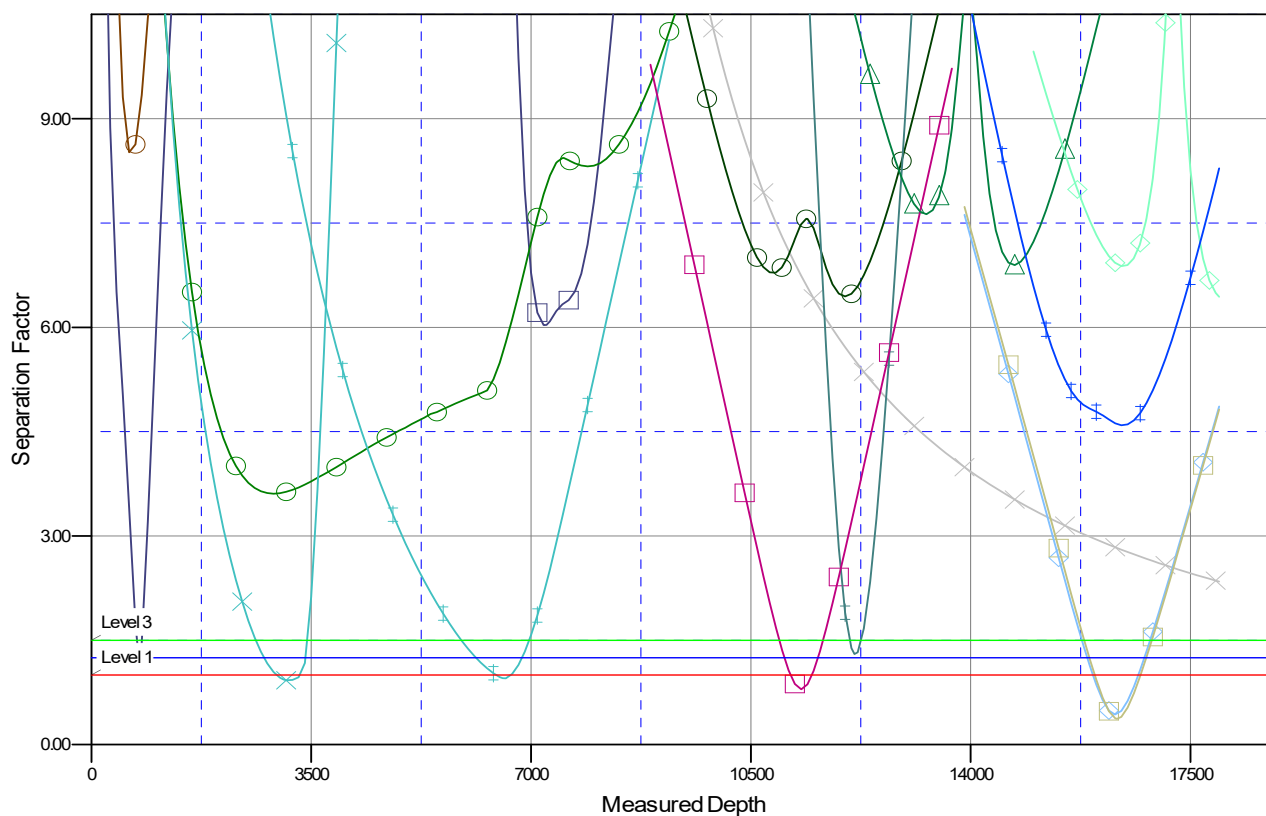


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #10	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6394' & RKB 24.5' @ 6418.50ft (E)
 Offset Depths are relative to Offset Datum
 Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit #665H - Slot A4 (665H)
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.26°

Separation Factor Plot



LEGEND

Rosa Unit#664H,OH,Plan#4 V0	Rosa Unit160D,OH,OH V0	Rosa Unit5A,OH,OH V0
Rosa Unit#662H,OH,Plan#4 V0	Rosa Unit162,OH,OH V0	Rosa Unit8,OH,OH V0
Rosa Unit#658H,OH,Plan#4 V0	Rosa Unit162C,OH,OH V0	Rosa Unit8C,OH,OH V0
Rosa Unit160,OH,OH V0	Rosa Unit233,OH,OH V0	Rosa Unit99,OH,OH V0
Rosa Unit160A,OH,OH V0	Rosa Unit99,OH,OH V0	Rosa Unit99Y,OH,OH V0

Released to Imaging: 4/27/2022 9:33:48 AM



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Rosa Unit 30
Well: Rosa Unit #665H
Wellbore: OH
Design: Plan #10

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



WELL DETAILS: Rosa Unit #665H

GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2136142.63	2848534.45	36.8696059	-107.4044791 A4 (665H)

Plan: Plan #10 (Rosa Unit #665H/OH)

Created By: Janie Collins Date: 12:47, April 14 2022



Azimuths to True North
Magnetic North: 10.89°

Magnetic Field
Strength: 51652.00
Dip Angle: 63.89°
Date: 12/31/2024
Model: IGRF2020

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
665H POE Rev 10	6999.00	-1534.37	-182.73	2134607.46	2848358.61	36.8653913	-107.4051037
665H IP1 Rev 1	6999.00	-1546.70	-997.10	2134591.47	2847544.31	36.8653574	-107.4078876
665H BHL Rev 5	6974.00	-1131.51	-10568.83	2134963.67	2837970.82	36.8664924	-107.4406089
665H FPerf	6974.00	-1137.54	-10409.43	2134958.36	2836130.25	36.8664760	-107.4400640
NE Corner Sec 36	0.00	-2275.35	-967.98	2133862.96	2847576.69	36.8633560	-107.4077890

SECTION DETAILS

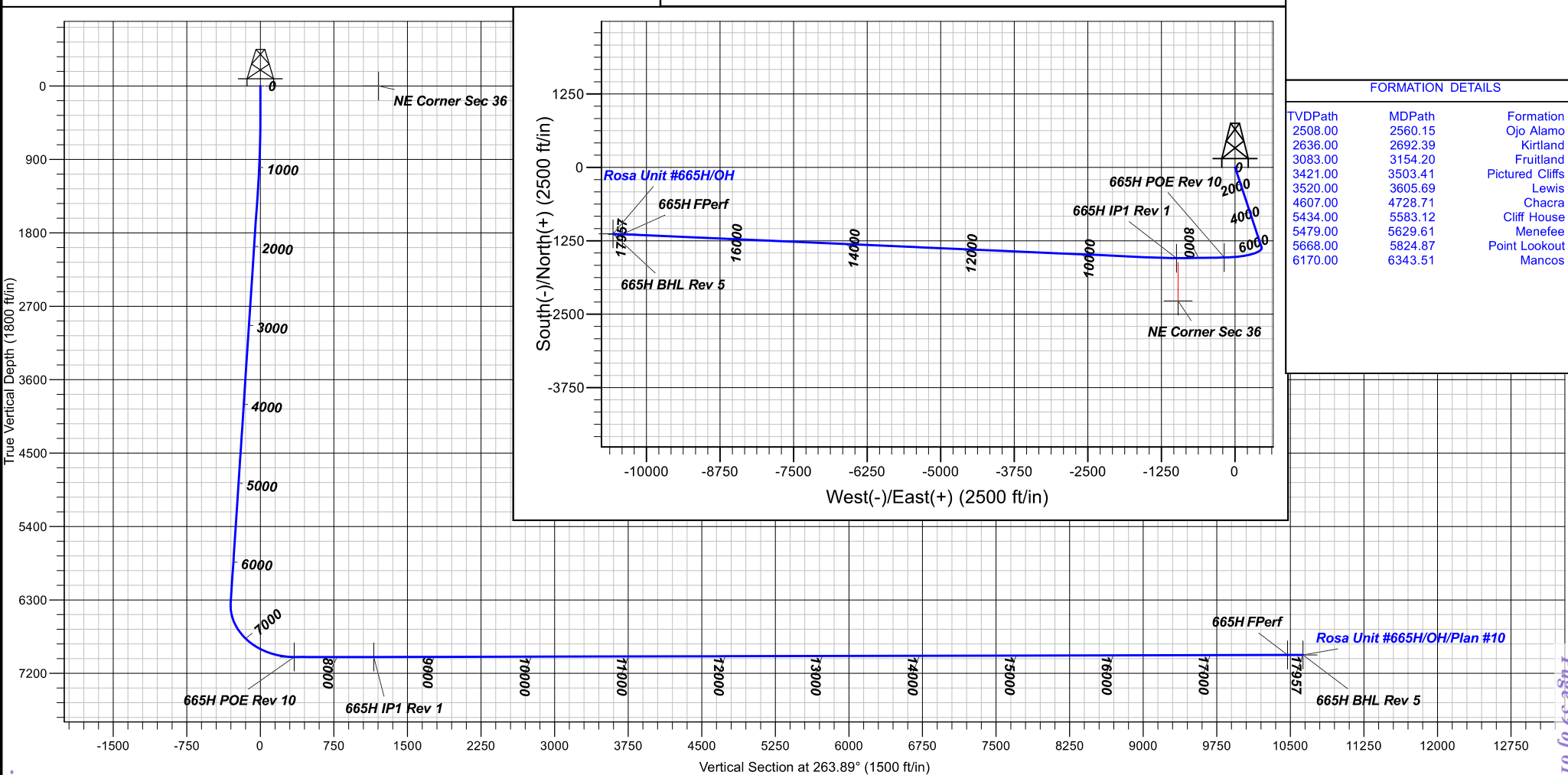
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450.00	0.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00
1177.58	14.55	161.71	1169.79	-87.26	28.84	2.00	161.71	-19.38
6513.54	14.55	161.71	6334.57	-1360.22	449.53	0.00	0.00	-302.17
7561.47	90.00	269.13	6999.00	-1534.37	-182.73	9.00	106.89	345.03
8375.93	90.00	269.13	6999.00	-1546.70	-997.10	0.00	0.00	1156.08
8545.15	90.15	272.51	6998.78	-1544.27	-1166.27	2.00	87.44	1324.04
17956.80	90.15	272.51	6974.00	-1131.51	-10568.83	0.00	0.00	10629.23

CASING DETAILS

TVD	MD	Name
-----	----	------

FORMATION DETAILS

TVDPath	MDPath	Formation
2508.00	2560.15	Ojo Alamo
2636.00	2692.39	Kirtland
3083.00	3154.20	Fruitland
3421.00	3503.41	Pictured Cliffs
3520.00	3605.69	Lewis
4607.00	4728.71	Chacra
5434.00	5583.12	Cliff House
5479.00	5629.61	Menefee
5668.00	5824.87	Point Lookout
6170.00	6343.51	Mancos





Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 30

Rosa Unit #665H - Slot A4 (665H)

OH

Plan: Plan #10

Standard Planning Report

14 April, 2022





Lonestar Consulting, LLC Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Project	Rio Arriba, NM NAD83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	Rosa Unit 30				
Site Position:		Northing:	2,136,112.13 usft	Latitude:	36.8695220
From:	Lat/Long	Easting:	2,848,540.75 usft	Longitude:	-107.4044580
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in		

Well	Rosa Unit #665H - Slot A4 (665H)					
Well Position	+N/-S	0.00 ft	Northing:	2,136,142.63 usft	Latitude:	36.8696058
	+E/-W	0.00 ft	Easting:	2,848,534.45 usft	Longitude:	-107.4044791
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,394.00 ft
Grid Convergence:		0.26 °				

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2000	12/31/2004	10.80	63.86	51,652.02243679

Design	Plan #10			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	263.89

Plan Survey Tool Program	Date	4/14/2022		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	17,956.80 Plan #10 (OH)	MWD+HDGM	
			OWSG MWD + HDGM	



Lonestar Consulting, LLC
Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
450.00	0.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,177.58	14.55	161.71	1,169.79	-87.26	28.84	2.00	2.00	0.00	161.71	
6,513.54	14.55	161.71	6,334.57	-1,360.22	449.53	0.00	0.00	0.00	0.00	
7,561.47	90.00	269.13	6,999.00	-1,534.37	-182.73	9.00	7.20	10.25	106.89	665H POE Rev 10
8,375.93	90.00	269.13	6,999.00	-1,546.70	-997.10	0.00	0.00	0.00	0.00	665H IP1 Rev 1
8,545.15	90.15	272.51	6,998.78	-1,544.27	-1,166.27	2.00	0.09	2.00	87.44	
17,956.80	90.15	272.51	6,974.00	-1,131.51	-10,568.83	0.00	0.00	0.00	0.00	665H BHL Rev 5



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
450.00	0.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	1.00	161.71	500.00	-0.41	0.14	-0.09	2.00	2.00	0.00
600.00	3.00	161.71	599.93	-3.73	1.23	-0.83	2.00	2.00	0.00
700.00	5.00	161.71	699.68	-10.35	3.42	-2.30	2.00	2.00	0.00
800.00	7.00	161.71	799.13	-20.28	6.70	-4.50	2.00	2.00	0.00
900.00	9.00	161.71	898.15	-33.49	11.07	-7.44	2.00	2.00	0.00
1,000.00	11.00	161.71	996.63	-49.98	16.52	-11.10	2.00	2.00	0.00
1,100.00	13.00	161.71	1,094.44	-69.72	23.04	-15.49	2.00	2.00	0.00
1,177.58	14.55	161.71	1,169.79	-87.26	28.84	-19.38	2.00	2.00	0.00
1,200.00	14.55	161.71	1,191.48	-92.60	30.60	-20.57	0.00	0.00	0.00
1,300.00	14.55	161.71	1,288.28	-116.46	38.49	-25.87	0.00	0.00	0.00
1,400.00	14.55	161.71	1,385.07	-140.32	46.37	-31.17	0.00	0.00	0.00
1,500.00	14.55	161.71	1,481.86	-164.17	54.26	-36.47	0.00	0.00	0.00
1,600.00	14.55	161.71	1,578.65	-188.03	62.14	-41.77	0.00	0.00	0.00
1,700.00	14.55	161.71	1,675.44	-211.89	70.02	-47.07	0.00	0.00	0.00
1,800.00	14.55	161.71	1,772.24	-235.74	77.91	-52.37	0.00	0.00	0.00
1,900.00	14.55	161.71	1,869.03	-259.60	85.79	-57.67	0.00	0.00	0.00
2,000.00	14.55	161.71	1,965.82	-283.45	93.68	-62.97	0.00	0.00	0.00
2,100.00	14.55	161.71	2,062.61	-307.31	101.56	-68.27	0.00	0.00	0.00
2,200.00	14.55	161.71	2,159.41	-331.17	109.44	-73.57	0.00	0.00	0.00
2,300.00	14.55	161.71	2,256.20	-355.02	117.33	-78.87	0.00	0.00	0.00
2,400.00	14.55	161.71	2,352.99	-378.88	125.21	-84.17	0.00	0.00	0.00
2,500.00	14.55	161.71	2,449.78	-402.74	133.10	-89.47	0.00	0.00	0.00
2,600.00	14.55	161.71	2,546.57	-426.59	140.98	-94.77	0.00	0.00	0.00
2,700.00	14.55	161.71	2,643.37	-450.45	148.86	-100.07	0.00	0.00	0.00
2,800.00	14.55	161.71	2,740.16	-474.30	156.75	-105.37	0.00	0.00	0.00
2,900.00	14.55	161.71	2,836.95	-498.16	164.63	-110.67	0.00	0.00	0.00
3,000.00	14.55	161.71	2,933.74	-522.02	172.52	-115.97	0.00	0.00	0.00
3,100.00	14.55	161.71	3,030.54	-545.87	180.40	-121.27	0.00	0.00	0.00
3,200.00	14.55	161.71	3,127.33	-569.73	188.29	-126.57	0.00	0.00	0.00
3,300.00	14.55	161.71	3,224.12	-593.59	196.17	-131.87	0.00	0.00	0.00
3,400.00	14.55	161.71	3,320.91	-617.44	204.05	-137.17	0.00	0.00	0.00
3,500.00	14.55	161.71	3,417.70	-641.30	211.94	-142.47	0.00	0.00	0.00
3,600.00	14.55	161.71	3,514.50	-665.16	219.82	-147.76	0.00	0.00	0.00
3,700.00	14.55	161.71	3,611.29	-689.01	227.71	-153.06	0.00	0.00	0.00
3,800.00	14.55	161.71	3,708.08	-712.87	235.59	-158.36	0.00	0.00	0.00
3,900.00	14.55	161.71	3,804.87	-736.72	243.47	-163.66	0.00	0.00	0.00
4,000.00	14.55	161.71	3,901.66	-760.58	251.36	-168.96	0.00	0.00	0.00
4,100.00	14.55	161.71	3,998.46	-784.44	259.24	-174.26	0.00	0.00	0.00
4,200.00	14.55	161.71	4,095.25	-808.29	267.13	-179.56	0.00	0.00	0.00
4,300.00	14.55	161.71	4,192.04	-832.15	275.01	-184.86	0.00	0.00	0.00
4,400.00	14.55	161.71	4,288.83	-856.01	282.89	-190.16	0.00	0.00	0.00
4,500.00	14.55	161.71	4,385.63	-879.86	290.78	-195.46	0.00	0.00	0.00
4,600.00	14.55	161.71	4,482.42	-903.72	298.66	-200.76	0.00	0.00	0.00
4,700.00	14.55	161.71	4,579.21	-927.57	306.55	-206.06	0.00	0.00	0.00
4,800.00	14.55	161.71	4,676.00	-951.43	314.43	-211.36	0.00	0.00	0.00
4,900.00	14.55	161.71	4,772.79	-975.29	322.31	-216.66	0.00	0.00	0.00



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,000.00	14.55	161.71	4,869.59	-999.14	330.20	-221.96	0.00	0.00	0.00
5,100.00	14.55	161.71	4,966.38	-1,023.00	338.08	-227.26	0.00	0.00	0.00
5,200.00	14.55	161.71	5,063.17	-1,046.86	345.97	-232.56	0.00	0.00	0.00
5,300.00	14.55	161.71	5,159.96	-1,070.71	353.85	-237.86	0.00	0.00	0.00
5,400.00	14.55	161.71	5,256.75	-1,094.57	361.73	-243.16	0.00	0.00	0.00
5,500.00	14.55	161.71	5,353.55	-1,118.42	369.62	-248.46	0.00	0.00	0.00
5,600.00	14.55	161.71	5,450.34	-1,142.28	377.50	-253.76	0.00	0.00	0.00
5,700.00	14.55	161.71	5,547.13	-1,166.14	385.39	-259.06	0.00	0.00	0.00
5,800.00	14.55	161.71	5,643.92	-1,189.99	393.27	-264.36	0.00	0.00	0.00
5,900.00	14.55	161.71	5,740.72	-1,213.85	401.15	-269.66	0.00	0.00	0.00
6,000.00	14.55	161.71	5,837.51	-1,237.71	409.04	-274.96	0.00	0.00	0.00
6,100.00	14.55	161.71	5,934.30	-1,261.56	416.92	-280.26	0.00	0.00	0.00
6,200.00	14.55	161.71	6,031.09	-1,285.42	424.81	-285.56	0.00	0.00	0.00
6,300.00	14.55	161.71	6,127.88	-1,309.27	432.69	-290.86	0.00	0.00	0.00
6,400.00	14.55	161.71	6,224.68	-1,333.13	440.57	-296.16	0.00	0.00	0.00
6,500.00	14.55	161.71	6,321.47	-1,356.99	448.46	-301.46	0.00	0.00	0.00
6,513.54	14.55	161.71	6,334.57	-1,360.22	449.53	-302.17	0.00	0.00	0.00
6,600.00	14.33	193.28	6,418.43	-1,380.97	450.48	-300.91	9.00	-0.26	36.51
6,700.00	18.60	221.74	6,514.46	-1,404.97	436.99	-284.95	9.00	4.27	28.46
6,800.00	25.40	237.69	6,607.21	-1,428.38	408.19	-253.82	9.00	6.80	15.96
6,900.00	33.21	246.90	6,694.39	-1,450.63	364.78	-208.28	9.00	7.81	9.21
7,000.00	41.47	252.86	6,773.85	-1,471.17	307.83	-149.47	9.00	8.25	5.95
7,100.00	49.94	257.11	6,843.64	-1,489.51	238.75	-78.83	9.00	8.47	4.26
7,200.00	58.53	260.41	6,902.04	-1,505.17	159.23	1.91	9.00	8.59	3.30
7,300.00	67.20	263.16	6,947.61	-1,517.80	71.23	90.75	9.00	8.66	2.74
7,400.00	75.90	265.57	6,979.23	-1,527.06	-23.08	185.50	9.00	8.71	2.41
7,500.00	84.63	267.80	6,996.12	-1,532.73	-121.37	283.84	9.00	8.73	2.23
7,561.47	90.00	269.13	6,999.00	-1,534.37	-182.73	345.03	9.00	8.74	2.17
7,600.00	90.00	269.13	6,999.00	-1,534.95	-221.25	383.40	0.00	0.00	0.00
7,700.00	90.00	269.13	6,999.00	-1,536.47	-321.24	482.98	0.00	0.00	0.00
7,800.00	90.00	269.13	6,999.00	-1,537.98	-421.23	582.56	0.00	0.00	0.00
7,900.00	90.00	269.13	6,999.00	-1,539.50	-521.22	682.14	0.00	0.00	0.00
8,000.00	90.00	269.13	6,999.00	-1,541.01	-621.21	781.72	0.00	0.00	0.00
8,100.00	90.00	269.13	6,999.00	-1,542.52	-721.20	881.30	0.00	0.00	0.00
8,200.00	90.00	269.13	6,999.00	-1,544.04	-821.19	980.89	0.00	0.00	0.00
8,300.00	90.00	269.13	6,999.00	-1,545.55	-921.17	1,080.47	0.00	0.00	0.00
8,375.93	90.00	269.13	6,999.00	-1,546.70	-997.10	1,156.08	0.00	0.00	0.00
8,400.00	90.02	269.61	6,999.00	-1,546.96	-1,021.16	1,180.04	2.00	0.09	2.00
8,500.00	90.11	271.61	6,998.88	-1,545.89	-1,121.15	1,279.35	2.00	0.09	2.00
8,545.15	90.15	272.51	6,998.78	-1,544.27	-1,166.27	1,324.04	2.00	0.09	2.00
8,600.00	90.15	272.51	6,998.63	-1,541.86	-1,221.07	1,378.27	0.00	0.00	0.00
8,700.00	90.15	272.51	6,998.37	-1,537.48	-1,320.97	1,477.14	0.00	0.00	0.00
8,800.00	90.15	272.51	6,998.11	-1,533.09	-1,420.88	1,576.00	0.00	0.00	0.00
8,900.00	90.15	272.51	6,997.84	-1,528.71	-1,520.78	1,674.87	0.00	0.00	0.00
9,000.00	90.15	272.51	6,997.58	-1,524.32	-1,620.68	1,773.74	0.00	0.00	0.00
9,100.00	90.15	272.51	6,997.32	-1,519.94	-1,720.59	1,872.61	0.00	0.00	0.00
9,200.00	90.15	272.51	6,997.05	-1,515.55	-1,820.49	1,971.48	0.00	0.00	0.00
9,300.00	90.15	272.51	6,996.79	-1,511.16	-1,920.39	2,070.35	0.00	0.00	0.00
9,400.00	90.15	272.51	6,996.53	-1,506.78	-2,020.30	2,169.22	0.00	0.00	0.00
9,500.00	90.15	272.51	6,996.26	-1,502.39	-2,120.20	2,268.09	0.00	0.00	0.00
9,600.00	90.15	272.51	6,996.00	-1,498.01	-2,220.10	2,366.96	0.00	0.00	0.00
9,700.00	90.15	272.51	6,995.74	-1,493.62	-2,320.01	2,465.82	0.00	0.00	0.00



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,800.00	90.15	272.51	6,995.47	-1,489.24	-2,419.91	2,564.69	0.00	0.00	0.00
9,900.00	90.15	272.51	6,995.21	-1,484.85	-2,519.81	2,663.56	0.00	0.00	0.00
10,000.00	90.15	272.51	6,994.95	-1,480.46	-2,619.72	2,762.43	0.00	0.00	0.00
10,100.00	90.15	272.51	6,994.68	-1,476.08	-2,719.62	2,861.30	0.00	0.00	0.00
10,200.00	90.15	272.51	6,994.42	-1,471.69	-2,819.53	2,960.17	0.00	0.00	0.00
10,300.00	90.15	272.51	6,994.16	-1,467.31	-2,919.43	3,059.04	0.00	0.00	0.00
10,400.00	90.15	272.51	6,993.89	-1,462.92	-3,019.33	3,157.91	0.00	0.00	0.00
10,500.00	90.15	272.51	6,993.63	-1,458.54	-3,119.24	3,256.78	0.00	0.00	0.00
10,600.00	90.15	272.51	6,993.37	-1,454.15	-3,219.14	3,355.65	0.00	0.00	0.00
10,700.00	90.15	272.51	6,993.10	-1,449.77	-3,319.04	3,454.51	0.00	0.00	0.00
10,800.00	90.15	272.51	6,992.84	-1,445.38	-3,418.95	3,553.38	0.00	0.00	0.00
10,900.00	90.15	272.51	6,992.58	-1,440.99	-3,518.85	3,652.25	0.00	0.00	0.00
11,000.00	90.15	272.51	6,992.31	-1,436.61	-3,618.75	3,751.12	0.00	0.00	0.00
11,100.00	90.15	272.51	6,992.05	-1,432.22	-3,718.66	3,849.99	0.00	0.00	0.00
11,200.00	90.15	272.51	6,991.79	-1,427.84	-3,818.56	3,948.86	0.00	0.00	0.00
11,300.00	90.15	272.51	6,991.52	-1,423.45	-3,918.46	4,047.73	0.00	0.00	0.00
11,400.00	90.15	272.51	6,991.26	-1,419.07	-4,018.37	4,146.60	0.00	0.00	0.00
11,500.00	90.15	272.51	6,991.00	-1,414.68	-4,118.27	4,245.47	0.00	0.00	0.00
11,600.00	90.15	272.51	6,990.74	-1,410.29	-4,218.17	4,344.33	0.00	0.00	0.00
11,700.00	90.15	272.51	6,990.47	-1,405.91	-4,318.08	4,443.20	0.00	0.00	0.00
11,800.00	90.15	272.51	6,990.21	-1,401.52	-4,417.98	4,542.07	0.00	0.00	0.00
11,900.00	90.15	272.51	6,989.95	-1,397.14	-4,517.88	4,640.94	0.00	0.00	0.00
12,000.00	90.15	272.51	6,989.68	-1,392.75	-4,617.79	4,739.81	0.00	0.00	0.00
12,100.00	90.15	272.51	6,989.42	-1,388.37	-4,717.69	4,838.68	0.00	0.00	0.00
12,200.00	90.15	272.51	6,989.16	-1,383.98	-4,817.59	4,937.55	0.00	0.00	0.00
12,300.00	90.15	272.51	6,988.89	-1,379.59	-4,917.50	5,036.42	0.00	0.00	0.00
12,400.00	90.15	272.51	6,988.63	-1,375.21	-5,017.40	5,135.29	0.00	0.00	0.00
12,500.00	90.15	272.51	6,988.37	-1,370.82	-5,117.30	5,234.15	0.00	0.00	0.00
12,600.00	90.15	272.51	6,988.10	-1,366.44	-5,217.21	5,333.02	0.00	0.00	0.00
12,700.00	90.15	272.51	6,987.84	-1,362.05	-5,317.11	5,431.89	0.00	0.00	0.00
12,800.00	90.15	272.51	6,987.58	-1,357.67	-5,417.01	5,530.76	0.00	0.00	0.00
12,900.00	90.15	272.51	6,987.31	-1,353.28	-5,516.92	5,629.63	0.00	0.00	0.00
13,000.00	90.15	272.51	6,987.05	-1,348.89	-5,616.82	5,728.50	0.00	0.00	0.00
13,100.00	90.15	272.51	6,986.79	-1,344.51	-5,716.73	5,827.37	0.00	0.00	0.00
13,200.00	90.15	272.51	6,986.52	-1,340.12	-5,816.63	5,926.24	0.00	0.00	0.00
13,300.00	90.15	272.51	6,986.26	-1,335.74	-5,916.53	6,025.11	0.00	0.00	0.00
13,400.00	90.15	272.51	6,986.00	-1,331.35	-6,016.44	6,123.97	0.00	0.00	0.00
13,500.00	90.15	272.51	6,985.73	-1,326.97	-6,116.34	6,222.84	0.00	0.00	0.00
13,600.00	90.15	272.51	6,985.47	-1,322.58	-6,216.24	6,321.71	0.00	0.00	0.00
13,700.00	90.15	272.51	6,985.21	-1,318.20	-6,316.15	6,420.58	0.00	0.00	0.00
13,800.00	90.15	272.51	6,984.94	-1,313.81	-6,416.05	6,519.45	0.00	0.00	0.00
13,900.00	90.15	272.51	6,984.68	-1,309.42	-6,515.95	6,618.32	0.00	0.00	0.00
14,000.00	90.15	272.51	6,984.42	-1,305.04	-6,615.86	6,717.19	0.00	0.00	0.00
14,100.00	90.15	272.51	6,984.15	-1,300.65	-6,715.76	6,816.06	0.00	0.00	0.00
14,200.00	90.15	272.51	6,983.89	-1,296.27	-6,815.66	6,914.93	0.00	0.00	0.00
14,300.00	90.15	272.51	6,983.63	-1,291.88	-6,915.57	7,013.79	0.00	0.00	0.00
14,400.00	90.15	272.51	6,983.36	-1,287.50	-7,015.47	7,112.66	0.00	0.00	0.00
14,500.00	90.15	272.51	6,983.10	-1,283.11	-7,115.37	7,211.53	0.00	0.00	0.00
14,600.00	90.15	272.51	6,982.84	-1,278.72	-7,215.28	7,310.40	0.00	0.00	0.00
14,700.00	90.15	272.51	6,982.57	-1,274.34	-7,315.18	7,409.27	0.00	0.00	0.00
14,800.00	90.15	272.51	6,982.31	-1,269.95	-7,415.08	7,508.14	0.00	0.00	0.00
14,900.00	90.15	272.51	6,982.05	-1,265.57	-7,514.99	7,607.01	0.00	0.00	0.00



Lonestar Consulting, LLC Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
15,000.00	90.15	272.51	6,981.78	-1,261.18	-7,614.89	7,705.88	0.00	0.00	0.00
15,100.00	90.15	272.51	6,981.52	-1,256.80	-7,714.79	7,804.75	0.00	0.00	0.00
15,200.00	90.15	272.51	6,981.26	-1,252.41	-7,814.70	7,903.61	0.00	0.00	0.00
15,300.00	90.15	272.51	6,980.99	-1,248.02	-7,914.60	8,002.48	0.00	0.00	0.00
15,400.00	90.15	272.51	6,980.73	-1,243.64	-8,014.50	8,101.35	0.00	0.00	0.00
15,500.00	90.15	272.51	6,980.47	-1,239.25	-8,114.41	8,200.22	0.00	0.00	0.00
15,600.00	90.15	272.51	6,980.20	-1,234.87	-8,214.31	8,299.09	0.00	0.00	0.00
15,700.00	90.15	272.51	6,979.94	-1,230.48	-8,314.21	8,397.96	0.00	0.00	0.00
15,800.00	90.15	272.51	6,979.68	-1,226.10	-8,414.12	8,496.83	0.00	0.00	0.00
15,900.00	90.15	272.51	6,979.41	-1,221.71	-8,514.02	8,595.70	0.00	0.00	0.00
16,000.00	90.15	272.51	6,979.15	-1,217.33	-8,613.92	8,694.57	0.00	0.00	0.00
16,100.00	90.15	272.51	6,978.89	-1,212.94	-8,713.83	8,793.43	0.00	0.00	0.00
16,200.00	90.15	272.51	6,978.63	-1,208.55	-8,813.73	8,892.30	0.00	0.00	0.00
16,300.00	90.15	272.51	6,978.36	-1,204.17	-8,913.64	8,991.17	0.00	0.00	0.00
16,400.00	90.15	272.51	6,978.10	-1,199.78	-9,013.54	9,090.04	0.00	0.00	0.00
16,500.00	90.15	272.51	6,977.84	-1,195.40	-9,113.44	9,188.91	0.00	0.00	0.00
16,600.00	90.15	272.51	6,977.57	-1,191.01	-9,213.35	9,287.78	0.00	0.00	0.00
16,700.00	90.15	272.51	6,977.31	-1,186.63	-9,313.25	9,386.65	0.00	0.00	0.00
16,800.00	90.15	272.51	6,977.05	-1,182.24	-9,413.15	9,485.52	0.00	0.00	0.00
16,900.00	90.15	272.51	6,976.78	-1,177.85	-9,513.06	9,584.39	0.00	0.00	0.00
17,000.00	90.15	272.51	6,976.52	-1,173.47	-9,612.96	9,683.25	0.00	0.00	0.00
17,100.00	90.15	272.51	6,976.26	-1,169.08	-9,712.86	9,782.12	0.00	0.00	0.00
17,200.00	90.15	272.51	6,975.99	-1,164.70	-9,812.77	9,880.99	0.00	0.00	0.00
17,300.00	90.15	272.51	6,975.73	-1,160.31	-9,912.67	9,979.86	0.00	0.00	0.00
17,400.00	90.15	272.51	6,975.47	-1,155.93	-10,012.57	10,078.73	0.00	0.00	0.00
17,500.00	90.15	272.51	6,975.20	-1,151.54	-10,112.48	10,177.60	0.00	0.00	0.00
17,600.00	90.15	272.51	6,974.94	-1,147.15	-10,212.38	10,276.47	0.00	0.00	0.00
17,700.00	90.15	272.51	6,974.68	-1,142.77	-10,312.28	10,375.34	0.00	0.00	0.00
17,800.00	90.15	272.51	6,974.41	-1,138.38	-10,412.19	10,474.21	0.00	0.00	0.00
17,900.00	90.15	272.51	6,974.15	-1,134.00	-10,512.09	10,573.08	0.00	0.00	0.00
17,956.80	90.15	272.51	6,974.00	-1,131.51	-10,568.83	10,629.23	0.00	0.00	0.00



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #665H - Slot A4 (665H)
Company:	Logos Operating LLC	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site:	Rosa Unit 30	North Reference:	True
Well:	Rosa Unit #665H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #10		

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
NE Corner Sec 36 - plan misses target center by 2472.70ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	-2,275.35	-967.98	2,133,862.96	2,847,576.70	36.8633560	-107.4077880
665H BHL Rev 5 - plan hits target center - Point	0.00	0.00	6,974.00	-1,131.51	-10,568.83	2,134,963.67	2,837,970.83	36.8664924	-107.4406090
665H FPerf - plan misses target center by 1.06ft at 17797.28ft MD (6974.42 TVD, -1138.50 N, -10409.47 E) - Point	0.00	0.00	6,974.00	-1,137.54	-10,409.43	2,134,958.36	2,838,130.26	36.8664760	-107.4400640
665H IP1 Rev 1 - plan hits target center - Point	0.00	0.00	6,999.00	-1,546.70	-997.10	2,134,591.47	2,847,544.31	36.8653574	-107.4078877
665H POE Rev 10 - plan hits target center - Point	0.00	0.00	6,999.00	-1,534.37	-182.73	2,134,607.46	2,848,358.62	36.8653913	-107.4051037

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,560.15	2,508.00	Ojo Alamo		0.00	0.00	
2,692.39	2,636.00	Kirtland		0.00	0.00	
3,154.20	3,083.00	Fruitland		0.00	0.00	
3,503.41	3,421.00	Pictured Cliffs		0.00	0.00	
3,605.69	3,520.00	Lewis		0.00	0.00	
4,728.71	4,607.00	Chacra		0.00	0.00	
5,583.12	5,434.00	Cliff House		0.00	0.00	
5,629.61	5,479.00	Menefee		0.00	0.00	
5,824.88	5,668.00	Point Lookout		0.00	0.00	
6,343.51	6,170.00	Mancos		0.00	0.00	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
450.00	450.00	0.00	0.00	Start Build 2.00	
1,177.58	1,169.79	-87.26	28.84	Start 5335.94 hold at 1177.58 MD	
6,513.54	6,334.57	-1,360.22	449.53	Start DLS 9.00 TFO 106.89	
7,561.47	6,999.00	-1,534.37	-182.72	36.8653913 / -107.4051037	
7,561.47	6,999.00	-1,534.37	-182.73	POE @ 7561' MD	
8,375.93	6,999.00	-1,546.70	-997.09	Start DLS 2.00 TFO 87.44	
8,545.15	6,998.78	-1,544.27	-1,166.27	Start 9411.63 hold at 8545.13 MD	
17,797.24	6,974.42	-1,138.50	-10,409.43	First Perf @ 17,797' MD	
17,956.80	6,974.00	-1,138.50	-10,409.43	TD at 17956.76	



LOGOS Operating, LLC Operations Plan

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

Date:	April 14, 2022	Pool:	Basin Mancos
Well Name:	Rosa Unit 665H	GL Elevation:	6,394'
Surface Location:	Sec 30, T31N, R5W 2277 FSL, 967 FWL (36.869606° N, 107.404479° W – NAD83)	Measured Depth:	17,957' (GL+24.5')
Bottom Hole Location:	Sec 26, T31N, R6W 1142 FSL, 170 FWL (36.866492° N, 107.440609° W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF078768, CA Serial #NMNM78407E

I. GEOLOGY

A. Formation Tops (Based on GL Elevation + 24.5' KB): Estimated top of important geological markers:
SURFACE FORMATION – NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2,560	2,508	*POINT LOOKOUT	5,825	5,668
KIRTLAND	2,692	2,636	*MANCOS	6,344	6,170
*FRUITLAND	3,154	3,083	KICKOFF POINT	6,514	6,335
*PICTURED CLIFFS	3,503	3,421	LANDING POINT	7,562	6,999
LEWIS	3,606	3,520			
CHACRA	4,729	4,607			
*CLIFF HOUSE	5,583	5,434			
MENEFEE	5,630	5,479	TD	17,957	6,974

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

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

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

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

II. DRILLING

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

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

ROSA UNIT 665H



- B. BOP TESTING:** The BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Pressure test surface casing to **600 psi for 30 minutes** and intermediate casing to **1500 psi for 30 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe and blind rams shall be activated each trip or but not more than once a day. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE. **All tests and inspections will be recorded and logged with time and results.** A full BOP test will be conducted when initially installed for the first well on the pad or if seals subject to test pressure are broken, following related repairs and at a minimum of 30 day intervals. A BOPE Shell Test only will be conducted for subsequent wells on the pad when seals subject to pressure have not been broken or repaired and fall within the 30 day interval of first full test.
- C. GeoHazards:** There are no Geohazards
- D. Maximum Anticipated Pressure:** $6999' \text{ TVD} \times 0.43 = 3010 \text{ psi}$
- E. H2S Concerns:** There is no record of any naturally occurring H2S in any formation in the Rosa Unit. No H2S is anticipated in this formation or this well.

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	OHSIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CONN
SURFACE	17.5"	324'	13.375"	54.5 LBS	J-55 or equiv	BTC
INTERMEDIATE	12.25"	6,419' (6,288 TVD)	9.625"	43.5 LBS	P-110 or equiv	BTC
PRODUCTION	8.5"	17,957' (6,974' TVD)	5.5"	20 LBS	P-110 or equiv	BTC

NOTE: All casing depths are approximate, based on GL elevation+24.5' KB and will be based on drilling conditions +/- 50'. Weights, grades and connections will be based on availability and may vary but will be equivalent or greater.

B. FLOAT EQUIPMENT:

- SURFACE CASING:** 13-3/8" notched regular pattern guide shoe. Run (1) standard centralizer on each of the bottom (3) joints of Surface Casing.
- INTERMEDIATE CASING:** 9-5/8" cement nose guide shoe with a self-fill insert float. Place float collar one joint above the shoe. Install (1) centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) centralizer at 2,500 ft., 2,300ft., 2,000ft., 1,500 ft., and 1,000 ft. Optional use of DV Tools (2) will be strategically placed above loss circulation zones anticipated in the Mesaverde and Fruitland Coal. Optional use of cancellation plugs for DV tools may be used if losses while cementing are not encountered.
- PRODUCTION CASING:** Run 5-1/2" casing with cement nose guide Float Shoe, 5-1/2" full or pup joints as necessary, Landing Collar, 5-1/2" full or pup joints as necessary, at least (1) one RSI (Sliding Sleeve) positioned inside the applicable production area. Centralizer program will be determined by wellbore conditions. Production casing to be pressure tested during completion operations with frac stack installed.



C. CEMENTING:

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

1. SURFACE: Casing shall be set at 323' and cemented to surface. TOC at Surface.
2. INTERMEDIATE: Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. The intermediate casing will be cemented in 2 or 3 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. Operator proposes optional DV tools above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal. If losses are not observed during the second stage a cancelation plug will be pumped and the remaining cement will be pumped during stage 2. If cement does not circulate to the DV tool(s) or to surface, a CBL will be run to determine TOC.

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	5,928	491	0.31318	1.3	217	39	1.15	189	15.8
Stage 1 Lead	4,769	1,159	0.31318	1.3	472	84	2.41	196	12.2
					689	123		385	
Stage 2 Tail	3,788	981	0.31318	1.3	399	71	1.83	218	13.2
Stage 2 Lead	3,178	610	0.31318	1.3	248	44	2.55	97	12
					648	115		316	
Stage 3 Tail	2,528	650	0.31318	1.3	265	47	1.83	145	13.2
Stage 3 Lead	323	2,205	0.31318	1.3	898	160	2.55	352	12
Stage 3 Lead	-	323	0.36268	1	117	21	2.55	46	12
					1,280	228		543	
All Stage Totals					2,617	466		1,243	

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

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

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Cased Lead	6,319	100	0.2531	1	25	5	1.89	13	13.2
Open Hole Lead	6,419	11,538	0.2291	1.15	3,050	543	1.89	1,614	13.2
					3,076	548		1,627	

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

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

IV. COMPLETION

ROSA UNIT 665H



A. CBL

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

B. PRESSURE TEST

- C. With frac stack installed on wellhead, pressure test 5-1/2" casing to 1550 psi (0.22 psi/ft * 6,954' TVD) for 30 minutes. Increase pressure to Open RSI sleeves.

D. STIMULATION

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

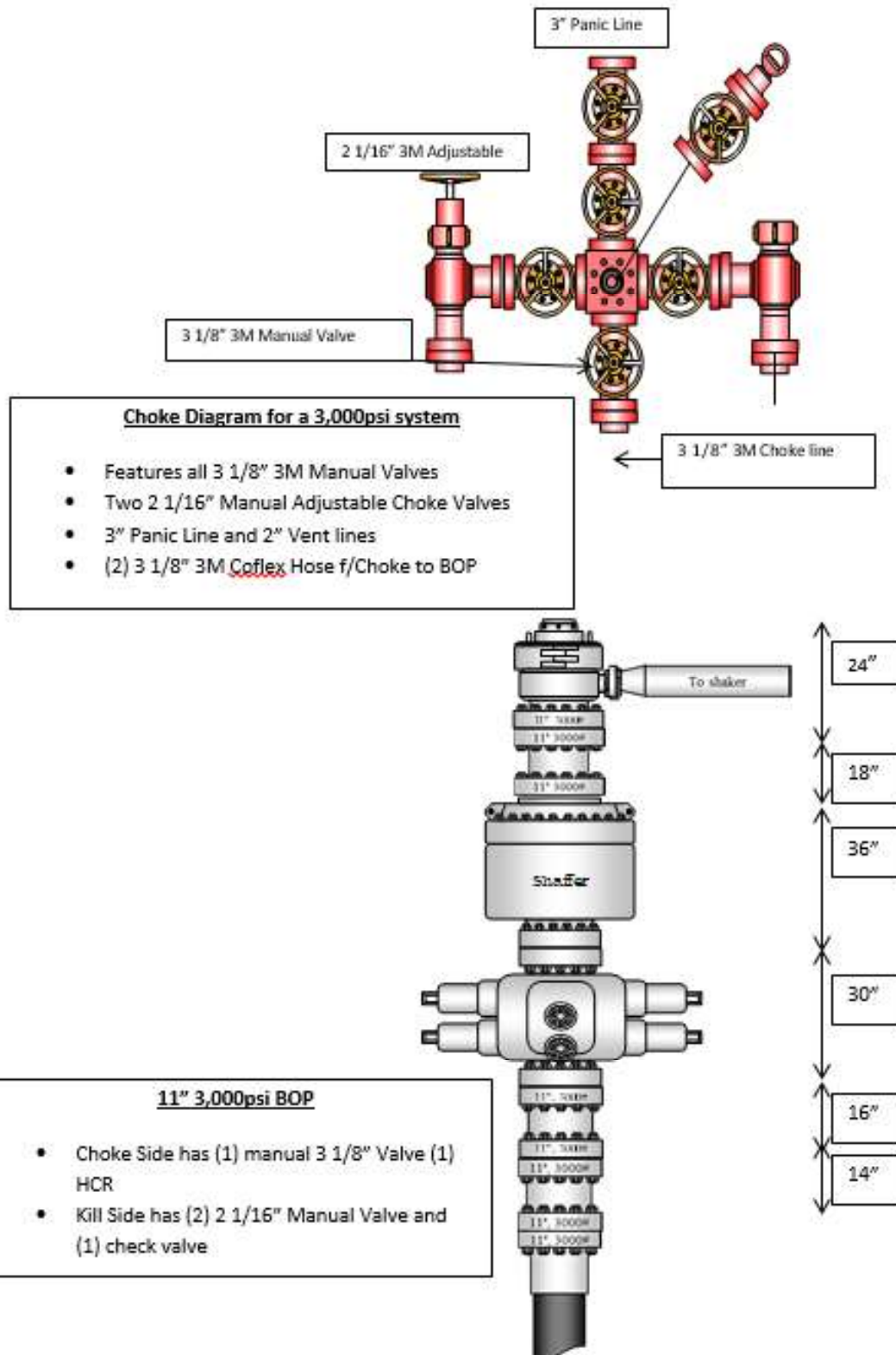
E. PRODUCTION TUBING

2-7/8", 6.5#, J-55, EUE tubing will be run once volumes and pressures dictate.

*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.



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



ROSA UNIT 665H

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

Submit Electronically
Via E-permitting

NATURAL GAS MANAGEMENT PLAN

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

Section 1 – Plan Description

Effective May 25, 2021

I. Operator: LOGOS Operating, LLC **OGRID:** 289408 **Date:** 08 / 26 / 2021

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

If Other, please describe: _____

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

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Rosa Unit 662H	30-039-	K 30 T31N R5W	2300FSL 946FWL	N/A	12,462	2,400
Rosa Unit 664H	30-039-	K 30 T31N R5W	2260FSL 966FWL	N/A	12,462	2,400
Rosa Unit 665H	30-039-31358	K 30 T31N R5W	2247FSL 973FWL	N/A	10,865	1,800
Rosa Unit 658H	30-039-	K 30 T31N R5W	2317FSL 947FWL	N/A	10,865	1,800

IV. Central Delivery Point Name: A-59 [See 19.15.27.9(D)(1) NMAC]

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

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Rosa Unit 662H	30-039-	2022	Pending	Pending	Pending	Pending
Rosa Unit 664H	30-039-	2022	Pending	Pending	Pending	Pending
Rosa Unit 665H	30-039-31358	8/25/2021	Pending	Pending	Pending	Pending
Rosa Unit 658H	30-039-	2022	Pending	Pending	Pending	Pending

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

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

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

Section 3 - Certifications

Effective May 25, 2021

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

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

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

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

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

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

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

Section 4 - Notices

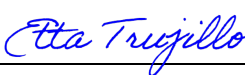
1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

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

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

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

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

Signature:	
Printed Name:	Etta Trujillo
Title:	Regulatory Specialist
E-mail Address:	etrujillo@logosresourcesllc.com
Date:	08/26/2021
Phone:	(505) 324-4154
OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)	
Approved By:	
Title:	
Approval Date:	
Conditions of Approval:	

LOGOS Operating, LLC

VI. Separation Equipment

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

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

VII. Operational Practices 19.15.27.8 NMAC A through F

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

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

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

E. Performance standards:

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

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

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

Well Name: ROSA UT	Well Location: T31N / R5W / SEC 3 / NESW / 36.869522 / -107.404458	County or Parish/State: RIO ARRIBA / NM
Well Number: 665H	Type of Well: COALBED NATURAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078764	Unit or CA Name: ROSA UNIT- MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 300393135800X1	Well Status: Location	Operator: LOGOS OPERATING LLC

Notice of Intent

Sundry ID: 2667990

Type of Submission: Notice of Intent

Date Sundry Submitted: 04/21/2022

Date proposed operation will begin: 04/21/2022

Type of Action: Other

Time Sundry Submitted: 10:21

Procedure Description: LOGOS Operating request a change in plans for the following: Original TD @ 17,449' MD 6,954' TVD to new TD @ 17,957' MD 6,974' TVD. Geology tops have been updated per changes. Original KOP @ 6,557' MD 6,359' TVD to new KOP @ 6,514' MD 6,335' TVD Original Landing point @ 7,560' MD 6,973' TVD to new Landing point @ 7,562' MD 6,999' TVD Original 9.625" casing Intermediate @ 6,415' MD to 6,419' MD 6,288' TVD Original 5.5" casing Production @ 17,449' MD to 17,957' MD 6,974' TVD Original 9.625" Intermediate & 5.5" production cementing bbls and sacks have been update per casing depth changes. Attached: New C102, Operation and Directional Drill plans.

Surface Disturbance

Is any additional surface disturbance proposed?: No

NOI Attachments

Procedure Description

3160_5_Rosa_Unit_665H_Change_in_plans_INT_PROD_20220421_attachments_20220421102115.pdf

Well Name: ROSA UT	Well Location: T31N / R5W / SEC 3 / NESW / 36.869522 / -107.404458	County or Parish/State: RIO ARRIBA / NM
Well Number: 665H	Type of Well: COALBED NATURAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078764	Unit or CA Name: ROSA UNIT- MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 300393135800X1	Well Status: Location	Operator: LOGOS OPERATING LLC

Operator Certification

I certify that the foregoing is true and correct. 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. Electronic submission of Sundry Notices through this system satisfies regulations requiring a submission of Form 3160-5 or a Sundry Notice.

Operator Electronic Signature: ETTA TRUJILLO	Signed on: APR 21, 2022 09:57 AM
Name: LOGOS OPERATING LLC	
Title: Regulatory Specialist	
Street Address: 2010 AFTON PLACE	
City: Farmington	State: NM
Phone: (505) 324-4154	
Email address: ETRUJILLO@LOGOSRESOURCESLLC.COM	

Field Representative

Representative Name:		
Street Address:		
City:	State:	Zip:
Phone:		
Email address:		

BLM Point of Contact

BLM POC Name: KENNETH G RENNICK	BLM POC Title: Petroleum Engineer
BLM POC Phone: 5055647742	BLM POC Email Address: krennick@blm.gov
Disposition: Approved	Disposition Date: 04/21/2022
Signature: Kenneth Rennick	

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

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

CONDITIONS

Action 100818

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 100818
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Adhere to previous NMOCD Conditions of Approval	4/27/2022