

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.
NMSF078769
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)
505-787-22184. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec 25 T31N R6W NENE Lot 1 1053' FNL & 298' FEL
36.874968, -107.408804 NAD83

7. If Unit of CA/Agreement, Name and/or No.

NMNM 78407E

8. Well Name and No.
Rosa Unit 654H9. API Well No.
30-039-3138410. Field and Pool or Exploratory Area
Basin Mancos11. Country or Parish, State
Rio Arriba, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

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

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

LOGOS Operating LLC, request a change in plans per attached Operation and Directional Drill Plans.

Original TD @ 18095' MD 6838' TVD to new TD @ 18272' MD 7027' TVD.

Geology tops have been updated per changes.

Original KOP @ 6463' MD 6383' TVD to new KOP @ 6042' MD 5890' TVD.

Original Landing Point @ 7542' MD 7077' TVD to new Landing point @ 7727' MD 7012' TVD.

Original 9 5/8" Casing Intermediate @ 5900' or greater MD to new '~6500' or greater MD.

Original 5.5" Casing Production Liner @ surface - 18093' MD to new surface - 18272' MD.

Original 9 5/8" Intermediate & 5.5" Production cementing was adjusted per changes.

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

Marie E. Florez

Title
Regulatory Specialist

Signature

Marie E. Florez

Date
2/02/2021**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)

Well Name: ROSA UNIT	Well Location: T31N / R6W / SEC 25 / NENE / 36.874968 / 107.408804	County or Parish/State: RIO ARRIBA / NM
Well Number: 654H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078769	Unit or CA Name: ROSA UNIT-MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 3003931384	Well Status: Drilling Shut In	Operator: LOGOS OPERATING LLC

Notice of Intent

Type of Submission: Notice of Intent	Type of Action Other
Date Sundry Submitted: 02/02/2021	Time Sundry Submitted: 03:42
Date proposed operation will begin: 02/02/2021	

Procedure Description: LOGOS Operating LLC, request a change in plans per attached Operation and Directional Drill Plans. Original TD @ 18095' MD 6838' TVD to new TD @ 18272' MD 7027' TVD. Geology tops have been updated per changes. Original KOP @ 6463' MD 6383' TVD to new KOP @ 6042' MD 5890' TVD. Original Landing Point @ 7542' MD 7077' TVD to new Landing point @ 7727' MD 7012' TVD. Original 9 5/8" Casing Intermediate @ 5900' or greater MD to new '~6500' or greater MD. Original 5.5" Casing Production Liner @ surface - 18093' MD to new surface - 18272' MD. Original 9 5/8" Intermediate & 5.5" Production cementing was adjusted per changes.

Surface Disturbance

Is any additional surface disturbance proposed?: No

NOI Attachments

Procedure Description

3160_5_Rosa_Unit_654H_Change_in_Operation_and_DDR_plans_20210220_20210202154153.pdf

Well Name: ROSA UNIT	Well Location: T31N / R6W / SEC 25 / NENE / 36.874968 / 107.408804	County or Parish/State: RIO ARRIBA / NM
Well Number: 654H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF078769	Unit or CA Name: ROSA UNIT-MANCOS PA	Unit or CA Number: NMNM78407E
US Well Number: 3003931384	Well Status: Drilling Shut In	Operator: LOGOS OPERATING LLC

Operator Certification

I certify that the foregoing is true and correct. Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction. Electronic submission of Sundry Notices through this system satisfies regulations requiring a submission of Form 3160-5 or a Sundry Notice.

Operator Electronic Signature: FLOREZ	Signed on: FEB 02, 2021 03:42 PM
Name: LOGOS OPERATING LLC	
Title: Regulatory Specialist	
Street Address: 2010 Afton Place	
City: Farmington	State: NM
Phone: (505) 324-4145	
Email address: MFLOREZ@LOGOSRESOURCESLLC.COM	

Field Representative

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

BLM Point of Contact

BLM POC Name: JOE D KILLINS	BLM POC Title: Petroleum Engineer
BLM POC Phone: 5055647731	BLM POC Email Address: jkillins@blm.gov
Disposition: Approved	Disposition Date: 04/09/2021
Signature: Joe Killins	



LOGOS Operating, LLC Operations Plan

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

Date:	January 3, 2021	Pool:	Basin Mancos
Well Name:	Rosa Unit 654H	Elevation:	6,372'
Surface Location:	Sec 25, T31N, R6W 1053 FNL, 298 FEL (36.874968° N, 107.408804° W – NAD83)	Measured Depth:	18,272
Bottom Hole Location:	Sec 21, T31N, R5W 83 FSL, 1193 FWL (36.878042° N, 107.372609° W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF-078769, CA Serial #NMNM-78407E

I. GEOLOGY

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

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2,540	2,510			
KIRTLAND	2,675	2,640	*POINT LOOKOUT	5,838	5,693
*FRUITLAND	3,160	3,108	KICKOFF POINT	6,042	5,890
*PICTURED CLIFFS	3,499	3,435	*MANCOS	6,308	6,150
LEWIS	3,596	3,529	LANDING POINT	7,727	7,012
CHACRA	4,722	4,616			
*CLIFF HOUSE	5,579	5,443			
MENEFEE	5,605	5,468	TD	18,272	7,027

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

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

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

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

II. DRILLING

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

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

ROSA UNIT 654H



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, repaired and fall within the 30 day interval of first full test.

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	OH SIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CONN
SURFACE	17.5"	320' or greater	13.375"	54.5 LBS	J-55 or equiv	BTC
INTERMEDIATE	12.25"	~6500' or greater	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.75"	Surface – 18,272'	5.5"	20 LBS	P-110 or equiv	LTC/BTC

B. FLOAT EQUIPMENT:

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

NOTE: Use of DV tool would be considered by operator as back up in case we experience heavy losses and are concerned with cement not reaching surface. If major losses are not encountered we will not run DV tool.

C. CEMENTING:

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

1. SURFACE: Casing shall be set at ~ 320' and cemented to surface.
2. INTERMEDIATE: 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. Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. If losses are not observed during the second stage a cancellation plug will be pumped and the remaining cement will be pumped during stage 2.



Operator proposes DV tools above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal.

	Top (ft)	Footage (ft)	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement
Stage 1 Tail	6,015	500	0.31318	1.3	221	39	1.1508	192
Stage 1 Lead	4,774	1,241	0.31318	1.3	505	90	2.3139	218
					726	129		411
Stage 2 Tail	4,674	100	0.31318	1.3	45	8	1.1504	39
Stage 2 Lead	3,212	1,462	0.31318	1.3	595	106	2.3139	257
					641	114		297
Stage 3 Tail	3,112	100	0.31318	1.3	45	8	1.1504	39
Stage 3 Lead	326	2,786	0.31318	1.3	1134	202	2.3139	490
Stage 3 Lead	-	326	0.36268	1	118	21	2.3139	51
					1,298	231		581

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

3. **PRODUCTION:** Production casing will be cemented in 1 stage with at least 150' of cement overlap above intermediate shoe. A CBL or Temperature Survey will be used to determine TOC.

	Top	ft	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement
Cased Lead	6,365	150	0.25307	1	38	7	1.1545	33
Open Hole Lead	6,515	11,757	0.25259	1.15	3,424	610	1.1545	2,966
					3,462	617		2,998

Calculations based on 15% excess for open hole and 150' 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.

B. **PRESSURE TEST**

With frac stack installed on wellhead, pressure test 5-1/2" casing to 1550 psi (0.22 psi/ft * 7,027' TVD) for 30 minutes. Increase pressure to Open RSI sleeves.

C. **STIMULATION**

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



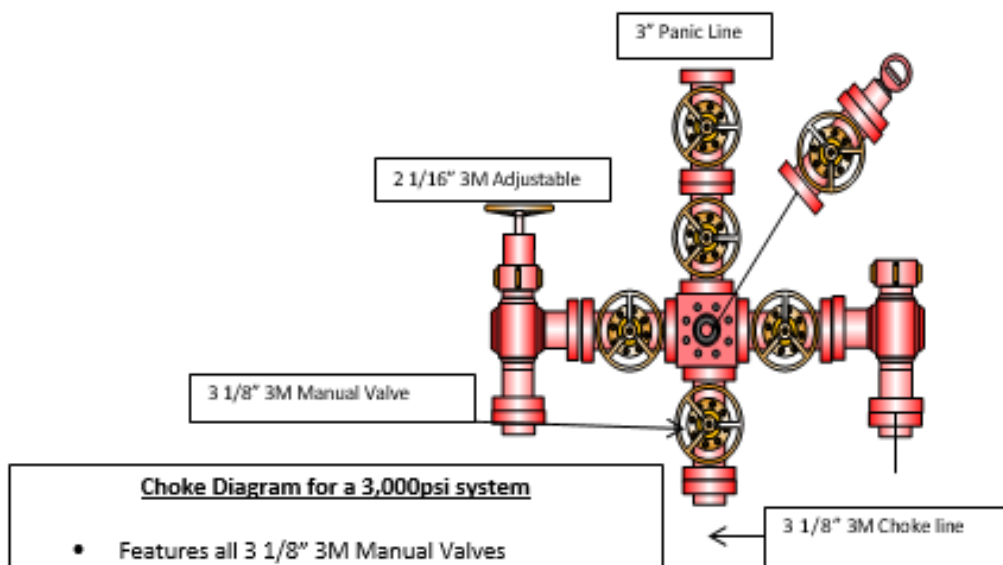
D. PRODUCTION TUBING

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

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

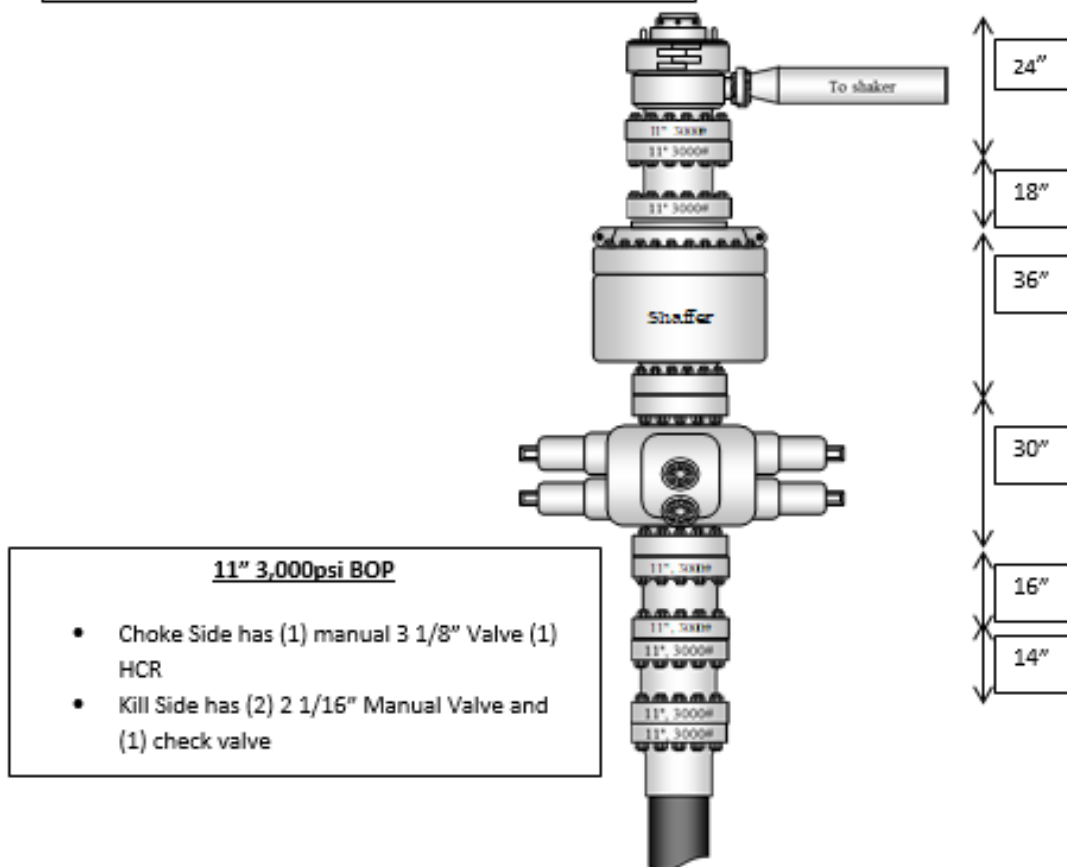


3M 11" B.O.P.E Diagram



Choke Diagram for a 3,000psi system

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



ROSA UNIT 654H



Company: Logos Operating LLC
 Project: Rio Arriba, NM NAD83
 Site: Rosa Unit 29
 Well: Rosa Unit #654H
 Wellbore: OH
 Design: Plan #2

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 #654H

GL 6372' & RKB 25' @ 6397.00ft
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.00 0.00 2138089.14 2847260.68 36.8749680 -107.4088040 A2 (654H)

Plan: Plan #2 (Rosa Unit #654H/OH)

Created By: Janie Collins Date: 10:45, January 13 2021



Azimuths to True North
 Magnetic North: 8

Magnetic Field
 Strength: 49854.2
 Dip Angle: 63.43
 Date: 3/6/2019
 Model: HD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rosa 654H POE	7012.00	999.99	42.67	2139089.31	2847298.91	36.8777147	-107.4086581
Rosa 654H BHL	7027.00	1121.28	10586.43	2139257.49	2857842.00	36.8780424	-107.3726086

SECTION DETAILS

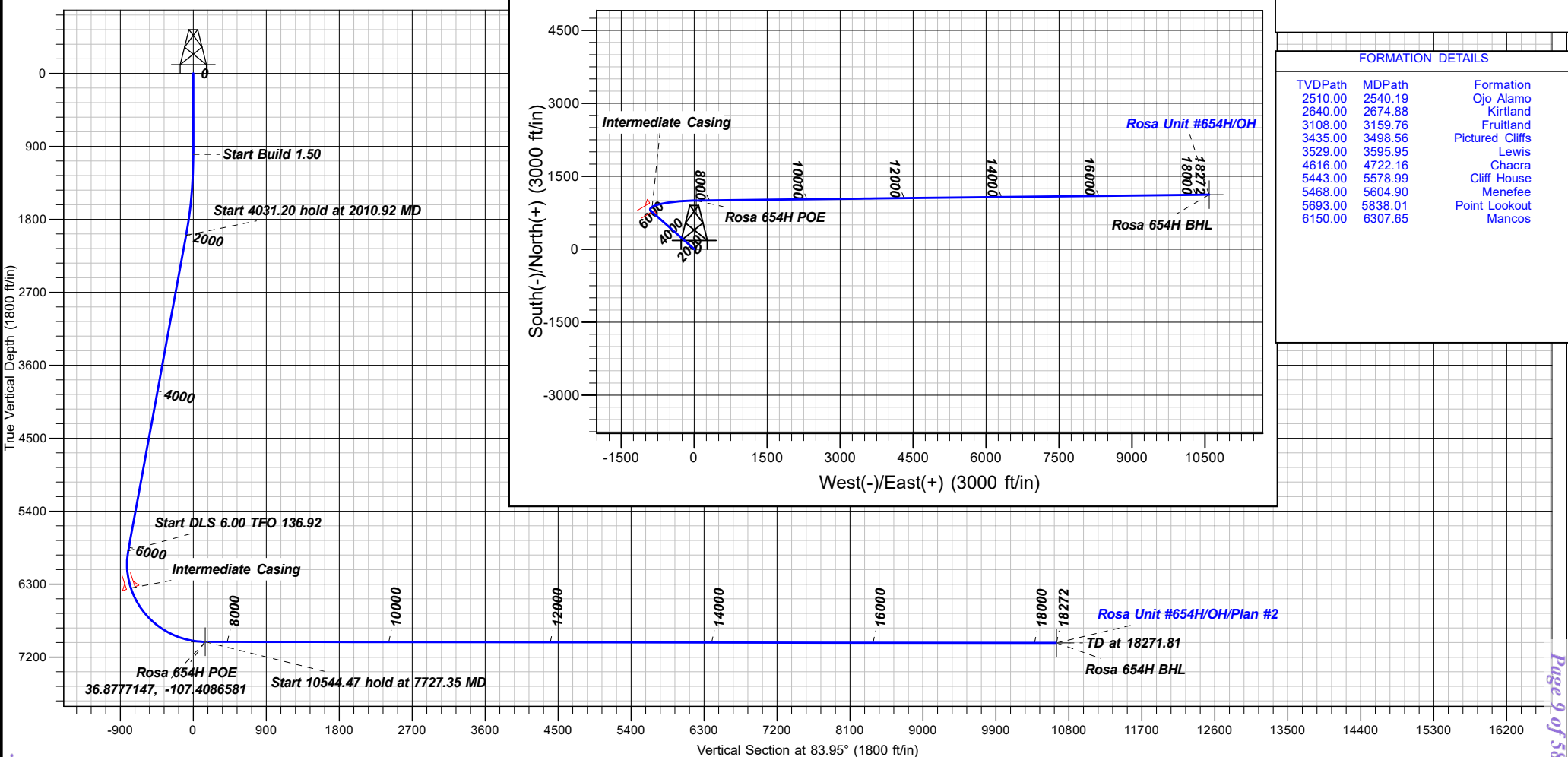
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	0.00	
2010.92	15.16	311.43	1999.16	88.00	-99.72	1.50	311.43	-89.89	
6042.12	15.16	311.43	5890.00	785.73	-890.35	0.00	0.00	-802.64	
7727.35	89.92	89.34	7012.00	999.99	42.67	6.00	136.92	147.76	Rosa 654H POE
18271.81	89.92	89.34	7027.00	1121.28	10586.43	0.00	0.00	10645.65	Rosa 654H BHL

CASING DETAILS

TVD	MD	Name
6350.00	6515.10	Intermediate Casing

FORMATION DETAILS

TVDPath	MDPath	Formation
2510.00	2540.19	Ojo Alamo
2640.00	2674.88	Kirtland
3108.00	3159.76	Fruitland
3435.00	3498.56	Pictured Cliffs
3529.00	3595.95	Lewis
4616.00	4722.16	Chacra
5443.00	5578.99	Cliff House
5468.00	5604.90	Menefee
5693.00	5838.01	Point Lookout
6150.00	6307.65	Mancos





Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 29

Rosa Unit #654H - Slot A2 (654H)

OH

Plan: Plan #2

Standard Planning Report

13 January, 2021





Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

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 #654H - Slot A2 (654H)			
Well Position	+N/-S	0.00 ft	Northing:	2,138,089.14 usft
	+E/-W	0.00 ft	Easting:	2,847,260.69 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft
Grid Convergence:		0.25 °	Ground Level:	6,372.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	3/6/2019	8.88	63.43	49,854.20000000

Design	Plan #2			
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	83.95

Plan Survey Tool Program	Date	1/13/2021		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,271.81 Plan #2 (OH)	MWD+HDGM	
			OWSG MWD + HDGM	

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,010.92	15.16	311.43	1,999.16	88.00	-99.72	1.50	1.50	0.00	311.43	
6,042.12	15.16	311.43	5,890.00	785.73	-890.35	0.00	0.00	0.00	0.00	
7,727.35	89.92	89.34	7,012.00	999.99	42.67	6.00	4.44	8.18	136.92	Rosa 654H POE
18,271.81	89.92	89.34	7,027.00	1,121.28	10,586.43	0.00	0.00	0.00	0.00	Rosa 654H BHL



Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	1.50	311.43	1,099.99	0.87	-0.98	-0.88	1.50	1.50	0.00
1,200.00	3.00	311.43	1,199.91	3.46	-3.92	-3.54	1.50	1.50	0.00
1,300.00	4.50	311.43	1,299.69	7.79	-8.83	-7.96	1.50	1.50	0.00
1,400.00	6.00	311.43	1,399.27	13.85	-15.69	-14.14	1.50	1.50	0.00
1,500.00	7.50	311.43	1,498.57	21.62	-24.50	-22.09	1.50	1.50	0.00
1,600.00	9.00	311.43	1,597.54	31.12	-35.26	-31.79	1.50	1.50	0.00
1,700.00	10.50	311.43	1,696.09	42.32	-47.96	-43.23	1.50	1.50	0.00
1,800.00	12.00	311.43	1,794.16	55.23	-62.58	-56.42	1.50	1.50	0.00
1,900.00	13.50	311.43	1,891.70	69.83	-79.13	-71.34	1.50	1.50	0.00
2,000.00	15.00	311.43	1,988.62	86.12	-97.59	-87.97	1.50	1.50	0.00
2,010.92	15.16	311.43	1,999.16	88.00	-99.72	-89.89	1.50	1.50	0.00
2,100.00	15.16	311.43	2,085.14	103.42	-117.19	-105.64	0.00	0.00	0.00
2,200.00	15.16	311.43	2,181.66	120.73	-136.80	-123.33	0.00	0.00	0.00
2,300.00	15.16	311.43	2,278.17	138.03	-156.41	-141.01	0.00	0.00	0.00
2,400.00	15.16	311.43	2,374.69	155.34	-176.03	-158.69	0.00	0.00	0.00
2,500.00	15.16	311.43	2,471.21	172.65	-195.64	-176.37	0.00	0.00	0.00
2,600.00	15.16	311.43	2,567.73	189.96	-215.25	-194.05	0.00	0.00	0.00
2,700.00	15.16	311.43	2,664.25	207.27	-234.87	-211.73	0.00	0.00	0.00
2,800.00	15.16	311.43	2,760.77	224.58	-254.48	-229.41	0.00	0.00	0.00
2,900.00	15.16	311.43	2,857.28	241.88	-274.09	-247.09	0.00	0.00	0.00
3,000.00	15.16	311.43	2,953.80	259.19	-293.70	-264.77	0.00	0.00	0.00
3,100.00	15.16	311.43	3,050.32	276.50	-313.32	-282.45	0.00	0.00	0.00
3,200.00	15.16	311.43	3,146.84	293.81	-332.93	-300.13	0.00	0.00	0.00
3,300.00	15.16	311.43	3,243.36	311.12	-352.54	-317.81	0.00	0.00	0.00
3,400.00	15.16	311.43	3,339.87	328.42	-372.16	-335.49	0.00	0.00	0.00
3,500.00	15.16	311.43	3,436.39	345.73	-391.77	-353.17	0.00	0.00	0.00
3,600.00	15.16	311.43	3,532.91	363.04	-411.38	-370.85	0.00	0.00	0.00
3,700.00	15.16	311.43	3,629.43	380.35	-430.99	-388.54	0.00	0.00	0.00
3,800.00	15.16	311.43	3,725.95	397.66	-450.61	-406.22	0.00	0.00	0.00
3,900.00	15.16	311.43	3,822.47	414.97	-470.22	-423.90	0.00	0.00	0.00
4,000.00	15.16	311.43	3,918.98	432.27	-489.83	-441.58	0.00	0.00	0.00
4,100.00	15.16	311.43	4,015.50	449.58	-509.45	-459.26	0.00	0.00	0.00
4,200.00	15.16	311.43	4,112.02	466.89	-529.06	-476.94	0.00	0.00	0.00
4,300.00	15.16	311.43	4,208.54	484.20	-548.67	-494.62	0.00	0.00	0.00
4,400.00	15.16	311.43	4,305.06	501.51	-568.28	-512.30	0.00	0.00	0.00
4,500.00	15.16	311.43	4,401.58	518.81	-587.90	-529.98	0.00	0.00	0.00
4,600.00	15.16	311.43	4,498.09	536.12	-607.51	-547.66	0.00	0.00	0.00
4,700.00	15.16	311.43	4,594.61	553.43	-627.12	-565.34	0.00	0.00	0.00
4,800.00	15.16	311.43	4,691.13	570.74	-646.74	-583.02	0.00	0.00	0.00
4,900.00	15.16	311.43	4,787.65	588.05	-666.35	-600.70	0.00	0.00	0.00
5,000.00	15.16	311.43	4,884.17	605.36	-685.96	-618.38	0.00	0.00	0.00
5,100.00	15.16	311.43	4,980.68	622.66	-705.57	-636.07	0.00	0.00	0.00
5,200.00	15.16	311.43	5,077.20	639.97	-725.19	-653.75	0.00	0.00	0.00



Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

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)
5,300.00	15.16	311.43	5,173.72	657.28	-744.80	-671.43	0.00	0.00	0.00
5,400.00	15.16	311.43	5,270.24	674.59	-764.41	-689.11	0.00	0.00	0.00
5,500.00	15.16	311.43	5,366.76	691.90	-784.03	-706.79	0.00	0.00	0.00
5,600.00	15.16	311.43	5,463.28	709.20	-803.64	-724.47	0.00	0.00	0.00
5,700.00	15.16	311.43	5,559.79	726.51	-823.25	-742.15	0.00	0.00	0.00
5,800.00	15.16	311.43	5,656.31	743.82	-842.86	-759.83	0.00	0.00	0.00
5,900.00	15.16	311.43	5,752.83	761.13	-862.48	-777.51	0.00	0.00	0.00
6,000.00	15.16	311.43	5,849.35	778.44	-882.09	-795.19	0.00	0.00	0.00
6,042.12	15.16	311.43	5,890.00	785.73	-890.35	-802.64	0.00	0.00	0.00
6,100.00	12.84	322.16	5,946.17	795.82	-899.98	-811.15	6.00	-4.01	18.53
6,200.00	10.43	349.80	6,044.18	813.52	-908.41	-817.67	6.00	-2.41	27.64
6,300.00	11.14	22.07	6,142.50	831.40	-906.38	-813.77	6.00	0.70	32.27
6,400.00	14.51	44.77	6,240.05	849.26	-893.92	-799.50	6.00	3.37	22.71
6,500.00	19.18	57.89	6,335.77	866.90	-871.16	-775.01	6.00	4.68	13.12
6,600.00	24.43	65.79	6,428.60	884.13	-838.36	-740.57	6.00	5.25	7.90
6,700.00	29.95	70.98	6,517.53	900.76	-795.86	-696.56	6.00	5.52	5.19
6,800.00	35.61	74.67	6,601.59	916.60	-744.14	-643.46	6.00	5.66	3.68
6,900.00	41.35	77.45	6,679.84	931.49	-683.77	-581.85	6.00	5.75	2.78
7,000.00	47.15	79.66	6,751.44	945.27	-615.40	-512.41	6.00	5.80	2.21
7,100.00	52.99	81.49	6,815.61	957.77	-539.78	-435.90	6.00	5.83	1.83
7,200.00	58.84	83.05	6,871.63	968.87	-457.75	-353.16	6.00	5.86	1.57
7,300.00	64.72	84.44	6,918.89	978.43	-370.20	-265.08	6.00	5.88	1.38
7,400.00	70.61	85.69	6,956.88	986.37	-278.08	-172.65	6.00	5.89	1.25
7,500.00	76.50	86.86	6,985.18	992.58	-182.42	-76.86	6.00	5.89	1.17
7,600.00	82.40	87.97	7,003.48	997.01	-84.26	21.23	6.00	5.90	1.11
7,700.00	88.30	89.05	7,011.58	999.60	15.34	120.54	6.00	5.90	1.08
7,727.35	89.92	89.34	7,012.00	999.99	42.67	147.76	6.00	5.90	1.07
7,800.00	89.92	89.34	7,012.10	1,000.82	115.32	220.10	0.00	0.00	0.00
7,900.00	89.92	89.34	7,012.25	1,001.97	215.32	319.65	0.00	0.00	0.00
8,000.00	89.92	89.34	7,012.39	1,003.12	315.31	419.21	0.00	0.00	0.00
8,100.00	89.92	89.34	7,012.53	1,004.27	415.30	518.77	0.00	0.00	0.00
8,200.00	89.92	89.34	7,012.67	1,005.42	515.30	618.33	0.00	0.00	0.00
8,300.00	89.92	89.34	7,012.81	1,006.57	615.29	717.89	0.00	0.00	0.00
8,400.00	89.92	89.34	7,012.96	1,007.72	715.28	817.45	0.00	0.00	0.00
8,500.00	89.92	89.34	7,013.10	1,008.88	815.28	917.00	0.00	0.00	0.00
8,600.00	89.92	89.34	7,013.24	1,010.03	915.27	1,016.56	0.00	0.00	0.00
8,700.00	89.92	89.34	7,013.38	1,011.18	1,015.26	1,116.12	0.00	0.00	0.00
8,800.00	89.92	89.34	7,013.53	1,012.33	1,115.26	1,215.68	0.00	0.00	0.00
8,900.00	89.92	89.34	7,013.67	1,013.48	1,215.25	1,315.24	0.00	0.00	0.00
9,000.00	89.92	89.34	7,013.81	1,014.63	1,315.24	1,414.80	0.00	0.00	0.00
9,100.00	89.92	89.34	7,013.95	1,015.78	1,415.24	1,514.35	0.00	0.00	0.00
9,200.00	89.92	89.34	7,014.10	1,016.93	1,515.23	1,613.91	0.00	0.00	0.00
9,300.00	89.92	89.34	7,014.24	1,018.08	1,615.22	1,713.47	0.00	0.00	0.00
9,400.00	89.92	89.34	7,014.38	1,019.23	1,715.22	1,813.03	0.00	0.00	0.00
9,500.00	89.92	89.34	7,014.52	1,020.38	1,815.21	1,912.59	0.00	0.00	0.00
9,600.00	89.92	89.34	7,014.66	1,021.53	1,915.20	2,012.14	0.00	0.00	0.00
9,700.00	89.92	89.34	7,014.81	1,022.68	2,015.20	2,111.70	0.00	0.00	0.00
9,800.00	89.92	89.34	7,014.95	1,023.83	2,115.19	2,211.26	0.00	0.00	0.00
9,900.00	89.92	89.34	7,015.09	1,024.98	2,215.18	2,310.82	0.00	0.00	0.00
10,000.00	89.92	89.34	7,015.23	1,026.13	2,315.18	2,410.38	0.00	0.00	0.00
10,100.00	89.92	89.34	7,015.38	1,027.28	2,415.17	2,509.94	0.00	0.00	0.00
10,200.00	89.92	89.34	7,015.52	1,028.43	2,515.16	2,609.49	0.00	0.00	0.00
10,300.00	89.92	89.34	7,015.66	1,029.58	2,615.16	2,709.05	0.00	0.00	0.00
10,400.00	89.92	89.34	7,015.80	1,030.73	2,715.15	2,808.61	0.00	0.00	0.00



Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

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)
10,500.00	89.92	89.34	7,015.94	1,031.88	2,815.14	2,908.17	0.00	0.00	0.00
10,600.00	89.92	89.34	7,016.09	1,033.03	2,915.14	3,007.73	0.00	0.00	0.00
10,700.00	89.92	89.34	7,016.23	1,034.18	3,015.13	3,107.29	0.00	0.00	0.00
10,800.00	89.92	89.34	7,016.37	1,035.33	3,115.12	3,206.84	0.00	0.00	0.00
10,900.00	89.92	89.34	7,016.51	1,036.48	3,215.12	3,306.40	0.00	0.00	0.00
11,000.00	89.92	89.34	7,016.66	1,037.63	3,315.11	3,405.96	0.00	0.00	0.00
11,100.00	89.92	89.34	7,016.80	1,038.78	3,415.10	3,505.52	0.00	0.00	0.00
11,200.00	89.92	89.34	7,016.94	1,039.93	3,515.10	3,605.08	0.00	0.00	0.00
11,300.00	89.92	89.34	7,017.08	1,041.08	3,615.09	3,704.63	0.00	0.00	0.00
11,400.00	89.92	89.34	7,017.22	1,042.24	3,715.08	3,804.19	0.00	0.00	0.00
11,500.00	89.92	89.34	7,017.37	1,043.39	3,815.07	3,903.75	0.00	0.00	0.00
11,600.00	89.92	89.34	7,017.51	1,044.54	3,915.07	4,003.31	0.00	0.00	0.00
11,700.00	89.92	89.34	7,017.65	1,045.69	4,015.06	4,102.87	0.00	0.00	0.00
11,800.00	89.92	89.34	7,017.79	1,046.84	4,115.05	4,202.43	0.00	0.00	0.00
11,900.00	89.92	89.34	7,017.94	1,047.99	4,215.05	4,301.98	0.00	0.00	0.00
12,000.00	89.92	89.34	7,018.08	1,049.14	4,315.04	4,401.54	0.00	0.00	0.00
12,100.00	89.92	89.34	7,018.22	1,050.29	4,415.03	4,501.10	0.00	0.00	0.00
12,200.00	89.92	89.34	7,018.36	1,051.44	4,515.03	4,600.66	0.00	0.00	0.00
12,300.00	89.92	89.34	7,018.50	1,052.59	4,615.02	4,700.22	0.00	0.00	0.00
12,400.00	89.92	89.34	7,018.65	1,053.74	4,715.01	4,799.78	0.00	0.00	0.00
12,500.00	89.92	89.34	7,018.79	1,054.89	4,815.01	4,899.33	0.00	0.00	0.00
12,600.00	89.92	89.34	7,018.93	1,056.04	4,915.00	4,998.89	0.00	0.00	0.00
12,700.00	89.92	89.34	7,019.07	1,057.19	5,014.99	5,098.45	0.00	0.00	0.00
12,800.00	89.92	89.34	7,019.22	1,058.34	5,114.99	5,198.01	0.00	0.00	0.00
12,900.00	89.92	89.34	7,019.36	1,059.49	5,214.98	5,297.57	0.00	0.00	0.00
13,000.00	89.92	89.34	7,019.50	1,060.64	5,314.97	5,397.12	0.00	0.00	0.00
13,100.00	89.92	89.34	7,019.64	1,061.79	5,414.97	5,496.68	0.00	0.00	0.00
13,200.00	89.92	89.34	7,019.79	1,062.94	5,514.96	5,596.24	0.00	0.00	0.00
13,300.00	89.92	89.34	7,019.93	1,064.09	5,614.95	5,695.80	0.00	0.00	0.00
13,400.00	89.92	89.34	7,020.07	1,065.24	5,714.95	5,795.36	0.00	0.00	0.00
13,500.00	89.92	89.34	7,020.21	1,066.39	5,814.94	5,894.92	0.00	0.00	0.00
13,600.00	89.92	89.34	7,020.35	1,067.54	5,914.93	5,994.47	0.00	0.00	0.00
13,700.00	89.92	89.34	7,020.50	1,068.69	6,014.93	6,094.03	0.00	0.00	0.00
13,800.00	89.92	89.34	7,020.64	1,069.84	6,114.92	6,193.59	0.00	0.00	0.00
13,900.00	89.92	89.34	7,020.78	1,070.99	6,214.91	6,293.15	0.00	0.00	0.00
14,000.00	89.92	89.34	7,020.92	1,072.14	6,314.91	6,392.71	0.00	0.00	0.00
14,100.00	89.92	89.34	7,021.07	1,073.29	6,414.90	6,492.27	0.00	0.00	0.00
14,200.00	89.92	89.34	7,021.21	1,074.44	6,514.89	6,591.82	0.00	0.00	0.00
14,300.00	89.92	89.34	7,021.35	1,075.60	6,614.89	6,691.38	0.00	0.00	0.00
14,400.00	89.92	89.34	7,021.49	1,076.75	6,714.88	6,790.94	0.00	0.00	0.00
14,500.00	89.92	89.34	7,021.63	1,077.90	6,814.87	6,890.50	0.00	0.00	0.00
14,600.00	89.92	89.34	7,021.78	1,079.05	6,914.87	6,990.06	0.00	0.00	0.00
14,700.00	89.92	89.34	7,021.92	1,080.20	7,014.86	7,089.62	0.00	0.00	0.00
14,800.00	89.92	89.34	7,022.06	1,081.35	7,114.85	7,189.17	0.00	0.00	0.00
14,900.00	89.92	89.34	7,022.20	1,082.50	7,214.85	7,288.73	0.00	0.00	0.00
15,000.00	89.92	89.34	7,022.35	1,083.65	7,314.84	7,388.29	0.00	0.00	0.00
15,100.00	89.92	89.34	7,022.49	1,084.80	7,414.83	7,487.85	0.00	0.00	0.00
15,200.00	89.92	89.34	7,022.63	1,085.95	7,514.83	7,587.41	0.00	0.00	0.00
15,300.00	89.92	89.34	7,022.77	1,087.10	7,614.82	7,686.96	0.00	0.00	0.00
15,400.00	89.92	89.34	7,022.91	1,088.25	7,714.81	7,786.52	0.00	0.00	0.00
15,500.00	89.92	89.34	7,023.06	1,089.40	7,814.81	7,886.08	0.00	0.00	0.00
15,600.00	89.92	89.34	7,023.20	1,090.55	7,914.80	7,985.64	0.00	0.00	0.00
15,700.00	89.92	89.34	7,023.34	1,091.70	8,014.79	8,085.20	0.00	0.00	0.00
15,800.00	89.92	89.34	7,023.48	1,092.85	8,114.79	8,184.76	0.00	0.00	0.00



Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

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)	
15,900.00	89.92	89.34	7,023.63	1,094.00	8,214.78	8,284.31	0.00	0.00	0.00	
16,000.00	89.92	89.34	7,023.77	1,095.15	8,314.77	8,383.87	0.00	0.00	0.00	
16,100.00	89.92	89.34	7,023.91	1,096.30	8,414.77	8,483.43	0.00	0.00	0.00	
16,200.00	89.92	89.34	7,024.05	1,097.45	8,514.76	8,582.99	0.00	0.00	0.00	
16,300.00	89.92	89.34	7,024.20	1,098.60	8,614.75	8,682.55	0.00	0.00	0.00	
16,400.00	89.92	89.34	7,024.34	1,099.75	8,714.75	8,782.11	0.00	0.00	0.00	
16,500.00	89.92	89.34	7,024.48	1,100.90	8,814.74	8,881.66	0.00	0.00	0.00	
16,600.00	89.92	89.34	7,024.62	1,102.05	8,914.73	8,981.22	0.00	0.00	0.00	
16,700.00	89.92	89.34	7,024.76	1,103.20	9,014.73	9,080.78	0.00	0.00	0.00	
16,800.00	89.92	89.34	7,024.91	1,104.35	9,114.72	9,180.34	0.00	0.00	0.00	
16,900.00	89.92	89.34	7,025.05	1,105.50	9,214.71	9,279.90	0.00	0.00	0.00	
17,000.00	89.92	89.34	7,025.19	1,106.65	9,314.71	9,379.45	0.00	0.00	0.00	
17,100.00	89.92	89.34	7,025.33	1,107.80	9,414.70	9,479.01	0.00	0.00	0.00	
17,200.00	89.92	89.34	7,025.48	1,108.96	9,514.69	9,578.57	0.00	0.00	0.00	
17,300.00	89.92	89.34	7,025.62	1,110.11	9,614.69	9,678.13	0.00	0.00	0.00	
17,400.00	89.92	89.34	7,025.76	1,111.26	9,714.68	9,777.69	0.00	0.00	0.00	
17,500.00	89.92	89.34	7,025.90	1,112.41	9,814.67	9,877.25	0.00	0.00	0.00	
17,600.00	89.92	89.34	7,026.04	1,113.56	9,914.67	9,976.80	0.00	0.00	0.00	
17,700.00	89.92	89.34	7,026.19	1,114.71	10,014.66	10,076.36	0.00	0.00	0.00	
17,800.00	89.92	89.34	7,026.33	1,115.86	10,114.65	10,175.92	0.00	0.00	0.00	
17,900.00	89.92	89.34	7,026.47	1,117.01	10,214.65	10,275.48	0.00	0.00	0.00	
18,000.00	89.92	89.34	7,026.61	1,118.16	10,314.64	10,375.04	0.00	0.00	0.00	
18,100.00	89.92	89.34	7,026.76	1,119.31	10,414.63	10,474.60	0.00	0.00	0.00	
18,200.00	89.92	89.34	7,026.90	1,120.46	10,514.62	10,574.15	0.00	0.00	0.00	
18,271.81	89.92	89.34	7,027.00	1,121.28	10,586.43	10,645.65	0.00	0.00	0.00	

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Rosa 654H POE - plan hits target center - Point	0.00	0.00	7,012.00	999.99	42.67	2,139,089.30	2,847,298.92	36.8777147	-107.4086581
Rosa 654H BHL - plan hits target center - Point	0.00	0.00	7,027.00	1,121.28	10,586.43	2,139,257.48	2,857,842.01	36.8780423	-107.3726086

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
6,515.10	6,350.00	Intermediate Casing	7.000	8.750	



Lonestar Consulting

Planning Report



Database:	EDM _16.0	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Company:	Logos Operating LLC	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Project:	Rio Arriba, NM NAD83	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site:	Rosa Unit 29	North Reference:	True
Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,540.19	2,510.00	Ojo Alamo		0.00	0.00
2,674.88	2,640.00	Kirtland		0.00	0.00
3,159.76	3,108.00	Fruitland		0.00	0.00
3,498.56	3,435.00	Pictured Cliffs		0.00	0.00
3,595.95	3,529.00	Lewis		0.00	0.00
4,722.16	4,616.00	Chacra		0.00	0.00
5,578.99	5,443.00	Cliff House		0.00	0.00
5,604.90	5,468.00	Menefee		0.00	0.00
5,838.01	5,693.00	Point Lookout		0.00	0.00
6,307.65	6,150.00	Mancos		0.00	0.00

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,000.00	1,000.00	0.00	0.00	Start Build 1.50
2,010.92	1,999.16	88.00	-99.72	Start 4031.20 hold at 2010.92 MD
6,042.12	5,890.00	785.73	-890.35	Start DLS 6.00 TFO 136.92
7,727.35	7,012.00	999.99	42.67	Start 10544.47 hold at 7727.35 MD
7,727.35	7,012.00	999.99	42.68	POE @ 7727' MD / 7012' TVD
7,727.35	7,012.00	999.99	42.68	36.8777147, -107.4086581
18,271.81	7,027.00	1,121.28	10,586.43	TD at 18271.81



Logos Operating LLC

Rio Arriba, NM NAD83

Rosa Unit 29

Rosa Unit #654H

OH

Plan #2

Anticollision Report

12 January, 2021





Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference	Plan #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum centre distance of 10,000.00ft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	1/12/2021		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	18,374.03	Plan #2 (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 #650H - OH - Plan #4 15Apr19 jcsdi	400.00	400.01	15.22	12.80	6.291	CC
Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi	7,959.39	7,225.37	81.44	9.18	1.127	Level 2, ES, SF
Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi	316.66	316.68	20.42	18.60	11.208	CC
Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi	400.00	400.00	20.42	18.00	8.440	ES
Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi	500.00	499.58	22.02	18.88	7.015	SF
Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi	316.66	316.68	44.98	43.15	24.682	CC
Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi	400.00	400.00	44.98	42.56	18.588	ES
Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi	500.00	497.60	48.16	45.01	15.254	SF
Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi	316.66	316.68	37.49	35.67	20.573	CC
Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi	400.00	400.00	37.49	35.07	15.493	ES
Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi	500.00	498.71	39.79	36.65	12.697	SF
Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi	316.66	316.68	12.62	10.80	6.928	CC
Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi	18,374.53	18,266.12	609.03	-41.65	0.936	Level 1, ES, SF
Rosa Unit #656H - OH - Plan #1	400.00	400.00	17.49	15.07	7.227	CC
Rosa Unit #656H - OH - Plan #1	500.00	500.00	18.06	14.94	5.780	ES
Rosa Unit #656H - OH - Plan #1	18,374.53	17,953.95	1,463.54	781.56	2.146	SF
Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi	400.00	400.01	22.52	20.10	9.308	CC
Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi	400.02	400.03	22.52	20.10	9.307	ES
Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi	18,374.53	18,295.49	2,257.99	1,577.92	3.320	SF
Sec 25 T31N R6W Offsets						
Rosa Unit #256A - OH - OH	3,353.81	5,136.14	153.26	83.40	2.194	CC, ES, SF
Sec 29 T31N R5W Offsets						
Rosa Unit #229 - OH - OH	12,605.33	6,492.00	3,777.47	3,702.14	50.146	CC, ES
Rosa Unit #229 - OH - OH	15,100.00	6,428.00	4,525.46	4,404.94	37.550	SF

Offset Design:	Rosa Unit 29 - Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi												Offset Site Error:	0.00 ft
Survey Program:	0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis	Offset Wellbore Centre	Rule Assigned:										
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.00	0.00	0.01	0.01	0.00	0.00	120.15	-7.65	13.16	15.22					
100.00	100.00	100.01	100.01	0.13	0.13	120.15	-7.65	13.16	15.22	14.95	0.27	56.607		
200.00	200.00	200.01	200.01	0.49	0.49	120.15	-7.65	13.16	15.22	14.24	0.99	15.440		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi												Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference												Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
							+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
300.00	300.00	300.01	300.01	0.85	0.85	120.15	-7.65	13.16	15.22	13.52	1.70	8.939	
400.00	400.00	400.01	400.01	1.21	1.21	120.15	-7.65	13.16	15.22	12.80	2.42	6.291	CC
401.80	401.80	401.82	401.82	1.22	1.22	170.52	-7.64	13.16	15.22	12.79	2.43	6.257	
500.00	499.99	500.00	499.96	1.57	1.57	161.44	-5.29	14.31	15.88	12.74	3.13	5.066	
600.00	599.85	599.39	599.03	1.93	1.93	145.48	1.70	17.73	22.37	18.51	3.87	5.787	
700.00	699.29	697.64	696.44	2.29	2.30	135.36	13.15	23.33	36.13	31.49	4.64	7.794	
800.00	798.04	794.82	792.10	2.67	2.67	130.70	28.53	30.85	56.39	50.98	5.40	10.437	
900.00	895.85	891.84	887.44	3.08	3.05	130.60	44.65	38.73	80.57	74.42	6.15	13.097	
1,000.00	992.43	987.88	981.82	3.52	3.45	132.38	60.62	46.53	108.14	101.21	6.92	15.623	
1,100.00	1,088.21	1,083.26	1,075.55	4.01	3.84	134.70	76.47	54.28	137.80	130.10	7.71	17.879	
1,200.00	1,183.99	1,178.63	1,169.28	4.51	4.24	136.23	92.32	62.03	167.62	159.12	8.50	19.714	
1,300.00	1,279.76	1,274.00	1,263.00	5.03	4.65	137.30	108.17	69.78	197.51	188.20	9.31	21.214	
1,400.00	1,375.54	1,369.37	1,356.73	5.56	5.05	138.09	124.02	77.52	227.45	217.32	10.13	22.459	
1,500.00	1,471.32	1,464.75	1,450.46	6.10	5.46	138.69	139.87	85.27	257.42	246.47	10.95	23.506	
1,600.00	1,567.10	1,560.12	1,544.18	6.64	5.87	139.17	155.72	93.02	287.41	275.63	11.78	24.397	
1,700.00	1,662.87	1,655.49	1,637.91	7.19	6.28	139.56	171.57	100.77	317.41	304.80	12.61	25.164	
1,800.00	1,758.65	1,750.87	1,731.64	7.74	6.69	139.88	187.42	108.52	347.43	333.98	13.45	25.829	
1,900.00	1,854.43	1,846.24	1,825.36	8.30	7.10	140.15	203.27	116.27	377.45	363.16	14.29	26.412	
2,000.00	1,950.20	1,941.61	1,919.09	8.85	7.51	140.38	219.13	124.01	407.48	392.35	15.13	26.926	
2,100.00	2,045.98	2,036.98	2,012.82	9.41	7.92	140.58	234.98	131.76	437.51	421.54	15.98	27.383	
2,200.00	2,141.76	2,132.36	2,106.54	9.97	8.33	140.75	250.83	139.51	467.55	450.73	16.82	27.792	
2,300.00	2,237.54	2,227.73	2,200.27	10.53	8.75	140.90	266.68	147.26	497.60	479.92	17.67	28.159	
2,400.00	2,333.31	2,323.10	2,294.00	11.09	9.16	141.04	282.53	155.01	527.64	509.12	18.52	28.491	
2,500.00	2,429.09	2,418.48	2,387.72	11.65	9.58	141.16	298.38	162.76	557.69	538.32	19.37	28.792	
2,600.00	2,524.87	2,513.85	2,481.45	12.21	9.99	141.26	314.23	170.51	587.74	567.52	20.22	29.067	
2,700.00	2,620.64	2,609.22	2,575.18	12.78	10.40	141.36	330.08	178.25	617.79	596.72	21.07	29.319	
2,800.00	2,716.42	2,704.59	2,668.90	13.34	10.82	141.45	345.93	186.00	647.84	625.92	21.92	29.550	
2,900.00	2,812.20	2,799.97	2,762.63	13.91	11.23	141.53	361.79	193.75	677.90	655.12	22.78	29.762	
3,000.00	2,907.97	2,895.34	2,856.35	14.47	11.65	141.60	377.64	201.50	707.95	684.32	23.63	29.959	
3,100.00	3,003.75	2,990.71	2,950.08	15.04	12.06	141.67	393.49	209.25	738.01	713.52	24.48	30.142	
3,200.00	3,099.53	3,086.08	3,043.81	15.60	12.48	141.73	409.34	217.00	768.06	742.72	25.34	30.311	
3,300.00	3,195.31	3,181.46	3,137.53	16.17	12.89	141.79	425.19	224.74	798.12	771.93	26.19	30.469	
3,400.00	3,291.08	3,276.83	3,231.26	16.74	13.31	141.85	441.04	232.49	828.18	801.13	27.05	30.617	
3,500.00	3,386.86	3,372.20	3,324.99	17.30	13.72	141.90	456.89	240.24	858.24	830.33	27.91	30.755	
3,600.00	3,482.64	3,467.58	3,418.71	17.87	14.14	141.94	472.74	247.99	888.30	859.54	28.76	30.884	
3,700.00	3,578.41	3,562.95	3,512.44	18.44	14.55	141.99	488.59	255.74	918.36	888.74	29.62	31.006	
3,800.00	3,674.19	3,658.32	3,606.17	19.01	14.97	142.03	504.44	263.49	948.42	917.94	30.48	31.121	
3,900.00	3,769.97	3,753.69	3,699.89	19.57	15.39	142.06	520.30	271.24	978.48	947.15	31.33	31.229	
4,000.00	3,865.75	3,849.07	3,793.62	20.14	15.80	142.10	536.15	278.98	1,008.54	976.35	32.19	31.331	
4,100.00	3,961.52	3,944.44	3,887.35	20.71	16.22	142.13	552.00	286.73	1,038.60	1,005.56	33.05	31.427	
4,200.00	4,057.30	4,039.81	3,981.07	21.28	16.63	142.17	567.85	294.48	1,068.67	1,034.76	33.91	31.519	
4,300.00	4,153.08	4,135.19	4,074.80	21.85	17.05	142.20	583.70	302.23	1,098.73	1,063.96	34.76	31.606	
4,400.00	4,248.85	4,230.56	4,168.53	22.42	17.47	142.22	599.55	309.98	1,128.79	1,093.17	35.62	31.688	
4,500.00	4,344.63	4,325.93	4,262.25	22.98	17.88	142.25	615.40	317.73	1,158.85	1,122.37	36.48	31.766	
4,600.00	4,440.41	4,421.30	4,355.98	23.55	18.30	142.28	631.25	325.47	1,188.92	1,151.58	37.34	31.841	
4,700.00	4,536.18	4,516.68	4,449.71	24.12	18.71	142.30	647.10	333.22	1,218.98	1,180.78	38.20	31.912	
4,800.00	4,631.96	4,612.05	4,543.43	24.69	19.13	142.33	662.95	340.97	1,249.04	1,209.98	39.06	31.980	
4,900.00	4,727.74	4,707.42	4,637.16	25.26	19.55	142.35	678.81	348.72	1,279.11	1,239.19	39.92	32.044	
5,000.00	4,823.52	4,802.79	4,730.89	25.83	19.96	142.37	694.66	356.47	1,309.17	1,268.39	40.78	32.106	
5,100.00	4,919.29	4,898.17	4,824.61	26.40	20.38	142.39	710.51	364.22	1,339.23	1,297.60	41.64	32.166	
5,200.00	5,015.07	4,993.54	4,918.34	26.97	20.79	142.41	726.36	371.97	1,369.30	1,326.80	42.50	32.222	
5,300.00	5,110.85	5,088.91	5,012.07	27.54	21.21	142.43	742.21	379.71	1,399.36	1,356.01	43.36	32.277	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi											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	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
5,400.00	5,206.62	5,184.29	5,105.79	28.11	21.63	142.44	758.06	387.46	1,429.43	1,385.21	44.22	32.329
5,500.00	5,302.40	5,279.66	5,199.52	28.68	22.04	142.46	773.91	395.21	1,459.49	1,414.41	45.08	32.379
5,600.00	5,398.18	5,375.03	5,293.25	29.25	22.46	142.48	789.76	402.96	1,489.55	1,443.62	45.94	32.427
5,700.00	5,493.96	5,470.40	5,386.97	29.82	22.88	142.52	805.61	410.71	1,519.62	1,472.82	46.80	32.473
5,800.00	5,590.88	5,575.14	5,483.10	30.32	52.83	153.29	1,101.95	-1,164.16	1,463.14	1,439.98	23.16	63.167
5,900.00	5,689.39	5,679.26	5,483.10	30.71	52.94	-151.23	1,101.97	-1,168.28	1,363.34	1,339.98	23.36	58.356
6,000.00	5,788.43	5,773.12	5,483.10	30.99	52.78	-127.48	1,101.94	-1,162.14	1,263.59	1,240.12	23.47	53.849
6,100.00	5,886.89	5,866.79	5,483.10	31.20	52.36	-147.39	1,101.88	-1,145.82	1,164.98	1,141.50	23.48	49.621
6,200.00	5,983.70	5,963.45	5,483.10	31.37	51.68	-157.49	1,101.77	-1,119.50	1,068.59	1,045.18	23.40	45.658
6,300.00	6,077.81	6,057.39	5,483.10	31.51	50.75	-162.50	1,101.62	-1,083.45	975.49	952.23	23.26	41.946
6,400.00	6,168.18	6,147.99	5,483.10	31.66	49.61	-165.10	1,101.43	-1,038.08	886.73	863.68	23.05	38.470
6,500.00	6,254.10	6,233.95	5,483.10	31.83	48.25	-165.65	1,101.21	-984.32	803.06	780.24	22.81	35.199
6,600.00	6,338.81	6,318.66	5,483.10	32.03	46.87	-164.17	1,100.99	-928.56	720.85	698.20	22.65	31.828
6,700.00	6,423.53	6,403.38	5,483.10	32.25	45.50	-162.33	1,100.76	-872.80	638.86	616.28	22.57	28.300
6,800.00	6,508.25	6,487.99	5,483.10	32.51	44.16	-159.99	1,100.53	-817.04	557.15	534.49	22.66	24.582
6,900.00	6,592.64	6,572.38	5,483.10	32.79	42.83	-157.95	1,100.30	-760.79	476.22	453.18	23.04	20.668
7,000.00	6,672.35	6,652.09	5,483.10	33.16	41.37	-157.05	1,100.04	-698.01	400.69	376.89	23.80	16.836
7,100.00	6,745.32	6,725.06	5,483.10	33.63	39.79	-155.20	1,099.75	-627.46	332.77	307.58	25.19	13.211
7,200.00	6,810.74	6,790.48	5,483.10	34.24	38.11	-152.33	1,099.43	-549.90	273.44	245.92	27.52	9.935
7,300.00	6,867.91	6,847.65	5,483.10	35.03	36.36	-148.31	1,099.09	-466.19	223.58	192.46	31.12	7.185
7,400.00	6,916.19	6,895.93	5,483.10	36.03	34.61	-143.12	1,098.73	-377.24	183.88	147.82	36.06	5.100
7,500.00	6,955.06	6,934.80	5,483.10	37.26	32.90	-137.07	1,098.35	-284.02	154.55	112.64	41.91	3.688
7,600.00	6,984.10	6,963.84	5,483.10	38.71	31.30	-131.08	1,097.95	-187.56	135.01	87.43	47.58	2.837
7,700.00	7,002.97	6,982.71	5,483.10	40.36	29.70	-124.50	1,096.62	-77.81	120.55	67.02	53.53	2.252
7,800.00	7,011.48	6,991.22	5,483.10	42.17	28.89	-113.88	1,092.31	28.98	102.86	41.04	61.82	1.664
7,900.00	7,012.10	6,991.84	5,483.10	44.11	28.90	-94.98	1,085.72	123.16	85.90	15.36	70.54	1.218 Level 2
7,959.39	7,012.18	6,991.84	5,483.10	45.34	28.90	-78.28	1,081.21	171.10	81.44	9.18	72.26	1.127 Level 2, ES, SF
8,000.00	7,012.24	6,991.84	5,483.10	46.18	28.89	-66.12	1,078.02	200.35	84.13	14.59	69.53	1.210 Level 2
8,100.00	7,012.38	6,991.84	5,483.10	48.36	28.86	-41.41	1,070.16	261.00	114.26	57.63	56.63	2.018
8,200.00	7,012.53	6,991.84	5,483.10	50.64	28.80	-26.12	1,062.24	310.39	168.51	119.01	49.50	3.404
8,300.00	7,012.67	6,991.84	5,483.10	52.99	28.75	-18.44	1,055.77	344.28	235.67	186.83	48.85	4.825
8,400.00	7,012.81	6,991.84	5,483.10	55.42	28.68	-12.98	1,048.90	375.18	310.70	261.69	49.01	6.339
8,500.00	7,012.95	6,991.84	5,483.10	57.91	28.63	-10.49	1,044.66	392.01	390.59	340.00	50.59	7.721
8,600.00	7,013.10	6,991.84	5,483.10	60.44	28.57	-8.29	1,040.04	408.60	474.26	422.75	51.52	9.206
8,700.00	7,013.24	6,991.84	5,483.10	63.03	28.52	-6.71	1,035.99	421.72	560.68	508.35	52.32	10.716
8,800.00	7,013.38	6,991.84	5,483.10	65.65	28.49	-6.07	1,034.15	427.29	649.38	596.09	53.29	12.185
8,900.00	7,013.52	6,991.84	5,483.10	68.30	28.42	-4.60	1,029.30	440.76	739.37	685.83	53.54	13.810
9,000.00	7,013.66	6,991.84	5,483.10	70.99	28.38	-3.83	1,026.34	448.17	830.87	776.90	53.97	15.394
9,100.00	7,013.81	6,991.84	5,483.10	73.70	28.38	-3.83	1,026.34	448.17	923.73	869.14	54.59	16.921
9,200.00	7,013.95	6,991.84	5,483.10	76.44	28.31	-2.79	1,021.85	458.35	1,016.92	962.24	54.69	18.596
9,300.00	7,014.09	6,991.84	5,483.10	79.20	28.25	-2.08	1,018.33	465.42	1,111.25	1,056.41	54.84	20.262
9,400.00	7,014.23	6,991.84	5,483.10	81.97	28.25	-2.08	1,018.33	465.42	1,205.98	1,150.79	55.19	21.851
9,500.00	7,014.38	6,991.84	5,483.10	84.77	28.25	-2.08	1,018.33	465.42	1,301.50	1,246.03	55.46	23.465
9,600.00	7,014.52	6,991.84	5,483.10	87.58	28.19	-1.48	1,014.99	471.41	1,397.16	1,341.63	55.53	25.158
9,700.00	7,014.66	6,991.84	5,483.10	90.40	28.17	-1.25	1,013.65	473.63	1,493.37	1,437.69	55.68	26.821
9,800.00	7,014.80	6,991.84	5,483.10	93.23	28.11	-0.70	1,010.14	478.94	1,590.13	1,534.41	55.72	28.536
9,900.00	7,014.94	6,991.84	5,483.10	96.08	28.11	-0.70	1,010.14	478.94	1,686.82	1,630.93	55.88	30.185
10,000.00	7,015.09	6,991.84	5,483.10	98.94	28.11	-0.70	1,010.14	478.94	1,783.87	1,727.85	56.02	31.845
10,100.00	7,015.23	6,991.84	5,483.10	101.80	28.11	-0.70	1,010.14	478.94	1,881.23	1,825.10	56.13	33.513
10,200.00	7,015.37	6,991.84	5,483.10	104.68	28.11	-0.70	1,010.14	478.94	1,978.85	1,922.62	56.24	35.189
10,300.00	7,015.51	6,991.84	5,483.10	107.56	28.11	-0.70	1,010.14	478.94	2,076.70	2,020.38	56.33	36.869
10,400.00	7,015.66	6,991.84	5,483.10	110.45	28.05	-0.23	1,006.80	483.31	2,174.34	2,118.00	56.34	38.594

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi													Offset Site Error:	0.00 ft
Survey Program:		0-MWD+HDGM					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	
10,500.00	7,015.80	6,675.51	6,570.97	113.35	28.03	-0.13	1,006.08	484.17	2,272.36	2,215.96	56.40	40.288		
10,600.00	7,015.94	6,671.45	6,567.05	116.25	28.02	-0.04	1,005.41	484.95	2,370.52	2,314.05	56.46	41.983		
10,700.00	7,016.08	6,650.01	6,546.23	119.16	27.95	0.40	1,001.84	488.64	2,469.10	2,412.63	56.47	43.722		
10,800.00	7,016.23	6,650.01	6,546.23	122.07	27.95	0.40	1,001.84	488.64	2,567.37	2,510.83	56.54	45.409		
10,900.00	7,016.37	6,650.01	6,546.23	124.99	27.95	0.40	1,001.84	488.64	2,665.77	2,609.16	56.60	47.097		
11,000.00	7,016.51	6,650.01	6,546.23	127.92	27.95	0.40	1,001.84	488.64	2,764.28	2,707.62	56.66	48.786		
11,100.00	7,016.65	6,650.01	6,546.23	130.85	27.95	0.40	1,001.84	488.64	2,862.89	2,806.18	56.72	50.477		
11,200.00	7,016.79	6,650.01	6,546.23	133.78	27.95	0.40	1,001.84	488.64	2,961.60	2,904.83	56.77	52.168		
11,300.00	7,016.94	6,650.01	6,546.23	136.71	27.95	0.40	1,001.84	488.64	3,060.40	3,003.57	56.82	53.859		
11,400.00	7,017.08	6,650.01	6,546.23	139.65	27.95	0.40	1,001.84	488.64	3,159.26	3,102.39	56.87	55.550		
11,500.00	7,017.22	6,650.01	6,546.23	142.60	27.95	0.40	1,001.84	488.64	3,258.20	3,201.28	56.92	57.241		
11,600.00	7,017.36	6,650.01	6,546.23	145.54	27.95	0.40	1,001.84	488.64	3,357.20	3,300.23	56.97	58.931		
11,700.00	7,017.51	6,650.01	6,546.23	148.49	27.95	0.40	1,001.84	488.64	3,456.26	3,399.25	57.01	60.620		
11,800.00	7,017.65	6,650.01	6,546.23	151.44	27.95	0.40	1,001.84	488.64	3,555.37	3,498.31	57.06	62.308		
11,900.00	7,017.79	6,650.01	6,546.23	154.40	27.95	0.40	1,001.84	488.64	3,654.53	3,597.42	57.11	63.995		
12,000.00	7,017.93	6,650.01	6,546.23	157.35	27.95	0.40	1,001.84	488.64	3,753.73	3,696.58	57.15	65.680		
12,100.00	7,018.07	6,650.01	6,546.23	160.31	27.95	0.40	1,001.84	488.64	3,852.98	3,795.78	57.20	67.363		
12,200.00	7,018.22	6,650.01	6,546.23	163.27	27.95	0.40	1,001.84	488.64	3,952.26	3,895.02	57.24	69.045		
12,300.00	7,018.36	6,650.01	6,546.23	166.23	27.95	0.40	1,001.84	488.64	4,051.58	3,994.29	57.29	70.724		
12,400.00	7,018.50	6,627.07	6,523.83	169.20	27.87	0.84	998.00	491.79	4,150.46	4,093.16	57.30	72.438		
12,500.00	7,018.64	6,625.55	6,522.35	172.17	27.86	0.87	997.75	491.97	4,249.77	4,192.43	57.34	74.115		
12,600.00	7,018.79	6,624.10	6,520.92	175.13	27.86	0.89	997.50	492.14	4,349.12	4,291.74	57.38	75.790		
12,700.00	7,018.93	6,622.70	6,519.55	178.10	27.85	0.92	997.27	492.30	4,448.49	4,391.06	57.43	77.462		
12,800.00	7,019.07	6,600.01	6,497.30	181.08	27.77	1.30	993.47	494.46	4,548.29	4,490.85	57.44	79.180		
12,900.00	7,019.21	6,600.01	6,497.30	184.05	27.77	1.30	993.47	494.46	4,647.66	4,590.17	57.49	80.843		
13,000.00	7,019.35	6,600.01	6,497.30	187.02	27.77	1.30	993.47	494.46	4,747.06	4,689.52	57.54	82.504		
13,100.00	7,019.50	6,600.01	6,497.30	190.00	27.77	1.30	993.47	494.46	4,846.48	4,788.89	57.59	84.162		
13,200.00	7,019.64	6,600.01	6,497.30	192.98	27.77	1.30	993.47	494.46	4,945.92	4,888.29	57.63	85.817		
13,300.00	7,019.78	6,600.01	6,497.30	195.96	27.77	1.30	993.47	494.46	5,045.39	4,987.71	57.68	87.469		
13,400.00	7,019.92	6,600.01	6,497.30	198.94	27.77	1.30	993.47	494.46	5,144.88	5,087.15	57.73	89.118		
13,500.00	7,020.07	6,600.01	6,497.30	201.92	27.77	1.30	993.47	494.46	5,244.38	5,186.60	57.78	90.764		
13,600.00	7,020.21	6,600.01	6,497.30	204.90	27.77	1.30	993.47	494.46	5,343.91	5,286.08	57.83	92.407		
13,700.00	7,020.35	6,600.01	6,497.30	207.88	27.77	1.30	993.47	494.46	5,443.45	5,385.57	57.88	94.046		
13,800.00	7,020.49	6,600.01	6,497.30	210.86	27.77	1.30	993.47	494.46	5,543.01	5,485.08	57.93	95.682		
13,900.00	7,020.63	6,600.01	6,497.30	213.85	27.77	1.30	993.47	494.46	5,642.58	5,584.60	57.98	97.315		
14,000.00	7,020.78	6,600.01	6,497.30	216.84	27.77	1.30	993.47	494.46	5,742.17	5,684.14	58.03	98.944		
14,100.00	7,020.92	6,600.01	6,497.30	219.82	27.77	1.30	993.47	494.46	5,841.78	5,783.69	58.09	100.569		
14,200.00	7,021.06	6,600.01	6,497.30	222.81	27.77	1.30	993.47	494.46	5,941.39	5,883.25	58.14	102.191		
14,300.00	7,021.20	6,600.01	6,497.30	225.80	27.77	1.30	993.47	494.46	6,041.02	5,982.83	58.19	103.809		
14,400.00	7,021.35	6,600.01	6,497.30	228.79	27.77	1.30	993.47	494.46	6,140.66	6,082.41	58.25	105.423		
14,500.00	7,021.49	6,600.01	6,497.30	231.78	27.77	1.30	993.47	494.46	6,240.32	6,182.01	58.30	107.033		
14,600.00	7,021.63	6,600.01	6,497.30	234.77	27.77	1.30	993.47	494.46	6,339.98	6,281.62	58.36	108.640		
14,700.00	7,021.77	6,600.01	6,497.30	237.76	27.77	1.30	993.47	494.46	6,439.65	6,381.24	58.41	110.242		
14,800.00	7,021.92	6,600.01	6,497.30	240.75	27.77	1.30	993.47	494.46	6,539.34	6,480.87	58.47	111.841		
14,900.00	7,022.06	6,600.01	6,497.30	243.74	27.77	1.30	993.47	494.46	6,639.03	6,580.50	58.53	113.435		
15,000.00	7,022.20	6,600.01	6,497.30	246.74	27.77	1.30	993.47	494.46	6,738.73	6,680.15	58.58	115.025		
15,100.00	7,022.34	6,600.01	6,497.30	249.73	27.77	1.30	993.47	494.46	6,838.44	6,779.80	58.64	116.611		
15,200.00	7,022.48	6,600.01	6,497.30	252.72	27.77	1.30	993.47	494.46	6,938.16	6,879.46	58.70	118.193		
15,300.00	7,022.63	6,600.01	6,497.30	255.72	27.77	1.30	993.47	494.46	7,037.89	6,979.13	58.76	119.771		
15,400.00	7,022.77	6,600.01	6,497.30	258.71	27.77	1.30	993.47	494.46	7,137.63	7,078.81	58.82	121.344		
15,500.00	7,022.91	6,600.01	6,497.30	261.71	27.77	1.30	993.47	494.46	7,237.37	7,178.49	58.88	122.913		
15,600.00	7,023.05	6,600.01	6,497.30	264.71	27.77	1.30	993.47	494.46	7,337.12	7,278.18	58.94	124.478		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #650H - OH - Plan #4 15Apr19 jcsdi												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)			
15,700.00	7,023.20	6,600.01	6,497.30	267.70	27.77	1.30	993.47	494.46	7,436.87	7,377.87	59.00	126.038	
15,800.00	7,023.34	6,600.01	6,497.30	270.70	27.77	1.30	993.47	494.46	7,536.64	7,477.57	59.07	127.594	
15,900.00	7,023.48	6,600.01	6,497.30	273.70	27.77	1.30	993.47	494.46	7,636.41	7,577.28	59.13	129.145	
16,000.00	7,023.62	6,600.01	6,497.30	276.70	27.77	1.30	993.47	494.46	7,736.18	7,676.99	59.19	130.692	
16,100.00	7,023.76	6,600.01	6,497.30	279.69	27.77	1.30	993.47	494.46	7,835.96	7,776.70	59.26	132.234	
16,200.00	7,023.91	6,600.01	6,497.30	282.69	27.77	1.30	993.47	494.46	7,935.75	7,876.42	59.32	133.772	
16,300.00	7,024.05	6,600.01	6,497.30	285.69	27.77	1.30	993.47	494.46	8,035.54	7,976.15	59.39	135.305	
16,400.00	7,024.19	6,600.01	6,497.30	288.69	27.77	1.30	993.47	494.46	8,135.34	8,075.88	59.45	136.833	
16,500.00	7,024.33	6,600.01	6,497.30	291.69	27.77	1.30	993.47	494.46	8,235.14	8,175.62	59.52	138.357	
16,600.00	7,024.48	6,600.01	6,497.30	294.69	27.77	1.30	993.47	494.46	8,334.94	8,275.35	59.59	139.875	
16,700.00	7,024.62	6,600.01	6,497.30	297.69	27.77	1.30	993.47	494.46	8,434.75	8,375.10	59.66	141.390	
16,800.00	7,024.76	6,600.01	6,497.30	300.69	27.77	1.30	993.47	494.46	8,534.57	8,474.84	59.72	142.899	
16,900.00	7,024.90	6,600.01	6,497.30	303.70	27.77	1.30	993.47	494.46	8,634.39	8,574.60	59.79	144.404	
17,000.00	7,025.04	6,600.01	6,497.30	306.70	27.77	1.30	993.47	494.46	8,734.21	8,674.35	59.86	145.903	
17,100.00	7,025.19	6,600.01	6,497.30	309.70	27.77	1.30	993.47	494.46	8,834.04	8,774.11	59.93	147.398	
17,200.00	7,025.33	6,600.01	6,497.30	312.70	27.77	1.30	993.47	494.46	8,933.87	8,873.87	60.00	148.889	
17,300.00	7,025.47	6,600.01	6,497.30	315.71	27.77	1.30	993.47	494.46	9,033.71	8,973.63	60.07	150.374	
17,400.00	7,025.61	6,600.01	6,497.30	318.71	27.77	1.30	993.47	494.46	9,133.55	9,073.40	60.15	151.854	
17,500.00	7,025.76	6,600.01	6,497.30	321.71	27.77	1.30	993.47	494.46	9,233.39	9,173.17	60.22	153.330	
17,600.00	7,025.90	6,600.01	6,497.30	324.71	27.77	1.30	993.47	494.46	9,333.23	9,272.94	60.29	154.800	
17,700.00	7,026.04	6,600.01	6,497.30	327.72	27.77	1.30	993.47	494.46	9,433.08	9,372.72	60.37	156.266	
17,800.00	7,026.18	6,600.01	6,497.30	330.72	27.77	1.30	993.47	494.46	9,532.93	9,472.50	60.44	157.726	
17,900.00	7,026.33	6,600.01	6,497.30	333.73	27.77	1.30	993.47	494.46	9,632.79	9,572.28	60.51	159.182	
18,000.00	7,026.47	6,600.01	6,497.30	336.73	27.77	1.30	993.47	494.46	9,732.65	9,672.06	60.59	160.633	
18,100.00	7,026.61	6,600.01	6,497.30	339.74	27.77	1.30	993.47	494.46	9,832.51	9,771.84	60.67	162.078	
18,200.00	7,026.75	6,600.01	6,497.30	342.74	27.77	1.30	993.47	494.46	9,932.37	9,871.63	60.74	163.519	



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi												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)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.01	0.01	0.00	0.00	122.33	-10.92	17.26	20.42				
100.00	100.00	100.01	100.01	0.13	0.13	122.33	-10.92	17.26	20.42	20.15	0.27	75.952	
200.00	200.00	200.01	200.01	0.49	0.49	122.33	-10.92	17.26	20.42	19.44	0.99	20.717	
300.00	300.00	300.01	300.01	0.85	0.85	122.33	-10.92	17.26	20.42	18.72	1.70	11.994	
316.66	316.66	316.68	316.68	0.91	0.91	122.33	-10.92	17.26	20.42	18.60	1.82	11.208 CC	
400.00	400.00	400.00	400.00	1.21	1.21	122.33	-10.92	17.26	20.42	18.00	2.42	8.440 ES	
500.00	499.99	499.58	499.53	1.57	1.57	166.48	-9.27	19.26	22.02	18.88	3.14	7.015 SF	
600.00	599.85	598.47	598.12	1.93	1.93	155.54	-4.40	25.19	30.87	26.98	3.88	7.950	
700.00	699.29	697.24	696.42	2.29	2.28	150.81	1.73	32.63	46.13	41.53	4.61	10.017	
800.00	798.04	795.24	793.94	2.67	2.64	150.66	7.81	40.02	65.99	60.67	5.33	12.390	
900.00	895.85	892.19	890.43	3.08	3.00	152.04	13.82	47.33	90.34	84.29	6.05	14.928	
1,000.00	992.43	987.83	985.62	3.52	3.36	153.81	19.75	54.54	119.26	112.48	6.78	17.583	
1,100.00	1,088.21	1,082.62	1,079.96	4.01	3.72	155.61	25.63	61.69	150.85	143.34	7.51	20.085	
1,200.00	1,183.99	1,177.41	1,174.29	4.51	4.07	156.81	31.51	68.83	182.54	174.31	8.23	22.167	
1,300.00	1,279.76	1,272.20	1,268.63	5.03	4.43	157.65	37.39	75.98	214.29	205.32	8.97	23.901	
1,400.00	1,375.54	1,366.99	1,362.96	5.56	4.79	158.28	43.27	83.12	246.06	236.36	9.70	25.362	
1,500.00	1,471.32	1,461.77	1,457.30	6.10	5.15	158.76	49.15	90.27	277.86	267.41	10.44	26.609	
1,600.00	1,567.10	1,556.56	1,551.63	6.64	5.51	159.14	55.03	97.42	309.67	298.48	11.19	27.685	
1,700.00	1,662.87	1,651.35	1,645.97	7.19	5.87	159.46	60.91	104.56	341.49	329.55	11.93	28.620	
1,800.00	1,758.65	1,746.14	1,740.30	7.74	6.23	159.71	66.79	111.71	373.31	360.63	12.68	29.441	
1,900.00	1,854.43	1,840.92	1,834.63	8.30	6.59	159.93	72.67	118.85	405.15	391.72	13.43	30.168	
2,000.00	1,950.20	1,935.71	1,928.97	8.85	6.95	160.12	78.55	126.00	436.98	422.80	14.18	30.814	
2,100.00	2,045.98	2,030.50	2,023.30	9.41	7.31	160.28	84.43	133.15	468.82	453.89	14.93	31.393	
2,200.00	2,141.76	2,125.29	2,117.64	9.97	7.67	160.42	90.31	140.29	500.67	484.98	15.69	31.914	
2,300.00	2,237.54	2,220.07	2,211.97	10.53	8.03	160.55	96.19	147.44	532.51	516.07	16.44	32.386	
2,400.00	2,333.31	2,314.86	2,306.31	11.09	8.39	160.65	102.07	154.58	564.36	547.16	17.20	32.814	
2,500.00	2,429.09	2,409.65	2,400.64	11.65	8.75	160.75	107.95	161.73	596.21	578.26	17.96	33.206	
2,600.00	2,524.87	2,504.44	2,494.98	12.21	9.11	160.84	113.83	168.88	628.06	609.35	18.71	33.565	
2,700.00	2,620.64	2,599.22	2,589.31	12.78	9.47	160.92	119.71	176.02	659.92	640.45	19.47	33.894	
2,800.00	2,716.42	2,694.01	2,683.65	13.34	9.83	160.99	125.59	183.17	691.77	671.54	20.23	34.199	
2,900.00	2,812.20	2,788.80	2,777.98	13.91	10.19	161.06	131.47	190.31	723.62	702.64	20.99	34.480	
3,000.00	2,907.97	2,883.59	2,872.32	14.47	10.56	161.12	137.35	197.46	755.48	733.73	21.75	34.742	
3,100.00	3,003.75	2,978.38	2,966.65	15.04	10.92	161.18	143.23	204.61	787.34	764.83	22.50	34.985	
3,200.00	3,099.53	3,073.16	3,060.99	15.60	11.28	161.23	149.11	211.75	819.19	795.93	23.26	35.212	
3,300.00	3,195.31	3,167.95	3,155.32	16.17	11.64	161.27	154.99	218.90	851.05	827.02	24.02	35.424	
3,400.00	3,291.08	3,262.74	3,249.66	16.74	12.00	161.32	160.87	226.05	882.91	858.12	24.79	35.622	
3,500.00	3,386.86	3,357.53	3,343.99	17.30	12.36	161.36	166.75	233.19	914.77	889.22	25.55	35.809	
3,600.00	3,482.64	3,452.31	3,438.33	17.87	12.72	161.40	172.63	240.34	946.62	920.32	26.31	35.984	
3,700.00	3,578.41	3,547.10	3,532.66	18.44	13.08	161.43	178.51	247.48	978.48	951.41	27.07	36.149	
3,800.00	3,674.19	3,641.89	3,627.00	19.01	13.44	161.47	184.39	254.63	1,010.34	982.51	27.83	36.305	
3,900.00	3,769.97	3,736.68	3,721.33	19.57	13.81	161.50	190.27	261.78	1,042.20	1,013.61	28.59	36.452	
4,000.00	3,865.75	3,831.46	3,815.67	20.14	14.17	161.53	196.15	268.92	1,074.06	1,044.71	29.35	36.591	
4,100.00	3,961.52	3,926.25	3,910.00	20.71	14.53	161.55	202.03	276.07	1,105.92	1,075.81	30.12	36.723	
4,200.00	4,057.30	4,021.04	4,004.34	21.28	14.89	161.58	207.91	283.21	1,137.78	1,106.90	30.88	36.848	
4,300.00	4,153.08	4,115.83	4,098.67	21.85	15.25	161.61	213.79	290.36	1,169.64	1,138.00	31.64	36.967	
4,400.00	4,248.85	4,210.61	4,193.00	22.42	15.61	161.63	219.67	297.51	1,201.50	1,169.10	32.40	37.080	
4,500.00	4,344.63	4,305.40	4,287.34	22.98	15.97	161.65	225.55	304.65	1,233.36	1,200.20	33.17	37.188	
4,600.00	4,440.41	4,400.19	4,381.67	23.55	16.33	161.67	231.43	311.80	1,265.22	1,231.29	33.93	37.291	
4,700.00	4,536.18	4,494.98	4,476.01	24.12	16.70	161.69	237.31	318.94	1,297.08	1,262.39	34.69	37.389	
4,800.00	4,631.96	4,589.76	4,570.34	24.69	17.06	161.71	243.19	326.09	1,328.95	1,293.49	35.45	37.483	
4,900.00	4,727.74	4,684.55	4,664.68	25.26	17.42	161.73	249.07	333.24	1,360.81	1,324.59	36.22	37.572	
5,000.00	4,823.52	4,779.34	4,759.01	25.83	17.78	161.75	254.95	340.38	1,392.67	1,355.69	36.98	37.658	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi													Offset Site Error: 0.00 ft		
Survey Program: Reference		0-MWD+HDGM Offset		Semi Major Axis			Offset Wellbore Centre			Rule Assigned: Distance				Offset Well Error: 0.00 ft	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
5,100.00	4,919.29	4,874.13	4,853.35	26.40	18.14	161.76	260.83	347.53	1,424.53	1,386.78	37.75	37.740			
5,200.00	5,015.07	4,968.92	4,947.68	26.97	18.50	161.78	266.71	354.67	1,456.39	1,417.88	38.51	37.819			
5,300.00	5,110.85	5,063.70	5,042.02	27.54	18.86	161.80	272.59	361.82	1,488.25	1,448.98	39.27	37.895			
5,400.00	5,206.62	5,158.49	5,136.35	28.11	19.23	161.81	278.47	368.97	1,520.11	1,480.08	40.04	37.967			
5,500.00	5,302.40	5,253.28	5,230.69	28.68	19.59	161.82	284.35	376.11	1,551.98	1,511.17	40.80	38.037			
5,600.00	5,398.18	5,348.07	5,325.02	29.25	19.95	161.84	290.23	383.26	1,583.84	1,542.27	41.57	38.104			
5,700.00	5,493.96	5,442.85	5,419.36	29.82	20.31	161.86	296.11	390.40	1,615.70	1,573.37	42.33	38.168			
5,800.00	5,590.88	5,539.08	5,515.12	30.32	20.68	168.70	302.08	397.66	1,642.75	1,599.66	43.09	38.126			
5,900.00	5,689.39	5,637.53	5,613.10	30.71	21.05	120.25	308.19	405.08	1,659.77	1,615.94	43.83	37.871			
6,000.00	5,788.43	8,708.92	7,290.27	30.99	52.22	158.89	451.97	-1,159.30	1,585.15	1,548.37	36.79	43.090			
6,100.00	5,886.89	8,694.26	7,290.51	31.20	51.84	141.91	451.64	-1,144.65	1,496.26	1,457.84	38.42	38.949			
6,200.00	5,983.70	8,669.52	7,290.93	31.37	51.21	137.19	451.10	-1,119.92	1,409.58	1,369.57	40.02	35.226			
6,300.00	6,077.81	8,634.98	7,291.51	31.51	50.32	136.70	450.33	-1,085.38	1,326.05	1,284.48	41.56	31.905			
6,400.00	6,168.18	8,591.00	7,292.25	31.66	49.20	137.34	449.36	-1,041.42	1,246.48	1,203.45	43.03	28.966			
6,500.00	6,254.10	8,538.50	7,293.13	31.83	47.88	137.17	448.20	-988.94	1,171.43	1,127.02	44.42	26.374			
6,600.00	6,338.81	8,483.98	7,294.05	32.03	46.52	134.73	446.99	-934.45	1,098.65	1,052.72	45.93	23.922			
6,700.00	6,423.53	8,429.47	7,294.96	32.25	45.18	132.09	445.79	-879.95	1,027.55	979.90	47.65	21.565			
6,800.00	6,508.25	8,374.95	7,295.88	32.51	43.86	129.23	444.58	-825.45	958.51	908.91	49.60	19.326			
6,900.00	6,592.64	8,319.94	7,296.80	32.79	42.56	127.51	443.37	-770.46	892.28	840.51	51.77	17.235			
7,000.00	6,672.35	8,258.33	7,297.84	33.16	41.13	127.74	442.00	-708.88	832.93	778.96	53.97	15.433			
7,100.00	6,745.32	8,188.84	7,299.00	33.63	39.55	127.18	440.47	-639.41	782.06	726.00	56.06	13.951			
7,200.00	6,810.74	8,112.22	7,300.29	34.24	37.88	126.02	438.77	-562.83	739.94	681.95	57.98	12.761			
7,300.00	6,867.91	8,029.33	7,301.68	35.03	36.16	124.45	436.94	-479.97	706.44	646.75	59.69	11.835			
7,400.00	6,916.19	7,941.06	7,303.17	36.03	34.43	122.68	434.99	-391.73	681.13	619.96	61.17	11.135			
7,500.00	6,955.06	7,848.39	7,304.72	37.26	32.75	120.92	432.94	-299.09	663.27	600.83	62.43	10.623			
7,600.00	6,984.10	7,752.32	7,306.34	38.71	31.17	119.37	430.81	-203.07	652.02	588.48	63.54	10.262			
7,700.00	7,002.97	7,612.57	7,300.96	40.36	29.20	117.13	427.23	-63.65	644.72	580.74	63.98	10.076			
7,800.00	7,011.48	7,458.96	7,261.66	42.17	27.60	113.17	421.28	84.34	634.21	568.80	65.41	9.695			
7,900.00	7,012.10	7,328.61	7,201.36	44.11	26.76	107.86	414.75	199.46	621.94	553.97	67.97	9.151			
8,000.00	7,012.24	7,225.85	7,138.07	46.18	26.39	101.95	408.82	280.06	610.06	539.04	71.02	8.590			
8,100.00	7,012.38	7,146.73	7,080.99	48.36	26.20	96.53	403.90	334.54	603.51	529.52	73.98	8.157			
8,126.20	7,012.42	7,129.21	7,067.45	48.96	26.16	95.23	402.77	345.62	603.17	528.48	74.70	8.075			
8,200.00	7,012.53	7,085.70	7,032.59	50.64	26.08	91.91	399.94	371.48	606.03	529.58	76.45	7.927			
8,300.00	7,012.67	7,037.99	6,992.42	52.99	25.98	88.11	396.77	397.01	619.83	541.65	78.18	7.928			
8,400.00	7,012.81	7,000.01	6,959.15	55.42	25.91	85.00	394.22	415.13	645.60	566.52	79.09	8.163			
8,500.00	7,012.95	6,969.42	6,931.60	57.91	25.84	82.47	392.15	428.27	682.89	603.63	79.27	8.615			
8,600.00	7,013.10	6,950.01	6,913.81	60.44	25.80	80.86	390.83	435.90	730.53	651.57	78.95	9.253			
8,700.00	7,013.24	6,923.21	6,888.87	63.03	25.73	78.64	389.01	445.55	786.88	708.72	78.17	10.067			
8,800.00	7,013.38	6,900.01	6,866.98	65.65	25.68	76.73	387.43	453.04	850.59	773.39	77.19	11.019			
8,900.00	7,013.52	6,900.01	6,866.98	68.30	25.68	76.73	387.43	453.04	920.26	843.92	76.34	12.055			
9,000.00	7,013.66	6,877.18	6,845.17	70.99	25.62	74.86	385.88	459.63	994.53	919.27	75.26	13.215			
9,100.00	7,013.81	6,865.76	6,834.17	73.70	25.59	73.94	385.11	462.63	1,072.77	998.48	74.30	14.439			
9,200.00	7,013.95	6,850.01	6,818.94	76.44	25.55	72.67	384.04	466.44	1,154.18	1,080.82	73.36	15.733			
9,300.00	7,014.09	6,850.01	6,818.94	79.20	25.55	72.67	384.04	466.44	1,238.08	1,165.50	72.58	17.057			
9,400.00	7,014.23	6,850.01	6,818.94	81.97	25.55	72.67	384.04	466.44	1,324.22	1,252.37	71.85	18.429			
9,500.00	7,014.38	6,831.79	6,801.19	84.77	25.50	71.23	382.81	470.38	1,411.84	1,340.74	71.10	19.856			
9,600.00	7,014.52	6,825.39	6,794.93	87.58	25.48	70.73	382.38	471.64	1,501.03	1,430.56	70.47	21.301			
9,700.00	7,014.66	6,819.59	6,789.24	90.40	25.47	70.27	381.99	472.73	1,591.43	1,521.55	69.89	22.771			
9,800.00	7,014.80	6,800.01	6,769.99	93.23	25.41	68.76	380.68	476.03	1,683.07	1,613.76	69.31	24.284			
9,900.00	7,014.94	6,800.01	6,769.99	96.08	25.41	68.76	380.68	476.03	1,775.26	1,706.41	68.85	25.785			
10,000.00	7,015.09	6,800.01	6,769.99	98.94	25.41	68.76	380.68	476.03	1,868.25	1,799.83	68.43	27.303			
10,100.00	7,015.23	6,800.01	6,769.99	101.80	25.41	68.76	380.68	476.03	1,961.93	1,893.90	68.04	28.836			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM				Offset					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	
10,200.00	7,015.37	6,800.01	6,769.99	104.68	25.41	68.76	380.68	476.03	2,056.21	1,988.53	67.68	30.382		
10,300.00	7,015.51	6,800.01	6,769.99	107.56	25.41	68.76	380.68	476.03	2,151.00	2,083.65	67.35	31.938		
10,400.00	7,015.66	6,800.01	6,769.99	110.45	25.41	68.76	380.68	476.03	2,246.25	2,179.20	67.04	33.504		
10,500.00	7,015.80	6,800.01	6,769.99	113.35	25.41	68.76	380.68	476.03	2,341.89	2,275.13	66.76	35.078		
10,600.00	7,015.94	6,800.01	6,769.99	116.25	25.41	68.76	380.68	476.03	2,437.88	2,371.38	66.50	36.659		
10,700.00	7,016.08	6,800.01	6,769.99	119.16	25.41	68.76	380.68	476.03	2,534.18	2,467.92	66.26	38.246		
10,800.00	7,016.23	6,779.58	6,749.80	122.07	25.35	67.21	379.32	478.83	2,630.36	2,564.36	66.01	39.849		
10,900.00	7,016.37	6,777.26	6,747.50	124.99	25.34	67.04	379.17	479.11	2,727.10	2,661.30	65.80	41.445		
11,000.00	7,016.51	6,775.08	6,745.34	127.92	25.34	66.88	379.03	479.36	2,824.05	2,758.44	65.61	43.045		
11,100.00	7,016.65	6,773.02	6,743.30	130.85	25.33	66.72	378.89	479.59	2,921.19	2,855.77	65.43	44.647		
11,200.00	7,016.79	6,771.08	6,741.38	133.78	25.33	66.58	378.76	479.80	3,018.52	2,953.26	65.26	46.252		
11,300.00	7,016.94	6,750.01	6,720.44	136.71	25.26	65.04	377.38	481.73	3,116.35	3,051.27	65.08	47.882		
11,400.00	7,017.08	6,750.01	6,720.44	139.65	25.26	65.04	377.38	481.73	3,213.93	3,148.99	64.94	49.488		
11,500.00	7,017.22	6,750.01	6,720.44	142.60	25.26	65.04	377.38	481.73	3,311.65	3,246.84	64.81	51.095		
11,600.00	7,017.36	6,750.01	6,720.44	145.54	25.26	65.04	377.38	481.73	3,409.51	3,344.82	64.69	52.704		
11,700.00	7,017.51	6,750.01	6,720.44	148.49	25.26	65.04	377.38	481.73	3,507.48	3,442.90	64.58	54.313		
11,800.00	7,017.65	6,750.01	6,720.44	151.44	25.26	65.04	377.38	481.73	3,605.57	3,541.10	64.47	55.923		
11,900.00	7,017.79	6,750.01	6,720.44	154.40	25.26	65.04	377.38	481.73	3,703.76	3,639.38	64.38	57.534		
12,000.00	7,017.93	6,750.01	6,720.44	157.35	25.26	65.04	377.38	481.73	3,802.04	3,737.76	64.28	59.145		
12,100.00	7,018.07	6,750.01	6,720.44	160.31	25.26	65.04	377.38	481.73	3,900.41	3,836.21	64.20	60.755		
12,200.00	7,018.22	6,750.01	6,720.44	163.27	25.26	65.04	377.38	481.73	3,998.86	3,934.75	64.12	62.366		
12,300.00	7,018.36	6,750.01	6,720.44	166.23	25.26	65.04	377.38	481.73	4,097.39	4,033.35	64.05	63.976		
12,400.00	7,018.50	6,750.01	6,720.44	169.20	25.26	65.04	377.38	481.73	4,195.99	4,132.01	63.98	65.585		
12,500.00	7,018.64	6,750.01	6,720.44	172.17	25.26	65.04	377.38	481.73	4,294.65	4,230.73	63.91	67.193		
12,600.00	7,018.79	6,750.01	6,720.44	175.13	25.26	65.04	377.38	481.73	4,393.37	4,329.51	63.86	68.801		
12,700.00	7,018.93	6,750.01	6,720.44	178.10	25.26	65.04	377.38	481.73	4,492.15	4,428.35	63.80	70.407		
12,800.00	7,019.07	6,750.01	6,720.44	181.08	25.26	65.04	377.38	481.73	4,590.98	4,527.23	63.75	72.012		
12,900.00	7,019.21	6,750.01	6,720.44	184.05	25.26	65.04	377.38	481.73	4,689.86	4,626.15	63.71	73.616		
13,000.00	7,019.35	6,750.01	6,720.44	187.02	25.26	65.04	377.38	481.73	4,788.79	4,725.12	63.67	75.218		
13,100.00	7,019.50	6,750.01	6,720.44	190.00	25.26	65.04	377.38	481.73	4,887.76	4,824.13	63.63	76.818		
13,200.00	7,019.64	6,750.01	6,720.44	192.98	25.26	65.04	377.38	481.73	4,986.77	4,923.18	63.59	78.417		
13,300.00	7,019.78	6,750.01	6,720.44	195.96	25.26	65.04	377.38	481.73	5,085.82	5,022.26	63.56	80.014		
13,400.00	7,019.92	6,750.01	6,720.44	198.94	25.26	65.04	377.38	481.73	5,184.91	5,121.38	63.53	81.609		
13,500.00	7,020.07	6,750.01	6,720.44	201.92	25.26	65.04	377.38	481.73	5,284.03	5,220.52	63.51	83.202		
13,600.00	7,020.21	6,750.01	6,720.44	204.90	25.26	65.04	377.38	481.73	5,383.18	5,319.70	63.49	84.793		
13,700.00	7,020.35	6,750.01	6,720.44	207.88	25.26	65.04	377.38	481.73	5,482.37	5,418.90	63.47	86.382		
13,800.00	7,020.49	6,750.01	6,720.44	210.86	25.26	65.04	377.38	481.73	5,581.58	5,518.13	63.45	87.968		
13,900.00	7,020.63	6,750.01	6,720.44	213.85	25.26	65.04	377.38	481.73	5,680.82	5,617.39	63.44	89.552		
14,000.00	7,020.78	6,750.01	6,720.44	216.84	25.26	65.04	377.38	481.73	5,780.09	5,716.67	63.42	91.134		
14,100.00	7,020.92	6,750.01	6,720.44	219.82	25.26	65.04	377.38	481.73	5,879.38	5,815.97	63.42	92.713		
14,200.00	7,021.06	6,750.01	6,720.44	222.81	25.26	65.04	377.38	481.73	5,978.70	5,915.29	63.41	94.289		
14,300.00	7,021.20	6,750.01	6,720.44	225.80	25.26	65.04	377.38	481.73	6,078.04	6,014.63	63.40	95.863		
14,400.00	7,021.35	6,750.01	6,720.44	228.79	25.26	65.04	377.38	481.73	6,177.40	6,114.00	63.40	97.434		
14,500.00	7,021.49	6,750.01	6,720.44	231.78	25.26	65.04	377.38	481.73	6,276.78	6,213.38	63.40	99.002		
14,600.00	7,021.63	6,750.01	6,720.44	234.77	25.26	65.04	377.38	481.73	6,376.18	6,312.78	63.40	100.567		
14,700.00	7,021.77	6,750.01	6,720.44	237.76	25.26	65.04	377.38	481.73	6,475.60	6,412.19	63.41	102.130		
14,800.00	7,021.92	6,750.01	6,720.44	240.75	25.26	65.04	377.38	481.73	6,575.03	6,511.62	63.41	103.689		
14,900.00	7,022.06	6,750.01	6,720.44	243.74	25.26	65.04	377.38	481.73	6,674.48	6,611.07	63.42	105.246		
15,000.00	7,022.20	6,750.01	6,720.44	246.74	25.26	65.04	377.38	481.73	6,773.95	6,710.52	63.43	106.799		
15,100.00	7,022.34	6,750.01	6,720.44	249.73	25.26	65.04	377.38	481.73	6,873.44	6,810.00	63.44	108.350		
15,200.00	7,022.48	6,750.01	6,720.44	252.72	25.26	65.04	377.38	481.73	6,972.93	6,909.48	63.45	109.897		
15,300.00	7,022.63	6,750.01	6,720.44	255.72	25.26	65.04	377.38	481.73	7,072.45	7,008.98	63.46	111.440		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #651H - OH - Plan #3 11Mar19 jcsdi													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	Vertical	Measured	Vertical	Reference	Offset	Highside									
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
15,400.00	7,022.77	6,750.01	6,720.44	258.71	25.26	65.04	377.38	481.73	7,171.97	7,108.49	63.48	112.981			
15,500.00	7,022.91	6,750.01	6,720.44	261.71	25.26	65.04	377.38	481.73	7,271.51	7,208.02	63.50	114.518			
15,600.00	7,023.05	6,750.01	6,720.44	264.71	25.26	65.04	377.38	481.73	7,371.07	7,307.55	63.52	116.052			
15,700.00	7,023.20	6,750.01	6,720.44	267.70	25.26	65.04	377.38	481.73	7,470.63	7,407.09	63.54	117.583			
15,800.00	7,023.34	6,750.01	6,720.44	270.70	25.26	65.04	377.38	481.73	7,570.20	7,506.65	63.56	119.110			
15,900.00	7,023.48	6,750.01	6,720.44	273.70	25.26	65.04	377.38	481.73	7,669.79	7,606.21	63.58	120.633			
16,000.00	7,023.62	6,750.01	6,720.44	276.70	25.26	65.04	377.38	481.73	7,769.39	7,705.78	63.60	122.153			
16,100.00	7,023.76	6,750.01	6,720.44	279.69	25.26	65.04	377.38	481.73	7,869.00	7,805.37	63.63	123.670			
16,200.00	7,023.91	6,750.01	6,720.44	282.69	25.26	65.04	377.38	481.73	7,968.61	7,904.96	63.66	125.183			
16,300.00	7,024.05	6,750.01	6,720.44	285.69	25.26	65.04	377.38	481.73	8,068.24	8,004.55	63.68	126.692			
16,400.00	7,024.19	6,750.01	6,720.44	288.69	25.26	65.04	377.38	481.73	8,167.87	8,104.16	63.71	128.197			
16,500.00	7,024.33	6,750.01	6,720.44	291.69	25.26	65.04	377.38	481.73	8,267.52	8,203.77	63.74	129.699			
16,600.00	7,024.48	6,750.01	6,720.44	294.69	25.26	65.04	377.38	481.73	8,367.17	8,303.40	63.78	131.197			
16,700.00	7,024.62	6,750.01	6,720.44	297.69	25.26	65.04	377.38	481.73	8,466.83	8,403.02	63.81	132.691			
16,800.00	7,024.76	6,750.01	6,720.44	300.69	25.26	65.04	377.38	481.73	8,566.50	8,502.66	63.84	134.182			
16,900.00	7,024.90	6,750.01	6,720.44	303.70	25.26	65.04	377.38	481.73	8,666.18	8,602.30	63.88	135.668			
17,000.00	7,025.04	6,750.01	6,720.44	306.70	25.26	65.04	377.38	481.73	8,765.86	8,701.95	63.91	137.151			
17,100.00	7,025.19	6,750.01	6,720.44	309.70	25.26	65.04	377.38	481.73	8,865.55	8,801.60	63.95	138.629			
17,200.00	7,025.33	6,750.01	6,720.44	312.70	25.26	65.04	377.38	481.73	8,965.25	8,901.26	63.99	140.104			
17,300.00	7,025.47	6,750.01	6,720.44	315.71	25.26	65.04	377.38	481.73	9,064.96	9,000.93	64.03	141.575			
17,400.00	7,025.61	6,750.01	6,720.44	318.71	25.26	65.04	377.38	481.73	9,164.67	9,100.60	64.07	143.042			
17,500.00	7,025.76	6,750.01	6,720.44	321.71	25.26	65.04	377.38	481.73	9,264.39	9,200.27	64.11	144.505			
17,600.00	7,025.90	6,750.01	6,720.44	324.71	25.26	65.04	377.38	481.73	9,364.11	9,299.95	64.15	145.964			
17,700.00	7,026.04	6,750.01	6,720.44	327.72	25.26	65.04	377.38	481.73	9,463.84	9,399.64	64.20	147.418			
17,800.00	7,026.18	6,750.01	6,720.44	330.72	25.26	65.04	377.38	481.73	9,563.57	9,499.33	64.24	148.869			
17,900.00	7,026.33	6,750.01	6,720.44	333.73	25.26	65.04	377.38	481.73	9,663.31	9,599.03	64.29	150.316			
18,000.00	7,026.47	6,750.01	6,720.44	336.73	25.26	65.04	377.38	481.73	9,763.06	9,698.73	64.33	151.758			
18,100.00	7,026.61	6,750.01	6,720.44	339.74	25.26	65.04	377.38	481.73	9,862.81	9,798.43	64.38	153.196			
18,200.00	7,026.75	6,726.35	6,696.87	342.74	25.18	63.35	375.83	483.07	9,962.10	9,897.69	64.41	154.667			



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi												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)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.01	0.01	0.00	0.00	120.12	-22.57	38.90	44.98				
100.00	100.00	100.01	100.01	0.13	0.13	120.12	-22.57	38.90	44.98	44.71	0.27	167.261	
200.00	200.00	200.01	200.01	0.49	0.49	120.12	-22.57	38.90	44.98	43.99	0.99	45.622	
300.00	300.00	300.01	300.01	0.85	0.85	120.12	-22.57	38.90	44.98	43.27	1.70	26.413	
316.66	316.66	316.68	316.68	0.91	0.91	120.12	-22.57	38.90	44.98	43.15	1.82	24.682 CC	
400.00	400.00	400.00	400.00	1.21	1.21	120.12	-22.57	38.90	44.98	42.56	2.42	18.588 ES	
500.00	499.99	497.60	497.56	1.57	1.55	170.28	-23.58	41.18	48.16	45.01	3.16	15.254 SF	
600.00	599.85	595.16	594.85	1.93	1.89	170.33	-26.47	47.70	60.56	56.66	3.90	15.533	
700.00	699.29	693.41	692.76	2.29	2.24	170.87	-29.78	55.18	79.06	74.47	4.60	17.200	
800.00	798.04	790.58	789.59	2.67	2.59	171.61	-33.05	62.58	102.63	97.34	5.30	19.372	
900.00	895.85	886.38	885.06	3.08	2.94	172.34	-36.27	69.87	131.23	125.23	6.00	21.874	
1,000.00	992.43	980.55	978.90	3.52	3.29	172.99	-39.44	77.04	164.78	158.08	6.70	24.592	
1,100.00	1,088.21	1,073.69	1,071.72	4.01	3.64	173.61	-42.58	84.13	201.11	193.72	7.39	27.207	
1,200.00	1,183.99	1,166.84	1,164.54	4.51	3.98	174.04	-45.72	91.22	237.48	229.40	8.08	29.404	
1,300.00	1,279.76	1,259.98	1,257.36	5.03	4.33	174.36	-48.86	98.31	273.85	265.08	8.77	31.235	
1,400.00	1,375.54	1,353.12	1,350.18	5.56	4.68	174.60	-51.99	105.40	310.23	300.76	9.46	32.781	
1,500.00	1,471.32	1,446.26	1,443.00	6.10	5.03	174.79	-55.13	112.49	346.61	336.45	10.16	34.102	
1,600.00	1,567.10	1,539.40	1,535.81	6.64	5.38	174.95	-58.27	119.58	382.99	372.13	10.87	35.241	
1,700.00	1,662.87	1,632.54	1,628.63	7.19	5.73	175.08	-61.40	126.67	419.38	407.81	11.57	36.234	
1,800.00	1,758.65	1,725.68	1,721.45	7.74	6.08	175.19	-64.54	133.76	455.77	443.49	12.28	37.106	
1,900.00	1,854.43	1,818.82	1,814.27	8.30	6.43	175.28	-67.68	140.85	492.16	479.17	12.99	37.877	
2,000.00	1,950.20	1,911.97	1,907.09	8.85	6.78	175.36	-70.81	147.94	528.55	514.84	13.71	38.564	
2,100.00	2,045.98	2,005.11	1,999.90	9.41	7.13	175.43	-73.95	155.03	564.94	550.52	14.42	39.179	
2,200.00	2,141.76	2,098.25	2,092.72	9.97	7.48	175.49	-77.09	162.12	601.33	586.20	15.13	39.734	
2,300.00	2,237.54	2,191.39	2,185.54	10.53	7.83	175.54	-80.22	169.21	637.72	621.87	15.85	40.235	
2,400.00	2,333.31	2,284.53	2,278.36	11.09	8.18	175.59	-83.36	176.30	674.12	657.55	16.57	40.691	
2,500.00	2,429.09	2,377.67	2,371.18	11.65	8.53	175.64	-86.50	183.40	710.51	693.23	17.28	41.108	
2,600.00	2,524.87	2,470.81	2,463.99	12.21	8.88	175.68	-89.63	190.49	746.90	728.90	18.00	41.489	
2,700.00	2,620.64	2,563.95	2,556.81	12.78	9.23	175.71	-92.77	197.58	783.30	764.58	18.72	41.840	
2,800.00	2,716.42	2,657.10	2,649.63	13.34	9.59	175.74	-95.91	204.67	819.69	800.25	19.44	42.164	
2,900.00	2,812.20	2,750.24	2,742.45	13.91	9.94	175.77	-99.04	211.76	856.09	835.93	20.16	42.463	
3,000.00	2,907.97	2,843.38	2,835.27	14.47	10.29	175.80	-102.18	218.85	892.48	871.60	20.88	42.741	
3,100.00	3,003.75	2,936.52	2,928.08	15.04	10.64	175.82	-105.32	225.94	928.88	907.27	21.60	43.000	
3,200.00	3,099.53	3,029.66	3,020.90	15.60	10.99	175.85	-108.45	233.03	965.27	942.95	22.32	43.241	
3,300.00	3,195.31	3,122.80	3,113.72	16.17	11.34	175.87	-111.59	240.12	1,001.66	978.62	23.04	43.466	
3,400.00	3,291.08	3,215.94	3,206.54	16.74	11.70	175.89	-114.73	247.21	1,038.06	1,014.29	23.77	43.677	
3,500.00	3,386.86	3,309.08	3,299.36	17.30	12.05	175.91	-117.86	254.30	1,074.45	1,049.97	24.49	43.875	
3,600.00	3,482.64	3,402.23	3,392.18	17.87	12.40	175.92	-121.00	261.39	1,110.85	1,085.64	25.21	44.061	
3,700.00	3,578.41	3,495.37	3,484.99	18.44	12.75	175.94	-124.14	268.48	1,147.25	1,121.31	25.93	44.236	
3,800.00	3,674.19	3,588.51	3,577.81	19.01	13.10	175.96	-127.27	275.57	1,183.64	1,156.98	26.66	44.401	
3,900.00	3,769.97	3,681.65	3,670.63	19.57	13.45	175.97	-130.41	282.66	1,220.04	1,192.65	27.38	44.557	
4,000.00	3,865.75	3,774.79	3,763.45	20.14	13.81	175.98	-133.55	289.75	1,256.43	1,228.33	28.11	44.705	
4,100.00	3,961.52	3,867.93	3,856.27	20.71	14.16	176.00	-136.68	296.84	1,292.83	1,264.00	28.83	44.845	
4,200.00	4,057.30	3,961.07	3,949.08	21.28	14.51	176.01	-139.82	303.93	1,329.22	1,299.67	29.55	44.977	
4,300.00	4,153.08	4,054.22	4,041.90	21.85	14.86	176.02	-142.96	311.02	1,365.62	1,335.34	30.28	45.103	
4,400.00	4,248.85	4,147.36	4,134.72	22.42	15.21	176.03	-146.09	318.11	1,402.01	1,371.01	31.00	45.223	
4,500.00	4,344.63	4,240.50	4,227.54	22.98	15.57	176.04	-149.23	325.20	1,438.41	1,406.68	31.73	45.337	
4,600.00	4,440.41	4,333.64	4,320.36	23.55	15.92	176.05	-152.37	332.29	1,474.81	1,442.35	32.45	45.446	
4,700.00	4,536.18	4,426.78	4,413.17	24.12	16.27	176.06	-155.50	339.38	1,511.20	1,478.02	33.18	45.549	
4,800.00	4,631.96	4,519.92	4,505.99	24.69	16.62	176.07	-158.64	346.47	1,547.60	1,513.69	33.90	45.648	
4,900.00	4,727.74	4,613.06	4,598.81	25.26	16.97	176.08	-161.78	353.56	1,583.99	1,549.36	34.63	45.743	
5,000.00	4,823.52	4,706.20	4,691.63	25.83	17.33	176.09	-164.91	360.65	1,620.39	1,585.03	35.35	45.833	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi											Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM											Offset Well Error:	0.00 ft
Rule Assigned:												
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
5,100.00	4,919.29	4,799.35	4,784.45	26.40	17.68	176.09	-168.05	367.74	1,656.78	1,620.70	36.08	45.919
5,200.00	5,015.07	4,892.49	4,877.26	26.97	18.03	176.10	-171.19	374.83	1,693.18	1,656.37	36.81	46.002
5,300.00	5,110.85	4,985.63	4,970.08	27.54	18.38	176.11	-174.32	381.92	1,729.58	1,692.04	37.53	46.082
5,400.00	5,206.62	5,078.77	5,062.90	28.11	18.73	176.12	-177.46	389.01	1,765.97	1,727.71	38.26	46.158
5,500.00	5,302.40	5,171.91	5,155.72	28.68	19.09	176.12	-180.60	396.10	1,802.37	1,763.38	38.99	46.231
5,600.00	5,398.18	5,265.05	5,248.54	29.25	19.44	176.13	-183.74	403.19	1,838.76	1,799.05	39.71	46.301
5,700.00	5,493.96	5,358.19	5,341.36	29.82	19.79	176.14	-186.87	410.28	1,875.16	1,834.72	40.44	46.369
5,800.00	5,590.88	5,453.47	5,436.46	30.32	20.09	176.14	-189.99	417.37	1,911.56	1,870.12	41.17	46.437
5,900.00	5,689.39	5,550.79	5,533.31	30.71	20.31	176.14	-193.12	424.46	1,947.95	1,905.49	41.90	46.505
6,000.00	5,788.43	5,650.80	5,632.81	30.99	20.46	176.13	-196.27	431.55	1,984.34	1,941.88	42.63	46.573
6,100.00	5,886.89	5,748.59	5,729.84	31.20	20.54	176.13	-199.42	438.64	2,020.73	1,977.27	43.36	46.641
6,200.00	5,983.70	5,846.33	5,826.84	31.37	20.54	176.13	-202.57	445.73	2,057.12	2,012.66	44.09	46.709
6,300.00	6,077.81	5,942.30	5,921.81	31.51	20.54	176.13	-205.72	452.82	2,093.51	2,048.05	44.82	46.777
6,400.00	6,168.18	6,037.91	6,016.42	31.66	20.54	176.13	-208.87	459.91	2,129.90	2,083.44	45.55	46.845
6,500.00	6,254.10	6,126.07	6,103.58	31.83	20.54	176.13	-212.02	467.00	2,166.29	2,119.83	46.28	46.913
6,600.00	6,338.81	6,210.23	6,186.74	32.03	20.54	176.13	-215.17	474.09	2,202.68	2,155.22	47.01	46.981
6,700.00	6,423.53	6,294.39	6,269.80	32.25	20.54	176.13	-218.32	481.18	2,239.07	2,191.61	47.74	47.049
6,800.00	6,508.25	6,379.55	6,353.96	32.51	20.54	176.13	-221.47	488.27	2,275.46	2,227.00	48.47	47.117
6,900.00	6,592.64	6,464.22	6,437.57	32.79	20.54	176.13	-224.62	495.36	2,311.85	2,262.43	49.20	47.185
7,000.00	6,672.35	6,543.37	6,515.68	33.16	20.54	176.13	-227.77	502.45	2,348.24	2,298.82	49.93	47.253
7,100.00	6,745.32	6,616.74	6,587.99	33.63	20.54	176.13	-230.92	509.54	2,384.63	2,335.21	50.66	47.321
7,200.00	6,810.74	6,681.12	6,651.23	34.24	20.54	176.13	-234.07	516.63	2,421.02	2,371.60	51.39	47.389
7,300.00	6,867.91	6,737.36	6,706.27	35.03	20.54	176.13	-237.22	523.72	2,457.41	2,408.00	52.12	47.457
7,400.00	6,916.19	6,785.36	6,753.17	36.03	20.54	176.13	-240.37	530.81	2,493.80	2,444.39	52.85	47.525
7,481.48	6,948.60	6,817.65	6,784.26	37.03	20.54	176.13	-243.52	537.90	2,530.19	2,480.78	53.58	47.593
7,500.00	6,955.06	6,825.10	6,791.22	37.26	20.54	176.13	-246.67	545.00	2,566.58	2,517.17	54.31	47.661
7,600.00	6,984.10	6,854.62	6,819.37	38.71	20.54	176.13	-252.82	552.09	2,602.97	2,553.56	55.04	47.729
7,700.00	7,002.97	6,873.49	6,837.22	40.36	20.54	176.13	-259.07	559.18	2,639.36	2,590.00	55.77	47.797
7,800.00	7,011.48	6,882.00	6,845.16	42.17	20.54	176.13	-265.32	566.27	2,675.75	2,626.39	56.50	47.865
7,900.00	7,012.10	6,890.68	6,852.44	44.11	20.54	176.13	-271.57	573.36	2,712.14	2,662.78	57.23	47.933
8,000.00	7,012.24	6,899.55	6,859.50	46.18	20.54	176.13	-277.82	580.45	2,748.53	2,699.17	57.96	47.999
8,100.00	7,012.38	6,908.60	6,867.30	48.36	20.54	176.13	-284.07	587.54	2,784.92	2,735.56	58.69	48.067
8,200.00	7,012.53	6,917.73	6,875.18	50.64	20.54	176.13	-290.32	594.63	2,821.31	2,771.95	59.42	48.135
8,300.00	7,012.67	6,926.84	6,883.10	52.99	20.54	176.13	-296.57	601.72	2,857.70	2,808.34	60.15	48.203
8,400.00	7,012.81	6,935.95	6,891.43	55.42	20.54	176.13	-302.82	608.81	2,894.09	2,844.73	60.88	48.271
8,500.00	7,012.95	6,945.06	6,899.08	57.91	20.54	176.13	-309.07	615.90	2,930.48	2,881.12	61.61	48.339
8,600.00	7,013.10	6,954.17	6,907.23	60.44	20.54	176.13	-315.32	623.00	2,966.87	2,917.51	62.34	48.407
8,700.00	7,013.24	6,963.28	6,915.37	63.03	20.54	176.13	-321.57	630.09	3,003.26	2,953.90	63.07	48.475
8,800.00	7,013.38	6,972.39	6,923.46	65.65	20.54	176.13	-327.82	637.18	3,039.65	2,990.29	63.80	48.543
8,900.00	7,013.52	6,981.50	6,931.55	68.30	20.54	176.13	-334.07	644.27	3,076.04	3,026.68	64.53	48.611
9,000.00	7,013.66	6,990.61	6,940.66	70.99	20.54	176.13	-340.32	651.36	3,112.43	3,063.07	65.26	48.679
9,100.00	7,013.81	7,000.00	6,950.00	73.70	20.54	176.13	-346.57	658.45	3,148.82	3,099.46	65.99	48.747
9,200.00	7,013.95	7,009.40	6,960.00	76.44	20.54	176.13	-352.82	665.54	3,185.21	3,135.85	66.72	48.815
9,300.00	7,014.09	7,018.80	6,970.00	79.20	20.54	176.13	-359.07	672.63	3,221.60	3,172.24	67.45	48.883
9,400.00	7,014.23	7,028.20	6,980.00	81.97	20.54	176.13	-365.32	679.72	3,258.00	3,208.63	68.18	48.951
9,500.00	7,014.38	7,037.60	6,990.00	84.77	20.54	176.13	-371.57	686.81	3,294.39	3,245.02	68.91	49.019
9,600.00	7,014.52	7,047.00	7,000.00	87.58	20.54	176.13	-377.82	693.90	3,330.78	3,281.41	69.64	49.087
9,700.00	7,014.66	7,056.40	7,010.00	90.40	20.54	176.13	-384.07	701.00	3,367.17	3,317.80	70.37	49.155
9,800.00	7,014.80	7,065.80	7,020.00	93.23	20.54	176.13	-390.32	708.09	3,403.56	3,354.19	71.10	49.223
9,900.00	7,014.94	7,075.20	7,030.00	96.08	20.54	176.13	-396.57	715.18	3,439.95	3,390.58	71.83	49.291
10,000.00	7,015.09	7,084.60	7,040.00	98.94	20.54	176.13	-402.82	722.27	3,476.34	3,426.97	72.56	49.359
10,100.00	7,015.23	7,094.00	7,050.00	101.80	20.54	176.13	-409.07	729.36	3,512.73	3,463.36	73.29	49.427

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi													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		
10,200.00	7,015.37	6,600.01	6,578.20	104.68	24.35	70.59	-228.05	476.14	2,348.66	2,263.31	85.34	27.520			
10,300.00	7,015.51	6,600.01	6,578.20	107.56	24.35	70.59	-228.05	476.14	2,432.37	2,347.27	85.11	28.580			
10,400.00	7,015.66	6,600.01	6,578.20	110.45	24.35	70.59	-228.05	476.14	2,517.28	2,432.41	84.87	29.662			
10,500.00	7,015.80	6,576.95	6,555.63	113.35	24.29	69.65	-227.43	480.87	2,602.79	2,518.30	84.50	30.803			
10,600.00	7,015.94	6,572.97	6,551.73	116.25	24.28	69.49	-227.32	481.60	2,689.57	2,605.33	84.23	31.929			
10,700.00	7,016.08	6,550.01	6,529.08	119.16	24.22	68.57	-226.67	485.34	2,777.53	2,693.66	83.87	33.118			
10,800.00	7,016.23	6,550.01	6,529.08	122.07	24.22	68.57	-226.67	485.34	2,865.85	2,782.21	83.63	34.267			
10,900.00	7,016.37	6,550.01	6,529.08	124.99	24.22	68.57	-226.67	485.34	2,954.91	2,871.51	83.40	35.429			
11,000.00	7,016.51	6,550.01	6,529.08	127.92	24.22	68.57	-226.67	485.34	3,044.65	2,961.48	83.18	36.605			
11,100.00	7,016.65	6,550.01	6,529.08	130.85	24.22	68.57	-226.67	485.34	3,135.02	3,052.06	82.95	37.793			
11,200.00	7,016.79	6,550.01	6,529.08	133.78	24.22	68.57	-226.67	485.34	3,225.95	3,143.21	82.74	38.991			
11,300.00	7,016.94	6,550.01	6,529.08	136.71	24.22	68.57	-226.67	485.34	3,317.40	3,234.88	82.52	40.200			
11,400.00	7,017.08	6,550.01	6,529.08	139.65	24.22	68.57	-226.67	485.34	3,409.34	3,327.02	82.32	41.417			
11,500.00	7,017.22	6,550.01	6,529.08	142.60	24.22	68.57	-226.67	485.34	3,501.72	3,419.60	82.12	42.643			
11,600.00	7,017.36	6,550.01	6,529.08	145.54	24.22	68.57	-226.67	485.34	3,594.50	3,512.58	81.92	43.877			
11,700.00	7,017.51	6,550.01	6,529.08	148.49	24.22	68.57	-226.67	485.34	3,687.66	3,605.93	81.73	45.117			
11,800.00	7,017.65	6,550.01	6,529.08	151.44	24.22	68.57	-226.67	485.34	3,781.17	3,699.62	81.55	46.365			
11,900.00	7,017.79	6,550.01	6,529.08	154.40	24.22	68.57	-226.67	485.34	3,875.01	3,793.63	81.38	47.617			
12,000.00	7,017.93	6,550.01	6,529.08	157.35	24.22	68.57	-226.67	485.34	3,969.14	3,887.94	81.21	48.876			
12,100.00	7,018.07	6,550.01	6,529.08	160.31	24.22	68.57	-226.67	485.34	4,063.56	3,982.52	81.05	50.139			
12,200.00	7,018.22	6,550.01	6,529.08	163.27	24.22	68.57	-226.67	485.34	4,158.24	4,077.35	80.89	51.407			
12,300.00	7,018.36	6,550.01	6,529.08	166.23	24.22	68.57	-226.67	485.34	4,253.16	4,172.42	80.74	52.679			
12,400.00	7,018.50	6,550.01	6,529.08	169.20	24.22	68.57	-226.67	485.34	4,348.31	4,267.72	80.59	53.955			
12,500.00	7,018.64	6,528.18	6,507.44	172.17	24.15	67.69	-226.04	488.14	4,443.26	4,362.89	80.37	55.283			
12,600.00	7,018.79	6,526.77	6,506.04	175.13	24.15	67.63	-225.99	488.30	4,538.77	4,458.53	80.23	56.569			
12,700.00	7,018.93	6,525.41	6,504.68	178.10	24.15	67.58	-225.95	488.44	4,634.46	4,554.36	80.10	57.858			
12,800.00	7,019.07	6,524.10	6,503.39	181.08	24.14	67.53	-225.92	488.58	4,730.33	4,650.36	79.97	59.149			
12,900.00	7,019.21	6,522.84	6,502.14	184.05	24.14	67.47	-225.88	488.71	4,826.36	4,746.51	79.85	60.443			
13,000.00	7,019.35	6,500.01	6,479.40	187.02	24.07	66.57	-225.19	490.66	4,922.95	4,843.30	79.65	61.806			
13,100.00	7,019.50	6,500.01	6,479.40	190.00	24.07	66.57	-225.19	490.66	5,019.25	4,939.70	79.54	63.100			
13,200.00	7,019.64	6,500.01	6,479.40	192.98	24.07	66.57	-225.19	490.66	5,115.68	5,036.24	79.44	64.397			
13,300.00	7,019.78	6,500.01	6,479.40	195.96	24.07	66.57	-225.19	490.66	5,212.25	5,132.91	79.34	65.695			
13,400.00	7,019.92	6,500.01	6,479.40	198.94	24.07	66.57	-225.19	490.66	5,308.95	5,229.70	79.25	66.994			
13,500.00	7,020.07	6,500.01	6,479.40	201.92	24.07	66.57	-225.19	490.66	5,405.76	5,326.61	79.15	68.295			
13,600.00	7,020.21	6,500.01	6,479.40	204.90	24.07	66.57	-225.19	490.66	5,502.70	5,423.63	79.07	69.597			
13,700.00	7,020.35	6,500.01	6,479.40	207.88	24.07	66.57	-225.19	490.66	5,599.73	5,520.75	78.98	70.899			
13,800.00	7,020.49	6,500.01	6,479.40	210.86	24.07	66.57	-225.19	490.66	5,696.88	5,617.97	78.90	72.203			
13,900.00	7,020.63	6,500.01	6,479.40	213.85	24.07	66.57	-225.19	490.66	5,794.11	5,715.29	78.82	73.507			
14,000.00	7,020.78	6,500.01	6,479.40	216.84	24.07	66.57	-225.19	490.66	5,891.45	5,812.70	78.75	74.812			
14,100.00	7,020.92	6,500.01	6,479.40	219.82	24.07	66.57	-225.19	490.66	5,988.86	5,910.19	78.68	76.118			
14,200.00	7,021.06	6,500.01	6,479.40	222.81	24.07	66.57	-225.19	490.66	6,086.37	6,007.76	78.61	77.423			
14,300.00	7,021.20	6,500.01	6,479.40	225.80	24.07	66.57	-225.19	490.66	6,183.95	6,105.40	78.55	78.729			
14,400.00	7,021.35	6,500.01	6,479.40	228.79	24.07	66.57	-225.19	490.66	6,281.61	6,203.12	78.49	80.035			
14,500.00	7,021.49	6,500.01	6,479.40	231.78	24.07	66.57	-225.19	490.66	6,379.34	6,300.91	78.43	81.341			
14,600.00	7,021.63	6,500.01	6,479.40	234.77	24.07	66.57	-225.19	490.66	6,477.14	6,398.77	78.37	82.647			
14,700.00	7,021.77	6,500.01	6,479.40	237.76	24.07	66.57	-225.19	490.66	6,575.01	6,496.69	78.32	83.953			
14,800.00	7,021.92	6,500.01	6,479.40	240.75	24.07	66.57	-225.19	490.66	6,672.94	6,594.67	78.27	85.259			
14,900.00	7,022.06	6,500.01	6,479.40	243.74	24.07	66.57	-225.19	490.66	6,770.93	6,692.71	78.22	86.564			
15,000.00	7,022.20	6,500.01	6,479.40	246.74	24.07	66.57	-225.19	490.66	6,868.97	6,790.80	78.17	87.869			
15,100.00	7,022.34	6,500.01	6,479.40	249.73	24.07	66.57	-225.19	490.66	6,967.08	6,888.95	78.13	89.173			
15,200.00	7,022.48	6,500.01	6,479.40	252.72	24.07	66.57	-225.19	490.66	7,065.23	6,987.14	78.09	90.476			
15,300.00	7,022.63	6,500.01	6,479.40	255.72	24.07	66.57	-225.19	490.66	7,163.44	7,085.39	78.05	91.779			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #652H - OH - Plan #4 15Apr19 jcsdi													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		
15,400.00	7,022.77	6,500.01	6,479.40	258.71	24.07	66.57	-225.19	490.66	7,261.70	7,183.68	78.01	93.082			
15,500.00	7,022.91	6,500.01	6,479.40	261.71	24.07	66.57	-225.19	490.66	7,360.00	7,282.02	77.98	94.383			
15,600.00	7,023.05	6,500.01	6,479.40	264.71	24.07	66.57	-225.19	490.66	7,458.35	7,380.40	77.95	95.684			
15,700.00	7,023.20	6,500.01	6,479.40	267.70	24.07	66.57	-225.19	490.66	7,556.74	7,478.83	77.92	96.983			
15,800.00	7,023.34	6,500.01	6,479.40	270.70	24.07	66.57	-225.19	490.66	7,655.18	7,577.29	77.89	98.282			
15,900.00	7,023.48	6,500.01	6,479.40	273.70	24.07	66.57	-225.19	490.66	7,753.65	7,675.79	77.86	99.580			
16,000.00	7,023.62	6,500.01	6,479.40	276.70	24.07	66.57	-225.19	490.66	7,852.16	7,774.32	77.84	100.876			
16,100.00	7,023.76	6,500.01	6,479.40	279.69	24.07	66.57	-225.19	490.66	7,950.71	7,872.90	77.82	102.172			
16,200.00	7,023.91	6,500.01	6,479.40	282.69	24.07	66.57	-225.19	490.66	8,049.30	7,971.50	77.80	103.466			
16,300.00	7,024.05	6,500.01	6,479.40	285.69	24.07	66.57	-225.19	490.66	8,147.92	8,070.14	77.78	104.759			
16,400.00	7,024.19	6,500.01	6,479.40	288.69	24.07	66.57	-225.19	490.66	8,246.57	8,168.81	77.76	106.050			
16,500.00	7,024.33	6,500.01	6,479.40	291.69	24.07	66.57	-225.19	490.66	8,345.26	8,267.51	77.75	107.341			
16,600.00	7,024.48	6,500.01	6,479.40	294.69	24.07	66.57	-225.19	490.66	8,443.97	8,366.24	77.73	108.630			
16,700.00	7,024.62	6,500.01	6,479.40	297.69	24.07	66.57	-225.19	490.66	8,542.72	8,465.00	77.72	109.917			
16,800.00	7,024.76	6,500.01	6,479.40	300.69	24.07	66.57	-225.19	490.66	8,641.49	8,563.78	77.71	111.203			
16,900.00	7,024.90	6,500.01	6,479.40	303.70	24.07	66.57	-225.19	490.66	8,740.30	8,662.60	77.70	112.487			
17,000.00	7,025.04	6,500.01	6,479.40	306.70	24.07	66.57	-225.19	490.66	8,839.13	8,761.43	77.69	113.770			
17,100.00	7,025.19	6,500.01	6,479.40	309.70	24.07	66.57	-225.19	490.66	8,937.98	8,860.29	77.69	115.052			
17,200.00	7,025.33	6,500.01	6,479.40	312.70	24.07	66.57	-225.19	490.66	9,036.86	8,959.18	77.68	116.331			
17,300.00	7,025.47	6,500.01	6,479.40	315.71	24.07	66.57	-225.19	490.66	9,135.77	9,058.09	77.68	117.609			
17,400.00	7,025.61	6,500.01	6,479.40	318.71	24.07	66.57	-225.19	490.66	9,234.70	9,157.02	77.68	118.885			
17,500.00	7,025.76	6,500.01	6,479.40	321.71	24.07	66.57	-225.19	490.66	9,333.65	9,255.97	77.68	120.160			
17,600.00	7,025.90	6,500.01	6,479.40	324.71	24.07	66.57	-225.19	490.66	9,432.62	9,354.94	77.68	121.432			
17,700.00	7,026.04	6,500.01	6,479.40	327.72	24.07	66.57	-225.19	490.66	9,531.62	9,453.94	77.68	122.703			
17,800.00	7,026.18	6,500.01	6,479.40	330.72	24.07	66.57	-225.19	490.66	9,630.63	9,552.95	77.68	123.972			
17,900.00	7,026.33	6,500.01	6,479.40	333.73	24.07	66.57	-225.19	490.66	9,729.67	9,651.98	77.69	125.239			
18,000.00	7,026.47	6,500.01	6,479.40	336.73	24.07	66.57	-225.19	490.66	9,828.72	9,751.03	77.69	126.504			
18,100.00	7,026.61	6,500.01	6,479.40	339.74	24.07	66.57	-225.19	490.66	9,927.80	9,850.10	77.70	127.768			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi												Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.01	0.01	0.00	0.00	132.83	-25.48	27.50	37.49				
100.00	100.00	100.01	100.01	0.13	0.13	132.83	-25.48	27.50	37.49	37.22	0.27	139.417	
200.00	200.00	200.01	200.01	0.49	0.49	132.83	-25.48	27.50	37.49	36.50	0.99	38.028	
300.00	300.00	300.01	300.01	0.85	0.85	132.83	-25.48	27.50	37.49	35.79	1.70	22.016	
316.66	316.66	316.68	316.68	0.91	0.91	132.83	-25.48	27.50	37.49	35.67	1.82	20.573 CC	
400.00	400.00	400.00	400.00	1.21	1.21	132.83	-25.48	27.50	37.49	35.07	2.42	15.493 ES	
500.00	499.99	498.71	498.70	1.57	1.55	-176.11	-26.96	28.34	39.79	36.65	3.13	12.697 SF	
600.00	599.85	596.71	596.56	1.93	1.88	-174.79	-31.35	30.83	49.94	46.08	3.86	12.926	
700.00	699.29	693.04	692.53	2.29	2.22	-173.63	-38.50	34.89	68.51	63.90	4.61	14.860	
800.00	798.04	786.77	785.60	2.67	2.56	-172.82	-48.15	40.37	95.29	89.93	5.35	17.799	
900.00	895.85	879.03	876.85	3.08	2.91	-172.30	-59.91	47.05	129.64	123.58	6.06	21.392	
1,000.00	992.43	970.86	967.64	3.52	3.27	-172.13	-71.95	53.89	169.20	162.46	6.74	25.115	
1,100.00	1,088.21	1,061.50	1,057.24	4.01	3.63	-172.24	-83.82	60.64	211.45	204.03	7.41	28.526	
1,200.00	1,183.99	1,152.13	1,146.84	4.51	3.99	-172.32	-95.70	67.38	253.70	245.63	8.08	31.404	
1,300.00	1,279.76	1,242.76	1,236.43	5.03	4.36	-172.38	-107.58	74.13	295.96	287.21	8.75	33.809	
1,400.00	1,375.54	1,333.39	1,326.03	5.56	4.73	-172.42	-119.45	80.88	338.22	328.79	9.44	35.842	
1,500.00	1,471.32	1,424.02	1,415.63	6.10	5.10	-172.46	-131.33	87.62	380.48	370.36	10.12	37.579	
1,600.00	1,567.10	1,514.65	1,505.22	6.64	5.47	-172.49	-143.20	94.37	422.74	411.92	10.82	39.078	
1,700.00	1,662.87	1,605.29	1,594.82	7.19	5.84	-172.51	-155.08	101.12	465.00	453.49	11.51	40.384	
1,800.00	1,758.65	1,695.92	1,684.41	7.74	6.22	-172.53	-166.95	107.86	507.26	495.05	12.21	41.529	
1,900.00	1,854.43	1,786.55	1,774.01	8.30	6.60	-172.54	-178.83	114.61	549.52	536.60	12.92	42.542	
2,000.00	1,950.20	1,877.18	1,863.61	8.85	6.97	-172.56	-190.71	121.36	591.78	578.16	13.62	43.443	
2,100.00	2,045.98	1,967.81	1,953.20	9.41	7.35	-172.57	-202.58	128.10	634.04	619.71	14.33	44.249	
2,200.00	2,141.76	2,058.44	2,042.80	9.97	7.73	-172.58	-214.46	134.85	676.30	661.26	15.04	44.974	
2,300.00	2,237.54	2,149.07	2,132.40	10.53	8.10	-172.59	-226.33	141.60	718.56	702.81	15.75	45.630	
2,400.00	2,333.31	2,239.71	2,221.99	11.09	8.48	-172.60	-238.21	148.34	760.82	744.36	16.46	46.226	
2,500.00	2,429.09	2,330.34	2,311.59	11.65	8.86	-172.60	-250.09	155.09	803.08	785.91	17.17	46.769	
2,600.00	2,524.87	2,420.97	2,401.19	12.21	9.24	-172.61	-261.96	161.84	845.34	827.46	17.88	47.267	
2,700.00	2,620.64	2,511.60	2,490.78	12.78	9.62	-172.62	-273.84	168.58	887.60	869.00	18.60	47.723	
2,800.00	2,716.42	2,602.23	2,580.38	13.34	10.00	-172.62	-285.71	175.33	929.86	910.55	19.31	48.145	
2,900.00	2,812.20	2,692.86	2,669.98	13.91	10.38	-172.63	-297.59	182.08	972.12	952.09	20.03	48.534	
3,000.00	2,907.97	2,783.50	2,759.57	14.47	10.76	-172.63	-309.47	188.82	1,014.38	993.64	20.75	48.894	
3,100.00	3,003.75	2,874.13	2,849.17	15.04	11.14	-172.64	-321.34	195.57	1,056.64	1,035.18	21.46	49.230	
3,200.00	3,099.53	2,964.76	2,938.77	15.60	11.52	-172.64	-333.22	202.32	1,098.90	1,076.72	22.18	49.542	
3,300.00	3,195.31	3,055.39	3,028.36	16.17	11.90	-172.64	-345.09	209.06	1,141.16	1,118.26	22.90	49.833	
3,400.00	3,291.08	3,146.02	3,117.96	16.74	12.28	-172.65	-356.97	215.81	1,183.42	1,159.80	23.62	50.106	
3,500.00	3,386.86	3,236.65	3,207.56	17.30	12.66	-172.65	-368.85	222.56	1,225.68	1,201.34	24.34	50.362	
3,600.00	3,482.64	3,327.29	3,297.15	17.87	13.04	-172.65	-380.72	229.30	1,267.94	1,242.88	25.06	50.602	
3,700.00	3,578.41	3,417.92	3,386.75	18.44	13.42	-172.65	-392.60	236.05	1,310.20	1,284.42	25.78	50.828	
3,800.00	3,674.19	3,508.55	3,476.34	19.01	13.80	-172.66	-404.47	242.80	1,352.46	1,325.96	26.50	51.041	
3,900.00	3,769.97	3,599.18	3,565.94	19.57	14.18	-172.66	-416.35	249.54	1,394.72	1,367.50	27.22	51.242	
4,000.00	3,865.75	3,689.81	3,655.54	20.14	14.57	-172.66	-428.23	256.29	1,436.98	1,409.04	27.94	51.431	
4,100.00	3,961.52	3,780.44	3,745.13	20.71	14.95	-172.66	-440.10	263.04	1,479.24	1,450.58	28.66	51.611	
4,200.00	4,057.30	3,871.08	3,834.73	21.28	15.33	-172.67	-451.98	269.78	1,521.50	1,492.12	29.38	51.782	
4,300.00	4,153.08	3,961.71	3,924.33	21.85	15.71	-172.67	-463.85	276.53	1,563.76	1,533.66	30.11	51.943	
4,400.00	4,248.85	4,052.34	4,013.92	22.42	16.09	-172.67	-475.73	283.27	1,606.02	1,575.19	30.83	52.097	
4,500.00	4,344.63	4,142.97	4,103.52	22.98	16.47	-172.67	-487.60	290.02	1,648.28	1,616.73	31.55	52.243	
4,600.00	4,440.41	4,233.60	4,193.12	23.55	16.85	-172.67	-499.48	296.77	1,690.54	1,658.27	32.27	52.382	
4,700.00	4,536.18	4,324.23	4,282.71	24.12	17.23	-172.67	-511.36	303.51	1,732.80	1,699.81	33.00	52.514	
4,800.00	4,631.96	4,414.86	4,372.31	24.69	17.62	-172.68	-523.23	310.26	1,775.06	1,741.34	33.72	52.641	
4,900.00	4,727.74	4,505.50	4,461.91	25.26	18.00	-172.68	-535.11	317.01	1,817.32	1,782.88	34.44	52.761	
5,000.00	4,823.52	4,596.13	4,551.50	25.83	18.38	-172.68	-546.98	323.75	1,859.58	1,824.41	35.17	52.876	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi													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)				
5,100.00	4,919.29	4,686.76	4,641.10	26.40	18.76	-172.68	-558.86	330.50	1,901.84	1,865.95	35.89	52.987		
5,200.00	5,015.07	4,777.39	4,730.70	26.97	19.14	-172.68	-570.74	337.25	1,944.10	1,907.49	36.62	53.092		
5,300.00	5,110.85	4,868.02	4,820.29	27.54	19.52	-172.68	-582.61	343.99	1,986.36	1,949.02	37.34	53.193		
5,400.00	5,206.62	4,958.65	4,909.89	28.11	19.91	-172.68	-594.49	350.74	2,028.62	1,990.56	38.07	53.290		
5,500.00	5,302.40	5,049.29	4,999.49	28.68	20.29	-172.68	-606.36	357.49	2,070.88	2,032.09	38.79	53.383		
5,600.00	5,398.18	5,139.92	5,089.08	29.25	20.67	-172.69	-618.24	364.23	2,113.14	2,073.62	39.52	53.472		
5,700.00	5,493.96	5,230.55	5,178.68	29.82	21.05	-172.69	-630.12	370.98	2,155.40	2,115.15	40.24	53.558		
5,800.00	5,590.88	5,322.82	5,269.89	30.32	21.44	173.09	-642.21	377.85	2,193.74	2,152.78	40.96	53.557		
5,900.00	5,689.39	5,417.67	5,363.66	30.71	21.84	143.89	-654.63	384.91	2,224.04	2,182.38	41.66	53.384		
6,000.00	5,788.43	5,514.07	5,458.96	30.99	22.24	101.66	-667.27	392.09	2,246.01	2,203.68	42.34	53.051		
6,100.00	5,886.89	5,610.96	5,554.74	31.20	22.65	74.29	-679.96	399.30	2,259.54	2,216.56	42.98	52.569		
6,200.00	5,983.70	5,744.37	5,728.23	31.37	22.41	117.08	-858.22	-1,166.73	2,248.76	2,181.24	67.52	33.303		
6,300.00	6,077.81	5,709.89	5,728.81	31.51	21.51	112.45	-859.32	-1,132.27	2,202.19	2,133.75	68.44	32.178		
6,400.00	6,168.18	5,665.96	5,728.15	31.66	20.39	110.14	-860.73	-1,088.37	2,158.80	2,089.76	69.04	31.269		
6,500.00	6,254.10	5,613.49	5,728.43	31.83	19.05	108.79	-862.40	-1,035.93	2,118.68	2,049.33	69.35	30.551		
6,600.00	6,338.81	5,558.99	5,728.35	32.03	17.49	107.49	-864.14	-981.47	2,081.34	2,011.76	69.58	29.913		
6,700.00	6,423.53	5,504.49	5,728.26	32.25	16.33	106.18	-865.88	-927.01	2,046.76	1,976.99	69.78	29.333		
6,800.00	6,508.25	5,450.00	5,728.18	32.51	15.00	104.85	-867.62	-872.55	2,015.08	1,945.13	69.96	28.805		
6,900.00	6,592.64	5,395.00	5,728.10	32.79	13.68	104.06	-869.37	-817.59	1,986.57	1,916.50	70.07	28.351		
7,000.00	6,672.35	5,333.42	5,728.14	33.16	12.23	104.05	-871.34	-756.04	1,962.98	1,892.96	70.03	28.032		
7,100.00	6,745.32	5,263.95	5,728.30	33.63	10.64	103.68	-873.56	-686.62	1,944.54	1,874.72	69.82	27.852		
7,200.00	6,810.74	5,187.37	5,728.59	34.24	8.93	103.04	-876.00	-610.09	1,930.79	1,861.28	69.52	27.775		
7,300.00	6,867.91	5,104.50	5,729.98	35.03	37.15	102.24	-878.65	-527.28	1,921.19	1,851.98	69.22	27.757		
7,400.00	6,916.19	5,016.27	5,729.47	36.03	35.37	101.36	-881.46	-439.10	1,915.16	1,846.15	69.01	27.753		
7,500.00	6,955.06	4,923.63	5,729.42	37.26	33.63	100.50	-884.42	-346.52	1,912.11	1,843.16	68.95	27.731		
7,575.31	6,977.86	4,851.57	5,729.23	38.35	32.39	99.91	-886.72	-274.51	1,911.48	1,842.41	69.07	27.674		
7,600.00	6,984.10	4,827.60	5,729.54	38.71	31.99	99.74	-887.48	-250.55	1,911.54	1,842.43	69.11	27.659		
7,700.00	7,002.97	4,743.12	5,729.57	40.36	29.46	98.57	-892.30	-66.46	1,912.65	1,844.48	68.17	28.055		
7,800.00	7,011.48	4,718.99	5,729.48	42.17	28.47	91.69	-876.07	325.85	1,902.80	1,836.47	66.32	28.689		
7,900.00	7,012.10	4,704.20	5,729.19	44.11	28.22	88.14	-862.37	410.80	1,887.83	1,819.81	68.02	27.752		
8,000.00	7,012.24	4,694.46	5,729.19	46.18	28.03	85.67	-852.97	445.35	1,874.72	1,804.56	70.16	26.721		
8,100.00	7,012.38	4,687.32	5,729.26	48.36	27.90	84.22	-847.32	459.75	1,865.66	1,793.09	72.57	25.708		
8,200.00	7,012.53	4,686.24	5,729.26	50.64	27.81	83.29	-843.63	466.98	1,861.39	1,786.28	75.11	24.781		
8,234.49	7,012.58	4,685.04	5,729.29	51.45	27.79	83.05	-842.64	468.64	1,861.09	1,785.08	76.01	24.485		
8,300.00	7,012.67	4,684.91	5,729.49	52.99	27.75	82.65	-841.04	471.08	1,862.20	1,784.50	77.69	23.969		
8,400.00	7,012.81	4,682.39	5,729.30	55.42	27.70	82.18	-839.14	473.62	1,868.19	1,787.94	80.24	23.282		
8,500.00	7,012.95	4,681.61	5,729.73	57.91	27.67	81.82	-837.68	475.30	1,879.37	1,796.65	82.72	22.720		
8,600.00	7,013.10	4,680.36	5,730.64	60.44	27.64	81.54	-836.53	476.47	1,895.70	1,810.62	85.09	22.280		
8,700.00	7,013.24	4,680.01	5,730.40	63.03	27.61	81.28	-835.49	477.41	1,917.07	1,829.76	87.31	21.957		
8,800.00	7,013.38	4,680.01	5,730.40	65.65	27.61	81.28	-835.49	477.41	1,943.32	1,853.88	89.44	21.728		
8,900.00	7,013.52	4,680.01	5,730.40	68.30	27.61	81.28	-835.49	477.41	1,974.29	1,882.90	91.39	21.602		
9,000.00	7,013.66	4,678.33	5,731.90	70.99	27.56	80.83	-833.64	478.80	2,009.66	1,916.63	93.03	21.602		
9,100.00	7,013.81	4,678.15	5,732.21	73.70	27.55	80.72	-833.16	479.10	2,049.34	1,954.74	94.59	21.665		
9,200.00	7,013.95	4,677.34	5,730.00	76.44	27.54	80.62	-832.75	479.34	2,093.03	1,997.04	95.99	21.806		
9,300.00	7,014.09	4,677.50	5,730.18	79.20	27.53	80.53	-832.39	479.54	2,140.49	2,043.28	97.22	22.018		
9,400.00	7,014.23	4,677.98	5,730.69	81.97	27.52	80.45	-832.07	479.71	2,191.49	2,093.19	98.29	22.295		
9,500.00	7,014.38	4,677.74	5,730.47	84.77	27.51	80.39	-831.79	479.85	2,245.77	2,146.54	99.23	22.632		
9,600.00	7,014.52	4,678.74	5,699.49	87.58	27.50	80.32	-831.53	479.97	2,303.11	2,203.08	100.04	23.023		
9,700.00	7,014.66	4,675.01	5,680.94	90.40	27.44	79.75	-829.14	480.76	2,363.49	2,262.93	100.56	23.503		
9,800.00	7,014.80	4,675.01	5,680.94	93.23	27.44	79.75	-829.14	480.76	2,426.26	2,325.10	101.16	23.985		
9,900.00	7,014.94	4,675.01	5,680.94	96.08	27.44	79.75	-829.14	480.76	2,491.47	2,389.81	101.66	24.508		
10,000.00	7,015.09	4,675.01	5,680.94	98.94	27.44	79.75	-829.14	480.76	2,558.93	2,456.85	102.08	25.069		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi													Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM				Offset					Rule Assigned:				Offset Well Error:	0.00 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,100.00	7,015.23	6,750.01	6,680.94	101.80	27.44	79.75	-829.14	480.76	2,628.46	2,526.04	102.42	25.665		
10,200.00	7,015.37	6,750.01	6,680.94	104.68	27.44	79.75	-829.14	480.76	2,699.90	2,597.21	102.69	26.292		
10,300.00	7,015.51	6,750.01	6,680.94	107.56	27.44	79.75	-829.14	480.76	2,773.11	2,670.21	102.90	26.949		
10,400.00	7,015.66	6,750.01	6,680.94	110.45	27.44	79.75	-829.14	480.76	2,847.95	2,744.89	103.06	27.633		
10,500.00	7,015.80	6,750.01	6,680.94	113.35	27.44	79.75	-829.14	480.76	2,924.29	2,821.11	103.18	28.341		
10,600.00	7,015.94	6,750.01	6,680.94	116.25	27.44	79.75	-829.14	480.76	3,002.03	2,898.77	103.26	29.072		
10,700.00	7,016.08	6,750.01	6,680.94	119.16	27.44	79.75	-829.14	480.76	3,081.05	2,977.74	103.31	29.824		
10,800.00	7,016.23	6,750.01	6,680.94	122.07	27.44	79.75	-829.14	480.76	3,161.25	3,057.93	103.32	30.596		
10,900.00	7,016.37	6,750.01	6,680.94	124.99	27.44	79.75	-829.14	480.76	3,242.56	3,139.24	103.32	31.385		
11,000.00	7,016.51	6,750.01	6,680.94	127.92	27.44	79.75	-829.14	480.76	3,324.89	3,221.60	103.29	32.190		
11,100.00	7,016.65	6,750.01	6,680.94	130.85	27.44	79.75	-829.14	480.76	3,408.16	3,304.92	103.24	33.011		
11,200.00	7,016.79	6,750.01	6,680.94	133.78	27.44	79.75	-829.14	480.76	3,492.31	3,389.13	103.18	33.846		
11,300.00	7,016.94	6,750.01	6,680.94	136.71	27.44	79.75	-829.14	480.76	3,577.28	3,474.17	103.11	34.694		
11,400.00	7,017.08	6,750.01	6,680.94	139.65	27.44	79.75	-829.14	480.76	3,663.00	3,559.98	103.03	35.554		
11,500.00	7,017.22	6,750.01	6,680.94	142.60	27.44	79.75	-829.14	480.76	3,749.44	3,646.50	102.93	36.425		
11,600.00	7,017.36	6,750.01	6,680.94	145.54	27.44	79.75	-829.14	480.76	3,836.53	3,733.69	102.83	37.308		
11,700.00	7,017.51	6,750.01	6,680.94	148.49	27.44	79.75	-829.14	480.76	3,924.24	3,821.51	102.73	38.200		
11,800.00	7,017.65	6,750.01	6,680.94	151.44	27.44	79.75	-829.14	480.76	4,012.52	3,909.90	102.62	39.101		
11,900.00	7,017.79	6,750.01	6,680.94	154.40	27.44	79.75	-829.14	480.76	4,101.34	3,998.83	102.51	40.011		
12,000.00	7,017.93	6,750.01	6,680.94	157.35	27.44	79.75	-829.14	480.76	4,190.66	4,088.27	102.39	40.929		
12,100.00	7,018.07	6,750.01	6,680.94	160.31	27.44	79.75	-829.14	480.76	4,280.46	4,178.19	102.27	41.854		
12,200.00	7,018.22	6,750.01	6,680.94	163.27	27.44	79.75	-829.14	480.76	4,370.70	4,268.55	102.15	42.786		
12,300.00	7,018.36	6,750.01	6,680.94	166.23	27.44	79.75	-829.14	480.76	4,461.36	4,359.32	102.03	43.725		
12,400.00	7,018.50	6,750.01	6,680.94	169.20	27.44	79.75	-829.14	480.76	4,552.40	4,450.49	101.91	44.670		
12,500.00	7,018.64	6,750.01	6,680.94	172.17	27.44	79.75	-829.14	480.76	4,643.82	4,542.03	101.79	45.621		
12,600.00	7,018.79	6,750.01	6,680.94	175.13	27.44	79.75	-829.14	480.76	4,735.58	4,633.91	101.67	46.577		
12,700.00	7,018.93	6,750.01	6,680.94	178.10	27.44	79.75	-829.14	480.76	4,827.67	4,726.12	101.55	47.539		
12,800.00	7,019.07	6,750.01	6,680.94	181.08	27.44	79.75	-829.14	480.76	4,920.07	4,818.64	101.43	48.505		
12,900.00	7,019.21	6,750.01	6,680.94	184.05	27.44	79.75	-829.14	480.76	5,012.76	4,911.44	101.32	49.475		
13,000.00	7,019.35	6,750.01	6,680.94	187.02	27.44	79.75	-829.14	480.76	5,105.73	5,004.52	101.20	50.450		
13,100.00	7,019.50	6,750.01	6,680.94	190.00	27.44	79.75	-829.14	480.76	5,198.95	5,097.86	101.09	51.429		
13,200.00	7,019.64	6,750.01	6,680.94	192.98	27.44	79.75	-829.14	480.76	5,292.43	5,191.45	100.98	52.411		
13,300.00	7,019.78	6,750.01	6,680.94	195.96	27.44	79.75	-829.14	480.76	5,386.14	5,285.27	100.87	53.397		
13,400.00	7,019.92	6,750.01	6,680.94	198.94	27.44	79.75	-829.14	480.76	5,480.07	5,379.31	100.76	54.386		
13,500.00	7,020.07	6,750.01	6,680.94	201.92	27.44	79.75	-829.14	480.76	5,574.21	5,473.55	100.66	55.378		
13,600.00	7,020.21	6,750.01	6,680.94	204.90	27.44	79.75	-829.14	480.76	5,668.55	5,568.00	100.55	56.373		
13,700.00	7,020.35	6,750.01	6,680.94	207.88	27.44	79.75	-829.14	480.76	5,763.09	5,662.63	100.45	57.371		
13,800.00	7,020.49	6,750.01	6,680.94	210.86	27.44	79.75	-829.14	480.76	5,857.80	5,757.45	100.36	58.371		
13,900.00	7,020.63	6,750.01	6,680.94	213.85	27.44	79.75	-829.14	480.76	5,952.69	5,852.43	100.26	59.373		
14,000.00	7,020.78	6,750.01	6,680.94	216.84	27.44	79.75	-829.14	480.76	6,047.75	5,947.58	100.16	60.378		
14,100.00	7,020.92	6,750.01	6,680.94	219.82	27.44	79.75	-829.14	480.76	6,142.96	6,042.88	100.07	61.385		
14,200.00	7,021.06	6,750.01	6,680.94	222.81	27.44	79.75	-829.14	480.76	6,238.32	6,138.33	99.98	62.394		
14,300.00	7,021.20	6,750.01	6,680.94	225.80	27.44	79.75	-829.14	480.76	6,333.82	6,233.92	99.90	63.404		
14,400.00	7,021.35	6,750.01	6,680.94	228.79	27.44	79.75	-829.14	480.76	6,429.46	6,329.65	99.81	64.416		
14,500.00	7,021.49	6,750.01	6,680.94	231.78	27.44	79.75	-829.14	480.76	6,525.23	6,425.50	99.73	65.430		
14,600.00	7,021.63	6,750.01	6,680.94	234.77	27.44	79.75	-829.14	480.76	6,621.12	6,521.48	99.65	66.445		
14,700.00	7,021.77	6,750.01	6,680.94	237.76	27.44	79.75	-829.14	480.76	6,717.14	6,617.57	99.57	67.462		
14,800.00	7,021.92	6,750.01	6,680.94	240.75	27.44	79.75	-829.14	480.76	6,813.27	6,713.78	99.49	68.480		
14,900.00	7,022.06	6,750.01	6,680.94	243.74	27.44	79.75	-829.14	480.76	6,909.51	6,810.09	99.42	69.499		
15,000.00	7,022.20	6,750.01	6,680.94	246.74	27.44	79.75	-829.14	480.76	7,005.86	6,906.51	99.35	70.519		
15,100.00	7,022.34	6,750.01	6,680.94	249.73	27.44	79.75	-829.14	480.76	7,102.30	7,003.02	99.28	71.540		
15,200.00	7,022.48	6,750.01	6,680.94	252.72	27.44	79.75	-829.14	480.76	7,198.84	7,099.63	99.21	72.562		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #653H - OH - Plan #3 11Mar19 jcsdi													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 (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		
15,300.00	7,022.63	6,750.01	6,680.94	255.72	27.44	79.75	-829.14	480.76	7,295.48	7,196.34	99.14	73.585		
15,400.00	7,022.77	6,750.01	6,680.94	258.71	27.44	79.75	-829.14	480.76	7,392.21	7,293.13	99.08	74.608		
15,500.00	7,022.91	6,750.01	6,680.94	261.71	27.44	79.75	-829.14	480.76	7,489.02	7,390.00	99.02	75.632		
15,600.00	7,023.05	6,750.01	6,680.94	264.71	27.44	79.75	-829.14	480.76	7,585.91	7,486.95	98.96	76.657		
15,700.00	7,023.20	6,750.01	6,680.94	267.70	27.44	79.75	-829.14	480.76	7,682.89	7,583.99	98.90	77.682		
15,800.00	7,023.34	6,750.01	6,680.94	270.70	27.44	79.75	-829.14	480.76	7,779.94	7,681.09	98.85	78.708		
15,900.00	7,023.48	6,750.01	6,680.94	273.70	27.44	79.75	-829.14	480.76	7,877.06	7,778.27	98.79	79.734		
16,000.00	7,023.62	6,750.01	6,680.94	276.70	27.44	79.75	-829.14	480.76	7,974.26	7,875.52	98.74	80.761		
16,100.00	7,023.76	6,750.01	6,680.94	279.69	27.44	79.75	-829.14	480.76	8,071.52	7,972.83	98.69	81.788		
16,200.00	7,023.91	6,750.01	6,680.94	282.69	27.44	79.75	-829.14	480.76	8,168.85	8,070.21	98.64	82.815		
16,300.00	7,024.05	6,750.01	6,680.94	285.69	27.44	79.75	-829.14	480.76	8,266.25	8,167.65	98.59	83.842		
16,400.00	7,024.19	6,750.01	6,680.94	288.69	27.44	79.75	-829.14	480.76	8,363.70	8,265.15	98.55	84.869		
16,500.00	7,024.33	6,750.01	6,680.94	291.69	27.44	79.75	-829.14	480.76	8,461.22	8,362.71	98.50	85.897		
16,600.00	7,024.48	6,750.01	6,680.94	294.69	27.44	79.75	-829.14	480.76	8,558.79	8,460.33	98.46	86.924		
16,700.00	7,024.62	6,750.01	6,680.94	297.69	27.44	79.75	-829.14	480.76	8,656.42	8,557.99	98.42	87.951		
16,800.00	7,024.76	6,750.01	6,680.94	300.69	27.44	79.75	-829.14	480.76	8,754.10	8,655.71	98.38	88.979		
16,900.00	7,024.90	6,750.01	6,680.94	303.70	27.44	79.75	-829.14	480.76	8,851.83	8,753.48	98.35	90.006		
17,000.00	7,025.04	6,750.01	6,680.94	306.70	27.44	79.75	-829.14	480.76	8,949.61	8,851.30	98.31	91.033		
17,100.00	7,025.19	6,750.01	6,680.94	309.70	27.44	79.75	-829.14	480.76	9,047.44	8,949.17	98.28	92.060		
17,200.00	7,025.33	6,750.01	6,680.94	312.70	27.44	79.75	-829.14	480.76	9,145.32	9,047.08	98.25	93.087		
17,300.00	7,025.47	6,750.01	6,680.94	315.71	27.44	79.75	-829.14	480.76	9,243.25	9,145.03	98.21	94.113		
17,400.00	7,025.61	6,750.01	6,680.94	318.71	27.44	79.75	-829.14	480.76	9,341.21	9,243.03	98.18	95.139		
17,500.00	7,025.76	6,750.01	6,680.94	321.71	27.44	79.75	-829.14	480.76	9,439.22	9,341.07	98.16	96.165		
17,600.00	7,025.90	6,750.01	6,680.94	324.71	27.44	79.75	-829.14	480.76	9,537.28	9,439.15	98.13	97.191		
17,700.00	7,026.04	6,750.01	6,680.94	327.72	27.44	79.75	-829.14	480.76	9,635.37	9,537.26	98.10	98.216		
17,800.00	7,026.18	6,750.01	6,680.94	330.72	27.44	79.75	-829.14	480.76	9,733.50	9,635.42	98.08	99.240		
17,900.00	7,026.33	6,750.01	6,680.94	333.73	27.44	79.75	-829.14	480.76	9,831.67	9,733.61	98.06	100.264		
18,000.00	7,026.47	6,750.01	6,680.94	336.73	27.44	79.75	-829.14	480.76	9,929.87	9,831.84	98.04	101.288		



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi													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)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
0.00	0.00	0.01	0.01	0.00	0.00	-103.34	-2.91	-12.28	12.62						
100.00	100.00	100.01	100.01	0.13	0.13	-103.34	-2.91	-12.28	12.62	12.36	0.27	46.949			
200.00	200.00	200.01	200.01	0.49	0.49	-103.34	-2.91	-12.28	12.62	11.64	0.99	12.806			
300.00	300.00	300.01	300.01	0.85	0.85	-103.34	-2.91	-12.28	12.62	10.92	1.70	7.414			
316.66	316.66	316.68	316.68	0.91	0.91	-103.34	-2.91	-12.28	12.62	10.80	1.82	6.928	CC		
400.00	400.00	400.00	400.00	1.21	1.21	-103.34	-2.91	-12.28	12.62	10.20	2.42	5.217			
500.00	499.99	499.65	499.63	1.57	1.56	-50.53	-2.16	-13.84	13.59	10.45	3.14	4.328			
600.00	599.85	599.25	599.09	1.93	1.92	-54.14	0.11	-18.52	14.47	10.61	3.86	3.745			
700.00	699.29	698.85	698.31	2.29	2.28	-64.88	3.88	-26.30	15.23	10.64	4.59	3.319			
800.00	798.04	798.63	797.52	2.67	2.65	-85.74	8.54	-35.93	16.39	11.07	5.31	3.084			
900.00	895.85	898.04	896.35	3.08	3.02	-115.83	13.19	-45.54	21.05	14.95	6.09	3.454			
1,000.00	992.43	996.76	994.50	3.52	3.39	-138.77	17.81	-55.08	32.88	26.01	6.87	4.788			
1,100.00	1,088.21	1,094.99	1,092.16	4.01	3.77	-150.72	22.41	-64.57	49.68	42.07	7.61	6.527			
1,200.00	1,183.99	1,193.21	1,189.81	4.51	4.14	-156.55	27.01	-74.06	67.53	59.18	8.35	8.087			
1,300.00	1,279.76	1,291.43	1,287.46	5.03	4.52	-159.92	31.61	-83.55	85.78	76.69	9.09	9.432			
1,400.00	1,375.54	1,389.65	1,385.12	5.56	4.89	-162.11	36.21	-93.05	104.22	94.37	9.84	10.588			
1,500.00	1,471.32	1,487.87	1,482.77	6.10	5.27	-163.64	40.80	-102.54	122.75	112.16	10.59	11.586			
1,600.00	1,567.10	1,586.10	1,580.43	6.64	5.65	-164.77	45.40	-112.03	141.35	130.00	11.35	12.454			
1,700.00	1,662.87	1,684.32	1,678.08	7.19	6.03	-165.63	50.00	-121.52	160.00	147.89	12.11	13.215			
1,800.00	1,758.65	1,782.54	1,775.73	7.74	6.41	-166.32	54.60	-131.02	178.66	165.80	12.87	13.885			
1,900.00	1,854.43	1,880.76	1,873.39	8.30	6.79	-166.87	59.19	-140.51	197.35	183.72	13.63	14.481			
2,000.00	1,950.20	1,978.98	1,971.04	8.85	7.17	-167.33	63.79	-150.00	216.06	201.66	14.39	15.013			
2,100.00	2,045.98	2,077.21	2,068.70	9.41	7.55	-167.72	68.39	-159.49	234.77	219.61	15.16	15.491			
2,200.00	2,141.76	2,175.43	2,166.35	9.97	7.93	-168.05	72.99	-168.99	253.49	237.57	15.92	15.922			
2,300.00	2,237.54	2,273.65	2,264.00	10.53	8.31	-168.33	77.59	-178.48	272.22	255.54	16.69	16.314			
2,400.00	2,333.31	2,371.87	2,361.66	11.09	8.69	-168.58	82.18	-187.97	290.96	273.51	17.45	16.670			
2,500.00	2,429.09	2,470.09	2,459.31	11.65	9.07	-168.80	86.78	-197.46	309.70	291.48	18.22	16.997			
2,600.00	2,524.87	2,568.32	2,556.97	12.21	9.45	-168.99	91.38	-206.96	328.44	309.45	18.99	17.296			
2,700.00	2,620.64	2,666.54	2,654.62	12.78	9.83	-169.16	95.98	-216.45	347.19	327.43	19.76	17.572			
2,800.00	2,716.42	2,764.76	2,752.27	13.34	10.21	-169.31	100.57	-225.94	365.94	345.41	20.53	17.827			
2,900.00	2,812.20	2,862.98	2,849.93	13.91	10.59	-169.45	105.17	-235.43	384.69	363.40	21.30	18.063			
3,000.00	2,907.97	2,961.20	2,947.58	14.47	10.97	-169.58	109.77	-244.93	403.45	381.38	22.07	18.283			
3,100.00	3,003.75	3,059.42	3,045.24	15.04	11.36	-169.69	114.37	-254.42	422.21	399.37	22.84	18.487			
3,200.00	3,099.53	3,157.65	3,142.89	15.60	11.74	-169.80	118.96	-263.91	440.96	417.35	23.61	18.678			
3,300.00	3,195.31	3,255.87	3,240.54	16.17	12.12	-169.90	123.56	-273.40	459.72	435.34	24.38	18.857			
3,400.00	3,291.08	3,354.09	3,338.20	16.74	12.50	-169.99	128.16	-282.89	478.48	453.33	25.15	19.025			
3,500.00	3,386.86	3,452.31	3,435.85	17.30	12.88	-170.07	132.76	-292.39	497.24	471.32	25.92	19.182			
3,600.00	3,482.64	3,550.53	3,533.51	17.87	13.26	-170.14	137.36	-301.88	516.01	489.31	26.69	19.331			
3,700.00	3,578.41	3,648.76	3,631.16	18.44	13.64	-170.22	141.95	-311.37	534.77	507.30	27.47	19.471			
3,800.00	3,674.19	3,746.98	3,728.81	19.01	14.03	-170.28	146.55	-320.86	553.53	525.29	28.24	19.603			
3,900.00	3,769.97	3,845.20	3,826.47	19.57	14.41	-170.34	151.15	-330.36	572.30	543.29	29.01	19.728			
4,000.00	3,865.75	3,943.42	3,924.12	20.14	14.79	-170.40	155.75	-339.85	591.06	561.28	29.78	19.846			
4,100.00	3,961.52	4,041.64	4,021.78	20.71	15.17	-170.46	160.34	-349.34	609.83	579.27	30.55	19.959			
4,200.00	4,057.30	4,139.87	4,119.43	21.28	15.55	-170.51	164.94	-358.83	628.59	597.27	31.33	20.065			
4,300.00	4,153.08	4,238.09	4,217.08	21.85	15.93	-170.55	169.54	-368.33	647.36	615.26	32.10	20.167			
4,400.00	4,248.85	4,336.31	4,314.74	22.42	16.31	-170.60	174.14	-377.82	666.13	633.25	32.87	20.263			
4,500.00	4,344.63	4,434.53	4,412.39	22.98	16.70	-170.64	178.73	-387.31	684.89	651.25	33.65	20.356			
4,600.00	4,440.41	4,532.75	4,510.05	23.55	17.08	-170.68	183.33	-396.80	703.66	669.24	34.42	20.444			
4,700.00	4,536.18	4,630.98	4,607.70	24.12	17.46	-170.72	187.93	-406.30	722.43	687.24	35.19	20.528			
4,800.00	4,631.96	4,729.20	4,705.35	24.69	17.84	-170.76	192.53	-415.79	741.20	705.23	35.97	20.608			
4,900.00	4,727.74	4,827.42	4,803.01	25.26	18.22	-170.79	197.13	-425.28	759.97	723.23	36.74	20.685			
5,000.00	4,823.52	4,925.64	4,900.66	25.83	18.60	-170.83	201.72	-434.77	778.73	741.22	37.51	20.759			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi													Offset Site Error: 0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 ft
Rule Assigned:													
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.00	4,919.29	5,023.86	4,998.32	26.40	18.99	-170.86	206.32	-444.27	797.50	759.22	38.29	20.829	
5,200.00	5,015.07	5,122.08	5,095.97	26.97	19.37	-170.89	210.92	-453.76	816.27	777.21	39.06	20.897	
5,300.00	5,110.85	5,220.31	5,193.62	27.54	19.75	-170.92	215.52	-463.25	835.04	795.21	39.84	20.962	
5,400.00	5,206.62	5,318.53	5,291.28	28.11	20.13	-170.94	220.11	-472.74	853.81	813.20	40.61	21.025	
5,500.00	5,302.40	5,416.75	5,388.93	28.68	20.51	-170.97	224.71	-482.23	872.58	831.20	41.38	21.085	
5,600.00	5,398.18	5,514.97	5,486.59	29.25	20.89	-171.00	229.31	-491.73	891.35	849.19	42.16	21.143	
5,700.00	5,493.96	5,613.20	5,584.24	29.82	21.28	-171.02	233.91	-501.22	910.12	867.19	42.93	21.199	
5,800.00	5,590.88	5,712.04	5,682.51	30.32	21.66	-171.05	238.53	-510.77	924.77	881.07	43.70	21.161	
5,900.00	5,689.39	5,811.39	5,781.29	30.71	22.05	-171.07	243.18	-520.37	931.20	886.74	44.46	20.945	
6,000.00	5,788.43	5,910.18	5,879.50	30.99	22.43	-171.07	247.81	-529.92	929.52	884.31	45.21	20.562	
6,100.00	5,886.89	6,007.30	5,976.07	31.20	22.81	-171.07	252.36	-539.31	920.05	874.10	45.94	20.027	
6,200.00	5,983.70	6,101.71	6,069.93	31.37	23.18	-171.07	256.77	-548.43	903.35	856.67	46.68	19.353	
6,300.00	6,077.81	6,192.36	6,160.06	31.51	23.53	-171.07	261.02	-557.19	880.25	832.81	47.44	18.554	
6,400.00	6,168.18	6,278.26	6,245.46	31.66	23.86	-171.07	265.04	-565.49	851.84	803.57	48.27	17.648	
6,500.00	6,254.10	6,358.80	6,325.54	31.83	24.17	-171.07	268.81	-573.28	819.83	770.63	49.20	16.663	
6,600.00	6,338.81	6,437.92	6,404.20	32.03	24.48	-171.07	272.51	-580.92	789.69	739.42	50.27	15.710	
6,700.00	6,423.53	6,517.05	6,482.86	32.25	24.79	-171.07	276.22	-588.57	763.26	711.80	51.46	14.833	
6,800.00	6,508.25	6,596.17	6,561.53	32.51	25.10	-171.07	279.92	-596.22	740.95	688.19	52.76	14.043	
6,900.00	6,592.64	6,670.27	6,635.23	32.79	25.38	-171.07	283.40	-602.96	723.16	669.03	54.12	13.361	
7,000.00	6,672.35	6,738.90	6,703.75	33.16	25.61	-171.07	286.75	-603.43	710.37	654.81	55.56	12.786	
7,100.00	6,745.32	6,814.17	6,778.45	33.63	25.83	-171.07	290.58	-595.46	702.93	645.79	57.14	12.302	
7,191.20	6,805.31	6,890.19	6,852.41	34.18	26.02	-171.07	294.56	-578.51	700.80	642.13	58.66	11.946	
7,200.00	6,810.74	6,897.97	6,859.85	34.24	26.04	-171.07	294.97	-576.28	700.82	642.01	58.80	11.918	
7,300.00	6,867.91	6,992.70	6,947.90	35.03	26.25	-171.07	300.01	-541.95	703.53	643.12	60.40	11.648	
7,400.00	6,916.19	7,101.21	7,041.19	36.03	26.48	-171.07	305.72	-487.08	709.97	648.18	61.79	11.490	
7,500.00	6,955.06	7,226.34	7,135.37	37.26	26.80	-171.07	312.03	-405.24	718.45	655.54	62.91	11.420	
7,600.00	6,984.10	7,369.73	7,221.23	38.71	27.41	-171.07	318.60	-290.96	726.73	662.75	63.98	11.359	
7,700.00	7,002.97	7,529.68	7,284.18	40.36	28.64	-171.07	324.72	-144.50	732.36	666.75	65.61	11.162	
7,800.00	7,011.48	7,699.30	7,308.98	42.17	30.64	-171.07	329.39	22.73	733.37	664.88	68.49	10.707	
7,900.00	7,012.10	7,805.30	7,308.23	44.11	32.21	-171.07	331.54	128.69	732.01	660.18	71.83	10.191	
8,000.00	7,012.24	7,905.29	7,307.36	46.18	33.91	-171.07	333.56	228.66	730.81	655.42	75.39	9.693	
8,100.00	7,012.38	8,005.28	7,306.50	48.36	35.77	-171.07	335.58	328.63	729.61	650.41	79.20	9.212	
8,200.00	7,012.53	8,105.27	7,305.64	50.64	37.79	-171.07	337.60	428.59	728.40	645.19	83.22	8.753	
8,300.00	7,012.67	8,205.26	7,304.78	52.99	39.93	-171.07	339.62	528.56	727.20	639.79	87.41	8.319	
8,400.00	7,012.81	8,305.25	7,303.91	55.42	42.18	-171.07	341.65	628.53	726.00	634.23	91.77	7.911	
8,500.00	7,012.95	8,405.24	7,303.05	57.91	44.52	-171.07	343.67	728.49	724.80	628.55	96.25	7.530	
8,600.00	7,013.10	8,505.24	7,302.19	60.44	46.93	-171.07	345.69	828.46	723.60	622.74	100.86	7.175	
8,700.00	7,013.24	8,605.23	7,301.33	63.03	49.41	-171.07	347.71	928.43	722.40	616.84	105.56	6.843	
8,800.00	7,013.38	8,705.22	7,300.46	65.65	51.95	-171.07	349.73	1,028.40	721.20	610.85	110.35	6.535	
8,900.00	7,013.52	8,805.21	7,299.60	68.30	54.54	-171.07	351.75	1,128.36	720.00	604.78	115.22	6.249	
9,000.00	7,013.66	8,905.20	7,298.74	70.99	57.16	-171.07	353.77	1,228.33	718.80	598.64	120.16	5.982	
9,100.00	7,013.81	9,005.19	7,297.88	73.70	59.83	-171.07	355.80	1,328.30	717.60	592.44	125.16	5.733	
9,200.00	7,013.95	9,105.18	7,297.02	76.44	62.52	-171.07	357.82	1,428.26	716.41	586.19	130.21	5.502	
9,300.00	7,014.09	9,205.17	7,296.15	79.20	65.25	-171.07	359.84	1,528.23	715.21	579.90	135.31	5.286	
9,400.00	7,014.23	9,305.16	7,295.29	81.97	68.00	-171.07	361.86	1,628.20	714.01	573.56	140.46	5.084	
9,500.00	7,014.38	9,405.16	7,294.43	84.77	70.77	-171.07	363.88	1,728.16	712.82	567.18	145.64	4.894	
9,600.00	7,014.52	9,505.15	7,293.57	87.58	73.56	-171.07	365.90	1,828.13	711.62	560.76	150.86	4.717	
9,700.00	7,014.66	9,605.14	7,292.70	90.40	76.36	-171.07	367.92	1,928.10	710.43	554.32	156.11	4.551	
9,800.00	7,014.80	9,705.13	7,291.84	93.23	79.18	-171.07	369.95	2,028.07	709.23	547.85	161.38	4.395	
9,900.00	7,014.94	9,805.12	7,290.98	96.08	82.02	-171.07	371.97	2,128.03	708.04	541.35	166.69	4.248	
10,000.00	7,015.09	9,905.11	7,290.12	98.94	84.86	-171.07	373.99	2,228.00	706.84	534.82	172.02	4.109	
10,100.00	7,015.23	10,005.10	7,289.26	101.80	87.72	-171.07	376.01	2,327.97	705.65	528.28	177.37	3.978	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi												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	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
10,200.00	7,015.37	10,105.09	7,288.39	104.68	90.59	112.80	378.03	2,427.93	704.46	521.71	182.75	3.855	
10,300.00	7,015.51	10,205.09	7,287.53	107.56	93.47	112.75	380.05	2,527.90	703.26	515.12	188.14	3.738	
10,400.00	7,015.66	10,305.08	7,286.67	110.45	96.35	112.71	382.07	2,627.87	702.07	508.52	193.55	3.627	
10,500.00	7,015.80	10,405.07	7,285.81	113.35	99.25	112.66	384.09	2,727.83	700.88	501.90	198.98	3.522	
10,600.00	7,015.94	10,505.06	7,284.94	116.25	102.15	112.61	386.12	2,827.80	699.69	495.26	204.43	3.423	
10,700.00	7,016.08	10,605.05	7,284.08	119.16	105.05	112.56	388.14	2,927.77	698.50	488.61	209.89	3.328	
10,800.00	7,016.23	10,705.04	7,283.22	122.07	107.97	112.51	390.16	3,027.74	697.31	481.95	215.36	3.238	
10,900.00	7,016.37	10,805.03	7,282.36	124.99	110.89	112.46	392.18	3,127.70	696.12	475.27	220.85	3.152	
11,000.00	7,016.51	10,905.02	7,281.49	127.92	113.81	112.41	394.20	3,227.67	694.93	468.58	226.35	3.070	
11,100.00	7,016.65	11,005.01	7,280.63	130.85	116.74	112.37	396.22	3,327.64	693.74	461.88	231.86	2.992	
11,200.00	7,016.79	11,105.01	7,279.77	133.78	119.67	112.32	398.24	3,427.60	692.55	455.17	237.39	2.917	
11,300.00	7,016.94	11,205.00	7,278.91	136.71	122.60	112.27	400.27	3,527.57	691.37	448.45	242.92	2.846	
11,400.00	7,017.08	11,304.99	7,278.05	139.65	125.54	112.22	402.29	3,627.54	690.18	441.71	248.47	2.778	
11,500.00	7,017.22	11,404.98	7,277.18	142.60	128.49	112.17	404.31	3,727.50	688.99	434.97	254.02	2.712	
11,600.00	7,017.36	11,504.97	7,276.32	145.54	131.43	112.12	406.33	3,827.47	687.81	428.22	259.59	2.650	
11,700.00	7,017.51	11,604.96	7,275.46	148.49	134.38	112.07	408.35	3,927.44	686.62	421.46	265.16	2.589	
11,800.00	7,017.65	11,704.95	7,274.60	151.44	137.33	112.02	410.37	4,027.41	685.44	414.69	270.75	2.532	
11,900.00	7,017.79	11,804.94	7,273.73	154.40	140.29	111.96	412.39	4,127.37	684.25	407.91	276.34	2.476	
12,000.00	7,017.93	11,904.93	7,272.87	157.35	143.24	111.91	414.42	4,227.34	683.07	401.13	281.94	2.423	
12,100.00	7,018.07	12,004.93	7,272.01	160.31	146.20	111.86	416.44	4,327.31	681.89	394.34	287.55	2.371	
12,200.00	7,018.22	12,104.92	7,271.15	163.27	149.16	111.81	418.46	4,427.27	680.71	387.54	293.17	2.322	
12,300.00	7,018.36	12,204.91	7,270.28	166.23	152.13	111.76	420.48	4,527.24	679.52	380.73	298.79	2.274	
12,400.00	7,018.50	12,304.90	7,269.42	169.20	155.09	111.71	422.50	4,627.21	678.34	373.91	304.43	2.228	
12,500.00	7,018.64	12,404.89	7,268.56	172.17	158.06	111.66	424.52	4,727.17	677.16	367.09	310.07	2.184	
12,600.00	7,018.79	12,504.88	7,267.70	175.13	161.03	111.61	426.54	4,827.14	675.98	360.27	315.71	2.141	
12,700.00	7,018.93	12,604.87	7,266.84	178.10	164.00	111.55	428.57	4,927.11	674.80	353.43	321.37	2.100	
12,800.00	7,019.07	12,704.86	7,265.97	181.08	166.97	111.50	430.59	5,027.08	673.62	346.59	327.03	2.060	
12,900.00	7,019.21	12,804.86	7,265.11	184.05	169.95	111.45	432.61	5,127.04	672.44	339.75	332.70	2.021	
13,000.00	7,019.35	12,904.85	7,264.25	187.02	172.92	111.40	434.63	5,227.01	671.26	332.89	338.37	1.984	
13,100.00	7,019.50	13,004.84	7,263.39	190.00	175.90	111.34	436.65	5,326.98	670.09	326.04	344.05	1.948	
13,200.00	7,019.64	13,104.83	7,262.52	192.98	178.87	111.29	438.67	5,426.94	668.91	319.17	349.74	1.913	
13,300.00	7,019.78	13,204.82	7,261.66	195.96	181.85	111.24	440.69	5,526.91	667.73	312.30	355.43	1.879	
13,400.00	7,019.92	13,304.81	7,260.80	198.94	184.83	111.18	442.72	5,626.88	666.56	305.43	361.13	1.846	
13,500.00	7,020.07	13,404.80	7,259.94	201.92	187.81	111.13	444.74	5,726.84	665.38	298.55	366.83	1.814	
13,600.00	7,020.21	13,504.79	7,259.07	204.90	190.80	111.08	446.76	5,826.81	664.21	291.66	372.55	1.783	
13,700.00	7,020.35	13,604.78	7,258.21	207.88	193.78	111.02	448.78	5,926.78	663.03	284.77	378.26	1.753	
13,800.00	7,020.49	13,704.78	7,257.35	210.86	196.76	110.97	450.80	6,026.75	661.86	277.87	383.99	1.724	
13,900.00	7,020.63	13,804.77	7,256.49	213.85	199.75	110.91	452.82	6,126.71	660.69	270.97	389.71	1.695	
14,000.00	7,020.78	13,904.76	7,255.63	216.84	202.73	110.86	454.84	6,226.68	659.51	264.07	395.45	1.668	
14,100.00	7,020.92	14,004.75	7,254.76	219.82	205.72	110.81	456.87	6,326.65	658.34	257.16	401.19	1.641	
14,200.00	7,021.06	14,104.74	7,253.90	222.81	208.71	110.75	458.89	6,426.61	657.17	250.24	406.93	1.615	
14,300.00	7,021.20	14,204.73	7,253.04	225.80	211.69	110.70	460.91	6,526.58	656.00	243.32	412.68	1.590	
14,400.00	7,021.35	14,304.72	7,252.18	228.79	214.68	110.64	462.93	6,626.55	654.83	236.39	418.44	1.565	
14,500.00	7,021.49	14,404.71	7,251.31	231.78	217.67	110.58	464.95	6,726.51	653.66	229.46	424.20	1.541	
14,600.00	7,021.63	14,504.71	7,250.45	234.77	220.66	110.53	466.97	6,826.48	652.49	222.53	429.96	1.518	
14,700.00	7,021.77	14,604.70	7,249.59	237.76	223.65	110.47	468.99	6,926.45	651.33	215.59	435.74	1.495 Level 3	
14,800.00	7,021.92	14,704.69	7,248.73	240.75	226.64	110.42	471.01	7,026.42	650.16	208.65	441.51	1.473 Level 3	
14,900.00	7,022.06	14,804.68	7,247.87	243.74	229.63	110.36	473.04	7,126.38	648.99	201.70	447.29	1.451 Level 3	
15,000.00	7,022.20	14,904.67	7,247.00	246.74	232.63	110.30	475.06	7,226.35	647.83	194.75	453.08	1.430 Level 3	
15,100.00	7,022.34	15,004.66	7,246.14	249.73	235.62	110.25	477.08	7,326.32	646.66	187.79	458.87	1.409 Level 3	
15,200.00	7,022.48	15,104.65	7,245.28	252.72	238.61	110.19	479.10	7,426.28	645.49	180.83	464.67	1.389 Level 3	
15,300.00	7,022.63	15,204.64	7,244.42	255.72	241.61	110.13	481.12	7,526.25	644.33	173.86	470.47	1.370 Level 3	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #655H - OH - Plan #3 11Mar19 jcsdi													Offset Site Error: 0.00 ft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 ft
Reference													
Offset													
Semi Major Axis													
Highside													
Offset Wellbore Centre													
Distance													
Rule Assigned:													
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
15,400.00	7,022.77	15,304.63	7,243.55	258.71	244.60	110.08	483.14	7,626.22	643.17	166.89	476.28	1.350	Level 3
15,500.00	7,022.91	15,404.63	7,242.69	261.71	247.60	110.02	485.16	7,726.18	642.00	159.92	482.09	1.332	Level 3
15,600.00	7,023.05	15,504.62	7,241.83	264.71	250.59	109.96	487.19	7,826.15	640.84	152.94	487.91	1.313	Level 3
15,700.00	7,023.20	15,604.61	7,240.97	267.70	253.59	109.90	489.21	7,926.12	639.68	145.95	493.73	1.296	Level 3
15,800.00	7,023.34	15,704.60	7,240.10	270.70	256.58	109.84	491.23	8,026.09	638.52	138.97	499.55	1.278	Level 3
15,900.00	7,023.48	15,804.59	7,239.24	273.70	259.58	109.79	493.25	8,126.05	637.36	131.98	505.38	1.261	Level 3
16,000.00	7,023.62	15,904.58	7,238.38	276.70	262.58	109.73	495.27	8,226.02	636.20	124.98	511.22	1.244	Level 2
16,100.00	7,023.76	16,004.57	7,237.52	279.69	265.57	109.67	497.29	8,325.99	635.04	117.98	517.06	1.228	Level 2
16,200.00	7,023.91	16,104.56	7,236.66	282.69	268.57	109.61	499.31	8,425.95	633.88	110.98	522.90	1.212	Level 2
16,300.00	7,024.05	16,204.55	7,235.79	285.69	271.57	109.55	501.34	8,525.92	632.72	103.97	528.75	1.197	Level 2
16,400.00	7,024.19	16,304.55	7,234.93	288.69	274.57	109.49	503.36	8,625.89	631.57	96.96	534.61	1.181	Level 2
16,500.00	7,024.33	16,404.54	7,234.07	291.69	277.57	109.43	505.38	8,725.85	630.41	89.94	540.47	1.166	Level 2
16,600.00	7,024.48	16,504.53	7,233.21	294.69	280.57	109.37	507.40	8,825.82	629.26	82.92	546.33	1.152	Level 2
16,700.00	7,024.62	16,604.52	7,232.34	297.69	283.57	109.31	509.42	8,925.79	628.10	75.90	552.20	1.137	Level 2
16,800.00	7,024.76	16,704.51	7,231.48	300.69	286.57	109.25	511.44	9,025.76	626.95	68.87	558.07	1.123	Level 2
16,900.00	7,024.90	16,804.50	7,230.62	303.70	289.57	109.19	513.46	9,125.72	625.79	61.84	563.95	1.110	Level 2
17,000.00	7,025.04	16,904.49	7,229.76	306.70	292.57	109.13	515.49	9,225.69	624.64	54.81	569.83	1.096	Level 2
17,100.00	7,025.19	17,004.48	7,228.89	309.70	295.57	109.07	517.51	9,325.66	623.49	47.77	575.72	1.083	Level 2
17,200.00	7,025.33	17,104.48	7,228.03	312.70	298.57	109.01	519.53	9,425.62	622.34	40.73	581.61	1.070	Level 2
17,300.00	7,025.47	17,204.47	7,227.17	315.71	301.57	108.95	521.55	9,525.59	621.19	33.68	587.51	1.057	Level 2
17,400.00	7,025.61	17,304.46	7,226.31	318.71	304.57	108.88	523.57	9,625.56	620.04	26.63	593.41	1.045	Level 2
17,500.00	7,025.76	17,404.45	7,225.45	321.71	307.57	108.82	525.59	9,725.52	618.89	19.57	599.31	1.033	Level 2
17,600.00	7,025.90	17,504.44	7,224.58	324.71	310.57	108.76	527.61	9,825.49	617.74	12.52	605.22	1.021	Level 2
17,700.00	7,026.04	17,604.43	7,223.72	327.72	313.57	108.70	529.64	9,925.46	616.59	5.45	611.13	1.009	Level 2
17,800.00	7,026.18	17,704.42	7,222.86	330.72	316.58	108.64	531.66	10,025.43	615.44	-1.61	617.05	0.997	Level 1
17,900.00	7,026.33	17,804.41	7,222.00	333.73	319.58	108.57	533.68	10,125.39	614.30	-8.68	622.98	0.986	Level 1
18,000.00	7,026.47	17,904.40	7,221.13	336.73	322.58	108.51	535.70	10,225.36	613.15	-15.75	628.90	0.975	Level 1
18,100.00	7,026.61	18,004.40	7,220.27	339.74	325.58	108.45	537.72	10,325.33	612.01	-22.83	634.83	0.964	Level 1
18,200.00	7,026.75	18,104.39	7,219.41	342.74	328.59	108.38	539.74	10,425.29	610.86	-29.91	640.77	0.953	Level 1
18,300.00	7,026.89	18,204.15	7,218.55	345.75	331.58	108.32	541.76	10,525.03	609.72	-36.98	646.70	0.943	Level 1
18,367.18	7,026.99	18,266.12	7,218.01	347.77	333.44	108.28	542.99	10,586.99	609.00	-41.54	650.54	0.936	Level 1
18,374.53	7,027.00	18,266.12	7,218.01	347.99	333.44	108.28	542.99	10,586.99	609.03	-41.65	650.67	0.936	Level 1, ES, SF



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - Plan #1												Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference	Offset	Rule Assigned:										Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	150.98	-15.29	8.48	17.49				
100.00	100.00	100.00	100.00	0.13	0.13	150.98	-15.29	8.48	17.49	17.22	0.27	65.039	
200.00	200.00	200.00	200.00	0.49	0.49	150.98	-15.29	8.48	17.49	16.50	0.99	17.738	
300.00	300.00	300.00	300.00	0.85	0.85	150.98	-15.29	8.48	17.49	15.78	1.70	10.269	
400.00	400.00	400.00	400.00	1.21	1.21	150.98	-15.29	8.48	17.49	15.07	2.42	7.227 CC	
403.08	403.08	403.08	403.08	1.22	1.22	-158.64	-15.29	8.48	17.49	15.05	2.44	7.163	
500.00	499.99	500.00	499.95	1.57	1.56	-151.09	-16.39	6.11	18.06	14.94	3.12	5.780 ES	
600.00	599.85	599.52	599.15	1.93	1.91	-138.11	-19.66	-0.97	23.70	19.86	3.83	6.185	
700.00	699.29	698.75	697.75	2.29	2.26	-131.42	-24.39	-11.20	34.87	30.32	4.56	7.652	
800.00	798.04	797.63	795.98	2.67	2.63	-132.46	-29.15	-21.48	49.69	44.39	5.30	9.373	
900.00	895.85	895.82	893.52	3.08	3.00	-136.05	-33.87	-31.70	68.15	62.09	6.06	11.242	
1,000.00	992.43	993.04	990.10	3.52	3.38	-140.12	-38.54	-41.81	90.70	83.86	6.84	13.262	
1,100.00	1,088.21	1,089.61	1,086.03	4.01	3.75	-143.72	-43.19	-51.85	115.89	108.27	7.62	15.213	
1,200.00	1,183.99	1,186.18	1,181.97	4.51	4.12	-146.05	-47.83	-61.90	141.37	132.97	8.39	16.840	
1,300.00	1,279.76	1,282.75	1,277.90	5.03	4.50	-147.67	-52.47	-71.94	167.00	157.82	9.18	18.196	
1,400.00	1,375.54	1,379.32	1,373.83	5.56	4.87	-148.86	-57.12	-81.99	192.72	182.76	9.96	19.340	
1,500.00	1,471.32	1,475.88	1,469.76	6.10	5.25	-149.77	-61.76	-92.03	218.50	207.75	10.76	20.315	
1,600.00	1,567.10	1,572.45	1,565.69	6.64	5.63	-150.49	-66.41	-102.08	244.33	232.78	11.55	21.154	
1,700.00	1,662.87	1,669.02	1,661.62	7.19	6.01	-151.07	-71.05	-112.12	270.18	257.83	12.35	21.883	
1,800.00	1,758.65	1,765.59	1,757.55	7.74	6.39	-151.55	-75.70	-122.17	296.05	282.91	13.14	22.523	
1,900.00	1,854.43	1,862.16	1,853.49	8.30	6.77	-151.96	-80.34	-132.21	321.94	308.00	13.94	23.087	
2,000.00	1,950.20	1,958.72	1,949.42	8.85	7.15	-152.30	-84.98	-142.25	347.85	333.10	14.75	23.588	
2,100.00	2,045.98	2,055.29	2,045.35	9.41	7.53	-152.59	-89.63	-152.30	373.76	358.21	15.55	24.037	
2,200.00	2,141.76	2,151.86	2,141.28	9.97	7.91	-152.85	-94.27	-162.34	399.68	383.33	16.35	24.441	
2,300.00	2,237.54	2,248.43	2,237.21	10.53	8.29	-153.07	-98.92	-172.39	425.61	408.45	17.16	24.805	
2,400.00	2,333.31	2,344.99	2,333.14	11.09	8.67	-153.27	-103.56	-182.43	451.54	433.58	17.96	25.137	
2,500.00	2,429.09	2,441.56	2,429.07	11.65	9.05	-153.45	-108.20	-192.48	477.48	458.71	18.77	25.439	
2,600.00	2,524.87	2,538.13	2,525.01	12.21	9.43	-153.61	-112.85	-202.52	503.42	483.84	19.58	25.716	
2,700.00	2,620.64	2,634.70	2,620.94	12.78	9.81	-153.76	-117.49	-212.57	529.37	508.98	20.38	25.970	
2,800.00	2,716.42	2,731.26	2,716.87	13.34	10.19	-153.89	-122.14	-222.61	555.31	534.12	21.19	26.204	
2,900.00	2,812.20	2,827.83	2,812.80	13.91	10.57	-154.00	-126.78	-232.66	581.26	559.26	22.00	26.421	
3,000.00	2,907.97	2,924.40	2,908.73	14.47	10.96	-154.11	-131.42	-242.70	607.22	584.41	22.81	26.622	
3,100.00	3,003.75	3,020.97	3,004.66	15.04	11.34	-154.21	-136.07	-252.75	633.17	609.55	23.62	26.809	
3,200.00	3,099.53	3,117.53	3,100.59	15.60	11.72	-154.31	-140.71	-262.79	659.13	634.70	24.43	26.984	
3,300.00	3,195.31	3,214.10	3,196.53	16.17	12.10	-154.39	-145.36	-272.83	685.08	659.85	25.24	27.147	
3,400.00	3,291.08	3,310.67	3,292.46	16.74	12.48	-154.47	-150.00	-282.88	711.04	684.99	26.05	27.299	
3,500.00	3,386.86	3,407.24	3,388.39	17.30	12.86	-154.54	-154.64	-292.92	737.00	710.14	26.86	27.442	
3,600.00	3,482.64	3,503.80	3,484.32	17.87	13.25	-154.61	-159.29	-302.97	762.96	735.29	27.67	27.577	
3,700.00	3,578.41	3,600.37	3,580.25	18.44	13.63	-154.67	-163.93	-313.01	788.92	760.44	28.48	27.703	
3,800.00	3,674.19	3,696.94	3,676.18	19.01	14.01	-154.73	-168.58	-323.06	814.88	785.60	29.29	27.823	
3,900.00	3,769.97	3,793.51	3,772.12	19.57	14.39	-154.79	-173.22	-333.10	840.85	810.75	30.10	27.936	
4,000.00	3,865.75	3,890.08	3,868.05	20.14	14.77	-154.84	-177.86	-343.15	866.81	835.90	30.91	28.043	
4,100.00	3,961.52	3,986.64	3,963.98	20.71	15.16	-154.89	-182.51	-353.19	892.78	861.05	31.72	28.144	
4,200.00	4,057.30	4,083.21	4,059.91	21.28	15.54	-154.94	-187.15	-363.24	918.74	886.21	32.53	28.240	
4,300.00	4,153.08	4,179.78	4,155.84	21.85	15.92	-154.98	-191.80	-373.28	944.71	911.36	33.35	28.331	
4,400.00	4,248.85	4,276.35	4,251.77	22.42	16.30	-155.02	-196.44	-383.32	970.67	936.52	34.16	28.418	
4,500.00	4,344.63	4,372.91	4,347.70	22.98	16.68	-155.06	-201.08	-393.37	996.64	961.67	34.97	28.501	
4,600.00	4,440.41	4,469.48	4,443.64	23.55	17.07	-155.10	-205.73	-403.41	1,022.61	986.83	35.78	28.580	
4,700.00	4,536.18	4,566.05	4,539.57	24.12	17.45	-155.14	-210.37	-413.46	1,048.57	1,011.98	36.59	28.655	
4,800.00	4,631.96	4,662.62	4,635.50	24.69	17.83	-155.17	-215.02	-423.50	1,074.54	1,037.14	37.41	28.727	
4,900.00	4,727.74	4,759.18	4,731.43	25.26	18.21	-155.20	-219.66	-433.55	1,100.51	1,062.29	38.22	28.796	
5,000.00	4,823.52	4,855.75	4,827.36	25.83	18.59	-155.24	-224.31	-443.59	1,126.48	1,087.45	39.03	28.861	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - Plan #1													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)			
5,100.00	4,919.29	4,952.32	4,923.29	26.40	18.98	-155.26	-228.95	-453.64	1,152.45	1,112.60	39.84	28.924	
5,200.00	5,015.07	5,048.89	5,019.22	26.97	19.36	-155.29	-233.59	-463.68	1,178.42	1,137.76	40.66	28.985	
5,300.00	5,110.85	5,145.45	5,115.16	27.54	19.74	-155.32	-238.24	-473.73	1,204.38	1,162.92	41.47	29.043	
5,400.00	5,206.62	5,242.02	5,211.09	28.11	20.12	-155.35	-242.88	-483.77	1,230.35	1,188.07	42.28	29.099	
5,500.00	5,302.40	5,338.59	5,307.02	28.68	20.51	-155.37	-247.53	-493.82	1,256.32	1,213.23	43.10	29.152	
5,600.00	5,398.18	5,435.16	5,402.95	29.25	20.89	-155.39	-252.17	-503.86	1,282.29	1,238.39	43.91	29.204	
5,700.00	5,493.96	5,531.73	5,498.88	29.82	21.27	-155.43	-256.81	-513.90	1,308.26	1,263.54	44.72	29.253	
5,800.00	5,590.88	5,628.98	5,595.50	30.32	21.66	-169.28	-261.49	-524.02	1,331.07	1,285.55	45.52	29.239	
5,900.00	5,689.39	5,726.86	5,692.73	30.71	22.04	162.06	-266.20	-534.20	1,347.67	1,301.37	46.30	29.105	
6,000.00	5,788.43	5,824.29	5,789.52	30.99	22.43	120.52	-270.88	-544.34	1,358.10	1,311.03	47.06	28.857	
6,100.00	5,886.89	5,920.20	5,884.80	31.20	22.81	94.00	-275.50	-554.31	1,362.58	1,314.77	47.81	28.500	
6,200.00	5,983.70	6,013.54	5,977.52	31.37	23.18	82.37	-279.98	-564.02	1,361.56	1,313.00	48.56	28.041	
6,300.00	6,077.81	6,103.28	6,066.68	31.51	23.53	77.45	-284.30	-573.36	1,355.67	1,306.35	49.31	27.491	
6,400.00	6,168.18	6,188.46	6,151.29	31.66	23.87	75.76	-288.40	-582.21	1,345.72	1,295.62	50.10	26.860	
6,500.00	6,254.10	6,268.43	6,230.74	31.83	24.19	76.33	-292.24	-590.53	1,332.96	1,282.02	50.94	26.166	
6,600.00	6,338.81	6,344.13	6,305.94	32.03	24.49	78.34	-295.88	-598.38	1,321.72	1,269.91	51.81	25.509	
6,700.00	6,423.53	6,400.00	6,361.65	32.25	24.69	79.74	-298.58	-601.23	1,314.11	1,261.58	52.53	25.018	
6,800.00	6,508.25	6,464.77	6,426.26	32.51	24.88	81.14	-301.72	-598.39	1,310.21	1,256.94	53.27	24.597	
6,900.00	6,592.64	6,535.69	6,496.26	32.79	25.07	82.41	-305.13	-587.77	1,309.25	1,255.23	54.02	24.238	
6,905.73	6,597.38	6,539.91	6,500.38	32.82	25.08	82.48	-305.33	-586.90	1,309.25	1,255.18	54.07	24.216	
7,000.00	6,672.35	6,611.18	6,568.97	33.16	25.24	83.62	-308.68	-567.99	1,309.71	1,254.84	54.87	23.868	
7,100.00	6,745.32	6,690.92	6,642.67	33.63	25.40	84.79	-312.29	-537.90	1,311.13	1,255.24	55.89	23.460	
7,200.00	6,810.74	6,775.32	6,715.94	34.24	25.56	85.90	-315.88	-496.27	1,313.36	1,256.27	57.10	23.003	
7,300.00	6,867.91	6,864.69	6,786.79	35.03	25.75	86.93	-319.38	-442.04	1,316.20	1,257.67	58.53	22.487	
7,400.00	6,916.19	6,959.13	6,852.65	36.03	26.01	87.84	-322.64	-374.55	1,319.38	1,259.14	60.24	21.902	
7,500.00	6,955.06	7,058.48	6,910.37	37.26	26.42	88.60	-325.53	-293.87	1,322.61	1,260.32	62.29	21.232	
7,600.00	6,984.10	7,162.16	6,956.49	38.71	27.09	89.17	-327.86	-201.17	1,325.61	1,260.85	64.76	20.470	
7,700.00	7,002.97	7,269.17	6,987.69	40.36	28.11	89.51	-329.48	-98.95	1,328.12	1,260.45	67.67	19.625	
7,800.00	7,011.48	7,378.10	7,001.45	42.17	29.47	89.59	-330.27	8.97	1,329.95	1,258.95	71.00	18.732	
7,900.00	7,012.10	7,480.26	7,002.13	44.11	30.99	89.57	-330.41	111.12	1,331.23	1,256.65	74.59	17.848	
8,000.00	7,012.24	7,580.25	7,002.30	46.18	32.69	89.57	-330.52	211.11	1,332.50	1,254.04	78.46	16.984	
8,100.00	7,012.38	7,680.24	7,002.47	48.36	34.57	89.58	-330.63	311.10	1,333.76	1,251.16	82.60	16.148	
8,200.00	7,012.53	7,780.23	7,002.64	50.64	36.61	89.58	-330.74	411.09	1,335.02	1,248.05	86.97	15.351	
8,300.00	7,012.67	7,880.22	7,002.81	52.99	38.78	89.58	-330.86	511.09	1,336.29	1,244.75	91.54	14.598	
8,400.00	7,012.81	7,980.22	7,002.98	55.42	41.05	89.58	-330.97	611.08	1,337.55	1,241.27	96.28	13.892	
8,500.00	7,012.95	8,080.21	7,003.15	57.91	43.42	89.58	-331.08	711.07	1,338.81	1,237.65	101.16	13.234	
8,600.00	7,013.10	8,180.20	7,003.32	60.44	45.87	89.58	-331.20	811.06	1,340.08	1,233.91	106.17	12.622	
8,700.00	7,013.24	8,280.19	7,003.49	63.03	48.38	89.58	-331.31	911.05	1,341.34	1,230.06	111.28	12.054	
8,800.00	7,013.38	8,380.18	7,003.67	65.65	50.94	89.59	-331.42	1,011.05	1,342.60	1,226.12	116.48	11.526	
8,900.00	7,013.52	8,480.18	7,003.84	68.30	53.56	89.59	-331.53	1,111.04	1,343.86	1,222.10	121.77	11.036	
9,000.00	7,013.66	8,580.17	7,004.01	70.99	56.21	89.59	-331.65	1,211.03	1,345.13	1,218.01	127.12	10.582	
9,100.00	7,013.81	8,680.16	7,004.18	73.70	58.90	89.59	-331.76	1,311.02	1,346.39	1,213.86	132.53	10.159	
9,200.00	7,013.95	8,780.15	7,004.35	76.44	61.62	89.59	-331.87	1,411.01	1,347.65	1,209.66	137.99	9.766	
9,300.00	7,014.09	8,880.14	7,004.52	79.20	64.37	89.59	-331.99	1,511.00	1,348.92	1,205.41	143.51	9.400	
9,400.00	7,014.23	8,980.14	7,004.69	81.97	67.14	89.60	-332.10	1,611.00	1,350.18	1,201.12	149.06	9.058	
9,500.00	7,014.38	9,080.13	7,004.86	84.77	69.93	89.60	-332.21	1,710.99	1,351.44	1,196.79	154.65	8.739	
9,600.00	7,014.52	9,180.12	7,005.03	87.58	72.74	89.60	-332.32	1,810.98	1,352.71	1,192.43	160.27	8.440	
9,700.00	7,014.66	9,280.11	7,005.20	90.40	75.57	89.60	-332.44	1,910.97	1,353.97	1,188.04	165.92	8.160	
9,800.00	7,014.80	9,380.10	7,005.37	93.23	78.41	89.60	-332.55	2,010.96	1,355.23	1,183.63	171.60	7.897	
9,900.00	7,014.94	9,480.10	7,005.54	96.08	81.26	89.60	-332.66	2,110.95	1,356.50	1,179.19	177.31	7.651	
10,000.00	7,015.09	9,580.09	7,005.71	98.94	84.13	89.61	-332.78	2,210.95	1,357.76	1,174.73	183.03	7.418	
10,100.00	7,015.23	9,680.08	7,005.88	101.80	87.00	89.61	-332.89	2,310.94	1,359.02	1,170.25	188.78	7.199	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - Plan #1												Offset Site Error:	0.00 ft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 ft
Reference												Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
							+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,200.00	7,015.37	9,780.07	7,006.05	104.68	89.89	89.61	-333.00	2,410.93	1,360.28	1,165.75	194.54	6.992	
10,300.00	7,015.51	9,880.06	7,006.22	107.56	92.78	89.61	-333.12	2,510.92	1,361.55	1,161.23	200.32	6.797	
10,400.00	7,015.66	9,980.06	7,006.39	110.45	95.69	89.61	-333.23	2,610.91	1,362.81	1,156.70	206.11	6.612	
10,500.00	7,015.80	10,080.05	7,006.56	113.35	98.60	89.61	-333.34	2,710.91	1,364.07	1,152.16	211.92	6.437	
10,600.00	7,015.94	10,180.04	7,006.73	116.25	101.51	89.61	-333.45	2,810.90	1,365.34	1,147.60	217.74	6.271	
10,700.00	7,016.08	10,280.03	7,006.90	119.16	104.43	89.62	-333.57	2,910.89	1,366.60	1,143.03	223.57	6.113	
10,800.00	7,016.23	10,380.02	7,007.07	122.07	107.36	89.62	-333.68	3,010.88	1,367.86	1,138.45	229.41	5.962	
10,900.00	7,016.37	10,480.02	7,007.24	124.99	110.30	89.62	-333.79	3,110.87	1,369.13	1,133.86	235.26	5.820	
11,000.00	7,016.51	10,580.01	7,007.41	127.92	113.23	89.62	-333.91	3,210.86	1,370.39	1,129.26	241.13	5.683	
11,100.00	7,016.65	10,680.00	7,007.59	130.85	116.17	89.62	-334.02	3,310.86	1,371.65	1,124.66	247.00	5.553	
11,200.00	7,016.79	10,779.99	7,007.76	133.78	119.12	89.62	-334.13	3,410.85	1,372.91	1,120.04	252.87	5.429	
11,300.00	7,016.94	10,879.98	7,007.93	136.71	122.07	89.63	-334.24	3,510.84	1,374.18	1,115.42	258.76	5.311	
11,400.00	7,017.08	10,979.98	7,008.10	139.65	125.02	89.63	-334.36	3,610.83	1,375.44	1,110.79	264.65	5.197	
11,500.00	7,017.22	11,079.97	7,008.27	142.60	127.98	89.63	-334.47	3,710.82	1,376.70	1,106.15	270.55	5.089	
11,600.00	7,017.36	11,179.96	7,008.44	145.54	130.94	89.63	-334.58	3,810.82	1,377.97	1,101.51	276.46	4.984	
11,700.00	7,017.51	11,279.95	7,008.61	148.49	133.90	89.63	-334.70	3,910.81	1,379.23	1,096.86	282.37	4.885	
11,800.00	7,017.65	11,379.94	7,008.78	151.44	136.86	89.63	-334.81	4,010.80	1,380.49	1,092.21	288.28	4.789	
11,900.00	7,017.79	11,479.94	7,008.95	154.40	139.83	89.63	-334.92	4,110.79	1,381.76	1,087.55	294.20	4.697	
12,000.00	7,017.93	11,579.93	7,009.12	157.35	142.80	89.64	-335.03	4,210.78	1,383.02	1,082.89	300.13	4.608	
12,100.00	7,018.07	11,679.92	7,009.29	160.31	145.77	89.64	-335.15	4,310.77	1,384.28	1,078.22	306.06	4.523	
12,200.00	7,018.22	11,779.91	7,009.46	163.27	148.75	89.64	-335.26	4,410.77	1,385.55	1,073.55	311.99	4.441	
12,300.00	7,018.36	11,879.90	7,009.63	166.23	151.72	89.64	-335.37	4,510.76	1,386.81	1,068.88	317.93	4.362	
12,400.00	7,018.50	11,979.90	7,009.80	169.20	154.70	89.64	-335.49	4,610.75	1,388.07	1,064.20	323.87	4.286	
12,500.00	7,018.64	12,079.89	7,009.97	172.17	157.68	89.64	-335.60	4,710.74	1,389.33	1,059.52	329.82	4.212	
12,600.00	7,018.79	12,179.88	7,010.14	175.13	160.66	89.64	-335.71	4,810.73	1,390.60	1,054.83	335.77	4.142	
12,700.00	7,018.93	12,279.87	7,010.31	178.10	163.64	89.65	-335.83	4,910.73	1,391.86	1,050.14	341.72	4.073	
12,800.00	7,019.07	12,379.86	7,010.48	181.08	166.62	89.65	-335.94	5,010.72	1,393.12	1,045.45	347.67	4.007	
12,900.00	7,019.21	12,479.86	7,010.65	184.05	169.61	89.65	-336.05	5,110.71	1,394.39	1,040.75	353.63	3.943	
13,000.00	7,019.35	12,579.85	7,010.82	187.02	172.59	89.65	-336.16	5,210.70	1,395.65	1,036.06	359.59	3.881	
13,100.00	7,019.50	12,679.84	7,010.99	190.00	175.58	89.65	-336.28	5,310.69	1,396.91	1,031.36	365.56	3.821	
13,200.00	7,019.64	12,779.83	7,011.16	192.98	178.57	89.65	-336.39	5,410.68	1,398.18	1,026.66	371.52	3.763	
13,300.00	7,019.78	12,879.82	7,011.33	195.96	181.56	89.66	-336.50	5,510.68	1,399.44	1,021.95	377.49	3.707	
13,400.00	7,019.92	12,979.82	7,011.51	198.94	184.55	89.66	-336.62	5,610.67	1,400.70	1,017.24	383.46	3.653	
13,500.00	7,020.07	13,079.81	7,011.68	201.92	187.54	89.66	-336.73	5,710.66	1,401.97	1,012.53	389.43	3.600	
13,600.00	7,020.21	13,179.80	7,011.85	204.90	190.53	89.66	-336.84	5,810.65	1,403.23	1,007.82	395.41	3.549	
13,700.00	7,020.35	13,279.79	7,012.02	207.88	193.53	89.66	-336.95	5,910.64	1,404.49	1,003.11	401.38	3.499	
13,800.00	7,020.49	13,379.78	7,012.19	210.86	196.52	89.66	-337.07	6,010.64	1,405.75	998.39	407.36	3.451	
13,900.00	7,020.63	13,479.78	7,012.36	213.85	199.52	89.66	-337.18	6,110.63	1,407.02	993.68	413.34	3.404	
14,000.00	7,020.78	13,579.77	7,012.53	216.84	202.51	89.67	-337.29	6,210.62	1,408.28	988.96	419.32	3.358	
14,100.00	7,020.92	13,679.76	7,012.70	219.82	205.51	89.67	-337.41	6,310.61	1,409.54	984.24	425.30	3.314	
14,200.00	7,021.06	13,779.75	7,012.87	222.81	208.51	89.67	-337.52	6,410.60	1,410.81	979.52	431.29	3.271	
14,300.00	7,021.20	13,879.74	7,013.04	225.80	211.51	89.67	-337.63	6,510.59	1,412.07	974.80	437.27	3.229	
14,400.00	7,021.35	13,979.74	7,013.21	228.79	214.51	89.67	-337.74	6,610.59	1,413.33	970.07	443.26	3.188	
14,500.00	7,021.49	14,079.73	7,013.38	231.78	217.50	89.67	-337.86	6,710.58	1,414.60	965.34	449.25	3.149	
14,600.00	7,021.63	14,179.72	7,013.55	234.77	220.50	89.67	-337.97	6,810.57	1,415.86	960.62	455.24	3.110	
14,700.00	7,021.77	14,279.71	7,013.72	237.76	223.51	89.68	-338.08	6,910.56	1,417.12	955.89	461.23	3.072	
14,800.00	7,021.92	14,379.70	7,013.89	240.75	226.51	89.68	-338.20	7,010.55	1,418.39	951.16	467.23	3.036	
14,900.00	7,022.06	14,479.70	7,014.06	243.74	229.51	89.68	-338.31	7,110.55	1,419.65	946.43	473.22	3.000	
15,000.00	7,022.20	14,579.69	7,014.23	246.74	232.51	89.68	-338.42	7,210.54	1,420.91	941.70	479.22	2.965	
15,100.00	7,022.34	14,679.68	7,014.40	249.73	235.51	89.68	-338.54	7,310.53	1,422.17	936.96	485.21	2.931	
15,200.00	7,022.48	14,779.67	7,014.57	252.72	238.52	89.68	-338.65	7,410.52	1,423.44	932.23	491.21	2.898	
15,300.00	7,022.63	14,879.67	7,014.74	255.72	241.52	89.68	-338.76	7,510.51	1,424.70	927.49	497.21	2.865	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #656H - OH - Plan #1													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)			
15,400.00	7,022.77	14,979.66	7,014.91	258.71	244.52	89.69	-338.87	7,610.50	1,425.96	922.76	503.21	2.834	
15,500.00	7,022.91	15,079.65	7,015.08	261.71	247.53	89.69	-338.99	7,710.50	1,427.23	918.02	509.21	2.803	
15,600.00	7,023.05	15,179.64	7,015.26	264.71	250.53	89.69	-339.10	7,810.49	1,428.49	913.28	515.21	2.773	
15,700.00	7,023.20	15,279.63	7,015.43	267.70	253.54	89.69	-339.21	7,910.48	1,429.75	908.54	521.21	2.743	
15,800.00	7,023.34	15,379.63	7,015.60	270.70	256.55	89.69	-339.33	8,010.47	1,431.02	903.80	527.21	2.714	
15,900.00	7,023.48	15,479.62	7,015.77	273.70	259.55	89.69	-339.44	8,110.46	1,432.28	899.06	533.22	2.686	
16,000.00	7,023.62	15,579.61	7,015.94	276.70	262.56	89.69	-339.55	8,210.46	1,433.54	894.32	539.22	2.659	
16,100.00	7,023.76	15,679.60	7,016.11	279.69	265.56	89.70	-339.66	8,310.45	1,434.81	889.58	545.23	2.632	
16,200.00	7,023.91	15,779.59	7,016.28	282.69	268.57	89.70	-339.78	8,410.44	1,436.07	884.84	551.23	2.605	
16,300.00	7,024.05	15,879.59	7,016.45	285.69	271.58	89.70	-339.89	8,510.43	1,437.33	880.09	557.24	2.579	
16,400.00	7,024.19	15,979.58	7,016.62	288.69	274.59	89.70	-340.00	8,610.42	1,438.59	875.35	563.25	2.554	
16,500.00	7,024.33	16,079.57	7,016.79	291.69	277.60	89.70	-340.12	8,710.41	1,439.86	870.60	569.25	2.529	
16,600.00	7,024.48	16,179.56	7,016.96	294.69	280.60	89.70	-340.23	8,810.41	1,441.12	865.86	575.26	2.505	
16,700.00	7,024.62	16,279.55	7,017.13	297.69	283.61	89.70	-340.34	8,910.40	1,442.38	861.11	581.27	2.481	
16,800.00	7,024.76	16,379.55	7,017.30	300.69	286.62	89.70	-340.46	9,010.39	1,443.65	856.37	587.28	2.458	
16,900.00	7,024.90	16,479.54	7,017.47	303.70	289.63	89.71	-340.57	9,110.38	1,444.91	851.62	593.29	2.435	
17,000.00	7,025.04	16,579.53	7,017.64	306.70	292.64	89.71	-340.68	9,210.37	1,446.17	846.87	599.30	2.413	
17,100.00	7,025.19	16,679.52	7,017.81	309.70	295.65	89.71	-340.79	9,310.37	1,447.44	842.12	605.31	2.391	
17,200.00	7,025.33	16,779.51	7,017.98	312.70	298.66	89.71	-340.91	9,410.36	1,448.70	837.37	611.33	2.370	
17,300.00	7,025.47	16,879.51	7,018.15	315.71	301.67	89.71	-341.02	9,510.35	1,449.96	832.62	617.34	2.349	
17,400.00	7,025.61	16,979.50	7,018.32	318.71	304.68	89.71	-341.13	9,610.34	1,451.23	827.87	623.35	2.328	
17,500.00	7,025.76	17,079.49	7,018.49	321.71	307.69	89.71	-341.25	9,710.33	1,452.49	823.12	629.37	2.308	
17,600.00	7,025.90	17,179.48	7,018.66	324.71	310.70	89.72	-341.36	9,810.32	1,453.75	818.37	635.38	2.288	
17,700.00	7,026.04	17,279.47	7,018.83	327.72	313.71	89.72	-341.47	9,910.32	1,455.02	813.62	641.39	2.269	
17,800.00	7,026.18	17,379.47	7,019.00	330.72	316.73	89.72	-341.58	10,010.31	1,456.28	808.87	647.41	2.249	
17,900.00	7,026.33	17,479.46	7,019.18	333.73	319.74	89.72	-341.70	10,110.30	1,457.54	804.12	653.43	2.231	
18,000.00	7,026.47	17,579.45	7,019.35	336.73	322.75	89.72	-341.81	10,210.29	1,458.80	799.36	659.44	2.212	
18,100.00	7,026.61	17,679.44	7,019.52	339.74	325.76	89.72	-341.92	10,310.28	1,460.07	794.61	665.46	2.194	
18,200.00	7,026.75	17,779.43	7,019.69	342.74	328.77	89.72	-342.04	10,410.28	1,461.33	789.86	671.47	2.176	
18,300.00	7,026.89	17,879.43	7,019.86	345.75	331.79	89.73	-342.15	10,510.27	1,462.59	785.10	677.49	2.159	
18,374.53	7,027.00	17,953.95	7,019.98	347.99	334.03	89.73	-342.23	10,584.79	1,463.54	781.56	681.98	2.146 SF	



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi												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)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.01	0.01	0.00	0.00	142.38	-17.84	13.75	22.52				
100.00	100.00	100.01	100.01	0.13	0.13	142.38	-17.84	13.75	22.52	22.25	0.27	83.757	
200.00	200.00	200.01	200.01	0.49	0.49	142.38	-17.84	13.75	22.52	21.54	0.99	22.846	
300.00	300.00	300.01	300.01	0.85	0.85	142.38	-17.84	13.75	22.52	20.82	1.70	13.227	
400.00	400.00	400.01	400.01	1.21	1.21	142.38	-17.84	13.75	22.52	20.10	2.42	9.308 CC	
400.02	400.02	400.03	400.03	1.21	1.21	142.38	-17.84	13.75	22.52	20.10	2.42	9.307 ES	
500.00	499.99	499.89	499.89	1.57	1.56	-166.57	-18.19	13.49	23.29	20.16	3.13	7.445	
600.00	599.85	599.37	599.30	1.93	1.89	-162.44	-21.00	11.47	29.48	25.66	3.83	7.708	
700.00	699.29	698.02	697.71	2.29	2.24	-157.84	-26.55	7.48	42.09	37.54	4.55	9.260	
800.00	798.04	795.33	794.50	2.67	2.58	-154.44	-34.71	1.60	61.13	55.85	5.28	11.577	
900.00	895.85	890.80	889.06	3.08	2.94	-152.14	-45.30	-6.03	86.48	80.45	6.03	14.349	
1,000.00	992.43	984.48	981.41	3.52	3.30	-150.57	-58.09	-15.25	117.88	111.10	6.78	17.383	
1,100.00	1,088.21	1,078.41	1,073.85	4.01	3.68	-150.19	-71.59	-24.97	152.20	144.66	7.53	20.201	
1,200.00	1,183.99	1,172.33	1,166.28	4.51	4.07	-149.98	-85.08	-34.69	186.53	178.23	8.29	22.493	
1,300.00	1,279.76	1,266.25	1,258.72	5.03	4.46	-149.83	-98.57	-44.41	220.86	211.79	9.06	24.365	
1,400.00	1,375.54	1,360.17	1,351.16	5.56	4.85	-149.73	-112.06	-54.13	255.19	245.34	9.85	25.917	
1,500.00	1,471.32	1,454.09	1,443.60	6.10	5.25	-149.64	-125.56	-63.85	289.52	278.88	10.64	27.220	
1,600.00	1,567.10	1,548.01	1,536.03	6.64	5.65	-149.58	-139.05	-73.56	323.85	312.42	11.43	28.326	
1,700.00	1,662.87	1,641.93	1,628.47	7.19	6.05	-149.53	-152.54	-83.28	358.19	345.95	12.23	29.277	
1,800.00	1,758.65	1,735.85	1,720.91	7.74	6.46	-149.48	-166.03	-93.00	392.52	379.48	13.04	30.100	
1,900.00	1,854.43	1,829.78	1,813.35	8.30	6.86	-149.45	-179.53	-102.72	426.85	413.00	13.85	30.820	
2,000.00	1,950.20	1,923.70	1,905.78	8.85	7.27	-149.42	-193.02	-112.44	461.19	446.52	14.66	31.454	
2,100.00	2,045.98	2,017.62	1,998.22	9.41	7.68	-149.39	-206.51	-122.16	495.52	480.04	15.48	32.017	
2,200.00	2,141.76	2,111.54	2,090.66	9.97	8.09	-149.37	-220.00	-131.88	529.85	513.56	16.29	32.519	
2,300.00	2,237.54	2,205.46	2,183.09	10.53	8.50	-149.35	-233.50	-141.60	564.19	547.07	17.11	32.970	
2,400.00	2,333.31	2,299.38	2,275.53	11.09	8.91	-149.33	-246.99	-151.32	598.52	580.59	17.93	33.376	
2,500.00	2,429.09	2,393.30	2,367.97	11.65	9.32	-149.31	-260.48	-161.04	632.85	614.10	18.75	33.745	
2,600.00	2,524.87	2,487.22	2,460.41	12.21	9.73	-149.30	-273.97	-170.76	667.19	647.61	19.58	34.080	
2,700.00	2,620.64	2,581.14	2,552.84	12.78	10.14	-149.29	-287.47	-180.48	701.52	681.12	20.40	34.387	
2,800.00	2,716.42	2,675.07	2,645.28	13.34	10.55	-149.28	-300.96	-190.20	735.86	714.63	21.23	34.668	
2,900.00	2,812.20	2,768.99	2,737.72	13.91	10.96	-149.26	-314.45	-199.91	770.19	748.14	22.05	34.927	
3,000.00	2,907.97	2,862.91	2,830.16	14.47	11.38	-149.25	-327.94	-209.63	804.52	781.65	22.88	35.166	
3,100.00	3,003.75	2,956.83	2,922.59	15.04	11.79	-149.25	-341.44	-219.35	838.86	815.15	23.71	35.387	
3,200.00	3,099.53	3,050.75	3,015.03	15.60	12.20	-149.24	-354.93	-229.07	873.19	848.66	24.53	35.592	
3,300.00	3,195.31	3,144.67	3,107.47	16.17	12.61	-149.23	-368.42	-238.79	907.53	882.16	25.36	35.784	
3,400.00	3,291.08	3,238.59	3,199.91	16.74	13.03	-149.22	-381.91	-248.51	941.86	915.67	26.19	35.962	
3,500.00	3,386.86	3,332.51	3,292.34	17.30	13.44	-149.22	-395.41	-258.23	976.19	949.17	27.02	36.129	
3,600.00	3,482.64	3,426.43	3,384.78	17.87	13.85	-149.21	-408.90	-267.95	1,010.53	982.68	27.85	36.285	
3,700.00	3,578.41	3,520.35	3,477.22	18.44	14.27	-149.20	-422.39	-277.67	1,044.86	1,016.18	28.68	36.432	
3,800.00	3,674.19	3,614.28	3,569.65	19.01	14.68	-149.20	-435.88	-287.39	1,079.20	1,049.68	29.51	36.570	
3,900.00	3,769.97	3,708.20	3,662.09	19.57	15.10	-149.19	-449.38	-297.11	1,113.53	1,083.19	30.34	36.700	
4,000.00	3,865.75	3,802.12	3,754.53	20.14	15.51	-149.19	-462.87	-306.83	1,147.86	1,116.69	31.17	36.822	
4,100.00	3,961.52	3,896.04	3,846.97	20.71	15.92	-149.19	-476.36	-316.55	1,182.20	1,150.19	32.00	36.938	
4,200.00	4,057.30	3,989.96	3,939.40	21.28	16.34	-149.18	-489.85	-326.27	1,216.53	1,183.69	32.84	37.048	
4,300.00	4,153.08	4,083.88	4,031.84	21.85	16.75	-149.18	-503.35	-335.98	1,250.87	1,217.20	33.67	37.152	
4,400.00	4,248.85	4,177.80	4,124.28	22.42	17.17	-149.17	-516.84	-345.70	1,285.20	1,250.70	34.50	37.250	
4,500.00	4,344.63	4,271.72	4,216.72	22.98	17.58	-149.17	-530.33	-355.42	1,319.53	1,284.20	35.33	37.344	
4,600.00	4,440.41	4,365.64	4,309.15	23.55	18.00	-149.17	-543.82	-365.14	1,353.87	1,317.70	36.17	37.433	
4,700.00	4,536.18	4,459.57	4,401.59	24.12	18.41	-149.16	-557.32	-374.86	1,388.20	1,351.20	37.00	37.518	
4,800.00	4,631.96	4,553.49	4,494.03	24.69	18.83	-149.16	-570.81	-384.58	1,422.54	1,384.70	37.83	37.599	
4,900.00	4,727.74	4,647.41	4,586.46	25.26	19.24	-149.16	-584.30	-394.30	1,456.87	1,418.20	38.67	37.676	
5,000.00	4,823.52	4,741.33	4,678.90	25.83	19.66	-149.15	-597.79	-404.02	1,491.20	1,451.70	39.50	37.750	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi													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	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.00	4,919.29	4,835.25	4,771.34	26.40	20.07	-149.15	-611.29	-413.74	1,525.54	1,485.20	40.34	37.820		
5,200.00	5,015.07	4,929.17	4,863.78	26.97	20.48	-149.15	-624.78	-423.46	1,559.87	1,518.70	41.17	37.888		
5,300.00	5,110.85	5,023.09	4,956.21	27.54	20.90	-149.15	-638.27	-433.18	1,594.21	1,552.20	42.01	37.952		
5,400.00	5,206.62	5,117.01	5,048.65	28.11	21.31	-149.14	-651.76	-442.90	1,628.54	1,585.70	42.84	38.014		
5,500.00	5,302.40	5,210.93	5,141.09	28.68	21.73	-149.14	-665.26	-452.62	1,662.87	1,619.20	43.68	38.073		
5,600.00	5,398.18	5,304.85	5,233.53	29.25	22.14	-149.14	-678.75	-462.33	1,697.21	1,652.70	44.51	38.130		
5,700.00	5,493.96	5,398.78	5,325.96	29.82	22.56	-149.16	-692.24	-472.05	1,731.54	1,686.19	45.35	38.185		
5,800.00	5,590.88	5,493.49	5,419.18	30.32	22.98	-163.58	-705.85	-481.85	1,763.21	1,717.05	46.16	38.200		
5,900.00	5,689.39	5,588.99	5,513.18	30.71	23.40	167.10	-719.57	-491.74	1,789.63	1,742.70	46.92	38.140		
6,000.00	5,788.43	5,684.25	5,606.93	30.99	23.82	124.84	-733.25	-501.60	1,810.71	1,763.06	47.65	38.004		
6,100.00	5,886.89	5,778.21	5,699.40	31.20	24.24	97.52	-746.75	-511.32	1,826.52	1,778.19	48.34	37.788		
6,200.00	5,983.70	5,869.85	5,789.59	31.37	24.64	85.01	-759.91	-520.80	1,837.32	1,788.31	49.01	37.492		
6,300.00	6,077.81	5,958.16	5,876.51	31.51	25.03	79.11	-772.60	-529.94	1,843.48	1,793.81	49.67	37.118		
6,400.00	6,168.18	6,042.17	5,959.19	31.66	25.40	76.34	-784.67	-538.63	1,845.53	1,795.19	50.33	36.665		
6,500.00	6,254.10	6,121.27	6,037.04	31.83	25.75	75.96	-796.03	-546.82	1,844.37	1,793.33	51.03	36.140		
6,561.73	6,306.39	6,169.29	6,084.30	31.95	25.97	76.90	-802.93	-551.79	1,843.96	1,792.47	51.49	35.810		
6,600.00	6,338.81	6,199.06	6,113.60	32.03	26.10	77.48	-807.21	-554.87	1,844.12	1,792.34	51.78	35.617		
6,700.00	6,423.53	6,276.85	6,190.17	32.25	26.44	79.00	-818.38	-562.92	1,846.00	1,793.45	52.56	35.124		
6,800.00	6,508.25	6,354.64	6,266.73	32.51	26.79	80.51	-829.56	-570.97	1,850.03	1,796.65	53.37	34.663		
6,900.00	6,592.64	6,432.07	6,342.93	32.79	27.13	81.89	-840.68	-578.98	1,856.09	1,801.87	54.22	34.232		
7,000.00	6,672.35	6,504.17	6,413.90	33.16	27.45	83.00	-851.04	-586.44	1,863.33	1,808.18	55.15	33.787		
7,100.00	6,745.32	6,568.80	6,477.51	33.63	27.73	83.98	-860.32	-593.13	1,872.12	1,815.93	56.19	33.317		
7,200.00	6,810.74	6,625.25	6,533.06	34.24	27.98	84.74	-868.43	-598.97	1,883.13	1,825.77	57.36	32.830		
7,300.00	6,867.91	6,672.89	6,579.95	35.03	28.19	85.19	-875.28	-603.90	1,896.96	1,838.29	58.66	32.336		
7,400.00	6,916.19	6,718.28	6,624.66	36.03	28.39	85.42	-881.81	-608.24	1,914.05	1,853.90	60.15	31.823		
7,500.00	6,955.06	6,778.74	6,684.43	37.26	28.63	85.89	-890.61	-609.58	1,934.33	1,872.42	61.91	31.242		
7,600.00	6,984.10	6,860.25	6,764.68	38.71	28.90	86.75	-902.55	-602.33	1,957.52	1,893.60	63.92	30.626		
7,700.00	7,002.97	7,000.66	6,898.44	40.36	29.25	88.96	-922.81	-565.84	1,982.84	1,916.65	66.20	29.954		
7,800.00	7,011.48	7,391.92	7,193.94	42.17	29.71	95.64	-969.94	-323.37	2,006.35	1,937.29	69.06	29.053		
7,900.00	7,012.10	7,824.76	7,296.49	44.11	32.06	98.13	-991.09	88.81	2,012.22	1,937.26	74.95	26.846		
8,000.00	7,012.24	7,924.73	7,295.57	46.18	33.63	98.09	-992.41	188.76	2,014.52	1,935.82	78.69	25.599		
8,100.00	7,012.38	8,024.69	7,294.65	48.36	35.43	98.05	-993.74	288.71	2,016.82	1,934.11	82.71	24.384		
8,200.00	7,012.53	8,124.66	7,293.73	50.64	37.39	98.01	-995.06	388.67	2,019.12	1,932.15	86.97	23.217		
8,300.00	7,012.67	8,224.62	7,292.81	52.99	39.49	97.97	-996.39	488.62	2,021.43	1,930.00	91.43	22.109		
8,400.00	7,012.81	8,324.58	7,291.90	55.42	41.70	97.93	-997.71	588.57	2,023.73	1,927.66	96.07	21.066		
8,500.00	7,012.95	8,424.55	7,290.98	57.91	44.02	97.89	-999.04	688.52	2,026.04	1,925.18	100.86	20.088		
8,600.00	7,013.10	8,524.51	7,290.06	60.44	46.41	97.85	-1,000.36	788.47	2,028.35	1,922.57	105.77	19.177		
8,700.00	7,013.24	8,624.47	7,289.14	63.03	48.87	97.81	-1,001.69	888.42	2,030.65	1,919.85	110.80	18.327		
8,800.00	7,013.38	8,724.44	7,288.22	65.65	51.39	97.77	-1,003.01	988.37	2,032.96	1,917.04	115.92	17.537		
8,900.00	7,013.52	8,824.40	7,287.31	68.30	53.97	97.73	-1,004.34	1,088.32	2,035.27	1,914.14	121.13	16.802		
9,000.00	7,013.66	8,924.37	7,286.39	70.99	56.58	97.70	-1,005.66	1,188.27	2,037.58	1,911.17	126.41	16.119		
9,100.00	7,013.81	9,024.33	7,285.47	73.70	59.24	97.66	-1,006.99	1,288.22	2,039.90	1,908.14	131.75	15.483		
9,200.00	7,013.95	9,124.29	7,284.55	76.44	61.93	97.62	-1,008.31	1,388.17	2,042.21	1,905.05	137.16	14.890		
9,300.00	7,014.09	9,224.26	7,283.63	79.20	64.65	97.58	-1,009.64	1,488.12	2,044.52	1,901.92	142.61	14.337		
9,400.00	7,014.23	9,324.22	7,282.71	81.97	67.39	97.54	-1,010.96	1,588.07	2,046.84	1,898.74	148.10	13.821		
9,500.00	7,014.38	9,424.18	7,281.80	84.77	70.16	97.50	-1,012.29	1,688.03	2,049.15	1,895.52	153.64	13.338		
9,600.00	7,014.52	9,524.15	7,280.88	87.58	72.95	97.46	-1,013.61	1,787.98	2,051.47	1,892.26	159.21	12.886		
9,700.00	7,014.66	9,624.11	7,279.96	90.40	75.75	97.43	-1,014.94	1,887.93	2,053.79	1,888.98	164.81	12.462		
9,800.00	7,014.80	9,724.08	7,279.04	93.23	78.58	97.39	-1,016.26	1,987.88	2,056.11	1,885.67	170.44	12.064		
9,900.00	7,014.94	9,824.04	7,278.12	96.08	81.41	97.35	-1,017.59	2,087.83	2,058.42	1,882.33	176.10	11.689		
10,000.00	7,015.09	9,924.00	7,277.21	98.94	84.26	97.31	-1,018.91	2,187.78	2,060.74	1,878.97	181.78	11.337		
10,100.00	7,015.23	10,023.97	7,276.29	101.80	87.12	97.27	-1,020.24	2,287.73	2,063.07	1,875.59	187.48	11.004		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi											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	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
10,200.00	7,015.37	10,123.93	7,275.37	104.68	90.00	97.24	-1,021.56	2,387.68	2,065.39	1,872.19	193.20	10.690
10,300.00	7,015.51	10,223.89	7,274.45	107.56	92.88	97.20	-1,022.89	2,487.63	2,067.71	1,868.77	198.94	10.394
10,400.00	7,015.66	10,323.86	7,273.53	110.45	95.77	97.16	-1,024.21	2,587.58	2,070.03	1,865.34	204.69	10.113
10,500.00	7,015.80	10,423.82	7,272.61	113.35	98.66	97.12	-1,025.54	2,687.53	2,072.36	1,861.89	210.47	9.847
10,600.00	7,015.94	10,523.79	7,271.70	116.25	101.57	97.08	-1,026.86	2,787.48	2,074.68	1,858.43	216.25	9.594
10,700.00	7,016.08	10,623.75	7,270.78	119.16	104.48	97.05	-1,028.19	2,887.43	2,077.01	1,854.96	222.05	9.354
10,800.00	7,016.23	10,723.71	7,269.86	122.07	107.40	97.01	-1,029.51	2,987.38	2,079.34	1,851.48	227.86	9.126
10,900.00	7,016.37	10,823.68	7,268.94	124.99	110.32	96.97	-1,030.83	3,087.34	2,081.67	1,847.99	233.68	8.908
11,000.00	7,016.51	10,923.64	7,268.02	127.92	113.25	96.94	-1,032.16	3,187.29	2,084.00	1,844.48	239.51	8.701
11,100.00	7,016.65	11,023.60	7,267.11	130.85	116.19	96.90	-1,033.48	3,287.24	2,086.33	1,840.97	245.35	8.503
11,200.00	7,016.79	11,123.57	7,266.19	133.78	119.13	96.86	-1,034.81	3,387.19	2,088.66	1,837.45	251.20	8.315
11,300.00	7,016.94	11,223.53	7,265.27	136.71	122.07	96.82	-1,036.13	3,487.14	2,090.99	1,833.93	257.06	8.134
11,400.00	7,017.08	11,323.50	7,264.35	139.65	125.02	96.79	-1,037.46	3,587.09	2,093.32	1,830.39	262.93	7.962
11,500.00	7,017.22	11,423.46	7,263.43	142.60	127.97	96.75	-1,038.78	3,687.04	2,095.65	1,826.85	268.80	7.796
11,600.00	7,017.36	11,523.42	7,262.51	145.54	130.92	96.71	-1,040.11	3,786.99	2,097.99	1,823.30	274.69	7.638
11,700.00	7,017.51	11,623.39	7,261.60	148.49	133.88	96.68	-1,041.43	3,886.94	2,100.32	1,819.75	280.57	7.486
11,800.00	7,017.65	11,723.35	7,260.68	151.44	136.84	96.64	-1,042.76	3,986.89	2,102.66	1,816.19	286.47	7.340
11,900.00	7,017.79	11,823.31	7,259.76	154.40	139.80	96.60	-1,044.08	4,086.84	2,105.00	1,812.63	292.37	7.200
12,000.00	7,017.93	11,923.28	7,258.84	157.35	142.76	96.57	-1,045.41	4,186.79	2,107.33	1,809.06	298.27	7.065
12,100.00	7,018.07	12,023.24	7,257.92	160.31	145.73	96.53	-1,046.73	4,286.74	2,109.67	1,805.49	304.19	6.935
12,200.00	7,018.22	12,123.21	7,257.01	163.27	148.70	96.50	-1,048.06	4,386.69	2,112.01	1,801.91	310.10	6.811
12,300.00	7,018.36	12,223.17	7,256.09	166.23	151.67	96.46	-1,049.38	4,486.65	2,114.35	1,798.33	316.02	6.690
12,400.00	7,018.50	12,323.13	7,255.17	169.20	154.65	96.42	-1,050.71	4,586.60	2,116.69	1,794.75	321.95	6.575
12,500.00	7,018.64	12,423.10	7,254.25	172.17	157.62	96.39	-1,052.03	4,686.55	2,119.04	1,791.16	327.88	6.463
12,600.00	7,018.79	12,523.06	7,253.33	175.13	160.60	96.35	-1,053.36	4,786.50	2,121.38	1,787.57	333.81	6.355
12,700.00	7,018.93	12,623.02	7,252.42	178.10	163.58	96.32	-1,054.68	4,886.46	2,123.72	1,783.97	339.75	6.251
12,800.00	7,019.07	12,722.99	7,251.50	181.08	166.56	96.28	-1,056.01	4,986.40	2,126.07	1,780.37	345.69	6.150
12,900.00	7,019.21	12,822.95	7,250.58	184.05	169.54	96.24	-1,057.33	5,086.35	2,128.41	1,776.78	351.64	6.053
13,000.00	7,019.35	12,922.91	7,249.66	187.02	172.53	96.21	-1,058.66	5,186.30	2,130.76	1,773.17	357.59	5.959
13,100.00	7,019.50	13,022.88	7,248.74	190.00	175.51	96.17	-1,059.98	5,286.25	2,133.10	1,769.57	363.54	5.868
13,200.00	7,019.64	13,122.84	7,247.82	192.98	178.50	96.14	-1,061.31	5,386.20	2,135.45	1,765.96	369.49	5.779
13,300.00	7,019.78	13,222.81	7,246.91	195.96	181.49	96.10	-1,062.63	5,486.15	2,137.80	1,762.35	375.45	5.694
13,400.00	7,019.92	13,322.77	7,245.99	198.94	184.48	96.07	-1,063.96	5,586.10	2,140.15	1,758.74	381.41	5.611
13,500.00	7,020.07	13,422.73	7,245.07	201.92	187.47	96.03	-1,065.28	5,686.05	2,142.50	1,755.13	387.37	5.531
13,600.00	7,020.21	13,522.70	7,244.15	204.90	190.46	96.00	-1,066.61	5,786.01	2,144.85	1,751.51	393.34	5.453
13,700.00	7,020.35	13,622.66	7,243.23	207.88	193.45	95.96	-1,067.93	5,885.96	2,147.20	1,747.89	399.31	5.377
13,800.00	7,020.49	13,722.62	7,242.32	210.86	196.45	95.93	-1,069.26	5,985.91	2,149.56	1,744.28	405.28	5.304
13,900.00	7,020.63	13,822.59	7,241.40	213.85	199.44	95.89	-1,070.58	6,085.86	2,151.91	1,740.66	411.25	5.233
14,000.00	7,020.78	13,922.55	7,240.48	216.84	202.44	95.86	-1,071.91	6,185.81	2,154.26	1,737.03	417.23	5.163
14,100.00	7,020.92	14,022.52	7,239.56	219.82	205.43	95.82	-1,073.23	6,285.76	2,156.62	1,733.41	423.21	5.096
14,200.00	7,021.06	14,122.48	7,238.64	222.81	208.43	95.79	-1,074.56	6,385.71	2,158.97	1,729.79	429.19	5.030
14,300.00	7,021.20	14,222.44	7,237.72	225.80	211.43	95.75	-1,075.88	6,485.66	2,161.33	1,726.16	435.17	4.967
14,400.00	7,021.35	14,322.41	7,236.81	228.79	214.43	95.72	-1,077.21	6,585.61	2,163.69	1,722.53	441.15	4.905
14,500.00	7,021.49	14,422.37	7,235.89	231.78	217.42	95.68	-1,078.53	6,685.56	2,166.05	1,718.91	447.14	4.844
14,600.00	7,021.63	14,522.33	7,234.97	234.77	220.42	95.65	-1,079.86	6,785.51	2,168.41	1,715.28	453.13	4.785
14,700.00	7,021.77	14,622.30	7,234.05	237.76	223.43	95.62	-1,081.18	6,885.46	2,170.76	1,711.65	459.12	4.728
14,800.00	7,021.92	14,722.26	7,233.13	240.75	226.43	95.58	-1,082.51	6,985.41	2,173.13	1,708.02	465.11	4.672
14,900.00	7,022.06	14,822.23	7,232.22	243.74	229.43	95.55	-1,083.83	7,085.36	2,175.49	1,704.38	471.10	4.618
15,000.00	7,022.20	14,922.19	7,231.30	246.74	232.43	95.51	-1,085.16	7,185.32	2,177.85	1,700.75	477.10	4.565
15,100.00	7,022.34	15,022.15	7,230.38	249.73	235.43	95.48	-1,086.48	7,285.27	2,180.21	1,697.12	483.09	4.513
15,200.00	7,022.48	15,122.12	7,229.46	252.72	238.44	95.44	-1,087.81	7,385.22	2,182.57	1,693.48	489.09	4.463
15,300.00	7,022.63	15,222.08	7,228.54	255.72	241.44	95.41	-1,089.13	7,485.17	2,184.94	1,689.85	495.09	4.413

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 29 - Rosa Unit #657H - OH - Plan #3 11Mar19 jcsdi													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)			
15,400.00	7,022.77	15,322.04	7,227.63	258.71	244.45	95.38	-1,090.46	7,585.12	2,187.30	1,686.21	501.09	4.365	
15,500.00	7,022.91	15,422.01	7,226.71	261.71	247.45	95.34	-1,091.78	7,685.07	2,189.67	1,682.58	507.09	4.318	
15,600.00	7,023.05	15,521.97	7,225.79	264.71	250.46	95.31	-1,093.11	7,785.02	2,192.04	1,678.94	513.10	4.272	
15,700.00	7,023.20	15,621.94	7,224.87	267.70	253.46	95.28	-1,094.43	7,884.97	2,194.40	1,675.30	519.10	4.227	
15,800.00	7,023.34	15,721.90	7,223.95	270.70	256.47	95.24	-1,095.76	7,984.92	2,196.77	1,671.67	525.11	4.183	
15,900.00	7,023.48	15,821.86	7,223.03	273.70	259.48	95.21	-1,097.08	8,084.87	2,199.14	1,668.03	531.11	4.141	
16,000.00	7,023.62	15,921.83	7,222.12	276.70	262.48	95.18	-1,098.41	8,184.82	2,201.51	1,664.39	537.12	4.099	
16,100.00	7,023.76	16,021.79	7,221.20	279.69	265.49	95.14	-1,099.73	8,284.77	2,203.88	1,660.75	543.13	4.058	
16,200.00	7,023.91	16,121.75	7,220.28	282.69	268.50	95.11	-1,101.06	8,384.72	2,206.25	1,657.11	549.14	4.018	
16,300.00	7,024.05	16,221.72	7,219.36	285.69	271.51	95.08	-1,102.38	8,484.67	2,208.62	1,653.47	555.15	3.978	
16,400.00	7,024.19	16,321.68	7,218.44	288.69	274.52	95.04	-1,103.71	8,584.63	2,211.00	1,649.83	561.17	3.940	
16,500.00	7,024.33	16,421.65	7,217.53	291.69	277.52	95.01	-1,105.03	8,684.58	2,213.37	1,646.19	567.18	3.902	
16,600.00	7,024.48	16,521.61	7,216.61	294.69	280.53	94.98	-1,106.36	8,784.53	2,215.74	1,642.55	573.19	3.866	
16,700.00	7,024.62	16,621.57	7,215.69	297.69	283.54	94.94	-1,107.68	8,884.48	2,218.12	1,638.91	579.21	3.830	
16,800.00	7,024.76	16,721.54	7,214.77	300.69	286.55	94.91	-1,109.01	8,984.43	2,220.49	1,635.27	585.23	3.794	
16,900.00	7,024.90	16,821.50	7,213.85	303.70	289.56	94.88	-1,110.33	9,084.38	2,222.87	1,631.63	591.24	3.760	
17,000.00	7,025.04	16,921.46	7,212.93	306.70	292.58	94.85	-1,111.66	9,184.33	2,225.25	1,627.98	597.26	3.726	
17,100.00	7,025.19	17,021.43	7,212.02	309.70	295.59	94.81	-1,112.98	9,284.28	2,227.62	1,624.34	603.28	3.693	
17,200.00	7,025.33	17,121.39	7,211.10	312.70	298.60	94.78	-1,114.30	9,384.23	2,230.00	1,620.70	609.30	3.660	
17,300.00	7,025.47	17,221.36	7,210.18	315.71	301.61	94.75	-1,115.63	9,484.18	2,232.38	1,617.06	615.32	3.628	
17,400.00	7,025.61	17,321.32	7,209.26	318.71	304.62	94.72	-1,116.95	9,584.13	2,234.76	1,613.42	621.34	3.597	
17,500.00	7,025.76	17,421.28	7,208.34	321.71	307.63	94.68	-1,118.28	9,684.08	2,237.14	1,609.77	627.37	3.566	
17,600.00	7,025.90	17,521.25	7,207.43	324.71	310.65	94.65	-1,119.60	9,784.03	2,239.52	1,606.13	633.39	3.536	
17,700.00	7,026.04	17,621.21	7,206.51	327.72	313.66	94.62	-1,120.93	9,883.99	2,241.90	1,602.49	639.42	3.506	
17,800.00	7,026.18	17,721.17	7,205.59	330.72	316.67	94.59	-1,122.25	9,983.94	2,244.29	1,598.85	645.44	3.477	
17,900.00	7,026.33	17,821.14	7,204.67	333.73	319.68	94.56	-1,123.58	10,083.89	2,246.67	1,595.20	651.47	3.449	
18,000.00	7,026.47	17,921.10	7,203.75	336.73	322.70	94.52	-1,124.90	10,183.84	2,249.05	1,591.56	657.49	3.421	
18,100.00	7,026.61	18,021.07	7,202.83	339.74	325.71	94.49	-1,126.23	10,283.79	2,251.44	1,587.92	663.52	3.393	
18,200.00	7,026.75	18,121.03	7,201.92	342.74	328.72	94.46	-1,127.55	10,383.74	2,253.82	1,584.28	669.55	3.366	
18,300.00	7,026.89	18,220.99	7,201.00	345.75	331.74	94.43	-1,128.88	10,483.69	2,256.21	1,580.63	675.58	3.340	
18,374.53	7,027.00	18,295.49	7,200.31	347.99	333.98	94.41	-1,129.87	10,558.18	2,257.99	1,577.92	680.07	3.320 SF	



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 25 T31N R6W Offsets - Rosa Unit #256A - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 200-MWD													Offset Well Error:	0.00 ft
Rule Assigned:													Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	-95.48	-250.72	-2,613.70	2,625.75					
100.00	100.00	96.15	96.14	0.13	0.16	-95.48	-250.68	-2,614.10	2,626.18	2,625.89	0.30	8,860.170		
200.00	200.00	177.61	177.61	0.49	0.30	-95.47	-250.59	-2,615.08	2,627.37	2,626.58	0.79	3,324.465		
300.00	300.00	272.11	272.09	0.85	0.59	-95.46	-250.34	-2,616.73	2,629.08	2,627.63	1.44	1,820.027		
400.00	400.00	371.55	371.51	1.21	0.95	-95.45	-249.72	-2,618.54	2,630.84	2,628.68	2.16	1,218.810		
500.00	499.99	473.05	472.98	1.57	1.32	-45.06	-248.87	-2,620.41	2,632.12	2,629.24	2.88	914.408		
600.00	599.85	575.30	575.22	1.93	1.68	-45.16	-248.17	-2,622.19	2,630.09	2,626.49	3.60	730.631		
700.00	699.29	680.94	680.85	2.29	2.06	-45.44	-247.54	-2,623.86	2,624.24	2,619.90	4.34	604.583		
800.00	798.04	5,395.00	3,228.41	2.67	65.04	44.84	729.35	-413.64	2,544.30	2,514.79	29.51	86.214		
900.00	895.85	5,387.12	3,228.29	3.08	64.83	59.15	725.88	-420.71	2,445.46	2,415.73	29.73	82.268		
1,000.00	992.43	5,379.46	3,228.17	3.52	64.63	79.55	722.50	-427.59	2,346.30	2,316.43	29.87	78.551		
1,100.00	1,088.21	5,370.69	3,228.04	4.01	64.39	80.27	718.64	-435.46	2,247.06	2,217.10	29.96	74.995		
1,200.00	1,183.99	5,361.80	3,227.92	4.51	64.16	79.25	714.73	-443.44	2,147.86	2,117.79	30.07	71.431		
1,300.00	1,279.76	5,352.79	3,227.80	5.03	63.92	78.16	710.76	-451.53	2,048.68	2,018.49	30.19	67.853		
1,400.00	1,375.54	5,343.65	3,227.68	5.56	63.68	76.99	706.75	-459.73	1,949.54	1,919.20	30.34	64.263		
1,500.00	1,471.32	5,336.65	3,227.60	6.10	63.49	76.05	703.67	-466.02	1,850.43	1,819.90	30.53	60.608		
1,600.00	1,567.10	5,318.98	3,227.38	6.64	63.03	73.47	695.90	-481.89	1,751.37	1,720.75	30.62	57.197		
1,700.00	1,662.87	5,302.51	3,227.12	7.19	62.59	70.80	688.63	-496.67	1,652.30	1,621.55	30.75	53.734		
1,800.00	1,758.65	5,287.11	3,226.83	7.74	62.19	68.04	681.81	-510.48	1,553.25	1,522.33	30.92	50.227		
1,900.00	1,854.43	5,272.69	3,226.52	8.30	61.81	65.19	675.40	-523.39	1,454.23	1,423.08	31.15	46.685		
2,000.00	1,950.20	5,262.56	3,226.29	8.85	61.54	63.02	670.88	-532.46	1,355.27	1,323.79	31.48	43.049		
2,100.00	2,045.98	5,254.19	3,226.10	9.41	61.32	61.12	667.16	-539.94	1,256.40	1,224.50	31.90	39.384		
2,200.00	2,141.76	5,245.68	3,225.91	9.97	61.10	59.08	663.37	-547.56	1,157.67	1,125.27	32.40	35.735		
2,300.00	2,237.54	5,237.01	3,225.73	10.53	60.87	56.90	659.51	-555.32	1,059.08	1,026.10	32.99	32.105		
2,400.00	2,333.31	5,228.19	3,225.55	11.09	60.63	54.55	655.58	-563.22	960.71	927.00	33.71	28.502		
2,500.00	2,429.09	5,219.20	3,225.37	11.65	60.40	52.04	651.59	-571.27	862.61	828.01	34.60	24.934		
2,600.00	2,524.87	5,210.05	3,225.20	12.21	60.16	49.34	647.52	-579.47	764.88	729.16	35.72	21.413		
2,700.00	2,620.64	5,204.00	3,225.09	12.78	60.00	47.50	644.84	-584.89	667.70	630.44	37.26	17.922		
2,800.00	2,716.42	5,192.64	3,224.91	13.34	59.70	43.87	639.80	-595.07	571.32	532.13	39.19	14.578		
2,900.00	2,812.20	5,183.69	3,224.79	13.91	59.46	40.89	635.85	-603.10	476.25	434.28	41.98	11.345		
3,000.00	2,907.97	5,174.25	3,224.69	14.47	59.21	37.64	631.70	-611.58	383.45	337.39	46.06	8.324		
3,100.00	3,003.75	5,164.28	3,224.60	15.04	58.95	34.11	627.34	-620.54	295.03	242.70	52.33	5.638		
3,200.00	3,099.53	5,153.74	3,224.55	15.60	58.67	30.28	622.74	-630.03	216.38	154.58	61.80	3.501		
3,300.00	3,195.31	5,142.56	3,224.52	16.17	58.38	26.16	617.88	-640.09	162.31	91.16	71.15	2.281		
3,353.81	3,246.84	5,136.14	3,224.52	16.48	58.21	23.77	615.10	-645.88	153.26	83.40	69.87	2.194 CC, ES, SF		
3,400.00	3,291.08	5,130.42	3,224.53	16.74	58.06	21.65	612.62	-651.04	159.97	96.89	63.08	2.536		
3,500.00	3,386.86	5,117.43	3,224.59	17.30	57.71	16.87	607.00	-662.75	211.02	167.54	43.48	4.853		
3,600.00	3,482.64	5,103.57	3,224.71	17.87	57.35	11.87	601.01	-675.24	288.32	257.17	31.15	9.256		
3,700.00	3,578.41	5,088.75	3,224.91	18.44	56.96	6.72	594.60	-688.61	375.97	350.49	25.48	14.754		
3,800.00	3,674.19	5,072.82	3,225.20	19.01	56.54	1.49	587.72	-702.97	468.14	444.94	23.20	20.175		
3,900.00	3,769.97	5,055.75	3,225.60	19.57	56.09	-3.73	580.33	-718.35	562.58	540.14	22.44	25.071		
4,000.00	3,865.75	5,037.52	3,226.13	20.14	55.61	-8.81	572.39	-734.75	658.28	635.96	22.31	29.500		
4,100.00	3,961.52	5,018.03	3,226.82	20.71	55.09	-13.70	563.87	-752.27	754.72	732.26	22.45	33.613		
4,200.00	4,057.30	5,001.08	3,227.48	21.28	54.65	-17.51	556.44	-767.49	851.64	828.94	22.70	37.519		
4,300.00	4,153.08	4,984.49	3,228.15	21.85	54.21	-20.85	549.19	-782.40	948.93	925.95	22.97	41.303		
4,400.00	4,248.85	4,967.66	3,228.84	22.42	53.77	-23.90	541.86	-797.53	1,046.48	1,023.23	23.25	45.012		
4,500.00	4,344.63	4,951.00	3,229.54	22.98	53.33	-26.61	534.62	-812.52	1,144.21	1,120.70	23.51	48.668		
4,600.00	4,440.41	4,938.11	3,230.06	23.55	52.99	-28.51	529.04	-824.12	1,242.12	1,218.35	23.77	52.266		
4,700.00	4,536.18	4,925.93	3,230.52	24.12	52.67	-30.17	523.78	-835.10	1,340.19	1,316.18	24.01	55.828		
4,800.00	4,631.96	4,914.12	3,230.93	24.69	52.36	-31.66	518.70	-845.75	1,438.39	1,414.16	24.23	59.359		
4,900.00	4,727.74	4,902.66	3,231.30	25.26	52.06	-33.00	513.78	-856.10	1,536.71	1,512.27	24.45	62.862		
5,000.00	4,823.52	4,887.00	3,231.75	25.83	51.65	-34.69	507.07	-870.24	1,635.14	1,610.51	24.63	66.383		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 25 T31N R6W Offsets - Rosa Unit #256A - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 200-MWD													Offset Well Error:	0.00 ft
Rule Assigned:														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.00	4,919.29	4,887.00	3,231.75	26.40	51.65	-34.69	507.07	-870.24	1,733.66	1,708.79	24.87	69.708		
5,200.00	5,015.07	4,870.64	3,232.14	26.97	51.21	-36.27	500.17	-885.08	1,832.23	1,807.20	25.03	73.198		
5,300.00	5,110.85	4,860.60	3,232.32	27.54	50.94	-37.16	496.04	-894.22	1,930.89	1,905.68	25.21	76.589		
5,400.00	5,206.62	4,850.79	3,232.47	28.11	50.68	-37.96	492.07	-903.19	2,029.60	2,004.22	25.39	79.952		
5,500.00	5,302.40	4,841.20	3,232.57	28.68	50.43	-38.69	488.25	-911.99	2,128.38	2,102.82	25.55	83.287		
5,600.00	5,398.18	4,823.00	3,232.68	29.25	49.94	-39.95	481.20	-928.76	2,227.23	2,201.55	25.67	86.762		
5,700.00	5,493.96	4,823.00	3,232.68	29.82	49.94	-40.47	481.20	-928.76	2,326.07	2,300.18	25.89	89.858		
5,800.00	5,590.88	4,823.00	3,232.68	30.32	49.94	-79.17	481.20	-928.76	2,425.54	2,399.46	26.08	93.011		
5,900.00	5,689.39	4,823.00	3,232.68	30.71	49.94	134.20	481.20	-928.76	2,525.44	2,499.22	26.22	96.327		
6,000.00	5,788.43	4,823.00	3,232.68	30.99	49.94	77.81	481.20	-928.76	2,624.69	2,598.39	26.31	99.761		
6,100.00	5,886.89	4,823.00	3,232.68	31.20	49.94	46.67	481.20	-928.76	2,722.34	2,695.98	26.37	103.256		
6,200.00	5,983.70	4,845.47	3,232.53	31.37	50.54	31.12	489.94	-908.07	2,817.39	2,790.86	26.53	106.183		
6,300.00	6,077.81	4,864.20	3,232.26	31.51	51.04	22.98	497.52	-890.94	2,909.04	2,882.38	26.66	109.119		
6,400.00	6,168.18	4,887.00	3,231.75	31.66	51.65	18.01	507.07	-870.24	2,996.48	2,969.68	26.80	111.800		
6,500.00	6,254.10	4,912.81	3,230.97	31.83	52.33	15.45	518.13	-846.93	3,079.33	3,052.36	26.97	114.172		
6,600.00	6,338.81	4,951.00	3,229.54	32.03	53.33	14.70	534.62	-812.52	3,161.51	3,134.25	27.26	115.965		
6,700.00	6,423.53	4,982.08	3,228.25	32.25	54.15	14.10	548.14	-784.56	3,244.20	3,216.66	27.54	117.798		
6,800.00	6,508.25	5,231.88	3,225.62	32.51	60.73	9.75	657.22	-559.92	3,326.07	3,296.74	29.33	113.391		
6,900.00	6,592.64	5,283.37	3,226.76	32.79	62.09	8.54	680.15	-513.82	3,406.08	3,376.26	29.82	114.233		
7,000.00	6,672.35	5,316.23	3,227.34	33.16	62.96	7.16	694.69	-484.36	3,481.57	3,451.40	30.17	115.388		
7,100.00	6,745.32	5,380.71	3,228.19	33.63	64.66	5.79	723.05	-426.46	3,550.53	3,519.73	30.80	115.266		
7,200.00	6,810.74	5,422.31	3,228.74	34.24	65.76	4.94	741.37	-389.12	3,612.06	3,580.75	31.30	115.386		
7,300.00	6,867.91	5,459.00	3,228.80	35.03	66.73	4.31	757.39	-356.11	3,666.25	3,634.42	31.82	115.212		
7,400.00	6,916.19	5,523.00	3,228.75	36.03	68.43	3.58	785.55	-298.64	3,712.11	3,679.50	32.61	113.849		
7,500.00	6,955.06	5,586.00	3,228.27	37.26	70.10	2.98	812.76	-241.82	3,749.49	3,716.04	33.45	112.105		
7,600.00	6,984.10	5,758.84	3,228.43	38.71	74.78	1.81	881.89	-83.43	3,776.80	3,741.59	35.21	107.251		
7,700.00	7,002.97	5,817.35	3,228.98	40.36	76.37	1.44	904.49	-29.46	3,793.60	3,757.46	36.14	104.961		
7,800.00	7,011.48	5,897.97	3,229.12	42.17	78.59	0.99	934.05	45.54	3,801.08	3,763.78	37.30	101.904		
7,900.00	7,012.10	5,997.59	3,229.15	44.11	81.36	0.52	966.76	139.63	3,801.20	3,762.55	38.65	98.352		
8,000.00	7,012.24	6,095.00	3,230.11	46.18	84.07	0.05	998.75	231.63	3,800.18	3,760.15	40.02	94.945		
8,013.59	7,012.26	6,095.00	3,230.11	46.48	84.07	0.05	998.75	231.63	3,800.15	3,760.04	40.11	94.739		
8,100.00	7,012.38	6,095.00	3,230.11	48.36	84.07	0.05	998.75	231.63	3,801.13	3,760.45	40.68	93.434		
8,200.00	7,012.53	6,095.00	3,230.11	50.64	84.07	0.05	998.75	231.63	3,804.72	3,763.33	41.40	91.910		
8,300.00	7,012.67	6,095.00	3,230.11	52.99	84.07	0.05	998.75	231.63	3,810.93	3,768.77	42.16	90.398		
8,400.00	7,012.81	6,095.00	3,230.11	55.42	84.07	0.05	998.75	231.63	3,819.75	3,776.79	42.96	88.916		
8,500.00	7,012.95	6,095.00	3,230.11	57.91	84.07	0.05	998.75	231.63	3,831.16	3,787.36	43.80	87.479		
8,600.00	7,013.10	6,095.00	3,230.11	60.44	84.07	0.05	998.75	231.63	3,845.13	3,800.47	44.66	86.101		
8,700.00	7,013.24	6,095.00	3,230.11	63.03	84.07	0.05	998.75	231.63	3,861.65	3,816.10	45.54	84.789		
8,800.00	7,013.38	6,095.00	3,230.11	65.65	84.07	0.05	998.75	231.63	3,880.67	3,834.22	46.45	83.553		
8,900.00	7,013.52	6,095.00	3,230.11	68.30	84.07	0.05	998.75	231.63	3,902.16	3,854.81	47.36	82.395		
9,000.00	7,013.66	6,095.00	3,230.11	70.99	84.07	0.05	998.75	231.63	3,926.09	3,877.81	48.28	81.319		
9,100.00	7,013.81	6,095.00	3,230.11	73.70	84.07	0.05	998.75	231.63	3,952.40	3,903.19	49.20	80.328		
9,200.00	7,013.95	6,095.00	3,230.11	76.44	84.07	0.05	998.75	231.63	3,981.05	3,930.92	50.13	79.420		
9,300.00	7,014.09	6,095.00	3,230.11	79.20	84.07	0.05	998.75	231.63	4,011.98	3,960.94	51.05	78.597		
9,400.00	7,014.23	6,095.00	3,230.11	81.97	84.07	0.05	998.75	231.63	4,045.16	3,993.20	51.96	77.856		
9,500.00	7,014.38	6,095.00	3,230.11	84.77	84.07	0.05	998.75	231.63	4,080.51	4,027.65	52.86	77.196		
9,600.00	7,014.52	6,095.00	3,230.11	87.58	84.07	0.05	998.75	231.63	4,117.99	4,064.24	53.75	76.615		
9,700.00	7,014.66	6,095.00	3,230.11	90.40	84.07	0.05	998.75	231.63	4,157.54	4,102.92	54.62	76.111		
9,800.00	7,014.80	6,095.00	3,230.11	93.23	84.07	0.05	998.75	231.63	4,199.10	4,143.61	55.48	75.680		
9,900.00	7,014.94	6,095.00	3,230.11	96.08	84.07	0.05	998.75	231.63	4,242.61	4,186.28	56.33	75.321		
10,000.00	7,015.09	6,095.00	3,230.11	98.94	84.07	0.05	998.75	231.63	4,288.01	4,230.86	57.15	75.030		
10,100.00	7,015.23	6,095.00	3,230.11	101.80	84.07	0.05	998.75	231.63	4,335.24	4,277.28	57.95	74.804		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 25 T31N R6W Offsets - Rosa Unit #256A - OH - OH													Offset Site Error:	0.00 ft	
Survey Program:		200-MWD		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		
10,200.00	7,015.37	6,095.00	3,230.11	104.68	84.07	0.05	998.75	231.63	4,384.24	4,325.50	58.74	74.641			
10,300.00	7,015.51	6,095.00	3,230.11	107.56	84.07	0.05	998.75	231.63	4,434.96	4,375.46	59.50	74.537			
10,400.00	7,015.66	6,095.00	3,230.11	110.45	84.07	0.05	998.75	231.63	4,487.33	4,427.09	60.24	74.490			
10,500.00	7,015.80	6,095.00	3,230.11	113.35	84.07	0.05	998.75	231.63	4,541.30	4,480.34	60.96	74.497			
10,600.00	7,015.94	6,095.00	3,230.11	116.25	84.07	0.05	998.75	231.63	4,596.81	4,535.16	61.66	74.555			
10,700.00	7,016.08	6,095.00	3,230.11	119.16	84.07	0.05	998.75	231.63	4,653.81	4,591.48	62.33	74.662			
10,800.00	7,016.23	6,095.00	3,230.11	122.07	84.07	0.05	998.75	231.63	4,712.25	4,649.26	62.99	74.815			
10,900.00	7,016.37	6,095.00	3,230.11	124.99	84.07	0.05	998.75	231.63	4,772.06	4,708.44	63.62	75.013			
11,000.00	7,016.51	6,095.00	3,230.11	127.92	84.07	0.05	998.75	231.63	4,833.20	4,768.97	64.23	75.252			
11,100.00	7,016.65	6,095.00	3,230.11	130.85	84.07	0.05	998.75	231.63	4,895.62	4,830.81	64.82	75.531			
11,200.00	7,016.79	6,095.00	3,230.11	133.78	84.07	0.05	998.75	231.63	4,959.27	4,893.89	65.38	75.847			
11,300.00	7,016.94	6,095.00	3,230.11	136.71	84.07	0.05	998.75	231.63	5,024.11	4,958.18	65.93	76.200			
11,400.00	7,017.08	6,095.00	3,230.11	139.65	84.07	0.05	998.75	231.63	5,090.08	5,023.62	66.46	76.586			
11,500.00	7,017.22	6,095.00	3,230.11	142.60	84.07	0.05	998.75	231.63	5,157.15	5,090.18	66.97	77.004			
11,600.00	7,017.36	6,095.00	3,230.11	145.54	84.07	0.05	998.75	231.63	5,225.28	5,157.81	67.46	77.452			
11,700.00	7,017.51	6,095.00	3,230.11	148.49	84.07	0.05	998.75	231.63	5,294.41	5,226.47	67.94	77.930			
11,800.00	7,017.65	6,095.00	3,230.11	151.44	84.07	0.05	998.75	231.63	5,364.52	5,296.13	68.39	78.435			
11,900.00	7,017.79	6,095.00	3,230.11	154.40	84.07	0.05	998.75	231.63	5,435.57	5,366.73	68.83	78.966			
12,000.00	7,017.93	6,095.00	3,230.11	157.35	84.07	0.05	998.75	231.63	5,507.51	5,438.25	69.26	79.521			
12,100.00	7,018.07	6,095.00	3,230.11	160.31	84.07	0.05	998.75	231.63	5,580.32	5,510.65	69.67	80.100			
12,200.00	7,018.22	6,095.00	3,230.11	163.27	84.07	0.05	998.75	231.63	5,653.96	5,583.90	70.06	80.701			
12,300.00	7,018.36	6,095.00	3,230.11	166.23	84.07	0.05	998.75	231.63	5,728.40	5,657.96	70.44	81.324			
12,400.00	7,018.50	6,095.00	3,230.11	169.20	84.07	0.05	998.75	231.63	5,803.60	5,732.80	70.80	81.966			
12,500.00	7,018.64	6,095.00	3,230.11	172.17	84.07	0.05	998.75	231.63	5,879.55	5,808.39	71.16	82.628			
12,600.00	7,018.79	6,095.00	3,230.11	175.13	84.07	0.05	998.75	231.63	5,956.20	5,884.71	71.50	83.308			
12,700.00	7,018.93	6,095.00	3,230.11	178.10	84.07	0.05	998.75	231.63	6,033.54	5,961.72	71.82	84.005			
12,800.00	7,019.07	6,095.00	3,230.11	181.08	84.07	0.05	998.75	231.63	6,111.54	6,039.40	72.14	84.718			
12,900.00	7,019.21	6,095.00	3,230.11	184.05	84.07	0.05	998.75	231.63	6,190.17	6,117.73	72.44	85.447			
13,000.00	7,019.35	6,095.00	3,230.11	187.02	84.07	0.05	998.75	231.63	6,269.41	6,196.67	72.74	86.191			
13,100.00	7,019.50	6,095.00	3,230.11	190.00	84.07	0.05	998.75	231.63	6,349.23	6,276.21	73.02	86.949			
13,200.00	7,019.64	6,095.00	3,230.11	192.98	84.07	0.05	998.75	231.63	6,429.62	6,356.33	73.30	87.720			
13,300.00	7,019.78	6,095.00	3,230.11	195.96	84.07	0.05	998.75	231.63	6,510.56	6,436.99	73.56	88.504			
13,400.00	7,019.92	6,095.00	3,230.11	198.94	84.07	0.05	998.75	231.63	6,592.01	6,518.19	73.82	89.300			
13,500.00	7,020.07	6,095.00	3,230.11	201.92	84.07	0.05	998.75	231.63	6,673.97	6,599.91	74.07	90.108			
13,600.00	7,020.21	6,095.00	3,230.11	204.90	84.07	0.05	998.75	231.63	6,756.42	6,682.11	74.31	90.927			
13,700.00	7,020.35	6,095.00	3,230.11	207.88	84.07	0.05	998.75	231.63	6,839.33	6,764.79	74.54	91.756			
13,800.00	7,020.49	6,095.00	3,230.11	210.86	84.07	0.05	998.75	231.63	6,922.70	6,847.94	74.76	92.595			
13,900.00	7,020.63	6,095.00	3,230.11	213.85	84.07	0.05	998.75	231.63	7,006.50	6,931.52	74.98	93.444			
14,000.00	7,020.78	6,095.00	3,230.11	216.84	84.07	0.05	998.75	231.63	7,090.72	7,015.53	75.19	94.302			
14,100.00	7,020.92	6,095.00	3,230.11	219.82	84.07	0.05	998.75	231.63	7,175.35	7,099.95	75.40	95.168			
14,200.00	7,021.06	6,095.00	3,230.11	222.81	84.07	0.05	998.75	231.63	7,260.36	7,184.77	75.59	96.043			
14,300.00	7,021.20	6,095.00	3,230.11	225.80	84.07	0.05	998.75	231.63	7,345.76	7,269.97	75.79	96.926			
14,400.00	7,021.35	6,095.00	3,230.11	228.79	84.07	0.05	998.75	231.63	7,431.52	7,355.54	75.97	97.815			
14,500.00	7,021.49	6,095.00	3,230.11	231.78	84.07	0.05	998.75	231.63	7,517.63	7,441.47	76.16	98.712			
14,600.00	7,021.63	6,095.00	3,230.11	234.77	84.07	0.05	998.75	231.63	7,604.08	7,527.75	76.33	99.616			
14,700.00	7,021.77	6,095.00	3,230.11	237.76	84.07	0.05	998.75	231.63	7,690.86	7,614.35	76.51	100.526			
14,800.00	7,021.92	6,095.00	3,230.11	240.75	84.07	0.05	998.75	231.63	7,777.96	7,701.28	76.67	101.442			
14,900.00	7,022.06	6,095.00	3,230.11	243.74	84.07	0.05	998.75	231.63	7,865.36	7,788.52	76.84	102.364			
15,000.00	7,022.20	6,095.00	3,230.11	246.74	84.07	0.05	998.75	231.63	7,953.06	7,876.06	77.00	103.292			
15,100.00	7,022.34	6,095.00	3,230.11	249.73	84.07	0.05	998.75	231.63	8,041.05	7,963.90	77.15	104.225			
15,200.00	7,022.48	6,095.00	3,230.11	252.72	84.07	0.05	998.75	231.63	8,129.31	8,052.01	77.30	105.163			
15,300.00	7,022.63	6,095.00	3,230.11	255.72	84.07	0.05	998.75	231.63	8,217.85	8,140.40	77.45	106.105			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 25 T31N R6W Offsets - Rosa Unit #256A - OH - OH												Offset Site Error:	0.00 ft
Survey Program: 200-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
15,400.00	7,022.77	6,095.00	3,230.11	258.71	84.07	0.05	998.75	231.63	8,306.64	8,229.05	77.59	107.052	
15,500.00	7,022.91	6,095.00	3,230.11	261.71	84.07	0.05	998.75	231.63	8,395.69	8,317.95	77.74	108.003	
15,600.00	7,023.05	6,095.00	3,230.11	264.71	84.07	0.05	998.75	231.63	8,484.98	8,407.10	77.87	108.959	
15,700.00	7,023.20	6,095.00	3,230.11	267.70	84.07	0.05	998.75	231.63	8,574.50	8,496.50	78.01	109.918	
15,800.00	7,023.34	6,095.00	3,230.11	270.70	84.07	0.05	998.75	231.63	8,664.26	8,586.12	78.14	110.881	
15,900.00	7,023.48	6,095.00	3,230.11	273.70	84.07	0.05	998.75	231.63	8,754.24	8,675.97	78.27	111.847	
16,000.00	7,023.62	6,095.00	3,230.11	276.70	84.07	0.05	998.75	231.63	8,844.43	8,766.04	78.40	112.817	
16,100.00	7,023.76	6,095.00	3,230.11	279.69	84.07	0.05	998.75	231.63	8,934.83	8,856.31	78.52	113.789	
16,200.00	7,023.91	6,095.00	3,230.11	282.69	84.07	0.05	998.75	231.63	9,025.44	8,946.80	78.64	114.765	
16,300.00	7,024.05	6,095.00	3,230.11	285.69	84.07	0.05	998.75	231.63	9,116.24	9,037.48	78.76	115.743	
16,400.00	7,024.19	6,095.00	3,230.11	288.69	84.07	0.05	998.75	231.63	9,207.23	9,128.35	78.88	116.724	
16,500.00	7,024.33	6,095.00	3,230.11	291.69	84.07	0.05	998.75	231.63	9,298.41	9,219.41	79.00	117.707	
16,600.00	7,024.48	6,095.00	3,230.11	294.69	84.07	0.05	998.75	231.63	9,389.76	9,310.65	79.11	118.692	
16,700.00	7,024.62	6,095.00	3,230.11	297.69	84.07	0.05	998.75	231.63	9,481.30	9,402.07	79.22	119.680	
16,800.00	7,024.76	6,095.00	3,230.11	300.69	84.07	0.05	998.75	231.63	9,573.00	9,493.66	79.33	120.670	
16,900.00	7,024.90	6,095.00	3,230.11	303.70	84.07	0.05	998.75	231.63	9,664.86	9,585.42	79.44	121.661	
17,000.00	7,025.04	6,095.00	3,230.11	306.70	84.07	0.05	998.75	231.63	9,756.89	9,677.34	79.55	122.654	
17,100.00	7,025.19	6,095.00	3,230.11	309.70	84.07	0.05	998.75	231.63	9,849.07	9,769.41	79.65	123.649	
17,200.00	7,025.33	6,095.00	3,230.11	312.70	84.07	0.05	998.75	231.63	9,941.40	9,861.64	79.76	124.646	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 29 T31N R5W Offsets - Rosa Unit #229 - OH - OH														Offset Site Error:	0.00 ft
Survey Program: 241-INCLINOMETER, 2750-MWD														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)					
0.00	0.00	55.00	55.00	0.00	0.79	114.78	-2,389.12	5,174.82	5,699.71						
100.00	100.00	155.00	155.00	0.13	2.22	114.78	-2,389.12	5,174.82	5,699.71	5,697.36	2.35	2,424.085			
200.00	200.00	255.00	255.00	0.49	3.87	114.78	-2,389.12	5,174.82	5,699.71	5,695.34	4.36	1,305.795			
300.00	300.00	5,922.00	3,297.25	0.85	93.38	84.48	469.44	4,857.59	5,698.55	5,616.38	82.16	69.356			
400.00	400.00	5,922.00	3,297.25	1.21	93.38	84.48	469.44	4,857.59	5,647.56	5,564.55	83.01	68.034			
500.00	499.99	5,904.44	3,297.58	1.57	93.20	135.64	451.94	4,858.99	5,598.25	5,514.53	83.72	66.868			
600.00	599.85	5,922.00	3,297.25	1.93	93.38	136.49	469.44	4,857.59	5,553.33	5,468.54	84.79	65.498			
700.00	699.29	5,922.00	3,297.25	2.29	93.38	137.38	469.44	4,857.59	5,513.26	5,427.54	85.72	64.317			
800.00	798.04	5,922.00	3,297.25	2.67	93.38	138.14	469.44	4,857.59	5,478.31	5,391.62	86.69	63.195			
900.00	895.85	5,922.00	3,297.25	3.08	93.38	138.75	469.44	4,857.59	5,448.69	5,361.00	87.69	62.137			
1,000.00	992.43	5,922.00	3,297.25	3.52	93.38	139.24	469.44	4,857.59	5,424.56	5,335.84	88.72	61.145			
1,100.00	1,088.21	5,922.00	3,297.25	4.01	93.38	139.27	469.44	4,857.59	5,404.37	5,314.61	89.76	60.208			
1,200.00	1,183.99	5,922.00	3,297.25	4.51	93.38	139.27	469.44	4,857.59	5,385.98	5,295.16	90.81	59.310			
1,300.00	1,279.76	5,945.67	3,296.69	5.03	93.62	139.02	493.05	4,855.89	5,369.25	5,277.15	92.09	58.304			
1,400.00	1,375.54	5,952.42	3,296.51	5.56	93.69	138.95	499.77	4,855.44	5,354.37	5,261.19	93.19	57.458			
1,500.00	1,471.32	5,959.01	3,296.33	6.10	93.76	138.88	506.35	4,855.02	5,341.31	5,247.05	94.27	56.663			
1,600.00	1,567.10	5,965.46	3,296.14	6.64	93.83	138.81	512.78	4,854.63	5,330.08	5,234.75	95.32	55.916			
1,700.00	1,662.87	5,985.00	3,295.50	7.19	94.03	138.60	532.28	4,853.54	5,320.72	5,224.22	96.50	55.139			
1,800.00	1,758.65	5,985.00	3,295.50	7.74	94.03	138.60	532.28	4,853.54	5,313.14	5,215.69	97.44	54.527			
1,900.00	1,854.43	5,985.00	3,295.50	8.30	94.03	138.60	532.28	4,853.54	5,307.42	5,209.06	98.36	53.960			
2,000.00	1,950.20	6,050.49	3,293.76	8.85	94.70	137.91	597.63	4,849.67	5,303.51	5,203.56	99.95	53.060			
2,100.00	2,045.98	6,123.53	3,293.05	9.41	95.47	137.13	670.47	4,844.31	5,301.23	5,199.61	101.61	52.170			
2,174.68	2,117.51	6,104.64	3,293.16	9.83	95.27	137.33	651.64	4,845.76	5,300.68	5,198.64	102.04	51.948			
2,200.00	2,141.76	6,109.40	3,293.10	9.97	95.32	137.28	656.38	4,845.42	5,300.74	5,198.44	102.30	51.816			
2,300.00	2,237.54	6,133.65	3,292.98	10.53	95.58	137.02	680.57	4,843.57	5,302.05	5,198.67	103.38	51.288			
2,400.00	2,333.31	6,143.61	3,292.93	11.09	95.69	136.92	690.50	4,842.84	5,305.23	5,200.96	104.26	50.883			
2,500.00	2,429.09	6,153.48	3,292.87	11.65	95.79	136.81	700.34	4,842.14	5,310.26	5,205.14	105.12	50.517			
2,600.00	2,524.87	6,175.00	3,292.73	12.21	96.02	136.58	721.81	4,840.66	5,317.15	5,211.08	106.07	50.128			
2,700.00	2,620.64	6,175.00	3,292.73	12.78	96.02	136.58	721.81	4,840.66	5,325.83	5,219.08	106.74	49.893			
2,800.00	2,716.42	6,175.00	3,292.73	13.34	96.02	136.58	721.81	4,840.66	5,336.36	5,228.98	107.38	49.694			
2,900.00	2,812.20	6,175.00	3,292.73	13.91	96.02	136.58	721.81	4,840.66	5,348.75	5,240.76	107.99	49.532			
3,000.00	2,907.97	6,197.31	3,292.66	14.47	96.26	136.35	744.08	4,839.24	5,362.86	5,254.05	108.81	49.285			
3,100.00	3,003.75	6,205.63	3,292.67	15.04	96.35	136.26	752.38	4,838.74	5,378.81	5,269.37	109.44	49.148			
3,200.00	3,099.53	6,214.13	3,292.70	15.60	96.45	136.17	760.86	4,838.25	5,396.53	5,286.50	110.04	49.043			
3,300.00	3,195.31	6,239.00	3,292.93	16.17	96.71	135.91	785.70	4,836.90	5,416.07	5,305.28	110.79	48.885			
3,400.00	3,291.08	6,239.00	3,292.93	16.74	96.71	135.91	785.70	4,836.90	5,437.24	5,326.03	111.22	48.888			
3,500.00	3,386.86	6,239.00	3,292.93	17.30	96.71	135.91	785.70	4,836.90	5,460.17	5,348.56	111.61	48.923			
3,600.00	3,482.64	6,239.00	3,292.93	17.87	96.71	135.91	785.70	4,836.90	5,484.82	5,372.85	111.96	48.987			
3,700.00	3,578.41	6,260.19	3,293.17	18.44	96.94	135.68	806.86	4,835.86	5,511.08	5,398.54	112.54	48.970			
3,800.00	3,674.19	6,269.56	3,293.25	19.01	97.04	135.58	816.23	4,835.43	5,539.02	5,426.08	112.94	49.043			
3,900.00	3,769.97	6,278.76	3,293.31	19.57	97.14	135.49	825.42	4,835.02	5,568.59	5,455.28	113.31	49.144			
4,000.00	3,865.75	6,588.72	3,295.76	20.14	100.63	132.23	1,134.54	4,813.94	5,599.55	5,482.15	117.40	47.697			
4,100.00	3,961.52	6,609.46	3,295.93	20.71	100.88	132.01	1,155.18	4,811.97	5,631.16	5,513.29	117.87	47.774			
4,200.00	4,057.30	6,630.62	3,296.11	21.28	101.13	131.79	1,176.24	4,809.96	5,664.28	5,545.96	118.32	47.872			
4,300.00	4,153.08	6,644.00	3,296.22	21.85	101.29	131.65	1,189.56	4,808.69	5,698.89	5,580.26	118.64	48.035			
4,400.00	4,248.85	6,644.00	3,296.22	22.42	101.29	131.65	1,189.56	4,808.69	5,735.02	5,616.27	118.76	48.292			
4,500.00	4,344.63	6,644.00	3,296.22	22.98	101.29	131.65	1,189.56	4,808.69	5,772.66	5,653.81	118.85	48.572			
4,600.00	4,440.41	6,644.00	3,296.22	23.55	101.29	131.65	1,189.56	4,808.69	5,811.77	5,692.86	118.91	48.875			
4,700.00	4,536.18	6,644.00	3,296.22	24.12	101.29	131.65	1,189.56	4,808.69	5,852.34	5,733.39	118.95	49.201			
4,800.00	4,631.96	6,644.00	3,296.22	24.69	101.29	131.65	1,189.56	4,808.69	5,894.31	5,775.36	118.96	49.550			
4,900.00	4,727.74	6,644.00	3,296.22	25.26	101.29	131.65	1,189.56	4,808.69	5,937.68	5,818.73	118.94	49.920			
5,000.00	4,823.52	6,644.00	3,296.22	25.83	101.29	131.65	1,189.56	4,808.69	5,982.40	5,863.49	118.91	50.311			

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 29 T31N R5W Offsets - Rosa Unit #229 - OH - OH												Offset Site Error:	0.00 ft
Survey Program: 241-INCLINOMETER, 2750-MWD												Offset Well Error:	0.00 ft
Reference												Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
							+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
5,100.00	4,919.29	6,644.00	3,296.22	26.40	101.29	131.65	1,189.56	4,808.69	6,028.45	5,909.60	118.85	50.722	
5,200.00	5,015.07	6,644.00	3,296.22	26.97	101.29	131.65	1,189.56	4,808.69	6,075.80	5,957.03	118.77	51.154	
5,300.00	5,110.85	6,644.00	3,296.22	27.54	101.29	131.65	1,189.56	4,808.69	6,124.42	6,005.74	118.68	51.605	
5,400.00	5,206.62	6,644.00	3,296.22	28.11	101.29	131.65	1,189.56	4,808.69	6,174.27	6,055.70	118.56	52.075	
5,500.00	5,302.40	6,644.00	3,296.22	28.68	101.29	131.65	1,189.56	4,808.69	6,225.33	6,106.89	118.43	52.564	
5,600.00	5,398.18	6,644.00	3,296.22	29.25	101.29	131.65	1,189.56	4,808.69	6,277.56	6,159.28	118.29	53.071	
5,700.00	5,493.96	6,644.00	3,296.22	29.82	101.29	131.71	1,189.56	4,808.69	6,330.94	6,212.82	118.12	53.596	
5,800.00	5,590.88	6,644.00	3,296.22	30.32	101.29	119.92	1,189.56	4,808.69	6,381.45	6,263.54	117.90	54.124	
5,900.00	5,689.39	6,644.00	3,296.22	30.71	101.29	92.44	1,189.56	4,808.69	6,424.42	6,306.82	117.60	54.630	
6,000.00	5,788.43	6,644.00	3,296.22	30.99	101.29	51.24	1,189.56	4,808.69	6,459.52	6,342.32	117.20	55.115	
6,100.00	5,886.89	6,644.00	3,296.22	31.20	101.29	24.30	1,189.56	4,808.69	6,486.50	6,369.78	116.72	55.574	
6,200.00	5,983.70	6,644.00	3,296.22	31.37	101.29	11.54	1,189.56	4,808.69	6,505.17	6,389.01	116.16	56.001	
6,300.00	6,077.81	6,644.00	3,296.22	31.51	101.29	4.84	1,189.56	4,808.69	6,515.39	6,399.85	115.54	56.390	
6,400.00	6,168.18	6,644.00	3,296.22	31.66	101.29	0.79	1,189.56	4,808.69	6,517.09	6,402.22	114.87	56.734	
6,500.00	6,254.10	6,644.00	3,296.22	31.83	101.29	-1.18	1,189.56	4,808.69	6,510.78	6,396.62	114.16	57.032	
6,600.00	6,338.81	6,644.00	3,296.22	32.03	101.29	-1.18	1,189.56	4,808.69	6,503.66	6,390.23	113.43	57.336	
6,700.00	6,423.53	6,644.00	3,296.22	32.25	101.29	-1.18	1,189.56	4,808.69	6,498.07	6,385.38	112.69	57.663	
6,800.00	6,508.25	6,644.00	3,296.22	32.51	101.29	-1.18	1,189.56	4,808.69	6,494.01	6,382.07	111.94	58.013	
6,900.00	6,592.64	6,644.00	3,296.22	32.79	101.29	-1.19	1,189.56	4,808.69	6,490.90	6,379.72	111.18	58.382	
7,000.00	6,672.35	6,644.00	3,296.22	33.16	101.29	-1.20	1,189.56	4,808.69	6,481.18	6,370.79	110.40	58.708	
7,100.00	6,745.32	6,644.00	3,296.22	33.63	101.29	-1.22	1,189.56	4,808.69	6,462.62	6,353.02	109.59	58.969	
7,200.00	6,810.74	6,644.00	3,296.22	34.24	101.29	-1.26	1,189.56	4,808.69	6,435.33	6,326.55	108.78	59.160	
7,300.00	6,867.91	6,644.00	3,296.22	35.03	101.29	-1.31	1,189.56	4,808.69	6,399.52	6,291.55	107.96	59.275	
7,400.00	6,916.19	6,644.00	3,296.22	36.03	101.29	-1.38	1,189.56	4,808.69	6,355.42	6,248.27	107.16	59.309	
7,500.00	6,955.06	6,644.00	3,296.22	37.26	101.29	-1.48	1,189.56	4,808.69	6,303.37	6,197.00	106.37	59.259	
7,600.00	6,984.10	6,644.00	3,296.22	38.71	101.29	-1.60	1,189.56	4,808.69	6,243.73	6,138.12	105.61	59.122	
7,700.00	7,002.97	6,644.00	3,296.22	40.36	101.29	-1.75	1,189.56	4,808.69	6,176.95	6,072.07	104.88	58.893	
7,800.00	7,011.48	6,644.00	3,296.22	42.17	101.29	-1.97	1,189.56	4,808.69	6,103.55	5,999.34	104.20	58.573	
7,900.00	7,012.10	6,644.00	3,296.22	44.11	101.29	-2.04	1,189.56	4,808.69	6,025.64	5,922.09	103.56	58.187	
8,000.00	7,012.24	6,644.00	3,296.22	46.18	101.29	-2.04	1,189.56	4,808.69	5,948.10	5,845.20	102.90	57.807	
8,100.00	7,012.38	6,644.00	3,296.22	48.36	101.29	-2.04	1,189.56	4,808.69	5,871.23	5,769.00	102.23	57.432	
8,200.00	7,012.53	6,644.00	3,296.22	50.64	101.29	-2.04	1,189.56	4,808.69	5,795.07	5,693.51	101.56	57.062	
8,300.00	7,012.67	6,644.00	3,296.22	52.99	101.29	-2.04	1,189.56	4,808.69	5,719.64	5,618.76	100.88	56.699	
8,400.00	7,012.81	6,644.00	3,296.22	55.42	101.29	-2.04	1,189.56	4,808.69	5,644.98	5,544.79	100.19	56.341	
8,500.00	7,012.95	6,644.00	3,296.22	57.91	101.29	-2.04	1,189.56	4,808.69	5,571.11	5,471.61	99.50	55.989	
8,600.00	7,013.10	6,644.00	3,296.22	60.44	101.29	-2.04	1,189.56	4,808.69	5,498.07	5,399.26	98.81	55.644	
8,700.00	7,013.24	6,644.00	3,296.22	63.03	101.29	-2.04	1,189.56	4,808.69	5,425.89	5,327.78	98.11	55.305	
8,800.00	7,013.38	6,644.00	3,296.22	65.65	101.29	-2.04	1,189.56	4,808.69	5,354.60	5,257.19	97.41	54.972	
8,900.00	7,013.52	6,644.00	3,296.22	68.30	101.29	-2.04	1,189.56	4,808.69	5,284.24	5,187.54	96.70	54.645	
9,000.00	7,013.66	6,644.00	3,296.22	70.99	101.29	-2.04	1,189.56	4,808.69	5,214.85	5,118.86	95.99	54.326	
9,100.00	7,013.81	6,644.00	3,296.22	73.70	101.29	-2.04	1,189.56	4,808.69	5,146.47	5,051.19	95.28	54.014	
9,200.00	7,013.95	6,644.00	3,296.22	76.44	101.29	-2.04	1,189.56	4,808.69	5,079.14	4,984.57	94.57	53.710	
9,300.00	7,014.09	6,644.00	3,296.22	79.20	101.29	-2.04	1,189.56	4,808.69	5,012.90	4,919.05	93.85	53.413	
9,400.00	7,014.23	6,644.00	3,296.22	81.97	101.29	-2.04	1,189.56	4,808.69	4,947.79	4,854.66	93.13	53.126	
9,500.00	7,014.38	6,644.00	3,296.22	84.77	101.29	-2.04	1,189.56	4,808.69	4,883.86	4,791.45	92.41	52.848	
9,600.00	7,014.52	6,644.00	3,296.22	87.58	101.29	-2.04	1,189.56	4,808.69	4,821.16	4,729.47	91.69	52.581	
9,700.00	7,014.66	6,644.00	3,296.22	90.40	101.29	-2.04	1,189.56	4,808.69	4,759.74	4,668.77	90.97	52.324	
9,800.00	7,014.80	6,644.00	3,296.22	93.23	101.29	-2.04	1,189.56	4,808.69	4,699.64	4,609.40	90.24	52.079	
9,900.00	7,014.94	6,644.00	3,296.22	96.08	101.29	-2.04	1,189.56	4,808.69	4,640.91	4,551.40	89.51	51.848	
10,000.00	7,015.09	6,644.00	3,296.22	98.94	101.29	-2.04	1,189.56	4,808.69	4,583.62	4,494.84	88.78	51.630	
10,100.00	7,015.23	6,644.00	3,296.22	101.80	101.29	-2.04	1,189.56	4,808.69	4,527.81	4,439.76	88.04	51.427	
10,200.00	7,015.37	6,644.00	3,296.22	104.68	101.29	-2.04	1,189.56	4,808.69	4,473.54	4,386.23	87.31	51.240	

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM_16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 29 T31N R5W Offsets - Rosa Unit #229 - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 241-INCLINOMETER, 2750-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Rule Assigned:				Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
10,300.00	7,015.51	6,644.00	3,296.22	107.56	101.29	-2.04	1,189.56	4,808.69	4,420.86	4,334.30	86.56	51.070		
10,400.00	7,015.66	6,644.00	3,296.22	110.45	101.29	-2.04	1,189.56	4,808.69	4,369.84	4,284.02	85.82	50.919		
10,500.00	7,015.80	6,644.00	3,296.22	113.35	101.29	-2.04	1,189.56	4,808.69	4,320.53	4,235.46	85.07	50.786		
10,600.00	7,015.94	6,644.00	3,296.22	116.25	101.29	-2.04	1,189.56	4,808.69	4,272.99	4,188.67	84.32	50.674		
10,700.00	7,016.08	6,644.00	3,296.22	119.16	101.29	-2.04	1,189.56	4,808.69	4,227.29	4,143.71	83.57	50.582		
10,800.00	7,016.23	6,644.00	3,296.22	122.07	101.29	-2.04	1,189.56	4,808.69	4,183.47	4,100.65	82.82	50.511		
10,900.00	7,016.37	6,644.00	3,296.22	124.99	101.29	-2.04	1,189.56	4,808.69	4,141.61	4,059.53	82.07	50.461		
11,000.00	7,016.51	6,644.00	3,296.22	127.92	101.29	-2.04	1,189.56	4,808.69	4,101.76	4,020.42	81.33	50.432		
11,100.00	7,016.65	6,644.00	3,296.22	130.85	101.29	-2.04	1,189.56	4,808.69	4,063.97	3,983.38	80.60	50.423		
11,200.00	7,016.79	6,644.00	3,296.22	133.78	101.29	-2.04	1,189.56	4,808.69	4,028.32	3,948.45	79.88	50.432		
11,300.00	7,016.94	6,644.00	3,296.22	136.71	101.29	-2.04	1,189.56	4,808.69	3,994.85	3,915.68	79.17	50.456		
11,400.00	7,017.08	6,641.43	3,296.20	139.65	101.26	-2.00	1,187.00	4,808.93	3,963.63	3,885.17	78.46	50.519		
11,500.00	7,017.22	6,633.08	3,296.13	142.60	101.16	-1.88	1,178.69	4,809.73	3,934.68	3,856.99	77.69	50.646		
11,600.00	7,017.36	6,624.73	3,296.06	145.54	101.06	-1.75	1,170.38	4,810.52	3,908.06	3,831.10	76.96	50.777		
11,700.00	7,017.51	6,616.38	3,295.99	148.49	100.96	-1.63	1,162.06	4,811.31	3,883.82	3,807.52	76.30	50.903		
11,800.00	7,017.65	6,608.02	3,295.92	151.44	100.86	-1.50	1,153.75	4,812.11	3,861.99	3,786.29	75.70	51.015		
11,900.00	7,017.79	6,534.29	3,295.89	154.40	100.00	-0.39	1,080.35	4,819.13	3,842.61	3,768.26	74.35	51.685		
12,000.00	7,017.93	6,521.29	3,296.02	157.35	99.85	-0.19	1,067.42	4,820.37	3,825.59	3,751.68	73.91	51.757		
12,100.00	7,018.07	6,508.24	3,296.16	160.31	99.69	0.01	1,054.43	4,821.62	3,811.10	3,737.48	73.61	51.771		
12,200.00	7,018.22	6,495.14	3,296.32	163.27	99.54	0.21	1,041.38	4,822.88	3,799.15	3,725.69	73.47	51.711		
12,300.00	7,018.36	6,492.00	3,296.36	166.23	99.50	0.25	1,038.26	4,823.18	3,789.79	3,716.19	73.60	51.494		
12,400.00	7,018.50	6,492.00	3,296.36	169.20	99.50	0.25	1,038.26	4,823.18	3,783.05	3,709.10	73.95	51.158		
12,500.00	7,018.64	6,492.00	3,296.36	172.17	99.50	0.25	1,038.26	4,823.18	3,778.94	3,704.43	74.51	50.720		
12,600.00	7,018.79	6,492.00	3,296.36	175.13	99.50	0.25	1,038.26	4,823.18	3,777.48	3,702.19	75.28	50.178		
12,605.33	7,018.79	6,492.00	3,296.36	175.29	99.50	0.25	1,038.26	4,823.18	3,777.47	3,702.14	75.33	50.146 CC, ES		
12,700.00	7,018.93	6,492.00	3,296.36	178.10	99.50	0.25	1,038.26	4,823.18	3,778.66	3,702.38	76.28	49.538		
12,800.00	7,019.07	6,492.00	3,296.36	181.08	99.50	0.25	1,038.26	4,823.18	3,782.48	3,705.00	77.49	48.814		
12,900.00	7,019.21	6,492.00	3,296.36	184.05	99.50	0.25	1,038.26	4,823.18	3,788.95	3,710.05	78.90	48.023		
13,000.00	7,019.35	6,492.00	3,296.36	187.02	99.50	0.25	1,038.26	4,823.18	3,798.03	3,717.54	80.49	47.187		
13,100.00	7,019.50	6,468.89	3,296.53	190.00	99.24	0.60	1,015.24	4,825.24	3,809.50	3,727.47	82.02	46.443		
13,200.00	7,019.64	6,466.74	3,296.53	192.98	99.22	0.64	1,013.10	4,825.41	3,823.72	3,739.83	83.89	45.582		
13,300.00	7,019.78	6,464.67	3,296.53	195.96	99.19	0.67	1,011.04	4,825.58	3,840.49	3,754.64	85.85	44.733		
13,400.00	7,019.92	6,462.69	3,296.53	198.94	99.17	0.70	1,009.06	4,825.73	3,859.78	3,771.88	87.90	43.912		
13,500.00	7,020.07	6,460.77	3,296.53	201.92	99.15	0.73	1,007.15	4,825.88	3,881.54	3,791.54	90.00	43.128		
13,600.00	7,020.21	6,458.92	3,296.52	204.90	99.13	0.75	1,005.30	4,826.02	3,905.74	3,813.61	92.13	42.392		
13,700.00	7,020.35	6,457.13	3,296.51	207.88	99.11	0.78	1,003.52	4,826.16	3,932.33	3,838.05	94.29	41.707		
13,800.00	7,020.49	6,455.41	3,296.50	210.86	99.09	0.81	1,001.80	4,826.28	3,961.27	3,864.83	96.44	41.077		
13,900.00	7,020.63	6,453.75	3,296.49	213.85	99.07	0.83	1,000.14	4,826.40	3,992.50	3,893.93	98.57	40.503		
14,000.00	7,020.78	6,452.14	3,296.48	216.84	99.05	0.86	998.54	4,826.52	4,025.97	3,925.28	100.68	39.986		
14,100.00	7,020.92	6,428.00	3,296.17	219.82	98.78	1.22	974.45	4,828.06	4,061.86	3,959.24	102.62	39.581		
14,200.00	7,021.06	6,428.00	3,296.17	222.81	98.78	1.22	974.45	4,828.06	4,099.61	3,994.94	104.67	39.168		
14,300.00	7,021.20	6,428.00	3,296.17	225.80	98.78	1.22	974.45	4,828.06	4,139.44	4,032.77	106.66	38.808		
14,400.00	7,021.35	6,428.00	3,296.17	228.79	98.78	1.22	974.45	4,828.06	4,181.27	4,072.66	108.61	38.499		
14,500.00	7,021.49	6,428.00	3,296.17	231.78	98.78	1.22	974.45	4,828.06	4,225.06	4,114.57	110.49	38.239		
14,600.00	7,021.63	6,428.00	3,296.17	234.77	98.78	1.22	974.45	4,828.06	4,270.74	4,158.42	112.32	38.023		
14,700.00	7,021.77	6,428.00	3,296.17	237.76	98.78	1.22	974.45	4,828.06	4,318.26	4,204.17	114.08	37.852		
14,800.00	7,021.92	6,428.00	3,296.17	240.75	98.78	1.22	974.45	4,828.06	4,367.55	4,251.76	115.79	37.721		
14,900.00	7,022.06	6,428.00	3,296.17	243.74	98.78	1.22	974.45	4,828.06	4,418.55	4,301.12	117.43	37.628		
15,000.00	7,022.20	6,428.00	3,296.17	246.74	98.78	1.22	974.45	4,828.06	4,471.20	4,352.20	119.00	37.572		
15,100.00	7,022.34	6,428.00	3,296.17	249.73	98.78	1.22	974.45	4,828.06	4,525.46	4,404.94	120.52	37.550 SF		
15,200.00	7,022.48	6,428.00	3,296.17	252.72	98.78	1.22	974.45	4,828.06	4,581.25	4,459.28	121.97	37.559		
15,300.00	7,022.63	6,428.00	3,296.17	255.72	98.78	1.22	974.45	4,828.06	4,638.53	4,515.17	123.37	37.599		

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



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 29 T31N R5W Offsets - Rosa Unit #229 - OH - OH													Offset Site Error:	0.00 ft
Survey Program: 241-INCLINOMETER, 2750-MWD													Offset Well Error:	0.00 ft
Reference													Rule Assigned:	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
							+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
15,400.00	7,022.77	6,428.00	3,296.17	258.71	98.78	1.22	974.45	4,828.06	4,697.24	4,572.54	124.70	37.668		
15,500.00	7,022.91	6,428.00	3,296.17	261.71	98.78	1.22	974.45	4,828.06	4,757.33	4,631.35	125.98	37.763		
15,600.00	7,023.05	6,428.00	3,296.17	264.71	98.78	1.22	974.45	4,828.06	4,818.75	4,691.55	127.20	37.883		
15,700.00	7,023.20	6,428.00	3,296.17	267.70	98.78	1.22	974.45	4,828.06	4,881.44	4,753.07	128.37	38.027		
15,800.00	7,023.34	6,428.00	3,296.17	270.70	98.78	1.22	974.45	4,828.06	4,945.35	4,815.87	129.48	38.193		
15,900.00	7,023.48	6,428.00	3,296.17	273.70	98.78	1.22	974.45	4,828.06	5,010.45	4,879.90	130.55	38.380		
16,000.00	7,023.62	6,428.00	3,296.17	276.70	98.78	1.22	974.45	4,828.06	5,076.68	4,945.12	131.56	38.587		
16,100.00	7,023.76	6,428.00	3,296.17	279.69	98.78	1.22	974.45	4,828.06	5,144.01	5,011.48	132.53	38.813		
16,200.00	7,023.91	6,428.00	3,296.17	282.69	98.78	1.22	974.45	4,828.06	5,212.38	5,078.93	133.46	39.056		
16,300.00	7,024.05	6,428.00	3,296.17	285.69	98.78	1.22	974.45	4,828.06	5,281.77	5,147.43	134.34	39.316		
16,400.00	7,024.19	6,428.00	3,296.17	288.69	98.78	1.22	974.45	4,828.06	5,352.12	5,216.94	135.18	39.592		
16,500.00	7,024.33	6,428.00	3,296.17	291.69	98.78	1.22	974.45	4,828.06	5,423.40	5,287.42	135.98	39.883		
16,600.00	7,024.48	6,428.00	3,296.17	294.69	98.78	1.22	974.45	4,828.06	5,495.58	5,358.83	136.75	40.187		
16,700.00	7,024.62	6,428.00	3,296.17	297.69	98.78	1.22	974.45	4,828.06	5,568.62	5,431.14	137.48	40.505		
16,800.00	7,024.76	6,428.00	3,296.17	300.69	98.78	1.22	974.45	4,828.06	5,642.48	5,504.30	138.18	40.836		
16,900.00	7,024.90	6,428.00	3,296.17	303.70	98.78	1.22	974.45	4,828.06	5,717.14	5,578.30	138.84	41.178		
17,000.00	7,025.04	6,428.00	3,296.17	306.70	98.78	1.22	974.45	4,828.06	5,792.56	5,653.09	139.47	41.532		
17,100.00	7,025.19	6,408.40	3,295.75	309.70	98.56	1.52	954.89	4,829.13	5,868.64	5,728.68	139.96	41.931		
17,200.00	7,025.33	6,406.66	3,295.71	312.70	98.54	1.54	953.15	4,829.23	5,945.49	5,804.97	140.52	42.309		
17,300.00	7,025.47	6,404.95	3,295.67	315.71	98.52	1.57	951.44	4,829.32	6,023.02	5,881.96	141.06	42.697		
17,400.00	7,025.61	6,403.25	3,295.62	318.71	98.50	1.60	949.74	4,829.41	6,101.21	5,959.63	141.58	43.094		
17,500.00	7,025.76	6,401.57	3,295.58	321.71	98.48	1.62	948.07	4,829.50	6,180.02	6,037.95	142.07	43.500		
17,600.00	7,025.90	6,399.90	3,295.54	324.71	98.47	1.65	946.41	4,829.58	6,259.43	6,116.89	142.54	43.914		
17,700.00	7,026.04	6,398.26	3,295.50	327.72	98.45	1.67	944.76	4,829.67	6,339.43	6,196.44	142.99	44.336		
17,800.00	7,026.18	6,396.63	3,295.46	330.72	98.43	1.70	943.14	4,829.76	6,419.98	6,276.57	143.41	44.766		
17,900.00	7,026.33	6,395.02	3,295.41	333.73	98.41	1.72	941.53	4,829.84	6,501.08	6,357.26	143.82	45.203		
18,000.00	7,026.47	6,393.42	3,295.37	336.73	98.39	1.75	939.94	4,829.92	6,582.69	6,438.48	144.21	45.647		
18,100.00	7,026.61	6,391.84	3,295.33	339.74	98.38	1.77	938.36	4,830.00	6,664.81	6,520.22	144.58	46.097		
18,200.00	7,026.75	6,390.28	3,295.29	342.74	98.36	1.79	936.80	4,830.08	6,747.40	6,602.46	144.94	46.554		
18,300.00	7,026.89	6,388.73	3,295.24	345.75	98.34	1.82	935.26	4,830.16	6,830.46	6,685.18	145.28	47.017		
18,374.53	7,027.00	6,387.59	3,295.21	347.99	98.33	1.83	934.12	4,830.22	6,892.66	6,747.14	145.52	47.365		



Lonestar Consulting

Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #654H - Slot A2 (654H)
Project:	Rio Arriba, NM NAD83	TVD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Reference Site:	Rosa Unit 29	MD Reference:	GL 6372' & RKB 25' @ 6397.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	Rosa Unit #654H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM _16.0
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6372' & RKB 25' @ 6397.00ft

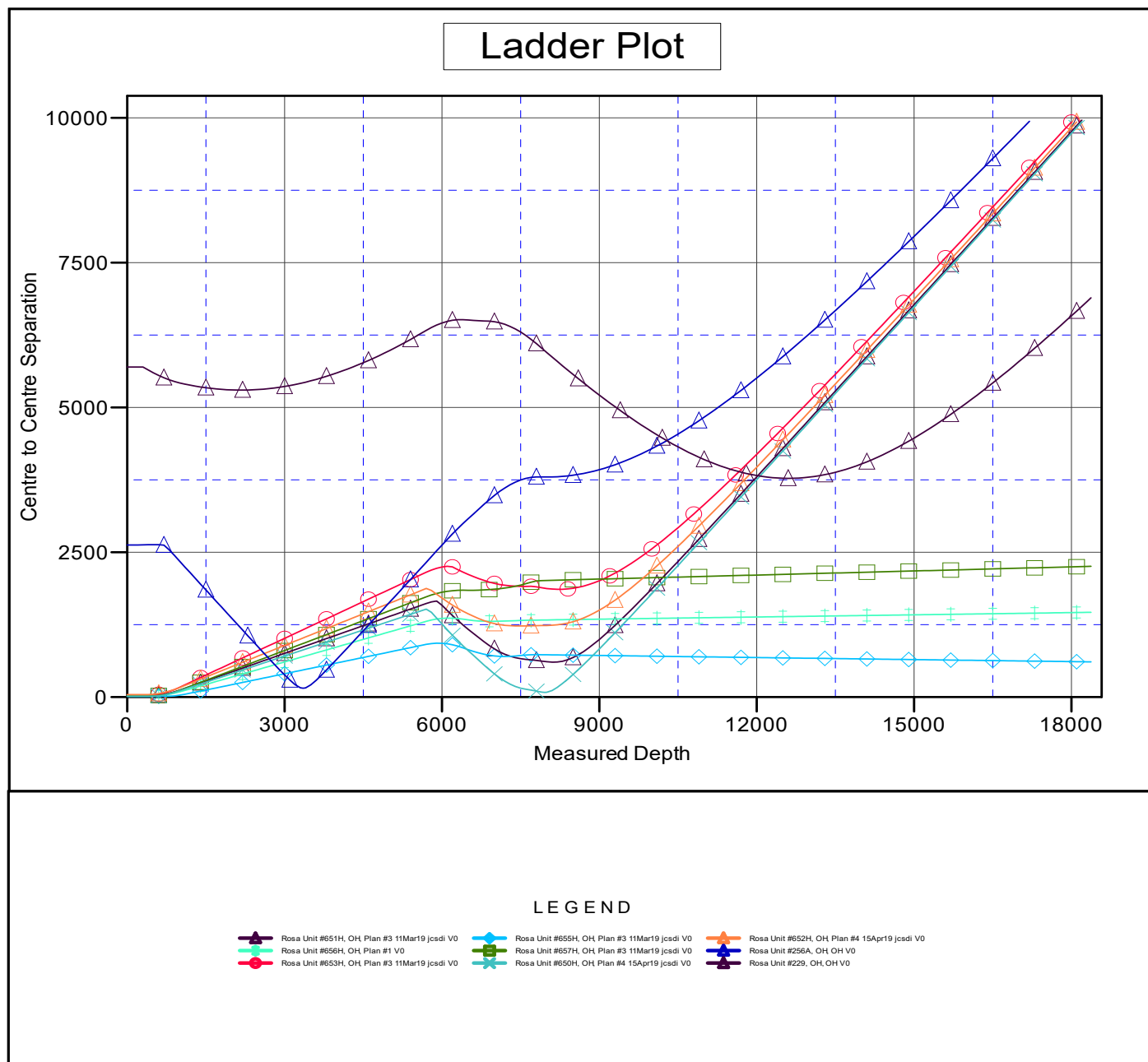
Offset Depths are relative to Offset Datum

Central Meridian is -107.8333334

Coordinates are relative to: Rosa Unit #654H - Slot A2 (654H)

Coordinate System is US State Plane 1983, New Mexico Western Zone

Grid Convergence at Surface is: 0.25°



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



Lonestar Consulting

Anticollision Report



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Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6372' & RKB 25' @ 6397.00ft

Offset Depths are relative to Offset Datum

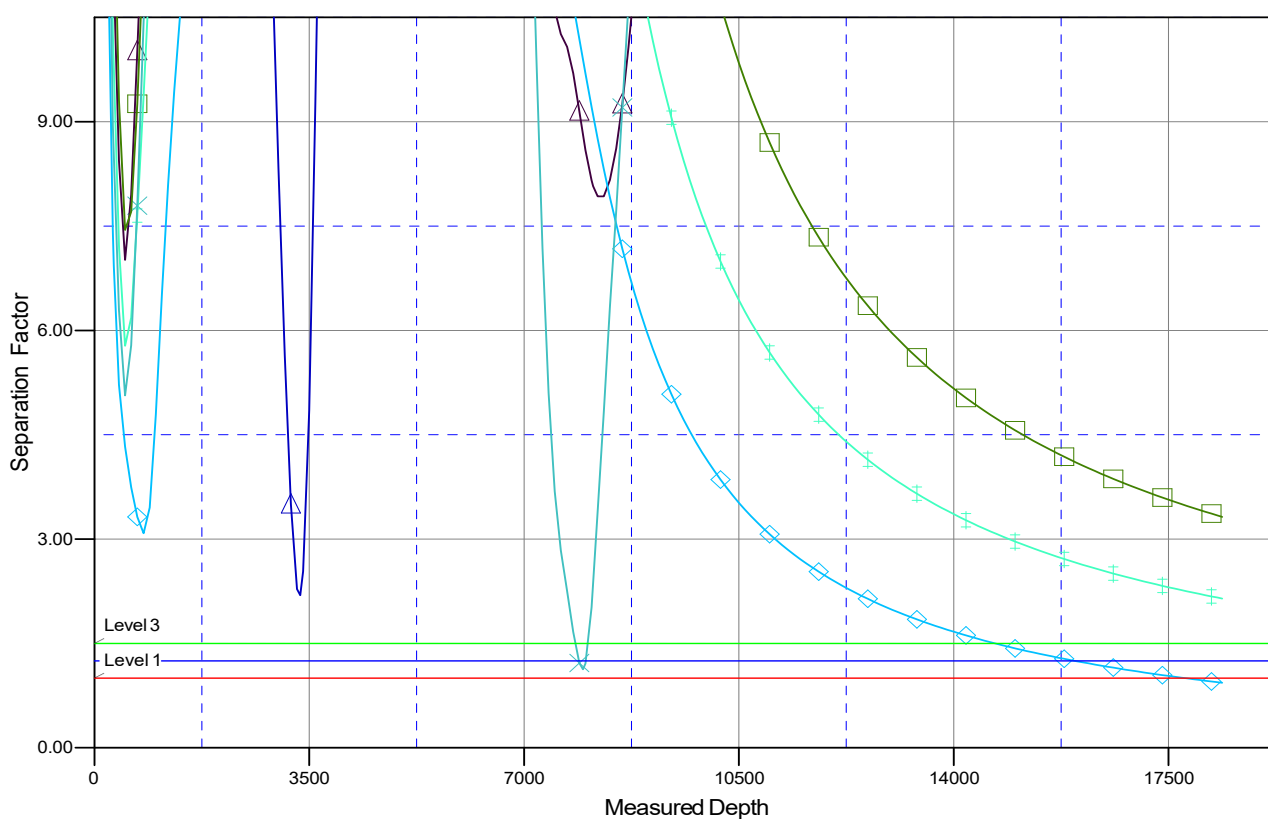
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Coordinates are relative to: Rosa Unit #654H - Slot A2 (654H)

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Grid Convergence at Surface is: 0.25°

Separation Factor Plot



LEGEND

Rosa Unit #651H, OH, Plan #3 11Mar19 jcsdi V0	Rosa Unit #655H, OH, Plan #3 11Mar19 jcsdi V0	Rosa Unit #652H, OH, Plan #4 15Apr19 jcsdi V0
Rosa Unit #656H, OH, Plan #1 V0	Rosa Unit #657H, OH, Plan #3 11Mar19 jcsdi V0	Rosa Unit #256A, OH, OH V0
Rosa Unit #653H, OH, Plan #3 11Mar19 jcsdi V0	Rosa Unit #650H, OH, Plan #4 15Apr19 jcsdi V0	Rosa Unit #229, OH, OH V0

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

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

COMMENTS

Action 23628

COMMENTS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM87401			OGRID: 289408	Action Number: 23628	Action Type: C-103A
Created By	Comment			Comment Date	
kpickford	KP GEO Review 4/16/2021			04/16/2021	

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CONDITIONS

Action 23628

CONDITIONS OF APPROVAL

Operator:	LOGOS OPERATING, LLC	2010 Afton Place	Farmington, NM87401	OGRID:	289408	Action Number:	23628	Action Type:	C-103A
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OCD Reviewer	Condition
kpickford	Adhere to previous NMOCD Conditions of Approval