

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.
NMSF078771
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 25 T31N R06W NE/NE (A) 1080 FNL 258 FEL7. If Unit of CA/Agreement, Name and/or No.
NMNM78407E8. Well Name and No.
ROSA UNIT 650H9. API Well No.
30-039-3141210. 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 recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

LOGOS Operating request a change in plans for the following:

Original bottom-hole location from 74' FSL & 145' FWL to **new bottom-hole location 453' FSL & 17' FWL**Original TD @ 16,438' MD 6987' TVD to **new TD @ 16,482' MD 7250' TVD.**

Geology tops have been updated per changes.

Original KOP @ 6433' MD 6350' TVD to **new KOP @ 6826' MD 6668' TVD**Original Landing point @ 7454' MD 6999' TVD to **new Landing point @ 7806' MD 7267' TVD**Original Intermediate 9.625" casing @ 6325' MD to **new Intermediate casing set depth @ 6389' MD 6170' TVD**Original Production 5.5" casing @ 16,438' MD to **new Production casing set depth @ 16,482' MD 7250' TVD**

The 9.625" Intermediate & 5.5" production casing grade, weight and cement sacks have been update per casing depth changes.

Attached: New C102, Operation and Directional Drill plans.

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

Etta Trujillo

Title Regulatory Specialist

Signature *Etta Trujillo*

Date 9/20/2022

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)

1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720District II
811 S. First Street, Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170District IV
1220 S. St. Francis Drive, Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462State of New Mexico
Energy, Minerals & Natural Resources DepartmentForm Page 2 of 42
Revised August 1, 2011Submit one copy to
Appropriate District OfficeOIL CONSERVATION DIVISION
1220 South St. Francis Drive
Santa Fe, NM 87505☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-039-31412		² Pool Code 97232		³ Pool Name BASIN MANCOS	
⁴ Property Code 320608		⁵ Property Name ROSA UNIT		⁶ Well Number 650H	
⁷ GRID No. 289408		⁸ Operator Name LOGOS OPERATING, LLC		⁹ Elevation 6372'	

¹⁰ Surface Location

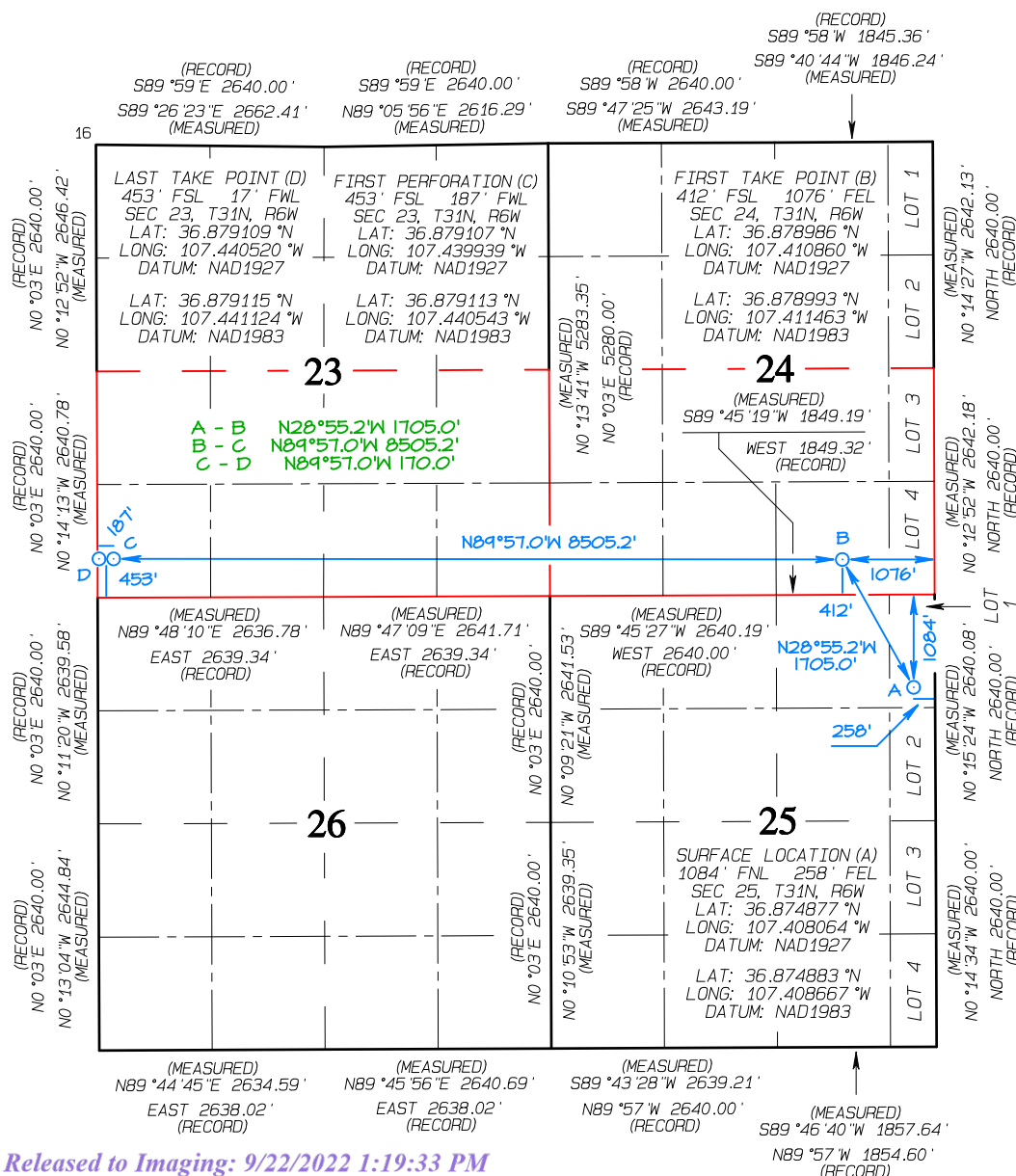
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	25	31N	6W	1	1084	NORTH	258	EAST	RIO ARriba

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	23	31N	6W		453	SOUTH	17	WEST	RIO ARriba

¹² Dedicated Acres 592.02	S/2 - Section 23 S/2 - Section 24	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. R-13457
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NO ALLOWABLE WILL BE ASSIGNED
TO THIS COMPLETION UNTIL ALL
INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS
BEEN APPROVED BY THE DIVISION

¹⁷ OPERATOR CERTIFICATION

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

Etta Trujillo 9/9/2022
Signature Date

Printed Name
Etta Trujillo

etrujillo@logosresourcelc.com
E-mail Address

¹⁸ SURVEYOR CERTIFICATION

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

Date Revised: AUGUST 22, 2022
Date of Survey: MARCH 15, 2019

Signature and Seal of Professional Surveyor



JASON C. EDWARDS
Certificate Number 15269



LOGOS Operating, LLC Operations Plan

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

Date:	September 19, 2022	Pool:	Basin Mancos
Well Name:	Rosa Unit 650H	GL Elevation:	6,372'
Surface Location:	Sec 25, T31N, R6W 1084 FNL, 258 FEL (36.874883° N, 107.408667° W – NAD83)	Measured Depth:	16,482' (KB)
Bottom Hole Location:	Sec 23, T31N, R6W 453 FSL, 17 FWL (36.879115° N, 107.441124° W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF078771, CA Serial #NMNM78407E

I. GEOLOGY

A. Formation Tops (Based on 25' KB Elevation): Estimated top of important geological markers:
SURFACE FORMATION – NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2,548'	2,508'	*POINT LOOKOUT	5,798'	5,668'
KIRTLAND	2,680'	2,636'	*MANCOS	6,314'	6,170'
*FRUITLAND	3,139'	3,083'	KICKOFF POINT	6,826'	6,668'
*PICTURED CLIFFS	3,487'	3,421'	LANDING POINT	7,806'	7,267'
LEWIS	3,589'	3,520'			
CHACRA	4,707'	4,607'			
*CLIFF HOUSE	5,557'	5,434'			
MENEFEE	5,603'	5,479'	TD	16,482'	7,250'

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

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

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

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

II. DRILLING

A. MUD PROGRAM: LSND mud (WBM) will be used to drill the 17-1/2" surface hole as well as the 12-1/4" directional vertical hole. A LSND (WBM) or (OBM) will be used to drill the 8-1/2" curve and lateral portion of the wellbore. Treat for lost circulation as necessary. Notify Engineering of any mud losses.

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

ROSA UNIT 650H



- 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:** 7,267' TVD x 0.43 = 3125 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)	GL 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"	6,389'	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.5"	16,482'	5.5"	20 LBS	P-110 or equiv	LTC/BTC

NOTE: All casing depths are approximate, based on 25' KB elevation and will be adjusted based on actual drilling KB and drilling conditions +/- 50'. Weights, grades and connections will be based on availability and may vary but will be equivalent or greater.

B. FLOAT EQUIPMENT:

- SURFACE CASING:** 13-3/8" notched regular pattern guide shoe. Run (1) standard centralizer on each of the bottom (3) joints of Surface Casing.
- INTERMEDIATE CASING:** 9-5/8" cement nose guide shoe with a self-fill insert float. Place float collar one joint above the shoe. Install (1) centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) centralizer at 2,500 ft., 2,300ft., 2,000ft., 1,500 ft., and 1,000 ft. Optional use of DV Tools (2) will be strategically placed above loss circulation zones anticipated in the Mesaverde and Fruitland Coal. Optional use of cancellation plugs for DV tools may be used if losses while cementing are not encountered.
- PRODUCTION CASING:** Run 5-1/2" casing with cement nose guide Float Shoe, 5-1/2" full or pup joints as necessary, Landing Collar, 5-1/2" full or pup joints as necessary, at least (1) one Toe Sleeve (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 650H



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	5,764	471	0.31318	1.3	209	37	1.15	182	15.8
Stage 1 Lead	4,715	1,049	0.31318	1.3	427	76	2.30	186	12
					636	113		368	
Stage 2 Tail	3,715	1,000	0.31318	1.3	407	72	1.73	235	13.2
Stage 2 Lead	3,180	535	0.31318	1.3	218	39	2.30	95	12
					625	111		330	
Stage 3 Tail	2,530	650	0.31318	1.3	265	47	1.73	153	13.2
Stage 3 Lead	320	2,210	0.31318	1.3	900	160	2.30	391	12
Stage 3 Lead	-	320	0.36268	1	116	21	2.30	50	12
					1,280	228		595	
All Stage Totals					2,542	453		1,292	

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	6,289	100	0.2531	1	25	5	1.56	16	13
Open Hole Lead	6,389	10,093	0.2291	1.15	2,670	475	1.56	1,711	13
					2,695	480		1,727	

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

CBLs and/or Temperature Surveys will be performed as needed or required to determine cement top if

ROSA UNIT 650H



cement is not circulated.

B. PRESSURE TEST

- C. Install Frac Stacks and pressure test 5-1/2" casing to 1600 psi (0.22 psi/ft * 7267' 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 as required and flow back lateral.

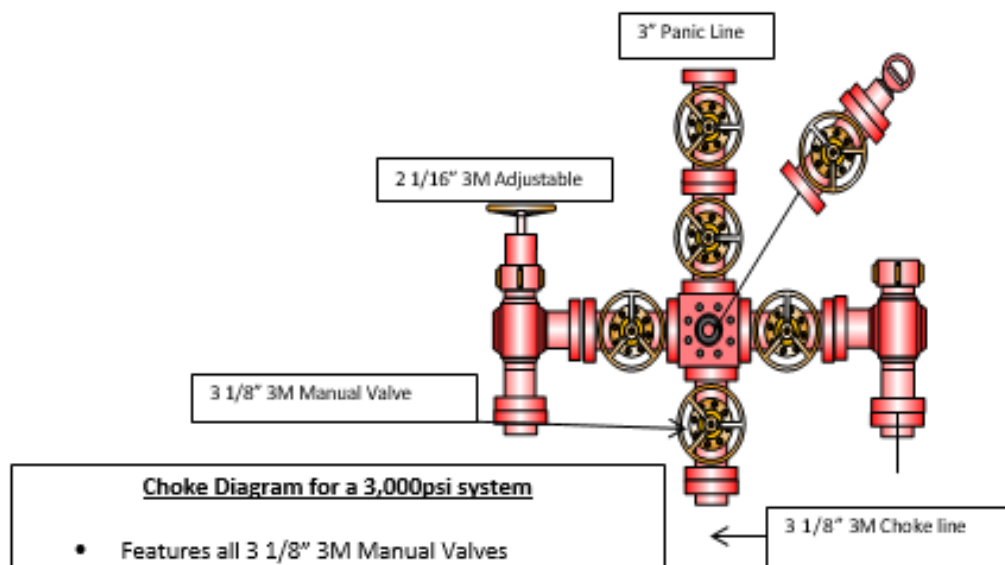
E. PRODUCTION TUBING

2-7/8", 6.5#, J-55 or L-80, EUE tubing will be run once volumes and pressures dictate. Due to the extremely high initial flow rates and pressures seen in offset wells, tubing will be installed once it is safe to do so, typically 12-18 months after completion.

*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.

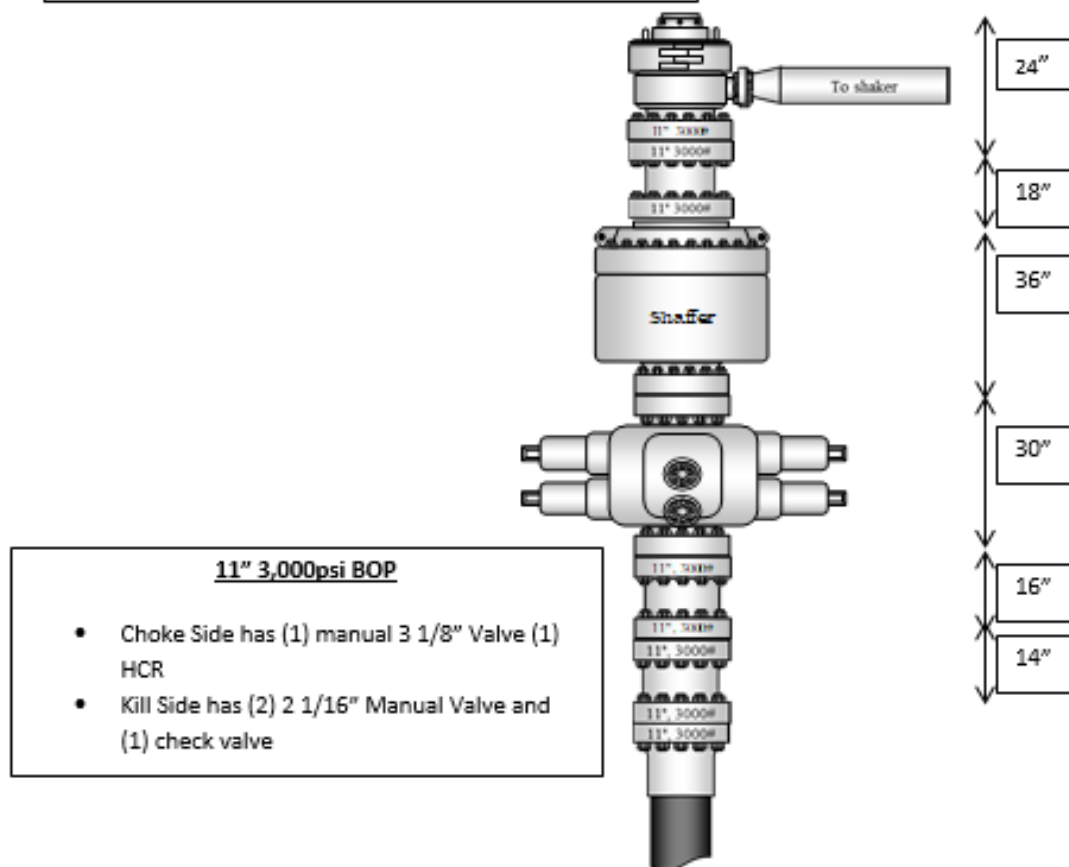


3M 11" B.O.P.E Diagram



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 650H



Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 29

Rosa Unit #650H

OH

Plan #9

Anticollision Report

31 August, 2022





Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Reference	Plan #9		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum centre distance of 8,000.02ft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	8/31/2022		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	16,481.51	Plan #9 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 29						
Rosa Unit #652H - OH - Plan #9	971.44	970.84	7.53	0.75	1.111	Level 3, CC, ES, SF
Rosa Unit #654H - OH - OH	1,056.84	1,055.02	34.83	28.11	5.181	CC, ES
Rosa Unit #654H - OH - OH	1,100.00	1,097.53	35.42	28.39	5.037	SF
Rosa Unit #654H - ST1 - ST1	1,056.84	1,055.02	34.83	28.11	5.181	CC, ES
Rosa Unit #654H - ST1 - ST1	1,100.00	1,097.53	35.42	28.39	5.037	SF
Rosa Unit #654H - ST2 - ST2	1,056.84	1,055.02	34.83	28.11	5.181	CC, ES
Rosa Unit #654H - ST2 - ST2	7,120.65	7,615.38	212.02	160.20	4.091	SF
Rosa Unit #656H - OH - OH	0.00	0.50	30.00			
Rosa Unit #656H - OH - OH	936.69	935.91	30.35	24.57	5.250	ES
Rosa Unit #656H - OH - OH	1,000.00	998.06	31.94	25.72	5.136	SF

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #9													Offset Site Error: 0.00 ft	
Survey Program: 0-MWD+HDGM								Rule Assigned:					Offset Well Error: 0.00 ft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Distance				Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	+N/-S	+E/-W	Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)			
0.00	0.00	0.00	0.00	0.00	0.00	29.69	7.85	4.47	9.03					
100.00	100.00	100.00	100.00	0.27	0.27	29.69	7.85	4.47	9.03	8.49	0.54	16.685		
200.00	200.00	200.00	200.00	0.63	0.63	29.69	7.85	4.47	9.03	7.77	1.26	7.178		
300.00	300.00	300.00	300.00	0.99	0.99	29.69	7.85	4.47	9.03	7.06	1.98	4.573		
310.00	310.00	310.00	310.00	1.02	1.02	29.69	7.85	4.47	9.03	6.98	2.05	4.412		
400.00	400.00	399.97	399.96	1.35	1.34	26.29	8.17	4.04	9.12	6.43	2.69	3.388		
500.00	500.00	499.91	499.86	1.70	1.70	9.46	9.96	1.66	10.10	6.69	3.40	2.967		
600.00	600.00	599.86	599.76	2.06	2.06	-3.83	11.80	-0.79	11.82	7.71	4.12	2.872		
650.00	650.00	649.84	649.72	2.24	2.23	-9.00	12.72	-2.01	12.88	8.40	4.48	2.877		
700.00	700.00	699.82	699.68	2.42	2.41	-5.90	13.63	-3.24	13.58	8.75	4.83	2.811		
800.00	799.93	799.78	799.59	2.78	2.77	-16.40	15.47	-5.69	12.69	7.14	5.55	2.287		
900.00	899.68	899.64	899.40	3.14	3.13	-38.15	17.31	-8.13	9.33	3.07	6.26	1.491	Level 3	
971.44	970.77	970.84	970.57	3.40	3.39	-76.44	18.62	-9.88	7.53	0.75	6.77	1.111	Level 3, CC, ES, SF	
1,000.00	999.13	999.26	998.98	3.51	3.49	-96.82	19.14	-10.58	8.00	1.02	6.98	1.146	Level 3	
1,100.00	1,098.15	1,098.53	1,098.21	3.87	3.84	-141.29	20.97	-13.01	16.28	8.56	7.71	2.110		
1,200.00	1,196.63	1,197.34	1,196.96	4.25	4.20	-156.00	22.79	-15.43	30.57	22.13	8.44	3.623		

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



Lonestar Consulting, LLC

Anticollision Report



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Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #9													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 ft
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)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
1,300.00	1,294.44	1,295.55	1,295.13	4.65	4.55	-162.48	24.59	-17.84	48.86	39.70	9.16	5.335		
1,324.38	1,318.17	1,319.39	1,318.96	4.75	4.64	-163.53	25.03	-18.42	53.87	44.53	9.34	5.770		
1,400.00	1,391.70	1,393.27	1,392.80	5.06	4.90	-165.97	26.39	-20.23	69.80	59.92	9.88	7.067		
1,500.00	1,488.95	1,490.96	1,490.45	5.49	5.26	-167.87	28.19	-22.62	90.98	80.38	10.59	8.587		
1,600.00	1,586.19	1,588.66	1,588.10	5.92	5.61	-169.06	29.98	-25.02	112.21	100.90	11.31	9.918		
1,700.00	1,683.43	1,686.36	1,685.75	6.36	5.96	-169.87	31.78	-27.41	133.48	121.44	12.04	11.090		
1,800.00	1,780.67	1,784.06	1,783.41	6.81	6.31	-170.45	33.58	-29.81	154.77	142.01	12.76	12.128		
1,900.00	1,877.91	1,881.76	1,881.06	7.26	6.66	-170.90	35.37	-32.20	176.07	162.58	13.49	13.054		
2,000.00	1,975.16	1,979.45	1,978.71	7.71	7.02	-171.25	37.17	-34.59	197.37	183.16	14.22	13.885		
2,100.00	2,072.40	2,077.15	2,076.36	8.17	7.37	-171.53	38.97	-36.99	218.68	203.74	14.94	14.633		
2,200.00	2,169.64	2,174.85	2,174.01	8.62	7.72	-171.76	40.77	-39.38	240.00	224.33	15.67	15.312		
2,300.00	2,266.88	2,272.55	2,271.66	9.08	8.07	-171.95	42.56	-41.78	261.32	244.91	16.41	15.929		
2,400.00	2,364.12	2,370.24	2,369.32	9.55	8.42	-172.12	44.36	-44.17	282.64	265.50	17.14	16.493		
2,500.00	2,461.37	2,467.94	2,466.97	10.01	8.78	-172.26	46.16	-46.56	303.96	286.09	17.87	17.010		
2,600.00	2,558.61	2,565.64	2,564.62	10.48	9.13	-172.38	47.95	-48.96	325.29	306.69	18.60	17.486		
2,700.00	2,655.85	2,663.34	2,662.27	10.94	9.48	-172.49	49.75	-51.35	346.61	327.28	19.34	17.925		
2,800.00	2,753.09	2,761.03	2,759.92	11.41	9.83	-172.58	51.55	-53.75	367.94	347.87	20.07	18.332		
2,900.00	2,850.33	2,858.73	2,857.58	11.88	10.19	-172.67	53.34	-56.14	389.27	368.46	20.81	18.710		
3,000.00	2,947.58	2,956.43	2,955.23	12.35	10.54	-172.74	55.14	-58.53	410.60	389.06	21.54	19.062		
3,100.00	3,044.82	3,054.13	3,052.88	12.82	10.89	-172.81	56.94	-60.93	431.93	409.65	22.28	19.390		
3,200.00	3,142.06	3,151.82	3,150.53	13.29	11.24	-172.87	58.74	-63.32	453.26	430.25	23.01	19.697		
3,300.00	3,239.30	3,249.52	3,248.18	13.76	11.59	-172.93	60.53	-65.72	474.59	450.84	23.75	19.984		
3,400.00	3,336.54	3,347.22	3,345.83	14.23	11.95	-172.98	62.33	-68.11	495.92	471.43	24.48	20.255		
3,500.00	3,433.79	3,444.92	3,443.49	14.71	12.30	-173.03	64.13	-70.50	517.25	492.03	25.22	20.509		
3,600.00	3,531.03	3,542.61	3,541.14	15.18	12.65	-173.07	65.92	-72.90	538.58	512.62	25.96	20.748		
3,700.00	3,628.27	3,640.31	3,638.79	15.65	13.00	-173.11	67.72	-75.29	559.91	533.22	26.69	20.974		
3,800.00	3,725.51	3,738.01	3,736.44	16.13	13.36	-173.15	69.52	-77.69	581.24	553.81	27.43	21.188		
3,900.00	3,822.75	3,835.71	3,834.09	16.60	13.71	-173.18	71.31	-80.08	602.58	574.41	28.17	21.391		
4,000.00	3,920.00	3,933.40	3,931.74	17.07	14.06	-173.21	73.11	-82.47	623.91	595.00	28.91	21.583		
4,100.00	4,017.24	4,031.10	4,029.40	17.55	14.41	-173.24	74.91	-84.87	645.24	615.60	29.65	21.765		
4,200.00	4,114.48	4,128.80	4,127.05	18.02	14.77	-173.27	76.71	-87.26	666.57	636.19	30.38	21.939		
4,300.00	4,211.72	4,226.50	4,224.70	18.50	15.12	-173.30	78.50	-89.66	687.91	656.79	31.12	22.104		
4,400.00	4,308.96	4,324.19	4,322.35	18.97	15.47	-173.32	80.30	-92.05	709.24	677.38	31.86	22.261		
4,500.00	4,406.21	4,421.89	4,420.00	19.45	15.82	-173.35	82.10	-94.44	730.57	697.98	32.60	22.411		
4,600.00	4,503.45	4,519.59	4,517.65	19.93	16.17	-173.37	83.89	-96.84	751.91	718.57	33.34	22.555		
4,700.00	4,600.69	4,617.29	4,615.31	20.40	16.53	-173.39	85.69	-99.23	773.24	739.16	34.08	22.692		
4,800.00	4,697.93	4,714.99	4,712.96	20.88	16.88	-173.41	87.49	-101.63	794.57	759.76	34.81	22.823		
4,900.00	4,795.18	4,812.68	4,810.61	21.35	17.23	-173.43	89.29	-104.02	815.91	780.35	35.55	22.949		
5,000.00	4,892.42	4,910.38	4,908.26	21.83	17.58	-173.45	91.08	-106.41	837.24	800.95	36.29	23.069		
5,100.00	4,989.66	5,008.08	5,005.91	22.31	17.94	-173.46	92.88	-108.81	858.57	821.54	37.03	23.185		
5,200.00	5,086.90	5,105.78	5,103.56	22.78	18.29	-173.48	94.68	-111.20	879.91	842.14	37.77	23.296		
5,300.00	5,184.14	5,203.47	5,201.22	23.26	18.64	-173.49	96.47	-113.60	901.24	862.73	38.51	23.403		
5,400.00	5,281.39	5,301.17	5,298.87	23.74	18.99	-173.51	98.27	-115.99	922.58	883.33	39.25	23.505		
5,500.00	5,378.63	5,398.87	5,396.52	24.21	19.34	-173.52	100.07	-118.38	943.91	903.92	39.99	23.604		
5,600.00	5,475.87	5,496.57	5,494.17	24.69	19.70	-173.54	101.86	-120.78	965.24	924.51	40.73	23.699		
5,700.00	5,573.11	5,594.26	5,591.82	25.17	20.05	-173.55	103.66	-123.17	986.58	945.11	41.47	23.791		
5,800.00	5,670.35	5,691.96	5,689.47	25.64	20.40	-173.56	105.46	-125.57	1,007.91	965.70	42.21	23.879		
5,900.00	5,767.60	5,789.66	5,787.13	26.12	20.75	-173.57	107.26	-127.96	1,029.25	986.30	42.95	23.964		
6,000.00	5,864.84	5,887.36	5,884.78	26.60	21.11	-173.58	109.05	-130.35	1,050.58	1,006.89	43.69	24.047		
6,100.00	5,962.08	5,985.05	5,982.43	27.08	21.46	-173.59	110.85	-132.75	1,071.91	1,027.48	44.43	24.126		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #9													Offset Site Error:	0.00 ft
Survey Program:		0-MWD+HDGM					Rule Assigned:						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		
6,200.00	6,059.32	6,082.75	6,080.08	27.55	21.81	-173.61	112.65	-135.14	1,093.25	1,048.08	45.17	24.203		
6,300.00	6,156.56	6,180.45	6,177.73	28.03	22.16	-173.62	114.44	-137.54	1,114.58	1,068.67	45.91	24.278		
6,400.00	6,253.81	6,278.15	6,275.39	28.51	22.52	-173.62	116.24	-139.93	1,135.92	1,089.27	46.65	24.350		
6,500.00	6,351.05	6,375.84	6,373.04	28.99	22.87	-173.63	118.04	-142.32	1,157.25	1,109.86	47.39	24.419		
6,600.00	6,448.29	6,473.54	6,470.69	29.46	23.22	-173.64	119.83	-144.72	1,178.58	1,130.45	48.13	24.487		
6,700.00	6,545.53	6,571.24	6,568.34	29.94	23.57	-173.65	121.63	-147.11	1,199.92	1,151.05	48.87	24.552		
6,800.00	6,642.77	6,670.19	6,667.22	30.42	23.93	-173.63	123.45	-150.16	1,221.24	1,171.62	49.62	24.610		
6,825.58	6,667.65	6,696.27	6,693.19	30.54	24.03	-173.55	123.92	-152.49	1,226.66	1,176.84	49.82	24.621		
6,850.00	6,691.37	6,721.05	6,717.76	30.66	24.12	-164.17	124.37	-155.68	1,231.83	1,181.81	50.02	24.629		
6,900.00	6,739.71	6,771.58	6,767.38	30.90	24.31	-147.52	125.27	-165.14	1,242.38	1,191.97	50.41	24.644		
6,950.00	6,787.49	6,821.83	6,815.82	31.15	24.50	-134.86	126.14	-178.42	1,252.86	1,202.04	50.82	24.655		
7,000.00	6,834.40	6,871.82	6,862.82	31.40	24.70	-125.51	126.98	-195.38	1,263.19	1,211.96	51.23	24.659		
7,050.00	6,880.16	6,921.57	6,908.14	31.64	24.91	-118.51	127.78	-215.87	1,273.30	1,221.66	51.65	24.655		
7,100.00	6,924.48	6,971.11	6,951.53	31.89	25.12	-113.11	128.54	-239.73	1,283.15	1,231.07	52.08	24.639		
7,150.00	6,967.10	7,020.46	6,992.79	32.14	25.34	-108.82	129.25	-266.77	1,292.65	1,240.12	52.53	24.608		
7,200.00	7,007.75	7,069.63	7,031.69	32.39	25.59	-105.34	129.92	-296.82	1,301.75	1,248.74	53.01	24.556		
7,250.00	7,046.17	7,118.65	7,068.04	32.64	25.85	-102.46	130.53	-329.67	1,310.40	1,256.87	53.53	24.479		
7,300.00	7,082.14	7,167.51	7,101.67	32.90	26.15	-100.03	131.09	-365.11	1,318.55	1,264.44	54.11	24.370		
7,350.00	7,115.44	7,216.24	7,132.39	33.17	26.48	-97.97	131.60	-402.91	1,326.13	1,271.39	54.74	24.224		
7,400.00	7,145.84	7,264.84	7,160.07	33.45	26.85	-96.22	132.04	-442.84	1,333.11	1,277.65	55.46	24.037		
7,450.00	7,173.18	7,313.32	7,184.56	33.75	27.27	-94.73	132.42	-484.66	1,339.43	1,283.17	56.27	23.804		
7,500.00	7,197.27	7,361.67	7,205.75	34.07	27.75	-93.46	132.73	-528.12	1,345.07	1,287.89	57.18	23.524		
7,550.00	7,217.98	7,409.91	7,223.55	34.42	28.28	-92.40	132.98	-572.94	1,349.98	1,291.79	58.20	23.197		
7,600.00	7,235.17	7,458.03	7,237.86	34.81	28.86	-91.52	133.17	-618.86	1,354.14	1,294.82	59.32	22.826		
7,650.00	7,248.74	7,506.02	7,248.65	35.24	29.50	-90.82	133.29	-665.61	1,357.52	1,296.96	60.56	22.416		
7,700.00	7,258.60	7,553.88	7,255.87	35.72	30.19	-90.29	133.34	-712.92	1,360.09	1,298.19	61.90	21.973		
7,750.00	7,264.69	7,601.61	7,259.52	36.24	30.92	-89.91	133.33	-760.50	1,361.85	1,298.52	63.33	21.504		
7,800.00	7,266.98	7,650.33	7,259.97	36.81	31.72	-89.71	133.25	-809.20	1,362.76	1,297.89	64.88	21.005		
7,806.27	7,267.00	7,656.59	7,259.97	36.89	31.83	-89.70	133.24	-815.47	1,362.82	1,297.74	65.08	20.940		
7,900.00	7,266.82	7,750.32	7,259.86	38.11	33.49	-89.71	133.08	-909.20	1,363.48	1,295.17	68.30	19.962		
8,000.00	7,266.62	7,850.32	7,259.74	39.63	35.42	-89.71	132.90	-1,009.20	1,364.18	1,292.12	72.06	18.931		
8,100.00	7,266.42	7,950.32	7,259.62	41.34	37.49	-89.71	132.73	-1,109.20	1,364.89	1,288.78	76.11	17.933		
8,200.00	7,266.23	8,050.32	7,259.51	43.22	39.68	-89.72	132.56	-1,209.19	1,365.59	1,285.18	80.41	16.983		
8,300.00	7,266.03	8,150.31	7,259.39	45.24	41.97	-89.72	132.38	-1,309.19	1,366.30	1,281.38	84.92	16.089		
8,400.00	7,265.84	8,250.31	7,259.27	47.38	44.35	-89.72	132.21	-1,409.19	1,367.01	1,277.39	89.61	15.254		
8,500.00	7,265.64	8,350.31	7,259.16	49.63	46.81	-89.73	132.03	-1,509.18	1,367.71	1,273.25	94.46	14.479		
8,600.00	7,265.44	8,450.31	7,259.04	51.96	49.32	-89.73	131.86	-1,609.18	1,368.42	1,268.98	99.43	13.762		
8,700.00	7,265.25	8,550.30	7,258.92	54.36	51.89	-89.73	131.69	-1,709.18	1,369.12	1,264.60	104.52	13.099		
8,800.00	7,265.05	8,650.30	7,258.81	56.83	54.51	-89.74	131.51	-1,809.18	1,369.83	1,260.13	109.70	12.487		
8,900.00	7,264.86	8,750.30	7,258.69	59.35	57.16	-89.74	131.34	-1,909.17	1,370.53	1,255.56	114.97	11.921		
9,000.00	7,264.66	8,850.30	7,258.57	61.92	59.85	-89.74	131.17	-2,009.17	1,371.24	1,250.93	120.31	11.398		
9,100.00	7,264.46	8,950.29	7,258.46	64.53	62.57	-89.75	130.99	-2,109.17	1,371.94	1,246.24	125.71	10.914		
9,200.00	7,264.27	9,050.29	7,258.34	67.18	65.32	-89.75	130.82	-2,209.17	1,372.65	1,241.48	131.17	10.465		
9,300.00	7,264.07	9,150.29	7,258.22	69.86	68.09	-89.76	130.64	-2,309.16	1,373.36	1,236.68	136.67	10.049		
9,400.00	7,263.88	9,250.29	7,258.11	72.57	70.88	-89.76	130.47	-2,409.16	1,374.06	1,231.84	142.22	9.662		
9,500.00	7,263.68	9,350.28	7,257.99	75.30	73.68	-89.76	130.30	-2,509.16	1,374.77	1,226.96	147.81	9.301		
9,600.00	7,263.49	9,450.28	7,257.87	78.05	76.51	-89.77	130.12	-2,609.15	1,375.47	1,222.05	153.43	8.965		
9,700.00	7,263.29	9,550.28	7,257.76	80.82	79.34	-89.77	129.95	-2,709.15	1,376.18	1,217.10	159.08	8.651		
9,800.00	7,263.09	9,650.28	7,257.64	83.61	82.19	-89.77	129.77	-2,809.15	1,376.88	1,212.13	164.76	8.357		
9,900.00	7,262.90	9,750.27	7,257.52	86.42	85.06	-89.78	129.60	-2,909.15	1,377.59	1,207.13	170.46	8.082		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #9													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)				
10,000.00	7,262.70	9,850.27	7,257.41	89.24	87.93	-89.78	129.43	-3,009.14	1,378.30	1,202.11	176.19	7.823		
10,100.00	7,262.51	9,950.27	7,257.29	92.07	90.81	-89.78	129.25	-3,109.14	1,379.00	1,197.07	181.93	7.580		
10,200.00	7,262.31	10,050.27	7,257.17	94.92	93.70	-89.79	129.08	-3,209.14	1,379.71	1,192.01	187.69	7.351		
10,300.00	7,262.11	10,150.26	7,257.06	97.77	96.60	-89.79	128.91	-3,309.13	1,380.41	1,186.94	193.48	7.135		
10,400.00	7,261.92	10,250.26	7,256.94	100.64	99.50	-89.79	128.73	-3,409.13	1,381.12	1,181.85	199.27	6.931		
10,500.00	7,261.72	10,350.26	7,256.82	103.51	102.41	-89.80	128.56	-3,509.13	1,381.82	1,176.74	205.08	6.738		
10,600.00	7,261.53	10,450.26	7,256.71	106.39	105.33	-89.80	128.38	-3,609.13	1,382.53	1,171.63	210.90	6.555		
10,700.00	7,261.33	10,550.25	7,256.59	109.28	108.25	-89.80	128.21	-3,709.12	1,383.24	1,166.50	216.74	6.382		
10,800.00	7,261.13	10,650.25	7,256.47	112.18	111.18	-89.81	128.04	-3,809.12	1,383.94	1,161.36	222.58	6.218		
10,900.00	7,260.94	10,750.25	7,256.36	115.08	114.11	-89.81	127.86	-3,909.12	1,384.65	1,156.21	228.43	6.061		
11,000.00	7,260.74	10,850.25	7,256.24	117.99	117.05	-89.81	127.69	-4,009.12	1,385.35	1,151.05	234.30	5.913		
11,100.00	7,260.55	10,950.24	7,256.12	120.91	119.99	-89.82	127.51	-4,109.11	1,386.06	1,145.89	240.17	5.771		
11,200.00	7,260.35	11,050.24	7,256.01	123.83	122.93	-89.82	127.34	-4,209.11	1,386.76	1,140.71	246.05	5.636		
11,300.00	7,260.15	11,150.24	7,255.89	126.75	125.88	-89.82	127.17	-4,309.11	1,387.47	1,135.53	251.94	5.507		
11,400.00	7,259.96	11,250.24	7,255.77	129.68	128.83	-89.83	126.99	-4,409.10	1,388.17	1,130.34	257.83	5.384		
11,500.00	7,259.76	11,350.23	7,255.66	132.61	131.79	-89.83	126.82	-4,509.10	1,388.88	1,125.15	263.73	5.266		
11,600.00	7,259.57	11,450.23	7,255.54	135.55	134.74	-89.83	126.65	-4,609.10	1,389.59	1,119.95	269.64	5.153		
11,700.00	7,259.37	11,550.23	7,255.42	138.49	137.70	-89.84	126.47	-4,709.10	1,390.29	1,114.74	275.55	5.045		
11,800.00	7,259.17	11,650.23	7,255.31	141.43	140.66	-89.84	126.30	-4,809.09	1,391.00	1,109.53	281.47	4.942		
11,900.00	7,258.98	11,750.22	7,255.19	144.38	143.63	-89.84	126.12	-4,909.09	1,391.70	1,104.31	287.39	4.843		
12,000.00	7,258.78	11,850.22	7,255.07	147.33	146.59	-89.85	125.95	-5,009.09	1,392.41	1,099.09	293.32	4.747		
12,100.00	7,258.59	11,950.22	7,254.96	150.28	149.56	-89.85	125.78	-5,109.09	1,393.12	1,093.86	299.25	4.655		
12,200.00	7,258.39	12,050.22	7,254.84	153.24	152.53	-89.85	125.60	-5,209.08	1,393.82	1,088.64	305.19	4.567		
12,300.00	7,258.19	12,150.21	7,254.72	156.20	155.50	-89.86	125.43	-5,309.08	1,394.53	1,083.40	311.13	4.482		
12,400.00	7,258.00	12,250.21	7,254.61	159.16	158.48	-89.86	125.25	-5,409.08	1,395.23	1,078.16	317.07	4.400		
12,500.00	7,257.80	12,350.21	7,254.49	162.12	161.45	-89.86	125.08	-5,509.07	1,395.94	1,072.92	323.01	4.322		
12,600.00	7,257.61	12,450.21	7,254.37	165.08	164.43	-89.87	124.91	-5,609.07	1,396.64	1,067.68	328.96	4.246		
12,700.00	7,257.41	12,550.20	7,254.26	168.05	167.41	-89.87	124.73	-5,709.07	1,397.35	1,062.43	334.92	4.172		
12,800.00	7,257.21	12,650.20	7,254.14	171.02	170.38	-89.87	124.56	-5,809.07	1,398.06	1,057.18	340.87	4.101		
12,900.00	7,257.02	12,750.20	7,254.02	173.99	173.37	-89.88	124.39	-5,909.06	1,398.76	1,051.93	346.83	4.033		
13,000.00	7,256.82	12,850.20	7,253.91	176.96	176.35	-89.88	124.21	-6,009.06	1,399.47	1,046.67	352.79	3.967		
13,100.00	7,256.63	12,950.19	7,253.79	179.93	179.33	-89.88	124.04	-6,109.06	1,400.17	1,041.42	358.76	3.903		
13,200.00	7,256.43	13,050.19	7,253.67	182.91	182.31	-89.89	123.86	-6,209.06	1,400.88	1,036.16	364.72	3.841		
13,300.00	7,256.23	13,150.19	7,253.56	185.88	185.30	-89.89	123.69	-6,309.05	1,401.58	1,030.89	370.69	3.781		
13,400.00	7,256.04	13,250.19	7,253.44	188.86	188.29	-89.89	123.52	-6,409.05	1,402.29	1,025.63	376.66	3.723		
13,500.00	7,255.84	13,350.18	7,253.32	191.84	191.27	-89.90	123.34	-6,509.05	1,403.00	1,020.36	382.63	3.667		
13,600.00	7,255.65	13,450.18	7,253.21	194.82	194.26	-89.90	123.17	-6,609.04	1,403.70	1,015.09	388.61	3.612		
13,700.00	7,255.45	13,550.18	7,253.09	197.80	197.25	-89.90	122.99	-6,709.04	1,404.41	1,009.82	394.58	3.559		
13,800.00	7,255.25	13,650.18	7,252.97	200.78	200.24	-89.91	122.82	-6,809.04	1,405.11	1,004.55	400.56	3.508		
13,900.00	7,255.06	13,750.17	7,252.85	203.77	203.23	-89.91	122.65	-6,909.04	1,405.82	999.28	406.54	3.458		
14,000.00	7,254.86	13,850.17	7,252.74	206.75	206.22	-89.91	122.47	-7,009.03	1,406.53	994.00	412.52	3.410		
14,100.00	7,254.67	13,950.17	7,252.62	209.74	209.21	-89.92	122.30	-7,109.03	1,407.23	988.72	418.51	3.363		
14,200.00	7,254.47	14,050.17	7,252.50	212.72	212.21	-89.92	122.13	-7,209.03	1,407.94	983.45	424.49	3.317		
14,300.00	7,254.28	14,150.16	7,252.39	215.71	215.20	-89.92	121.95	-7,309.03	1,408.64	978.17	430.48	3.272		
14,400.00	7,254.08	14,250.16	7,252.27	218.70	218.19	-89.93	121.78	-7,409.02	1,409.35	972.88	436.47	3.229		
14,500.00	7,253.88	14,350.16	7,252.15	221.69	221.19	-89.93	121.60	-7,509.02	1,410.05	967.60	442.45	3.187		
14,600.00	7,253.69	14,450.16	7,252.04	224.68	224.18	-89.93	121.43	-7,609.02	1,410.76	962.32	448.44	3.146		
14,700.00	7,253.49	14,550.15	7,251.92	227.67	227.18	-89.94	121.26	-7,709.01	1,411.47	957.03	454.43	3.106		
14,800.00	7,253.30	14,650.15	7,251.80	230.66	230.18	-89.94	121.08	-7,809.01	1,412.17	951.75	460.43	3.067		
14,900.00	7,253.10	14,750.15	7,251.69	233.65	233.17	-89.94	120.91	-7,909.01	1,412.88	946.46	466.42	3.029		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #9													Offset Site Error:	0.00 ft	
Survey Program: 0-MWD+HDGM				Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:				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		
15,000.00	7,252.90	14,850.15	7,251.57	236.65	236.17	-89.95	120.73	-8,009.01	1,413.58	941.17	472.41	2.992			
15,100.00	7,252.71	14,950.14	7,251.45	239.64	239.17	-89.95	120.56	-8,109.00	1,414.29	935.88	478.41	2.956			
15,200.00	7,252.51	15,050.14	7,251.34	242.63	242.17	-89.95	120.39	-8,209.00	1,415.00	930.59	484.41	2.921			
15,300.00	7,252.32	15,150.14	7,251.22	245.63	245.16	-89.95	120.21	-8,309.00	1,415.70	925.30	490.40	2.887			
15,400.00	7,252.12	15,250.13	7,251.10	248.62	248.16	-89.96	120.04	-8,409.00	1,416.41	920.00	496.40	2.853			
15,500.00	7,251.92	15,350.13	7,250.99	251.62	251.16	-89.96	119.87	-8,508.99	1,417.11	914.71	502.40	2.821			
15,600.00	7,251.73	15,450.13	7,250.87	254.62	254.16	-89.96	119.69	-8,608.99	1,417.82	909.42	508.40	2.789			
15,700.00	7,251.53	15,550.13	7,250.75	257.61	257.16	-89.97	119.52	-8,708.99	1,418.53	904.12	514.40	2.758			
15,800.00	7,251.34	15,650.12	7,250.64	260.61	260.16	-89.97	119.34	-8,808.98	1,419.23	898.83	520.41	2.727			
15,900.00	7,251.14	15,750.12	7,250.52	263.61	263.17	-89.97	119.17	-8,908.98	1,419.94	893.53	526.41	2.697			
16,000.00	7,250.94	15,850.12	7,250.40	266.61	266.17	-89.98	119.00	-9,008.98	1,420.64	888.23	532.41	2.668			
16,100.00	7,250.75	15,950.12	7,250.29	269.61	269.17	-89.98	118.82	-9,108.98	1,421.35	882.93	538.42	2.640			
16,200.00	7,250.55	16,050.11	7,250.17	272.61	272.17	-89.98	118.65	-9,208.97	1,422.05	877.63	544.42	2.612			
16,300.00	7,250.36	16,150.11	7,250.05	275.60	275.17	-89.99	118.47	-9,308.97	1,422.76	872.33	550.43	2.585			
16,400.00	7,250.16	16,196.58	7,250.00	278.61	276.57	-89.99	118.39	-9,355.44	1,424.47	870.59	553.89	2.572			
16,481.51	7,250.00	16,196.58	7,250.00	281.05	276.57	-89.99	118.39	-9,355.44	1,430.43	877.00	553.43	2.585			



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 359-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	0.50	0.50	0.00	0.00	-53.32	27.00	-36.25	45.20					
100.00	100.00	100.36	100.36	0.27	0.17	-52.85	27.39	-36.15	45.35	44.92	0.44	103.390		
200.00	200.00	200.21	200.20	0.63	0.34	-51.50	28.53	-35.87	45.84	44.87	0.96	47.538		
300.00	300.00	300.03	300.00	0.99	0.50	-49.31	30.44	-35.40	46.69	45.20	1.49	31.346		
400.00	400.00	399.85	399.78	1.35	0.75	-46.40	33.09	-34.75	47.99	45.89	2.09	22.919		
500.00	500.00	500.09	499.98	1.70	1.11	-43.27	36.02	-33.92	49.48	46.67	2.81	17.596		
600.00	600.00	600.74	600.61	2.06	1.46	-41.54	37.31	-33.06	49.85	46.33	3.52	14.152		
650.00	650.00	650.98	650.86	2.24	1.63	-41.76	37.00	-33.03	49.60	45.73	3.87	12.810		
700.00	700.00	701.00	700.87	2.42	1.80	-35.18	36.28	-33.27	48.87	44.66	4.22	11.587		
800.00	799.93	800.58	800.42	2.78	2.13	-40.26	34.49	-34.34	45.60	40.69	4.91	9.282		
900.00	899.68	900.32	900.15	3.14	2.48	-49.17	33.26	-35.65	40.92	35.30	5.62	7.287		
1,000.00	999.13	999.11	998.92	3.51	2.82	-64.37	32.24	-36.86	35.79	29.47	6.32	5.664		
1,056.84	1,055.48	1,055.02	1,054.81	3.71	3.02	-76.31	32.17	-38.46	34.83	28.11	6.72	5.181 CC, ES		
1,100.00	1,098.15	1,097.53	1,097.30	3.87	3.17	-85.96	32.55	-40.00	35.42	28.39	7.03	5.037 SF		
1,200.00	1,196.63	1,196.06	1,195.70	4.25	3.52	-106.61	34.75	-44.50	41.38	33.61	7.76	5.331		
1,300.00	1,294.44	1,294.17	1,293.56	4.65	3.87	-121.73	38.27	-50.40	53.33	44.83	8.50	6.275		
1,324.38	1,318.17	1,318.06	1,317.36	4.75	3.95	-124.46	39.33	-52.14	57.04	48.36	8.68	6.571		
1,400.00	1,391.70	1,392.47	1,391.42	5.06	4.22	-130.60	43.34	-58.20	69.34	60.10	9.24	7.502		
1,500.00	1,488.95	1,491.08	1,489.34	5.49	4.58	-134.62	50.13	-67.63	86.03	76.04	10.00	8.607		
1,600.00	1,586.19	1,590.73	1,588.06	5.92	4.96	-136.32	58.57	-78.28	102.34	91.57	10.77	9.506		
1,700.00	1,683.43	1,690.66	1,686.76	6.36	5.34	-136.62	69.02	-89.85	117.60	106.04	11.55	10.179		
1,800.00	1,780.67	1,790.13	1,784.64	6.81	5.73	-135.93	81.21	-102.67	132.15	119.79	12.36	10.693		
1,900.00	1,877.91	1,888.85	1,881.32	7.26	6.13	-134.42	94.84	-117.21	146.56	133.38	13.18	11.117		
2,000.00	1,975.16	1,985.81	1,975.75	7.71	6.55	-132.30	109.21	-133.89	161.82	147.80	14.02	11.539		
2,100.00	2,072.40	2,084.53	2,071.29	8.17	6.99	-129.69	125.04	-153.03	177.79	162.89	14.90	11.929		
2,200.00	2,169.64	2,183.85	2,167.08	8.62	7.44	-127.11	142.11	-172.96	193.73	177.92	15.81	12.254		
2,300.00	2,266.88	2,282.41	2,262.13	9.08	7.91	-124.93	159.19	-192.64	209.81	193.09	16.72	12.549		
2,400.00	2,364.12	2,382.03	2,358.26	9.55	8.38	-123.07	176.62	-212.15	225.74	208.10	17.64	12.794		
2,500.00	2,461.37	2,480.89	2,453.77	10.01	8.86	-121.59	193.79	-231.00	241.58	223.01	18.57	13.011		
2,600.00	2,558.61	2,579.47	2,549.07	10.48	9.33	-120.33	210.79	-249.62	257.47	237.98	19.49	13.211		
2,700.00	2,655.85	2,677.98	2,644.32	10.94	9.81	-119.24	227.71	-268.22	273.53	253.11	20.42	13.397		
2,800.00	2,753.09	2,776.71	2,739.71	11.41	10.30	-118.21	244.91	-286.98	289.61	268.26	21.35	13.565		
2,900.00	2,850.33	2,875.65	2,835.34	11.88	10.79	-117.31	262.07	-305.71	305.76	283.47	22.29	13.718		
3,000.00	2,947.58	2,974.60	2,931.00	12.35	11.28	-116.52	279.29	-324.18	321.73	298.50	23.23	13.851		
3,100.00	3,044.82	3,074.23	3,027.57	12.82	11.77	-115.96	295.88	-342.28	337.77	313.60	24.17	13.975		
3,200.00	3,142.06	3,174.30	3,124.82	13.29	12.26	-115.60	312.07	-359.45	353.25	328.15	25.11	14.069		
3,300.00	3,239.30	3,272.00	3,219.88	13.76	12.73	-115.37	327.46	-375.93	368.75	342.73	26.02	14.170		
3,400.00	3,336.54	3,367.79	3,313.00	14.23	13.19	-115.13	342.44	-392.63	384.79	357.87	26.92	14.292		
3,500.00	3,433.79	3,463.49	3,405.60	14.71	13.68	-114.67	358.28	-410.85	401.67	373.83	27.84	14.430		
3,600.00	3,531.03	3,559.33	3,497.93	15.18	14.17	-114.04	375.03	-430.37	419.19	390.43	28.76	14.575		
3,700.00	3,628.27	3,658.52	3,593.44	15.65	14.69	-113.43	392.21	-450.88	437.11	407.38	29.73	14.704		
3,800.00	3,725.51	3,757.01	3,688.49	16.13	15.20	-112.97	408.84	-470.61	454.73	424.05	30.68	14.822		
3,900.00	3,822.75	3,859.35	3,787.62	16.60	15.71	-112.71	425.06	-490.17	472.14	440.48	31.66	14.912		
4,000.00	3,920.00	3,961.05	3,886.71	17.07	16.21	-112.73	439.76	-507.71	488.68	456.06	32.62	14.983		
4,100.00	4,017.24	4,060.59	3,984.03	17.55	16.67	-112.92	453.12	-523.83	504.83	471.30	33.54	15.053		
4,200.00	4,114.48	4,154.65	4,076.02	18.02	17.12	-113.12	465.31	-539.17	521.34	486.94	34.40	15.154		
4,300.00	4,211.72	4,250.55	4,169.58	18.50	17.57	-113.22	478.16	-555.87	538.56	503.27	35.30	15.259		
4,400.00	4,308.96	4,356.48	4,272.70	18.97	18.09	-113.19	493.64	-574.47	555.27	518.97	36.30	15.298		
4,500.00	4,406.21	4,452.18	4,365.70	19.45	18.57	-113.07	508.57	-591.45	571.63	534.43	37.21	15.364		
4,600.00	4,503.45	4,546.01	4,456.32	19.93	19.05	-112.76	524.57	-609.74	588.74	550.62	38.11	15.447		

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



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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - OH - OH														Offset Site Error:	0.00 ft
Survey Program: 359-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)					
4,700.00	4,600.69	4,645.20	4,551.72	20.40	19.58	-112.29	542.64	-630.02	606.08	566.99	39.09	15.505			
4,800.00	4,697.93	4,740.79	4,643.89	20.88	20.08	-111.97	559.08	-649.25	623.70	583.68	40.02	15.584			
4,900.00	4,795.18	4,836.61	4,736.36	21.35	20.59	-111.70	575.11	-668.60	641.63	600.68	40.96	15.666			
5,000.00	4,892.42	4,927.84	4,823.83	21.83	21.09	-111.28	591.51	-688.65	660.49	618.64	41.85	15.781			
5,100.00	4,989.66	5,027.06	4,918.27	22.31	21.65	-110.65	611.24	-711.85	679.72	636.86	42.86	15.860			
5,200.00	5,086.90	5,126.27	5,012.64	22.78	22.22	-110.03	631.23	-734.99	698.85	654.98	43.87	15.931			
5,300.00	5,184.14	5,224.51	5,106.31	23.26	22.79	-109.51	650.54	-757.44	717.86	673.00	44.86	16.001			
5,400.00	5,281.39	5,320.51	5,197.43	23.74	23.35	-108.92	670.46	-780.16	737.15	691.32	45.84	16.082			
5,500.00	5,378.63	5,420.01	5,291.55	24.21	23.94	-108.25	692.02	-804.17	756.55	709.69	46.86	16.144			
5,600.00	5,475.87	5,522.02	5,388.14	24.69	24.54	-107.61	714.22	-828.34	775.60	727.69	47.91	16.188			
5,700.00	5,573.11	5,623.25	5,484.15	25.17	25.14	-107.04	736.17	-851.72	794.23	745.28	48.95	16.225			
5,800.00	5,670.35	5,727.09	5,582.81	25.64	25.75	-106.51	758.57	-875.14	812.49	762.48	50.01	16.246			
5,900.00	5,767.60	5,851.68	5,701.50	26.12	26.46	-105.92	786.08	-901.13	829.14	777.88	51.26	16.174			
6,000.00	5,864.84	5,999.26	5,842.57	26.60	27.23	-105.22	823.72	-922.12	837.09	784.49	52.59	15.917			
6,100.00	5,962.08	6,030.00	5,871.95	27.08	27.40	-105.08	831.58	-926.43	848.96	795.93	53.03	16.009			
6,200.00	6,059.32	6,030.00	5,871.95	27.55	27.40	-105.08	831.58	-926.43	871.67	818.96	52.71	16.538			
6,300.00	6,156.56	6,030.00	5,871.95	28.03	27.40	-105.08	831.58	-926.43	904.92	853.05	51.87	17.445			
6,400.00	6,253.81	6,030.00	5,871.95	28.51	27.40	-105.08	831.58	-926.43	947.61	896.94	50.67	18.702			
6,500.00	6,351.05	6,030.00	5,871.95	28.99	27.40	-105.08	831.58	-926.43	998.52	949.28	49.23	20.281			
6,600.00	6,448.29	6,030.00	5,871.95	29.46	27.40	-105.08	831.58	-926.43	1,056.46	1,008.77	47.69	22.152			
6,700.00	6,545.53	6,030.00	5,871.95	29.94	27.40	-105.08	831.58	-926.43	1,120.35	1,074.22	46.13	24.287			
6,800.00	6,642.77	6,030.00	5,871.95	30.42	27.40	-105.08	831.58	-926.43	1,189.23	1,144.61	44.61	26.656			
6,825.58	6,667.65	6,030.00	5,871.95	30.54	27.40	-105.08	831.58	-926.43	1,207.55	1,163.31	44.24	27.296			
6,850.00	6,691.37	6,030.00	5,871.95	30.66	27.40	-95.41	831.58	-926.43	1,224.98	1,181.10	43.88	27.918			
6,900.00	6,739.71	6,030.00	5,871.95	30.90	27.40	-78.38	831.58	-926.43	1,259.50	1,216.38	43.12	29.210			
6,950.00	6,787.49	6,030.00	5,871.95	31.15	27.40	-65.54	831.58	-926.43	1,292.39	1,250.06	42.33	30.530			
7,000.00	6,834.40	6,030.00	5,871.95	31.40	27.40	-56.18	831.58	-926.43	1,323.57	1,282.05	41.52	31.876			
7,050.00	6,880.16	6,030.00	5,871.95	31.64	27.40	-49.29	831.58	-926.43	1,352.97	1,312.28	40.69	33.250			
7,100.00	6,924.48	6,030.00	5,871.95	31.89	27.40	-44.11	831.58	-926.43	1,380.54	1,340.70	39.84	34.651			
7,150.00	6,967.10	6,030.00	5,871.95	32.14	27.40	-40.12	831.58	-926.43	1,406.21	1,367.23	38.98	36.079			
7,200.00	7,007.75	6,030.00	5,871.95	32.39	27.40	-36.99	831.58	-926.43	1,429.93	1,391.83	38.10	37.531			
7,250.00	7,046.17	6,030.00	5,871.95	32.64	27.40	-34.48	831.58	-926.43	1,451.66	1,414.44	37.22	39.005			
7,300.00	7,082.14	6,030.00	5,871.95	32.90	27.40	-32.46	831.58	-926.43	1,471.35	1,435.01	36.33	40.494			
7,350.00	7,115.44	6,030.00	5,871.95	33.17	27.40	-30.81	831.58	-926.43	1,488.96	1,453.51	35.46	41.993			
7,400.00	7,145.84	6,030.00	5,871.95	33.45	27.40	-29.47	831.58	-926.43	1,504.47	1,469.88	34.59	43.491			
7,450.00	7,173.18	6,030.00	5,871.95	33.75	27.40	-28.38	831.58	-926.43	1,517.83	1,484.08	33.75	44.975			
7,500.00	7,197.27	6,030.00	5,871.95	34.07	27.40	-27.50	831.58	-926.43	1,529.03	1,496.10	32.93	46.429			
7,550.00	7,217.98	6,030.00	5,871.95	34.42	27.40	-26.80	831.58	-926.43	1,538.05	1,505.89	32.15	47.835			
7,600.00	7,235.17	6,030.00	5,871.95	34.81	27.40	-26.27	831.58	-926.43	1,544.86	1,513.44	31.42	49.168			
7,609.55	7,238.04	6,030.00	5,871.95	34.89	27.40	-26.18	831.58	-926.43	1,545.91	1,514.62	31.29	49.411			
7,650.00	7,248.74	6,030.00	5,871.95	35.24	27.40	-25.87	831.58	-926.43	1,549.46	1,518.71	30.74	50.404			
7,660.62	7,251.14	6,030.00	5,871.95	35.34	27.40	-25.81	831.58	-926.43	1,550.15	1,519.54	30.61	50.649			
7,700.00	7,258.60	6,030.00	5,871.95	35.72	27.40	-25.62	831.58	-926.43	1,551.83	1,521.70	30.12	51.514			
7,739.19	7,263.70	6,030.00	5,871.95	36.12	27.40	-25.50	831.58	-926.43	1,552.13	1,522.44	29.69	52.275			
7,750.00	7,264.69	6,030.00	5,871.95	36.24	27.40	-25.48	831.58	-926.43	1,551.97	1,522.39	29.58	52.470			
7,789.83	7,266.83	6,030.00	5,871.95	36.69	27.40	-25.47	831.58	-926.43	1,550.49	1,521.29	29.20	53.099			
7,800.00	7,266.98	6,030.00	5,871.95	36.81	27.40	-25.48	831.58	-926.43	1,549.88	1,520.77	29.11	53.242			
7,805.05	7,267.00	6,030.00	5,871.95	36.88	27.40	-25.48	831.58	-926.43	1,549.55	1,520.48	29.07	53.307			
7,806.27	7,267.00	6,030.00	5,871.95	36.89	27.40	-25.48	831.58	-926.43	1,549.47	1,520.41	29.06	53.323			
7,880.27	7,266.86	6,030.00	5,871.95	37.84	27.40	-25.48	831.58	-926.43	1,546.08	1,517.55	28.53	54.185			

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - OH - OH													Offset Site Error: 0.00 ft			
Survey Program: 359-MWD+HDGM		Offset					Semi Major Axis			Offset Wellbore Centre		Rule Assigned:			Offset Well Error: 0.00 ft	
Reference	Vertical	Measured	Vertical	Reference	Offset	Highside			Distance		Minimum	Separation	Warning			
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Separation (ft)	Factor				
7,900.00	7,266.82	6,030.00	5,871.95	38.11	27.40	-25.48	831.58	-926.43	1,545.78	1,517.36	28.41	54.401				
7,921.54	7,266.77	6,030.00	5,871.95	38.43	27.40	-25.48	831.58	-926.43	1,545.73	1,517.42	28.32	54.588				
8,000.00	7,266.62	6,030.00	5,871.95	39.63	27.40	-25.48	831.58	-926.43	1,548.10	1,520.04	28.06	55.174				
8,100.00	7,266.42	6,030.00	5,871.95	41.34	27.40	-25.48	831.58	-926.43	1,556.86	1,528.80	28.06	55.488				
8,200.00	7,266.23	6,030.00	5,871.95	43.22	27.40	-25.48	831.58	-926.43	1,571.94	1,543.54	28.40	55.345				
8,300.00	7,266.03	6,030.00	5,871.95	45.24	27.40	-25.48	831.58	-926.43	1,593.17	1,564.11	29.06	54.825				
8,400.00	7,265.84	6,030.00	5,871.95	47.38	27.40	-25.48	831.58	-926.43	1,620.30	1,590.33	29.98	54.052				
8,500.00	7,265.64	6,030.00	5,871.95	49.63	27.40	-25.48	831.58	-926.43	1,653.05	1,621.96	31.09	53.164				
8,600.00	7,265.44	6,030.00	5,871.95	51.96	27.40	-25.48	831.58	-926.43	1,691.08	1,658.74	32.35	52.280				
8,700.00	7,265.25	6,030.00	5,871.95	54.36	27.40	-25.48	831.58	-926.43	1,734.06	1,700.38	33.68	51.486				
8,800.00	7,265.05	6,030.00	5,871.95	56.83	27.40	-25.48	831.58	-926.43	1,781.61	1,746.57	35.04	50.838				
8,900.00	7,264.86	6,030.00	5,871.95	59.35	27.40	-25.48	831.58	-926.43	1,833.39	1,796.99	36.40	50.364				
9,000.00	7,264.66	6,030.00	5,871.95	61.92	27.40	-25.48	831.58	-926.43	1,889.05	1,851.33	37.73	50.070				
9,100.00	7,264.46	6,030.00	5,871.95	64.53	27.40	-25.48	831.58	-926.43	1,948.26	1,909.26	39.00	49.955				
9,200.00	7,264.27	6,030.00	5,871.95	67.18	27.40	-25.48	831.58	-926.43	2,010.70	1,970.49	40.21	50.007				
9,300.00	7,264.07	6,030.00	5,871.95	69.86	27.40	-25.48	831.58	-926.43	2,076.08	2,034.73	41.35	50.211				
9,400.00	7,263.88	6,030.00	5,871.95	72.57	27.40	-25.48	831.58	-926.43	2,144.13	2,101.72	42.41	50.555				
9,500.00	7,263.68	6,030.00	5,871.95	75.30	27.40	-25.48	831.58	-926.43	2,214.61	2,171.20	43.40	51.022				
9,600.00	7,263.49	6,030.00	5,871.95	78.05	27.40	-25.48	831.58	-926.43	2,287.28	2,242.96	44.33	51.600				
9,700.00	7,263.29	6,030.00	5,871.95	80.82	27.40	-25.48	831.58	-926.43	2,361.96	2,316.78	45.18	52.275				
9,800.00	7,263.09	6,030.00	5,871.95	83.61	27.40	-25.48	831.58	-926.43	2,438.45	2,392.48	45.98	53.038				
9,900.00	7,262.90	6,030.00	5,871.95	86.42	27.40	-25.48	831.58	-926.43	2,516.59	2,469.88	46.71	53.878				
10,000.00	7,262.70	6,030.00	5,871.95	89.24	27.40	-25.48	831.58	-926.43	2,596.23	2,548.85	47.39	54.786				
10,100.00	7,262.51	6,030.00	5,871.95	92.07	27.40	-25.48	831.58	-926.43	2,677.24	2,629.22	48.02	55.755				
10,200.00	7,262.31	6,030.00	5,871.95	94.92	27.40	-25.48	831.58	-926.43	2,759.50	2,710.89	48.60	56.778				
10,300.00	7,262.11	6,030.00	5,871.95	97.77	27.40	-25.48	831.58	-926.43	2,842.89	2,793.74	49.14	57.849				
10,400.00	7,261.92	6,030.00	5,871.95	100.64	27.40	-25.48	831.58	-926.43	2,927.32	2,877.67	49.65	58.963				
10,500.00	7,261.72	6,030.00	5,871.95	103.51	27.40	-25.48	831.58	-926.43	3,012.70	2,962.59	50.11	60.116				
10,600.00	7,261.53	6,030.00	5,871.95	106.39	27.40	-25.48	831.58	-926.43	3,098.96	3,048.41	50.55	61.304				
10,700.00	7,261.33	6,030.00	5,871.95	109.28	27.40	-25.48	831.58	-926.43	3,186.03	3,135.07	50.96	62.522				
10,800.00	7,261.13	6,030.00	5,871.95	112.18	27.40	-25.48	831.58	-926.43	3,273.83	3,222.49	51.34	63.769				
10,900.00	7,260.94	6,030.00	5,871.95	115.08	27.40	-25.48	831.58	-926.43	3,362.31	3,310.62	51.70	65.041				
11,000.00	7,260.74	6,030.00	5,871.95	117.99	27.40	-25.48	831.58	-926.43	3,451.43	3,399.40	52.03	66.335				
11,100.00	7,260.55	6,030.00	5,871.95	120.91	27.40	-25.48	831.58	-926.43	3,541.12	3,488.78	52.34	67.650				
11,200.00	7,260.35	6,030.00	5,871.95	123.83	27.40	-25.48	831.58	-926.43	3,631.35	3,578.71	52.64	68.984				
11,300.00	7,260.15	6,030.00	5,871.95	126.75	27.40	-25.48	831.58	-926.43	3,722.08	3,669.16	52.92	70.334				
11,400.00	7,259.96	6,030.00	5,871.95	129.68	27.40	-25.48	831.58	-926.43	3,813.28	3,760.10	53.18	71.699				
11,500.00	7,259.76	6,030.00	5,871.95	132.61	27.40	-25.48	831.58	-926.43	3,904.91	3,851.47	53.43	73.078				
11,600.00	7,259.57	6,030.00	5,871.95	135.55	27.40	-25.48	831.58	-926.43	3,996.93	3,943.26	53.67	74.470				
11,700.00	7,259.37	6,030.00	5,871.95	138.49	27.40	-25.48	831.58	-926.43	4,089.34	4,035.44	53.90	75.873				
11,800.00	7,259.17	6,030.00	5,871.95	141.43	27.40	-25.48	831.58	-926.43	4,182.09	4,127.98	54.11	77.286				
11,900.00	7,258.98	6,030.00	5,871.95	144.38	27.40	-25.48	831.58	-926.43	4,275.17	4,220.85	54.32	78.708				
12,000.00	7,258.78	6,030.00	5,871.95	147.33	27.40	-25.48	831.58	-926.43	4,368.55	4,314.04	54.51	80.138				
12,100.00	7,258.59	6,030.00	5,871.95	150.28	27.40	-25.48	831.58	-926.43	4,462.22	4,407.52	54.70	81.576				
12,200.00	7,258.39	6,030.00	5,871.95	153.24	27.40	-25.48	831.58	-926.43	4,556.16	4,501.28	54.88	83.021				
12,300.00	7,258.19	6,030.00	5,871.95	156.20	27.40	-25.48	831.58	-926.43	4,650.36	4,595.30	55.05	84.472				
12,400.00	7,258.00	6,030.00	5,871.95	159.16	27.40	-25.48	831.58	-926.43	4,744.79	4,689.57	55.22	85.928				
12,500.00	7,257.80	6,030.00	5,871.95	162.12	27.40	-25.48	831.58	-926.43	4,839.44	4,784.06	55.38	87.389				
12,600.00	7,257.61	6,030.00	5,871.95	165.08	27.40	-25.48	831.58	-926.43	4,934.31	4,878.78	55.53	88.855				
12,700.00	7,257.41	6,030.00	5,871.95	168.05	27.40	-25.48	831.58	-926.43	5,029.37	4,973.69	55.68	90.324				

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM													Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (ft)		Minimum Separation (ft)	Separation Factor	Warning	
							+N/-S (ft)	+E/-W (ft)						
12,800.00	7,257.21	6,030.00	5,871.95	171.02	27.40	-25.48	831.58	-926.43	5,124.62	5,068.80	55.83	91.797		
12,900.00	7,257.02	6,030.00	5,871.95	173.99	27.40	-25.48	831.58	-926.43	5,220.05	5,164.09	55.97	93.272		
13,000.00	7,256.82	6,030.00	5,871.95	176.96	27.40	-25.48	831.58	-926.43	5,315.65	5,259.55	56.10	94.751		
13,100.00	7,256.63	6,030.00	5,871.95	179.93	27.40	-25.48	831.58	-926.43	5,411.41	5,355.18	56.23	96.231		
13,200.00	7,256.43	6,030.00	5,871.95	182.91	27.40	-25.48	831.58	-926.43	5,507.32	5,450.95	56.36	97.713		
13,300.00	7,256.23	6,030.00	5,871.95	185.88	27.40	-25.48	831.58	-926.43	5,603.37	5,546.88	56.49	99.197		
13,400.00	7,256.04	6,030.00	5,871.95	188.86	27.40	-25.48	831.58	-926.43	5,699.55	5,642.94	56.61	100.681		
13,500.00	7,255.84	6,030.00	5,871.95	191.84	27.40	-25.48	831.58	-926.43	5,795.87	5,739.14	56.73	102.167		
13,600.00	7,255.65	6,030.00	5,871.95	194.82	27.40	-25.48	831.58	-926.43	5,892.31	5,835.46	56.85	103.653		
13,700.00	7,255.45	6,030.00	5,871.95	197.80	27.40	-25.48	831.58	-926.43	5,988.86	5,931.90	56.96	105.140		
13,800.00	7,255.25	6,030.00	5,871.95	200.78	27.40	-25.48	831.58	-926.43	6,085.53	6,028.46	57.07	106.627		
13,900.00	7,255.06	6,030.00	5,871.95	203.77	27.40	-25.48	831.58	-926.43	6,182.30	6,125.12	57.18	108.114		
14,000.00	7,254.86	6,030.00	5,871.95	206.75	27.40	-25.48	831.58	-926.43	6,279.18	6,221.89	57.29	109.600		
14,100.00	7,254.67	6,030.00	5,871.95	209.74	27.40	-25.48	831.58	-926.43	6,376.15	6,318.75	57.40	111.086		
14,200.00	7,254.47	6,030.00	5,871.95	212.72	27.40	-25.48	831.58	-926.43	6,473.21	6,415.71	57.50	112.572		
14,300.00	7,254.28	6,030.00	5,871.95	215.71	27.40	-25.48	831.58	-926.43	6,570.36	6,512.75	57.61	114.056		
14,400.00	7,254.08	6,030.00	5,871.95	218.70	27.40	-25.48	831.58	-926.43	6,667.60	6,609.89	57.71	115.539		
14,500.00	7,253.88	6,030.00	5,871.95	221.69	27.40	-25.48	831.58	-926.43	6,764.91	6,707.10	57.81	117.022		
14,600.00	7,253.69	6,030.00	5,871.95	224.68	27.40	-25.48	831.58	-926.43	6,862.30	6,804.39	57.91	118.503		
14,700.00	7,253.49	6,030.00	5,871.95	227.67	27.40	-25.48	831.58	-926.43	6,959.77	6,901.76	58.01	119.982		
14,800.00	7,253.30	6,030.00	5,871.95	230.66	27.40	-25.48	831.58	-926.43	7,057.31	6,999.20	58.10	121.460		
14,900.00	7,253.10	6,030.00	5,871.95	233.65	27.40	-25.48	831.58	-926.43	7,154.91	7,096.71	58.20	122.936		
15,000.00	7,252.90	6,030.00	5,871.95	236.65	27.40	-25.48	831.58	-926.43	7,252.58	7,194.29	58.30	124.410		
15,100.00	7,252.71	6,030.00	5,871.95	239.64	27.40	-25.48	831.58	-926.43	7,350.32	7,291.93	58.39	125.882		
15,200.00	7,252.51	6,030.00	5,871.95	242.63	27.40	-25.48	831.58	-926.43	7,448.11	7,389.63	58.48	127.352		
15,300.00	7,252.32	6,030.00	5,871.95	245.63	27.40	-25.48	831.58	-926.43	7,545.96	7,487.38	58.58	128.820		
15,400.00	7,252.12	6,030.00	5,871.95	248.62	27.40	-25.48	831.58	-926.43	7,643.87	7,585.20	58.67	130.285		
15,500.00	7,251.92	6,030.00	5,871.95	251.62	27.40	-25.48	831.58	-926.43	7,741.83	7,683.07	58.76	131.749		
15,600.00	7,251.73	6,030.00	5,871.95	254.62	27.40	-25.48	831.58	-926.43	7,839.84	7,780.99	58.85	133.209		
15,700.00	7,251.53	6,030.00	5,871.95	257.61	27.40	-25.48	831.58	-926.43	7,937.90	7,878.96	58.94	134.667		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST1 - ST1													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Vertical	Reference	Semi Major Axis	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning
Measured	Depth	Depth	Depth	Reference	Offset	Offset	Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor	
Depth	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	Centres	Ellipses	(ft)		
0.00	0.00	0.50	0.50	0.00	0.00	-53.32		27.00	-36.25	45.20				
100.00	100.00	100.36	100.36	0.27	0.17	-52.85		27.39	-36.15	45.35	44.92	0.44	103.389	
200.00	200.00	200.21	200.20	0.63	0.34	-51.50		28.53	-35.87	45.84	44.87	0.96	47.538	
300.00	300.00	300.03	300.00	0.99	0.50	-49.31		30.44	-35.40	46.69	45.20	1.49	31.346	
400.00	400.00	399.85	399.78	1.35	0.75	-46.40		33.09	-34.75	47.99	45.89	2.09	22.919	
500.00	500.00	500.09	499.98	1.70	1.11	-43.27		36.02	-33.92	49.48	46.67	2.81	17.596	
600.00	600.00	600.74	600.61	2.06	1.46	-41.54		37.31	-33.06	49.85	46.33	3.52	14.152	
650.00	650.00	650.98	650.86	2.24	1.63	-41.76		37.00	-33.03	49.60	45.73	3.87	12.810	
700.00	700.00	701.00	700.87	2.42	1.80	-35.18		36.28	-33.27	48.87	44.66	4.22	11.587	
800.00	799.93	800.58	800.42	2.78	2.13	-40.26		34.49	-34.34	45.60	40.69	4.91	9.282	
900.00	899.68	900.32	900.15	3.14	2.48	-49.17		33.26	-35.65	40.92	35.30	5.62	7.287	
1,000.00	999.13	999.11	998.92	3.51	2.82	-64.37		32.24	-36.86	35.79	29.47	6.32	5.664	
1,056.84	1,055.48	1,055.02	1,054.81	3.71	3.02	-76.31		32.17	-38.46	34.83	28.11	6.72	5.181 CC, ES	
1,100.00	1,098.15	1,097.53	1,097.30	3.87	3.17	-85.96		32.55	-40.00	35.42	28.39	7.03	5.037 SF	
1,200.00	1,196.63	1,196.06	1,195.70	4.25	3.52	-106.61		34.75	-44.50	41.38	33.61	7.76	5.331	
1,300.00	1,294.44	1,294.17	1,293.56	4.65	3.87	-121.73		38.27	-50.40	53.33	44.83	8.50	6.275	
1,324.38	1,318.17	1,318.06	1,317.36	4.75	3.95	-124.46		39.33	-52.14	57.04	48.36	8.68	6.571	
1,400.00	1,391.70	1,392.47	1,391.42	5.06	4.22	-130.60		43.34	-58.20	69.34	60.10	9.24	7.502	
1,500.00	1,488.95	1,491.08	1,489.34	5.49	4.58	-134.62		50.13	-67.63	86.03	76.04	10.00	8.607	
1,600.00	1,586.19	1,590.73	1,588.06	5.92	4.96	-136.32		58.57	-78.28	102.34	91.57	10.77	9.506	
1,700.00	1,683.43	1,690.66	1,686.76	6.36	5.34	-136.62		69.02	-89.85	117.60	106.04	11.55	10.179	
1,800.00	1,780.67	1,790.13	1,784.64	6.81	5.73	-135.93		81.21	-102.67	132.15	119.79	12.36	10.693	
1,900.00	1,877.91	1,888.85	1,881.32	7.26	6.13	-134.42		94.84	-117.21	146.56	133.38	13.18	11.117	
2,000.00	1,975.16	1,985.81	1,975.75	7.71	6.55	-132.30		109.21	-133.89	161.82	147.80	14.02	11.539	
2,100.00	2,072.40	2,084.53	2,071.29	8.17	6.99	-129.69		125.04	-153.03	177.79	162.89	14.90	11.929	
2,200.00	2,169.64	2,183.85	2,167.08	8.62	7.44	-127.11		142.11	-172.96	193.73	177.92	15.81	12.254	
2,300.00	2,266.88	2,282.41	2,262.13	9.08	7.91	-124.93		159.19	-192.64	209.81	193.09	16.72	12.549	
2,400.00	2,364.12	2,382.03	2,358.26	9.55	8.38	-123.07		176.62	-212.15	225.74	208.10	17.64	12.794	
2,500.00	2,461.37	2,480.89	2,453.77	10.01	8.86	-121.59		193.79	-231.00	241.58	223.01	18.57	13.011	
2,600.00	2,558.61	2,579.47	2,549.07	10.48	9.33	-120.33		210.79	-249.62	257.47	237.98	19.49	13.210	
2,700.00	2,655.85	2,677.98	2,644.32	10.94	9.81	-119.24		227.71	-268.22	273.53	253.11	20.42	13.397	
2,800.00	2,753.09	2,776.71	2,739.71	11.41	10.30	-118.21		244.91	-286.98	289.61	268.26	21.35	13.564	
2,900.00	2,850.33	2,875.65	2,835.34	11.88	10.79	-117.31		262.07	-305.71	305.76	283.47	22.29	13.718	
3,000.00	2,947.58	2,974.60	2,931.00	12.35	11.28	-116.52		279.29	-324.18	321.73	298.50	23.23	13.851	
3,100.00	3,044.82	3,074.23	3,027.57	12.82	11.77	-115.96		295.88	-342.28	337.77	313.60	24.17	13.975	
3,200.00	3,142.06	3,174.30	3,124.82	13.29	12.26	-115.60		312.07	-359.45	353.25	328.14	25.11	14.069	
3,300.00	3,239.30	3,272.00	3,219.88	13.76	12.73	-115.37		327.46	-375.93	368.75	342.73	26.02	14.170	
3,400.00	3,336.54	3,367.79	3,313.00	14.23	13.20	-115.13		342.44	-392.63	384.79	357.87	26.92	14.292	
3,500.00	3,433.79	3,463.49	3,405.60	14.71	13.68	-114.67		358.28	-410.85	401.67	373.83	27.84	14.429	
3,600.00	3,531.03	3,559.33	3,497.93	15.18	14.17	-114.04		375.03	-430.37	419.19	390.43	28.76	14.574	
3,700.00	3,628.27	3,658.52	3,593.44	15.65	14.69	-113.43		392.21	-450.88	437.11	407.38	29.73	14.703	
3,800.00	3,725.51	3,757.01	3,688.49	16.13	15.20	-112.97		408.84	-470.61	454.73	424.05	30.68	14.821	
3,900.00	3,822.75	3,859.35	3,787.62	16.60	15.72	-112.71		425.06	-490.17	472.14	440.48	31.66	14.912	
4,000.00	3,920.00	3,961.05	3,886.71	17.07	16.21	-112.73		439.76	-507.71	488.68	456.06	32.62	14.982	
4,100.00	4,017.24	4,060.59	3,984.03	17.55	16.68	-112.92		453.12	-523.83	504.83	471.29	33.54	15.053	
4,200.00	4,114.48	4,154.65	4,076.02	18.02	17.12	-113.12		465.31	-539.17	521.34	486.94	34.40	15.154	
4,300.00	4,211.72	4,250.55	4,169.58	18.50	17.58	-113.22		478.16	-555.87	538.56	503.26	35.30	15.258	
4,400.00	4,308.96	4,356.48	4,272.70	18.97	18.09	-113.19		493.64	-574.47	555.27	518.97	36.30	15.298	
4,500.00	4,406.21	4,452.18	4,365.70	19.45	18.57	-113.07		508.57	-591.45	571.63	534.42	37.21	15.364	
4,600.00	4,503.45	4,546.01	4,456.32	19.93	19.05	-112.76		524.57	-609.74	588.74	550.62	38.11	15.446	

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST1 - ST1													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM													Offset Well Error:	0.00 ft
Rule Assigned:													Warning	
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)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
4,700.00	4,600.69	4,645.20	4,551.72	20.40	19.58	-112.29	542.64	-630.02	606.08	566.99	39.09	15.504		
4,800.00	4,697.93	4,740.79	4,643.89	20.88	20.08	-111.97	559.08	-649.25	623.70	583.68	40.02	15.583		
4,900.00	4,795.18	4,836.61	4,736.36	21.35	20.59	-111.70	575.11	-668.60	641.63	600.67	40.96	15.666		
5,000.00	4,892.42	4,927.84	4,823.83	21.83	21.09	-111.28	591.51	-688.65	660.49	618.64	41.85	15.781		
5,100.00	4,989.66	5,027.06	4,918.27	22.31	21.65	-110.65	611.24	-711.85	679.72	636.86	42.86	15.859		
5,200.00	5,086.90	5,132.99	5,019.10	22.78	22.20	-110.00	632.52	-736.34	698.73	654.85	43.88	15.923		
5,300.00	5,184.14	5,260.33	5,141.82	23.26	22.66	-109.63	656.24	-760.59	714.87	669.96	44.91	15.918		
5,400.00	5,281.39	5,373.65	5,252.52	23.74	22.86	-109.74	674.34	-776.56	727.88	682.27	45.61	15.959		
5,500.00	5,378.63	5,470.26	5,347.39	24.21	22.99	-110.01	688.07	-788.56	740.27	694.07	46.20	16.024		
5,600.00	5,475.87	5,576.72	5,451.73	24.69	23.15	-110.21	704.37	-802.09	752.42	705.58	46.84	16.064		
5,700.00	5,573.11	5,695.32	5,567.65	25.17	23.35	-110.30	725.03	-816.22	762.89	715.36	47.53	16.051		
5,800.00	5,670.35	5,835.06	5,703.77	25.64	23.60	-110.23	753.67	-829.35	769.80	721.58	48.23	15.962		
5,900.00	5,767.60	5,970.65	5,834.79	26.12	23.85	-109.94	787.77	-836.45	770.48	721.62	48.86	15.769		
6,000.00	5,864.84	6,064.45	5,925.25	26.60	24.04	-109.71	812.22	-840.56	770.22	720.65	49.56	15.540		
6,004.45	5,869.16	6,068.74	5,929.40	26.62	24.05	-109.70	813.32	-840.75	770.22	720.63	49.59	15.530		
6,100.00	5,962.08	6,158.26	6,016.07	27.08	24.22	-109.57	835.35	-844.61	770.59	720.32	50.26	15.331		
6,200.00	6,059.32	6,245.15	6,100.83	27.55	24.39	-109.63	854.12	-848.25	772.27	721.31	50.96	15.155		
6,300.00	6,156.56	6,328.76	6,183.09	28.03	24.53	-109.92	868.61	-851.77	775.95	724.33	51.62	15.032		
6,400.00	6,253.81	6,412.00	6,265.54	28.51	24.66	-110.45	879.55	-855.11	781.53	729.29	52.24	14.960		
6,500.00	6,351.05	7,161.00	6,891.47	28.99	25.28	-120.48	1,055.04	-620.64	736.16	695.83	40.33	18.252		
6,600.00	6,448.29	7,161.00	6,891.47	29.46	25.28	-120.48	1,055.04	-620.64	674.02	630.15	43.87	15.365		
6,700.00	6,545.53	7,161.00	6,891.47	29.94	25.28	-120.48	1,055.04	-620.64	621.82	574.24	47.58	13.069		
6,800.00	6,642.77	7,161.00	6,891.47	30.42	25.28	-120.48	1,055.04	-620.64	582.26	531.15	51.11	11.393		
6,825.58	6,667.65	7,161.00	6,891.47	30.54	25.28	-120.48	1,055.04	-620.64	574.50	522.58	51.92	11.066		
6,850.00	6,691.37	7,161.00	6,891.47	30.66	25.28	-112.07	1,055.04	-620.64	567.71	515.08	52.63	10.786		
6,900.00	6,739.71	7,161.00	6,891.47	30.90	25.28	-97.35	1,055.04	-620.64	554.68	500.79	53.90	10.292		
6,950.00	6,787.49	7,161.00	6,891.47	31.15	25.28	-86.54	1,055.04	-620.64	542.94	488.10	54.84	9.900		
7,000.00	6,834.40	7,161.00	6,891.47	31.40	25.28	-78.93	1,055.04	-620.64	532.64	477.22	55.43	9.609		
7,050.00	6,880.16	7,161.00	6,891.47	31.64	25.28	-73.55	1,055.04	-620.64	523.95	468.32	55.63	9.419		
7,100.00	6,924.48	7,161.00	6,891.47	31.89	25.28	-69.63	1,055.04	-620.64	516.99	461.57	55.42	9.328		
7,150.00	6,967.10	7,161.00	6,891.47	32.14	25.28	-66.68	1,055.04	-620.64	511.88	457.07	54.81	9.339		
7,199.24	7,007.14	7,161.00	6,891.47	32.39	25.28	-64.40	1,055.04	-620.64	508.74	454.93	53.82	9.453		
7,200.00	7,007.75	7,161.00	6,891.47	32.39	25.28	-64.37	1,055.04	-620.64	508.71	454.91	53.80	9.455		
7,239.98	7,038.66	7,161.00	6,891.47	32.59	25.28	-62.83	1,055.04	-620.64	507.61	454.87	52.74	9.625		
7,250.00	7,046.17	7,161.00	6,891.47	32.64	25.28	-62.48	1,055.04	-620.64	507.53	455.09	52.44	9.679		
7,256.05	7,050.66	7,161.00	6,891.47	32.67	25.28	-62.27	1,055.04	-620.64	507.53	455.27	52.25	9.713		
7,300.00	7,082.14	7,161.00	6,891.47	32.90	25.28	-60.87	1,055.04	-620.64	508.37	457.59	50.78	10.011		
7,350.00	7,115.44	7,161.00	6,891.47	33.17	25.28	-59.45	1,055.04	-620.64	511.20	462.30	48.90	10.453		
7,400.00	7,145.84	7,161.00	6,891.47	33.45	25.28	-58.16	1,055.04	-620.64	515.99	469.08	46.91	11.000		
7,450.00	7,173.18	7,161.00	6,891.47	33.75	25.28	-56.95	1,055.04	-620.64	522.64	477.74	44.90	11.640		
7,500.00	7,197.27	7,161.00	6,891.47	34.07	25.28	-55.79	1,055.04	-620.64	531.05	488.06	42.99	12.353		
7,550.00	7,217.98	7,161.00	6,891.47	34.42	25.28	-54.67	1,055.04	-620.64	541.08	499.80	41.28	13.108		
7,600.00	7,235.17	7,161.00	6,891.47	34.81	25.28	-53.58	1,055.04	-620.64	552.59	512.73	39.86	13.863		
7,650.00	7,248.74	7,161.00	6,891.47	35.24	25.28	-52.52	1,055.04	-620.64	565.41	526.61	38.81	14.570		
7,700.00	7,258.60	7,161.00	6,891.47	35.72	25.28	-51.49	1,055.04	-620.64	579.39	541.24	38.15	15.187		
7,750.00	7,264.69	7,161.00	6,891.47	36.24	25.28	-50.51	1,055.04	-620.64	594.36	556.46	37.90	15.682		
7,800.00	7,266.98	7,161.00	6,891.47	36.81	25.28	-49.56	1,055.04	-620.64	610.15	572.12	38.03	16.042		
7,806.27	7,267.00	7,161.00	6,891.47	36.89	25.28	-49.45	1,055.04	-620.64	612.18	574.11	38.07	16.079		
7,900.00	7,266.82	7,161.00	6,891.47	38.11	25.28	-49.45	1,055.04	-620.64	648.71	609.63	39.08	16.598		
8,000.00	7,266.62	7,096.00	6,851.79	39.63	25.39	-46.64	1,054.80	-672.12	695.22	656.53	38.69	17.970		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST1 - ST1													Offset Site Error: 0.00 ft	
Survey Program:		359-MWD+HDGM, 5279-MWD+HDGM							Rule Assigned:				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)				
8,100.00	7,266.42	7,058.31	6,827.94	41.34	25.45	-45.12	1,053.80	-701.27	747.01	707.73	39.28	19.020		
8,200.00	7,266.23	7,001.00	6,788.66	43.22	25.55	-43.00	1,048.94	-742.68	806.35	766.93	39.41	20.458		
8,300.00	7,266.03	7,001.00	6,788.66	45.24	25.55	-43.00	1,048.94	-742.68	868.48	827.37	41.11	21.125		
8,400.00	7,265.84	7,001.00	6,788.66	47.38	25.55	-43.00	1,048.94	-742.68	937.19	894.51	42.69	21.956		
8,500.00	7,265.64	6,959.57	6,758.22	49.63	25.58	-41.66	1,042.60	-770.04	1,008.37	965.21	43.16	23.365		
8,600.00	7,265.44	6,941.05	6,744.13	51.96	25.59	-41.12	1,038.88	-781.47	1,083.62	1,039.55	44.07	24.589		
8,700.00	7,265.25	6,906.00	6,716.76	54.36	25.63	-40.21	1,030.36	-801.62	1,162.19	1,117.62	44.57	26.076		
8,800.00	7,265.05	6,906.00	6,716.76	56.83	25.63	-40.21	1,030.36	-801.62	1,242.16	1,196.54	45.62	27.229		
8,900.00	7,264.86	6,906.00	6,716.76	59.35	25.63	-40.21	1,030.36	-801.62	1,324.85	1,278.33	46.53	28.474		
9,000.00	7,264.66	6,906.00	6,716.76	61.92	25.63	-40.21	1,030.36	-801.62	1,409.79	1,362.47	47.32	29.794		
9,100.00	7,264.46	6,906.00	6,716.76	64.53	25.63	-40.21	1,030.36	-801.62	1,496.59	1,448.59	48.00	31.176		
9,200.00	7,264.27	6,865.70	6,684.25	67.18	25.60	-39.34	1,018.05	-821.95	1,582.29	1,534.17	48.12	32.885		
9,300.00	7,264.07	6,857.19	6,677.25	69.86	25.59	-39.18	1,015.10	-825.80	1,670.76	1,622.18	48.58	34.390		
9,400.00	7,263.88	6,810.00	6,637.96	72.57	25.56	-38.44	996.56	-844.13	1,762.74	1,714.13	48.62	36.258		
9,500.00	7,263.68	6,810.00	6,637.96	75.30	25.56	-38.44	996.56	-844.13	1,852.30	1,803.21	49.09	37.730		
9,600.00	7,263.49	6,810.00	6,637.96	78.05	25.56	-38.44	996.56	-844.13	1,942.89	1,893.37	49.52	39.235		
9,700.00	7,263.29	6,810.00	6,637.96	80.82	25.56	-38.44	996.56	-844.13	2,034.35	1,984.45	49.90	40.767		
9,800.00	7,263.09	6,810.00	6,637.96	83.61	25.56	-38.44	996.56	-844.13	2,126.58	2,076.34	50.25	42.324		
9,900.00	7,262.90	6,810.00	6,637.96	86.42	25.56	-38.44	996.56	-844.13	2,219.49	2,168.93	50.56	43.900		
10,000.00	7,262.70	6,810.00	6,637.96	89.24	25.56	-38.44	996.56	-844.13	2,312.99	2,262.15	50.84	45.495		
10,100.00	7,262.51	6,810.00	6,637.96	92.07	25.56	-38.44	996.56	-844.13	2,407.01	2,355.91	51.10	47.104		
10,200.00	7,262.31	6,810.00	6,637.96	94.92	25.56	-38.44	996.56	-844.13	2,501.49	2,450.16	51.34	48.726		
10,300.00	7,262.11	6,810.00	6,637.96	97.77	25.56	-38.44	996.56	-844.13	2,596.39	2,544.83	51.56	50.360		
10,400.00	7,261.92	6,810.00	6,637.96	100.64	25.56	-38.44	996.56	-844.13	2,691.66	2,639.90	51.76	52.003		
10,500.00	7,261.72	6,810.00	6,637.96	103.51	25.56	-38.44	996.56	-844.13	2,787.26	2,735.31	51.95	53.655		
10,600.00	7,261.53	6,810.00	6,637.96	106.39	25.56	-38.44	996.56	-844.13	2,883.15	2,831.03	52.12	55.313		
10,700.00	7,261.33	6,810.00	6,637.96	109.28	25.56	-38.44	996.56	-844.13	2,979.32	2,927.03	52.29	56.978		
10,800.00	7,261.13	6,810.00	6,637.96	112.18	25.56	-38.44	996.56	-844.13	3,075.73	3,023.29	52.44	58.648		
10,900.00	7,260.94	6,810.00	6,637.96	115.08	25.56	-38.44	996.56	-844.13	3,172.36	3,119.77	52.59	60.322		
11,000.00	7,260.74	6,810.00	6,637.96	117.99	25.56	-38.44	996.56	-844.13	3,269.20	3,216.47	52.73	62.000		
11,100.00	7,260.55	6,810.00	6,637.96	120.91	25.56	-38.44	996.56	-844.13	3,366.22	3,313.36	52.86	63.681		
11,200.00	7,260.35	6,810.00	6,637.96	123.83	25.56	-38.44	996.56	-844.13	3,463.41	3,410.43	52.99	65.365		
11,300.00	7,260.15	6,810.00	6,637.96	126.75	25.56	-38.44	996.56	-844.13	3,560.76	3,507.65	53.11	67.050		
11,400.00	7,259.96	6,810.00	6,637.96	129.68	25.56	-38.44	996.56	-844.13	3,658.25	3,605.03	53.22	68.737		
11,500.00	7,259.76	6,810.00	6,637.96	132.61	25.56	-38.44	996.56	-844.13	3,755.87	3,702.54	53.33	70.425		
11,600.00	7,259.57	6,810.00	6,637.96	135.55	25.56	-38.44	996.56	-844.13	3,853.61	3,800.17	53.44	72.114		
11,700.00	7,259.37	6,810.00	6,637.96	138.49	25.56	-38.44	996.56	-844.13	3,951.47	3,897.93	53.54	73.803		
11,800.00	7,259.17	6,810.00	6,637.96	141.43	25.56	-38.44	996.56	-844.13	4,049.43	3,995.79	53.64	75.491		
11,900.00	7,258.98	6,810.00	6,637.96	144.38	25.56	-38.44	996.56	-844.13	4,147.49	4,093.75	53.74	77.180		
12,000.00	7,258.78	6,765.10	6,599.66	147.33	25.45	-37.89	976.49	-856.06	4,242.23	4,188.54	53.69	79.019		
12,100.00	7,258.59	6,763.77	6,598.50	150.28	25.44	-37.88	975.87	-856.32	4,340.26	4,286.48	53.78	80.709		
12,200.00	7,258.39	6,762.48	6,597.39	153.24	25.44	-37.87	975.28	-856.57	4,438.38	4,384.51	53.87	82.397		
12,300.00	7,258.19	6,761.25	6,596.32	156.20	25.44	-37.85	974.70	-856.80	4,536.57	4,482.61	53.95	84.084		
12,400.00	7,258.00	6,760.07	6,595.30	159.16	25.43	-37.84	974.15	-857.02	4,634.83	4,580.79	54.04	85.769		
12,500.00	7,257.80	6,715.00	6,556.07	162.12	25.32	-37.39	952.64	-862.06	4,736.41	4,682.39	54.01	87.692		
12,600.00	7,257.61	6,715.00	6,556.07	165.08	25.32	-37.39	952.64	-862.06	4,834.64	4,780.54	54.10	89.365		
12,700.00	7,257.41	6,715.00	6,556.07	168.05	25.32	-37.39	952.64	-862.06	4,932.95	4,878.76	54.19	91.037		
12,800.00	7,257.21	6,715.00	6,556.07	171.02	25.32	-37.39	952.64	-862.06	5,031.32	4,977.05	54.27	92.708		
12,900.00	7,257.02	6,715.00	6,556.07	173.99	25.32	-37.39	952.64	-862.06	5,129.75	5,075.40	54.35	94.376		
13,000.00	7,256.82	6,715.00	6,556.07	176.96	25.32	-37.39	952.64	-862.06	5,228.25	5,173.81	54.44	96.042		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST1 - ST1													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Semi Major Axis	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning		
Measured Depth (ft)	Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Separation (ft)			
13,100.00	7,256.63	6,715.00	6,556.07	179.93	25.32	-37.39	952.64	-862.06	5,326.80	5,272.28	54.52	97.707		
13,200.00	7,256.43	6,715.00	6,556.07	182.91	25.32	-37.39	952.64	-862.06	5,425.40	5,370.80	54.60	99.368		
13,300.00	7,256.23	6,715.00	6,556.07	185.88	25.32	-37.39	952.64	-862.06	5,524.05	5,469.38	54.68	101.028		
13,400.00	7,256.04	6,715.00	6,556.07	188.86	25.32	-37.39	952.64	-862.06	5,622.76	5,568.00	54.76	102.684		
13,500.00	7,255.84	6,715.00	6,556.07	191.84	25.32	-37.39	952.64	-862.06	5,721.50	5,666.67	54.84	104.338		
13,600.00	7,255.65	6,715.00	6,556.07	194.82	25.32	-37.39	952.64	-862.06	5,820.29	5,765.38	54.91	105.989		
13,700.00	7,255.45	6,715.00	6,556.07	197.80	25.32	-37.39	952.64	-862.06	5,919.12	5,864.13	54.99	107.638		
13,800.00	7,255.25	6,715.00	6,556.07	200.78	25.32	-37.39	952.64	-862.06	6,017.99	5,962.92	55.07	109.283		
13,900.00	7,255.06	6,715.00	6,556.07	203.77	25.32	-37.39	952.64	-862.06	6,116.89	6,061.75	55.14	110.924		
14,000.00	7,254.86	6,715.00	6,556.07	206.75	25.32	-37.39	952.64	-862.06	6,215.84	6,160.61	55.22	112.563		
14,100.00	7,254.67	6,715.00	6,556.07	209.74	25.32	-37.39	952.64	-862.06	6,314.81	6,259.51	55.30	114.198		
14,200.00	7,254.47	6,715.00	6,556.07	212.72	25.32	-37.39	952.64	-862.06	6,413.81	6,358.44	55.37	115.830		
14,300.00	7,254.28	6,715.00	6,556.07	215.71	25.32	-37.39	952.64	-862.06	6,512.85	6,457.40	55.45	117.458		
14,400.00	7,254.08	6,715.00	6,556.07	218.70	25.32	-37.39	952.64	-862.06	6,611.92	6,556.39	55.52	119.083		
14,500.00	7,253.88	6,715.00	6,556.07	221.69	25.32	-37.39	952.64	-862.06	6,711.01	6,655.41	55.60	120.704		
14,600.00	7,253.69	6,715.00	6,556.07	224.68	25.32	-37.39	952.64	-862.06	6,810.13	6,754.45	55.67	122.321		
14,700.00	7,253.49	6,715.00	6,556.07	227.67	25.32	-37.39	952.64	-862.06	6,909.27	6,853.52	55.75	123.934		
14,800.00	7,253.30	6,715.00	6,556.07	230.66	25.32	-37.39	952.64	-862.06	7,008.44	6,952.62	55.82	125.544		
14,900.00	7,253.10	6,715.00	6,556.07	233.65	25.32	-37.39	952.64	-862.06	7,107.63	7,051.73	55.90	127.149		
15,000.00	7,252.90	6,715.00	6,556.07	236.65	25.32	-37.39	952.64	-862.06	7,206.85	7,150.87	55.98	128.751		
15,100.00	7,252.71	6,715.00	6,556.07	239.64	25.32	-37.39	952.64	-862.06	7,306.08	7,250.03	56.05	130.348		
15,200.00	7,252.51	6,715.00	6,556.07	242.63	25.32	-37.39	952.64	-862.06	7,405.34	7,349.21	56.13	131.941		
15,300.00	7,252.32	6,715.00	6,556.07	245.63	25.32	-37.39	952.64	-862.06	7,504.62	7,448.41	56.20	133.530		
15,400.00	7,252.12	6,715.00	6,556.07	248.62	25.32	-37.39	952.64	-862.06	7,603.91	7,547.63	56.28	135.115		
15,500.00	7,251.92	6,715.00	6,556.07	251.62	25.32	-37.39	952.64	-862.06	7,703.22	7,646.87	56.35	136.695		
15,600.00	7,251.73	6,715.00	6,556.07	254.62	25.32	-37.39	952.64	-862.06	7,802.56	7,746.13	56.43	138.271		
15,700.00	7,251.53	6,715.00	6,556.07	257.61	25.32	-37.39	952.64	-862.06	7,901.90	7,845.40	56.51	139.843		



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST2 - ST2													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM, 6808-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis	Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Tooface (")	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Separation (ft)	Factor		
0.00	0.00	0.50	0.50	0.00	0.00	-53.32	27.00	-36.25	45.20					
100.00	100.00	100.36	100.36	0.27	0.17	-52.85	27.39	-36.15	45.35	44.92	0.44	103.389		
200.00	200.00	200.21	200.20	0.63	0.34	-51.50	28.53	-35.87	45.84	44.87	0.96	47.538		
300.00	300.00	300.03	300.00	0.99	0.50	-49.31	30.44	-35.40	46.69	45.20	1.49	31.346		
400.00	400.00	399.85	399.78	1.35	0.75	-46.40	33.09	-34.75	47.99	45.89	2.09	22.919		
500.00	500.00	500.09	499.98	1.70	1.11	-43.27	36.02	-33.92	49.48	46.67	2.81	17.596		
600.00	600.00	600.74	600.61	2.06	1.46	-41.54	37.31	-33.06	49.85	46.33	3.52	14.152		
650.00	650.00	650.98	650.86	2.24	1.63	-41.76	37.00	-33.03	49.60	45.73	3.87	12.810		
700.00	700.00	701.00	700.87	2.42	1.80	-35.18	36.28	-33.27	48.87	44.66	4.22	11.587		
800.00	799.93	800.58	800.42	2.78	2.13	-40.26	34.49	-34.34	45.60	40.69	4.91	9.282		
900.00	899.68	900.32	900.15	3.14	2.48	-49.17	33.26	-35.65	40.92	35.30	5.62	7.287		
1,000.00	999.13	999.11	998.92	3.51	2.82	-64.37	32.24	-36.86	35.79	29.47	6.32	5.664		
1,056.84	1,055.48	1,055.02	1,054.81	3.71	3.02	-76.31	32.17	-38.46	34.83	28.11	6.72	5.181 CC, ES		
1,100.00	1,098.15	1,097.53	1,097.30	3.87	3.17	-85.96	32.55	-40.00	35.42	28.39	7.03	5.037		
1,200.00	1,196.63	1,196.06	1,195.70	4.25	3.52	-106.61	34.75	-44.50	41.38	33.61	7.76	5.331		
1,300.00	1,294.44	1,294.17	1,293.56	4.65	3.87	-121.73	38.27	-50.40	53.33	44.83	8.50	6.275		
1,324.38	1,318.17	1,318.06	1,317.36	4.75	3.95	-124.46	39.33	-52.14	57.04	48.36	8.68	6.571		
1,400.00	1,391.70	1,392.47	1,391.42	5.06	4.22	-130.60	43.34	-58.20	69.34	60.10	9.24	7.502		
1,500.00	1,488.95	1,491.08	1,489.34	5.49	4.58	-134.62	50.13	-67.63	86.03	76.04	10.00	8.607		
1,600.00	1,586.19	1,590.73	1,588.06	5.92	4.96	-136.32	58.57	-78.28	102.34	91.57	10.77	9.506		
1,700.00	1,683.43	1,690.66	1,686.76	6.36	5.34	-136.62	69.02	-89.85	117.60	106.04	11.55	10.179		
1,800.00	1,780.67	1,790.13	1,784.64	6.81	5.73	-135.93	81.21	-102.67	132.15	119.79	12.36	10.693		
1,900.00	1,877.91	1,888.85	1,881.32	7.26	6.13	-134.42	94.84	-117.21	146.56	133.38	13.18	11.117		
2,000.00	1,975.16	1,985.81	1,975.75	7.71	6.55	-132.30	109.21	-133.89	161.82	147.80	14.02	11.539		
2,100.00	2,072.40	2,084.53	2,071.29	8.17	6.99	-129.69	125.04	-153.03	177.79	162.89	14.90	11.929		
2,200.00	2,169.64	2,183.85	2,167.08	8.62	7.44	-127.11	142.11	-172.96	193.73	177.92	15.81	12.254		
2,300.00	2,266.88	2,282.41	2,262.13	9.08	7.91	-124.93	159.19	-192.64	209.81	193.09	16.72	12.549		
2,400.00	2,364.12	2,382.03	2,358.26	9.55	8.38	-123.07	176.62	-212.15	225.74	208.10	17.64	12.794		
2,500.00	2,461.37	2,480.89	2,453.77	10.01	8.86	-121.59	193.79	-231.00	241.58	223.01	18.57	13.011		
2,600.00	2,558.61	2,579.47	2,549.07	10.48	9.33	-120.33	210.79	-249.62	257.47	237.98	19.49	13.210		
2,700.00	2,655.85	2,677.98	2,644.32	10.94	9.82	-119.24	227.71	-268.22	273.53	253.11	20.42	13.397		
2,800.00	2,753.09	2,776.71	2,739.71	11.41	10.30	-118.21	244.91	-286.98	289.61	268.26	21.35	13.564		
2,900.00	2,850.33	2,875.65	2,835.34	11.88	10.79	-117.31	262.07	-305.71	305.76	283.47	22.29	13.718		
3,000.00	2,947.58	2,974.60	2,931.00	12.35	11.28	-116.52	279.29	-324.18	321.73	298.50	23.23	13.851		
3,100.00	3,044.82	3,074.24	3,027.57	12.82	11.77	-115.96	295.88	-342.28	337.77	313.60	24.17	13.974		
3,200.00	3,142.06	3,174.30	3,124.82	13.29	12.26	-115.60	312.07	-359.45	353.25	328.14	25.11	14.069		
3,300.00	3,239.30	3,272.00	3,219.88	13.76	12.73	-115.37	327.46	-375.93	368.75	342.73	26.02	14.170		
3,400.00	3,336.54	3,367.79	3,313.00	14.23	13.20	-115.13	342.44	-392.63	384.79	357.87	26.92	14.292		
3,500.00	3,433.79	3,463.49	3,405.60	14.71	13.68	-114.67	358.28	-410.85	401.67	373.83	27.84	14.429		
3,600.00	3,531.03	3,559.33	3,497.93	15.18	14.17	-114.04	375.03	-430.37	419.19	390.43	28.76	14.574		
3,700.00	3,628.27	3,658.52	3,593.44	15.65	14.69	-113.43	392.21	-450.88	437.11	407.38	29.73	14.703		
3,800.00	3,725.51	3,757.01	3,688.49	16.13	15.20	-112.97	408.84	-470.61	454.73	424.05	30.68	14.821		
3,900.00	3,822.75	3,859.35	3,787.62	16.60	15.72	-112.71	425.06	-490.17	472.14	440.48	31.66	14.912		
4,000.00	3,920.00	3,961.05	3,886.71	17.07	16.21	-112.73	439.76	-507.71	488.68	456.06	32.62	14.982		
4,100.00	4,017.24	4,060.59	3,984.03	17.55	16.68	-112.92	453.12	-523.83	504.83	471.29	33.54	15.053		
4,200.00	4,114.48	4,154.65	4,076.02	18.02	17.12	-113.12	465.31	-539.17	521.34	486.94	34.40	15.153		
4,300.00	4,211.72	4,250.55	4,169.58	18.50	17.58	-113.22	478.16	-555.87	538.56	503.26	35.30	15.258		
4,400.00	4,308.96	4,356.48	4,272.70	18.97	18.09	-113.19	493.64	-574.47	555.27	518.97	36.30	15.298		
4,500.00	4,406.21	4,452.18	4,365.70	19.45	18.57	-113.07	508.57	-591.45	571.63	534.42	37.21	15.363		
4,600.00	4,503.45	4,546.01	4,456.32	19.93	19.05	-112.76	524.57	-609.74	588.74	550.62	38.12	15.446		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST2 - ST2													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM, 6808-MWD+HDGM													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
Measured	Vertical	Measured	Vertical	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	4,600.69	4,645.20	4,551.72	20.40	19.58	-112.29	542.64	-630.02	606.08	566.99	39.09	15.504		
4,800.00	4,697.93	4,740.79	4,643.89	20.88	20.08	-111.97	559.08	-649.25	623.70	583.68	40.02	15.583		
4,900.00	4,795.18	4,836.61	4,736.36	21.35	20.59	-111.70	575.11	-668.60	641.63	600.67	40.96	15.666		
5,000.00	4,892.42	4,927.84	4,823.83	21.83	21.09	-111.28	591.52	-688.65	660.49	618.64	41.85	15.781		
5,100.00	4,989.66	5,027.06	4,918.27	22.31	21.65	-110.65	611.24	-711.85	679.72	636.86	42.86	15.859		
5,200.00	5,086.90	5,132.99	5,019.10	22.78	22.20	-110.00	632.52	-736.34	698.73	654.85	43.88	15.923		
5,300.00	5,184.14	5,260.33	5,141.82	23.26	22.66	-109.63	656.24	-760.59	714.87	669.96	44.91	15.918		
5,400.00	5,281.39	5,373.65	5,252.52	23.74	22.86	-109.74	674.34	-776.56	727.88	682.27	45.61	15.959		
5,500.00	5,378.63	5,470.26	5,347.39	24.21	22.99	-110.01	688.07	-788.56	740.27	694.07	46.20	16.024		
5,600.00	5,475.87	5,576.72	5,451.73	24.69	23.15	-110.21	704.37	-802.09	752.42	705.58	46.84	16.064		
5,700.00	5,573.11	5,695.32	5,567.65	25.17	23.35	-110.30	725.03	-816.22	762.89	715.36	47.53	16.051		
5,800.00	5,670.35	5,835.06	5,703.77	25.64	23.60	-110.23	753.67	-829.35	769.80	721.58	48.23	15.962		
5,900.00	5,767.60	5,970.65	5,834.79	26.12	23.86	-109.94	787.77	-836.45	770.48	721.62	48.86	15.769		
6,000.00	5,864.84	6,064.45	5,925.25	26.60	24.04	-109.71	812.22	-840.56	770.22	720.65	49.56	15.540		
6,004.45	5,869.16	6,068.74	5,929.40	26.62	24.05	-109.70	813.32	-840.75	770.22	720.63	49.59	15.530		
6,100.00	5,962.08	6,158.26	6,016.07	27.08	24.22	-109.57	835.35	-844.61	770.59	720.32	50.26	15.331		
6,200.00	6,059.32	6,245.15	6,100.83	27.55	24.39	-109.63	854.12	-848.25	772.27	721.31	50.96	15.155		
6,300.00	6,156.56	6,328.76	6,183.09	28.03	24.53	-109.92	868.61	-851.77	775.95	724.33	51.62	15.032		
6,400.00	6,253.81	7,669.00	7,000.75	28.51	25.73	-107.40	1,215.37	-190.80	747.67	724.49	23.18	32.251		
6,500.00	6,351.05	7,671.05	7,000.82	28.99	25.76	-172.96	1,215.51	-188.76	652.20	628.08	24.12	27.035		
6,600.00	6,448.29	7,672.96	7,000.88	29.46	25.78	-173.49	1,215.64	-186.86	558.32	532.82	25.50	21.897		
6,700.00	6,545.53	7,674.75	7,000.94	29.94	25.81	-173.98	1,215.76	-185.07	466.98	439.36	27.61	16.910		
6,800.00	6,642.77	7,676.44	7,000.99	30.42	25.83	-174.45	1,215.87	-183.38	380.01	348.98	31.03	12.245		
6,825.58	6,667.65	7,676.86	7,001.01	30.54	25.84	-174.56	1,215.90	-182.97	358.85	326.64	32.22	11.139		
6,850.00	6,691.37	7,676.77	7,001.00	30.66	25.84	-168.68	1,215.89	-183.06	339.24	305.75	33.49	10.129		
6,900.00	6,739.71	7,673.62	7,000.90	30.90	25.79	-157.50	1,215.68	-186.20	301.50	264.90	36.59	8.239		
6,950.00	6,787.49	7,666.65	7,000.67	31.15	25.71	-148.11	1,215.21	-193.15	268.19	227.86	40.33	6.650		
7,000.00	6,834.40	7,656.19	7,000.31	31.40	25.61	-140.02	1,214.49	-203.58	241.09	196.60	44.49	5.419		
7,050.00	6,880.16	7,641.94	6,999.85	31.64	25.52	-132.30	1,213.50	-217.79	222.14	173.71	48.43	4.587		
7,100.00	6,924.48	7,623.91	6,999.29	31.89	25.47	-124.30	1,212.24	-235.76	212.88	161.67	51.20	4.158		
7,120.65	6,942.30	7,615.38	6,999.04	31.99	25.47	-120.83	1,211.64	-244.27	212.02	160.20	51.82	4.091 SF		
7,150.00	6,967.10	7,602.17	6,998.67	32.14	25.48	-115.71	1,210.71	-257.44	213.68	161.56	52.11	4.100		
7,200.00	7,007.75	7,576.83	6,998.01	32.39	25.52	-106.51	1,208.90	-282.71	223.38	172.15	51.24	4.360		
7,250.00	7,046.17	7,548.18	6,997.21	32.64	25.56	-97.05	1,206.85	-311.27	239.78	190.47	49.31	4.863		
7,300.00	7,082.14	7,517.45	6,995.89	32.90	25.61	-87.92	1,204.72	-341.90	260.57	213.61	46.96	5.548		
7,350.00	7,115.44	7,484.95	6,993.96	33.17	25.67	-79.52	1,202.52	-374.27	283.88	239.27	44.61	6.364		
7,400.00	7,145.84	7,456.13	6,991.65	33.45	25.72	-72.67	1,200.52	-402.92	308.51	266.02	42.49	7.261		
7,450.00	7,173.18	7,429.00	6,988.50	33.75	25.78	-66.87	1,198.26	-429.77	334.09	293.42	40.66	8.216		
7,500.00	7,197.27	7,401.83	6,984.40	34.07	25.83	-61.87	1,195.62	-456.50	359.98	320.83	39.15	9.195		
7,550.00	7,217.98	7,380.00	6,980.41	34.42	25.88	-57.92	1,193.22	-477.83	385.78	347.78	38.00	10.152		
7,600.00	7,235.17	7,354.23	6,974.69	34.81	25.92	-54.31	1,189.87	-502.72	411.36	374.15	37.21	11.056		
7,650.00	7,248.74	7,333.07	6,969.01	35.24	25.96	-51.43	1,186.55	-522.83	436.78	400.01	36.77	11.878		
7,700.00	7,258.60	7,312.21	6,962.56	35.72	26.00	-48.98	1,182.80	-542.31	461.78	425.15	36.63	12.608		
7,750.00	7,264.69	7,285.00	6,952.92	36.24	26.05	-46.76	1,177.19	-567.12	486.27	449.74	36.53	13.311		
7,800.00	7,266.98	7,285.00	6,952.92	36.81	26.05	-45.39	1,177.19	-567.12	510.24	472.73	37.51	13.601		
7,806.27	7,267.00	7,285.00	6,952.92	36.89	26.05	-45.22	1,177.19	-567.12	513.31	475.65	37.66	13.630		
7,900.00	7,266.82	7,230.64	6,930.54	38.11	26.10	-44.54	1,162.91	-614.53	559.43	521.33	38.11	14.680		
8,000.00	7,266.62	7,190.00	6,911.67	39.63	26.15	-44.15	1,149.32	-647.84	616.10	576.95	39.15	15.737		
8,100.00	7,266.42	7,154.32	6,893.13	41.34	26.17	-43.75	1,136.68	-675.57	678.30	637.99	40.31	16.829		
8,200.00	7,266.23	7,094.00	6,856.55	43.22	26.21	-42.63	1,117.04	-719.26	745.56	705.04	40.51	18.402		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST2 - ST2													Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM, 6808-MWD+HDGM													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,300.00	7,266.03	7,094.00	6,856.55	45.24	26.21	-42.63	1,117.04	-719.26	815.21	772.80	42.41	19.224		
8,400.00	7,265.84	7,060.83	6,834.04	47.38	26.22	-41.90	1,106.61	-741.27	888.99	845.81	43.18	20.586		
8,500.00	7,265.64	7,038.38	6,818.08	49.63	26.23	-41.41	1,099.26	-755.23	966.01	921.90	44.11	21.900		
8,600.00	7,265.44	6,999.00	6,788.76	51.96	26.26	-40.57	1,085.83	-777.82	1,046.23	1,001.70	44.53	23.497		
8,700.00	7,265.25	6,999.00	6,788.76	54.36	26.26	-40.57	1,085.83	-777.82	1,127.65	1,081.96	45.69	24.679		
8,800.00	7,265.05	6,999.00	6,788.76	56.83	26.26	-40.57	1,085.83	-777.82	1,211.85	1,165.17	46.69	25.957		
8,900.00	7,264.86	6,999.00	6,788.76	59.35	26.26	-40.57	1,085.83	-777.82	1,298.30	1,250.76	47.54	27.310		
9,000.00	7,264.66	6,959.92	6,758.52	61.92	26.23	-39.85	1,071.02	-797.63	1,384.34	1,336.66	47.67	29.039		
9,100.00	7,264.46	6,948.86	6,749.85	64.53	26.23	-39.68	1,066.41	-802.73	1,472.72	1,424.53	48.19	30.558		
9,200.00	7,264.27	6,904.00	6,714.40	67.18	26.21	-39.14	1,045.94	-821.01	1,563.92	1,515.69	48.23	32.426		
9,300.00	7,264.07	6,904.00	6,714.40	69.86	26.21	-39.14	1,045.94	-821.01	1,653.55	1,604.75	48.79	33.890		
9,400.00	7,263.88	6,904.00	6,714.40	72.57	26.21	-39.14	1,045.94	-821.01	1,744.30	1,695.01	49.29	35.390		
9,500.00	7,263.68	6,904.00	6,714.40	75.30	26.21	-39.14	1,045.94	-821.01	1,836.02	1,786.29	49.73	36.922		
9,600.00	7,263.49	6,904.00	6,714.40	78.05	26.21	-39.14	1,045.94	-821.01	1,928.56	1,878.44	50.12	38.479		
9,700.00	7,263.29	6,904.00	6,714.40	80.82	26.21	-39.14	1,045.94	-821.01	2,021.81	1,971.34	50.47	40.059		
9,800.00	7,263.09	6,904.00	6,714.40	83.61	26.21	-39.14	1,045.94	-821.01	2,115.68	2,064.89	50.79	41.658		
9,900.00	7,262.90	6,904.00	6,714.40	86.42	26.21	-39.14	1,045.94	-821.01	2,210.08	2,159.01	51.07	43.272		
10,000.00	7,262.70	6,904.00	6,714.40	89.24	26.21	-39.14	1,045.94	-821.01	2,304.96	2,253.62	51.34	44.900		
10,100.00	7,262.51	6,904.00	6,714.40	92.07	26.21	-39.14	1,045.94	-821.01	2,400.25	2,348.68	51.58	46.539		
10,200.00	7,262.31	6,904.00	6,714.40	94.92	26.21	-39.14	1,045.94	-821.01	2,495.91	2,444.12	51.80	48.188		
10,300.00	7,262.11	6,861.12	6,679.89	97.77	26.14	-38.74	1,024.73	-835.03	2,589.88	2,538.15	51.73	50.064		
10,400.00	7,261.92	6,856.22	6,675.88	100.64	26.13	-38.69	1,022.27	-836.43	2,685.69	2,633.78	51.90	51.745		
10,500.00	7,261.72	6,851.59	6,672.10	103.51	26.12	-38.65	1,019.94	-837.72	2,781.74	2,729.68	52.06	53.429		
10,600.00	7,261.53	6,808.00	6,636.05	106.39	26.06	-38.29	997.68	-847.96	2,879.69	2,827.67	52.02	55.357		
10,700.00	7,261.33	6,808.00	6,636.05	109.28	26.06	-38.29	997.68	-847.96	2,975.84	2,923.64	52.19	57.015		
10,800.00	7,261.13	6,808.00	6,636.05	112.18	26.06	-38.29	997.68	-847.96	3,072.23	3,019.88	52.36	58.678		
10,900.00	7,260.94	6,808.00	6,636.05	115.08	26.06	-38.29	997.68	-847.96	3,168.85	3,116.34	52.51	60.346		
11,000.00	7,260.74	6,808.00	6,636.05	117.99	26.06	-38.29	997.68	-847.96	3,265.68	3,213.02	52.66	62.018		
11,100.00	7,260.55	6,808.00	6,636.05	120.91	26.06	-38.29	997.68	-847.96	3,362.68	3,309.89	52.80	63.693		
11,200.00	7,260.35	6,808.00	6,636.05	123.83	26.06	-38.29	997.68	-847.96	3,459.86	3,406.94	52.93	65.370		
11,300.00	7,260.15	6,808.00	6,636.05	126.75	26.06	-38.29	997.68	-847.96	3,557.20	3,504.15	53.05	67.050		
11,400.00	7,259.96	6,808.00	6,636.05	129.68	26.06	-38.29	997.68	-847.96	3,654.68	3,601.50	53.17	68.731		
11,500.00	7,259.76	6,808.00	6,636.05	132.61	26.06	-38.29	997.68	-847.96	3,752.29	3,699.00	53.29	70.413		
11,600.00	7,259.57	6,808.00	6,636.05	135.55	26.06	-38.29	997.68	-847.96	3,850.02	3,796.62	53.40	72.096		
11,700.00	7,259.37	6,808.00	6,636.05	138.49	26.06	-38.29	997.68	-847.96	3,947.87	3,894.36	53.51	73.779		
11,800.00	7,259.17	6,808.00	6,636.05	141.43	26.06	-38.29	997.68	-847.96	4,045.82	3,992.21	53.61	75.462		
11,900.00	7,258.98	6,808.00	6,636.05	144.38	26.06	-38.29	997.68	-847.96	4,143.88	4,090.16	53.72	77.146		
12,000.00	7,258.78	6,794.52	6,624.75	147.33	25.89	-38.18	990.83	-850.57	4,241.97	4,188.20	53.77	78.886		
12,100.00	7,258.59	6,785.66	6,617.25	150.28	25.78	-38.10	986.42	-852.27	4,340.12	4,286.28	53.84	80.606		
12,200.00	7,258.39	6,777.03	6,609.90	153.24	25.67	-38.02	982.21	-853.89	4,438.31	4,384.40	53.91	82.326		
12,300.00	7,258.19	6,760.00	6,595.24	156.20	25.46	-37.84	974.12	-857.03	4,536.57	4,482.62	53.95	84.083		
12,400.00	7,258.00	6,760.00	6,595.24	159.16	25.46	-37.84	974.12	-857.03	4,634.83	4,580.79	54.04	85.763		
12,500.00	7,257.80	6,760.00	6,595.24	162.12	25.46	-37.84	974.12	-857.03	4,733.17	4,679.04	54.13	87.442		
12,600.00	7,257.61	6,760.00	6,595.24	165.08	25.46	-37.84	974.12	-857.03	4,831.57	4,777.36	54.21	89.119		
12,700.00	7,257.41	6,760.00	6,595.24	168.05	25.46	-37.84	974.12	-857.03	4,930.04	4,875.74	54.30	90.794		
12,800.00	7,257.21	6,760.00	6,595.24	171.02	25.46	-37.84	974.12	-857.03	5,028.57	4,974.18	54.38	92.467		
12,900.00	7,257.02	6,760.00	6,595.24	173.99	25.46	-37.84	974.12	-857.03	5,127.15	5,072.69	54.46	94.138		
13,000.00	7,256.82	6,760.00	6,595.24	176.96	25.46	-37.84	974.12	-857.03	5,225.79	5,171.25	54.54	95.807		
13,100.00	7,256.63	6,760.00	6,595.24	179.93	25.46	-37.84	974.12	-857.03	5,324.48	5,269.85	54.62	97.474		
13,200.00	7,256.43	6,760.00	6,595.24	182.91	25.46	-37.84	974.12	-857.03	5,423.22	5,368.51	54.70	99.138		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #654H - ST2 - ST2												Offset Site Error:	0.00 ft
Survey Program: 359-MWD+HDGM, 5279-MWD+HDGM, 6808-MWD+HDGM												Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Semi Major Axis	Reference	Offset	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	
13,300.00	7,256.23	6,760.00	6,595.24	185.88	25.46	-37.84	974.12	-857.03	5,522.00	5,467.22	54.78	100.799	
13,400.00	7,256.04	6,760.00	6,595.24	188.86	25.46	-37.84	974.12	-857.03	5,620.83	5,565.97	54.86	102.457	
13,500.00	7,255.84	6,760.00	6,595.24	191.84	25.46	-37.84	974.12	-857.03	5,719.69	5,664.76	54.94	104.113	
13,600.00	7,255.65	6,760.00	6,595.24	194.82	25.46	-37.84	974.12	-857.03	5,818.60	5,763.59	55.01	105.766	
13,700.00	7,255.45	6,760.00	6,595.24	197.80	25.46	-37.84	974.12	-857.03	5,917.54	5,862.45	55.09	107.415	
13,800.00	7,255.25	6,760.00	6,595.24	200.78	25.46	-37.84	974.12	-857.03	6,016.52	5,961.35	55.17	109.061	
13,900.00	7,255.06	6,760.00	6,595.24	203.77	25.46	-37.84	974.12	-857.03	6,115.53	6,060.29	55.24	110.704	
14,000.00	7,254.86	6,760.00	6,595.24	206.75	25.46	-37.84	974.12	-857.03	6,214.57	6,159.25	55.32	112.344	
14,100.00	7,254.67	6,760.00	6,595.24	209.74	25.46	-37.84	974.12	-857.03	6,313.64	6,258.25	55.39	113.980	
14,200.00	7,254.47	6,760.00	6,595.24	212.72	25.46	-37.84	974.12	-857.03	6,412.75	6,357.28	55.47	115.613	
14,300.00	7,254.28	6,760.00	6,595.24	215.71	25.46	-37.84	974.12	-857.03	6,511.87	6,456.33	55.54	117.242	
14,400.00	7,254.08	6,760.00	6,595.24	218.70	25.46	-37.84	974.12	-857.03	6,611.03	6,555.41	55.62	118.867	
14,500.00	7,253.88	6,760.00	6,595.24	221.69	25.46	-37.84	974.12	-857.03	6,710.21	6,654.52	55.69	120.489	
14,600.00	7,253.69	6,760.00	6,595.24	224.68	25.46	-37.84	974.12	-857.03	6,809.41	6,753.65	55.77	122.106	
14,700.00	7,253.49	6,760.00	6,595.24	227.67	25.46	-37.84	974.12	-857.03	6,908.64	6,852.80	55.84	123.720	
14,800.00	7,253.30	6,760.00	6,595.24	230.66	25.46	-37.84	974.12	-857.03	7,007.89	6,951.97	55.92	125.330	
14,900.00	7,253.10	6,760.00	6,595.24	233.65	25.46	-37.84	974.12	-857.03	7,107.16	7,051.17	55.99	126.935	
15,000.00	7,252.90	6,760.00	6,595.24	236.65	25.46	-37.84	974.12	-857.03	7,206.45	7,150.39	56.07	128.537	
15,100.00	7,252.71	6,760.00	6,595.24	239.64	25.46	-37.84	974.12	-857.03	7,305.76	7,249.62	56.14	130.134	
15,200.00	7,252.51	6,760.00	6,595.24	242.63	25.46	-37.84	974.12	-857.03	7,405.09	7,348.87	56.22	131.727	
15,300.00	7,252.32	6,760.00	6,595.24	245.63	25.46	-37.84	974.12	-857.03	7,504.43	7,448.14	56.29	133.316	
15,400.00	7,252.12	6,738.27	6,576.36	248.62	25.39	-37.61	963.87	-860.25	7,603.02	7,546.70	56.32	134.995	
15,500.00	7,251.92	6,737.82	6,575.97	251.62	25.39	-37.61	963.66	-860.30	7,702.37	7,645.97	56.40	136.577	
15,600.00	7,251.73	6,737.39	6,575.59	254.62	25.39	-37.60	963.45	-860.35	7,801.73	7,745.26	56.47	138.155	
15,700.00	7,251.53	6,736.96	6,575.21	257.61	25.39	-37.60	963.25	-860.39	7,901.11	7,844.57	56.55	139.729	



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 435-MWD+HDGM, 6501-MWD+HDGM, 7540-MWD+HDGM													Offset Well Error:	0.00 ft
Reference	Vertical	Offset	Semi Major Axis	Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Measured	Depth	Depth	Depth	Reference	Offset	Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor		
Depth	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	Centres	Ellipses	(ft)			
0.00	0.00	0.50	0.50	0.00	0.00	-64.81	12.77	-27.15	30.00					
100.00	100.00	100.43	100.43	0.27	0.17	-64.60	12.92	-27.21	30.12	29.68	0.44	68.387		
200.00	200.00	200.36	200.36	0.63	0.34	-63.99	13.36	-27.38	30.47	29.50	0.97	31.486		
300.00	300.00	300.28	300.28	0.99	0.51	-63.01	14.10	-27.68	31.06	29.57	1.49	20.778		
400.00	400.00	400.20	400.19	1.35	0.68	-61.70	15.13	-28.09	31.91	29.88	2.02	15.778		
500.00	500.00	500.22	500.20	1.70	0.97	-60.25	16.33	-28.57	32.91	30.23	2.67	12.310		
600.00	600.00	600.29	600.26	2.06	1.33	-58.92	17.41	-28.87	33.71	30.32	3.39	9.945		
650.00	650.00	650.24	650.21	2.24	1.51	-58.05	18.03	-28.91	34.07	30.32	3.75	9.090		
700.00	700.00	700.11	700.07	2.42	1.69	-49.94	18.83	-29.02	34.31	30.21	4.11	8.358		
800.00	799.93	800.22	800.17	2.78	2.04	-52.73	20.34	-29.42	33.25	28.43	4.82	6.896		
900.00	899.68	899.64	899.58	3.14	2.39	-64.85	20.03	-30.72	30.70	25.17	5.53	5.555		
936.69	936.21	935.91	935.81	3.28	2.52	-72.80	19.20	-31.83	30.35	24.57	5.78	5.250 ES		
1,000.00	999.13	998.06	997.87	3.51	2.73	-89.96	16.73	-34.42	31.94	25.72	6.22	5.136 SF		
1,100.00	1,098.15	1,094.79	1,094.23	3.87	3.07	-114.87	11.09	-40.58	43.33	36.42	6.91	6.271		
1,200.00	1,196.63	1,189.03	1,187.71	4.25	3.40	-128.50	4.28	-50.23	65.20	57.61	7.59	8.592		
1,300.00	1,294.44	1,281.74	1,279.09	4.65	3.76	-134.70	-3.48	-63.84	94.82	86.54	8.27	11.463		
1,324.38	1,318.17	1,304.12	1,301.05	4.75	3.84	-135.60	-5.42	-67.66	102.90	94.45	8.44	12.187		
1,400.00	1,391.70	1,373.24	1,368.72	5.06	4.12	-137.81	-11.73	-80.21	129.03	120.07	8.96	14.397		
1,500.00	1,488.95	1,461.29	1,454.50	5.49	4.49	-139.38	-21.09	-97.72	165.85	156.23	9.62	17.241		
1,600.00	1,586.19	1,551.25	1,541.61	5.92	4.89	-140.28	-32.41	-117.14	205.13	194.82	10.32	19.886		
1,700.00	1,683.43	1,645.19	1,632.38	6.36	5.32	-140.55	-43.51	-138.62	244.45	233.37	11.08	22.071		
1,800.00	1,780.67	1,738.12	1,722.18	6.81	5.76	-140.48	-53.16	-160.52	282.94	271.11	11.83	23.909		
1,900.00	1,877.91	1,832.45	1,813.47	7.26	6.21	-140.57	-63.21	-182.02	321.29	308.68	12.61	25.473		
2,000.00	1,975.16	1,930.62	1,908.87	7.71	6.68	-140.84	-73.27	-202.91	358.57	345.14	13.43	26.698		
2,100.00	2,072.40	2,034.74	2,010.74	8.17	7.16	-141.44	-83.23	-221.91	393.87	379.58	14.29	27.556		
2,200.00	2,169.64	2,147.47	2,121.79	8.62	7.65	-142.12	-91.00	-239.63	425.79	410.59	15.21	27.997		
2,300.00	2,266.88	2,239.75	2,212.85	9.08	8.04	-142.50	-95.38	-253.92	455.83	439.87	15.96	28.558		
2,400.00	2,364.12	2,327.02	2,298.83	9.55	8.42	-142.80	-100.38	-268.02	487.02	470.35	16.68	29.204		
2,500.00	2,461.37	2,428.24	2,398.76	10.01	8.85	-143.41	-107.77	-282.26	518.62	501.13	17.49	29.648		
2,600.00	2,558.61	2,523.72	2,493.34	10.48	9.24	-144.20	-115.16	-293.03	549.39	531.14	18.25	30.102		
2,700.00	2,655.85	2,607.46	2,576.21	10.94	9.58	-144.82	-122.30	-302.78	581.09	562.18	18.92	30.715		
2,800.00	2,753.09	2,700.57	2,668.07	11.41	9.98	-145.32	-130.78	-315.33	614.12	594.45	19.67	31.224		
2,900.00	2,850.33	2,811.82	2,777.85	11.88	10.46	-145.68	-138.93	-331.37	646.07	625.50	20.57	31.413		
3,000.00	2,947.58	2,911.08	2,875.97	12.35	10.87	-145.93	-144.36	-345.36	676.27	654.90	21.37	31.644		
3,100.00	3,044.82	2,990.22	2,954.08	12.82	11.22	-146.08	-149.13	-357.17	707.29	685.27	22.02	32.114		
3,200.00	3,142.06	3,080.80	3,043.25	13.29	11.61	-146.20	-155.74	-371.65	739.84	717.08	22.77	32.495		
3,300.00	3,239.30	3,185.48	3,146.44	13.76	12.07	-146.38	-163.26	-387.56	772.02	748.39	23.62	32.681		
3,400.00	3,336.54	3,282.37	3,242.14	14.23	12.48	-146.59	-169.63	-401.30	803.23	778.82	24.41	32.905		
3,500.00	3,433.79	3,372.42	3,331.05	14.71	12.86	-146.76	-175.71	-414.17	834.65	809.50	25.15	33.192		
3,600.00	3,531.03	3,475.89	3,433.20	15.18	13.31	-146.93	-182.54	-429.20	866.05	840.06	25.99	33.326		
3,700.00	3,628.27	3,571.27	3,527.46	15.65	13.71	-147.08	-188.34	-442.57	896.80	870.03	26.76	33.507		
3,800.00	3,725.51	3,675.80	3,630.88	16.13	14.15	-147.29	-194.56	-456.42	927.13	899.53	27.61	33.585		
3,900.00	3,822.75	3,787.39	3,741.63	16.60	14.59	-147.62	-200.50	-468.68	956.03	927.55	28.48	33.568		
4,000.00	3,920.00	3,886.08	3,839.70	17.07	14.98	-147.92	-205.08	-478.79	984.08	954.81	29.26	33.630		
4,100.00	4,017.24	3,981.94	3,934.89	17.55	15.36	-148.15	-209.15	-489.34	1,012.08	982.05	30.03	33.704		
4,200.00	4,114.48	4,078.88	4,031.08	18.02	15.75	-148.31	-212.73	-500.84	1,039.93	1,009.13	30.81	33.756		
4,300.00	4,211.72	4,167.56	4,118.96	18.50	16.11	-148.40	-215.93	-512.22	1,068.10	1,036.56	31.53	33.872		
4,400.00	4,308.96	4,249.84	4,200.36	18.97	16.45	-148.44	-219.41	-523.76	1,097.26	1,065.04	32.22	34.058		
4,500.00	4,406.21	4,338.00	4,287.42	19.45	16.82	-148.46	-223.77	-536.92	1,127.39	1,094.44	32.95	34.219		
4,600.00	4,503.45	4,424.74	4,372.95	19.93	17.20	-148.45	-228.41	-550.58	1,158.17	1,124.50	33.67	34.400		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - OH												Offset Site Error:	0.00 ft
Survey Program: 435-MWD+HDGM, 6501-MWD+HDGM, 7540-MWD+HDGM												Offset Well Error:	0.00 ft
Reference												Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,700.00	4,600.69	4,509.90	4,456.81	20.40	17.57	-148.42	-233.36	-564.53	1,189.62	1,155.24	34.38	34.605	
4,800.00	4,697.93	4,609.97	4,555.40	20.88	18.01	-148.42	-239.74	-580.44	1,221.38	1,186.17	35.20	34.694	
4,900.00	4,795.18	4,691.46	4,635.70	21.35	18.37	-148.43	-245.09	-593.23	1,253.24	1,217.36	35.88	34.928	
5,000.00	4,892.42	4,777.03	4,719.77	21.83	18.75	-148.40	-251.17	-607.94	1,286.11	1,249.51	36.60	35.144	
5,100.00	4,989.66	4,864.96	4,805.99	22.31	19.16	-148.32	-257.46	-624.02	1,319.46	1,282.12	37.33	35.341	
5,200.00	5,086.90	4,953.20	4,892.40	22.78	19.56	-148.23	-264.02	-640.67	1,353.25	1,315.18	38.08	35.538	
5,300.00	5,184.14	5,063.84	5,000.89	23.26	20.07	-148.16	-272.56	-660.64	1,387.06	1,348.05	39.01	35.557	
5,400.00	5,281.39	5,164.01	5,119.40	23.74	20.59	-148.23	-280.92	-678.70	1,418.98	1,378.98	39.99	35.479	
5,500.00	5,378.63	5,276.60	5,210.63	24.21	21.00	-148.22	-286.21	-693.53	1,450.19	1,409.43	40.77	35.574	
5,600.00	5,475.87	5,344.34	5,277.11	24.69	21.31	-148.15	-290.13	-705.91	1,482.35	1,441.00	41.35	35.853	
5,700.00	5,573.11	5,425.86	5,356.86	25.17	21.68	-148.06	-295.87	-721.80	1,516.03	1,473.99	42.04	36.064	
5,800.00	5,670.35	5,517.20	5,446.29	25.64	22.11	-147.98	-302.71	-739.08	1,549.92	1,507.11	42.81	36.203	
5,900.00	5,767.60	5,611.60	5,538.82	26.12	22.54	-147.94	-310.38	-756.15	1,584.03	1,540.42	43.61	36.325	
6,000.00	5,864.84	5,725.97	5,651.28	26.60	23.05	-147.98	-319.90	-774.62	1,617.61	1,573.06	44.56	36.305	
6,100.00	5,962.08	5,844.82	5,768.60	27.08	23.57	-148.08	-328.85	-791.37	1,649.68	1,604.16	45.52	36.239	
6,200.00	6,059.32	5,937.29	5,859.97	27.55	23.96	-148.16	-335.34	-804.00	1,681.15	1,634.87	46.28	36.327	
6,300.00	6,156.56	6,046.71	5,968.19	28.03	24.42	-148.28	-342.91	-818.32	1,712.32	1,665.16	47.16	36.310	
6,400.00	6,253.81	6,154.47	6,074.92	28.51	24.86	-148.42	-349.94	-831.41	1,742.80	1,694.78	48.02	36.294	
6,500.00	6,351.05	6,283.19	6,202.65	28.99	25.37	-148.60	-357.21	-845.55	1,772.11	1,723.10	49.01	36.157	
6,600.00	6,448.29	6,371.32	6,287.34	29.46	25.82	-170.43	-363.64	-859.39	1,796.53	1,745.42	50.12	34.754	
6,700.00	6,545.53	6,468.43	6,387.47	29.94	26.30	-170.50	-369.69	-873.29	1,821.75	1,771.72	51.28	34.052	
6,734.95	6,579.52	6,420.08	6,387.51	30.11	27.35	-170.52	-393.70	-241.64	1,771.40	1,719.09	52.32	33.858	
6,800.00	6,642.77	6,421.17	6,387.57	30.42	27.37	-170.55	-393.73	-240.55	1,772.60	1,719.79	52.81	33.567	
6,825.58	6,667.65	6,421.57	6,387.59	30.54	27.37	-170.57	-393.74	-240.16	1,773.72	1,720.74	52.98	33.477	
6,850.00	6,691.37	6,421.54	6,387.59	30.66	27.37	-161.63	-393.73	-240.18	1,775.12	1,721.98	53.14	33.405	
6,900.00	6,739.71	6,419.16	6,387.45	30.90	27.34	-145.73	-393.68	-242.56	1,778.94	1,725.53	53.41	33.309	
6,950.00	6,787.49	6,413.97	6,387.14	31.15	27.29	-133.60	-393.56	-247.74	1,783.98	1,730.37	53.61	33.277	
7,000.00	6,834.40	6,406.30	6,386.62	31.40	27.20	-124.57	-393.41	-255.39	1,790.18	1,736.43	53.75	33.303	
7,050.00	6,880.16	6,396.45	6,385.88	31.64	27.09	-117.70	-393.23	-265.21	1,797.45	1,743.61	53.84	33.384	
7,100.00	6,924.48	6,384.68	6,384.87	31.89	26.96	-112.26	-393.06	-276.93	1,805.67	1,751.79	53.88	33.512	
7,150.00	6,967.10	6,371.21	6,383.55	32.14	26.81	-107.79	-392.91	-290.34	1,814.71	1,760.83	53.88	33.682	
7,200.00	7,007.75	6,351.00	6,381.23	32.39	26.59	-103.82	-392.77	-310.42	1,824.46	1,770.68	53.78	33.923	
7,250.00	7,046.17	6,337.49	6,379.46	32.64	26.48	-100.56	-392.74	-323.81	1,834.73	1,780.95	53.78	34.113	
7,300.00	7,082.14	6,316.35	6,376.32	32.90	26.30	-97.49	-392.72	-344.71	1,845.38	1,791.66	53.72	34.354	
7,350.00	7,115.44	6,291.48	6,371.99	33.17	26.11	-94.65	-392.76	-369.20	1,856.21	1,802.57	53.64	34.603	
7,400.00	7,145.84	6,263.39	6,365.85	33.45	25.93	-91.99	-392.75	-396.61	1,867.03	1,813.45	53.58	34.843	
7,450.00	7,173.18	6,233.05	6,357.67	33.75	25.77	-89.52	-392.63	-425.83	1,877.67	1,824.10	53.57	35.050	
7,500.00	7,197.27	6,202.75	6,349.93	34.07	25.64	-87.27	-392.35	-454.51	1,887.99	1,834.37	53.61	35.216	
7,550.00	7,217.98	6,172.61	6,336.96	34.42	25.55	-85.23	-391.95	-482.58	1,897.86	1,844.13	53.73	35.322	
7,600.00	7,235.17	6,137.33	6,322.67	34.81	25.48	-83.29	-391.29	-514.82	1,907.13	1,853.23	53.91	35.379	
7,650.00	7,248.74	6,104.61	6,308.00	35.24	25.44	-81.60	-390.41	-544.06	1,915.62	1,861.46	54.16	35.368	
7,700.00	7,258.60	6,079.49	6,295.71	35.72	25.43	-80.25	-389.65	-565.94	1,923.38	1,868.86	54.52	35.280	
7,750.00	7,264.69	6,051.41	6,280.85	36.24	25.43	-79.02	-388.72	-589.75	1,930.36	1,875.43	54.93	35.143	
7,800.00	7,266.98	6,018.00	6,261.70	36.81	25.44	-77.88	-387.39	-617.09	1,936.39	1,881.01	55.38	34.964	
7,806.27	7,267.00	6,018.00	6,261.70	36.89	25.44	-77.82	-387.39	-617.09	1,937.08	1,881.62	55.45	34.932	
7,900.00	7,266.82	6,011.00	6,252.05	37.11	25.47	-76.95	-385.26	-653.48	1,948.65	1,892.19	56.46	34.511	
8,000.00	7,266.62	6,011.15	6,241.59	37.63	25.51	-76.35	-383.90	-675.16	1,964.36	1,906.69	57.68	34.058	
8,100.00	7,266.42	6,025.00	6,230.00	41.34	25.53	-76.02	-383.18	-686.38	1,983.98	1,925.01	58.97	33.644	
8,200.00	7,266.23	6,077.00	6,263.70	43.22	25.60	-74.97	-381.32	-717.71	2,007.31	1,947.08	60.24	33.324	
8,300.00	7,266.03	6,077.00	6,263.70	45.24	25.60	-74.97	-381.32	-717.71	2,034.67	1,973.07	61.60	33.030	

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 435-MWD+HDGM, 6501-MWD+HDGM, 7540-MWD+HDGM													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
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)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,400.00	7,265.84	6,832.00	6,727.70	47.38	25.68	-73.94	-380.53	-744.70	2,065.97	2,003.10	62.87	32.862		
8,500.00	7,265.64	6,832.00	6,727.70	49.63	25.68	-73.94	-380.53	-744.70	2,100.81	2,036.62	64.19	32.729		
8,600.00	7,265.44	6,800.80	6,701.85	51.96	25.73	-73.22	-380.39	-762.16	2,139.28	2,073.87	65.41	32.707		
8,700.00	7,265.25	6,783.00	6,686.76	54.36	25.77	-72.80	-380.21	-771.59	2,181.04	2,114.45	66.60	32.751		
8,800.00	7,265.05	6,760.40	6,667.17	56.83	25.80	-72.25	-379.87	-782.86	2,226.03	2,158.32	67.70	32.879		
8,900.00	7,264.86	6,737.00	6,646.37	59.35	25.84	-71.67	-379.39	-793.55	2,274.24	2,205.51	68.74	33.086		
9,000.00	7,264.66	6,737.00	6,646.37	61.92	25.84	-71.67	-379.39	-793.55	2,325.41	2,255.65	69.77	33.332		
9,100.00	7,264.46	6,737.00	6,646.37	64.53	25.84	-71.67	-379.39	-793.55	2,379.69	2,308.97	70.72	33.650		
9,200.00	7,264.27	6,709.30	6,621.13	67.18	25.88	-70.98	-378.71	-804.96	2,436.25	2,364.73	71.53	34.060		
9,300.00	7,264.07	6,690.00	6,603.22	69.86	25.91	-70.48	-378.22	-812.12	2,495.67	2,423.38	72.29	34.524		
9,400.00	7,263.88	6,690.00	6,603.22	72.57	25.91	-70.48	-378.22	-812.12	2,557.34	2,484.30	73.05	35.009		
9,500.00	7,263.68	6,675.89	6,589.98	75.30	25.93	-70.12	-377.78	-816.98	2,621.29	2,547.59	73.70	35.568		
9,600.00	7,263.49	6,662.50	6,577.32	78.05	25.95	-69.77	-377.22	-821.32	2,687.26	2,612.97	74.29	36.172		
9,700.00	7,263.29	6,643.00	6,558.76	80.82	25.97	-69.27	-376.15	-827.16	2,755.16	2,680.36	74.80	36.832		
9,800.00	7,263.09	6,643.00	6,558.76	83.61	25.97	-69.27	-376.15	-827.16	2,824.80	2,749.46	75.35	37.491		
9,900.00	7,262.90	6,643.00	6,558.76	86.42	25.97	-69.27	-376.15	-827.16	2,896.22	2,820.38	75.84	38.187		
10,000.00	7,262.70	6,643.00	6,558.76	89.24	25.97	-69.27	-376.15	-827.16	2,969.29	2,893.00	76.29	38.919		
10,100.00	7,262.51	6,643.00	6,558.76	92.07	25.97	-69.27	-376.15	-827.16	3,043.90	2,967.19	76.71	39.682		
10,200.00	7,262.31	6,620.18	6,536.80	94.92	25.99	-68.67	-374.68	-833.18	3,119.47	3,042.48	76.99	40.516		
10,300.00	7,262.11	6,615.82	6,532.57	97.77	25.99	-68.55	-374.39	-834.22	3,196.62	3,119.29	77.32	41.341		
10,400.00	7,261.92	6,596.00	6,513.27	100.64	26.01	-68.03	-373.00	-838.49	3,275.19	3,197.64	77.55	42.232		
10,500.00	7,261.72	6,596.00	6,513.27	103.51	26.01	-68.03	-373.00	-838.49	3,354.58	3,276.73	77.85	43.092		
10,600.00	7,261.53	6,596.00	6,513.27	106.39	26.01	-68.03	-373.00	-838.49	3,435.04	3,356.93	78.11	43.974		
10,700.00	7,261.33	6,596.00	6,513.27	109.28	26.01	-68.03	-373.00	-838.49	3,516.51	3,438.15	78.36	44.876		
10,800.00	7,261.13	6,596.00	6,513.27	112.18	26.01	-68.03	-373.00	-838.49	3,598.91	3,520.32	78.58	45.797		
10,900.00	7,260.94	6,596.00	6,513.27	115.08	26.01	-68.03	-373.00	-838.49	3,682.18	3,603.39	78.79	46.734		
11,000.00	7,260.74	6,596.00	6,513.27	117.99	26.01	-68.03	-373.00	-838.49	3,766.26	3,687.29	78.98	47.687		
11,100.00	7,260.55	6,596.00	6,513.27	120.91	26.01	-68.03	-373.00	-838.49	3,851.11	3,771.96	79.15	48.654		
11,200.00	7,260.35	6,596.00	6,513.27	123.83	26.01	-68.03	-373.00	-838.49	3,936.67	3,857.36	79.31	49.635		
11,300.00	7,260.15	6,574.54	6,492.25	126.75	26.02	-67.46	-371.50	-842.54	4,022.66	3,943.28	79.38	50.676		
11,400.00	7,259.96	6,570.14	6,487.93	129.68	26.02	-67.34	-371.21	-843.33	4,109.41	4,029.90	79.50	51.689		
11,500.00	7,259.76	6,548.00	6,466.15	132.61	26.04	-66.76	-369.81	-847.08	4,196.88	4,117.33	79.55	52.757		
11,600.00	7,259.57	6,548.00	6,466.15	135.55	26.04	-66.76	-369.81	-847.08	4,284.67	4,205.00	79.67	53.779		
11,700.00	7,259.37	6,548.00	6,466.15	138.49	26.04	-66.76	-369.81	-847.08	4,372.98	4,293.20	79.78	54.811		
11,800.00	7,259.17	6,548.00	6,466.15	141.43	26.04	-66.76	-369.81	-847.08	4,461.79	4,381.90	79.89	55.852		
11,900.00	7,258.98	6,548.00	6,466.15	144.38	26.04	-66.76	-369.81	-847.08	4,551.06	4,471.07	79.98	56.901		
12,000.00	7,258.78	6,548.00	6,466.15	147.33	26.04	-66.76	-369.81	-847.08	4,640.76	4,560.69	80.07	57.957		
12,100.00	7,258.59	6,548.00	6,466.15	150.28	26.04	-66.76	-369.81	-847.08	4,730.88	4,650.73	80.16	59.021		
12,200.00	7,258.39	6,548.00	6,466.15	153.24	26.04	-66.76	-369.81	-847.08	4,821.39	4,741.16	80.23	60.092		
12,300.00	7,258.19	6,548.00	6,466.15	156.20	26.04	-66.76	-369.81	-847.08	4,912.27	4,831.96	80.31	61.168		
12,400.00	7,258.00	6,548.00	6,466.15	159.16	26.04	-66.76	-369.81	-847.08	5,003.49	4,923.12	80.38	62.251		
12,500.00	7,257.80	6,548.00	6,466.15	162.12	26.04	-66.76	-369.81	-847.08	5,095.05	5,014.61	80.44	63.339		
12,600.00	7,257.61	6,548.00	6,466.15	165.08	26.04	-66.76	-369.81	-847.08	5,186.92	5,106.41	80.50	64.432		
12,700.00	7,257.41	6,548.00	6,466.15	168.05	26.04	-66.76	-369.81	-847.08	5,279.08	5,198.52	80.56	65.530		
12,800.00	7,257.21	6,527.66	6,446.08	171.02	26.05	-66.23	-368.61	-850.15	5,371.26	5,290.70	80.56	66.673		
12,900.00	7,257.02	6,525.59	6,444.04	173.99	26.05	-66.17	-368.49	-850.44	5,463.92	5,383.31	80.61	67.783		
13,000.00	7,256.82	6,523.59	6,442.06	176.96	26.05	-66.12	-368.38	-850.71	5,556.82	5,476.16	80.65	68.896		
13,100.00	7,256.63	6,521.64	6,440.13	179.93	26.05	-66.07	-368.27	-850.97	5,649.96	5,569.26	80.70	70.013		
13,200.00	7,256.43	6,501.00	6,419.68	182.91	26.06	-65.54	-367.13	-853.49	5,743.55	5,662.85	80.69	71.179		
13,300.00	7,256.23	6,501.00	6,419.68	185.88	26.06	-65.54	-367.13	-853.49	5,837.09	5,756.35	80.74	72.297		

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



Lonestar Consulting, LLC

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 435-MWD+HDGM, 6501-MWD+HDGM, 7540-MWD+HDGM													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (ft)		Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
13,400.00	7,256.04	6,501.00	6,419.68	188.86	26.06	-65.54	-367.13	-853.49	5,930.84	5,850.06	80.78	73.418		
13,500.00	7,255.84	6,501.00	6,419.68	191.84	26.06	-65.54	-367.13	-853.49	6,024.79	5,943.97	80.82	74.542		
13,600.00	7,255.65	6,501.00	6,419.68	194.82	26.06	-65.54	-367.13	-853.49	6,118.94	6,038.07	80.87	75.668		
13,700.00	7,255.45	6,501.00	6,419.68	197.80	26.06	-65.54	-367.13	-853.49	6,213.27	6,132.36	80.91	76.796		
13,800.00	7,255.25	6,501.00	6,419.68	200.78	26.06	-65.54	-367.13	-853.49	6,307.77	6,226.82	80.94	77.927		
13,900.00	7,255.06	6,501.00	6,419.68	203.77	26.06	-65.54	-367.13	-853.49	6,402.44	6,321.46	80.98	79.060		
14,000.00	7,254.86	6,501.00	6,419.68	206.75	26.06	-65.54	-367.13	-853.49	6,497.27	6,416.25	81.02	80.194		
14,100.00	7,254.67	6,501.00	6,419.68	209.74	26.06	-65.54	-367.13	-853.49	6,592.25	6,511.19	81.06	81.330		
14,200.00	7,254.47	6,501.00	6,419.68	212.72	26.06	-65.54	-367.13	-853.49	6,687.38	6,606.29	81.09	82.468		
14,300.00	7,254.28	6,501.00	6,419.68	215.71	26.06	-65.54	-367.13	-853.49	6,782.65	6,701.52	81.13	83.607		
14,400.00	7,254.08	6,501.00	6,419.68	218.70	26.06	-65.54	-367.13	-853.49	6,878.05	6,796.89	81.16	84.747		
14,500.00	7,253.88	6,501.00	6,419.68	221.69	26.06	-65.54	-367.13	-853.49	6,973.58	6,892.39	81.19	85.888		
14,600.00	7,253.69	6,501.00	6,419.68	224.68	26.06	-65.54	-367.13	-853.49	7,069.24	6,988.01	81.23	87.030		
14,700.00	7,253.49	6,501.00	6,419.68	227.67	26.06	-65.54	-367.13	-853.49	7,165.01	7,083.75	81.26	88.173		
14,800.00	7,253.30	6,501.00	6,419.68	230.66	26.06	-65.54	-367.13	-853.49	7,260.90	7,179.60	81.29	89.317		
14,900.00	7,253.10	6,501.00	6,419.68	233.65	26.06	-65.54	-367.13	-853.49	7,356.89	7,275.57	81.33	90.462		
15,000.00	7,252.90	6,501.00	6,419.68	236.65	26.06	-65.54	-367.13	-853.49	7,453.00	7,371.64	81.36	91.607		
15,100.00	7,252.71	6,501.00	6,419.68	239.64	26.06	-65.54	-367.13	-853.49	7,549.20	7,467.81	81.39	92.752		
15,200.00	7,252.51	6,501.00	6,419.68	242.63	26.06	-65.54	-367.13	-853.49	7,645.50	7,564.08	81.42	93.898		
15,300.00	7,252.32	6,501.00	6,419.68	245.63	26.06	-65.54	-367.13	-853.49	7,741.90	7,660.44	81.46	95.044		
15,400.00	7,252.12	6,501.00	6,419.68	248.62	26.06	-65.54	-367.13	-853.49	7,838.38	7,756.89	81.49	96.191		
15,500.00	7,251.92	6,501.00	6,419.68	251.62	26.06	-65.54	-367.13	-853.49	7,934.95	7,853.43	81.52	97.337		

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



Lonestar Consulting, LLC

Anticollision Report

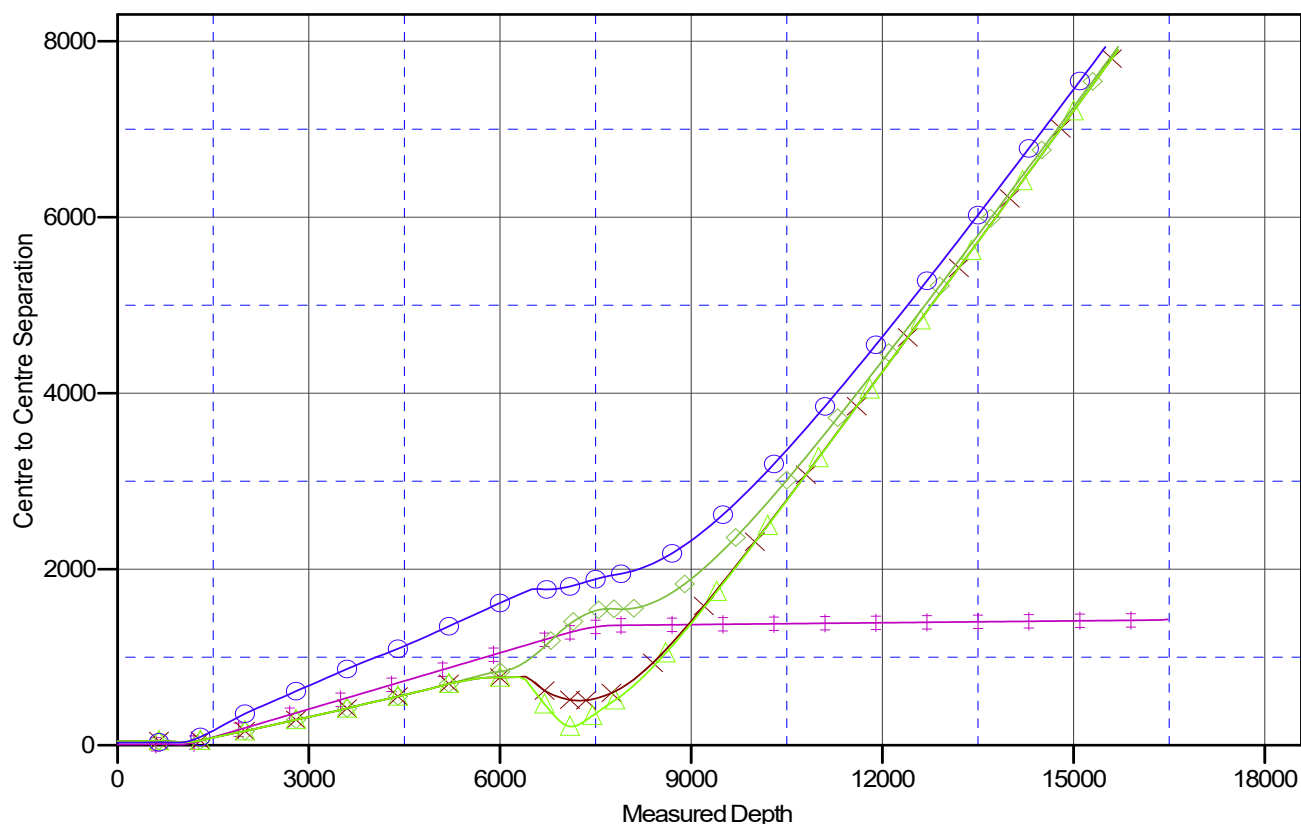


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6372' & RKB 24.5' @ 6396.50ft (E)
 Offset Depths are relative to Offset Datum
 Central Meridian is -107.8333334

Coordinates are relative to: Rosa Unit #650H - Slot B10
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.25°

Ladder Plot



LEGEND

Rosa Unit#652H OH Plan #9 V0
 Rosa Unit#654H ST1, ST1 V0
 Rosa Unit#656H OH OH V0
 Rosa Unit#654H OH OH V0
 Rosa Unit#654H ST2, ST2 V0

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



Lonestar Consulting, LLC

Anticollision Report

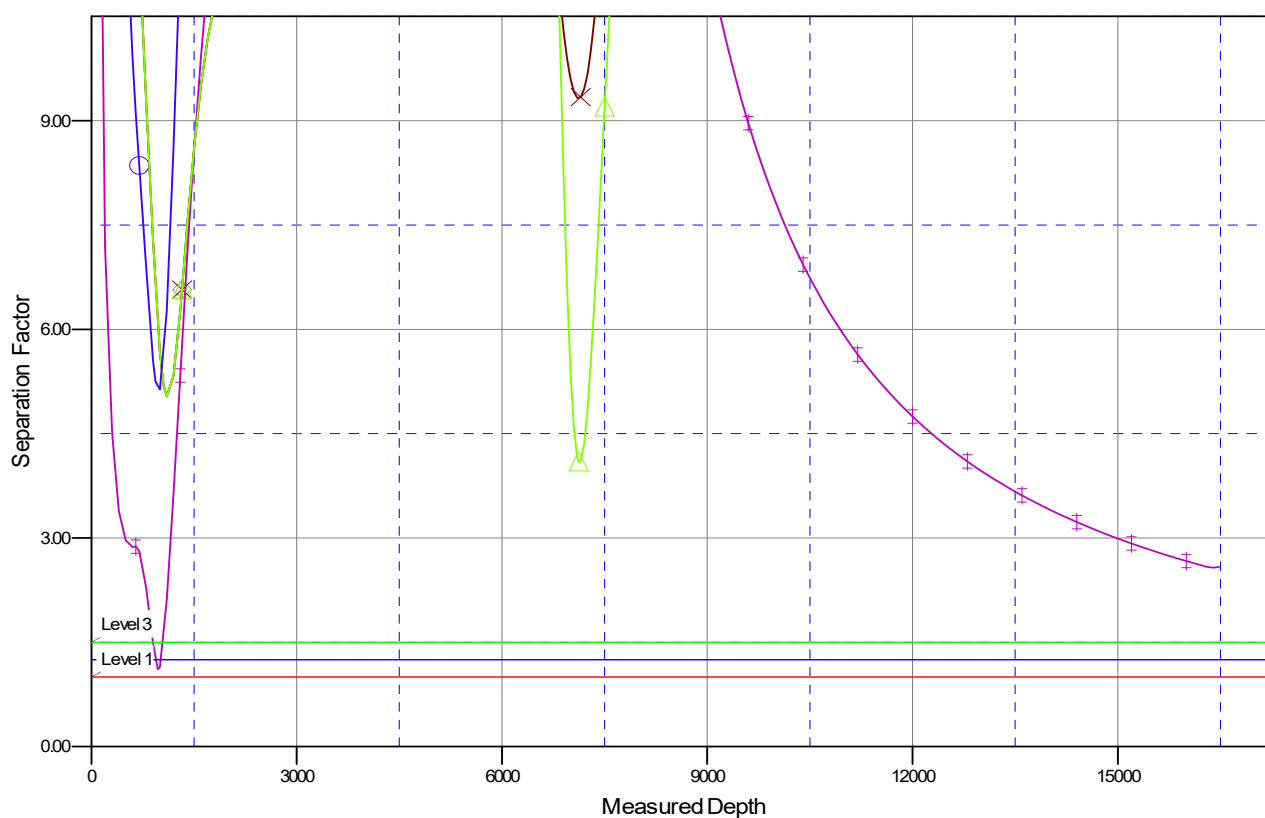


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #650H	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 #9	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6372' & RKB 24.5' @ 6396.50ft (E)
 Offset Depths are relative to Offset Datum
 Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit #650H - Slot B10
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.25°

Separation Factor Plot



LEGEND

Rosa Unit #652H OH Plan #9 V0
 Rosa Unit #654H ST1, ST1 V0
 Rosa Unit #656H OH O H V0
 Rosa Unit #654H ST2, ST2 V0

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

Released to Imaging: 9/22/2022 4:19:33 PM



Company: Logos Operating LLC
Project: Rio Arriba, NM NAD83
Site: Rosa Unit 29
Well: Rosa Unit #650H
Wellbore: OH
Design: Plan #9

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



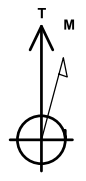
WELL DETAILS: Rosa Unit #650H

GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2138058.49	2847301.01	36.8748833	-107.4086666

Plan: Plan #9 (Rosa Unit #650H/OH)

Created By: Janie Collins Date: 13:53, August 31 2022



Azimuths to True North
Magnetic North: 82.23°

Magnetic Field
Strength: 49909
Dip Angle: 63.6°
Date: 3/6/2019
Model: HDGM2021_F

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rosa 650H POE Rev 4	7267.00	1496.04	-817.85	2139550.87	2846476.52	36.8789925	-107.4114629
Rosa 650H BHL Rev 3	7250.00	1542.20	-9492.95	2139558.45	2837801.31	36.8791149	-107.4411239
Rosa 650H FPerf	7250.00	1541.45	-9323.05	2139558.45	2837971.21	36.8791130	-107.4405430

SECTION DETAILS

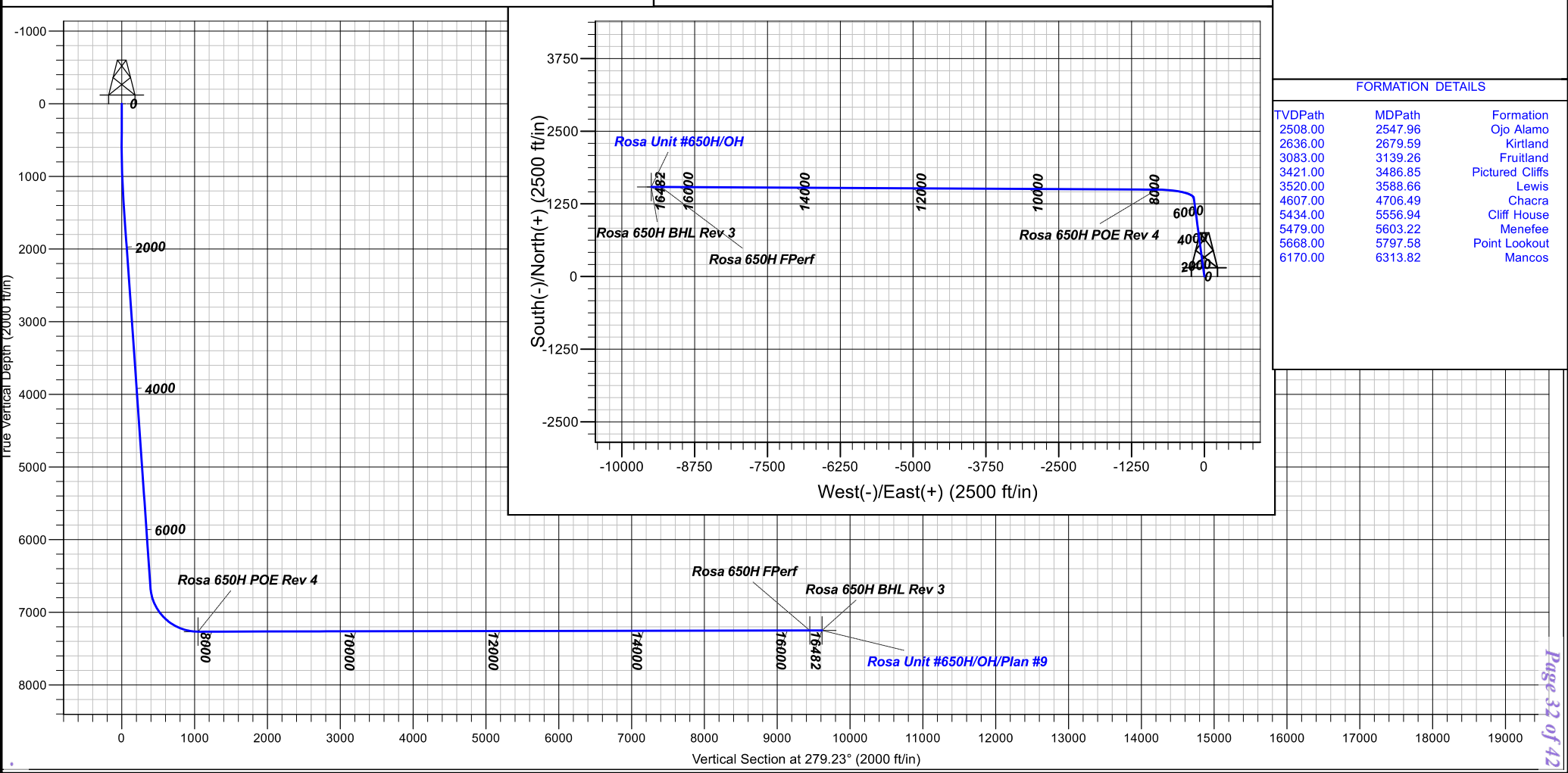
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
650.00	0.00	0.00	650.00	0.00	0.00	0.00	0.00	0.00
1324.38	13.49	352.36	1318.17	78.31	-10.51	2.00	352.36	22.93
6825.58	13.49	352.36	6867.65	1349.99	-181.11	0.00	0.00	395.25
7806.27	90.11	270.30	7267.00	1496.04	-817.85	9.00	-82.24	1047.16
16481.51	90.11	270.30	7250.00	1542.20	-9492.95	0.00	0.00	9617.41

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
2508.00	2547.96	Ojo Alamo
2636.00	2679.59	Kirtland
3083.00	3139.26	Fruitland
3421.00	3486.85	Pictured Cliffs
3520.00	3588.66	Lewis
4607.00	4706.49	Chacra
5434.00	5556.94	Cliff House
5479.00	5603.22	Menefee
5668.00	5797.58	Point Lookout
6170.00	6313.82	Mancos



Received by OCB: 9/21/2022 10:01:53 AM

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Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 29

Rosa Unit #650H - Slot B10

OH

Plan: Plan #9

Standard Planning Report

31 August, 2022





Lonestar Consulting, LLC Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

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 29				
Site Position:		Northing:	2,138,126.53 usft	Latitude:	36.8750715
From:	Map	Easting:	2,847,195.58 usft	Longitude:	-107.4090261
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in		

Well	Rosa Unit #650H - Slot B10					
Well Position	+N/-S	0.00 ft	Northing:	2,138,058.49 usft	Latitude:	36.874883
	+E/-W	0.00 ft	Easting:	2,847,301.01 usft	Longitude:	-107.408666
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	6,372.00 ft
Grid Convergence:		0.25 °				

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2021_FILE	3/6/2019	8.88	63.42	49,909.20000000

Design	Plan #9			
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	279.23

Plan Survey Tool Program	Date	8/31/2022		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	16,481.51 Plan #9 (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	
650.00	0.00	0.00	650.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,324.38	13.49	352.36	1,318.17	78.31	-10.51	2.00	2.00	0.00	352.36	
6,825.58	13.49	352.36	6,667.65	1,349.99	-181.11	0.00	0.00	0.00	0.00	
7,806.27	90.11	270.30	7,267.00	1,496.04	-817.85	9.00	7.81	-8.37	-82.24	Rosa 650H POE Rev
16,481.51	90.11	270.30	7,250.00	1,542.20	-9,492.95	0.00	0.00	0.00	0.00	Rosa 650H BHL Rev



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

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	
650.00	0.00	0.00	650.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	1.00	352.36	700.00	0.43	-0.06	0.13	2.00	2.00	0.00	
800.00	3.00	352.36	799.93	3.89	-0.52	1.14	2.00	2.00	0.00	
900.00	5.00	352.36	899.68	10.80	-1.45	3.16	2.00	2.00	0.00	
1,000.00	7.00	352.36	999.13	21.16	-2.84	6.20	2.00	2.00	0.00	
1,100.00	9.00	352.36	1,098.15	34.96	-4.69	10.23	2.00	2.00	0.00	
1,200.00	11.00	352.36	1,196.63	52.17	-7.00	15.27	2.00	2.00	0.00	
1,300.00	13.00	352.36	1,294.44	72.77	-9.76	21.31	2.00	2.00	0.00	
1,324.38	13.49	352.36	1,318.17	78.31	-10.51	22.93	2.00	2.00	0.00	
1,400.00	13.49	352.36	1,391.70	95.79	-12.85	28.04	0.00	0.00	0.00	
1,500.00	13.49	352.36	1,488.95	118.90	-15.95	34.81	0.00	0.00	0.00	
1,600.00	13.49	352.36	1,586.19	142.02	-19.05	41.58	0.00	0.00	0.00	
1,700.00	13.49	352.36	1,683.43	165.14	-22.15	48.35	0.00	0.00	0.00	
1,800.00	13.49	352.36	1,780.67	188.25	-25.26	55.12	0.00	0.00	0.00	
1,900.00	13.49	352.36	1,877.91	211.37	-28.36	61.88	0.00	0.00	0.00	
2,000.00	13.49	352.36	1,975.16	234.49	-31.46	68.65	0.00	0.00	0.00	
2,100.00	13.49	352.36	2,072.40	257.60	-34.56	75.42	0.00	0.00	0.00	
2,200.00	13.49	352.36	2,169.64	280.72	-37.66	82.19	0.00	0.00	0.00	
2,300.00	13.49	352.36	2,266.88	303.84	-40.76	88.96	0.00	0.00	0.00	
2,400.00	13.49	352.36	2,364.12	326.95	-43.86	95.72	0.00	0.00	0.00	
2,500.00	13.49	352.36	2,461.37	350.07	-46.97	102.49	0.00	0.00	0.00	
2,600.00	13.49	352.36	2,558.61	373.18	-50.07	109.26	0.00	0.00	0.00	
2,700.00	13.49	352.36	2,655.85	396.30	-53.17	116.03	0.00	0.00	0.00	
2,800.00	13.49	352.36	2,753.09	419.42	-56.27	122.80	0.00	0.00	0.00	
2,900.00	13.49	352.36	2,850.33	442.53	-59.37	129.56	0.00	0.00	0.00	
3,000.00	13.49	352.36	2,947.58	465.65	-62.47	136.33	0.00	0.00	0.00	
3,100.00	13.49	352.36	3,044.82	488.77	-65.57	143.10	0.00	0.00	0.00	
3,200.00	13.49	352.36	3,142.06	511.88	-68.67	149.87	0.00	0.00	0.00	
3,300.00	13.49	352.36	3,239.30	535.00	-71.78	156.64	0.00	0.00	0.00	
3,400.00	13.49	352.36	3,336.54	558.12	-74.88	163.40	0.00	0.00	0.00	
3,500.00	13.49	352.36	3,433.79	581.23	-77.98	170.17	0.00	0.00	0.00	
3,600.00	13.49	352.36	3,531.03	604.35	-81.08	176.94	0.00	0.00	0.00	
3,700.00	13.49	352.36	3,628.27	627.46	-84.18	183.71	0.00	0.00	0.00	
3,800.00	13.49	352.36	3,725.51	650.58	-87.28	190.48	0.00	0.00	0.00	
3,900.00	13.49	352.36	3,822.75	673.70	-90.38	197.24	0.00	0.00	0.00	
4,000.00	13.49	352.36	3,920.00	696.81	-93.48	204.01	0.00	0.00	0.00	
4,100.00	13.49	352.36	4,017.24	719.93	-96.59	210.78	0.00	0.00	0.00	
4,200.00	13.49	352.36	4,114.48	743.05	-99.69	217.55	0.00	0.00	0.00	
4,300.00	13.49	352.36	4,211.72	766.16	-102.79	224.32	0.00	0.00	0.00	
4,400.00	13.49	352.36	4,308.96	789.28	-105.89	231.08	0.00	0.00	0.00	
4,500.00	13.49	352.36	4,406.21	812.40	-108.99	237.85	0.00	0.00	0.00	
4,600.00	13.49	352.36	4,503.45	835.51	-112.09	244.62	0.00	0.00	0.00	
4,700.00	13.49	352.36	4,600.69	858.63	-115.19	251.39	0.00	0.00	0.00	
4,800.00	13.49	352.36	4,697.93	881.74	-118.29	258.16	0.00	0.00	0.00	
4,900.00	13.49	352.36	4,795.18	904.86	-121.40	264.92	0.00	0.00	0.00	



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
5,000.00	13.49	352.36	4,892.42	927.98	-124.50	271.69	0.00	0.00	0.00	
5,100.00	13.49	352.36	4,989.66	951.09	-127.60	278.46	0.00	0.00	0.00	
5,200.00	13.49	352.36	5,086.90	974.21	-130.70	285.23	0.00	0.00	0.00	
5,300.00	13.49	352.36	5,184.14	997.33	-133.80	292.00	0.00	0.00	0.00	
5,400.00	13.49	352.36	5,281.39	1,020.44	-136.90	298.76	0.00	0.00	0.00	
5,500.00	13.49	352.36	5,378.63	1,043.56	-140.00	305.53	0.00	0.00	0.00	
5,600.00	13.49	352.36	5,475.87	1,066.68	-143.10	312.30	0.00	0.00	0.00	
5,700.00	13.49	352.36	5,573.11	1,089.79	-146.21	319.07	0.00	0.00	0.00	
5,800.00	13.49	352.36	5,670.35	1,112.91	-149.31	325.84	0.00	0.00	0.00	
5,900.00	13.49	352.36	5,767.60	1,136.02	-152.41	332.60	0.00	0.00	0.00	
6,000.00	13.49	352.36	5,864.84	1,159.14	-155.51	339.37	0.00	0.00	0.00	
6,100.00	13.49	352.36	5,962.08	1,182.26	-158.61	346.14	0.00	0.00	0.00	
6,200.00	13.49	352.36	6,059.32	1,205.37	-161.71	352.91	0.00	0.00	0.00	
6,300.00	13.49	352.36	6,156.56	1,228.49	-164.81	359.68	0.00	0.00	0.00	
6,400.00	13.49	352.36	6,253.81	1,251.61	-167.91	366.44	0.00	0.00	0.00	
6,500.00	13.49	352.36	6,351.05	1,274.72	-171.02	373.21	0.00	0.00	0.00	
6,600.00	13.49	352.36	6,448.29	1,297.84	-174.12	379.98	0.00	0.00	0.00	
6,700.00	13.49	352.36	6,545.53	1,320.96	-177.22	386.75	0.00	0.00	0.00	
6,800.00	13.49	352.36	6,642.77	1,344.07	-180.32	393.52	0.00	0.00	0.00	
6,825.58	13.49	352.36	6,667.65	1,349.99	-181.11	395.25	0.00	0.00	0.00	
6,900.00	15.82	327.28	6,739.71	1,367.14	-187.76	404.56	9.00	3.14	-33.70	
7,000.00	21.93	306.49	6,834.40	1,389.76	-210.19	430.32	9.00	6.11	-20.79	
7,100.00	29.50	295.15	6,924.48	1,411.38	-247.57	470.69	9.00	7.57	-11.34	
7,200.00	37.67	288.25	7,007.75	1,431.45	-298.98	524.65	9.00	8.16	-6.90	
7,300.00	46.11	283.54	7,082.14	1,449.50	-363.16	590.89	9.00	8.44	-4.71	
7,400.00	54.69	280.02	7,145.84	1,465.06	-438.52	667.78	9.00	8.58	-3.52	
7,500.00	63.35	277.18	7,197.27	1,477.77	-523.21	753.41	9.00	8.67	-2.84	
7,600.00	72.07	274.74	7,235.17	1,487.30	-615.15	845.69	9.00	8.71	-2.44	
7,700.00	80.81	272.53	7,258.60	1,493.43	-712.07	942.33	9.00	8.74	-2.21	
7,800.00	89.56	270.44	7,266.98	1,496.00	-811.58	1,040.97	9.00	8.75	-2.10	
7,806.27	90.11	270.30	7,267.00	1,496.04	-817.85	1,047.16	9.00	8.76	-2.08	
7,900.00	90.11	270.30	7,266.82	1,496.54	-911.58	1,139.76	0.00	0.00	0.00	
8,000.00	90.11	270.30	7,266.62	1,497.07	-1,011.58	1,238.55	0.00	0.00	0.00	
8,100.00	90.11	270.30	7,266.42	1,497.60	-1,111.58	1,337.34	0.00	0.00	0.00	
8,200.00	90.11	270.30	7,266.23	1,498.13	-1,211.57	1,436.13	0.00	0.00	0.00	
8,300.00	90.11	270.30	7,266.03	1,498.66	-1,311.57	1,534.92	0.00	0.00	0.00	
8,400.00	90.11	270.30	7,265.84	1,499.20	-1,411.57	1,633.71	0.00	0.00	0.00	
8,500.00	90.11	270.30	7,265.64	1,499.73	-1,511.57	1,732.50	0.00	0.00	0.00	
8,600.00	90.11	270.30	7,265.44	1,500.26	-1,611.57	1,831.29	0.00	0.00	0.00	
8,700.00	90.11	270.30	7,265.25	1,500.79	-1,711.57	1,930.08	0.00	0.00	0.00	
8,800.00	90.11	270.30	7,265.05	1,501.32	-1,811.56	2,028.87	0.00	0.00	0.00	
8,900.00	90.11	270.30	7,264.86	1,501.86	-1,911.56	2,127.66	0.00	0.00	0.00	
9,000.00	90.11	270.30	7,264.66	1,502.39	-2,011.56	2,226.45	0.00	0.00	0.00	
9,100.00	90.11	270.30	7,264.46	1,502.92	-2,111.56	2,325.24	0.00	0.00	0.00	
9,200.00	90.11	270.30	7,264.27	1,503.45	-2,211.56	2,424.03	0.00	0.00	0.00	
9,300.00	90.11	270.30	7,264.07	1,503.98	-2,311.56	2,522.82	0.00	0.00	0.00	
9,400.00	90.11	270.30	7,263.88	1,504.52	-2,411.56	2,621.60	0.00	0.00	0.00	
9,500.00	90.11	270.30	7,263.68	1,505.05	-2,511.55	2,720.39	0.00	0.00	0.00	
9,600.00	90.11	270.30	7,263.49	1,505.58	-2,611.55	2,819.18	0.00	0.00	0.00	
9,700.00	90.11	270.30	7,263.29	1,506.11	-2,711.55	2,917.97	0.00	0.00	0.00	
9,800.00	90.11	270.30	7,263.09	1,506.65	-2,811.55	3,016.76	0.00	0.00	0.00	
9,900.00	90.11	270.30	7,262.90	1,507.18	-2,911.55	3,115.55	0.00	0.00	0.00	



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

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)
10,000.00	90.11	270.30	7,262.70	1,507.71	-3,011.55	3,214.34	0.00	0.00	0.00
10,100.00	90.11	270.30	7,262.51	1,508.24	-3,111.54	3,313.13	0.00	0.00	0.00
10,200.00	90.11	270.30	7,262.31	1,508.77	-3,211.54	3,411.92	0.00	0.00	0.00
10,300.00	90.11	270.30	7,262.11	1,509.31	-3,311.54	3,510.71	0.00	0.00	0.00
10,400.00	90.11	270.30	7,261.92	1,509.84	-3,411.54	3,609.50	0.00	0.00	0.00
10,500.00	90.11	270.30	7,261.72	1,510.37	-3,511.54	3,708.29	0.00	0.00	0.00
10,600.00	90.11	270.30	7,261.53	1,510.90	-3,611.54	3,807.08	0.00	0.00	0.00
10,700.00	90.11	270.30	7,261.33	1,511.43	-3,711.53	3,905.87	0.00	0.00	0.00
10,800.00	90.11	270.30	7,261.13	1,511.97	-3,811.53	4,004.66	0.00	0.00	0.00
10,900.00	90.11	270.30	7,260.94	1,512.50	-3,911.53	4,103.45	0.00	0.00	0.00
11,000.00	90.11	270.30	7,260.74	1,513.03	-4,011.53	4,202.24	0.00	0.00	0.00
11,100.00	90.11	270.30	7,260.55	1,513.56	-4,111.53	4,301.03	0.00	0.00	0.00
11,200.00	90.11	270.30	7,260.35	1,514.10	-4,211.53	4,399.82	0.00	0.00	0.00
11,300.00	90.11	270.30	7,260.15	1,514.63	-4,311.52	4,498.61	0.00	0.00	0.00
11,400.00	90.11	270.30	7,259.96	1,515.16	-4,411.52	4,597.40	0.00	0.00	0.00
11,500.00	90.11	270.30	7,259.76	1,515.69	-4,511.52	4,696.19	0.00	0.00	0.00
11,600.00	90.11	270.30	7,259.57	1,516.22	-4,611.52	4,794.98	0.00	0.00	0.00
11,700.00	90.11	270.30	7,259.37	1,516.76	-4,711.52	4,893.77	0.00	0.00	0.00
11,800.00	90.11	270.30	7,259.17	1,517.29	-4,811.52	4,992.56	0.00	0.00	0.00
11,900.00	90.11	270.30	7,258.98	1,517.82	-4,911.51	5,091.35	0.00	0.00	0.00
12,000.00	90.11	270.30	7,258.78	1,518.35	-5,011.51	5,190.14	0.00	0.00	0.00
12,100.00	90.11	270.30	7,258.59	1,518.88	-5,111.51	5,288.93	0.00	0.00	0.00
12,200.00	90.11	270.30	7,258.39	1,519.42	-5,211.51	5,387.72	0.00	0.00	0.00
12,300.00	90.11	270.30	7,258.19	1,519.95	-5,311.51	5,486.51	0.00	0.00	0.00
12,400.00	90.11	270.30	7,258.00	1,520.48	-5,411.51	5,585.30	0.00	0.00	0.00
12,500.00	90.11	270.30	7,257.80	1,521.01	-5,511.51	5,684.09	0.00	0.00	0.00
12,600.00	90.11	270.30	7,257.61	1,521.54	-5,611.50	5,782.87	0.00	0.00	0.00
12,700.00	90.11	270.30	7,257.41	1,522.08	-5,711.50	5,881.66	0.00	0.00	0.00
12,800.00	90.11	270.30	7,257.21	1,522.61	-5,811.50	5,980.45	0.00	0.00	0.00
12,900.00	90.11	270.30	7,257.02	1,523.14	-5,911.50	6,079.24	0.00	0.00	0.00
13,000.00	90.11	270.30	7,256.82	1,523.67	-6,011.50	6,178.03	0.00	0.00	0.00
13,100.00	90.11	270.30	7,256.63	1,524.21	-6,111.50	6,276.82	0.00	0.00	0.00
13,200.00	90.11	270.30	7,256.43	1,524.74	-6,211.49	6,375.61	0.00	0.00	0.00
13,300.00	90.11	270.30	7,256.23	1,525.27	-6,311.49	6,474.40	0.00	0.00	0.00
13,400.00	90.11	270.30	7,256.04	1,525.80	-6,411.49	6,573.19	0.00	0.00	0.00
13,500.00	90.11	270.30	7,255.84	1,526.33	-6,511.49	6,671.98	0.00	0.00	0.00
13,600.00	90.11	270.30	7,255.65	1,526.87	-6,611.49	6,770.77	0.00	0.00	0.00
13,700.00	90.11	270.30	7,255.45	1,527.40	-6,711.49	6,869.56	0.00	0.00	0.00
13,800.00	90.11	270.30	7,255.25	1,527.93	-6,811.48	6,968.35	0.00	0.00	0.00
13,900.00	90.11	270.30	7,255.06	1,528.46	-6,911.48	7,067.14	0.00	0.00	0.00
14,000.00	90.11	270.30	7,254.86	1,528.99	-7,011.48	7,165.93	0.00	0.00	0.00
14,100.00	90.11	270.30	7,254.67	1,529.53	-7,111.48	7,264.72	0.00	0.00	0.00
14,200.00	90.11	270.30	7,254.47	1,530.06	-7,211.48	7,363.51	0.00	0.00	0.00
14,300.00	90.11	270.30	7,254.28	1,530.59	-7,311.48	7,462.30	0.00	0.00	0.00
14,400.00	90.11	270.30	7,254.08	1,531.12	-7,411.47	7,561.09	0.00	0.00	0.00
14,500.00	90.11	270.30	7,253.88	1,531.66	-7,511.47	7,659.88	0.00	0.00	0.00
14,600.00	90.11	270.30	7,253.69	1,532.19	-7,611.47	7,758.67	0.00	0.00	0.00
14,700.00	90.11	270.30	7,253.49	1,532.72	-7,711.47	7,857.46	0.00	0.00	0.00
14,800.00	90.11	270.30	7,253.30	1,533.25	-7,811.47	7,956.25	0.00	0.00	0.00
14,900.00	90.11	270.30	7,253.10	1,533.78	-7,911.47	8,055.04	0.00	0.00	0.00
15,000.00	90.11	270.30	7,252.90	1,534.32	-8,011.47	8,153.83	0.00	0.00	0.00
15,100.00	90.11	270.30	7,252.71	1,534.85	-8,111.46	8,252.62	0.00	0.00	0.00



Lonestar Consulting, LLC

Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

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)
15,200.00	90.11	270.30	7,252.51	1,535.38	-8,211.46	8,351.41	0.00	0.00	0.00
15,300.00	90.11	270.30	7,252.32	1,535.91	-8,311.46	8,450.20	0.00	0.00	0.00
15,400.00	90.11	270.30	7,252.12	1,536.44	-8,411.46	8,548.99	0.00	0.00	0.00
15,500.00	90.11	270.30	7,251.92	1,536.98	-8,511.46	8,647.78	0.00	0.00	0.00
15,600.00	90.11	270.30	7,251.73	1,537.51	-8,611.46	8,746.57	0.00	0.00	0.00
15,700.00	90.11	270.30	7,251.53	1,538.04	-8,711.45	8,845.35	0.00	0.00	0.00
15,800.00	90.11	270.30	7,251.34	1,538.57	-8,811.45	8,944.14	0.00	0.00	0.00
15,900.00	90.11	270.30	7,251.14	1,539.10	-8,911.45	9,042.93	0.00	0.00	0.00
16,000.00	90.11	270.30	7,250.94	1,539.64	-9,011.45	9,141.72	0.00	0.00	0.00
16,100.00	90.11	270.30	7,250.75	1,540.17	-9,111.45	9,240.51	0.00	0.00	0.00
16,200.00	90.11	270.30	7,250.55	1,540.70	-9,211.45	9,339.30	0.00	0.00	0.00
16,300.00	90.11	270.30	7,250.36	1,541.23	-9,311.44	9,438.09	0.00	0.00	0.00
16,400.00	90.11	270.30	7,250.16	1,541.77	-9,411.44	9,536.88	0.00	0.00	0.00
16,481.51	90.11	270.30	7,250.00	1,542.20	-9,492.95	9,617.41	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Rosa 650H BHL Rev 3	0.00	0.00	7,250.00	1,542.20	-9,492.95	2,139,558.44	2,837,801.32	36.8791149	-107.4411239
- plan hits target center									
- Point									
Rosa 650H FPerf	0.00	0.00	7,250.00	1,541.45	-9,323.05	2,139,558.45	2,837,971.21	36.8791130	-107.4405430
- plan misses target center by 0.37ft at 16311.61ft MD (7250.33 TVD, 1541.29 N, -9323.05 E)									
- Point									
Rosa 650H POE Rev 4	0.00	0.00	7,267.00	1,496.04	-817.85	2,139,550.87	2,846,476.52	36.8789925	-107.4114629
- plan hits target center									
- Point									

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,547.96	2,508.00	Ojo Alamo		0.00	0.00	
2,679.59	2,636.00	Kirtland		0.00	0.00	
3,139.26	3,083.00	Fruitland		0.00	0.00	
3,486.85	3,421.00	Pictured Cliffs		0.00	0.00	
3,588.66	3,520.00	Lewis		0.00	0.00	
4,706.49	4,607.00	Chacra		0.00	0.00	
5,556.94	5,434.00	Cliff House		0.00	0.00	
5,603.22	5,479.00	Menefee		0.00	0.00	
5,797.58	5,668.00	Point Lookout		0.00	0.00	
6,313.82	6,170.00	Mancos		0.00	0.00	



Lonestar Consulting, LLC
Planning Report



Database:	Grand Junction	Local Co-ordinate Reference:	Well Rosa Unit #650H - Slot B10
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 24.5' @ 6396.50ft (Ensign 223)
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #650H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #9		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
650.00	650.00	0.00	0.00	Start Build 2.00
1,326.02	1,319.76	78.69	-10.56	Start 5499.62 hold at 1326.02 MD
6,825.65	6,667.71	1,350.00	-181.12	Start DLS 9.00 TFO -82.57
7,805.85	7,267.00	1,496.03	-817.43	Start 200.00 hold at 7805.85 MD
8,005.85	7,266.61	1,497.10	-1,017.43	Start DLS 2.00 TFO 9.03
8,105.66	7,266.41	1,497.63	-1,117.23	Start 8380.40 hold at 8105.65 MD
16,486.06				TD at 16486.06

Well Name: ROSA UNIT	Well Location: T31N / R6W / SEC 25 / NENE /	County or Parish/State: RIO ARRIBA / NM
Well Number: 650H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078771	Unit or CA Name: ROSA UNIT-MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 300393141200X1	Well Status: Temporarily Abandoned	Operator: LOGOS OPERATING LLC

Notice of Intent

Sundry ID: 2693542

Type of Submission: Notice of Intent	Type of Action: Other
Date Sundry Submitted: 09/20/2022	Time Sundry Submitted: 10:15
Date proposed operation will begin: 09/20/2022	

Procedure Description: LOGOS Operating request a change in plans for the following: Original bottom-hole location from 74' FSL & 145' FWL to new bottom-hole location 453' FSL & 17' FWL Original TD @ 16,438' MD 6987' TVD to new TD @ 16,482' MD 7250' TVD. Geology tops have been updated per changes. Original KOP @ 6433' MD 6350' TVD to new KOP @ 6826' MD 6668' TVD Original Landing point @ 7454' MD 6999' TVD to new Landing point @ 7806' MD 7267' TVD Original Intermediate 9.625" casing @ 6325' MD to new Intermediate casing set depth @ 6389' MD 6170' TVD Original Production 5.5" casing @ 16,438' MD to new Production casing set depth @ 16,482' MD 7250' TVD The 9.625" Intermediate & 5.5" production casing grade, weight and cement sacks have been update per casing depth changes. Attached: New C102, Operation and Directional Drill plans.

Surface Disturbance

Is any additional surface disturbance proposed?: No

NOI Attachments

Procedure Description

3160_5_Rosa_Unit_650H_BHL_KOP_Change_of_Plans_20220920_20220920101443.pdf

Well Name: ROSA UNIT	Well Location: T31N / R6W / SEC 25 / NENE /	County or Parish/State: RIO ARRIBA / NM
Well Number: 650H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078771	Unit or CA Name: ROSA UNIT-MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 300393141200X1	Well Status: Temporarily Abandoned	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: SEP 20, 2022 10:15 AM

Name: LOGOS OPERATING LLC

Title: Regulatory Specialist

Street Address: 2010 AFTON PLACE

City: FarmingtonState: 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: 09/21/2022

Signature: Kenneth Rennick

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

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

CONDITIONS

Action 145247

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 145247
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Adhere to previous NMOCD Conditions of Approval	9/22/2022