

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 LLC3a. Address
2010 AFTON PLACE
FARMINGTON, NM 874013b. Phone No. (include area code)
(505) 278-87204. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SEC 30 T31N R05W NESW (K) 2300 FSL 946 FWL7. If Unit of CA/Agreement, Name and/or No.
NMNM078407E8. Well Name and No.
ROSA UNIT 662H9. API Well No.
30-039-3141710. Field and Pool or Exploratory Area
BASIN MANCOS11. Country or Parish, State
RIO ARRIBA COUNTY, 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 recompleting 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 recompleting in a new interval, a Form 3160-4 must be filed one testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

LOGOS Operating request a change in plans for the following:

Original TD @ 17,395' MD 7000' TVD to **new TD (KB) @ 19,582' MD 7021' TVD.**

Geology tops have been updated per changes.

Original 9.625" casing Intermediate @ 6237' MD to **6264' (KB)**Original 5.5" casing Production @ 17,395' MD to **19,582' (KB)**

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

Attached: New C102, Operation and Direction Drilling Plans

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)

Etta Trujillo

Title Regulatory Specialist

Signature *Etta Trujillo*

Date 6/22/2022

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
1620 S. St. Francis Drive, Santa Fe, NM 87505
Phone: (505) 393-6161 Fax: (505) 393-0720
District II
811 S. First Street, Artesia, NM 88210
Phone: (505) 748-1283 Fax: (505) 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

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 6/7/2022
Signature Date
Etta Trujillo
Printed Name
etrujillo@logosresourcesllc.com
E-mail Address

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

☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number		2 Pool Code		3 Pool Name	
		97232		BASIN MANCOS	
4 Property Code		5 Property Name		6 Well Number	
320608		ROSA UNIT		662H	
7 OGRID No.		8 Operator Name		9 Elevation	
289408		LOGOS OPERATING, LLC		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	2300	SOUTH	946	WEST	RIO ARriba

11 Bottom Hole Location If Different From Surface

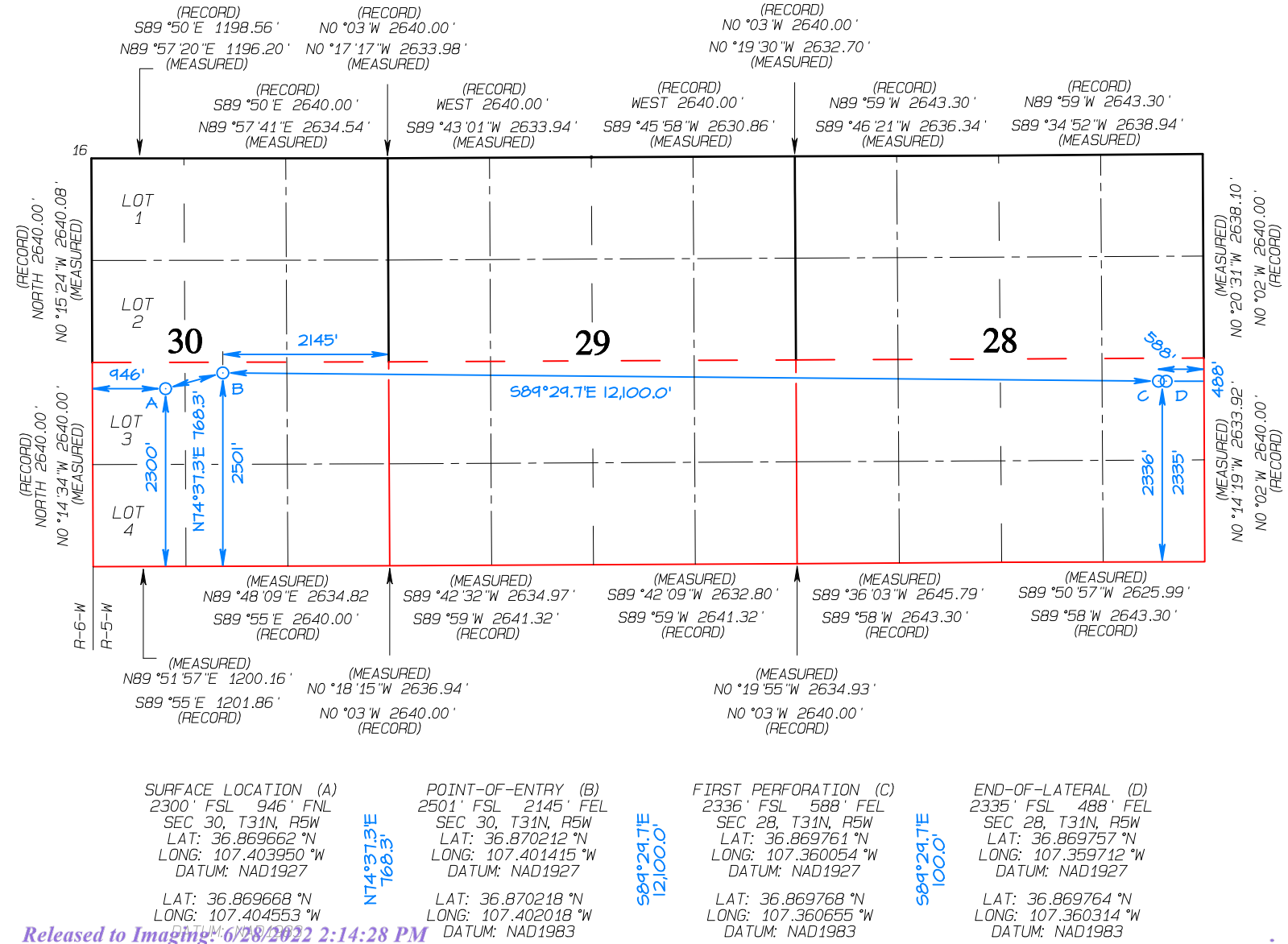
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	28	31N	5W		2335	SOUTH	488	EAST	RIO ARriba

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
872.79	S/2 - Sections 28, 29, 30, T31N, R5W		R-13457

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

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: JUNE 2, 2022
Survey Date: SEPTEMBER 3, 2015
Signature and Seal of Professional Surveyor

JASON C. EDWARDS
Certificate Number 15269





Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 30

Rosa Unit #662H

OH

Plan #5

Anticollision Report

03 June, 2022





Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Reference	Plan #5
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum centre distance of 2,500.00ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program	Date	6/3/2022
From (ft)	To (ft)	Survey (Wellbore)
0.00	19,581.75	Plan #5 (OH)
		Tool Name
		MWD+HDGM
		Description
		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 - OH	226.98	226.98	17.48	16.36	15.711	CC
Rosa Unit #658H - OH - OH	600.00	599.97	18.24	14.89	5.442	ES
Rosa Unit #658H - OH - OH	3,000.00	2,999.88	46.38	26.05	2.282	SF
Rosa Unit #658H - OH - Plan #4	1,583.80	1,583.32	17.47	6.30	1.565	CC
Rosa Unit #658H - OH - Plan #4	1,700.00	1,699.45	17.96	5.97	1.498	Level 3, ES, SF
Rosa Unit #664H - OH - OH	0.00	0.00	45.14			
Rosa Unit #664H - OH - OH	100.00	99.84	45.32	44.88	103.272	ES
Rosa Unit #664H - OH - OH	1,200.00	1,197.92	59.39	51.66	7.685	SF
Rosa Unit #664H - OH - Plan #5	1,000.00	1,000.00	45.14	38.14	6.454	CC, ES
Rosa Unit #664H - OH - Plan #5	19,100.00	19,984.07	1,448.81	683.26	1.893	SF
Rosa Unit #665H - OH - OH	0.00	0.00	31.26			
Rosa Unit #665H - OH - OH	300.00	299.85	31.95	30.46	21.414	ES
Rosa Unit #665H - OH - OH	700.00	696.24	45.99	41.84	11.087	SF
Rosa Unit #665H - OH - Plan #10	410.00	410.00	31.26	28.50	11.311	CC
Rosa Unit #665H - OH - Plan #10	500.00	499.51	31.65	28.25	9.313	ES
Rosa Unit #665H - OH - Plan #10	600.00	598.40	34.81	30.73	8.522	SF
Rosa Unit 146B - OH - OH	15,608.27	7,051.81	427.27	-53.97	0.888	Level 3, CC, ES, SF
Rosa Unit 15A - OH - OH	13,990.75	7,036.43	638.17	206.22	1.477	Level 3, CC
Rosa Unit 15A - OH - OH	14,000.00	7,036.44	638.24	206.05	1.477	Level 3, ES, SF
Rosa Unit 15B - OH - OH						Out of range
Rosa Unit 166B - OH - OH	7,216.15	6,961.02	451.65	212.40	1.888	CC, ES
Rosa Unit 166B - OH - OH	7,250.00	6,969.01	452.88	212.92	1.887	SF
Rosa Unit 229 - OH - OH						Out of range
Rosa Unit 233 - OH - OH	100.00	81.26	590.50	588.61	311.159	CC
Rosa Unit 233 - OH - OH	3,200.00	3,179.40	661.16	527.00	4.928	ES
Rosa Unit 233 - OH - OH	3,300.00	3,254.00	665.23	527.83	4.842	SF
Rosa Unit 233A - OH - OH	400.00	380.00	1,411.22	1,409.14	677.652	CC
Rosa Unit 233A - OH - OH	407.45	384.99	1,411.23	1,409.10	663.495	ES
Rosa Unit 233A - OH - OH	3,500.00	3,147.01	1,924.83	1,901.08	81.050	SF
Rosa Unit 23C - OH - OH	9,751.67	6,997.29	424.58	120.17	1.395	Level 3, CC, ES, SF



Lonestar Consulting, LLC

Anticollision Report



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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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - OH												Offset Site Error:	0.00 ft
Survey Program: 459-MWD+HDGM												Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Semi Major Axis	Offset	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Minimum	Separation	Warning		
Measured Depth (ft)	Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Toothface (")	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
0.00	0.00	0.00	0.00	0.00	0.00	2.88	17.49	0.88	17.51				
100.00	100.00	100.00	100.00	0.27	0.17	2.16	17.49	0.66	17.50	17.06	0.44	39.690	
200.00	200.00	200.00	200.00	0.63	0.34	-0.01	17.48	0.00	17.48	16.51	0.97	18.025	
226.98	226.98	226.98	226.98	0.73	0.39	-0.84	17.47	-0.26	17.48	16.36	1.11	15.711 CC	
300.00	300.00	300.00	299.99	0.99	0.51	-3.62	17.46	-1.10	17.50	16.00	1.50	11.676	
400.00	400.00	399.98	399.96	1.35	0.68	-8.63	17.44	-2.65	17.64	15.61	2.03	8.701	
500.00	500.00	499.99	499.95	1.70	0.93	-14.96	17.35	-4.64	17.96	15.33	2.63	6.819	
600.00	600.00	599.97	599.89	2.06	1.29	-22.78	16.82	-7.07	18.24	14.89	3.35	5.442 ES	
700.00	700.00	699.82	699.71	2.42	1.65	-30.53	16.60	-9.79	19.27	15.20	4.07	4.734	
800.00	800.00	799.60	799.45	2.78	2.01	-36.45	17.11	-12.64	21.28	16.49	4.79	4.445	
900.00	900.00	899.44	899.24	3.14	2.36	-37.78	19.13	-14.82	24.21	18.71	5.50	4.403	
1,000.00	1,000.00	999.43	999.18	3.50	2.71	-36.65	21.90	-16.30	27.32	21.11	6.21	4.401	
1,100.00	1,100.00	1,099.44	1,099.14	3.86	3.06	-33.78	25.12	-16.80	30.23	23.32	6.91	4.372	
1,200.00	1,200.00	1,198.97	1,198.59	4.21	3.41	-30.73	29.09	-17.29	33.87	26.25	7.62	4.445	
1,300.00	1,299.98	1,299.42	1,298.97	4.57	3.77	-60.34	32.73	-17.81	36.39	28.05	8.33	4.367	
1,319.29	1,319.26	1,318.73	1,318.27	4.64	3.83	-61.03	33.29	-17.91	36.55	28.09	8.47	4.316	
1,400.00	1,399.90	1,399.39	1,398.90	4.93	4.12	-64.24	35.57	-18.30	37.13	28.09	9.04	4.106	
1,500.00	1,499.81	1,499.15	1,498.60	5.29	4.47	-68.23	38.67	-19.16	38.46	28.71	9.75	3.944	
1,600.00	1,599.72	1,599.37	1,598.78	5.64	4.83	-73.09	41.24	-20.59	39.96	29.49	10.47	3.818	
1,700.00	1,699.64	1,699.75	1,699.15	6.00	5.19	-79.70	41.94	-22.20	40.62	29.44	11.18	3.633	
1,800.00	1,799.55	1,799.78	1,799.16	6.36	5.54	-87.37	41.47	-23.82	41.19	29.30	11.89	3.464	
1,900.00	1,899.46	1,899.95	1,899.31	6.72	5.89	-94.89	40.69	-25.11	42.04	29.45	12.60	3.338	
2,000.00	1,999.38	2,000.17	1,999.54	7.08	6.23	-101.37	40.05	-25.23	42.51	29.22	13.29	3.198	
2,100.00	2,099.29	2,100.24	2,099.60	7.44	6.56	-107.20	39.60	-24.78	42.99	29.00	13.98	3.074	
2,200.00	2,199.20	2,200.37	2,199.73	7.79	6.90	-112.34	39.49	-23.83	43.44	28.76	14.68	2.960	
2,300.00	2,299.12	2,300.35	2,299.70	8.15	7.24	-116.94	39.65	-22.47	43.84	28.46	15.38	2.851	
2,400.00	2,399.03	2,400.40	2,399.73	8.51	7.58	-120.37	40.64	-21.04	44.42	28.34	16.08	2.763	
2,500.00	2,498.94	2,500.63	2,499.93	8.87	7.93	-122.78	42.39	-19.25	44.75	27.97	16.78	2.666	
2,600.00	2,598.86	2,600.54	2,599.79	9.23	8.28	-124.19	44.91	-17.19	44.82	27.33	17.49	2.562	
2,700.00	2,698.77	2,700.67	2,699.87	9.59	8.62	-125.68	47.36	-15.19	44.98	26.78	18.20	2.472	
2,729.73	2,728.47	2,730.40	2,729.58	9.70	8.73	-126.23	48.01	-14.53	44.97	26.56	18.41	2.443	
2,800.00	2,798.68	2,800.60	2,799.75	9.95	8.97	-127.43	49.62	-13.03	45.03	26.12	18.91	2.382	
2,900.00	2,898.60	2,900.51	2,899.61	10.32	9.32	-129.19	51.82	-11.03	45.30	25.68	19.62	2.309	
3,000.00	2,998.51	2,999.88	2,998.96	10.68	9.67	-131.23	53.62	-9.75	46.38	26.05	20.33	2.282 SF	
3,100.00	3,098.42	3,099.72	3,098.79	11.04	10.03	-133.23	55.20	-9.23	48.32	27.28	21.04	2.297	
3,200.00	3,198.34	3,199.60	3,198.66	11.40	10.38	-135.65	56.23	-8.77	50.54	28.78	21.75	2.323	
3,300.00	3,298.25	3,299.44	3,298.49	11.76	10.72	-139.51	55.75	-8.05	53.07	30.61	22.46	2.363	
3,400.00	3,398.16	3,399.51	3,398.55	12.12	11.07	-143.50	54.86	-7.08	55.77	32.61	23.16	2.408	
3,500.00	3,498.08	3,499.60	3,498.64	12.48	11.41	-146.16	55.02	-6.16	58.27	34.41	23.86	2.442	
3,600.00	3,597.99	3,599.51	3,598.54	12.84	11.77	-147.27	56.42	-5.89	60.87	36.30	24.58	2.477	
3,700.00	3,697.90	3,699.45	3,698.45	13.20	12.12	-147.33	58.81	-6.04	63.39	38.10	25.29	2.506	
3,800.00	3,797.82	3,799.02	3,798.00	13.56	12.48	-147.39	60.99	-6.56	66.34	40.34	26.00	2.551	
3,900.00	3,897.73	3,898.64	3,897.60	13.92	12.83	-147.68	62.66	-7.42	69.83	43.11	26.71	2.614	
4,000.00	3,997.64	3,998.21	3,997.16	14.28	13.18	-148.29	63.73	-8.46	73.76	46.33	27.42	2.690	
4,100.00	4,097.56	4,097.87	4,096.81	14.65	13.53	-149.14	64.21	-9.72	78.18	50.05	28.13	2.779	
4,200.00	4,197.47	4,197.89	4,196.82	15.01	13.88	-150.13	64.37	-10.87	82.70	53.86	28.84	2.867	
4,300.00	4,297.38	4,297.77	4,296.68	15.37	14.24	-150.39	65.44	-12.36	87.03	57.48	29.55	2.945	
4,400.00	4,397.30	4,397.48	4,396.37	15.73	14.59	-150.39	66.72	-14.19	91.57	61.31	30.26	3.026	
4,500.00	4,497.21	4,497.01	4,495.88	16.09	14.94	-150.83	67.25	-15.86	96.36	65.39	30.97	3.112	
4,600.00	4,597.12	4,596.75	4,595.60	16.45	15.29	-151.41	67.33	-17.64	101.48	69.81	31.68	3.204	



Lonestar Consulting, LLC

Anticollision Report



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Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction
Reference Design:	Plan #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 459-MWD+HDGM													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
Measured	Vertical	Measured	Vertical	Reference	Semi Major Axis	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Depth	Depth	Depth	Depth	Reference	Offset	Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	Centres	Ellipses	(ft)			
4,700.00	4,697.04	4,696.92	4,695.76	16.81	15.64	-151.74	67.76	-19.54	106.52	74.13	32.39	3.289		
4,800.00	4,796.95	4,797.01	4,795.83	17.17	16.00	-151.93	68.54	-21.32	111.28	78.17	33.11	3.361		
4,900.00	4,896.86	4,896.15	4,894.95	17.54	16.35	-152.38	68.73	-22.96	116.25	82.44	33.81	3.438		
5,000.00	4,996.77	4,996.00	4,994.79	17.90	16.69	-153.15	68.11	-24.44	121.53	87.02	34.51	3.521		
5,100.00	5,096.69	5,095.22	5,094.00	18.26	17.04	-153.95	67.21	-25.99	127.06	91.85	35.21	3.608		
5,200.00	5,196.60	5,193.88	5,192.62	18.62	17.38	-154.58	66.06	-28.25	133.35	97.44	35.90	3.714		
5,300.00	5,296.51	5,293.80	5,292.50	18.98	17.73	-155.18	64.62	-30.84	140.07	103.45	36.61	3.826		
5,400.00	5,396.43	5,393.58	5,392.23	19.34	18.08	-155.70	63.28	-33.41	146.72	109.40	37.32	3.932		
5,500.00	5,496.34	5,494.60	5,493.22	19.70	18.44	-156.03	62.45	-36.00	153.07	115.03	38.04	4.024		
5,600.00	5,596.25	5,595.07	5,593.65	20.07	18.79	-155.95	63.05	-38.44	158.47	119.71	38.76	4.088		
5,700.00	5,696.17	5,694.62	5,693.16	20.43	19.15	-155.68	64.01	-41.26	163.98	124.51	39.47	4.154		
5,800.00	5,796.08	5,793.37	5,791.87	20.79	19.50	-155.68	64.07	-44.06	170.01	129.84	40.17	4.232		
5,900.00	5,895.99	5,892.92	5,891.37	21.15	19.85	-155.60	64.16	-47.21	176.30	135.42	40.88	4.312		
6,000.00	5,995.91	5,992.21	5,990.59	21.51	20.21	-155.34	64.59	-50.93	182.86	141.27	41.59	4.397		
6,100.00	6,095.82	6,092.58	6,090.86	21.87	20.56	-154.88	65.57	-55.15	189.49	147.18	42.31	4.478		
6,200.00	6,195.73	6,193.18	6,191.37	22.23	20.92	-154.32	67.22	-59.17	195.57	152.53	43.03	4.544		
6,300.00	6,295.65	6,266.00	6,264.14	22.60	21.18	-154.01	68.27	-61.89	203.36	160.19	43.17	4.710		
6,394.97	6,390.53	6,266.00	6,264.14	22.94	21.18	-154.01	68.27	-61.89	240.38	201.85	38.53	6.239		
6,400.00	6,395.56	6,266.00	6,264.14	22.96	21.18	-162.86	68.27	-61.89	243.24	205.01	38.23	6.363		
6,450.00	6,445.40	6,266.00	6,264.14	23.14	21.18	161.11	68.27	-61.89	276.25	240.85	35.40	7.804		
6,500.00	6,494.83	6,266.00	6,264.14	23.32	21.18	149.66	68.27	-61.89	315.63	282.49	33.14	9.523		
6,550.00	6,543.53	6,266.00	6,264.14	23.51	21.18	140.83	68.27	-61.89	359.10	327.57	31.53	11.390		
6,600.00	6,591.21	6,266.00	6,264.14	23.69	21.18	130.75	68.27	-61.89	405.12	374.67	30.45	13.304		
6,650.00	6,637.58	6,266.00	6,264.14	23.88	21.18	117.43	68.27	-61.89	452.67	422.87	29.79	15.194		
6,700.00	6,682.34	6,266.00	6,264.14	24.08	21.18	99.85	68.27	-61.89	501.06	471.61	29.45	17.013		
6,750.00	6,725.23	6,266.00	6,264.14	24.28	21.18	79.64	68.27	-61.89	549.82	520.47	29.35	18.734		
6,800.00	6,765.97	6,266.00	6,264.14	24.50	21.18	61.04	68.27	-61.89	598.59	569.16	29.43	20.339		
6,850.00	6,804.32	6,266.00	6,264.14	24.75	21.18	46.84	68.27	-61.89	647.10	617.45	29.65	21.822		
6,900.00	6,840.04	6,266.00	6,264.14	25.02	21.18	36.84	68.27	-61.89	695.14	665.15	29.99	23.179		
6,950.00	6,872.91	6,266.00	6,264.14	25.33	21.18	29.85	68.27	-61.89	742.54	712.12	30.41	24.414		
7,000.00	6,902.73	6,266.00	6,264.14	25.68	21.18	24.86	68.27	-61.89	789.13	758.22	30.91	25.530		
7,050.00	6,929.32	6,266.00	6,264.14	26.09	21.18	21.20	68.27	-61.89	834.80	803.34	31.46	26.532		
7,100.00	6,952.50	6,266.00	6,264.14	26.56	21.18	18.43	68.27	-61.89	879.42	847.36	32.06	27.427		
7,150.00	6,972.14	6,266.00	6,264.14	27.09	21.18	16.30	68.27	-61.89	922.90	890.20	32.70	28.221		
7,200.00	6,988.11	6,266.00	6,264.14	27.68	21.18	14.61	68.27	-61.89	965.14	931.77	33.37	28.922		
7,250.00	7,000.33	6,266.00	6,264.14	28.34	21.18	13.26	68.27	-61.89	1,006.04	971.98	34.06	29.535		
7,300.00	7,008.70	6,266.00	6,264.14	29.06	21.18	12.17	68.27	-61.89	1,045.54	1,010.76	34.77	30.069		
7,350.00	7,013.19	6,266.00	6,264.14	29.83	21.18	11.27	68.27	-61.89	1,083.54	1,048.05	35.49	30.528		
7,381.86	7,014.00	6,266.00	6,264.14	30.35	21.18	10.79	68.27	-61.89	1,106.95	1,071.00	35.96	30.786		
7,400.00	7,014.01	6,266.00	6,264.14	30.65	21.18	10.79	68.27	-61.89	1,120.16	1,083.95	36.22	30.928		
7,500.00	7,014.07	6,266.00	6,264.14	32.44	21.18	10.79	68.27	-61.89	1,195.33	1,157.79	37.54	31.839		
7,600.00	7,014.13	6,266.00	6,264.14	34.39	21.18	10.79	68.27	-61.89	1,273.91	1,235.25	38.66	32.949		
7,700.00	7,014.18	6,266.00	6,264.14	36.50	21.18	10.79	68.27	-61.89	1,355.32	1,315.71	39.61	34.217		
7,800.00	7,014.24	6,266.00	6,264.14	38.73	21.18	10.79	68.27	-61.89	1,439.08	1,398.66	40.41	35.610		
7,900.00	7,014.30	6,266.00	6,264.14	41.06	21.18	10.79	68.27	-61.89	1,524.79	1,483.69	41.10	37.102		
8,000.00	7,014.35	6,266.00	6,264.14	43.47	21.18	10.79	68.27	-61.89	1,612.15	1,570.47	41.68	38.675		
8,100.00	7,014.41	6,266.00	6,264.14	45.97	21.18	10.79	68.27	-61.89	1,700.91	1,658.71	42.19	40.315		
8,200.00	7,014.47	6,266.00	6,264.14	48.52	21.18	10.79	68.27	-61.89	1,790.84	1,748.21	42.63	42.009		
8,300.00	7,014.53	6,266.00	6,264.14	51.12	21.18	10.79	68.27	-61.89	1,881.80	1,838.79	43.01	43.748		
8,400.00	7,014.58	6,266.00	6,264.14	53.77	21.18	10.79	68.27	-61.89	1,973.63	1,930.28	43.35	45.526		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 459-MWD+HDGM													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		
8,500.00	7,014.64	6,266.00	6,264.14	56.46	21.18	10.79	68.27	-61.89	2,066.22	2,022.57	43.65	47.335		
8,600.00	7,014.70	6,266.00	6,264.14	59.18	21.18	10.79	68.27	-61.89	2,159.47	2,115.55	43.92	49.171		
8,700.00	7,014.76	6,266.00	6,264.14	61.93	21.18	10.79	68.27	-61.89	2,253.30	2,209.14	44.16	51.031		
8,800.00	7,014.81	6,266.00	6,264.14	64.70	21.18	10.79	68.27	-61.89	2,347.64	2,303.26	44.37	52.909		
8,900.00	7,014.87	6,266.00	6,264.14	67.50	21.18	10.79	68.27	-61.89	2,442.42	2,397.86	44.57	54.804		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	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	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	2.88	17.49	0.88	17.51					
100.00	100.00	100.00	100.00	0.27	0.27	2.88	17.49	0.88	17.51	16.97	0.54	32.352		
200.00	200.00	200.00	200.00	0.63	0.63	2.88	17.49	0.88	17.51	16.25	1.26	13.918		
300.00	300.00	300.00	300.00	0.99	0.99	2.88	17.49	0.88	17.51	15.54	1.98	8.866		
400.00	400.00	400.00	400.00	1.35	1.35	2.88	17.49	0.88	17.51	14.82	2.69	6.505		
500.00	500.00	500.00	500.00	1.70	1.70	2.88	17.49	0.88	17.51	14.10	3.41	5.137		
600.00	600.00	600.00	600.00	2.06	2.06	2.88	17.49	0.88	17.51	13.39	4.13	4.244		
700.00	700.00	700.00	700.00	2.42	2.42	2.88	17.49	0.88	17.51	12.67	4.84	3.616		
800.00	800.00	800.00	800.00	2.78	2.78	2.88	17.49	0.88	17.51	11.95	5.56	3.150		
900.00	900.00	900.00	900.00	3.14	3.14	2.88	17.49	0.88	17.51	11.24	6.28	2.790		
1,000.00	1,000.00	1,000.00	1,000.00	3.50	3.50	2.88	17.49	0.88	17.51	10.52	6.99	2.504		
1,100.00	1,100.00	1,099.74	1,099.73	3.86	3.85	0.77	18.60	0.25	18.61	10.90	7.71	2.414		
1,200.00	1,200.00	1,199.72	1,199.70	4.21	4.21	-1.67	20.08	-0.58	20.09	11.67	8.42	2.386		
1,300.00	1,299.98	1,299.70	1,299.66	4.57	4.57	-35.97	21.56	-1.42	20.17	11.04	9.14	2.208		
1,319.29	1,319.26	1,318.99	1,318.94	4.64	4.64	-37.59	21.85	-1.58	19.89	10.61	9.27	2.144		
1,400.00	1,399.90	1,399.64	1,399.59	4.93	4.92	-45.43	23.04	-2.25	18.67	8.82	9.85	1.896		
1,500.00	1,499.81	1,499.58	1,499.51	5.29	5.28	-56.36	24.52	-3.09	17.72	7.16	10.56	1.678		
1,583.80	1,583.53	1,583.32	1,583.24	5.58	5.58	-66.13	25.75	-3.79	17.47	6.30	11.16	1.565 CC		
1,600.00	1,599.72	1,599.51	1,599.43	5.64	5.64	-68.04	25.99	-3.92	17.48	6.20	11.28	1.550		
1,700.00	1,699.64	1,699.45	1,699.35	6.00	6.00	-79.58	27.47	-4.75	17.96	5.97	11.99	1.498 Level 3, ES, SF		
1,800.00	1,799.55	1,799.38	1,799.27	6.36	6.35	-90.11	28.95	-5.59	19.12	6.41	12.71	1.505		
1,900.00	1,899.46	1,899.32	1,899.19	6.72	6.71	-99.17	30.43	-6.42	20.84	7.42	13.42	1.553		
2,000.00	1,999.38	1,999.25	1,999.11	7.08	7.07	-106.70	31.90	-7.26	23.00	8.86	14.14	1.627		
2,100.00	2,099.29	2,099.19	2,099.03	7.44	7.43	-112.85	33.38	-8.09	25.48	10.63	14.85	1.716		
2,200.00	2,199.20	2,199.12	2,198.96	7.79	7.79	-117.86	34.86	-8.93	28.21	12.64	15.57	1.812		
2,300.00	2,299.12	2,299.06	2,298.88	8.15	8.14	-121.96	36.34	-9.76	31.11	14.82	16.28	1.910		
2,400.00	2,399.03	2,398.99	2,398.80	8.51	8.50	-125.35	37.81	-10.59	34.14	17.14	17.00	2.008		
2,500.00	2,498.94	2,498.93	2,498.72	8.87	8.86	-128.18	39.29	-11.43	37.28	19.56	17.72	2.104		
2,600.00	2,598.86	2,598.86	2,598.64	9.23	9.22	-130.57	40.77	-12.26	40.49	22.05	18.43	2.196		
2,700.00	2,698.77	2,698.80	2,698.56	9.59	9.58	-132.60	42.24	-13.10	43.76	24.61	19.15	2.285		
2,800.00	2,798.68	2,798.74	2,798.48	9.95	9.93	-134.34	43.72	-13.93	47.07	27.21	19.87	2.369		
2,900.00	2,898.60	2,898.67	2,898.40	10.32	10.29	-135.86	45.20	-14.76	50.43	29.85	20.58	2.450		
3,000.00	2,998.51	2,998.61	2,998.32	10.68	10.65	-137.19	46.68	-15.60	53.82	32.51	21.30	2.526		
3,100.00	3,098.42	3,098.54	3,098.24	11.04	11.01	-138.35	48.15	-16.43	57.23	35.21	22.02	2.599		
3,200.00	3,198.34	3,198.48	3,198.17	11.40	11.37	-139.39	49.63	-17.27	60.66	37.92	22.74	2.668		
3,300.00	3,298.25	3,298.41	3,298.09	11.76	11.73	-140.32	51.11	-18.10	64.11	40.66	23.45	2.734		
3,400.00	3,398.16	3,398.35	3,398.01	12.12	12.09	-141.15	52.59	-18.93	67.58	43.41	24.17	2.796		
3,500.00	3,498.08	3,498.28	3,497.93	12.48	12.44	-141.90	54.06	-19.77	71.05	46.17	24.89	2.855		
3,600.00	3,597.99	3,598.22	3,597.85	12.84	12.80	-142.58	55.54	-20.60	74.54	48.94	25.61	2.911		
3,700.00	3,697.90	3,698.15	3,697.77	13.20	13.16	-143.20	57.02	-21.44	78.04	51.72	26.32	2.965		
3,800.00	3,797.82	3,798.09	3,797.69	13.56	13.52	-143.76	58.50	-22.27	81.55	54.51	27.04	3.016		
3,900.00	3,897.73	3,898.02	3,897.61	13.92	13.88	-144.28	59.97	-23.10	85.06	57.31	27.76	3.065		
4,000.00	3,997.64	3,997.96	3,997.53	14.28	14.24	-144.76	61.45	-23.94	88.59	60.11	28.48	3.111		
4,100.00	4,097.56	4,097.90	4,097.45	14.65	14.59	-145.20	62.93	-24.77	92.11	62.92	29.19	3.155		
4,200.00	4,197.47	4,197.83	4,197.37	15.01	14.95	-145.61	64.41	-25.61	95.64	65.73	29.91	3.198		
4,300.00	4,297.38	4,297.77	4,297.30	15.37	15.31	-145.99	65.88	-26.44	99.18	68.55	30.63	3.238		
4,400.00	4,397.30	4,397.70	4,397.22	15.73	15.67	-146.34	67.36	-27.28	102.72	71.37	31.35	3.277		
4,500.00	4,497.21	4,497.64	4,497.14	16.09	16.03	-146.67	68.84	-28.11	106.26	74.20	32.06	3.314		
4,600.00	4,597.12	4,597.57	4,597.06	16.45	16.39	-146.98	70.32	-28.94	109.81	77.03	32.78	3.350		
4,700.00	4,697.04	4,697.51	4,696.98	16.81	16.75	-147.27	71.79	-29.78	113.36	79.86	33.50	3.384		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	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		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)				
4,800.00	4,796.95	4,797.44	4,796.90	17.17	17.10	-147.54	73.27	-30.61	116.91	82.70	34.22	3.417		
4,900.00	4,896.86	4,897.38	4,896.82	17.54	17.46	-147.79	74.75	-31.45	120.47	85.53	34.94	3.448		
5,000.00	4,996.77	4,997.31	4,996.74	17.90	17.82	-148.03	76.22	-32.28	124.03	88.37	35.65	3.479		
5,100.00	5,096.69	5,097.25	5,096.66	18.26	18.18	-148.26	77.70	-33.11	127.59	91.21	36.37	3.508		
5,200.00	5,196.60	5,197.18	5,196.58	18.62	18.54	-148.48	79.18	-33.95	131.15	94.06	37.09	3.536		
5,300.00	5,296.51	5,297.12	5,296.51	18.98	18.90	-148.68	80.66	-34.78	134.71	96.90	37.81	3.563		
5,400.00	5,396.43	5,397.06	5,396.43	19.34	19.26	-148.87	82.13	-35.62	138.28	99.75	38.52	3.589		
5,500.00	5,496.34	5,496.99	5,496.35	19.70	19.61	-149.06	83.61	-36.45	141.84	102.60	39.24	3.614		
5,600.00	5,596.25	5,596.93	5,596.27	20.07	19.97	-149.23	85.09	-37.28	145.41	105.45	39.96	3.639		
5,700.00	5,696.17	5,696.86	5,696.19	20.43	20.33	-149.40	86.57	-38.12	148.98	108.30	40.68	3.662		
5,800.00	5,796.08	5,796.80	5,796.11	20.79	20.69	-149.56	88.04	-38.95	152.55	111.15	41.40	3.685		
5,900.00	5,895.99	5,896.73	5,896.03	21.15	21.05	-149.71	89.52	-39.79	156.12	114.00	42.11	3.707		
6,000.00	5,995.91	5,996.67	5,995.95	21.51	21.41	-149.85	91.00	-40.62	159.69	116.86	42.83	3.728		
6,100.00	6,095.82	6,096.60	6,095.87	21.87	21.77	-149.99	92.48	-41.45	163.27	119.71	43.55	3.749		
6,200.00	6,195.73	6,196.54	6,195.79	22.23	22.12	-150.12	93.95	-42.29	166.84	122.57	44.27	3.769		
6,300.00	6,295.65	6,296.47	6,295.72	22.60	22.48	-150.25	95.43	-43.12	170.41	125.43	44.99	3.788		
6,394.97	6,390.53	6,388.44	6,387.67	22.94	22.81	-150.34	96.79	-44.02	173.94	128.30	45.64	3.811		
6,400.00	6,395.56	6,392.52	6,391.75	22.96	22.83	-150.01	96.86	-44.15	174.24	128.57	45.67	3.815		
6,450.00	6,445.40	6,432.57	6,431.70	23.14	22.97	-149.71	97.50	-46.79	180.48	134.62	45.86	3.935		
6,500.00	6,494.83	6,470.99	6,469.79	23.32	23.11	-160.86	98.17	-51.69	192.71	146.78	45.94	4.195		
6,550.00	6,543.53	6,506.82	6,504.99	23.51	23.24	-158.72	98.83	-58.31	210.83	164.94	45.89	4.594		
6,600.00	6,591.21	6,539.36	6,536.59	23.69	23.35	-157.98	99.47	-66.04	234.59	188.85	45.74	5.128		
6,650.00	6,637.58	6,568.19	6,564.22	23.88	23.46	-157.61	100.06	-74.22	263.57	218.05	45.52	5.790		
6,700.00	6,682.34	6,600.00	6,594.25	24.08	23.57	-157.73	100.73	-84.70	297.31	251.75	45.56	6.526		
6,750.00	6,725.23	6,614.09	6,607.38	24.28	23.63	-156.21	101.04	-89.82	334.83	289.85	44.98	7.444		
6,800.00	6,765.97	6,631.32	6,623.26	24.50	23.69	-154.63	101.42	-96.46	375.81	331.08	44.72	8.403		
6,850.00	6,804.32	6,650.00	6,640.28	24.75	23.76	-152.74	101.85	-104.15	419.53	374.83	44.70	9.386		
6,900.00	6,840.04	6,650.00	6,640.28	25.02	23.76	-146.84	101.85	-104.15	465.31	421.21	44.10	10.551		
6,950.00	6,872.91	6,662.89	6,651.89	25.33	23.81	-140.99	102.14	-109.75	512.60	468.42	44.18	11.604		
7,000.00	6,902.73	6,667.69	6,656.19	25.68	23.83	-129.28	102.26	-111.90	561.03	516.95	44.09	12.725		
7,050.00	6,929.32	6,670.11	6,658.34	26.09	23.84	-109.26	102.31	-112.99	610.14	566.09	44.05	13.852		
7,100.00	6,952.50	6,670.39	6,658.59	26.56	23.84	-80.71	102.32	-113.12	659.54	615.50	44.05	14.973		
7,150.00	6,972.14	6,668.79	6,657.17	27.09	23.83	-54.55	102.28	-112.39	708.92	664.83	44.09	16.078		
7,200.00	6,988.11	6,665.51	6,654.24	27.68	23.82	-37.85	102.20	-110.92	757.97	713.79	44.17	17.160		
7,250.00	7,000.33	6,650.00	6,640.28	28.34	23.76	-26.84	101.85	-104.15	806.59	762.58	44.01	18.326		
7,300.00	7,008.70	6,650.00	6,640.28	29.06	23.76	-21.64	101.85	-104.15	854.11	809.80	44.31	19.274		
7,350.00	7,013.19	6,650.00	6,640.28	29.83	23.76	-18.10	101.85	-104.15	900.72	856.07	44.65	20.174		
7,381.86	7,014.00	6,650.00	6,640.28	30.35	23.76	-16.39	101.85	-104.15	929.88	885.01	44.87	20.724		
7,400.00	7,014.01	6,650.00	6,640.28	30.65	23.76	-16.39	101.85	-104.15	946.38	901.39	45.00	21.032		
7,500.00	7,014.07	6,623.56	6,616.13	32.44	23.66	-15.50	101.25	-93.41	1,037.47	992.35	45.13	22.989		
7,600.00	7,014.13	6,600.00	6,594.25	34.39	23.57	-14.78	100.73	-84.70	1,129.81	1,084.53	45.28	24.953		
7,700.00	7,014.18	6,600.00	6,594.25	36.50	23.57	-14.78	100.73	-84.70	1,222.75	1,177.00	45.75	26.729		
7,800.00	7,014.24	6,600.00	6,594.25	38.73	23.57	-14.78	100.73	-84.70	1,316.73	1,270.60	46.13	28.545		
7,900.00	7,014.30	6,575.28	6,570.96	41.06	23.48	-14.09	100.21	-76.43	1,410.84	1,364.70	46.14	30.577		
8,000.00	7,014.35	6,550.00	6,546.83	43.47	23.39	-13.43	99.68	-68.91	1,505.99	1,459.86	46.14	32.641		
8,100.00	7,014.41	6,550.00	6,546.83	45.97	23.39	-13.43	99.68	-68.91	1,601.10	1,554.69	46.41	34.501		
8,200.00	7,014.47	6,550.00	6,546.83	48.52	23.39	-13.43	99.68	-68.91	1,696.77	1,650.13	46.64	36.383		
8,300.00	7,014.53	6,550.00	6,546.83	51.12	23.39	-13.43	99.68	-68.91	1,792.91	1,746.07	46.84	38.281		
8,400.00	7,014.58	6,550.00	6,546.83	53.77	23.39	-13.43	99.68	-68.91	1,889.45	1,842.44	47.01	40.193		
8,500.00	7,014.64	6,529.17	6,526.73	56.46	23.32	-12.94	99.26	-63.45	1,985.89	1,938.89	46.99	42.259		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #658H - OH - Plan #4													
Survey Program: 0-MWD+HDGM													
Rule Assigned:													
Warning													
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
8,600.00	7,014.70	6,523.39	6,521.13	59.18	23.30	12.81	99.15	-62.05	2,082.79	2,035.69	47.10	44.225	
8,700.00	7,014.76	6,500.00	6,498.32	61.93	23.21	12.30	98.70	-56.90	2,180.24	2,133.18	47.05	46.334	
8,800.00	7,014.81	6,500.00	6,498.32	64.70	23.21	12.30	98.70	-56.90	2,277.40	2,230.21	47.19	48.265	
8,900.00	7,014.87	6,500.00	6,498.32	67.50	23.21	12.30	98.70	-56.90	2,374.79	2,327.49	47.30	50.202	
9,000.00	7,014.93	6,500.00	6,498.32	70.32	23.21	12.30	98.70	-56.90	2,472.40	2,424.98	47.41	52.145	



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 396-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	152.67	-40.10	20.72	45.14					
100.00	100.00	99.84	99.84	0.27	0.17	152.65	-40.25	20.82	45.32	44.88	0.44	103.272 ES		
200.00	200.00	199.67	199.67	0.63	0.34	152.59	-40.70	21.11	45.86	44.89	0.97	47.505		
300.00	300.00	299.50	299.50	0.99	0.50	152.48	-41.46	21.60	46.75	45.26	1.49	31.343		
400.00	400.00	399.33	399.31	1.35	0.68	152.34	-42.52	22.29	48.01	45.99	2.02	23.716		
500.00	500.00	499.29	499.26	1.70	1.04	152.25	-43.79	23.04	49.49	46.75	2.74	18.053		
600.00	600.00	599.38	599.34	2.06	1.40	152.23	-45.02	23.70	50.88	47.42	3.46	14.712		
700.00	700.00	699.47	699.43	2.42	1.76	152.39	-46.13	24.13	52.07	47.89	4.17	12.473		
800.00	800.00	799.49	799.43	2.78	2.11	153.79	-47.66	23.46	53.12	48.24	4.89	10.872		
900.00	900.00	899.49	899.41	3.14	2.46	155.59	-49.37	22.40	54.22	48.63	5.60	9.688		
1,000.00	1,000.00	999.55	999.45	3.50	2.82	157.38	-51.00	21.25	55.25	48.95	6.31	8.758		
1,100.00	1,100.00	1,099.06	1,098.93	3.86	3.17	159.72	-52.98	19.58	56.49	49.47	7.02	8.047		
1,200.00	1,200.00	1,197.92	1,197.62	4.21	3.53	164.54	-57.19	15.82	59.39	51.66	7.73	7.685 SF		
1,300.00	1,299.98	1,296.16	1,295.51	4.57	3.88	141.93	-63.64	10.57	66.03	57.60	8.43	7.833		
1,319.29	1,319.26	1,314.98	1,314.22	4.64	3.95	143.53	-65.15	9.32	67.98	59.42	8.56	7.937		
1,400.00	1,399.90	1,393.04	1,391.70	4.93	4.24	150.07	-72.48	3.27	78.00	68.88	9.12	8.555		
1,500.00	1,499.81	1,488.97	1,486.50	5.29	4.61	157.20	-83.72	-6.16	94.04	84.26	9.79	9.608		
1,600.00	1,599.72	1,583.33	1,579.19	5.64	4.99	163.12	-97.01	-17.77	113.97	103.53	10.44	10.918		
1,700.00	1,699.64	1,676.32	1,669.90	6.00	5.37	167.81	-112.37	-31.23	137.74	126.67	11.07	12.439		
1,800.00	1,799.55	1,768.75	1,759.44	6.36	5.77	171.54	-129.47	-46.52	164.74	153.04	11.71	14.071		
1,900.00	1,899.46	1,862.05	1,849.34	6.72	6.20	174.56	-147.80	-63.42	193.94	181.58	12.37	15.683		
2,000.00	1,999.38	1,955.61	1,939.28	7.08	6.64	176.91	-166.65	-81.00	224.27	211.23	13.04	17.200		
2,100.00	2,099.29	2,049.98	2,029.86	7.44	7.09	178.79	-185.88	-99.24	255.31	241.58	13.73	18.595		
2,200.00	2,199.20	2,147.93	2,124.04	7.79	7.57	-179.93	-206.14	-116.93	286.18	271.71	14.47	19.773		
2,300.00	2,299.12	2,248.52	2,221.27	8.15	8.06	-179.43	-227.11	-131.86	315.67	300.43	15.25	20.705		
2,400.00	2,399.03	2,348.36	2,318.18	8.51	8.53	-179.35	-247.62	-144.34	343.73	327.73	16.00	21.477		
2,500.00	2,498.94	2,443.76	2,410.91	8.87	8.99	-179.32	-266.91	-155.81	371.28	354.57	16.71	22.216		
2,600.00	2,598.86	2,540.49	2,504.88	9.23	9.45	-179.22	-286.37	-167.92	398.98	381.55	17.44	22.883		
2,700.00	2,698.77	2,634.83	2,596.53	9.59	9.90	-179.11	-305.26	-179.90	426.72	408.58	18.14	23.530		
2,800.00	2,798.68	2,728.31	2,687.22	9.95	10.36	-179.01	-324.38	-192.08	454.96	436.13	18.83	24.164		
2,900.00	2,898.60	2,823.15	2,779.13	10.32	10.82	-178.89	-343.99	-204.81	483.60	464.07	19.54	24.754		
3,000.00	2,998.51	2,924.18	2,877.13	10.68	11.32	-178.77	-364.55	-218.27	511.93	491.62	20.31	25.209		
3,100.00	3,098.42	3,025.54	2,975.71	11.04	11.81	-178.69	-384.36	-231.01	539.17	518.10	21.08	25.580		
3,200.00	3,198.34	3,123.72	3,071.35	11.40	12.28	-178.61	-402.99	-243.05	565.79	543.98	21.82	25.935		
3,300.00	3,298.25	3,223.72	3,168.87	11.76	12.76	-178.51	-421.40	-255.38	591.97	569.40	22.57	26.229		
3,400.00	3,398.16	3,317.00	3,259.80	12.12	13.20	-178.45	-438.79	-266.71	618.24	594.97	23.26	26.576		
3,500.00	3,498.08	3,407.52	3,347.91	12.48	13.64	-178.40	-456.26	-277.97	645.20	621.27	23.93	26.958		
3,600.00	3,597.99	3,503.54	3,441.28	12.84	14.11	-178.29	-474.75	-290.63	672.53	647.88	24.65	27.278		
3,700.00	3,697.90	3,592.56	3,527.74	13.20	14.55	-178.18	-492.11	-302.82	700.33	675.02	25.31	27.666		
3,800.00	3,797.82	3,698.49	3,630.63	13.56	15.07	-178.08	-512.93	-316.99	728.11	701.99	26.13	27.869		
3,900.00	3,897.73	3,791.27	3,720.87	13.92	15.52	-178.04	-530.92	-328.80	755.33	728.51	26.82	28.163		
4,000.00	3,997.64	3,892.53	3,819.39	14.28	16.02	-178.03	-550.72	-341.26	782.46	754.87	27.59	28.362		
4,100.00	4,097.56	3,988.71	3,913.06	14.65	16.48	-178.02	-569.30	-352.82	809.24	780.92	28.31	28.584		
4,200.00	4,197.47	4,078.00	3,999.84	15.01	16.92	-177.97	-586.70	-364.51	836.70	807.73	28.98	28.876		
4,300.00	4,297.38	4,176.20	4,095.22	15.37	17.41	-177.85	-605.62	-378.27	864.48	834.76	29.72	29.088		
4,400.00	4,397.30	4,263.80	4,180.26	15.73	17.84	-177.73	-622.44	-390.84	892.38	862.01	30.37	29.382		
4,500.00	4,497.21	4,345.19	4,259.03	16.09	18.26	-177.63	-638.83	-403.10	921.45	890.49	30.97	29.755		
4,600.00	4,597.12	4,476.89	4,386.71	16.45	18.92	-177.49	-664.89	-422.17	950.09	918.08	32.00	29.686		
4,700.00	4,697.04	4,582.88	4,490.18	16.81	19.42	-177.39	-683.26	-435.85	975.66	942.86	32.80	29.744		
4,800.00	4,796.95	4,668.40	4,573.66	17.17	19.83	-177.28	-697.90	-447.30	1,001.35	967.91	33.44	29.944		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH													Offset Site Error: 0.00 ft		
Survey Program: 396-MWD+HDGM				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		
4,900.00	4,896.86	4,745.00	4,648.14	17.54	20.21	-177.19	-712.09	-458.21	1,028.63	994.63	34.00	30.251			
5,000.00	4,996.77	4,822.88	4,723.53	17.90	20.61	-177.13	-727.90	-469.68	1,057.67	1,023.09	34.57	30.591			
5,100.00	5,096.69	4,891.45	4,789.57	18.26	20.97	-177.11	-743.22	-479.97	1,088.59	1,053.53	35.05	31.055			
5,200.00	5,196.60	4,971.64	4,866.23	18.62	21.40	-177.13	-763.16	-492.47	1,121.81	1,086.17	35.64	31.476			
5,300.00	5,296.51	5,093.58	4,983.12	18.98	22.06	-177.14	-792.51	-511.03	1,154.30	1,117.67	36.63	31.514			
5,400.00	5,396.43	5,125.00	5,013.39	19.34	22.22	-177.15	-799.69	-515.41	1,187.01	1,150.28	36.73	32.315			
5,500.00	5,496.34	5,125.00	5,013.39	19.70	22.22	-177.15	-799.69	-515.41	1,226.74	1,190.34	36.40	33.706			
5,600.00	5,596.25	5,125.00	5,013.39	20.07	22.22	-177.15	-799.69	-515.41	1,273.09	1,237.16	35.94	35.426			
5,700.00	5,696.17	5,125.00	5,013.39	20.43	22.22	-177.15	-799.69	-515.41	1,325.39	1,289.99	35.39	37.447			
5,800.00	5,796.08	5,125.00	5,013.39	20.79	22.22	-177.15	-799.69	-515.41	1,382.94	1,348.14	34.80	39.740			
5,900.00	5,895.99	5,125.00	5,013.39	21.15	22.22	-177.15	-799.69	-515.41	1,445.14	1,410.95	34.18	42.274			
6,000.00	5,995.91	5,125.00	5,013.39	21.51	22.22	-177.15	-799.69	-515.41	1,511.39	1,477.82	33.57	45.024			
6,100.00	6,095.82	5,125.00	5,013.39	21.87	22.22	-177.15	-799.69	-515.41	1,581.20	1,548.23	32.97	47.962			
6,200.00	6,195.73	5,125.00	5,013.39	22.23	22.22	-177.15	-799.69	-515.41	1,654.11	1,621.71	32.39	51.064			
6,300.00	6,295.65	5,125.00	5,013.39	22.60	22.22	-177.15	-799.69	-515.41	1,729.73	1,697.88	31.85	54.306			
6,394.97	6,390.53	5,125.00	5,013.39	22.94	22.22	-177.15	-799.69	-515.41	1,803.74	1,772.37	31.37	57.495			
6,400.00	6,395.56	5,125.00	5,013.39	22.96	22.22	173.68	-799.69	-515.41	1,807.72	1,776.37	31.35	57.666			
6,450.00	6,445.40	5,125.00	5,013.39	23.14	22.22	134.56	-799.69	-515.41	1,848.20	1,817.07	31.12	59.382			
6,500.00	6,494.83	5,125.00	5,013.39	23.32	22.22	120.45	-799.69	-515.41	1,890.07	1,859.14	30.93	61.109			
6,550.00	6,543.53	5,125.00	5,013.39	23.51	22.22	109.94	-799.69	-515.41	1,932.99	1,902.23	30.76	62.836			
6,600.00	6,591.21	5,125.00	5,013.39	23.69	22.22	100.20	-799.69	-515.41	1,976.64	1,946.02	30.62	64.546			
6,650.00	6,637.58	5,125.00	5,013.39	23.88	22.22	90.71	-799.69	-515.41	2,020.71	1,990.20	30.52	66.220			
6,700.00	6,682.34	5,125.00	5,013.39	24.08	22.22	81.55	-799.69	-515.41	2,064.92	2,034.48	30.44	67.842			
6,750.00	6,725.23	5,125.00	5,013.39	24.28	22.22	72.99	-799.69	-515.41	2,108.98	2,078.59	30.39	69.396			
6,800.00	6,765.97	5,125.00	5,013.39	24.50	22.22	65.25	-799.69	-515.41	2,152.65	2,122.27	30.38	70.864			
6,850.00	6,804.32	5,125.00	5,013.39	24.75	22.22	58.46	-799.69	-515.41	2,195.68	2,165.28	30.40	72.231			
6,900.00	6,840.04	5,125.00	5,013.39	25.02	22.22	52.61	-799.69	-515.41	2,237.86	2,207.40	30.46	73.480			
6,950.00	6,872.91	5,125.00	5,013.39	25.33	22.22	47.63	-799.69	-515.41	2,278.98	2,248.43	30.55	74.597			
7,000.00	6,902.73	5,125.00	5,013.39	25.68	22.22	43.43	-799.69	-515.41	2,318.85	2,288.16	30.69	75.568			
7,050.00	6,929.32	5,125.00	5,013.39	26.09	22.22	39.89	-799.69	-515.41	2,357.29	2,326.43	30.86	76.383			
7,100.00	6,952.50	5,125.00	5,013.39	26.56	22.22	36.91	-799.69	-515.41	2,394.14	2,363.06	31.08	77.032			
7,150.00	6,972.14	5,125.00	5,013.39	27.09	22.22	34.39	-799.69	-515.41	2,429.26	2,397.91	31.34	77.510			
7,200.00	6,988.11	5,125.00	5,013.39	27.68	22.22	32.26	-799.69	-515.41	2,462.49	2,430.85	31.65	77.814			
7,250.00	7,000.33	5,125.00	5,013.39	28.34	22.22	30.46	-799.69	-515.41	2,493.73	2,461.73	31.99	77.947			



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #5													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	152.67	-40.10	20.72	45.14					
100.00	100.00	100.00	100.00	0.27	0.27	152.67	-40.10	20.72	45.14	44.60	0.54	83.387		
200.00	200.00	200.00	200.00	0.63	0.63	152.67	-40.10	20.72	45.14	43.88	1.26	35.873		
300.00	300.00	300.00	300.00	0.99	0.99	152.67	-40.10	20.72	45.14	43.16	1.98	22.852		
400.00	400.00	400.00	400.00	1.35	1.35	152.67	-40.10	20.72	45.14	42.44	2.69	16.766		
500.00	500.00	500.00	500.00	1.70	1.70	152.67	-40.10	20.72	45.14	41.73	3.41	13.240		
600.00	600.00	600.00	600.00	2.06	2.06	152.67	-40.10	20.72	45.14	41.01	4.13	10.940		
700.00	700.00	700.00	700.00	2.42	2.42	152.67	-40.10	20.72	45.14	40.29	4.84	9.320		
800.00	800.00	800.00	800.00	2.78	2.78	152.67	-40.10	20.72	45.14	39.58	5.56	8.118		
900.00	900.00	900.00	900.00	3.14	3.14	152.67	-40.10	20.72	45.14	38.86	6.28	7.191		
1,000.00	1,000.00	1,000.00	1,000.00	3.50	3.50	152.67	-40.10	20.72	45.14	38.14	6.99	6.454 CC, ES		
1,100.00	1,100.00	1,099.23	1,099.21	3.86	3.84	154.57	-41.51	19.73	45.97	38.28	7.69	5.976		
1,200.00	1,200.00	1,198.23	1,198.07	4.21	4.17	159.84	-45.72	16.79	48.74	40.37	8.37	5.820		
1,300.00	1,299.98	1,296.56	1,296.03	4.57	4.50	138.86	-52.66	11.92	55.44	46.39	9.05	6.125		
1,319.29	1,319.26	1,315.39	1,314.75	4.64	4.56	140.77	-54.31	10.77	57.45	48.26	9.18	6.256		
1,400.00	1,399.90	1,393.69	1,392.46	4.93	4.83	148.35	-62.22	5.23	67.76	58.04	9.72	6.973		
1,500.00	1,499.81	1,489.65	1,487.27	5.29	5.17	155.95	-74.29	-3.22	84.34	73.98	10.37	8.137		
1,600.00	1,599.72	1,584.23	1,580.19	5.64	5.53	161.72	-88.73	-13.33	104.92	93.92	11.00	9.542		
1,700.00	1,699.64	1,677.28	1,670.99	6.00	5.89	166.03	-105.38	-24.99	129.23	117.62	11.61	11.132		
1,800.00	1,799.55	1,772.26	1,763.16	6.36	6.28	169.29	-124.13	-38.12	156.19	143.92	12.27	12.731		
1,900.00	1,899.46	1,868.20	1,856.26	6.72	6.68	171.63	-143.14	-51.43	183.59	170.63	12.95	14.172		
2,000.00	1,999.38	1,964.14	1,949.35	7.08	7.09	173.36	-162.15	-64.74	211.19	197.55	13.64	15.478		
2,100.00	2,099.29	2,060.08	2,042.44	7.44	7.52	174.69	-181.17	-78.05	238.94	224.60	14.34	16.663		
2,200.00	2,199.20	2,156.03	2,135.54	7.79	7.95	175.75	-200.18	-91.37	266.77	251.74	15.04	17.740		
2,300.00	2,299.12	2,251.97	2,228.63	8.15	8.38	176.60	-219.19	-104.68	294.68	278.94	15.74	18.723		
2,400.00	2,399.03	2,347.91	2,321.72	8.51	8.82	177.31	-238.20	-117.99	322.64	306.19	16.44	19.622		
2,500.00	2,498.94	2,443.86	2,414.82	8.87	9.27	177.90	-257.22	-131.31	350.63	333.48	17.15	20.446		
2,600.00	2,598.86	2,539.80	2,507.91	9.23	9.72	178.41	-276.23	-144.62	378.66	360.80	17.86	21.205		
2,700.00	2,698.77	2,635.74	2,601.00	9.59	10.17	178.85	-295.24	-157.93	406.70	388.14	18.57	21.905		
2,800.00	2,798.68	2,731.69	2,694.10	9.95	10.62	179.23	-314.26	-171.25	434.77	415.49	19.28	22.553		
2,900.00	2,898.60	2,827.63	2,787.19	10.32	11.08	179.56	-333.27	-184.56	462.85	442.86	19.99	23.154		
3,000.00	2,998.51	2,923.57	2,880.28	10.68	11.54	179.86	-352.28	-197.87	490.95	470.24	20.70	23.713		
3,100.00	3,098.42	3,019.51	2,973.37	11.04	12.00	-179.88	-371.30	-211.19	519.05	497.64	21.42	24.233		
3,200.00	3,198.34	3,115.46	3,066.47	11.40	12.47	-179.64	-390.31	-224.50	547.17	525.03	22.13	24.720		
3,300.00	3,298.25	3,211.40	3,159.56	11.76	12.93	-179.43	-409.32	-237.81	575.29	552.44	22.85	25.175		
3,400.00	3,398.16	3,307.34	3,252.65	12.12	13.40	-179.23	-428.34	-251.13	603.42	579.85	23.57	25.602		
3,500.00	3,498.08	3,403.29	3,345.75	12.48	13.87	-179.06	-447.35	-264.44	631.56	607.27	24.29	26.004		
3,600.00	3,597.99	3,499.23	3,438.84	12.84	14.33	-178.89	-466.36	-277.75	659.70	634.69	25.01	26.381		
3,700.00	3,697.90	3,595.17	3,531.93	13.20	14.81	-178.75	-485.38	-291.06	687.84	662.12	25.73	26.737		
3,800.00	3,797.82	3,691.12	3,625.03	13.56	15.28	-178.61	-504.39	-304.38	715.99	689.55	26.45	27.074		
3,900.00	3,897.73	3,787.06	3,718.12	13.92	15.75	-178.48	-523.40	-317.69	744.14	716.98	27.17	27.392		
4,000.00	3,997.64	3,883.00	3,811.21	14.28	16.22	-178.37	-542.41	-331.00	772.30	744.41	27.89	27.693		
4,100.00	4,097.56	3,978.94	3,904.31	14.65	16.69	-178.26	-561.43	-344.32	800.46	771.85	28.61	27.979		
4,200.00	4,197.47	4,074.89	3,997.40	15.01	17.17	-178.16	-580.44	-357.63	828.62	799.29	29.33	28.250		
4,300.00	4,297.38	4,170.83	4,090.49	15.37	17.64	-178.06	-599.45	-370.94	856.78	826.73	30.05	28.508		
4,400.00	4,397.30	4,266.77	4,183.58	15.73	18.12	-177.97	-618.47	-384.26	884.95	854.17	30.78	28.753		
4,500.00	4,497.21	4,362.72	4,276.68	16.09	18.59	-177.89	-637.48	-397.57	913.11	881.61	31.50	28.987		
4,600.00	4,597.12	4,458.66	4,369.77	16.45	19.07	-177.81	-656.49	-410.88	941.28	909.06	32.22	29.210		
4,700.00	4,697.04	4,554.60	4,462.86	16.81	19.55	-177.74	-675.51	-424.20	969.45	936.50	32.95	29.423		
4,800.00	4,796.95	4,650.55	4,555.96	17.17	20.02	-177.67	-694.52	-437.51	997.62	963.95	33.67	29.627		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #5													Offset Site Error: 0.00 ft	
Survey Program: 0-MWD+HDGM													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)				
4,900.00	4,896.86	4,746.49	4,649.05	17.54	20.50	-177.60	-713.53	-450.82	1,025.79	991.40	34.40	29.822		
5,000.00	4,996.77	4,842.43	4,742.14	17.90	20.98	-177.54	-732.55	-464.13	1,053.97	1,018.85	35.12	30.009		
5,100.00	5,096.69	4,938.38	4,835.24	18.26	21.46	-177.48	-751.56	-477.45	1,082.14	1,046.30	35.85	30.188		
5,200.00	5,196.60	5,034.32	4,928.33	18.62	21.93	-177.42	-770.57	-490.76	1,110.32	1,073.75	36.57	30.359		
5,300.00	5,296.51	5,130.26	5,021.42	18.98	22.41	-177.37	-789.58	-504.07	1,138.50	1,101.20	37.30	30.524		
5,400.00	5,396.43	5,226.20	5,114.52	19.34	22.89	-177.32	-808.60	-517.39	1,166.67	1,128.65	38.02	30.682		
5,500.00	5,496.34	5,322.15	5,207.61	19.70	23.37	-177.27	-827.61	-530.70	1,194.85	1,156.10	38.75	30.834		
5,600.00	5,596.25	5,418.09	5,300.70	20.07	23.85	-177.23	-846.62	-544.01	1,223.03	1,183.55	39.48	30.981		
5,700.00	5,696.17	5,514.03	5,393.80	20.43	24.33	-177.18	-865.64	-557.33	1,251.21	1,211.01	40.20	31.122		
5,800.00	5,796.08	5,609.98	5,486.89	20.79	24.81	-177.14	-884.65	-570.64	1,279.39	1,238.46	40.93	31.257		
5,900.00	5,895.99	5,705.92	5,579.98	21.15	25.29	-177.10	-903.66	-583.95	1,307.57	1,265.91	41.66	31.388		
6,000.00	5,995.91	5,801.86	5,673.07	21.51	25.77	-177.06	-922.68	-597.27	1,335.75	1,293.37	42.39	31.515		
6,100.00	6,095.82	5,897.81	5,766.17	21.87	26.25	-177.02	-941.69	-610.58	1,363.94	1,320.82	43.11	31.636		
6,200.00	6,195.73	5,993.75	5,859.26	22.23	26.73	-176.99	-960.70	-623.89	1,392.12	1,348.28	43.84	31.754		
6,300.00	6,295.65	6,089.69	5,952.35	22.60	27.21	-176.95	-979.72	-637.21	1,420.30	1,375.73	44.57	31.868		
6,394.97	6,390.53	6,180.81	6,040.76	22.94	27.67	-176.92	-997.77	-649.85	1,447.07	1,401.81	45.26	31.972		
6,400.00	6,395.56	6,185.63	6,045.44	22.96	27.69	174.29	-998.73	-650.52	1,448.50	1,403.20	45.30	31.978		
6,450.00	6,445.40	6,233.17	6,091.57	23.14	27.93	139.51	-1,008.15	-657.11	1,463.76	1,418.10	45.66	32.059		
6,500.00	6,494.83	7,725.61	7,006.26	23.32	34.33	102.86	-1,168.41	144.68	1,451.55	1,398.31	53.24	27.262		
6,550.00	6,543.53	7,737.41	7,006.41	23.51	34.54	100.56	-1,168.11	156.48	1,436.43	1,382.19	54.24	26.482		
6,600.00	6,591.21	7,752.98	7,006.61	23.69	34.81	99.43	-1,167.70	172.04	1,422.95	1,367.68	55.27	25.746		
6,650.00	6,637.58	7,772.23	7,006.85	23.88	35.14	98.69	-1,167.21	191.28	1,411.10	1,354.78	56.32	25.055		
6,700.00	6,682.34	7,791.67	7,007.10	24.08	35.49	98.17	-1,166.71	210.71	1,400.87	1,343.53	57.34	24.431		
6,750.00	6,725.23	7,800.00	7,007.19	24.28	35.65	98.11	-1,166.53	219.04	1,392.36	1,334.25	58.11	23.962		
6,800.00	6,765.97	7,830.33	7,007.50	24.50	36.23	97.31	-1,166.06	249.36	1,385.37	1,326.08	59.29	23.365		
6,850.00	6,804.32	7,852.78	7,007.67	24.75	36.67	96.78	-1,165.92	271.81	1,380.00	1,319.72	60.29	22.891		
6,900.00	6,840.04	7,877.12	7,007.80	25.02	37.15	96.17	-1,165.96	296.15	1,376.10	1,314.80	61.30	22.450		
6,950.00	6,872.91	7,903.19	7,007.89	25.33	37.66	95.49	-1,166.22	322.22	1,373.56	1,311.23	62.33	22.036		
7,000.00	6,902.73	7,936.31	7,007.92	25.68	38.35	94.64	-1,166.82	355.34	1,372.24	1,308.68	63.55	21.592		
7,050.00	6,929.32	7,978.65	7,007.96	26.09	39.25	93.63	-1,167.66	397.67	1,371.69	1,306.69	65.00	21.103		
7,075.05	6,941.37	8,000.61	7,007.97	26.32	39.72	93.14	-1,168.09	419.62	1,371.63	1,305.87	65.76	20.858		
7,100.00	6,952.50	8,022.94	7,007.99	26.56	40.21	92.68	-1,168.52	441.95	1,371.69	1,305.14	66.54	20.614		
7,102.25	6,953.46	8,024.97	7,007.99	26.58	40.26	92.63	-1,168.56	443.98	1,371.69	1,305.08	66.61	20.591		
7,150.00	6,972.14	8,068.91	7,008.02	27.09	41.24	91.81	-1,169.43	487.91	1,372.04	1,303.86	68.17	20.125		
7,152.25	6,972.94	8,071.01	7,008.03	27.11	41.29	91.78	-1,169.47	490.01	1,372.06	1,303.81	68.25	20.103		
7,200.00	6,988.11	8,116.28	7,008.06	27.68	42.31	91.07	-1,170.36	535.27	1,372.60	1,302.70	69.90	19.638		
7,250.00	7,000.33	8,164.75	7,008.10	28.34	43.44	90.48	-1,171.31	583.74	1,373.22	1,301.50	71.72	19.147		
7,300.00	7,008.70	8,214.04	7,008.13	29.06	44.60	90.06	-1,172.28	633.01	1,373.82	1,300.20	73.62	18.660		
7,350.00	7,013.19	8,263.82	7,008.17	29.83	45.81	89.81	-1,173.25	682.79	1,374.30	1,298.70	75.61	18.177		
7,381.86	7,014.00	8,295.67	7,008.20	30.35	46.58	89.76	-1,173.88	714.63	1,374.54	1,297.64	76.90	17.875		
7,400.00	7,014.01	8,313.81	7,008.21	30.65	47.02	89.76	-1,174.23	732.76	1,374.65	1,297.01	77.64	17.704		
7,500.00	7,014.07	8,413.81	7,008.28	32.44	49.52	89.76	-1,176.20	832.74	1,375.28	1,293.36	81.92	16.788		
7,600.00	7,014.13	8,513.81	7,008.36	34.39	52.07	89.76	-1,178.16	932.72	1,375.91	1,289.49	86.43	15.920		
7,700.00	7,014.18	8,613.80	7,008.44	36.50	54.67	89.76	-1,180.12	1,032.70	1,376.55	1,285.41	91.13	15.105		
7,800.00	7,014.24	8,713.80	7,008.51	38.73	57.31	89.76	-1,182.08	1,132.68	1,377.18	1,281.17	96.00	14.345		
7,900.00	7,014.30	8,813.80	7,008.59	41.06	59.99	89.76	-1,184.05	1,232.66	1,377.81	1,276.79	101.01	13.640		
8,000.00	7,014.35	8,913.80	7,008.66	43.47	62.71	89.76	-1,186.01	1,332.64	1,378.44	1,272.30	106.14	12.987		
8,100.00	7,014.41	9,013.80	7,008.74	45.97	65.45	89.76	-1,187.97	1,432.61	1,379.07	1,267.70	111.37	12.382		
8,200.00	7,014.47	9,113.79	7,008.81	48.52	68.21	89.77	-1,189.93	1,532.59	1,379.70	1,263.01	116.69	11.824		
8,300.00	7,014.53	9,213.79	7,008.89	51.12	71.00	89.77	-1,191.90	1,632.57	1,380.33	1,258.25	122.08	11.307		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #5													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)			
8,400.00	7,014.58	9,313.79	7,008.96	53.77	73.81	89.77	-1,193.86	1,732.55	1,380.96	1,253.43	127.54	10.828		
8,500.00	7,014.64	9,413.79	7,009.04	56.46	76.63	89.77	-1,195.82	1,832.53	1,381.60	1,248.55	133.05	10.384		
8,600.00	7,014.70	9,513.79	7,009.11	59.18	79.47	89.77	-1,197.78	1,932.51	1,382.23	1,243.62	138.61	9.972		
8,700.00	7,014.76	9,613.78	7,009.19	61.93	82.33	89.77	-1,199.75	2,032.49	1,382.86	1,238.65	144.21	9.589		
8,800.00	7,014.81	9,713.78	7,009.26	64.70	85.19	89.77	-1,201.71	2,132.47	1,383.49	1,233.64	149.85	9.232		
8,900.00	7,014.87	9,813.78	7,009.34	67.50	88.07	89.77	-1,203.67	2,232.44	1,384.12	1,228.59	155.53	8.900		
9,000.00	7,014.93	9,913.78	7,009.41	70.32	90.96	89.77	-1,205.63	2,332.42	1,384.75	1,223.52	161.23	8.589		
9,100.00	7,014.99	10,013.78	7,009.49	73.15	93.85	89.77	-1,207.60	2,432.40	1,385.38	1,218.42	166.96	8.298		
9,200.00	7,015.04	10,113.77	7,009.56	76.00	96.76	89.77	-1,209.56	2,532.38	1,386.01	1,213.30	172.71	8.025		
9,300.00	7,015.10	10,213.77	7,009.64	78.86	99.67	89.77	-1,211.52	2,632.36	1,386.65	1,208.16	178.49	7.769		
9,400.00	7,015.16	10,313.77	7,009.72	81.74	102.59	89.78	-1,213.48	2,732.34	1,387.28	1,202.99	184.28	7.528		
9,500.00	7,015.22	10,413.77	7,009.79	84.62	105.51	89.78	-1,215.45	2,832.32	1,387.91	1,197.81	190.10	7.301		
9,600.00	7,015.27	10,513.77	7,009.87	87.52	108.45	89.78	-1,217.41	2,932.30	1,388.54	1,192.62	195.92	7.087		
9,700.00	7,015.33	10,613.76	7,009.94	90.42	111.38	89.78	-1,219.37	3,032.27	1,389.17	1,187.41	201.76	6.885		
9,800.00	7,015.39	10,713.76	7,010.02	93.34	114.33	89.78	-1,221.33	3,132.25	1,389.80	1,182.18	207.62	6.694		
9,900.00	7,015.45	10,813.76	7,010.09	96.26	117.27	89.78	-1,223.29	3,232.23	1,390.43	1,176.95	213.49	6.513		
10,000.00	7,015.50	10,913.76	7,010.17	99.18	120.22	89.78	-1,225.26	3,332.21	1,391.06	1,171.70	219.36	6.341		
10,100.00	7,015.56	11,013.76	7,010.24	102.12	123.18	89.78	-1,227.22	3,432.19	1,391.70	1,166.44	225.25	6.178		
10,200.00	7,015.62	11,113.75	7,010.32	105.05	126.14	89.78	-1,229.18	3,532.17	1,392.33	1,161.18	231.15	6.023		
10,300.00	7,015.67	11,213.75	7,010.39	108.00	129.10	89.78	-1,231.14	3,632.15	1,392.96	1,155.90	237.05	5.876		
10,400.00	7,015.73	11,313.75	7,010.47	110.95	132.06	89.78	-1,233.11	3,732.12	1,393.59	1,150.62	242.97	5.736		
10,500.00	7,015.79	11,413.75	7,010.54	113.90	135.03	89.78	-1,235.07	3,832.10	1,394.22	1,145.33	248.89	5.602		
10,600.00	7,015.85	11,513.75	7,010.62	116.86	138.00	89.79	-1,237.03	3,932.08	1,394.85	1,140.03	254.82	5.474		
10,700.00	7,015.90	11,613.74	7,010.69	119.82	140.98	89.79	-1,238.99	4,032.06	1,395.48	1,134.73	260.75	5.352		
10,800.00	7,015.96	11,713.74	7,010.77	122.78	143.95	89.79	-1,240.96	4,132.04	1,396.11	1,129.42	266.69	5.235		
10,900.00	7,016.02	11,813.74	7,010.85	125.75	146.93	89.79	-1,242.92	4,232.02	1,396.75	1,124.11	272.64	5.123		
11,000.00	7,016.08	11,913.74	7,010.92	128.72	149.91	89.79	-1,244.88	4,332.00	1,397.38	1,118.79	278.59	5.016		
11,100.00	7,016.13	12,013.74	7,011.00	131.69	152.90	89.79	-1,246.84	4,431.98	1,398.01	1,113.46	284.55	4.913		
11,200.00	7,016.19	12,113.73	7,011.07	134.67	155.88	89.79	-1,248.81	4,531.95	1,398.64	1,108.13	290.51	4.814		
11,300.00	7,016.25	12,213.73	7,011.15	137.64	158.87	89.79	-1,250.77	4,631.93	1,399.27	1,102.80	296.47	4.720		
11,400.00	7,016.31	12,313.73	7,011.22	140.62	161.86	89.79	-1,252.73	4,731.91	1,399.90	1,097.46	302.44	4.629		
11,500.00	7,016.36	12,413.73	7,011.30	143.61	164.85	89.79	-1,254.69	4,831.89	1,400.53	1,092.12	308.41	4.541		
11,600.00	7,016.42	12,513.73	7,011.37	146.59	167.84	89.79	-1,256.66	4,931.87	1,401.16	1,086.77	314.39	4.457		
11,700.00	7,016.48	12,613.72	7,011.45	149.58	170.83	89.79	-1,258.62	5,031.85	1,401.80	1,081.43	320.37	4.376		
11,800.00	7,016.54	12,713.72	7,011.52	152.56	173.83	89.80	-1,260.58	5,131.83	1,402.43	1,076.07	326.35	4.297		
11,900.00	7,016.59	12,813.72	7,011.60	155.55	176.82	89.80	-1,262.54	5,231.81	1,403.06	1,070.72	332.34	4.222		
12,000.00	7,016.65	12,913.72	7,011.67	158.55	179.82	89.80	-1,264.51	5,331.78	1,403.69	1,065.36	338.33	4.149		
12,100.00	7,016.71	13,013.72	7,011.75	161.54	182.82	89.80	-1,266.47	5,431.76	1,404.32	1,060.00	344.32	4.079		
12,200.00	7,016.76	13,113.71	7,011.82	164.53	185.82	89.80	-1,268.43	5,531.74	1,404.95	1,054.64	350.31	4.011		
12,300.00	7,016.82	13,213.71	7,011.90	167.53	188.82	89.80	-1,270.39	5,631.72	1,405.58	1,049.27	356.31	3.945		
12,400.00	7,016.88	13,313.71	7,011.98	170.53	191.82	89.80	-1,272.36	5,731.70	1,406.21	1,043.91	362.31	3.881		
12,500.00	7,016.94	13,413.71	7,012.05	173.52	194.82	89.80	-1,274.32	5,831.68	1,406.84	1,038.54	368.31	3.820		
12,600.00	7,016.99	13,513.71	7,012.13	176.52	197.83	89.80	-1,276.28	5,931.66	1,407.48	1,033.17	374.31	3.760		
12,700.00	7,017.05	13,613.70	7,012.20	179.52	200.83	89.80	-1,278.24	6,031.64	1,408.11	1,027.79	380.32	3.702		
12,800.00	7,017.11	13,713.70	7,012.28	182.52	203.84	89.80	-1,280.21	6,131.61	1,408.74	1,022.42	386.32	3.647		
12,900.00	7,017.17	13,813.70	7,012.35	185.53	206.84	89.80	-1,282.17	6,231.59	1,409.37	1,017.04	392.33	3.592		
13,000.00	7,017.22	13,913.70	7,012.43	188.53	209.85	89.81	-1,284.13	6,331.57	1,410.00	1,011.66	398.34	3.540		
13,100.00	7,017.28	14,013.70	7,012.50	191.53	212.86	89.81	-1,286.09	6,431.55	1,410.63	1,006.28	404.35	3.489		
13,200.00	7,017.34	14,113.69	7,012.58	194.54	215.86	89.81	-1,288.06	6,531.53	1,411.26	1,000.90	410.37	3.439		
13,300.00	7,017.40	14,213.69	7,012.65	197.55	218.87	89.81	-1,290.02	6,631.51	1,411.89	995.51	416.38	3.391		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #5													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Vertical	Measured	Vertical	Reference	Semi Major Axis	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Depth	Depth	Depth	Depth	Reference	Offset	Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	Centres	Ellipses	(ft)			
13,400.00	7,017.45	14,313.69	7,012.73	200.55	221.88	89.81	-1,291.98	6,731.49	1,412.53	990.13	422.40	3.344		
13,500.00	7,017.51	14,413.69	7,012.80	203.56	224.89	89.81	-1,293.94	6,831.47	1,413.16	984.74	428.42	3.299		
13,600.00	7,017.57	14,513.69	7,012.88	206.57	227.91	89.81	-1,295.91	6,931.44	1,413.79	979.35	434.44	3.254		
13,700.00	7,017.63	14,613.68	7,012.95	209.58	230.92	89.81	-1,297.87	7,031.42	1,414.42	973.96	440.46	3.211		
13,800.00	7,017.68	14,713.68	7,013.03	212.59	233.93	89.81	-1,299.83	7,131.40	1,415.05	968.57	446.48	3.169		
13,900.00	7,017.74	14,813.68	7,013.11	215.60	236.94	89.81	-1,301.79	7,231.38	1,415.68	963.18	452.50	3.129		
14,000.00	7,017.80	14,913.68	7,013.18	218.61	239.95	89.81	-1,303.76	7,331.36	1,416.31	957.79	458.52	3.089		
14,100.00	7,017.85	15,013.68	7,013.26	221.62	242.97	89.81	-1,305.72	7,431.34	1,416.94	952.39	464.55	3.050		
14,200.00	7,017.91	15,113.67	7,013.33	224.63	245.98	89.82	-1,307.68	7,531.32	1,417.58	947.00	470.58	3.012		
14,300.00	7,017.97	15,213.67	7,013.41	227.64	249.00	89.82	-1,309.64	7,631.30	1,418.21	941.60	476.60	2.976		
14,400.00	7,018.03	15,313.67	7,013.48	230.65	252.01	89.82	-1,311.61	7,731.27	1,418.84	936.21	482.63	2.940		
14,500.00	7,018.08	15,413.67	7,013.56	233.67	255.03	89.82	-1,313.57	7,831.25	1,419.47	930.81	488.66	2.905		
14,600.00	7,018.14	15,513.67	7,013.63	236.68	258.04	89.82	-1,315.53	7,931.23	1,420.10	925.41	494.69	2.871		
14,700.00	7,018.20	15,613.66	7,013.71	239.70	261.06	89.82	-1,317.49	8,031.21	1,420.73	920.01	500.72	2.837		
14,800.00	7,018.26	15,713.66	7,013.78	242.71	264.08	89.82	-1,319.46	8,131.19	1,421.36	914.61	506.75	2.805		
14,900.00	7,018.31	15,813.66	7,013.86	245.72	267.09	89.82	-1,321.42	8,231.17	1,421.99	909.21	512.78	2.773		
15,000.00	7,018.37	15,913.66	7,013.93	248.74	270.11	89.82	-1,323.38	8,331.15	1,422.63	903.81	518.82	2.742		
15,100.00	7,018.43	16,013.66	7,014.01	251.76	273.13	89.82	-1,325.34	8,431.12	1,423.26	898.41	524.85	2.712		
15,200.00	7,018.49	16,113.65	7,014.08	254.77	276.15	89.82	-1,327.31	8,531.10	1,423.89	893.00	530.89	2.682		
15,300.00	7,018.54	16,213.65	7,014.16	257.79	279.17	89.82	-1,329.27	8,631.08	1,424.52	887.60	536.92	2.653		
15,400.00	7,018.60	16,313.65	7,014.24	260.81	282.19	89.82	-1,331.23	8,731.06	1,425.15	882.19	542.96	2.625		
15,500.00	7,018.66	16,413.65	7,014.31	263.82	285.21	89.83	-1,333.19	8,831.04	1,425.78	876.79	548.99	2.597		
15,600.00	7,018.72	16,513.65	7,014.39	266.84	288.22	89.83	-1,335.16	8,931.02	1,426.41	871.38	555.03	2.570		
15,700.00	7,018.77	16,613.64	7,014.46	269.86	291.24	89.83	-1,337.12	9,031.00	1,427.04	865.98	561.07	2.543		
15,800.00	7,018.83	16,713.64	7,014.54	272.88	294.26	89.83	-1,339.08	9,130.98	1,427.68	860.57	567.11	2.517		
15,900.00	7,018.89	16,813.64	7,014.61	275.89	297.29	89.83	-1,341.04	9,230.95	1,428.31	855.16	573.15	2.492		
16,000.00	7,018.95	16,913.64	7,014.69	278.91	300.31	89.83	-1,343.01	9,330.93	1,428.94	849.75	579.19	2.467		
16,100.00	7,019.00	17,013.64	7,014.76	281.93	303.33	89.83	-1,344.97	9,430.91	1,429.57	844.34	585.23	2.443		
16,200.00	7,019.06	17,113.63	7,014.84	284.95	306.35	89.83	-1,346.93	9,530.89	1,430.20	838.94	591.27	2.419		
16,300.00	7,019.12	17,213.63	7,014.91	287.97	309.37	89.83	-1,348.89	9,630.87	1,430.83	833.53	597.31	2.395		
16,400.00	7,019.17	17,313.63	7,014.99	290.99	312.39	89.83	-1,350.86	9,730.85	1,431.46	828.12	603.35	2.373		
16,500.00	7,019.23	17,413.63	7,015.06	294.01	315.41	89.83	-1,352.82	9,830.83	1,432.09	822.70	609.39	2.350		
16,600.00	7,019.29	17,513.63	7,015.14	297.03	318.44	89.83	-1,354.78	9,930.81	1,432.73	817.29	615.43	2.328		
16,700.00	7,019.35	17,613.62	7,015.21	300.05	321.46	89.84	-1,356.74	10,030.78	1,433.36	811.88	621.48	2.306		
16,800.00	7,019.40	17,713.62	7,015.29	303.07	324.48	89.84	-1,358.71	10,130.76	1,433.99	806.47	627.52	2.285		
16,900.00	7,019.46	17,813.62	7,015.37	306.09	327.50	89.84	-1,360.67	10,230.74	1,434.62	801.06	633.56	2.264		
17,000.00	7,019.52	17,913.62	7,015.44	309.11	330.53	89.84	-1,362.63	10,330.72	1,435.25	795.64	639.61	2.244		
17,100.00	7,019.58	18,013.62	7,015.52	312.14	333.55	89.84	-1,364.59	10,430.70	1,435.88	790.23	645.65	2.224		
17,200.00	7,019.63	18,113.61	7,015.59	315.16	336.57	89.84	-1,366.56	10,530.68	1,436.51	784.82	651.70	2.204		
17,300.00	7,019.69	18,213.61	7,015.67	318.18	339.60	89.84	-1,368.52	10,630.66	1,437.14	779.40	657.74	2.185		
17,400.00	7,019.75	18,313.61	7,015.74	321.20	342.62	89.84	-1,370.48	10,730.64	1,437.78	773.99	663.79	2.166		
17,500.00	7,019.81	18,413.61	7,015.82	324.22	345.64	89.84	-1,372.44	10,830.61	1,438.41	768.57	669.83	2.147		
17,600.00	7,019.86	18,513.61	7,015.89	327.25	348.67	89.84	-1,374.40	10,930.59	1,439.04	763.16	675.88	2.129		
17,700.00	7,019.92	18,613.60	7,015.97	330.27	351.69	89.84	-1,376.37	11,030.57	1,439.67	757.74	681.93	2.111		
17,800.00	7,019.98	18,713.60	7,016.04	333.29	354.72	89.84	-1,378.33	11,130.55	1,440.30	752.33	687.97	2.094		
17,900.00	7,020.04	18,813.60	7,016.12	336.31	357.74	89.84	-1,380.29	11,230.53	1,440.93	746.91	694.02	2.076		
18,000.00	7,020.09	18,913.60	7,016.19	339.34	360.77	89.85	-1,382.25	11,330.51	1,441.56	741.50	700.07	2.059		
18,100.00	7,020.15	19,013.60	7,016.27	342.36	363.79	89.85	-1,384.22	11,430.49	1,442.19	736.08	706.12	2.042		
18,200.00	7,020.21	19,113.59	7,016.34	345.38	366.81	89.85	-1,386.18	11,530.47	1,442.83	730.66	712.16	2.026		
18,300.00	7,020.26	19,213.59	7,016.42	348.41	369.84	89.85	-1,388.14	11,630.44	1,443.46	725.24	718.21	2.010		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - Plan #5													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													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		
18,400.00	7,020.32	19,313.59	7,016.50	351.43	372.87	89.85	-1,390.10	11,730.42	1,444.09	719.83	724.26	1.994		
18,500.00	7,020.38	19,413.59	7,016.57	354.45	375.89	89.85	-1,392.07	11,830.40	1,444.72	714.41	730.31	1.978		
18,600.00	7,020.44	19,513.59	7,016.65	357.48	378.92	89.85	-1,394.03	11,930.38	1,445.35	708.99	736.36	1.963		
18,700.00	7,020.49	19,613.58	7,016.72	360.50	381.94	89.85	-1,395.99	12,030.36	1,445.98	703.57	742.41	1.948		
18,800.00	7,020.55	19,713.58	7,016.80	363.52	384.97	89.85	-1,397.95	12,130.34	1,446.61	698.15	748.46	1.933		
18,900.00	7,020.61	19,813.58	7,016.87	366.55	387.99	89.85	-1,399.92	12,230.32	1,447.24	692.74	754.51	1.918		
19,000.00	7,020.67	19,913.58	7,016.95	369.57	391.02	89.85	-1,401.88	12,330.29	1,447.88	687.32	760.56	1.904		
19,100.00	7,020.72	19,984.07	7,017.00	372.60	393.15	89.85	-1,403.26	12,400.77	1,448.81	683.26	765.55	1.893 SF		
19,200.00	7,020.78	19,984.07	7,017.00	375.62	393.15	89.85	-1,403.26	12,400.77	1,454.91	689.25	765.67	1.900		
19,300.00	7,020.84	19,984.07	7,017.00	378.65	393.15	89.85	-1,403.26	12,400.77	1,467.82	705.56	762.26	1.926		
19,400.00	7,020.90	19,984.07	7,017.00	381.67	393.15	89.85	-1,403.26	12,400.77	1,487.36	731.79	755.56	1.969		
19,500.00	7,020.95	19,984.07	7,017.00	384.70	393.15	89.85	-1,403.26	12,400.77	1,513.26	767.35	745.91	2.029		
19,581.75	7,021.00	19,984.07	7,017.00	387.17	393.15	89.85	-1,403.26	12,400.77	1,538.95	802.83	736.12	2.091		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #665H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 401-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 +N/-S (ft)	+E/-W (ft)	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	136.30	-22.60	21.60	31.26					
100.00	100.00	99.95	99.95	0.27	0.17	136.14	-22.59	21.72	31.34	30.90	0.44	71.406		
200.00	200.00	199.90	199.90	0.63	0.34	135.67	-22.58	22.06	31.57	30.60	0.97	32.694		
300.00	300.00	299.85	299.85	0.99	0.51	134.89	-22.55	22.64	31.95	30.46	1.49	21.414 ES		
400.00	400.00	399.80	399.79	1.35	0.67	133.85	-22.52	23.44	32.50	30.49	2.02	16.101		
500.00	500.00	499.06	499.03	1.70	1.03	131.70	-22.75	25.53	34.21	31.48	2.73	12.522		
600.00	600.00	597.86	597.73	2.06	1.38	131.09	-25.32	29.03	38.59	35.15	3.44	11.208		
700.00	700.00	696.24	695.79	2.42	1.74	134.53	-32.11	32.65	45.99	41.84	4.15	11.087 SF		
800.00	800.00	793.12	791.91	2.78	2.11	139.58	-43.40	36.96	57.57	52.73	4.84	11.889		
900.00	900.00	888.59	885.92	3.14	2.49	144.13	-58.94	42.62	74.08	68.56	5.52	13.409		
1,000.00	1,000.00	982.26	977.24	3.50	2.89	147.79	-78.59	49.52	95.64	89.45	6.19	15.450		
1,100.00	1,100.00	1,076.74	1,068.64	3.86	3.32	150.16	-101.00	57.93	120.58	113.71	6.87	17.544		
1,200.00	1,200.00	1,170.99	1,159.35	4.21	3.78	151.64	-124.76	67.36	147.50	139.94	7.56	19.509		
1,300.00	1,299.98	1,267.85	1,252.49	4.57	4.27	123.59	-149.89	76.16	175.64	167.36	8.28	21.204		
1,319.29	1,319.26	1,286.15	1,270.08	4.64	4.36	123.94	-154.66	77.68	181.26	172.84	8.42	21.522		
1,400.00	1,399.90	1,362.98	1,343.95	4.93	4.75	125.65	-174.82	84.05	205.15	196.15	9.00	22.806		
1,500.00	1,499.81	1,461.07	1,438.45	5.29	5.25	127.43	-199.99	91.57	234.15	224.41	9.74	24.052		
1,600.00	1,599.72	1,553.38	1,527.39	5.64	5.72	128.68	-223.59	98.84	263.31	252.89	10.42	25.266		
1,700.00	1,699.64	1,649.72	1,619.89	6.00	6.23	129.68	-249.23	107.06	293.76	282.61	11.15	26.345		
1,800.00	1,799.55	1,748.62	1,715.32	6.36	6.74	130.74	-274.33	113.78	322.53	310.63	11.90	27.097		
1,900.00	1,899.46	1,846.28	1,809.56	6.72	7.24	131.70	-299.19	119.86	351.30	338.66	12.64	27.787		
2,000.00	1,999.38	1,947.60	1,907.69	7.08	7.75	132.53	-323.73	125.84	378.88	365.46	13.41	28.249		
2,100.00	2,099.29	2,044.06	2,001.34	7.44	8.23	133.09	-346.00	132.05	405.58	391.44	14.14	28.685		
2,200.00	2,199.20	2,134.51	2,088.99	7.79	8.69	133.51	-367.40	138.39	433.03	418.21	14.82	29.222		
2,300.00	2,299.12	2,231.53	2,182.73	8.15	9.18	133.86	-391.26	145.76	461.56	446.01	15.55	29.673		
2,400.00	2,399.03	2,329.03	2,277.19	8.51	9.68	134.24	-414.53	152.39	489.18	472.88	16.30	30.020		
2,500.00	2,498.94	2,426.05	2,371.15	8.87	10.17	134.56	-437.74	159.22	516.94	499.91	17.03	30.352		
2,600.00	2,598.86	2,520.64	2,462.80	9.23	10.65	134.85	-460.19	165.74	544.49	526.74	17.75	30.679		
2,700.00	2,698.77	2,620.21	2,559.23	9.59	11.16	135.10	-483.97	172.84	572.26	553.76	18.51	30.925		
2,800.00	2,798.68	2,715.97	2,652.12	9.95	11.64	135.25	-506.01	180.18	599.34	580.11	19.23	31.165		
2,900.00	2,898.60	2,811.28	2,744.50	10.32	12.13	135.37	-528.26	187.74	626.81	606.86	19.95	31.412		
3,000.00	2,998.51	2,901.37	2,831.74	10.68	12.59	135.48	-549.57	194.82	654.57	633.93	20.64	31.719		
3,100.00	3,098.42	2,994.71	2,921.89	11.04	13.07	135.55	-572.41	202.84	683.28	661.94	21.35	32.008		
3,200.00	3,198.34	3,119.33	3,042.69	11.40	13.71	135.61	-601.06	213.41	710.72	688.42	22.30	31.876		
3,300.00	3,298.25	3,248.88	3,169.76	11.76	14.30	135.86	-625.24	220.48	732.99	709.76	23.23	31.554		
3,400.00	3,398.16	3,349.40	3,268.81	12.12	14.74	136.05	-641.68	225.19	752.94	728.97	23.97	31.414		
3,500.00	3,498.08	3,435.78	3,353.78	12.48	15.12	136.18	-656.53	229.71	773.83	749.21	24.63	31.424		
3,600.00	3,597.99	3,523.46	3,439.81	12.84	15.52	136.29	-672.64	234.95	796.06	770.77	25.29	31.477		
3,700.00	3,697.90	3,612.27	3,526.74	13.20	15.93	136.36	-689.85	240.83	819.41	793.44	25.96	31.562		
3,800.00	3,797.82	3,704.87	3,617.21	13.56	16.37	136.40	-708.41	247.55	843.55	816.89	26.66	31.641		
3,900.00	3,897.73	3,813.20	3,723.13	13.92	16.89	136.45	-729.71	255.31	867.32	839.85	27.47	31.578		
4,000.00	3,997.64	3,927.18	3,834.96	14.28	17.41	136.48	-750.33	263.26	889.51	861.22	28.30	31.433		
4,100.00	4,097.56	4,028.59	3,934.74	14.65	17.86	136.56	-767.34	269.30	910.19	881.14	29.05	31.335		
4,200.00	4,197.47	4,110.03	4,014.76	15.01	18.23	136.61	-781.67	274.30	931.73	902.06	29.67	31.400		
4,300.00	4,297.38	4,185.22	4,088.28	15.37	18.58	136.67	-796.63	279.23	955.55	925.30	30.25	31.589		
4,400.00	4,397.30	4,275.36	4,176.15	15.73	19.02	136.73	-815.72	285.39	980.70	949.77	30.93	31.705		
4,500.00	4,497.21	4,364.00	4,262.35	16.09	19.45	136.74	-835.14	292.47	1,006.79	975.19	31.60	31.857		
4,600.00	4,597.12	4,437.23	4,333.28	16.45	19.83	136.73	-852.14	298.95	1,034.33	1,002.17	32.15	32.168		
4,700.00	4,697.04	4,519.13	4,412.29	16.81	20.26	136.75	-872.54	305.99	1,063.47	1,030.70	32.77	32.452		
4,800.00	4,796.95	4,626.16	4,515.43	17.17	20.82	136.83	-899.91	314.19	1,093.09	1,059.49	33.60	32.532		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #665H - OH - OH													Offset Site Error: 0.00 ft	
Survey Program: 401-MWD+HDGM		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	
4,900.00	4,896.86	4,724.30	4,610.34	17.54	21.33	136.94	-924.02	320.69	1,121.46	1,087.10	34.35	32.646		
5,000.00	4,996.77	4,822.67	4,705.46	17.90	21.84	137.07	-948.37	326.76	1,149.91	1,114.80	35.11	32.756		
5,100.00	5,096.69	4,923.29	4,802.83	18.26	22.35	137.18	-972.87	333.21	1,178.03	1,142.15	35.88	32.836		
5,200.00	5,196.60	5,044.76	4,920.76	18.62	22.96	137.27	-1,000.83	341.33	1,204.93	1,168.13	36.80	32.743		
5,300.00	5,296.51	5,178.24	5,051.09	18.98	23.60	137.39	-1,028.60	349.06	1,229.54	1,191.76	37.78	32.543		
5,400.00	5,396.43	5,296.00	5,166.81	19.34	24.13	137.51	-1,049.69	354.62	1,250.94	1,212.30	38.63	32.379		
5,500.00	5,496.34	5,376.84	5,246.19	19.70	24.49	137.56	-1,064.26	359.16	1,272.81	1,233.55	39.26	32.421		
5,600.00	5,596.25	5,441.78	5,309.71	20.07	24.80	137.60	-1,077.17	363.24	1,296.62	1,256.84	39.77	32.600		
5,700.00	5,696.17	5,506.71	5,372.82	20.43	25.12	137.63	-1,091.75	367.63	1,322.97	1,282.69	40.27	32.852		
5,800.00	5,796.08	5,581.00	5,444.67	20.79	25.50	137.65	-1,109.75	373.38	1,351.24	1,310.41	40.83	33.093		
5,900.00	5,895.99	5,648.55	5,509.67	21.15	25.87	137.66	-1,127.23	379.04	1,381.26	1,339.93	41.33	33.418		
6,000.00	5,995.91	5,727.43	5,585.21	21.51	26.30	137.67	-1,148.90	385.84	1,412.87	1,370.95	41.93	33.699		
6,100.00	6,095.82	5,838.91	5,692.01	21.87	26.91	137.65	-1,179.15	396.15	1,444.32	1,401.51	42.81	33.739		
6,200.00	6,195.73	5,866.00	5,718.01	22.23	27.06	137.65	-1,186.33	398.68	1,476.78	1,433.86	42.93	34.404		
6,300.00	6,295.65	5,866.00	5,718.01	22.60	27.06	137.65	-1,186.33	398.68	1,514.93	1,472.24	42.69	35.488		
6,394.97	6,390.53	5,866.00	5,718.01	22.94	27.06	137.65	-1,186.33	398.68	1,556.25	1,513.89	42.37	36.731		
6,400.00	6,395.56	5,866.00	5,718.01	22.96	27.06	128.75	-1,186.33	398.68	1,558.57	1,516.22	42.35	36.802		
6,450.00	6,445.40	5,866.00	5,718.01	23.14	27.06	92.82	-1,186.33	398.68	1,581.80	1,539.65	42.15	37.528		
6,500.00	6,494.83	5,866.00	5,718.01	23.32	27.06	82.79	-1,186.33	398.68	1,605.29	1,563.35	41.93	38.281		
6,550.00	6,543.53	5,866.00	5,718.01	23.51	27.06	77.27	-1,186.33	398.68	1,628.90	1,587.19	41.71	39.053		
6,600.00	6,591.21	5,866.00	5,718.01	23.69	27.06	73.27	-1,186.33	398.68	1,652.48	1,611.00	41.48	39.837		
6,650.00	6,637.58	5,866.00	5,718.01	23.88	27.06	69.99	-1,186.33	398.68	1,675.88	1,634.63	41.25	40.624		
6,700.00	6,682.34	5,866.00	5,718.01	24.08	27.06	67.14	-1,186.33	398.68	1,698.98	1,657.95	41.03	41.405		
6,750.00	6,725.23	5,866.00	5,718.01	24.28	27.06	64.58	-1,186.33	398.68	1,721.65	1,680.82	40.83	42.168		
6,800.00	6,765.97	5,866.00	5,718.01	24.50	27.06	62.26	-1,186.33	398.68	1,743.76	1,703.11	40.65	42.900		
6,850.00	6,804.32	5,866.00	5,718.01	24.75	27.06	60.15	-1,186.33	398.68	1,765.20	1,724.70	40.50	43.586		
6,900.00	6,840.04	5,866.00	5,718.01	25.02	27.06	58.21	-1,186.33	398.68	1,785.87	1,745.48	40.39	44.213		
6,950.00	6,872.91	5,866.00	5,718.01	25.33	27.06	56.44	-1,186.33	398.68	1,805.67	1,765.33	40.34	44.763		
7,000.00	6,902.73	5,866.00	5,718.01	25.68	27.06	54.82	-1,186.33	398.68	1,824.51	1,784.16	40.35	45.222		
7,050.00	6,929.32	5,866.00	5,718.01	26.09	27.06	53.36	-1,186.33	398.68	1,842.30	1,801.87	40.42	45.577		
7,100.00	6,952.50	5,866.00	5,718.01	26.56	27.06	52.04	-1,186.33	398.68	1,858.96	1,818.38	40.58	45.815		
7,150.00	6,972.14	5,866.00	5,718.01	27.09	27.06	50.85	-1,186.33	398.68	1,874.42	1,833.61	40.81	45.929		
7,200.00	6,988.11	5,866.00	5,718.01	27.68	27.06	49.80	-1,186.33	398.68	1,888.62	1,847.49	41.13	45.916		
7,250.00	7,000.33	5,866.00	5,718.01	28.34	27.06	48.88	-1,186.33	398.68	1,901.50	1,859.96	41.54	45.776		
7,300.00	7,008.70	5,866.00	5,718.01	29.06	27.06	48.08	-1,186.33	398.68	1,913.01	1,870.98	42.03	45.514		
7,350.00	7,013.19	5,866.00	5,718.01	29.83	27.06	47.40	-1,186.33	398.68	1,923.10	1,880.50	42.60	45.141		
7,381.86	7,014.00	5,866.00	5,718.01	30.35	27.06	47.03	-1,186.33	398.68	1,928.77	1,885.77	43.00	44.851		
7,400.00	7,014.01	5,866.00	5,718.01	30.65	27.06	47.03	-1,186.33	398.68	1,931.91	1,888.67	43.24	44.674		
7,500.00	7,014.07	5,866.00	5,718.01	32.44	27.06	47.03	-1,186.33	398.68	1,952.16	1,907.51	44.65	43.721		
7,600.00	7,014.13	5,866.00	5,718.01	34.39	27.06	47.03	-1,186.33	398.68	1,977.27	1,931.12	46.15	42.840		
7,700.00	7,014.18	5,866.00	5,718.01	36.50	27.06	47.03	-1,186.33	398.68	2,007.05	1,959.34	47.71	42.064		
7,800.00	7,014.24	5,866.00	5,718.01	38.73	27.06	47.03	-1,186.33	398.68	2,041.31	1,992.01	49.29	41.412		
7,900.00	7,014.30	5,866.00	5,718.01	41.06	27.06	47.03	-1,186.33	398.68	2,079.81	2,028.94	50.86	40.892		
8,000.00	7,014.35	5,866.00	5,718.01	43.47	27.06	47.03	-1,186.33	398.68	2,122.32	2,069.93	52.39	40.506		
8,100.00	7,014.41	5,866.00	5,718.01	45.97	27.06	47.03	-1,186.33	398.68	2,168.62	2,114.74	53.88	40.251		
8,200.00	7,014.47	5,866.00	5,718.01	48.52	27.06	47.03	-1,186.33	398.68	2,218.46	2,163.16	55.30	40.118		
8,300.00	7,014.53	5,866.00	5,718.01	51.12	27.06	47.03	-1,186.33	398.68	2,271.61	2,214.97	56.65	40.100		
8,400.00	7,014.58	5,866.00	5,718.01	53.77	27.06	47.03	-1,186.33	398.68	2,327.85	2,269.93	57.92	40.188		
8,500.00	7,014.64	5,866.00	5,718.01	56.46	27.06	47.03	-1,186.33	398.68	2,386.96	2,327.83	59.12	40.373		
8,600.00	7,014.70	5,866.00	5,718.01	59.18	27.06	47.03	-1,186.33	398.68	2,448.72	2,388.47	60.24	40.647		



Lonestar Consulting, LLC
Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #665H - OH - Plan #10													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	136.30	-22.60	21.60	31.26					
100.00	100.00	100.00	100.00	0.27	0.27	136.30	-22.60	21.60	31.26	30.72	0.54	57.755		
200.00	200.00	200.00	200.00	0.63	0.63	136.30	-22.60	21.60	31.26	30.00	1.26	24.846		
300.00	300.00	300.00	300.00	0.99	0.99	136.30	-22.60	21.60	31.26	29.29	1.98	15.827		
400.00	400.00	400.00	400.00	1.35	1.35	136.30	-22.60	21.60	31.26	28.57	2.69	11.612		
410.00	410.00	410.00	410.00	1.38	1.38	136.30	-22.60	21.60	31.26	28.50	2.76	11.311 CC		
500.00	500.00	499.51	499.50	1.70	1.69	136.63	-23.01	21.73	31.65	28.25	3.40	9.313 ES		
600.00	600.00	598.40	598.34	2.06	2.02	139.01	-26.25	22.81	34.81	30.73	4.08	8.522 SF		
700.00	700.00	696.95	696.64	2.42	2.36	142.67	-32.70	24.94	41.26	36.49	4.77	8.641		
800.00	800.00	794.91	794.08	2.78	2.71	146.39	-42.29	28.11	51.12	45.66	5.46	9.358		
900.00	900.00	892.07	890.31	3.14	3.07	149.55	-54.92	32.28	64.44	58.29	6.15	10.484		
1,000.00	1,000.00	988.21	985.05	3.50	3.44	152.03	-70.46	37.42	81.17	74.35	6.82	11.898		
1,100.00	1,100.00	1,083.14	1,078.00	3.86	3.83	153.91	-88.76	43.47	101.25	93.76	7.49	13.520		
1,200.00	1,200.00	1,177.58	1,169.79	4.21	4.23	155.34	-109.86	50.44	124.60	116.44	8.16	15.278		
1,300.00	1,299.98	1,273.12	1,262.26	4.57	4.66	127.03	-132.65	57.97	150.62	141.77	8.85	17.025		
1,319.29	1,319.26	1,291.66	1,280.20	4.64	4.75	127.31	-137.07	59.43	155.88	146.90	8.99	17.345		
1,400.00	1,399.90	1,369.14	1,355.20	4.93	5.11	128.70	-155.55	65.54	178.13	168.57	9.56	18.641		
1,500.00	1,499.81	1,465.15	1,448.12	5.29	5.56	130.00	-178.46	73.11	205.80	195.53	10.26	20.053		
1,600.00	1,599.72	1,561.15	1,541.05	5.64	6.02	130.99	-201.36	80.68	233.54	222.56	10.97	21.282		
1,700.00	1,699.64	1,657.16	1,633.98	6.00	6.49	131.77	-224.26	88.25	261.33	249.64	11.69	22.361		
1,800.00	1,799.55	1,753.16	1,726.90	6.36	6.96	132.41	-247.17	95.82	289.16	276.76	12.40	23.314		
1,900.00	1,899.46	1,849.17	1,819.83	6.72	7.43	132.93	-270.07	103.38	317.02	303.90	13.12	24.161		
2,000.00	1,999.38	1,945.17	1,912.75	7.08	7.90	133.36	-292.97	110.95	344.89	331.05	13.84	24.919		
2,100.00	2,099.29	2,041.18	2,005.68	7.44	8.38	133.74	-315.88	118.52	372.79	358.22	14.56	25.600		
2,200.00	2,199.20	2,137.18	2,098.60	7.79	8.86	134.06	-338.78	126.09	400.69	385.41	15.28	26.216		
2,300.00	2,299.12	2,233.19	2,191.53	8.15	9.34	134.33	-361.68	133.66	428.61	412.60	16.01	26.775		
2,400.00	2,399.03	2,329.19	2,284.45	8.51	9.82	134.58	-384.59	141.23	456.53	439.80	16.73	27.285		
2,500.00	2,498.94	2,425.20	2,377.38	8.87	10.30	134.79	-407.49	148.80	484.46	467.00	17.46	27.752		
2,600.00	2,598.86	2,521.20	2,470.31	9.23	10.79	134.99	-430.39	156.37	512.39	494.21	18.18	28.180		
2,700.00	2,698.77	2,617.21	2,563.23	9.59	11.27	135.16	-453.30	163.94	540.33	521.43	18.91	28.575		
2,800.00	2,798.68	2,713.21	2,656.16	9.95	11.76	135.32	-476.20	171.51	568.28	548.64	19.64	28.940		
2,900.00	2,898.60	2,809.22	2,749.08	10.32	12.24	135.46	-499.10	179.08	596.23	575.86	20.36	29.278		
3,000.00	2,998.51	2,905.23	2,842.01	10.68	12.73	135.59	-522.01	186.65	624.18	603.09	21.09	29.592		
3,100.00	3,098.42	3,001.23	2,934.93	11.04	13.22	135.70	-544.91	194.21	652.13	630.31	21.82	29.885		
3,200.00	3,198.34	3,097.24	3,027.86	11.40	13.70	135.81	-567.81	201.78	680.09	657.54	22.55	30.159		
3,300.00	3,298.25	3,193.24	3,120.79	11.76	14.19	135.91	-590.72	209.35	708.05	684.77	23.28	30.415		
3,400.00	3,398.16	3,289.25	3,213.71	12.12	14.68	136.00	-613.62	216.92	736.01	712.00	24.01	30.655		
3,500.00	3,498.08	3,385.25	3,306.64	12.48	15.17	136.09	-636.52	224.49	763.97	739.23	24.74	30.881		
3,600.00	3,597.99	3,481.26	3,399.56	12.84	15.66	136.17	-659.43	232.06	791.93	766.46	25.47	31.093		
3,700.00	3,697.90	3,577.26	3,492.49	13.20	16.15	136.24	-682.33	239.63	819.89	793.69	26.20	31.293		
3,800.00	3,797.82	3,673.27	3,585.41	13.56	16.64	136.31	-705.23	247.20	847.86	820.93	26.93	31.482		
3,900.00	3,897.73	3,769.27	3,678.34	13.92	17.13	136.37	-728.14	254.77	875.82	848.16	27.66	31.661		
4,000.00	3,997.64	3,865.28	3,771.26	14.28	17.62	136.43	-751.04	262.34	903.79	875.40	28.39	31.831		
4,100.00	4,097.56	3,961.28	3,864.19	14.65	18.11	136.49	-773.94	269.91	931.76	902.63	29.13	31.992		
4,200.00	4,197.47	4,057.29	3,957.12	15.01	18.60	136.54	-796.85	277.47	959.73	929.87	29.86	32.144		
4,300.00	4,297.38	4,153.29	4,050.04	15.37	19.09	136.59	-819.75	285.04	987.70	957.11	30.59	32.289		
4,400.00	4,397.30	4,249.30	4,142.97	15.73	19.58	136.64	-842.65	292.61	1,015.67	984.35	31.32	32.428		
4,500.00	4,497.21	4,345.31	4,235.89	16.09	20.07	136.69	-865.56	300.18	1,043.64	1,011.59	32.05	32.559		
4,600.00	4,597.12	4,441.31	4,328.82	16.45	20.56	136.73	-888.46	307.75	1,071.61	1,038.83	32.79	32.685		
4,700.00	4,697.04	4,537.32	4,421.74	16.81	21.05	136.77	-911.36	315.32	1,099.58	1,066.06	33.52	32.805		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #665H - OH - Plan #10													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													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)				
4,800.00	4,796.95	4,633.32	4,514.67	17.17	21.55	136.81	-934.27	322.89	1,127.56	1,093.30	34.25	32.920		
4,900.00	4,896.86	4,729.33	4,607.59	17.54	22.04	136.84	-957.17	330.46	1,155.53	1,120.54	34.98	33.029		
5,000.00	4,996.77	4,825.33	4,700.52	17.90	22.53	136.88	-980.07	338.03	1,183.50	1,147.78	35.72	33.135		
5,100.00	5,096.69	4,921.34	4,793.45	18.26	23.02	136.91	-1,002.98	345.60	1,211.48	1,175.02	36.45	33.235		
5,200.00	5,196.60	5,017.34	4,886.37	18.62	23.51	136.95	-1,025.88	353.17	1,239.45	1,202.27	37.18	33.332		
5,300.00	5,296.51	5,113.35	4,979.30	18.98	24.00	136.98	-1,048.78	360.74	1,267.42	1,229.51	37.92	33.425		
5,400.00	5,396.43	5,209.35	5,072.22	19.34	24.50	137.00	-1,071.69	368.30	1,295.40	1,256.75	38.65	33.514		
5,500.00	5,496.34	5,305.36	5,165.15	19.70	24.99	137.03	-1,094.59	375.87	1,323.37	1,283.99	39.39	33.600		
5,600.00	5,596.25	5,401.36	5,258.07	20.07	25.48	137.06	-1,117.49	383.44	1,351.35	1,311.23	40.12	33.682		
5,700.00	5,696.17	5,497.37	5,351.00	20.43	25.97	137.08	-1,140.40	391.01	1,379.33	1,338.47	40.85	33.762		
5,800.00	5,796.08	5,593.37	5,443.93	20.79	26.47	137.11	-1,163.30	398.58	1,407.30	1,365.71	41.59	33.838		
5,900.00	5,895.99	5,689.38	5,536.85	21.15	26.96	137.13	-1,186.20	406.15	1,435.28	1,392.95	42.32	33.912		
6,000.00	5,995.91	5,785.38	5,629.78	21.51	27.45	137.16	-1,209.11	413.72	1,463.25	1,420.19	43.06	33.983		
6,100.00	6,095.82	5,881.39	5,722.70	21.87	27.94	137.18	-1,232.01	421.29	1,491.23	1,447.44	43.79	34.051		
6,200.00	6,195.73	5,977.40	5,815.63	22.23	28.44	137.20	-1,254.91	428.86	1,519.21	1,474.68	44.53	34.118		
6,300.00	6,295.65	6,073.40	5,908.55	22.60	28.93	137.22	-1,277.82	436.43	1,547.18	1,501.92	45.26	34.182		
6,394.97	6,390.53	6,164.57	5,996.80	22.94	29.40	137.24	-1,299.57	443.61	1,573.75	1,527.79	45.96	34.241		
6,400.00	6,395.56	6,169.41	6,001.48	22.96	29.42	128.44	-1,300.72	444.00	1,575.16	1,529.16	46.00	34.244		
6,450.00	6,445.40	6,217.49	6,048.02	23.14	29.67	93.67	-1,312.19	447.79	1,588.58	1,542.21	46.37	34.260		
6,500.00	6,494.83	6,265.50	6,094.49	23.32	29.91	85.05	-1,323.64	451.57	1,601.01	1,554.27	46.74	34.252		
6,550.00	6,543.53	6,313.13	6,140.59	23.51	30.16	81.15	-1,335.01	455.33	1,612.43	1,565.31	47.12	34.220		
6,600.00	6,591.21	6,360.09	6,186.04	23.69	30.40	78.94	-1,346.21	459.03	1,622.83	1,575.32	47.50	34.164		
6,650.00	6,637.58	6,406.09	6,230.57	23.88	30.63	77.59	-1,357.18	462.66	1,632.23	1,584.34	47.89	34.084		
6,700.00	6,682.34	6,450.85	6,273.89	24.08	30.86	76.77	-1,367.86	466.18	1,640.68	1,592.40	48.28	33.982		
6,750.00	6,725.23	6,494.09	6,315.75	24.28	31.09	76.31	-1,378.18	469.59	1,648.27	1,599.59	48.68	33.858		
6,800.00	6,765.97	6,546.50	6,366.52	24.50	31.35	76.35	-1,390.70	472.87	1,655.02	1,605.84	49.18	33.652		
6,850.00	6,804.32	6,599.17	6,417.63	24.75	31.60	76.78	-1,403.37	472.13	1,660.79	1,611.08	49.71	33.411		
6,900.00	6,840.04	6,640.87	6,457.93	25.02	31.78	77.21	-1,413.41	468.45	1,665.99	1,615.80	50.19	33.192		
6,950.00	6,872.91	6,672.77	6,488.54	25.33	31.91	77.52	-1,421.07	463.80	1,670.99	1,620.33	50.66	32.986		
7,000.00	6,902.73	6,696.29	6,510.95	25.68	32.00	77.66	-1,426.68	459.37	1,676.05	1,624.93	51.12	32.784		
7,050.00	6,929.32	6,712.85	6,526.61	26.09	32.06	77.61	-1,430.62	455.74	1,681.37	1,629.76	51.61	32.581		
7,100.00	6,952.50	6,723.67	6,536.80	26.56	32.10	77.38	-1,433.18	453.14	1,687.05	1,634.93	52.12	32.370		
7,150.00	6,972.14	6,729.80	6,542.55	27.09	32.12	76.98	-1,434.63	451.59	1,693.13	1,640.46	52.67	32.146		
7,200.00	6,988.11	6,732.06	6,544.67	27.68	32.13	76.43	-1,435.16	451.00	1,699.63	1,646.37	53.27	31.907		
7,250.00	7,000.33	6,731.15	6,543.82	28.34	32.12	75.75	-1,434.95	451.24	1,706.52	1,652.61	53.91	31.652		
7,300.00	7,008.70	6,727.61	6,540.50	29.06	32.11	74.98	-1,434.11	452.15	1,713.74	1,659.13	54.61	31.384		
7,350.00	7,013.19	6,721.88	6,535.11	29.83	32.09	74.12	-1,432.76	453.58	1,721.22	1,665.89	55.34	31.103		
7,381.86	7,014.00	6,717.25	6,530.76	30.35	32.07	73.55	-1,431.66	454.70	1,726.09	1,670.27	55.82	30.920		
7,400.00	7,014.01	6,714.46	6,528.14	30.65	32.07	73.46	-1,431.00	455.36	1,728.97	1,672.87	56.11	30.816		
7,500.00	7,014.07	6,700.01	6,514.48	32.44	32.01	72.98	-1,427.57	458.59	1,748.03	1,690.29	57.74	30.274		
7,600.00	7,014.13	6,700.01	6,514.48	34.39	32.01	72.98	-1,427.57	458.59	1,772.45	1,712.86	59.58	29.748		
7,700.00	7,014.18	6,679.72	6,495.18	36.50	31.94	72.31	-1,422.73	462.58	1,801.86	1,740.61	61.25	29.420		
7,800.00	7,014.24	6,671.47	6,487.29	38.73	31.90	72.04	-1,420.75	464.02	1,836.22	1,773.21	63.01	29.142		
7,900.00	7,014.30	6,664.32	6,480.45	41.06	31.88	71.81	-1,419.04	465.19	1,875.23	1,810.49	64.73	28.969		
8,000.00	7,014.35	6,650.01	6,466.72	43.47	31.82	71.33	-1,415.61	467.28	1,918.64	1,852.34	66.30	28.939		
8,100.00	7,014.41	6,650.01	6,466.72	45.97	31.82	71.33	-1,415.61	467.28	1,966.07	1,898.14	67.93	28.941		
8,200.00	7,014.47	6,650.01	6,466.72	48.52	31.82	71.33	-1,415.61	467.28	2,017.35	1,947.88	69.47	29.040		
8,300.00	7,014.53	6,650.01	6,466.72	51.12	31.82	71.33	-1,415.61	467.28	2,072.18	2,001.29	70.89	29.229		
8,400.00	7,014.58	6,650.01	6,466.72	53.77	31.82	71.33	-1,415.61	467.28	2,130.30	2,058.08	72.22	29.499		
8,500.00	7,014.64	6,650.01	6,466.72	56.46	31.82	71.33	-1,415.61	467.28	2,191.44	2,118.01	73.43	29.843		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #665H - OH - Plan #10													
Survey Program: 0-MWD+HDGM													
Rule Assigned:													
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning
Depth	Depth	Depth	Depth			Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor	
(ft)	(ft)	(ft)	(ft)			(°)	(ft)	(ft)	Centres	Ellipses	(ft)		
				(ft)	(ft)				(ft)	(ft)			
8,600.00	7,014.70	6,650.01	6,466.72	59.18	31.82	71.33	-1,415.61	467.28	2,255.36	2,180.82	74.55	30.254	
8,700.00	7,014.76	6,629.71	6,447.17	61.93	31.73	70.66	-1,410.73	469.70	2,321.52	2,246.18	75.34	30.815	
8,800.00	7,014.81	6,627.02	6,444.57	64.70	31.72	70.57	-1,410.08	469.97	2,390.23	2,313.99	76.24	31.352	
8,900.00	7,014.87	6,624.55	6,442.19	67.50	31.71	70.49	-1,409.49	470.21	2,461.08	2,384.02	77.06	31.937	



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 146B - OH - OH													Offset Site Error: 0.00 ft		
Survey Program: 130-INCLINOMETER				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		
13,200.00	7,017.34	7,050.43	7,049.85	194.54	214.11	89.81	-336.36	8,961.59	2,445.88	2,187.50	258.38	9.466			
13,300.00	7,017.40	7,050.49	7,049.91	197.55	214.11	89.82	-336.36	8,961.59	2,347.48	2,087.50	259.99	9.029			
13,400.00	7,017.45	7,050.55	7,049.97	200.55	214.11	89.83	-336.36	8,961.59	2,249.23	1,987.47	261.76	8.593			
13,500.00	7,017.51	7,050.60	7,050.02	203.56	214.12	89.84	-336.36	8,961.59	2,151.13	1,887.41	263.72	8.157			
13,600.00	7,017.57	7,050.66	7,050.08	206.57	214.12	89.85	-336.36	8,961.59	2,053.22	1,787.32	265.90	7.722			
13,700.00	7,017.63	7,050.72	7,050.14	209.58	214.12	89.85	-336.36	8,961.59	1,955.52	1,687.20	268.32	7.288			
13,800.00	7,017.68	7,050.78	7,050.20	212.59	214.12	89.86	-336.36	8,961.59	1,858.07	1,587.04	271.03	6.856			
13,900.00	7,017.74	7,050.83	7,050.25	215.60	214.12	89.87	-336.36	8,961.59	1,760.90	1,486.83	274.07	6.425			
14,000.00	7,017.80	7,050.89	7,050.31	218.61	214.12	89.88	-336.36	8,961.59	1,664.06	1,386.57	277.49	5.997			
14,100.00	7,017.85	7,050.95	7,050.37	221.62	214.13	89.88	-336.36	8,961.59	1,567.62	1,286.25	281.37	5.571			
14,200.00	7,017.91	7,051.01	7,050.43	224.63	214.13	89.89	-336.36	8,961.59	1,471.66	1,185.88	285.79	5.150			
14,300.00	7,017.97	7,051.06	7,050.48	227.64	214.13	89.90	-336.36	8,961.59	1,376.28	1,085.44	290.84	4.732			
14,400.00	7,018.03	7,051.12	7,050.54	230.65	214.13	89.91	-336.36	8,961.59	1,281.59	984.94	296.66	4.320			
14,500.00	7,018.08	7,051.18	7,050.60	233.67	214.13	89.91	-336.36	8,961.59	1,187.78	884.38	303.40	3.915			
14,600.00	7,018.14	7,051.24	7,050.65	236.68	214.13	89.92	-336.36	8,961.59	1,095.07	783.79	311.27	3.518			
14,700.00	7,018.20	7,051.29	7,050.71	239.70	214.14	89.93	-336.36	8,961.59	1,003.75	683.22	320.53	3.132			
14,800.00	7,018.26	7,051.35	7,050.77	242.71	214.14	89.94	-336.36	8,961.59	914.26	582.76	331.50	2.758			
14,900.00	7,018.31	7,051.41	7,050.83	245.72	214.14	89.95	-336.36	8,961.59	827.17	482.62	344.55	2.401			
15,000.00	7,018.37	7,051.46	7,050.88	248.74	214.14	89.95	-336.36	8,961.59	743.34	383.20	360.13	2.064			
15,100.00	7,018.43	7,051.52	7,050.94	251.76	214.14	89.96	-336.36	8,961.59	664.00	285.32	378.68	1.753			
15,200.00	7,018.49	7,051.58	7,051.00	254.77	214.15	89.97	-336.36	8,961.59	590.97	190.59	400.38	1.476	Level 3	0.888 Level 3, CC, ES, SF	
15,300.00	7,018.54	7,051.64	7,051.06	257.79	214.15	89.98	-336.36	8,961.59	526.87	102.16	424.71	1.241	Level 3		
15,400.00	7,018.60	7,051.69	7,051.11	260.81	214.15	89.98	-336.36	8,961.59	475.32	25.78	449.55	1.057	Level 3		
15,500.00	7,018.66	7,051.75	7,051.17	263.82	214.15	89.99	-336.36	8,961.59	440.77	-29.57	470.34	0.937	Level 3		
15,600.00	7,018.72	7,051.81	7,051.23	266.84	214.15	90.00	-336.36	8,961.59	427.35	-53.62	480.97	0.889	Level 3		
15,608.27	7,018.72	7,051.81	7,051.23	267.09	214.15	90.00	-336.36	8,961.59	427.27	-53.97	481.24	0.888	Level 3, CC, ES, SF		
15,700.00	7,018.77	7,051.87	7,051.29	269.86	214.15	90.01	-336.36	8,961.59	437.00	-40.76	477.76	0.915	Level 3	1.171 Level 3	
15,800.00	7,018.83	7,051.92	7,051.34	272.88	214.16	90.01	-336.36	8,961.59	468.31	5.51	462.80	1.012	Level 3		
15,900.00	7,018.89	7,051.98	7,051.40	275.89	214.16	90.02	-336.36	8,961.59	517.36	75.59	441.77	1.171	Level 3		
16,000.00	7,018.95	7,052.04	7,051.46	278.91	214.16	90.03	-336.36	8,961.59	579.66	159.97	419.69	1.381	Level 3		
16,100.00	7,019.00	7,052.10	7,051.52	281.93	214.16	90.04	-336.36	8,961.59	651.42	252.14	399.28	1.631			
16,200.00	7,019.06	7,052.15	7,051.57	284.95	214.16	90.05	-336.36	8,961.59	729.86	348.39	381.47	1.913			
16,300.00	7,019.12	7,052.21	7,051.63	287.97	214.16	90.05	-336.36	8,961.59	813.04	446.75	366.30	2.220			
16,400.00	7,019.17	7,052.27	7,051.69	290.99	214.17	90.06	-336.36	8,961.59	899.66	546.18	353.48	2.545			
16,500.00	7,019.23	7,052.33	7,051.74	294.01	214.17	90.07	-336.36	8,961.59	988.80	646.15	342.65	2.886			
16,600.00	7,019.29	7,052.38	7,051.80	297.03	214.17	90.08	-336.36	8,961.59	1,079.85	746.39	333.46	3.238			
16,700.00	7,019.35	7,052.44	7,051.86	300.05	214.17	90.08	-336.36	8,961.59	1,172.36	846.75	325.61	3.600			
16,800.00	7,019.40	7,052.50	7,051.92	303.07	214.17	90.09	-336.36	8,961.59	1,266.00	947.14	318.86	3.970			
16,900.00	7,019.46	7,052.56	7,051.97	306.09	214.18	90.10	-336.36	8,961.59	1,360.55	1,047.54	313.02	4.347			
17,000.00	7,019.52	7,052.61	7,052.03	309.11	214.18	90.11	-336.36	8,961.59	1,455.83	1,147.91	307.93	4.728			
17,100.00	7,019.58	7,052.67	7,052.09	312.14	214.18	90.11	-336.36	8,961.59	1,551.71	1,248.25	303.46	5.113			
17,200.00	7,019.63	7,052.73	7,052.15	315.16	214.18	90.12	-336.36	8,961.59	1,648.07	1,348.55	299.52	5.502			
17,300.00	7,019.69	7,052.78	7,052.20	318.18	214.18	90.13	-336.36	8,961.59	1,744.85	1,448.81	296.03	5.894			
17,400.00	7,019.75	7,052.84	7,052.26	321.20	214.18	90.14	-336.36	8,961.59	1,841.96	1,549.04	292.92	6.288			
17,500.00	7,019.81	7,052.90	7,052.32	324.22	214.19	90.15	-336.36	8,961.59	1,939.38	1,649.24	290.14	6.684			
17,600.00	7,019.86	7,052.96	7,052.38	327.25	214.19	90.15	-336.36	8,961.59	2,037.04	1,749.40	287.63	7.082			
17,700.00	7,019.92	7,053.01	7,052.43	330.27	214.19	90.16	-336.36	8,961.59	2,134.92	1,849.54	285.38	7.481			
17,800.00	7,019.98	7,053.07	7,052.49	333.29	214.19	90.17	-336.36	8,961.59	2,232.98	1,949.65	283.33	7.881			
17,900.00	7,020.04	7,053.13	7,052.55	336.31	214.19	90.18	-336.36	8,961.59	2,331.21	2,049.74	281.47	8.282			
18,000.00	7,020.09	7,053.19	7,052.61	339.34	214.19	90.18	-336.36	8,961.59	2,429.59	2,149.81	279.78	8.684			



Lonestar Consulting, LLC
Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 15A - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 133-INCLINOMETER													Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Vertical	Reference	Semi Major Axis	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Measured Depth (ft)	Depth (ft)	Measured Depth (ft)	Depth (ft)	Reference (ft)	Offset (ft)	Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Separation (ft)	Factor		
11,600.00	7,016.42	7,035.06	7,028.93	146.59	213.59	89.88	-525.71	7,341.40	2,474.45	2,214.24	260.22	9.509		
11,700.00	7,016.48	7,035.12	7,028.99	149.58	213.59	89.88	-525.71	7,341.40	2,377.97	2,115.79	262.18	9.070		
11,800.00	7,016.54	7,035.17	7,029.05	152.56	213.59	89.89	-525.71	7,341.40	2,281.80	2,017.46	264.34	8.632		
11,900.00	7,016.59	7,035.23	7,029.11	155.55	213.59	89.89	-525.71	7,341.40	2,185.97	1,919.26	266.71	8.196		
12,000.00	7,016.65	7,035.29	7,029.16	158.55	213.59	89.90	-525.71	7,341.40	2,090.53	1,821.20	269.33	7.762		
12,100.00	7,016.71	7,035.35	7,029.22	161.54	213.60	89.90	-525.71	7,341.40	1,995.54	1,723.32	272.22	7.331		
12,200.00	7,016.76	7,035.40	7,029.28	164.53	213.60	89.91	-525.71	7,341.40	1,901.06	1,625.63	275.43	6.902		
12,300.00	7,016.82	7,035.46	7,029.33	167.53	213.60	89.91	-525.71	7,341.40	1,807.17	1,528.18	278.99	6.478		
12,400.00	7,016.88	7,035.52	7,029.39	170.53	213.60	89.92	-525.71	7,341.40	1,713.98	1,431.02	282.96	6.057		
12,500.00	7,016.94	7,035.58	7,029.45	173.52	213.60	89.92	-525.71	7,341.40	1,621.60	1,334.21	287.39	5.643		
12,600.00	7,016.99	7,035.63	7,029.51	176.52	213.61	89.93	-525.71	7,341.40	1,530.17	1,237.82	292.36	5.234		
12,700.00	7,017.05	7,035.69	7,029.56	179.52	213.61	89.93	-525.71	7,341.40	1,439.89	1,141.95	297.94	4.833		
12,800.00	7,017.11	7,035.75	7,029.62	182.52	213.61	89.94	-525.71	7,341.40	1,350.97	1,046.75	304.23	4.441		
12,900.00	7,017.17	7,035.81	7,029.68	185.53	213.61	89.94	-525.71	7,341.40	1,263.72	952.39	311.33	4.059		
13,000.00	7,017.22	7,035.86	7,029.74	188.53	213.61	89.95	-525.71	7,341.40	1,178.49	859.13	319.36	3.690		
13,100.00	7,017.28	7,035.92	7,029.79	191.53	213.61	89.95	-525.71	7,341.40	1,095.76	767.31	328.45	3.336		
13,200.00	7,017.34	7,035.98	7,029.85	194.54	213.62	89.96	-525.71	7,341.40	1,016.14	677.44	338.69	3.000		
13,300.00	7,017.40	7,036.04	7,029.91	197.55	213.62	89.96	-525.71	7,341.40	940.42	590.23	350.19	2.685		
13,400.00	7,017.45	7,036.09	7,029.97	200.55	213.62	89.97	-525.71	7,341.40	869.62	506.70	362.92	2.396		
13,500.00	7,017.51	7,036.15	7,030.02	203.56	213.62	89.97	-525.71	7,341.40	805.04	428.33	376.71	2.137		
13,600.00	7,017.57	7,036.21	7,030.08	206.57	213.62	89.98	-525.71	7,341.40	748.29	357.18	391.11	1.913		
13,700.00	7,017.63	7,036.26	7,030.14	209.58	213.62	89.99	-525.71	7,341.40	701.28	296.01	405.27	1.730		
13,800.00	7,017.68	7,036.32	7,030.20	212.59	213.63	89.99	-525.71	7,341.40	666.06	248.20	417.87	1.594		
13,900.00	7,017.74	7,036.38	7,030.25	215.60	213.63	90.00	-525.71	7,341.40	644.59	217.28	427.31	1.508		
13,990.75	7,017.79	7,036.43	7,030.31	218.33	213.63	90.00	-525.71	7,341.40	638.17	206.22	431.95	1.477	Level 3, CC	
14,000.00	7,017.80	7,036.44	7,030.31	218.61	213.63	90.00	-525.71	7,341.40	638.24	206.05	432.19	1.477	Level 3, ES, SF	
14,100.00	7,017.85	7,036.49	7,030.37	221.62	213.63	90.01	-525.71	7,341.40	647.45	215.58	431.87	1.499	Level 3	
14,200.00	7,017.91	7,036.55	7,030.43	224.63	213.63	90.01	-525.71	7,341.40	671.60	244.80	426.80	1.574		
14,300.00	7,017.97	7,036.61	7,030.48	227.64	213.63	90.02	-525.71	7,341.40	709.15	290.95	418.21	1.696		
14,400.00	7,018.03	7,036.67	7,030.54	230.65	213.64	90.02	-525.71	7,341.40	758.12	350.54	407.59	1.860		
14,500.00	7,018.08	7,036.72	7,030.60	233.67	213.64	90.03	-525.71	7,341.40	816.46	420.26	396.20	2.061		
14,600.00	7,018.14	7,036.78	7,030.65	236.68	213.64	90.03	-525.71	7,341.40	882.30	497.39	384.91	2.292		
14,700.00	7,018.20	7,036.84	7,030.71	239.70	213.64	90.04	-525.71	7,341.40	954.10	579.86	374.24	2.549		
14,800.00	7,018.26	7,036.90	7,030.77	242.71	213.64	90.04	-525.71	7,341.40	1,030.61	666.20	364.41	2.828		
14,900.00	7,018.31	7,036.95	7,030.83	245.72	213.65	90.05	-525.71	7,341.40	1,110.86	755.36	355.50	3.125		
15,000.00	7,018.37	7,037.01	7,030.88	248.74	213.65	90.05	-525.71	7,341.40	1,194.09	846.60	347.49	3.436		
15,100.00	7,018.43	7,037.07	7,030.94	251.76	213.65	90.06	-525.71	7,341.40	1,279.73	939.41	340.32	3.760		
15,200.00	7,018.49	7,037.13	7,031.00	254.77	213.65	90.06	-525.71	7,341.40	1,367.32	1,033.41	333.91	4.095		
15,300.00	7,018.54	7,037.18	7,031.06	257.79	213.65	90.07	-525.71	7,341.40	1,456.51	1,128.33	328.18	4.438		
15,400.00	7,018.60	7,037.24	7,031.11	260.81	213.65	90.07	-525.71	7,341.40	1,547.02	1,223.98	323.04	4.789		
15,500.00	7,018.66	7,037.30	7,031.17	263.82	213.66	90.08	-525.71	7,341.40	1,638.63	1,320.22	318.42	5.146		
15,600.00	7,018.72	7,037.36	7,031.23	266.84	213.66	90.08	-525.71	7,341.40	1,731.18	1,416.92	314.26	5.509		
15,700.00	7,018.77	7,037.41	7,031.29	269.86	213.66	90.09	-525.71	7,341.40	1,824.50	1,514.01	310.50	5.876		
15,800.00	7,018.83	7,037.47	7,031.34	272.88	213.66	90.09	-525.71	7,341.40	1,918.51	1,611.42	307.09	6.247		
15,900.00	7,018.89	7,037.53	7,031.40	275.89	213.66	90.10	-525.71	7,341.40	2,013.09	1,709.10	303.99	6.622		
16,000.00	7,018.95	7,037.58	7,031.46	278.91	213.66	90.10	-525.71	7,341.40	2,108.17	1,807.00	301.17	7.000		
16,100.00	7,019.00	7,037.64	7,031.52	281.93	213.67	90.11	-525.71	7,341.40	2,203.68	1,905.09	298.59	7.380		
16,200.00	7,019.06	7,037.70	7,031.57	284.95	213.67	90.11	-525.71	7,341.40	2,299.58	2,003.36	296.23	7.763		
16,300.00	7,019.12	7,037.76	7,031.63	287.97	213.67	90.12	-525.71	7,341.40	2,395.81	2,101.76	294.05	8.148		
16,400.00	7,019.17	7,037.81	7,031.69	290.99	213.67	90.12	-525.71	7,341.40	2,492.34	2,200.29	292.05	8.534		



Lonestar Consulting, LLC
Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 166B - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 102-INCLINOMETER													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)				
0.00	0.00	0.00	0.00	0.00	0.00	41.60	652.44	579.25	873.11					
100.00	100.00	66.51	66.51	0.27	2.02	41.60	652.44	579.25	872.47	870.18	2.29	380.888		
200.00	200.00	166.62	166.62	0.63	5.06	41.60	652.51	579.25	872.52	866.83	5.69	153.363		
300.00	300.00	266.51	266.51	0.99	8.09	41.60	652.44	579.25	872.47	863.39	9.08	96.074		
400.00	400.00	367.42	367.42	1.35	11.16	41.60	652.50	579.25	872.52	860.01	12.50	69.779		
500.00	500.00	466.52	466.51	1.70	14.17	41.60	652.44	579.25	872.47	856.60	15.87	54.969		
600.00	600.00	566.52	566.51	2.06	17.20	41.60	652.44	579.25	872.47	853.20	19.27	45.283		
700.00	700.00	667.11	667.10	2.42	20.26	41.59	652.61	579.25	872.60	849.92	22.68	38.474		
800.00	800.00	767.87	767.86	2.78	23.32	41.60	652.46	579.25	872.49	846.39	26.10	33.430		
842.80	842.80	809.34	809.31	2.93	24.58	41.60	652.44	579.25	872.47	844.96	27.51	31.713		
900.00	900.00	866.54	866.51	3.14	26.32	41.60	652.44	579.25	872.47	843.02	29.45	29.622		
1,000.00	1,000.00	966.54	966.51	3.50	29.35	41.56	653.26	579.25	873.09	840.24	32.85	26.579		
1,100.00	1,100.00	1,069.68	1,069.64	3.86	32.48	41.57	653.02	579.25	872.91	836.57	36.34	24.021		
1,200.00	1,200.00	1,166.60	1,166.51	4.21	35.43	41.60	652.44	579.25	872.47	832.83	39.64	22.009		
1,300.00	1,299.98	1,266.58	1,266.49	4.57	38.46	12.14	652.44	579.25	870.77	827.73	43.03	20.234		
1,319.29	1,319.26	1,285.86	1,285.77	4.64	39.05	12.16	652.44	579.25	870.04	826.35	43.69	19.914		
1,400.00	1,399.90	1,366.69	1,366.60	4.93	41.50	12.16	653.33	579.25	867.42	820.99	46.43	18.682		
1,500.00	1,499.81	1,469.45	1,469.35	5.29	44.62	12.24	653.07	579.25	863.17	813.26	49.91	17.295		
1,600.00	1,599.72	1,566.38	1,566.23	5.64	47.57	12.32	652.44	579.25	858.62	805.41	53.21	16.137		
1,700.00	1,699.64	1,666.30	1,666.15	6.00	50.60	12.38	652.44	579.25	854.56	797.96	56.60	15.098		
1,800.00	1,799.55	1,766.21	1,766.06	6.36	53.64	12.44	652.44	579.25	850.49	790.50	59.99	14.177		
1,900.00	1,899.46	1,868.78	1,868.62	6.72	56.75	12.47	653.13	579.25	846.94	783.48	63.46	13.345		
2,000.00	1,999.38	1,971.43	1,971.26	7.08	59.87	12.56	652.48	579.25	842.41	775.47	66.94	12.585		
2,100.00	2,099.29	2,066.01	2,065.80	7.44	62.74	12.62	652.44	579.25	838.30	768.13	70.17	11.947		
2,200.00	2,199.20	2,166.01	2,165.80	7.79	65.78	12.65	653.26	579.25	834.84	761.28	73.56	11.349		
2,300.00	2,299.12	2,268.90	2,268.68	8.15	68.90	12.73	652.99	579.25	830.59	753.55	77.05	10.781		
2,400.00	2,399.03	2,365.80	2,365.54	8.51	71.85	12.81	652.44	579.25	826.12	745.77	80.35	10.282		
2,500.00	2,498.94	2,465.71	2,465.45	8.87	74.88	12.88	652.44	579.25	822.06	738.32	83.74	9.817		
2,600.00	2,598.86	2,565.62	2,565.37	9.23	77.91	12.94	652.44	579.25	818.00	730.87	87.13	9.388		
2,700.00	2,698.77	2,666.48	2,666.22	9.59	80.98	12.97	653.23	579.25	814.52	723.97	90.55	8.995		
2,800.00	2,798.68	2,767.95	2,767.69	9.95	84.06	13.05	652.94	579.25	810.26	716.27	93.99	8.621		
2,900.00	2,898.60	2,865.49	2,865.11	10.32	87.02	13.14	652.44	579.25	805.83	708.52	97.31	8.281		
3,000.00	2,998.51	2,965.40	2,965.02	10.68	90.05	13.21	652.44	579.25	801.78	701.07	100.71	7.962		
3,100.00	3,098.42	3,065.43	3,065.02	11.04	93.09	13.20	653.98	579.25	798.86	694.76	104.10	7.674		
3,200.00	3,198.34	3,170.01	3,169.59	11.40	96.27	13.30	653.55	579.25	794.50	686.87	107.63	7.382		
3,300.00	3,298.25	3,265.31	3,264.76	11.76	99.16	13.42	652.44	579.25	789.62	678.74	110.89	7.121		
3,400.00	3,398.16	3,365.22	3,364.67	12.12	102.19	13.49	652.44	579.25	785.58	671.29	114.28	6.874		
3,500.00	3,498.08	3,465.13	3,464.59	12.48	105.23	13.56	652.44	579.25	781.53	663.85	117.67	6.641		
3,600.00	3,597.99	3,567.81	3,567.24	12.84	108.35	13.57	653.69	579.25	778.40	657.25	121.15	6.425		
3,700.00	3,697.90	3,671.22	3,670.63	13.20	111.49	13.68	652.88	579.25	773.78	649.14	124.64	6.208		
3,800.00	3,797.82	3,765.11	3,764.33	13.56	114.34	13.78	652.44	579.25	769.39	641.53	127.86	6.017		
3,900.00	3,897.73	3,865.03	3,864.24	13.92	117.37	13.85	652.44	579.25	765.35	634.10	131.25	5.831		
4,000.00	3,997.64	3,965.71	3,964.88	14.28	120.43	13.80	654.79	579.25	763.02	628.35	134.67	5.666		
4,100.00	4,097.56	4,070.42	4,069.56	14.65	123.61	13.91	654.20	579.25	758.57	620.37	138.20	5.489		
4,200.00	4,197.47	4,175.11	4,174.20	15.01	126.79	14.07	652.72	579.25	753.50	611.78	141.73	5.317		
4,300.00	4,297.38	4,264.88	4,263.89	15.37	129.51	14.16	652.44	579.25	749.19	604.36	144.83	5.173		
4,400.00	4,397.30	4,364.80	4,363.81	15.73	132.55	14.23	652.44	579.25	745.16	596.93	148.22	5.027		
4,500.00	4,497.21	4,464.93	4,463.94	16.09	135.59	14.25	653.58	579.25	741.95	590.32	151.62	4.893		
4,600.00	4,597.12	4,566.67	4,565.66	16.45	138.68	14.34	653.37	579.25	737.76	582.69	155.07	4.758		
4,700.00	4,697.04	4,668.38	4,667.37	16.81	141.77	14.46	652.81	579.25	733.33	574.82	158.52	4.626		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 166B - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 102-INCLINOMETER													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	
4,800.00	4,796.95	4,764.61	4,763.46	17.17	144.69	14.56	652.44	579.25	729.03	567.22	161.80	4.506		
4,900.00	4,896.86	4,864.52	4,863.37	17.54	147.72	14.64	652.44	579.25	725.00	559.80	165.20	4.389		
5,000.00	4,996.77	4,965.02	4,963.85	17.90	150.77	14.62	654.21	579.25	722.24	553.63	168.61	4.284		
5,100.00	5,096.69	5,068.48	5,067.29	18.26	153.92	14.74	653.74	579.25	717.89	545.79	172.10	4.171		
5,200.00	5,196.60	5,171.91	5,170.70	18.62	157.06	14.89	652.58	579.25	713.06	537.46	175.59	4.061		
5,300.00	5,296.51	5,264.31	5,263.03	18.98	159.86	14.98	652.44	579.25	708.90	530.12	178.77	3.965		
5,400.00	5,396.43	5,364.22	5,362.94	19.34	162.90	15.07	652.44	579.25	704.88	522.71	182.17	3.869		
5,500.00	5,496.34	5,465.03	5,463.74	19.70	165.96	15.10	653.43	579.25	701.56	515.97	185.59	3.780		
5,600.00	5,596.25	5,566.83	5,565.53	20.07	169.05	15.21	653.05	579.25	697.28	508.25	189.03	3.689		
5,700.00	5,696.17	5,664.08	5,662.68	20.43	172.00	15.33	652.44	579.25	692.82	500.47	192.35	3.602		
5,800.00	5,796.08	5,763.99	5,762.59	20.79	175.04	15.43	652.44	579.25	688.81	493.07	195.74	3.519		
5,900.00	5,895.99	5,866.75	5,865.34	21.15	178.16	15.47	653.22	579.25	685.35	486.13	199.22	3.440		
6,000.00	5,995.91	5,963.89	5,962.42	21.51	181.11	15.61	652.44	579.25	680.79	478.25	202.53	3.361		
6,100.00	6,095.82	6,063.80	6,062.33	21.87	184.14	15.71	652.44	579.25	676.78	470.85	205.93	3.287		
6,200.00	6,195.73	6,163.71	6,162.25	22.23	187.18	15.80	652.44	579.25	672.77	463.45	209.32	3.214		
6,300.00	6,295.65	6,264.31	6,262.83	22.60	190.23	15.83	653.59	579.25	669.58	456.84	212.73	3.147		
6,394.97	6,390.53	6,360.65	6,359.17	22.94	193.16	15.94	653.30	579.25	665.58	449.58	216.00	3.081		
6,400.00	6,395.56	6,365.76	6,364.28	22.96	193.31	7.26	653.28	579.25	665.34	449.17	216.17	3.078		
6,450.00	6,445.40	6,416.36	6,414.88	23.14	194.85	-26.72	653.00	579.25	661.50	443.61	217.88	3.036		
6,500.00	6,494.83	6,466.54	6,465.05	23.32	196.37	-35.22	652.64	579.25	654.88	435.30	219.58	2.982		
6,550.00	6,543.53	6,511.55	6,510.04	23.51	197.74	-39.62	652.44	579.25	645.73	424.59	221.13	2.920		
6,600.00	6,591.21	6,559.23	6,557.72	23.69	199.19	-43.06	652.44	579.25	634.24	411.49	222.75	2.847		
6,650.00	6,637.58	6,605.69	6,604.19	23.88	200.60	-46.32	652.55	579.25	620.57	396.24	224.33	2.766		
6,700.00	6,682.34	6,650.88	6,649.38	24.08	201.97	-49.73	652.52	579.25	604.78	378.90	225.88	2.677		
6,750.00	6,725.23	6,694.18	6,692.68	24.28	203.28	-53.44	652.45	579.25	587.28	359.92	227.37	2.583		
6,800.00	6,765.97	6,734.00	6,732.48	24.50	204.49	-57.43	652.44	579.25	568.57	339.80	228.76	2.485		
6,850.00	6,804.32	6,772.35	6,770.83	24.75	205.66	-61.79	652.44	579.25	549.10	318.96	230.13	2.386		
6,900.00	6,840.04	6,808.07	6,806.56	25.02	206.74	-66.39	652.44	579.25	529.45	297.99	231.46	2.287		
6,950.00	6,872.91	6,840.94	6,839.43	25.33	207.74	-71.11	652.44	579.25	510.31	277.57	232.74	2.193		
7,000.00	6,902.73	6,870.76	6,869.25	25.68	208.65	-75.73	652.44	579.25	492.44	258.44	234.00	2.104		
7,050.00	6,929.32	6,897.35	6,895.83	26.09	209.45	-80.07	652.44	579.25	476.71	241.46	235.24	2.026		
7,100.00	6,952.50	6,920.53	6,919.01	26.56	210.16	-83.90	652.44	579.25	463.98	227.51	236.48	1.962		
7,150.00	6,972.14	6,940.33	6,938.80	27.09	210.76	-87.09	653.45	579.25	456.14	218.44	237.70	1.919		
7,200.00	6,988.11	6,956.58	6,955.06	27.68	211.25	-89.48	653.44	579.25	451.93	213.05	238.88	1.892		
7,216.15	6,992.47	6,961.02	6,959.49	27.90	211.39	-90.07	653.43	579.25	451.65	212.40	239.25	1.888 CC, ES		
7,250.00	7,000.33	6,969.01	6,967.48	28.34	211.63	-90.97	653.42	579.25	452.88	212.92	239.97	1.887 SF		
7,300.00	7,008.70	6,977.53	6,976.00	29.06	211.89	-91.48	653.41	579.25	459.28	218.36	240.92	1.906		
7,350.00	7,013.19	6,982.10	6,980.57	29.83	212.03	-90.98	653.40	579.25	471.06	229.38	241.68	1.949		
7,381.86	7,014.00	6,982.93	6,981.40	30.35	212.05	-90.12	653.40	579.25	481.23	239.18	242.05	1.988		
7,400.00	7,014.01	6,982.94	6,981.41	30.65	212.05	-90.13	653.40	579.25	487.87	245.64	242.23	2.014		
7,500.00	7,014.07	6,983.00	6,981.47	32.44	212.06	-90.13	653.40	579.25	534.15	291.18	242.97	2.198		
7,600.00	7,014.13	6,983.06	6,981.53	34.39	212.06	-90.14	653.40	579.25	593.82	350.45	243.37	2.440		
7,700.00	7,014.18	6,983.12	6,981.59	36.50	212.06	-90.15	653.40	579.25	663.26	419.73	243.54	2.723		
7,800.00	7,014.24	6,983.18	6,981.65	38.73	212.06	-90.16	653.40	579.25	739.74	496.17	243.57	3.037		
7,900.00	7,014.30	6,983.24	6,981.72	41.06	212.06	-90.17	653.40	579.25	821.29	577.76	243.53	3.372		
8,000.00	7,014.35	6,983.30	6,981.78	43.47	212.07	-90.17	653.40	579.25	906.54	663.09	243.46	3.724		
8,100.00	7,014.41	6,983.37	6,981.84	45.97	212.07	-90.18	653.40	579.25	994.55	751.18	243.37	4.087		
8,200.00	7,014.47	6,983.43	6,981.90	48.52	212.07	-90.19	653.40	579.25	1,084.63	841.36	243.28	4.458		
8,300.00	7,014.53	6,983.49	6,981.96	51.12	212.07	-90.20	653.40	579.25	1,176.32	933.13	243.19	4.837		
8,400.00	7,014.58	6,983.55	6,982.02	53.77	212.07	-90.20	653.40	579.25	1,269.26	1,026.16	243.11	5.221		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 166B - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 102-INCLINOMETER													Offset Well Error:	0.00 ft
Measured Reference Depth (ft)	Vertical Depth (ft)	Measured Offset Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	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)				
8,500.00	7,014.64	6,983.61	6,982.08	56.46	212.07	-90.21	653.40	579.25	1,363.21	1,120.17	243.03	5.609		
8,600.00	7,014.70	6,983.67	6,982.14	59.18	212.08	-90.22	653.40	579.25	1,457.95	1,214.99	242.96	6.001		
8,700.00	7,014.76	6,983.73	6,982.20	61.93	212.08	-90.23	653.40	579.25	1,553.36	1,310.46	242.90	6.395		
8,800.00	7,014.81	6,983.79	6,982.27	64.70	212.08	-90.23	653.40	579.25	1,649.31	1,406.46	242.85	6.791		
8,900.00	7,014.87	6,983.85	6,982.33	67.50	212.08	-90.24	653.39	579.25	1,745.72	1,502.91	242.81	7.190		
9,000.00	7,014.93	6,983.92	6,982.39	70.32	212.08	-90.25	653.39	579.25	1,842.51	1,599.74	242.77	7.590		
9,100.00	7,014.99	6,983.98	6,982.45	73.15	212.09	-90.26	653.39	579.25	1,939.62	1,696.89	242.73	7.991		
9,200.00	7,015.04	6,984.04	6,982.51	76.00	212.09	-90.27	653.39	579.25	2,037.02	1,794.31	242.70	8.393		
9,300.00	7,015.10	6,984.10	6,982.57	78.86	212.09	-90.27	653.39	579.25	2,134.65	1,891.97	242.68	8.796		
9,400.00	7,015.16	6,984.16	6,982.63	81.74	212.09	-90.28	653.39	579.25	2,232.50	1,989.84	242.66	9.200		
9,500.00	7,015.22	6,984.22	6,982.69	84.62	212.09	-90.29	653.39	579.25	2,330.52	2,087.88	242.64	9.605		
9,600.00	7,015.27	6,984.28	6,982.75	87.52	212.09	-90.30	653.39	579.25	2,428.71	2,186.08	242.63	10.010		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	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		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	176.19	-589.18	39.20	590.78					
100.00	100.00	81.26	81.26	0.27	1.63	176.17	-589.18	39.45	590.50	588.61	1.90	311.159 CC		
200.00	200.00	180.95	180.94	0.63	3.62	176.07	-589.18	40.47	590.57	586.32	4.25	138.895		
300.00	300.00	280.82	280.80	0.99	6.74	175.91	-589.18	42.12	590.69	582.96	7.73	76.447		
400.00	400.00	380.84	380.81	1.35	10.74	175.75	-589.18	43.78	590.81	578.72	12.09	48.870		
500.00	500.00	480.87	480.82	1.70	14.75	175.60	-589.18	45.35	590.93	574.47	16.45	35.918		
600.00	600.00	580.89	580.84	2.06	18.75	175.46	-589.18	46.83	591.04	570.23	20.81	28.395		
700.00	700.00	680.93	680.86	2.42	22.76	175.32	-589.18	48.23	591.15	565.98	25.18	23.479		
800.00	800.00	780.94	780.86	2.78	26.76	175.19	-589.18	49.55	591.26	561.72	29.54	20.016		
900.00	900.00	880.93	880.85	3.14	30.76	175.07	-589.18	50.86	591.38	557.48	33.90	17.445		
1,000.00	1,000.00	980.92	980.83	3.50	34.76	174.94	-589.18	52.17	591.49	553.23	38.26	15.460		
1,100.00	1,100.00	1,080.91	1,080.81	3.86	38.77	174.81	-589.18	53.48	591.61	548.99	42.62	13.881		
1,200.00	1,200.00	1,180.91	1,180.80	4.21	42.77	174.69	-589.18	54.79	591.73	544.74	46.98	12.595		
1,300.00	1,299.98	1,280.86	1,280.75	4.57	46.77	145.15	-589.18	56.11	593.28	541.94	51.34	11.556		
1,319.29	1,319.26	1,300.14	1,300.02	4.64	47.54	145.16	-589.18	56.37	593.91	541.73	52.18	11.382		
1,400.00	1,399.90	1,380.75	1,380.62	4.93	50.77	145.24	-589.18	57.50	596.78	541.08	55.70	10.715		
1,500.00	1,499.81	1,480.64	1,480.50	5.29	54.77	145.32	-589.18	58.98	600.33	540.28	60.05	9.997		
1,600.00	1,599.72	1,580.52	1,580.37	5.64	58.76	145.40	-589.18	60.55	603.90	539.49	64.41	9.376		
1,700.00	1,699.64	1,680.41	1,680.24	6.00	62.76	145.47	-589.18	62.21	607.47	538.71	68.76	8.834		
1,800.00	1,799.55	1,780.34	1,780.16	6.36	66.76	145.53	-589.18	63.93	611.06	537.93	73.12	8.357		
1,900.00	1,899.46	1,880.32	1,880.13	6.72	70.77	145.59	-589.18	65.58	614.63	537.15	77.48	7.933		
2,000.00	1,999.38	1,980.30	1,980.10	7.08	74.77	145.66	-589.18	67.15	618.20	536.36	81.84	7.554		
2,100.00	2,099.29	2,080.28	2,080.06	7.44	78.77	145.75	-589.18	68.63	621.77	535.56	86.20	7.213		
2,200.00	2,199.20	2,180.26	2,180.03	7.79	82.77	145.83	-589.18	70.02	625.32	534.76	90.57	6.905		
2,300.00	2,299.12	2,280.17	2,279.93	8.15	86.77	145.92	-589.18	71.36	628.88	533.95	94.92	6.625		
2,400.00	2,399.03	2,380.03	2,379.79	8.51	90.77	146.00	-589.18	72.81	632.44	533.16	99.28	6.370		
2,500.00	2,498.94	2,479.90	2,479.64	8.87	94.77	146.07	-589.18	74.41	636.02	532.38	103.64	6.137		
2,600.00	2,598.86	2,579.79	2,579.52	9.23	98.77	146.12	-589.18	76.12	639.61	531.61	108.00	5.923		
2,700.00	2,698.77	2,679.73	2,679.44	9.59	102.77	146.18	-589.18	77.87	643.20	530.84	112.36	5.725		
2,800.00	2,798.68	2,779.66	2,779.36	9.95	106.77	146.23	-589.18	79.61	646.79	530.07	116.72	5.541		
2,900.00	2,898.60	2,879.59	2,879.27	10.32	110.77	146.28	-589.18	81.36	650.38	529.30	121.08	5.372		
3,000.00	2,998.51	2,979.53	2,979.19	10.68	114.77	146.33	-589.18	83.10	653.97	528.53	125.44	5.213		
3,100.00	3,098.42	3,079.46	3,079.11	11.04	118.77	146.38	-589.18	84.84	657.56	527.76	129.80	5.066		
3,200.00	3,198.34	3,179.40	3,179.03	11.40	122.78	146.43	-589.18	86.59	661.16	527.00	134.16	4.928 ES		
3,300.00	3,298.25	3,254.00	3,253.62	11.76	125.76	146.46	-589.18	87.89	665.23	527.83	137.40	4.842 SF		
3,400.00	3,398.16	3,254.00	3,253.62	12.12	125.76	146.46	-589.18	87.89	679.98	544.49	135.50	5.018		
3,500.00	3,498.08	3,254.00	3,253.62	12.48	125.76	146.46	-589.18	87.89	708.67	577.59	131.08	5.406		
3,600.00	3,597.99	3,254.00	3,253.62	12.84	125.76	146.46	-589.18	87.89	749.70	624.74	124.97	5.999		
3,700.00	3,697.90	3,254.00	3,253.62	13.20	125.76	146.46	-589.18	87.89	801.18	683.22	117.97	6.792		
3,800.00	3,797.82	3,254.00	3,253.62	13.56	125.76	146.46	-589.18	87.89	861.24	750.50	110.74	7.777		
3,900.00	3,897.73	3,254.00	3,253.62	13.92	125.76	146.46	-589.18	87.89	928.21	824.50	103.71	8.950		
4,000.00	3,997.64	3,254.00	3,253.62	14.28	125.76	146.46	-589.18	87.89	1,000.71	903.58	97.13	10.303		
4,100.00	4,097.56	3,254.00	3,253.62	14.65	125.76	146.46	-589.18	87.89	1,077.61	986.52	91.10	11.829		
4,200.00	4,197.47	3,254.00	3,253.62	15.01	125.76	146.46	-589.18	87.89	1,158.06	1,072.42	85.64	13.523		
4,300.00	4,297.38	3,254.00	3,253.62	15.37	125.76	146.46	-589.18	87.89	1,241.34	1,160.61	80.73	15.376		
4,400.00	4,397.30	3,254.00	3,253.62	15.73	125.76	146.46	-589.18	87.89	1,326.94	1,250.60	76.34	17.382		
4,500.00	4,497.21	3,254.00	3,253.62	16.09	125.76	146.46	-589.18	87.89	1,414.43	1,342.02	72.41	19.533		
4,600.00	4,597.12	3,254.00	3,253.62	16.45	125.76	146.46	-589.18	87.89	1,503.48	1,434.58	68.90	21.821		
4,700.00	4,697.04	3,254.00	3,253.62	16.81	125.76	146.46	-589.18	87.89	1,593.83	1,528.08	65.75	24.241		
4,800.00	4,796.95	3,254.00	3,253.62	17.17	125.76	146.46	-589.18	87.89	1,685.27	1,622.35	62.92	26.783		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	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		Offset Wellbore Centre		Distance		Rule Assigned:		Warning				
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		
4,900.00	4,896.86	3,254.00	3,253.62	17.54	125.76	146.46	-589.18	87.89	1,777.63	1,717.25	60.38	29.441		
5,000.00	4,996.77	3,254.00	3,253.62	17.90	125.76	146.46	-589.18	87.89	1,870.78	1,812.69	58.08	32.208		
5,100.00	5,096.69	3,254.00	3,253.62	18.26	125.76	146.46	-589.18	87.89	1,964.60	1,908.59	56.01	35.075		
5,200.00	5,196.60	3,254.00	3,253.62	18.62	125.76	146.46	-589.18	87.89	2,059.00	2,004.87	54.13	38.037		
5,300.00	5,296.51	3,254.00	3,253.62	18.98	125.76	146.46	-589.18	87.89	2,153.91	2,101.49	52.43	41.085		
5,400.00	5,396.43	3,254.00	3,253.62	19.34	125.76	146.46	-589.18	87.89	2,249.26	2,198.39	50.87	44.212		
5,500.00	5,496.34	3,254.00	3,253.62	19.70	125.76	146.46	-589.18	87.89	2,345.00	2,295.54	49.46	47.412		
5,600.00	5,596.25	3,254.00	3,253.62	20.07	125.76	146.46	-589.18	87.89	2,441.08	2,392.91	48.17	50.678		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 233A - 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:		Warning						
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		
0.00	0.00	0.00	0.00	0.00	0.00	106.12	-391.94	1,355.90	1,411.56					
100.00	100.00	79.82	79.82	0.27	0.14	106.12	-391.89	1,355.90	1,411.40	1,410.99	0.41	3,410.531		
200.00	200.00	180.21	180.21	0.63	0.32	106.11	-391.68	1,355.93	1,411.36	1,410.41	0.95	1,482.310		
300.00	300.00	280.60	280.60	0.99	0.50	106.10	-391.31	1,355.97	1,411.30	1,409.81	1.49	946.902		
400.00	400.00	380.00	380.00	1.35	0.74	106.08	-390.77	1,356.04	1,411.22	1,409.14	2.08	677.652 CC		
407.45	407.45	384.99	384.99	1.37	0.75	106.07	-390.74	1,356.05	1,411.23	1,409.10	2.13	663.495 ES		
500.00	500.00	441.00	440.99	1.70	0.95	106.05	-390.37	1,356.77	1,412.34	1,409.68	2.66	531.480		
600.00	600.00	503.00	502.94	2.06	1.17	106.02	-390.16	1,359.18	1,416.14	1,412.91	3.23	437.969		
700.00	700.00	565.00	564.79	2.42	1.40	105.96	-390.09	1,363.54	1,422.88	1,419.07	3.81	373.600		
800.00	800.00	627.00	626.50	2.78	1.62	105.90	-390.15	1,369.49	1,432.17	1,427.79	4.38	326.817		
900.00	900.00	687.00	686.03	3.14	1.85	105.82	-390.18	1,376.91	1,444.14	1,439.20	4.95	291.949		
1,000.00	1,000.00	750.00	748.28	3.50	2.11	105.70	-389.84	1,386.61	1,458.81	1,453.29	5.52	264.253		
1,100.00	1,100.00	812.00	809.17	3.86	2.37	105.54	-388.71	1,398.23	1,476.22	1,470.13	6.09	242.402		
1,200.00	1,200.00	874.00	869.67	4.21	2.65	105.31	-386.55	1,411.60	1,496.01	1,489.35	6.66	224.647		
1,300.00	1,299.98	951.25	944.63	4.57	3.03	75.14	-382.81	1,429.84	1,517.18	1,509.89	7.30	207.932		
1,319.29	1,319.26	969.99	962.79	4.64	3.12	75.00	-381.77	1,434.38	1,521.26	1,513.82	7.44	204.564		
1,400.00	1,399.90	1,060.50	1,050.50	4.93	3.58	74.73	-376.44	1,456.08	1,538.03	1,529.94	8.09	190.151		
1,500.00	1,499.81	1,168.23	1,155.39	5.29	4.12	74.52	-372.42	1,480.24	1,557.80	1,548.93	8.87	175.568		
1,600.00	1,599.72	1,248.97	1,234.12	5.64	4.53	74.45	-371.63	1,498.15	1,578.02	1,568.49	9.53	165.614		
1,700.00	1,699.64	1,352.67	1,334.98	6.00	5.07	74.32	-369.67	1,522.16	1,598.98	1,588.68	10.30	155.305		
1,800.00	1,799.55	1,470.39	1,449.80	6.36	5.67	74.15	-366.45	1,547.93	1,618.44	1,607.31	11.13	145.380		
1,900.00	1,899.46	1,579.89	1,556.73	6.72	6.22	73.98	-362.80	1,571.24	1,637.24	1,625.31	11.93	137.221		
2,000.00	1,999.38	1,666.24	1,641.14	7.08	6.66	73.89	-360.99	1,589.36	1,656.06	1,643.44	12.62	131.254		
2,100.00	2,099.29	1,746.00	1,718.88	7.44	7.07	73.79	-359.06	1,607.06	1,675.96	1,662.69	13.27	126.272		
2,200.00	2,199.20	1,834.93	1,805.34	7.79	7.54	73.64	-355.86	1,627.62	1,696.54	1,682.56	13.98	121.375		
2,300.00	2,299.12	1,984.48	1,951.32	8.15	8.31	73.42	-350.75	1,659.61	1,715.23	1,700.25	14.98	114.515		
2,400.00	2,399.03	2,058.00	2,023.35	8.51	8.67	73.40	-350.43	1,674.35	1,733.60	1,718.01	15.60	111.157		
2,500.00	2,498.94	2,130.93	2,094.59	8.87	9.04	73.39	-350.87	1,689.97	1,753.50	1,737.29	16.21	108.191		
2,600.00	2,598.86	2,219.05	2,180.35	9.23	9.51	73.36	-351.09	1,710.19	1,774.74	1,757.85	16.90	105.032		
2,700.00	2,698.77	2,317.24	2,275.83	9.59	10.03	73.26	-349.21	1,733.00	1,795.82	1,778.17	17.65	101.773		
2,800.00	2,798.68	2,445.40	2,400.75	9.95	10.70	73.16	-347.27	1,761.57	1,816.00	1,797.46	18.54	97.929		
2,900.00	2,898.60	2,523.81	2,477.25	10.32	11.11	73.10	-346.24	1,778.70	1,835.92	1,816.74	19.19	95.687		
3,000.00	2,998.51	2,603.59	2,554.80	10.68	11.54	73.02	-344.38	1,797.32	1,857.04	1,837.20	19.84	93.603		
3,100.00	3,098.42	2,742.77	2,690.05	11.04	12.29	72.82	-339.75	1,829.85	1,878.14	1,857.33	20.81	90.256		
3,200.00	3,198.34	3,103.22	3,046.27	11.40	13.83	72.72	-333.16	1,882.09	1,890.57	1,867.93	22.64	83.508		
3,300.00	3,298.25	3,147.01	3,089.92	11.76	13.98	72.73	-332.44	1,885.36	1,897.13	1,873.97	23.16	81.919		
3,400.00	3,398.16	3,147.01	3,089.92	12.12	13.98	72.73	-332.44	1,885.36	1,908.41	1,884.93	23.48	81.271		
3,500.00	3,498.08	3,147.01	3,089.92	12.48	13.98	72.73	-332.44	1,885.36	1,924.83	1,901.08	23.75	81.050 SF		
3,600.00	3,597.99	3,147.01	3,089.92	12.84	13.98	72.73	-332.44	1,885.36	1,946.25	1,922.29	23.96	81.231		
3,700.00	3,697.90	3,147.01	3,089.92	13.20	13.98	72.73	-332.44	1,885.36	1,972.51	1,948.39	24.12	81.788		
3,800.00	3,797.82	3,147.01	3,089.92	13.56	13.98	72.73	-332.44	1,885.36	2,003.43	1,979.20	24.23	82.698		
3,900.00	3,897.73	3,147.01	3,089.92	13.92	13.98	72.73	-332.44	1,885.36	2,038.79	2,014.50	24.29	83.939		
4,000.00	3,997.64	3,147.01	3,089.92	14.28	13.98	72.73	-332.44	1,885.36	2,078.36	2,054.05	24.31	85.487		
4,100.00	4,097.56	3,147.01	3,089.92	14.65	13.98	72.73	-332.44	1,885.36	2,121.91	2,097.61	24.30	87.322		
4,200.00	4,197.47	3,147.01	3,089.92	15.01	13.98	72.73	-332.44	1,885.36	2,169.20	2,144.94	24.26	89.423		
4,300.00	4,297.38	3,147.01	3,089.92	15.37	13.98	72.73	-332.44	1,885.36	2,219.99	2,195.80	24.19	91.770		
4,400.00	4,397.30	3,147.01	3,089.92	15.73	13.98	72.73	-332.44	1,885.36	2,274.04	2,249.94	24.10	94.342		
4,500.00	4,497.21	3,147.01	3,089.92	16.09	13.98	72.73	-332.44	1,885.36	2,331.14	2,307.13	24.00	97.123		
4,600.00	4,597.12	3,147.01	3,089.92	16.45	13.98	72.73	-332.44	1,885.36	2,391.05	2,367.16	23.89	100.092		
4,700.00	4,697.04	3,147.01	3,089.92	16.81	13.98	72.73	-332.44	1,885.36	2,453.58	2,429.81	23.77	103.234		



Lonestar Consulting, LLC
Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 23C - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 100-INCLINOMETER													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Distance		Minimum	Separation	Warning		
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)	Separation (ft)	Factor		
7,300.00	7,008.70	6,990.63	6,989.21	29.06	212.29	54.13	-255.71	3,105.54	2,487.90	2,250.36	237.53	10.474		
7,350.00	7,013.19	6,995.11	6,993.70	29.83	212.42	74.20	-255.71	3,105.54	2,438.89	2,201.15	237.73	10.259		
7,381.86	7,014.00	6,995.93	6,994.51	30.35	212.45	89.82	-255.71	3,105.54	2,407.53	2,169.73	237.80	10.124		
7,400.00	7,014.01	6,995.94	6,994.52	30.65	212.45	89.82	-255.71	3,105.54	2,389.68	2,151.86	237.82	10.048		
7,500.00	7,014.07	6,995.99	6,994.58	32.44	212.45	89.83	-255.71	3,105.54	2,291.34	2,053.38	237.96	9.629		
7,600.00	7,014.13	6,996.05	6,994.64	34.39	212.45	89.83	-255.71	3,105.54	2,193.15	1,955.01	238.14	9.210		
7,700.00	7,014.18	6,996.11	6,994.70	36.50	212.46	89.84	-255.71	3,105.54	2,095.13	1,856.78	238.35	8.790		
7,800.00	7,014.24	6,996.17	6,994.75	38.73	212.46	89.85	-255.71	3,105.54	1,997.31	1,758.70	238.62	8.370		
7,900.00	7,014.30	6,996.22	6,994.81	41.06	212.46	89.86	-255.71	3,105.54	1,899.72	1,660.78	238.94	7.951		
8,000.00	7,014.35	6,996.28	6,994.87	43.47	212.46	89.86	-255.71	3,105.54	1,802.38	1,563.05	239.33	7.531		
8,100.00	7,014.41	6,996.34	6,994.93	45.97	212.46	89.87	-255.71	3,105.54	1,705.36	1,465.54	239.82	7.111		
8,200.00	7,014.47	6,996.40	6,994.98	48.52	212.46	89.88	-255.71	3,105.54	1,608.70	1,368.29	240.41	6.691		
8,300.00	7,014.53	6,996.45	6,995.04	51.12	212.47	89.89	-255.71	3,105.54	1,512.48	1,271.34	241.14	6.272		
8,400.00	7,014.58	6,996.51	6,995.10	53.77	212.47	89.90	-255.71	3,105.54	1,416.78	1,174.74	242.04	5.854		
8,500.00	7,014.64	6,996.57	6,995.15	56.46	212.47	89.90	-255.71	3,105.54	1,321.71	1,078.56	243.15	5.436		
8,600.00	7,014.70	6,996.63	6,995.21	59.18	212.47	89.91	-255.71	3,105.54	1,227.43	982.90	244.53	5.020		
8,700.00	7,014.76	6,996.68	6,995.27	61.93	212.47	89.92	-255.71	3,105.54	1,134.14	887.89	246.25	4.606		
8,800.00	7,014.81	6,996.74	6,995.33	64.70	212.47	89.93	-255.71	3,105.54	1,042.08	793.69	248.39	4.195		
8,900.00	7,014.87	6,996.80	6,995.38	67.50	212.48	89.93	-255.71	3,105.54	951.63	700.55	251.08	3.790		
9,000.00	7,014.93	6,996.85	6,995.44	70.32	212.48	89.94	-255.71	3,105.54	863.29	608.83	254.45	3.393		
9,100.00	7,014.99	6,996.91	6,995.50	73.15	212.48	89.95	-255.71	3,105.54	777.77	519.09	258.69	3.007		
9,200.00	7,015.04	6,996.97	6,995.56	76.00	212.48	89.96	-255.71	3,105.54	696.13	432.15	263.98	2.637		
9,300.00	7,015.10	6,997.03	6,995.61	78.86	212.48	89.97	-255.71	3,105.54	619.89	349.38	270.51	2.292		
9,400.00	7,015.16	6,997.08	6,995.67	81.74	212.48	89.97	-255.71	3,105.54	551.30	272.97	278.33	1.981		
9,500.00	7,015.22	6,997.14	6,995.73	84.62	212.49	89.98	-255.71	3,105.54	493.56	206.44	287.12	1.719		
9,600.00	7,015.27	6,997.20	6,995.79	87.52	212.49	89.99	-255.71	3,105.54	450.85	155.05	295.81	1.524		
9,700.00	7,015.33	6,997.26	6,995.84	90.42	212.49	90.00	-255.71	3,105.54	427.71	125.25	302.46	1.414	Level 3	
9,751.67	7,015.36	6,997.29	6,995.87	91.93	212.49	90.00	-255.71	3,105.54	424.58	120.17	304.41	1.395	Level 3, CC, ES, SF	
9,800.00	7,015.39	6,997.31	6,995.90	93.34	212.49	90.00	-255.71	3,105.54	427.32	122.22	305.10	1.401	Level 3	
9,900.00	7,015.45	6,997.37	6,995.96	96.26	212.49	90.01	-255.71	3,105.54	449.75	146.47	303.27	1.483	Level 3	
10,000.00	7,015.50	6,997.43	6,996.02	99.18	212.50	90.02	-255.71	3,105.54	491.87	193.52	298.35	1.649		
10,100.00	7,015.56	6,997.49	6,996.07	102.12	212.50	90.03	-255.71	3,105.54	549.19	256.99	292.19	1.880		
10,200.00	7,015.62	6,997.54	6,996.13	105.05	212.50	90.03	-255.71	3,105.54	617.47	331.40	286.07	2.158		
10,300.00	7,015.67	6,997.60	6,996.19	108.00	212.50	90.04	-255.71	3,105.54	693.50	412.94	280.56	2.472		
10,400.00	7,015.73	6,997.66	6,996.24	110.95	212.50	90.05	-255.71	3,105.54	774.99	499.17	275.82	2.810		
10,500.00	7,015.79	6,997.72	6,996.30	113.90	212.50	90.06	-255.71	3,105.54	860.39	588.57	271.82	3.165		
10,600.00	7,015.85	6,997.77	6,996.36	116.86	212.51	90.07	-255.71	3,105.54	948.65	680.19	268.46	3.534		
10,700.00	7,015.90	6,997.83	6,996.42	119.82	212.51	90.07	-255.71	3,105.54	1,039.04	773.41	265.63	3.912		
10,800.00	7,015.96	6,997.89	6,996.47	122.78	212.51	90.08	-255.71	3,105.54	1,131.05	867.81	263.25	4.297		
10,900.00	7,016.02	6,997.95	6,996.53	125.75	212.51	90.09	-255.71	3,105.54	1,224.31	963.10	261.22	4.687		
11,000.00	7,016.08	6,998.00	6,996.59	128.72	212.51	90.10	-255.71	3,105.54	1,318.56	1,059.08	259.49	5.081		
11,100.00	7,016.13	6,998.06	6,996.65	131.69	212.51	90.10	-255.71	3,105.54	1,413.61	1,155.61	257.99	5.479		
11,200.00	7,016.19	6,998.12	6,996.70	134.67	212.52	90.11	-255.71	3,105.54	1,509.29	1,252.58	256.70	5.880		
11,300.00	7,016.25	6,998.17	6,996.76	137.64	212.52	90.12	-255.71	3,105.54	1,605.50	1,349.92	255.58	6.282		
11,400.00	7,016.31	6,998.23	6,996.82	140.62	212.52	90.13	-255.71	3,105.54	1,702.14	1,447.55	254.59	6.686		
11,500.00	7,016.36	6,998.29	6,996.88	143.61	212.52	90.14	-255.71	3,105.54	1,799.15	1,545.42	253.73	7.091		
11,600.00	7,016.42	6,998.35	6,996.93	146.59	212.52	90.14	-255.71	3,105.54	1,896.47	1,643.51	252.96	7.497		
11,700.00	7,016.48	6,998.40	6,996.99	149.58	212.52	90.15	-255.71	3,105.54	1,994.06	1,741.78	252.28	7.904		
11,800.00	7,016.54	6,998.46	6,997.05	152.56	212.53	90.16	-255.71	3,105.54	2,091.88	1,840.20	251.68	8.312		
11,900.00	7,016.59	6,998.52	6,997.11	155.55	212.53	90.17	-255.71	3,105.54	2,189.89	1,938.75	251.14	8.720		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	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 #5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit 23C - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 100-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		
12,000.00	7,016.65	6,998.58	6,997.16	158.55	212.53	90.17	-255.71	3,105.54	2,288.07	2,037.42	250.65	9.128		
12,100.00	7,016.71	6,998.63	6,997.22	161.54	212.53	90.18	-255.71	3,105.54	2,386.41	2,136.19	250.22	9.537		
12,200.00	7,016.76	6,998.69	6,997.28	164.53	212.53	90.19	-255.71	3,105.54	2,484.88	2,235.06	249.82	9.947		



Lonestar Consulting, LLC

Anticollision Report

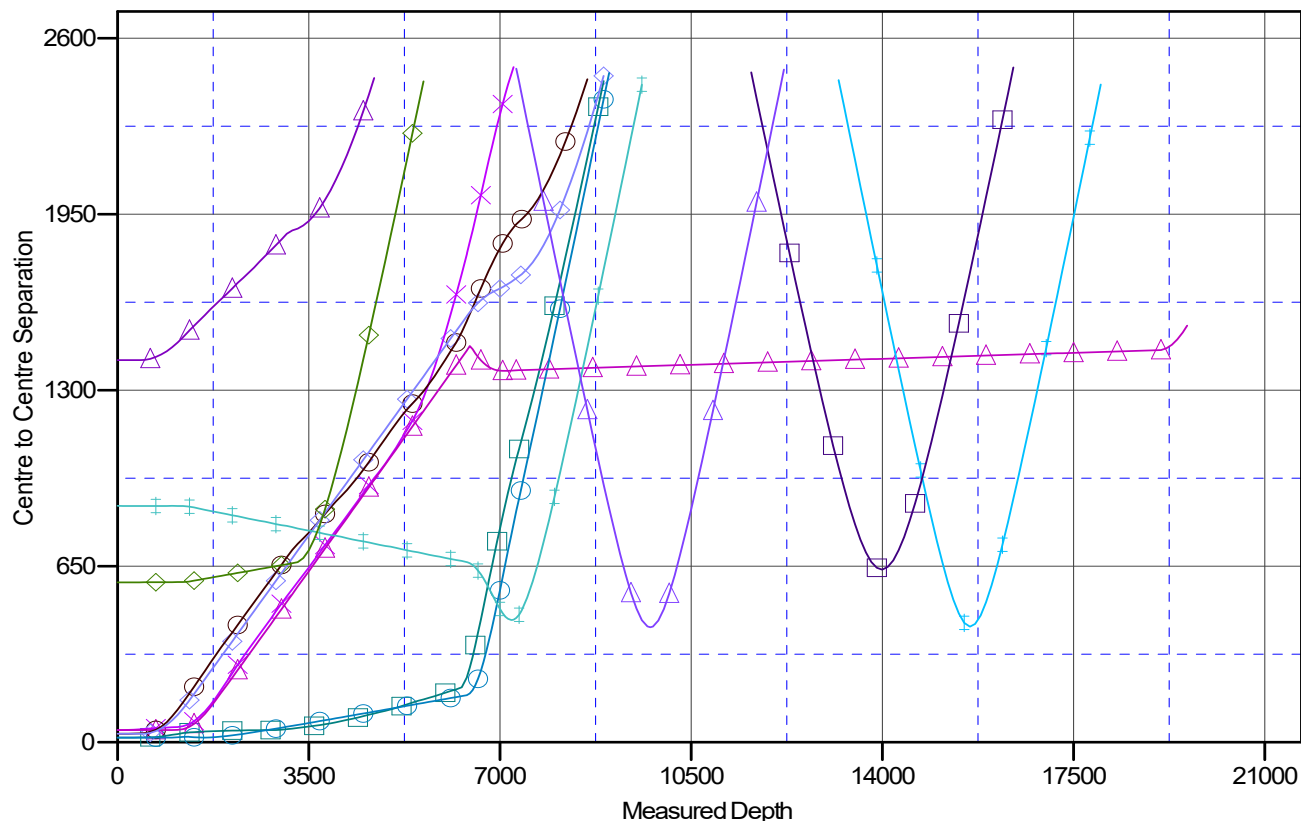


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #662H	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 #5	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 #662H - Slot B2 (662H)
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.26°

Ladder Plot



LEGEND

Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0
Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0
Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0
Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0	Rosa Unit#658H OH/OH V0



Lonestar Consulting, LLC

Anticollision Report

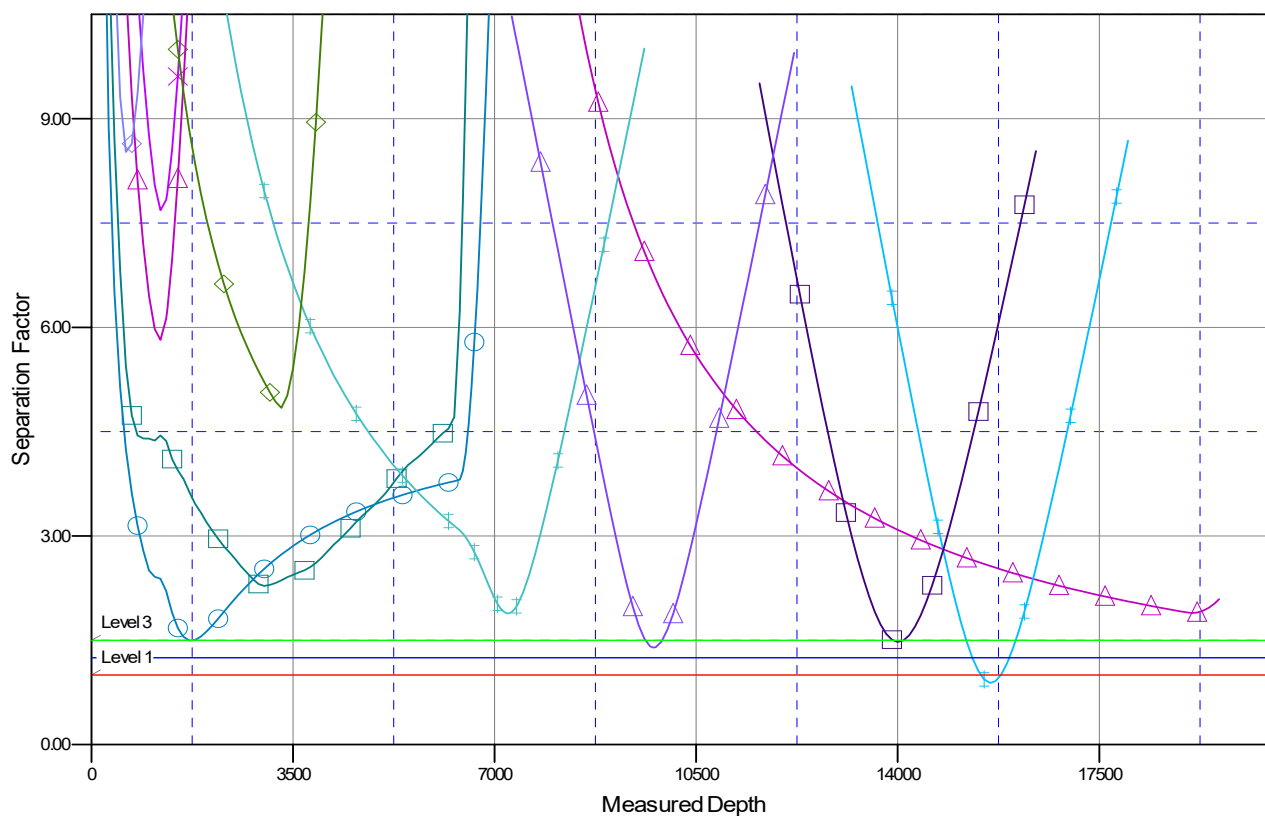


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Reference Site:	Rosa Unit 30	MD Reference:	GL 6394' & RKB 24.5' @ 6418.50ft (Ensign T223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #662H	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 #5	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 #662H - Slot B2 (662H)
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.26°

Separation Factor Plot



LEGEND

Rosa Unit#658H OH/OH V0	Rosa Unit#665H OH/OH V0	Rosa Unit#668H OH/OH V0
Rosa Unit#658H OH/Plan#4 V0	Rosa Unit#665H OH/Plan#10 V0	Rosa Unit#233 OH/OH V0
Rosa Unit#664H OH/OH V0	Rosa Unit#146B OH/OH V0	Rosa Unit#233A OH/OH V0
Rosa Unit#664H OH/Plan#5 V0	Rosa Unit#15A OH/OH V0	Rosa Unit#233C OH/OH V0

Released to Imaging: 6/28/2022 3:4:28 PM



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Rosa Unit 30
Well: Rosa Unit #662H
Wellbore: OH
Design: Plan #5

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



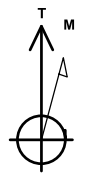
WELL DETAILS: Rosa Unit #662H

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

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2136165.14	2848512.74	36.8696679	-107.4045529 B2 (662H)

Plan: Plan #5 (Rosa Unit #662H/OH)

Created By: Janie Collins Date: 10:44, June 03 2022



Azimuths to True North
Magnetic North: 8

Magnetic Field
Strength: 49578
Dip Angle: 63.8
Date: 5/20/2022
Model: HDGM2022

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
662H POE Rev 2	7014.00	200.38	741.60	2136368.85	2849253.44	36.8702183	-107.4020176
662H BHL Rev 2	7021.00	37.97	12940.40	2136261.21	2861452.82	36.8697640	-107.3603140
662H FPerf	7021.00	39.38	12840.65	2136262.17	2861353.07	36.8697680	-107.3606550

SECTION DETAILS

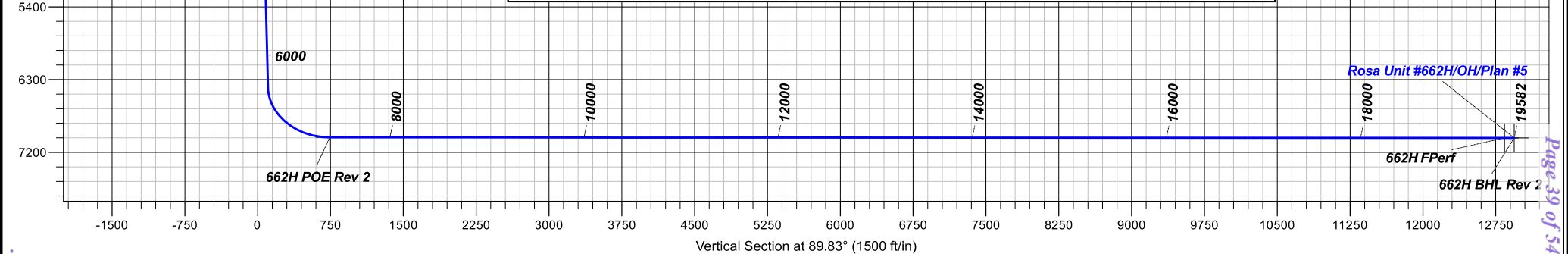
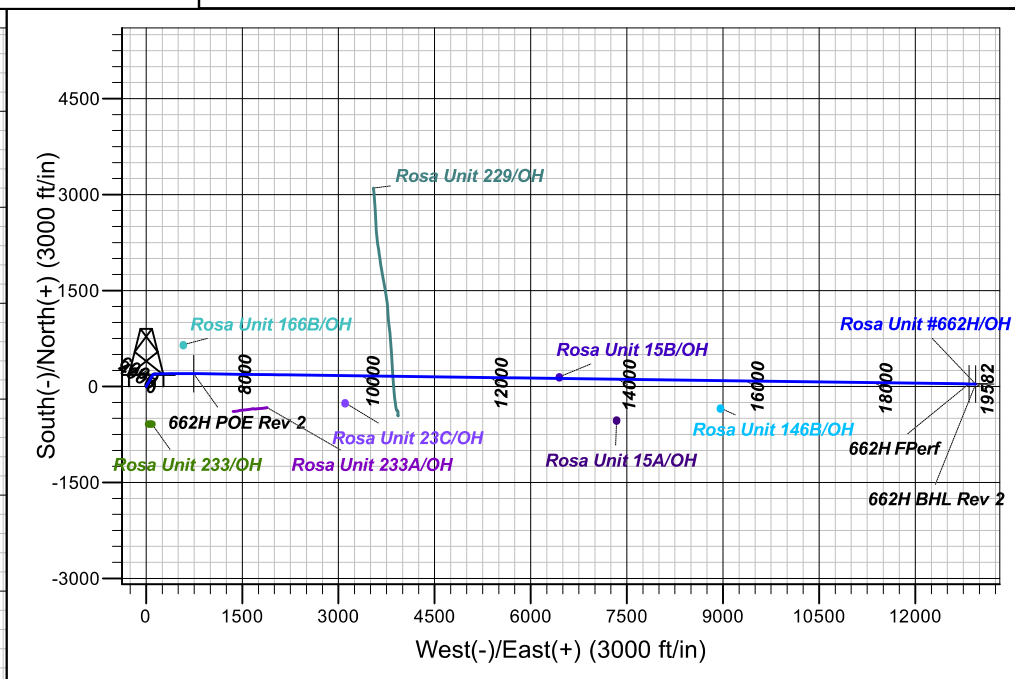
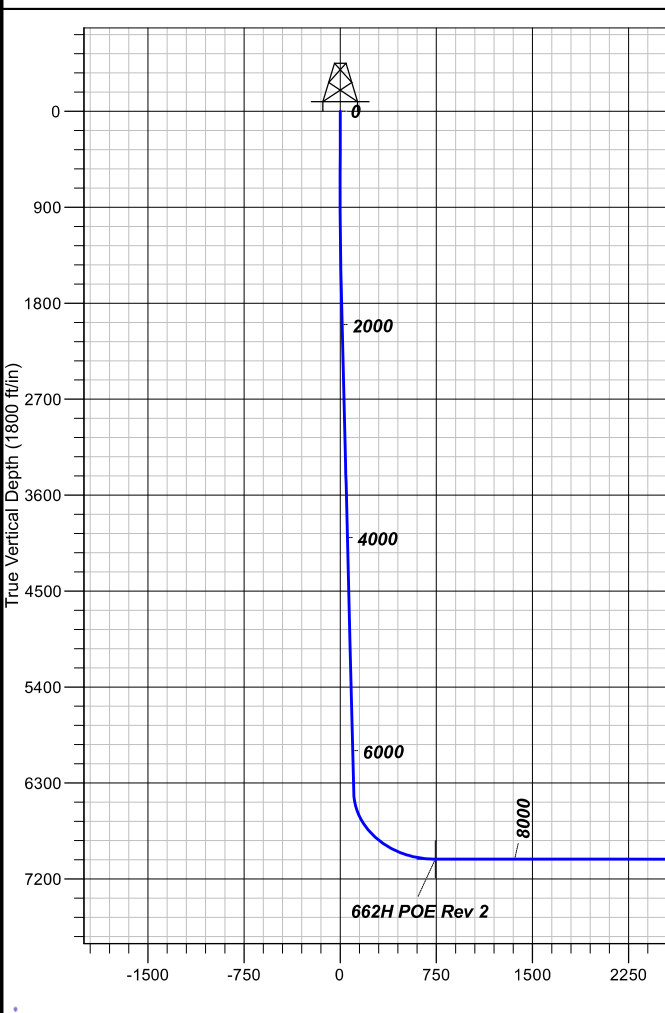
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00
1319.29	2.39	29.49	1319.26	2.16	1.22	2.00	29.49	1.23
6394.97	2.39	29.49	6390.53	186.09	105.23	0.00	0.00	105.77
7381.86	89.97	90.76	7014.00	200.38	741.60	9.00	61.30	742.19
19581.75	89.97	90.76	7021.00	37.97	12940.40	0.00	0.00	12940.46

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
2523.00	2524.08	Ojo Alamo
2651.00	2652.19	Kirtland
3098.00	3099.58	Fruitland
3436.00	3437.87	Pictured Cliffs
3535.00	3536.96	Lewis
4622.00	4624.90	Chacra
5449.00	5452.62	Cliff House
5494.00	5497.66	Menefee
5683.00	5686.82	Point Lookout
6185.00	6189.26	Mancos



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Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 30

Rosa Unit #662H - Slot B2 (662H)

OH

Plan: Plan #5

Standard Planning Report

03 June, 2022





Lonestar Consulting, LLC Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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 #662H - Slot B2 (662H)					
Well Position	+N/-S	0.00 ft	Northing:	2,136,165.13 usft	Latitude:	36.8696679
	+E/-W	0.00 ft	Easting:	2,848,512.75 usft	Longitude:	-107.4045529
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)
	HDGM2022	5/20/2022	8.60	63.32	49,578.40000000

Design	Plan #5			
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	89.83

Plan Survey Tool Program	Date	6/3/2022		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	19,581.75 Plan #5 (OH)	MWD+HDGM	
			OWSG MWD + HDGM	

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,319.29	2.39	29.49	1,319.26	2.16	1.22	2.00	2.00	0.00	29.49	
6,394.97	2.39	29.49	6,390.53	186.09	105.23	0.00	0.00	0.00	0.00	
7,381.86	89.97	90.76	7,014.00	200.38	741.60	9.00	8.87	6.21	61.30	662H POE Rev 2
19,581.75	89.97	90.76	7,021.00	37.97	12,940.40	0.00	0.00	0.00	0.00	662H BHL Rev 2



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	2.00	29.49	1,299.98	1.52	0.86	0.86	2.00	2.00	0.00	
1,319.29	2.39	29.49	1,319.26	2.16	1.22	1.23	2.00	2.00	0.00	
1,400.00	2.39	29.49	1,399.90	5.09	2.88	2.89	0.00	0.00	0.00	
1,500.00	2.39	29.49	1,499.81	8.71	4.93	4.95	0.00	0.00	0.00	
1,600.00	2.39	29.49	1,599.72	12.33	6.97	7.01	0.00	0.00	0.00	
1,700.00	2.39	29.49	1,699.64	15.96	9.02	9.07	0.00	0.00	0.00	
1,800.00	2.39	29.49	1,799.55	19.58	11.07	11.13	0.00	0.00	0.00	
1,900.00	2.39	29.49	1,899.46	23.20	13.12	13.19	0.00	0.00	0.00	
2,000.00	2.39	29.49	1,999.38	26.83	15.17	15.25	0.00	0.00	0.00	
2,100.00	2.39	29.49	2,099.29	30.45	17.22	17.31	0.00	0.00	0.00	
2,200.00	2.39	29.49	2,199.20	34.08	19.27	19.37	0.00	0.00	0.00	
2,300.00	2.39	29.49	2,299.12	37.70	21.32	21.43	0.00	0.00	0.00	
2,400.00	2.39	29.49	2,399.03	41.32	23.37	23.49	0.00	0.00	0.00	
2,500.00	2.39	29.49	2,498.94	44.95	25.42	25.55	0.00	0.00	0.00	
2,600.00	2.39	29.49	2,598.86	48.57	27.47	27.61	0.00	0.00	0.00	
2,700.00	2.39	29.49	2,698.77	52.19	29.51	29.67	0.00	0.00	0.00	
2,800.00	2.39	29.49	2,798.68	55.82	31.56	31.73	0.00	0.00	0.00	
2,900.00	2.39	29.49	2,898.60	59.44	33.61	33.79	0.00	0.00	0.00	
3,000.00	2.39	29.49	2,998.51	63.06	35.66	35.85	0.00	0.00	0.00	
3,100.00	2.39	29.49	3,098.42	66.69	37.71	37.91	0.00	0.00	0.00	
3,200.00	2.39	29.49	3,198.34	70.31	39.76	39.97	0.00	0.00	0.00	
3,300.00	2.39	29.49	3,298.25	73.94	41.81	42.03	0.00	0.00	0.00	
3,400.00	2.39	29.49	3,398.16	77.56	43.86	44.09	0.00	0.00	0.00	
3,500.00	2.39	29.49	3,498.08	81.18	45.91	46.15	0.00	0.00	0.00	
3,600.00	2.39	29.49	3,597.99	84.81	47.96	48.21	0.00	0.00	0.00	
3,700.00	2.39	29.49	3,697.90	88.43	50.01	50.26	0.00	0.00	0.00	
3,800.00	2.39	29.49	3,797.82	92.05	52.05	52.32	0.00	0.00	0.00	
3,900.00	2.39	29.49	3,897.73	95.68	54.10	54.38	0.00	0.00	0.00	
4,000.00	2.39	29.49	3,997.64	99.30	56.15	56.44	0.00	0.00	0.00	
4,100.00	2.39	29.49	4,097.56	102.93	58.20	58.50	0.00	0.00	0.00	
4,200.00	2.39	29.49	4,197.47	106.55	60.25	60.56	0.00	0.00	0.00	
4,300.00	2.39	29.49	4,297.38	110.17	62.30	62.62	0.00	0.00	0.00	
4,400.00	2.39	29.49	4,397.30	113.80	64.35	64.68	0.00	0.00	0.00	
4,500.00	2.39	29.49	4,497.21	117.42	66.40	66.74	0.00	0.00	0.00	
4,600.00	2.39	29.49	4,597.12	121.04	68.45	68.80	0.00	0.00	0.00	
4,700.00	2.39	29.49	4,697.04	124.67	70.50	70.86	0.00	0.00	0.00	
4,800.00	2.39	29.49	4,796.95	128.29	72.55	72.92	0.00	0.00	0.00	
4,900.00	2.39	29.49	4,896.86	131.91	74.59	74.98	0.00	0.00	0.00	
5,000.00	2.39	29.49	4,996.77	135.54	76.64	77.04	0.00	0.00	0.00	



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)	
5,100.00	2.39	29.49	5,096.69	139.16	78.69	79.10	0.00	0.00	0.00	
5,200.00	2.39	29.49	5,196.60	142.79	80.74	81.16	0.00	0.00	0.00	
5,300.00	2.39	29.49	5,296.51	146.41	82.79	83.22	0.00	0.00	0.00	
5,400.00	2.39	29.49	5,396.43	150.03	84.84	85.28	0.00	0.00	0.00	
5,500.00	2.39	29.49	5,496.34	153.66	86.89	87.34	0.00	0.00	0.00	
5,600.00	2.39	29.49	5,596.25	157.28	88.94	89.40	0.00	0.00	0.00	
5,700.00	2.39	29.49	5,696.17	160.90	90.99	91.46	0.00	0.00	0.00	
5,800.00	2.39	29.49	5,796.08	164.53	93.04	93.52	0.00	0.00	0.00	
5,900.00	2.39	29.49	5,895.99	168.15	95.09	95.58	0.00	0.00	0.00	
6,000.00	2.39	29.49	5,995.91	171.77	97.14	97.64	0.00	0.00	0.00	
6,100.00	2.39	29.49	6,095.82	175.40	99.18	99.70	0.00	0.00	0.00	
6,200.00	2.39	29.49	6,195.73	179.02	101.23	101.76	0.00	0.00	0.00	
6,300.00	2.39	29.49	6,295.65	182.65	103.28	103.82	0.00	0.00	0.00	
6,394.97	2.39	29.49	6,390.53	186.09	105.23	105.77	0.00	0.00	0.00	
6,400.00	2.63	38.17	6,395.56	186.27	105.35	105.90	9.00	4.92	172.46	
6,500.00	10.80	79.72	6,494.83	189.75	116.01	116.57	9.00	8.17	41.56	
6,600.00	19.71	84.91	6,591.21	192.93	142.08	142.65	9.00	8.90	5.19	
6,700.00	28.67	86.93	6,682.34	195.71	182.91	183.48	9.00	8.96	2.02	
6,800.00	37.65	88.05	6,765.97	198.04	237.50	238.08	9.00	8.98	1.12	
6,900.00	46.64	88.79	6,840.04	199.86	304.50	305.09	9.00	8.99	0.74	
7,000.00	55.63	89.33	6,902.73	201.11	382.27	382.86	9.00	8.99	0.55	
7,100.00	64.62	89.77	6,952.50	201.77	468.89	469.48	9.00	8.99	0.44	
7,200.00	73.61	90.15	6,988.11	201.83	562.22	562.81	9.00	8.99	0.38	
7,300.00	82.60	90.49	7,008.70	201.28	659.97	660.56	9.00	8.99	0.34	
7,381.86	89.97	90.76	7,014.00	200.38	741.60	742.19	9.00	8.99	0.33	
7,400.00	89.97	90.76	7,014.01	200.14	759.74	760.32	0.00	0.00	0.00	
7,500.00	89.97	90.76	7,014.07	198.81	859.73	860.31	0.00	0.00	0.00	
7,600.00	89.97	90.76	7,014.13	197.48	959.72	960.29	0.00	0.00	0.00	
7,700.00	89.97	90.76	7,014.18	196.15	1,059.71	1,060.28	0.00	0.00	0.00	
7,800.00	89.97	90.76	7,014.24	194.82	1,159.70	1,160.27	0.00	0.00	0.00	
7,900.00	89.97	90.76	7,014.30	193.49	1,259.69	1,260.25	0.00	0.00	0.00	
8,000.00	89.97	90.76	7,014.35	192.15	1,359.68	1,360.24	0.00	0.00	0.00	
8,100.00	89.97	90.76	7,014.41	190.82	1,459.67	1,460.23	0.00	0.00	0.00	
8,200.00	89.97	90.76	7,014.47	189.49	1,559.67	1,560.21	0.00	0.00	0.00	
8,300.00	89.97	90.76	7,014.53	188.16	1,659.66	1,660.20	0.00	0.00	0.00	
8,400.00	89.97	90.76	7,014.58	186.83	1,759.65	1,760.19	0.00	0.00	0.00	
8,500.00	89.97	90.76	7,014.64	185.50	1,859.64	1,860.18	0.00	0.00	0.00	
8,600.00	89.97	90.76	7,014.70	184.17	1,959.63	1,960.16	0.00	0.00	0.00	
8,700.00	89.97	90.76	7,014.76	182.84	2,059.62	2,060.15	0.00	0.00	0.00	
8,800.00	89.97	90.76	7,014.81	181.50	2,159.61	2,160.14	0.00	0.00	0.00	
8,900.00	89.97	90.76	7,014.87	180.17	2,259.60	2,260.12	0.00	0.00	0.00	
9,000.00	89.97	90.76	7,014.93	178.84	2,359.59	2,360.11	0.00	0.00	0.00	
9,100.00	89.97	90.76	7,014.99	177.51	2,459.59	2,460.10	0.00	0.00	0.00	
9,200.00	89.97	90.76	7,015.04	176.18	2,559.58	2,560.08	0.00	0.00	0.00	
9,300.00	89.97	90.76	7,015.10	174.85	2,659.57	2,660.07	0.00	0.00	0.00	
9,400.00	89.97	90.76	7,015.16	173.52	2,759.56	2,760.06	0.00	0.00	0.00	
9,500.00	89.97	90.76	7,015.22	172.19	2,859.55	2,860.04	0.00	0.00	0.00	
9,600.00	89.97	90.76	7,015.27	170.85	2,959.54	2,960.03	0.00	0.00	0.00	
9,700.00	89.97	90.76	7,015.33	169.52	3,059.53	3,060.02	0.00	0.00	0.00	
9,800.00	89.97	90.76	7,015.39	168.19	3,159.52	3,160.00	0.00	0.00	0.00	
9,900.00	89.97	90.76	7,015.45	166.86	3,259.51	3,259.99	0.00	0.00	0.00	
10,000.00	89.97	90.76	7,015.50	165.53	3,359.51	3,359.98	0.00	0.00	0.00	



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
10,100.00	89.97	90.76	7,015.56	164.20	3,459.50	3,459.96	0.00	0.00	0.00	
10,200.00	89.97	90.76	7,015.62	162.87	3,559.49	3,559.95	0.00	0.00	0.00	
10,300.00	89.97	90.76	7,015.67	161.53	3,659.48	3,659.94	0.00	0.00	0.00	
10,400.00	89.97	90.76	7,015.73	160.20	3,759.47	3,759.92	0.00	0.00	0.00	
10,500.00	89.97	90.76	7,015.79	158.87	3,859.46	3,859.91	0.00	0.00	0.00	
10,600.00	89.97	90.76	7,015.85	157.54	3,959.45	3,959.90	0.00	0.00	0.00	
10,700.00	89.97	90.76	7,015.90	156.21	4,059.44	4,059.88	0.00	0.00	0.00	
10,800.00	89.97	90.76	7,015.96	154.88	4,159.43	4,159.87	0.00	0.00	0.00	
10,900.00	89.97	90.76	7,016.02	153.55	4,259.43	4,259.86	0.00	0.00	0.00	
11,000.00	89.97	90.76	7,016.08	152.22	4,359.42	4,359.84	0.00	0.00	0.00	
11,100.00	89.97	90.76	7,016.13	150.88	4,459.41	4,459.83	0.00	0.00	0.00	
11,200.00	89.97	90.76	7,016.19	149.55	4,559.40	4,559.82	0.00	0.00	0.00	
11,300.00	89.97	90.76	7,016.25	148.22	4,659.39	4,659.81	0.00	0.00	0.00	
11,400.00	89.97	90.76	7,016.31	146.89	4,759.38	4,759.79	0.00	0.00	0.00	
11,500.00	89.97	90.76	7,016.36	145.56	4,859.37	4,859.78	0.00	0.00	0.00	
11,600.00	89.97	90.76	7,016.42	144.23	4,959.36	4,959.77	0.00	0.00	0.00	
11,700.00	89.97	90.76	7,016.48	142.90	5,059.35	5,059.75	0.00	0.00	0.00	
11,800.00	89.97	90.76	7,016.54	141.57	5,159.35	5,159.74	0.00	0.00	0.00	
11,900.00	89.97	90.76	7,016.59	140.23	5,259.34	5,259.73	0.00	0.00	0.00	
12,000.00	89.97	90.76	7,016.65	138.90	5,359.33	5,359.71	0.00	0.00	0.00	
12,100.00	89.97	90.76	7,016.71	137.57	5,459.32	5,459.70	0.00	0.00	0.00	
12,200.00	89.97	90.76	7,016.76	136.24	5,559.31	5,559.69	0.00	0.00	0.00	
12,300.00	89.97	90.76	7,016.82	134.91	5,659.30	5,659.67	0.00	0.00	0.00	
12,400.00	89.97	90.76	7,016.88	133.58	5,759.29	5,759.66	0.00	0.00	0.00	
12,500.00	89.97	90.76	7,016.94	132.25	5,859.28	5,859.65	0.00	0.00	0.00	
12,600.00	89.97	90.76	7,016.99	130.92	5,959.27	5,959.63	0.00	0.00	0.00	
12,700.00	89.97	90.76	7,017.05	129.58	6,059.27	6,059.62	0.00	0.00	0.00	
12,800.00	89.97	90.76	7,017.11	128.25	6,159.26	6,159.61	0.00	0.00	0.00	
12,900.00	89.97	90.76	7,017.17	126.92	6,259.25	6,259.59	0.00	0.00	0.00	
13,000.00	89.97	90.76	7,017.22	125.59	6,359.24	6,359.58	0.00	0.00	0.00	
13,100.00	89.97	90.76	7,017.28	124.26	6,459.23	6,459.57	0.00	0.00	0.00	
13,200.00	89.97	90.76	7,017.34	122.93	6,559.22	6,559.55	0.00	0.00	0.00	
13,300.00	89.97	90.76	7,017.40	121.60	6,659.21	6,659.54	0.00	0.00	0.00	
13,400.00	89.97	90.76	7,017.45	120.26	6,759.20	6,759.53	0.00	0.00	0.00	
13,500.00	89.97	90.76	7,017.51	118.93	6,859.19	6,859.51	0.00	0.00	0.00	
13,600.00	89.97	90.76	7,017.57	117.60	6,959.19	6,959.50	0.00	0.00	0.00	
13,700.00	89.97	90.76	7,017.63	116.27	7,059.18	7,059.49	0.00	0.00	0.00	
13,800.00	89.97	90.76	7,017.68	114.94	7,159.17	7,159.47	0.00	0.00	0.00	
13,900.00	89.97	90.76	7,017.74	113.61	7,259.16	7,259.46	0.00	0.00	0.00	
14,000.00	89.97	90.76	7,017.80	112.28	7,359.15	7,359.45	0.00	0.00	0.00	
14,100.00	89.97	90.76	7,017.85	110.95	7,459.14	7,459.44	0.00	0.00	0.00	
14,200.00	89.97	90.76	7,017.91	109.61	7,559.13	7,559.42	0.00	0.00	0.00	
14,300.00	89.97	90.76	7,017.97	108.28	7,659.12	7,659.41	0.00	0.00	0.00	
14,400.00	89.97	90.76	7,018.03	106.95	7,759.12	7,759.40	0.00	0.00	0.00	
14,500.00	89.97	90.76	7,018.08	105.62	7,859.11	7,859.38	0.00	0.00	0.00	
14,600.00	89.97	90.76	7,018.14	104.29	7,959.10	7,959.37	0.00	0.00	0.00	
14,700.00	89.97	90.76	7,018.20	102.96	8,059.09	8,059.36	0.00	0.00	0.00	
14,800.00	89.97	90.76	7,018.26	101.63	8,159.08	8,159.34	0.00	0.00	0.00	
14,900.00	89.97	90.76	7,018.31	100.30	8,259.07	8,259.33	0.00	0.00	0.00	
15,000.00	89.97	90.76	7,018.37	98.96	8,359.06	8,359.32	0.00	0.00	0.00	
15,100.00	89.97	90.76	7,018.43	97.63	8,459.05	8,459.30	0.00	0.00	0.00	
15,200.00	89.97	90.76	7,018.49	96.30	8,559.04	8,559.29	0.00	0.00	0.00	



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #662H - Slot B2 (662H)
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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)
15,300.00	89.97	90.76	7,018.54	94.97	8,659.04	8,659.28	0.00	0.00	0.00
15,400.00	89.97	90.76	7,018.60	93.64	8,759.03	8,759.26	0.00	0.00	0.00
15,500.00	89.97	90.76	7,018.66	92.31	8,859.02	8,859.25	0.00	0.00	0.00
15,600.00	89.97	90.76	7,018.72	90.98	8,959.01	8,959.24	0.00	0.00	0.00
15,700.00	89.97	90.76	7,018.77	89.65	9,059.00	9,059.22	0.00	0.00	0.00
15,800.00	89.97	90.76	7,018.83	88.31	9,158.99	9,159.21	0.00	0.00	0.00
15,900.00	89.97	90.76	7,018.89	86.98	9,258.98	9,259.20	0.00	0.00	0.00
16,000.00	89.97	90.76	7,018.95	85.65	9,358.97	9,359.18	0.00	0.00	0.00
16,100.00	89.97	90.76	7,019.00	84.32	9,458.96	9,459.17	0.00	0.00	0.00
16,200.00	89.97	90.76	7,019.06	82.99	9,558.96	9,559.16	0.00	0.00	0.00
16,300.00	89.97	90.76	7,019.12	81.66	9,658.95	9,659.14	0.00	0.00	0.00
16,400.00	89.97	90.76	7,019.17	80.33	9,758.94	9,759.13	0.00	0.00	0.00
16,500.00	89.97	90.76	7,019.23	79.00	9,858.93	9,859.12	0.00	0.00	0.00
16,600.00	89.97	90.76	7,019.29	77.66	9,958.92	9,959.10	0.00	0.00	0.00
16,700.00	89.97	90.76	7,019.35	76.33	10,058.91	10,059.09	0.00	0.00	0.00
16,800.00	89.97	90.76	7,019.40	75.00	10,158.90	10,159.08	0.00	0.00	0.00
16,900.00	89.97	90.76	7,019.46	73.67	10,258.89	10,259.07	0.00	0.00	0.00
17,000.00	89.97	90.76	7,019.52	72.34	10,358.88	10,359.05	0.00	0.00	0.00
17,100.00	89.97	90.76	7,019.58	71.01	10,458.88	10,459.04	0.00	0.00	0.00
17,200.00	89.97	90.76	7,019.63	69.68	10,558.87	10,559.03	0.00	0.00	0.00
17,300.00	89.97	90.76	7,019.69	68.34	10,658.86	10,659.01	0.00	0.00	0.00
17,400.00	89.97	90.76	7,019.75	67.01	10,758.85	10,759.00	0.00	0.00	0.00
17,500.00	89.97	90.76	7,019.81	65.68	10,858.84	10,858.99	0.00	0.00	0.00
17,600.00	89.97	90.76	7,019.86	64.35	10,958.83	10,958.97	0.00	0.00	0.00
17,700.00	89.97	90.76	7,019.92	63.02	11,058.82	11,058.96	0.00	0.00	0.00
17,800.00	89.97	90.76	7,019.98	61.69	11,158.81	11,158.95	0.00	0.00	0.00
17,900.00	89.97	90.76	7,020.04	60.36	11,258.80	11,258.93	0.00	0.00	0.00
18,000.00	89.97	90.76	7,020.09	59.03	11,358.80	11,358.92	0.00	0.00	0.00
18,100.00	89.97	90.76	7,020.15	57.69	11,458.79	11,458.91	0.00	0.00	0.00
18,200.00	89.97	90.76	7,020.21	56.36	11,558.78	11,558.89	0.00	0.00	0.00
18,300.00	89.97	90.76	7,020.26	55.03	11,658.77	11,658.88	0.00	0.00	0.00
18,400.00	89.97	90.76	7,020.32	53.70	11,758.76	11,758.87	0.00	0.00	0.00
18,500.00	89.97	90.76	7,020.38	52.37	11,858.75	11,858.85	0.00	0.00	0.00
18,600.00	89.97	90.76	7,020.44	51.04	11,958.74	11,958.84	0.00	0.00	0.00
18,700.00	89.97	90.76	7,020.49	49.71	12,058.73	12,058.83	0.00	0.00	0.00
18,800.00	89.97	90.76	7,020.55	48.38	12,158.72	12,158.81	0.00	0.00	0.00
18,900.00	89.97	90.76	7,020.61	47.04	12,258.72	12,258.80	0.00	0.00	0.00
19,000.00	89.97	90.76	7,020.67	45.71	12,358.71	12,358.79	0.00	0.00	0.00
19,100.00	89.97	90.76	7,020.72	44.38	12,458.70	12,458.77	0.00	0.00	0.00
19,200.00	89.97	90.76	7,020.78	43.05	12,558.69	12,558.76	0.00	0.00	0.00
19,300.00	89.97	90.76	7,020.84	41.72	12,658.68	12,658.75	0.00	0.00	0.00
19,400.00	89.97	90.76	7,020.90	40.39	12,758.67	12,758.73	0.00	0.00	0.00
19,500.00	89.97	90.76	7,020.95	39.06	12,858.66	12,858.72	0.00	0.00	0.00
19,581.75	89.97	90.76	7,021.00	37.97	12,940.40	12,940.46	0.00	0.00	0.00



Lonestar Consulting, LLC

Planning Report



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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 #662H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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
662H POE Rev 2 - plan hits target center - Point	0.00	0.00	7,014.00	200.38	741.60	2,136,368.85	2,849,253.44	36.8702183	-107.4020176
662H FPerf - plan misses target center by 0.10ft at 19481.99ft MD (7020.94 TVD, 39.30 N, 12840.65 E) - Point	0.00	0.00	7,021.00	39.38	12,840.65	2,136,262.17	2,861,353.07	36.8697680	-107.3606550
662H BHL Rev 2 - plan hits target center - Point	0.00	0.00	7,021.00	37.97	12,940.40	2,136,261.21	2,861,452.82	36.8697640	-107.3603140

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,524.08	2,523.00	Ojo Alamo		0.00	0.00
2,652.19	2,651.00	Kirtland		0.00	0.00
3,099.58	3,098.00	Fruitland		0.00	0.00
3,437.87	3,436.00	Pictured Cliffs		0.00	0.00
3,536.96	3,535.00	Lewis		0.00	0.00
4,624.90	4,622.00	Chacra		0.00	0.00
5,452.62	5,449.00	Cliff House		0.00	0.00
5,497.66	5,494.00	Menefee		0.00	0.00
5,686.82	5,683.00	Point Lookout		0.00	0.00
6,189.26	6,185.00	Mancos		0.00	0.00

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,200.00	1,200.00	0.00	0.00	Start Build 2.00
1,319.29	1,319.26	2.16	1.22	Start 5075.67 hold at 1319.29 MD
6,394.97	6,390.53	186.09	105.23	Start DLS 9.00 TFO 61.30
7,381.86	7,014.00	200.38	741.60	36.8702183 / -107.4020176
7,381.86	7,014.00	200.38	741.60	POE @ 7381' MD
19,481.00	7,020.94	39.31	12,839.66	First Perf @ 19,481' MD
19,481.00	7,020.94	39.31	12,839.66	36.8697678 / -107.3606584
19,581.75	7,021.00	37.97	12,940.40	TD at 19581.75



LOGOS Operating, LLC Operations Plan

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

Date:	June 21, 2022	Pool:	Basin Mancos
Well Name:	Rosa Unit 662H	GL Elevation:	6,394'
Surface Location:	Sec 30, T31N, R5W 2300 FSL, 946 FWL (36.869662° N, 107.404553° W – NAD83)	Measured Depth:	19,582' (KB)
Bottom Hole Location:	Sec 28, T31N, R5W 2335 FSL, 488 FEL (36.869764° N, 107.360314° W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF078764, CA Serial #NMNM78407E

I. GEOLOGY

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

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2497	2496	*POINT LOOKOUT	5676	5672
KIRTLAND	2625	2624	*MANCOS	6162	6158
*FRUITLAND	3087	3085	KICKOFF POINT	6381	6377
*PICTURED CLIFFS	3416	3414	LANDING POINT	7368	7000
LEWIS	3510	3508			
CHACRA	4598	4595			
*CLIFF HOUSE	5426	5422			
MENEFEE	5474	5470	TD (KB)	19,582	7,021

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

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

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

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

II. DRILLING

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

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

ROSA UNIT 662H



times.

- B. BOP TESTING:** The BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Pressure test surface casing to **600 psi for 30 minutes** and intermediate casing to **1500 psi for 30 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe and blind rams shall be activated each trip or but not more than once a day. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE. **All tests and inspections will be recorded and logged with time and results.** A full BOP test will be conducted when initially installed for the first well on the pad or if seals subject to test pressure are broken, following related repairs and at a minimum of 30 day intervals. A BOPE Shell Test only will be conducted for subsequent wells on the pad when seals subject to pressure have not been broken or repaired and fall within the 30 day interval of first full test.

- C. GeoHazards:** There are no Geohazards

- D. Maximum Anticipated Pressure:** 7021' TVD x 0.43 = 3020 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"	320' or greater	13.375"	54.5 LBS	J-55 or equiv	LTC/BTC
INTERMEDIATE	12.25"	6,264' (KB)	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.5"	19,582' (KB)	5.5"	20 LBS	P-110 or equiv	LTC/BTC

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

B. FLOAT EQUIPMENT:

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

ROSA UNIT 662H



C. CEMENTING:

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

1. **SURFACE:** Casing shall be set at ~ 320' and cemented to surface. TOC at Surface.
263 sks of 15.8 ppg Type Neat G, 1.18 cuft/sk yield or equivalent 223 sks of 14.6 ppg Type III with 1.39 cuft/sk yield, 30% excess.
2. **INTERMEDIATE:** Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. The intermediate casing will be cemented in 2 or 3 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. Operator proposes optional DV tools above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal. If losses are not observed during the second stage a cancelation plug will be pumped and the remaining cement will be pumped during stage 2. If cement does not circulate to the DV tool(s) or to surface, a CBL will be run to determine TOC.

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	5,672	592	0.3132	1.3	259	46	1.15	225	15.8
Stage 1 Lead	4,675	997	0.3132	1.3	406	72	2.30	176	12
					665	118		401	
Stage 2 Tail	3,889	786	0.3132	1.3	320	57	1.73	185	13.2
Stage 2 Lead	3,150	739	0.3132	1.3	301	54	2.00	150	12
					621	111		335	
Stage 3 Tail	2,380	770	0.3132	1.3	314	56	1.73	181	13.2
Stage 3 Lead	353	2,028	0.3132	1.3	826	147	2.00	413	12
Stage 3 Lead	-	353	0.4183	1.0	147	26	2.00	74	12
					1,263	225		532	
All Stage Totals					2,572	458		1,404	

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

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

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Cased Lead	6,164	100	0.2531		25	5	1.89	13	13.2
Open Hole Lead	6,264	13,318	0.2291	1.15	3,519	627	1.89	1,862	13.2
					3,544	631		1,875	

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

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

IV. COMPLETION

A. CBL

ROSA UNIT 662H



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 1545 psi (0.22 psi/ft * 7,021' TVD) for 30 minutes. Increase pressure to open toe sleeves.

D. STIMULATION

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

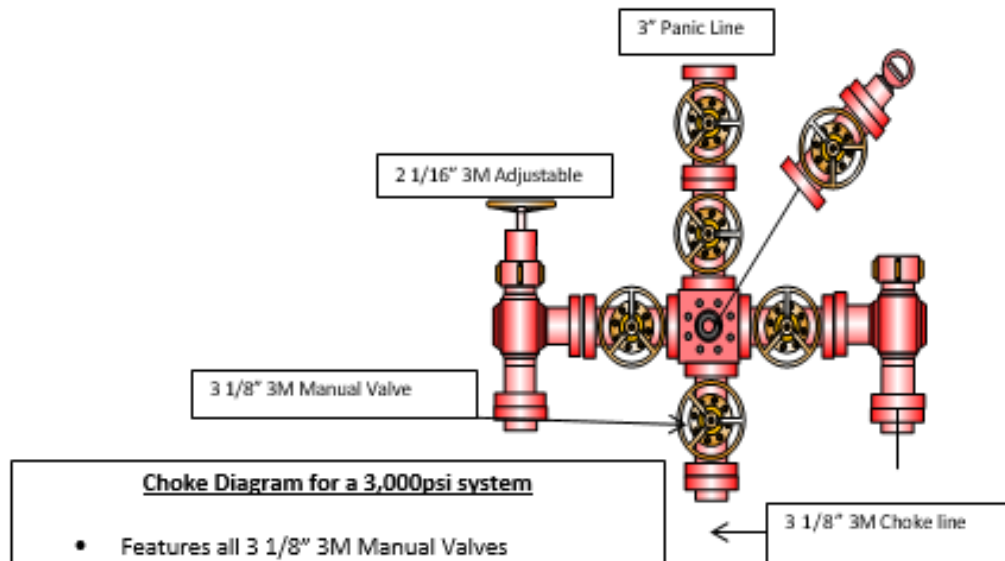
E. PRODUCTION TUBING

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.

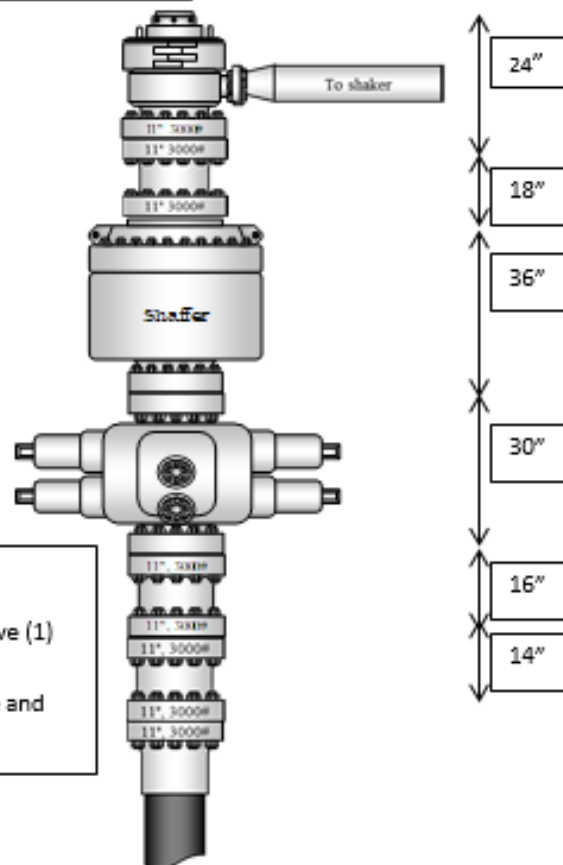


3M 11" B.O.P.E Diagram



Choke Diagram for a 3,000psi system

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



11" 3,000psi BOP

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

ROSA UNIT 662H

Well Name: ROSA UNIT	Well Location: T31N / R5W / SEC 30 / NESW / 36.869668 / -107.404553	County or Parish/State: RIO ARRIBA / NM
Well Number: 662H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF0078764	Unit or CA Name:	Unit or CA Number: NMNM078707E
US Well Number: 300393141700X1	Well Status: Drilling Well	Operator: LOGOS OPERATING LLC

Notice of Intent

Sundry ID: 2678520

Type of Submission: Notice of Intent	Type of Action: Other
Date Sundry Submitted: 06/23/2022	Time Sundry Submitted: 01:45
Date proposed operation will begin: 06/24/2022	

Procedure Description: LOGOS Operating request a change in plans for the following: Original TD @ 17,395' MD 7000' TVD to new TD (KB) @ 19,582' MD 7021' TVD. Geology tops have been updated per changes. Original 9.625" casing Intermediate @ 6237' MD to 6264' (KB) Original 5.5" casing Production @ 17,395' MD to 19,582' (KB) Original 9.625" Intermediate & 5.5 Production cementing bbls and sacks have been updated per casing depth changes. Attached: New C102, Operation and Direction Drilling Plans

Surface Disturbance

Is any additional surface disturbance proposed?: No

NOI Attachments

Procedure Description

3160_5_Rosa_Unit_662H_Change_in_plans_TD__20220622_20220623134456.pdf

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Well Name: ROSA UNIT	Well Location: T31N / R5W / SEC 30 / NESW / 36.869668 / -107.404553	County or Parish/State: RIO ARRIBA / NM
Well Number: 662H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF0078764	Unit or CA Name:	Unit or CA Number: NMNM078707E
US Well Number: 300393141700X1	Well Status: Drilling Well	Operator: LOGOS OPERATING LLC

Operator

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

Operator Electronic Signature: ETTA TRUJILLO	Signed on: JUN 23, 2022 01:45 PM
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 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: 06/23/2022
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 120095

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 120095
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Adhere to previous NMOCD COAs	6/28/2022