

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.
NMSF078768
6. If Indian, Allottee or Tribe Name**SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

LOGOS OPERATING, LLC

3a. Address 2010 AFTON PLACE
FARMINGTON, NM 874013b. Phone No. (include area code)
(505) 278-87204. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SEC 36 T31N R05W NWNW (D) 537 FNL 483 FWL7. If Unit of CA/Agreement, Name and/or No.
NMNM78407E8. Well Name and No.
ROSA UNIT 832H9. API Well No.
30-039-3142010. Field and Pool or Exploratory Area
BASIN MANCOS11. Country or Parish, State
RIO ARRIBA COUNTY, NM

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

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

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

LOGOS Operating request a change in plans for the following:

Original surface location from 604' FNL & 448' FWL to new **surface location 537' FNL & 483' FWL**Original bottom hole location from 1879' FNL & 1592' FEL to new **bottom hole location 736' FSL & 1378' FEL**Original TD @ 14,965' MD 7,152' TVD to new **TD @ 20,904' MD 7,168' TVD**

Geology tops have been updated per changes.

Original KOP @ 6,581' MD 6,443' TVD to new **KOP @ 6,664' MD 6,536' TVD**Original Landing point @ 7,649' MD 7,135' TVD to new **Landing point @ 7,679' MD 7,173' TVD**Original 9.625" Intermediate casing @ 6,536' MD to new **Intermediate casing @ 6,604' MD**Original 5.5" Production casing @ 14,965' MD to new **Production 5.5" casing @ 20,904' MD**

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

Attached: New C102, Operation and Directional Drill plans.

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

Etta Trujillo

Title Regulatory Specialist

Signature *Etta Trujillo*

Date 9/07/2023

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 / R5W / SEC 36 / NWNW /	County or Parish/State:
Well Number: 832H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMSF78768	Unit or CA Name: ROSA UNIT	Unit or CA Number: NMNM78407E
US Well Number: 3003931420	Well Status: Approved Application for Permit to Drill	Operator: LOGOS OPERATING LLC

Notice of Intent

Sundry ID: 2750150

Type of Submission: Notice of Intent

Type of Action: Drilling Operations

Date Sundry Submitted: 09/07/2023

Time Sundry Submitted: 04:00

Date proposed operation will begin: 09/07/2023

Procedure Description: LOGOS Operating request a change in plans for the following: Original surface location from 604' FNL & 448' FWL to new surface location 537' FNL & 483' FWL Original bottom hole location from 1879' FNL & 1592' FEL to new bottom hole location 736' FSL & 1378' FEL Original TD @ 14,965' MD 7,152' TVD to new TD @ 20,904' MD 7,168' TVD Geology tops have been updated per changes. Original KOP @ 6,581' MD 6,443' TVD to new KOP @ 6,664' MD 6,536' TVD Original Landing point @ 7,649' MD 7,135' TVD to new Landing point @ 7,679' MD 7,173' TVD Original 9.625" Intermediate casing @ 6,536' MD to new Intermediate casing @ 6,604' MD Original 5.5" Production casing @ 14,965' MD to new Production 5.5" casing @ 20,904' MD Original 9.625" and 5.5" production cementing bbls and sacks have been update per casing depth change. Attached: New C102, Operation and Directional Drill plans.

Surface Disturbance

Is any additional surface disturbance proposed?: No

NOI Attachments

Procedure Description

Rosa_Unit_832H_C102_Plat_with_Leases_labeled_20230911074211.pdf

3160_5_Rosa_Unit_832H_Plan_2_Change_in_Plans_20230907_20230907155956.pdf

Well Name: ROSA UNIT

Well Location: T31N / R5W / SEC 36 /
NWNW /

County or Parish/State:

Well Number: 832H

Type of Well: CONVENTIONAL GAS
WELL

Allottee or Tribe Name:

Lease Number: NMSF78768

Unit or CA Name: ROSA UNIT

Unit or CA Number:
NMNM78407E

US Well Number: 3003931420

Well Status: Approved Application for
Permit to DrillOperator: LOGOS OPERATING
LLC**Operator**

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

Operator Electronic Signature: ETTA TRUJILLO

Signed on: SEP 11, 2023 07:42 AM

Name: LOGOS OPERATING LLC

Title: Regulatory Specialist

Street Address: 2010 AFTON PLACE

City: Farmington

State: NM

Phone: (505) 324-4154

Email address: ETRUJILLO@LOGOSRESOURCESLLC.COM

Field

Representative Name:

Street Address:

City:

State:

Zip:

Phone:

Email address:

BLM Point of Contact

BLM POC Name: KENNETH G RENNICK

BLM POC Title: Petroleum Engineer

BLM POC Phone: 5055647742

BLM POC Email Address: krennick@blm.gov

Disposition: Approved

Disposition Date: 09/11/2023

Signature: Kenneth Rennick

☒ AMENDED REPORT

FIRST TAKE POINT (B) 816' FSL 992' FWL SEC 25, T31N, R5W LAT 36.865600°N LONG -107.318581°W DATUM: NAD1927 LAT 36.865607°N LONG -107.319182°W DATUM: NAD1983 25 (MEASURED) N0°14'20"W 2637.77' NORTH 2640.00' (RECORD) 992' B 816' 537' 483' A N20°19.2'E 1445.4' (MEASURED) S89°41'39"W 2638.62' (MEASURED) S89°57'W 2640.00' (RECORD) (RECORD) S89°57'W 2640.00' S89°42'41"W 2640.11' (MEASURED) 36 SURFACE LOCATION (A) 537' FNL 483' FWL SEC 36, T31N, R5W LAT 36.861885°N LONG -107.320322°W DATUM: NAD1927 LAT 36.861891°N LONG -107.320923°W DATUM: NAD1983 (MEASURED) S89°39'24"W 2635.40' (MEASURED) S89°37'18"W 2640.71' WEST 2640.00' (RECORD) WEST 2640.00' (RECORD)	FIRST PERF (C) 736' FSL 1513' FEL SEC 29, T31N, R4W LAT 36.865398°N LONG -107.273835°W DATUM: NAD1927 LAT 36.865405°N LONG -107.274434°W DATUM: NAD1983 30 (MEASURED) N0°26'19"W 2633.15' N0°03'W 2640.00' (RECORD) LOT 3 LOT 4 EAST 13,090.2' (MEASURED) S89°48'17"E 2416.10' (MEASURED) N89°12'23"E 2625.99' (MEASURED) N89°57'E 2534.40' (RECORD) (MEASURED) N89°57'E 2534.40' (RECORD) LOT 1 NORTH 2640.00' (RECORD) LOT 2 LOT 3 LOT 4 NORTH 2640.00' (RECORD) (MEASURED) N0°15'31"W 2628.42' (MEASURED) S89°37'25"W 2413.85' WEST 2436.06' (RECORD) (MEASURED) S89°36'10"W 2640.40' WEST 2640.00' (RECORD)	LAST TAKE POINT (D) 736' FSL 1378' FEL SEC 29, T31N, R4W LAT 36.865396°N LONG -107.273373°W DATUM: NAD1927 LAT 36.865403°N LONG -107.273973°W DATUM: NAD1983 29 (MEASURED) N0°28'08"W 2636.14' N0°02'W 2640.00' (RECORD) EAST 135.0' 1378' C D 736' 736' (MEASURED) S89°28'49"W 2636.47' (MEASURED) N89°58'W 2639.01' (RECORD) (MEASURED) S89°44'53"W 2640.04' N89°58'W 2639.01' (RECORD) (MEASURED) N0°19'25"W 2631.79' N0°02'W 2640.00' (RECORD) 32 (MEASURED) S89°29'16"W 2644.94' (MEASURED) S89°51'55"W 2628.28' WEST 2640.00' (RECORD) WEST 2640.00' (RECORD)
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LOGOS Operating, LLC Operations Plan

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

Date:	September 7, 2023	Pool:	Basin Mancos
Well Name:	Rosa Unit 832H	GL Elevation:	6,563'
Surface Location:	Sec 36, T31N, R5W 537 FNL, 483 FWL (36.861891° N, 107.320923° W – NAD83)	Measured Depth:	20,904 (RKB – 30')
Bottom Hole Location:	Sec 29, T31N, R4W 736 FSL, 1378 FEL (36.865403° N, 107.273973° W – NAD83)	County:	Rio Arriba

Lease Serial #NMSF078768, CA Serial #NMNM78407E

I. GEOLOGY

A. Formation Tops (Based on 30'KB Elevation): Estimated top of important geological markers:
SURFACE FORMATION – NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2,816'	2,774'	*POINT LOOKOUT	5,972'	5,860'
KIRTLAND	2,942'	2,897'	*MANCOS	6,529'	6,404'
*FRUITLAND	3,325'	3,271'	KICKOFF POINT	6,664'	6,536'
*PICTURED CLIFFS	3,686'	3,624'	LANDING POINT	7,679'	7,173'
LEWIS	3,787'	3,723'			
CHACRA	4,925'	4,836'			
*CLIFF HOUSE	5,751'	5,644'			
MENEFEE	5,786'	5,678'	TD	20,904	7,168

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

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

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

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

II. DRILLING

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

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

ROSA UNIT 832H



times.

- B. BOP TESTING:** The BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Pressure test surface casing to **600 psi for 30 minutes** and intermediate casing strings to one-third of internal yield pressure not to exceed **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 on each tour. BOP equipment will be tested a minimum of 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 but not more than once daily. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of the BOPE. **All tests and inspections will be recorded and logged with time and results.** A full BOP test will be conducted when installed for the first well on the pad or if seals subject to test pressure are broken, following related repairs and at a minimum of 30-day intervals. A BOPE Shell Test only will be conducted for subsequent wells on the pad when seals subject to pressure have not been broken or repaired and fall within the 30-day interval of the first full test.
- C. GeoHazards:** There are no anticipated geohazards
- D. Maximum Anticipated Pressure:** $7173' \text{ TVD} \times 0.43 = 3084 \text{ psi}$
- E. H2S Concerns:** – There is no record of any naturally occurring H2S in any formation in the Rosa Unit. No H2S is anticipated in this formation or this well.

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	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	LTC/BTC
INTERMEDIATE	12.25"	6,604'	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.5"	20,904'	5.5"	20 LBS	P-110 or equiv	LTC/BTC

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

B. FLOAT EQUIPMENT:

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

ROSA UNIT 832H



least (1) one Toe Sleeve (Sliding Sleeve) positioned inside the applicable production area. The centralizer program will be determined by wellbore conditions. Production casing to be pressure tested during completion operations with frac stack installed.

C. CEMENTING:

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

1. SURFACE: Casing shall be set at ~ 331' BGL (361' RKB) and cemented to surface. TOC at Surface.
303 sks of 15.8 ppg Type Neat G, 1.15 cuft/sk yield or equivalent 250 sks of 14.6 ppg Type III with 1.39 cuft/sk yield, 30% excess.
2. INTERMEDIATE: Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. The intermediate casing will be cemented in 2 or 3 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. Operator proposes optional DV tools above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal. If losses are not observed during the second stage a cancellation plug will be pumped and the remaining cement will be pumped during stage 2. If cement does not circulate to the DV tool(s) or to surface, a CBL will be run to determine TOC.

	Top	Footage	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	6,104	500	0.31321	1.3	221	39	1.15	192	15.8
Stage 1 Lead	4,975	1,129	0.31321	1.3	460	82	1.97	233	12.4
					681	121		426	
Stage 2 Tail	4,375	600	0.31321	1.3	244	44	1.65	148	13.2
Stage 2 Lead	3,375	1,000	0.31321	1.3	407	73	1.97	207	12.4
					651	116		355	
Stage 3 Tail	2,725	650	0.31321	1.3	265	47	1.65	160	13.2
Stage 3 Lead	361	2,364	0.31321	1.3	962	171	1.97	489	12.4
Stage 3 Lead	-	361	0.36268	1	131	23	1.97	67	12.4
					1,358	242		715	
					2,690	479		1,496	

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

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

	Top	ft	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Cased hole Tail	6,504	100	0.2531	1	25	5	1.56	16	13.2
Open Hole Tail	6,604	14,300	0.2291	1.15	3,778	673	1.56	2,422	13.2
					3,803	677		2,438	

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

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

ROSA UNIT 832H



IV. COMPLETION

A. CBL

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

B. PRESSURE TEST

C. Pressure test 5-1/2" casing to 1578 psi - (0.22 psi/ft * 7,173' TVD) for 30 minutes. Increase pressure to Open Toe sleeves.

D. STIMULATION

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

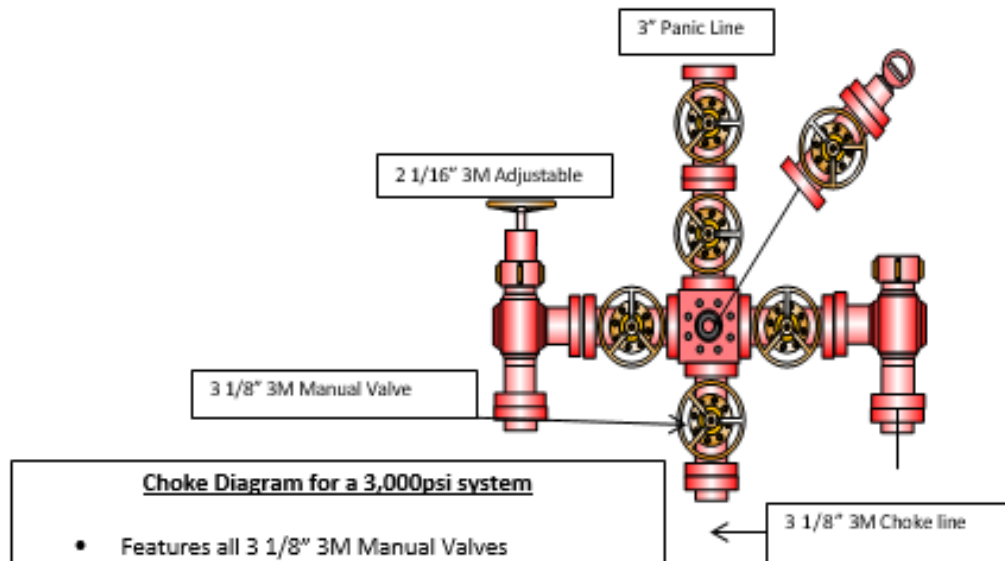
E. PRODUCTION TUBING

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

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

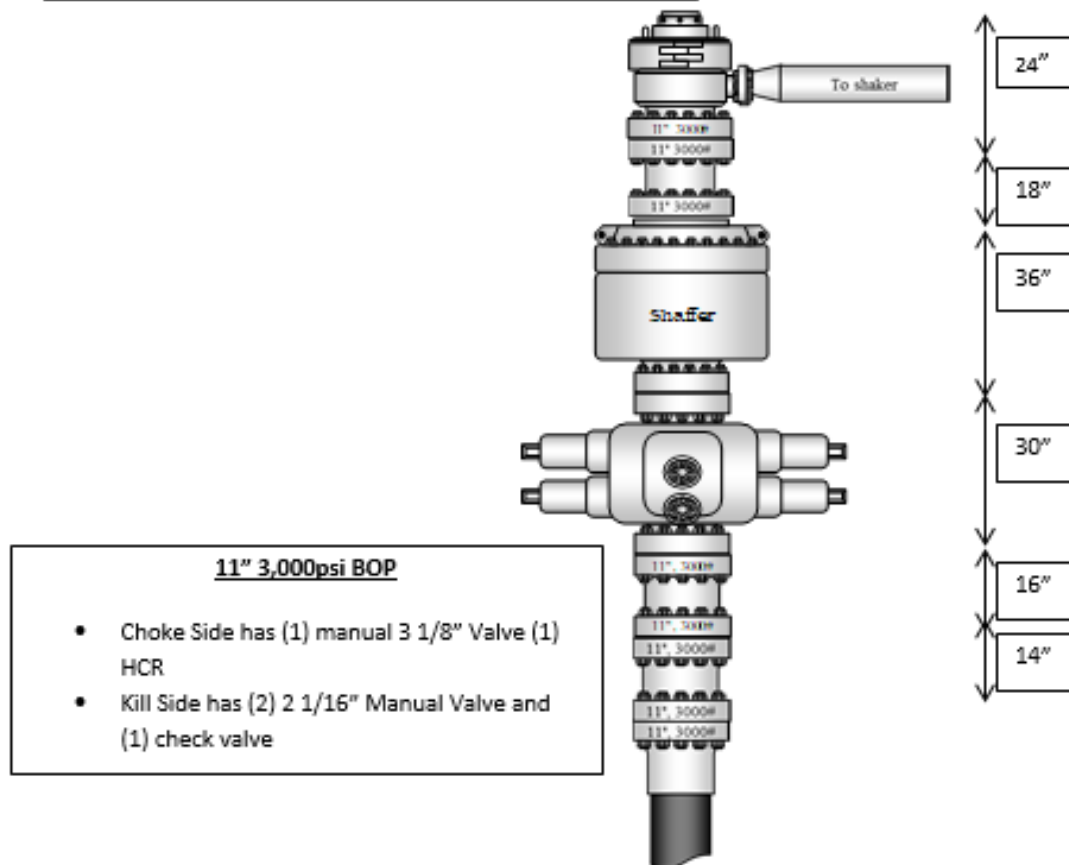


3M 11" B.O.P.E Diagram



Choke Diagram for a 3,000psi system

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



ROSA UNIT 832H



County: Rio Arriba, NM (NAD83)

Site: Rosa Unit 42

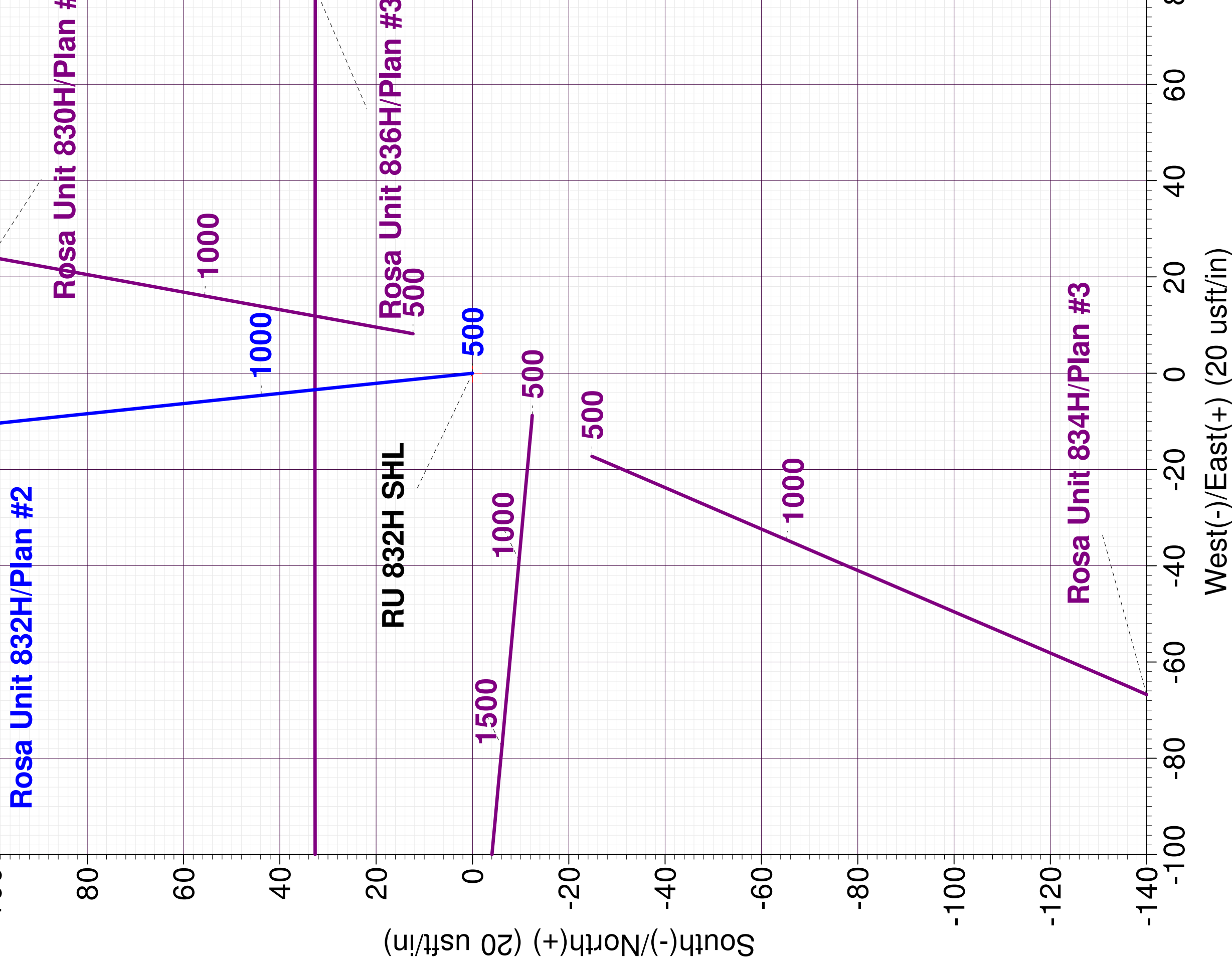
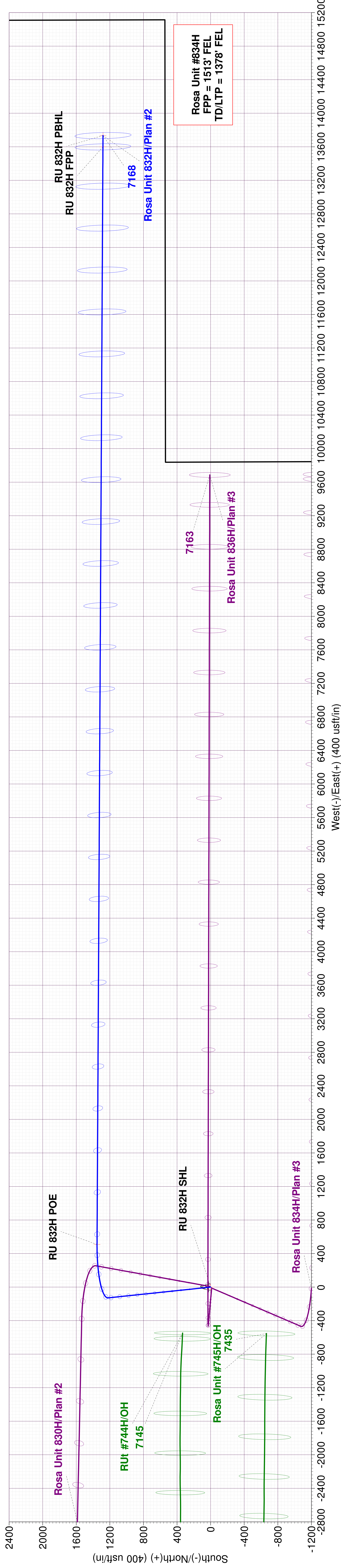
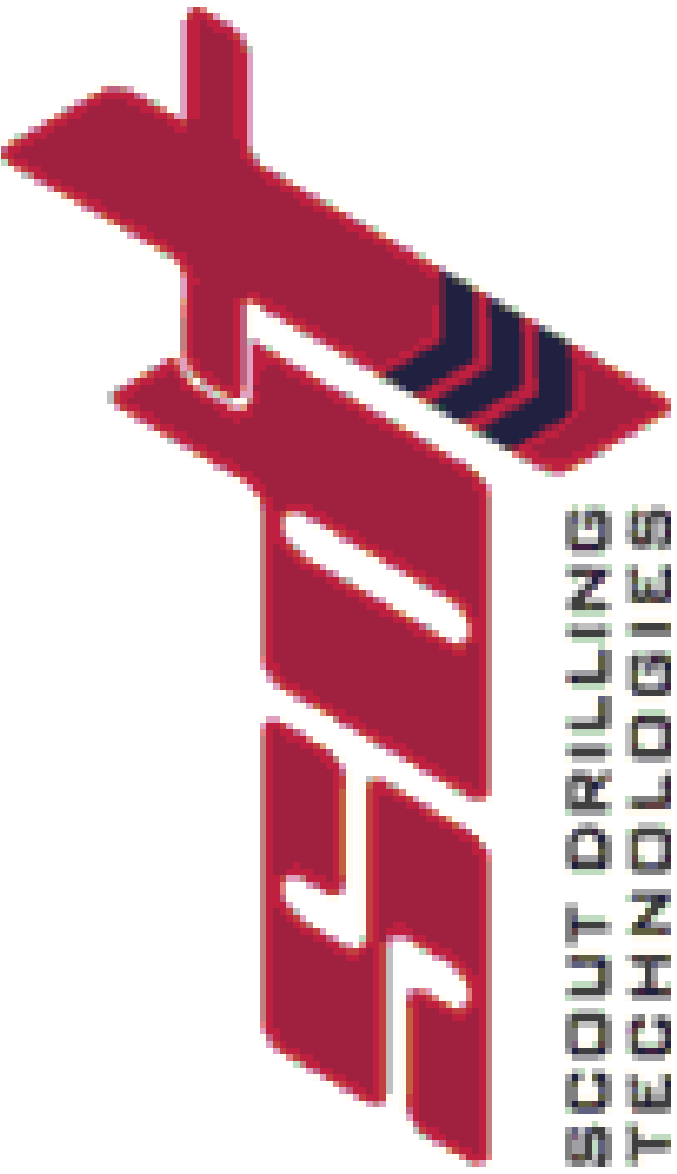
Well: Rosa Unit 832H

Depth Reference: 6563+30 @ 6593.00usft (H&P 530)

Rig: H&P 530

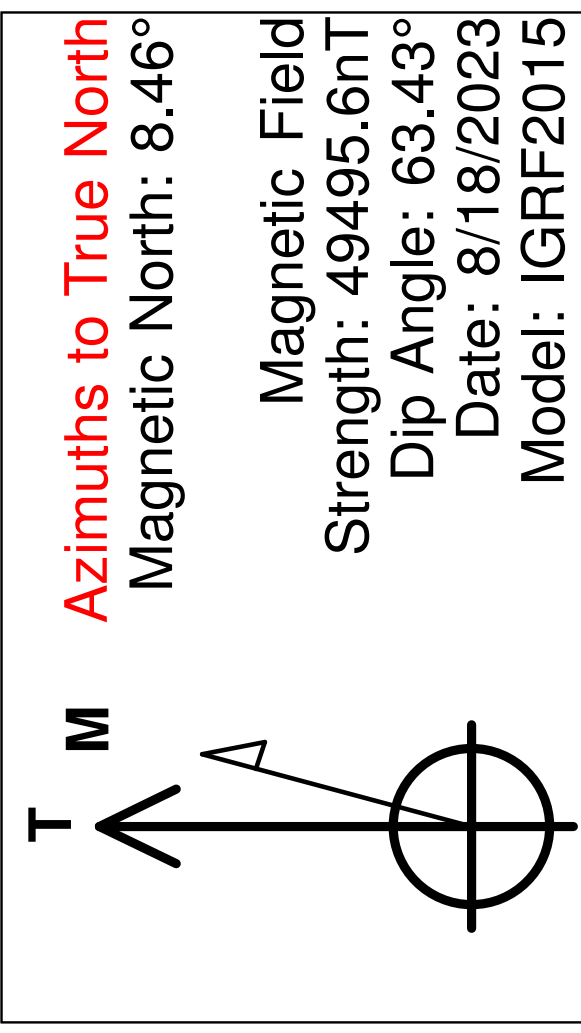
Plan: Plan #2

Job #: Prelim



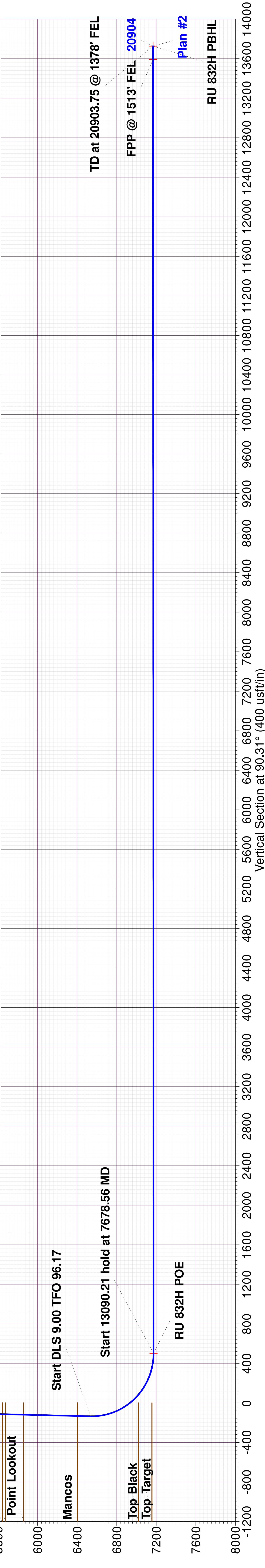
SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
3	1104.22	12.08	353.99	1099.75	63.13	-6.64	2.00	353.99	-6.98	Start 5559.45 hold at 1104.22 MD
4	6663.67	12.08	353.99	6536.00	1220.63	-128.40	0.00	0.00	-135.01	Start DLS 9.00 TFO 96.17
5	7678.56	90.02	90.31	7173.00	1352.82	509.00	9.00	96.17	501.67	Start 13090.21 hold at 7678.56 MD
6	20768.77	90.02	90.31	7168.05	1282.59	13599.02	0.00	0.00	13591.88	FPP @ 1513' FEL
7	20903.75	90.02	90.31	7168.00	1281.86	13734.00	0.00	0.00	13726.87	TD at 20903.75 @ 1378' FEL

DESIGN TARGET DETAILS										
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude			
RU 832H SHL	0.00	0.00	0.00	2133454.42	2872990.69	36.861891	-107.320922			
RU 832H PBHL	7168.00	1281.86	13734.00	2134809.95	2886717.62	36.865403	-107.273973			
RU 832H FPP	7168.05	1282.59	13599.02	2134809.95	2886582.63	36.865405	-107.274434			
RU 832H POE	7173.00	1352.82	509.00	2134809.95	2873492.43	36.865607	-107.319182			



TOTAL CORRECTION: 8.46°

FORMATION TOP DETAILS		
MDPath	MDPath	Formation
2774.00	2816.41	Ojo Alamo
2897.00	2942.20	Kirtland
3271.00	3324.67	Fruitland
3313.00	3367.63	Top of Coals
3400.00	3456.60	Base of Coals
3624.00	3685.67	Pictured Cliffs
3723.00	3786.92	Lewis
4836.00	4925.14	Chacra
5359.00	5459.99	Upper Cliff House
5644.00	5751.45	Cliff House
5768.00	5786.22	Menefee
5860.00	5972.35	Point Lookout
6404.00	6528.67	Mancos
7018.00	7219.24	Top Black
7157.00	7533.68	Top Target



Logos Operating LLC

Rio Arriba, NM (NAD83)

Rosa Unit 42

Rosa Unit 832H

OH

Plan: Plan #2

Standard Planning Report

22 August, 2023

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	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 42				
Site Position:		Northing:	2,133,465.56 usft	Latitude:	36.861919
From:	Lat/Long	Easting:	2,873,174.65 usft	Longitude:	-107.320923
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "		

Well	Rosa Unit 832H					
Well Position	+N/-S	0.00 usft	Northing:	2,133,454.42 usft	Latitude:	36.861891
	+E/-W	0.00 usft	Easting:	2,872,990.69 usft	Longitude:	-107.320922
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	6,563.00 usft
Grid Convergence:		0.31 °				

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/18/2023	8.46	63.43	49,495.64526035

Design	Plan #2				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	90.31	

Plan Survey Tool Program	Date	8/22/2023			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	20,903.74 Plan #2 (OH)	B001Mb_MWD+HRGM		
			OWSG MWD + HRGM		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	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	
1,104.22	12.08	353.99	1,099.75	63.13	-6.64	2.00	2.00	0.00	353.99	
6,663.67	12.08	353.99	6,536.00	1,220.63	-128.40	0.00	0.00	0.00	0.00	
7,678.56	90.02	90.31	7,173.00	1,352.82	509.00	9.00	7.68	9.49	96.17	RU 832H POE
20,768.77	90.02	90.31	7,168.05	1,282.59	13,599.02	0.00	0.00	0.00	0.00	RU 832H FPP
20,903.75	90.02	90.31	7,168.00	1,281.86	13,734.00	0.00	0.00	0.00	0.00	RU 832H PBHL

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	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
Start Build 2.00									
600.00	2.00	353.99	599.98	1.74	-0.18	-0.19	2.00	2.00	0.00
700.00	4.00	353.99	699.84	6.94	-0.73	-0.77	2.00	2.00	0.00
800.00	6.00	353.99	799.45	15.61	-1.64	-1.73	2.00	2.00	0.00
900.00	8.00	353.99	898.70	27.73	-2.92	-3.07	2.00	2.00	0.00
1,000.00	10.00	353.99	997.47	43.28	-4.55	-4.79	2.00	2.00	0.00
1,104.22	12.08	353.99	1,099.75	63.13	-6.64	-6.98	2.00	2.00	0.00
Start 5559.45 hold at 1104.22 MD									
1,200.00	12.08	353.99	1,193.41	83.08	-8.74	-9.19	0.00	0.00	0.00
1,300.00	12.08	353.99	1,291.19	103.90	-10.93	-11.49	0.00	0.00	0.00
1,400.00	12.08	353.99	1,388.98	124.72	-13.12	-13.79	0.00	0.00	0.00
1,500.00	12.08	353.99	1,486.76	145.54	-15.31	-16.10	0.00	0.00	0.00
1,600.00	12.08	353.99	1,584.54	166.36	-17.50	-18.40	0.00	0.00	0.00
1,700.00	12.08	353.99	1,682.33	187.18	-19.69	-20.70	0.00	0.00	0.00
1,800.00	12.08	353.99	1,780.11	208.00	-21.88	-23.01	0.00	0.00	0.00
1,900.00	12.08	353.99	1,877.90	228.82	-24.07	-25.31	0.00	0.00	0.00
2,000.00	12.08	353.99	1,975.68	249.64	-26.26	-27.61	0.00	0.00	0.00
2,100.00	12.08	353.99	2,073.46	270.46	-28.45	-29.91	0.00	0.00	0.00
2,200.00	12.08	353.99	2,171.25	291.28	-30.64	-32.22	0.00	0.00	0.00
2,300.00	12.08	353.99	2,269.03	312.10	-32.83	-34.52	0.00	0.00	0.00
2,400.00	12.08	353.99	2,366.82	332.92	-35.02	-36.82	0.00	0.00	0.00
2,500.00	12.08	353.99	2,464.60	353.74	-37.21	-39.13	0.00	0.00	0.00
2,600.00	12.08	353.99	2,562.38	374.56	-39.40	-41.43	0.00	0.00	0.00
2,700.00	12.08	353.99	2,660.17	395.38	-41.59	-43.73	0.00	0.00	0.00
2,800.00	12.08	353.99	2,757.95	416.20	-43.78	-46.03	0.00	0.00	0.00
2,816.41	12.08	353.99	2,774.00	419.62	-44.14	-46.41	0.00	0.00	0.00
Ojo Alamo									
2,900.00	12.08	353.99	2,855.74	437.02	-45.97	-48.34	0.00	0.00	0.00
2,942.20	12.08	353.99	2,897.00	445.81	-46.90	-49.31	0.00	0.00	0.00
Kirtland									
3,000.00	12.08	353.99	2,953.52	457.84	-48.16	-50.64	0.00	0.00	0.00
3,100.00	12.08	353.99	3,051.30	478.66	-50.35	-52.94	0.00	0.00	0.00
3,200.00	12.08	353.99	3,149.09	499.48	-52.54	-55.24	0.00	0.00	0.00
3,300.00	12.08	353.99	3,246.87	520.30	-54.73	-57.55	0.00	0.00	0.00
3,324.67	12.08	353.99	3,271.00	525.44	-55.27	-58.12	0.00	0.00	0.00
Fruitland									
3,367.63	12.08	353.99	3,313.00	534.38	-56.21	-59.11	0.00	0.00	0.00
Top of Coals									
3,400.00	12.08	353.99	3,344.66	541.12	-56.92	-59.85	0.00	0.00	0.00
3,456.60	12.08	353.99	3,400.00	552.91	-58.16	-61.15	0.00	0.00	0.00
Base of Coals									
3,500.00	12.08	353.99	3,442.44	561.94	-59.11	-62.15	0.00	0.00	0.00
3,600.00	12.08	353.99	3,540.22	582.77	-61.30	-64.46	0.00	0.00	0.00
3,685.67	12.08	353.99	3,624.00	600.60	-63.18	-66.43	0.00	0.00	0.00
Pictured Cliffs									
3,700.00	12.08	353.99	3,638.01	603.59	-63.49	-66.76	0.00	0.00	0.00
3,786.92	12.08	353.99	3,723.00	621.68	-65.40	-68.76	0.00	0.00	0.00

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Lewis									
3,800.00	12.08	353.99	3,735.79	624.41	-65.68	-69.06	0.00	0.00	0.00
3,900.00	12.08	353.99	3,833.58	645.23	-67.87	-71.36	0.00	0.00	0.00
4,000.00	12.08	353.99	3,931.36	666.05	-70.06	-73.67	0.00	0.00	0.00
4,100.00	12.08	353.99	4,029.14	686.87	-72.26	-75.97	0.00	0.00	0.00
4,200.00	12.08	353.99	4,126.93	707.69	-74.45	-78.27	0.00	0.00	0.00
4,300.00	12.08	353.99	4,224.71	728.51	-76.64	-80.58	0.00	0.00	0.00
4,400.00	12.08	353.99	4,322.50	749.33	-78.83	-82.88	0.00	0.00	0.00
4,500.00	12.08	353.99	4,420.28	770.15	-81.02	-85.18	0.00	0.00	0.00
4,600.00	12.08	353.99	4,518.06	790.97	-83.21	-87.48	0.00	0.00	0.00
4,700.00	12.08	353.99	4,615.85	811.79	-85.40	-89.79	0.00	0.00	0.00
4,800.00	12.08	353.99	4,713.63	832.61	-87.59	-92.09	0.00	0.00	0.00
4,900.00	12.08	353.99	4,811.42	853.43	-89.78	-94.39	0.00	0.00	0.00
4,925.14	12.08	353.99	4,836.00	858.66	-90.33	-94.97	0.00	0.00	0.00
Chacra									
5,000.00	12.08	353.99	4,909.20	874.25	-91.97	-96.70	0.00	0.00	0.00
5,100.00	12.08	353.99	5,006.98	895.07	-94.16	-99.00	0.00	0.00	0.00
5,200.00	12.08	353.99	5,104.77	915.89	-96.35	-101.30	0.00	0.00	0.00
5,300.00	12.08	353.99	5,202.55	936.71	-98.54	-103.60	0.00	0.00	0.00
5,400.00	12.08	353.99	5,300.34	957.53	-100.73	-105.91	0.00	0.00	0.00
5,459.99	12.08	353.99	5,359.00	970.02	-102.04	-107.29	0.00	0.00	0.00
Upper Cliff House									
5,500.00	12.08	353.99	5,398.12	978.35	-102.92	-108.21	0.00	0.00	0.00
5,600.00	12.08	353.99	5,495.90	999.17	-105.11	-110.51	0.00	0.00	0.00
5,700.00	12.08	353.99	5,593.69	1,019.99	-107.30	-112.82	0.00	0.00	0.00
5,751.45	12.08	353.99	5,644.00	1,030.71	-108.43	-114.00	0.00	0.00	0.00
Cliff House									
5,786.22	12.08	353.99	5,678.00	1,037.94	-109.19	-114.80	0.00	0.00	0.00
Menefee									
5,800.00	12.08	353.99	5,691.47	1,040.81	-109.49	-115.12	0.00	0.00	0.00
5,900.00	12.08	353.99	5,789.26	1,061.63	-111.68	-117.42	0.00	0.00	0.00
5,972.35	12.08	353.99	5,860.00	1,076.70	-113.26	-119.09	0.00	0.00	0.00
Point Lookout									
6,000.00	12.08	353.99	5,887.04	1,082.45	-113.87	-119.72	0.00	0.00	0.00
6,100.00	12.08	353.99	5,984.83	1,103.27	-116.06	-122.03	0.00	0.00	0.00
6,200.00	12.08	353.99	6,082.61	1,124.09	-118.25	-124.33	0.00	0.00	0.00
6,300.00	12.08	353.99	6,180.39	1,144.92	-120.44	-126.63	0.00	0.00	0.00
6,400.00	12.08	353.99	6,278.18	1,165.74	-122.63	-128.94	0.00	0.00	0.00
6,500.00	12.08	353.99	6,375.96	1,186.56	-124.82	-131.24	0.00	0.00	0.00
6,528.67	12.08	353.99	6,404.00	1,192.53	-125.45	-131.90	0.00	0.00	0.00
Mancos									
6,600.00	12.08	353.99	6,473.75	1,207.38	-127.01	-133.54	0.00	0.00	0.00
6,663.67	12.08	353.99	6,536.00	1,220.63	-128.40	-135.01	0.00	0.00	0.00
Start DLS 9.00 TFO 96.17									
6,700.00	12.17	9.60	6,571.53	1,228.19	-128.16	-134.81	9.00	0.23	42.96
6,750.00	13.61	28.82	6,620.29	1,238.55	-124.45	-131.15	9.00	2.89	38.43
6,800.00	16.20	43.22	6,668.62	1,248.79	-116.83	-123.58	9.00	5.18	28.80
6,850.00	19.48	53.32	6,716.22	1,258.86	-105.36	-112.17	9.00	6.56	20.21
6,900.00	23.16	60.47	6,762.80	1,268.69	-90.11	-96.97	9.00	7.36	14.30
6,950.00	27.08	65.71	6,808.07	1,278.23	-71.17	-78.08	9.00	7.83	10.47
7,000.00	31.14	69.68	6,851.75	1,287.40	-48.66	-55.62	9.00	8.13	7.95
7,050.00	35.31	72.82	6,893.57	1,296.16	-22.71	-29.73	9.00	8.32	6.26
7,100.00	39.53	75.36	6,933.27	1,304.46	6.50	-0.56	9.00	8.45	5.09

SDT Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,150.00	43.81	77.48	6,970.61	1,312.24	38.81	31.71	9.00	8.55	4.25
7,200.00	48.11	79.30	7,005.36	1,319.44	74.01	66.87	9.00	8.61	3.63
7,219.24	49.78	79.93	7,018.00	1,322.06	88.28	81.12	9.00	8.65	3.30
Top Black									
7,250.00	52.45	80.89	7,037.31	1,326.04	111.89	104.71	9.00	8.67	3.09
7,300.00	56.80	82.30	7,066.25	1,331.99	152.20	145.00	9.00	8.70	2.82
7,350.00	61.16	83.57	7,092.02	1,337.25	194.72	187.48	9.00	8.73	2.55
7,400.00	65.54	84.75	7,114.44	1,341.78	239.16	231.90	9.00	8.75	2.35
7,450.00	69.92	85.84	7,133.38	1,345.57	285.26	277.98	9.00	8.77	2.19
7,500.00	74.31	86.88	7,148.73	1,348.59	332.74	325.44	9.00	8.78	2.07
7,533.68	77.27	87.55	7,157.00	1,350.17	365.35	358.04	9.00	8.79	1.99
Top Target									
7,550.00	78.71	87.87	7,160.40	1,350.81	381.30	373.98	9.00	8.79	1.96
7,600.00	83.11	88.83	7,168.30	1,352.23	430.64	423.31	9.00	8.80	1.92
7,650.00	87.51	89.77	7,172.38	1,352.84	480.45	473.13	9.00	8.80	1.89
7,678.56	90.02	90.31	7,173.00	1,352.82	509.00	501.67	9.00	8.80	1.87
Start 13090.21 hold at 7678.56 MD									
7,700.00	90.02	90.31	7,172.99	1,352.70	530.44	523.12	0.00	0.00	0.00
7,800.00	90.02	90.31	7,172.95	1,352.17	630.44	623.12	0.00	0.00	0.00
7,900.00	90.02	90.31	7,172.92	1,351.63	730.44	723.12	0.00	0.00	0.00
8,000.00	90.02	90.31	7,172.88	1,351.09	830.44	823.12	0.00	0.00	0.00
8,100.00	90.02	90.31	7,172.84	1,350.56	930.44	923.12	0.00	0.00	0.00
8,200.00	90.02	90.31	7,172.80	1,350.02	1,030.44	1,023.12	0.00	0.00	0.00
8,300.00	90.02	90.31	7,172.77	1,349.48	1,130.43	1,123.12	0.00	0.00	0.00
8,400.00	90.02	90.31	7,172.73	1,348.95	1,230.43	1,223.12	0.00	0.00	0.00
8,500.00	90.02	90.31	7,172.69	1,348.41	1,330.43	1,323.12	0.00	0.00	0.00
8,600.00	90.02	90.31	7,172.65	1,347.88	1,430.43	1,423.12	0.00	0.00	0.00
8,700.00	90.02	90.31	7,172.61	1,347.34	1,530.43	1,523.12	0.00	0.00	0.00
8,800.00	90.02	90.31	7,172.58	1,346.80	1,630.43	1,623.12	0.00	0.00	0.00
8,900.00	90.02	90.31	7,172.54	1,346.27	1,730.43	1,723.12	0.00	0.00	0.00
9,000.00	90.02	90.31	7,172.50	1,345.73	1,830.42	1,823.12	0.00	0.00	0.00
9,100.00	90.02	90.31	7,172.46	1,345.19	1,930.42	1,923.12	0.00	0.00	0.00
9,200.00	90.02	90.31	7,172.42	1,344.66	2,030.42	2,023.12	0.00	0.00	0.00
9,300.00	90.02	90.31	7,172.39	1,344.12	2,130.42	2,123.12	0.00	0.00	0.00
9,400.00	90.02	90.31	7,172.35	1,343.58	2,230.42	2,223.12	0.00	0.00	0.00
9,500.00	90.02	90.31	7,172.31	1,343.05	2,330.42	2,323.12	0.00	0.00	0.00
9,600.00	90.02	90.31	7,172.27	1,342.51	2,430.42	2,423.12	0.00	0.00	0.00
9,700.00	90.02	90.31	7,172.24	1,341.97	2,530.41	2,523.12	0.00	0.00	0.00
9,800.00	90.02	90.31	7,172.20	1,341.44	2,630.41	2,623.12	0.00	0.00	0.00
9,900.00	90.02	90.31	7,172.16	1,340.90	2,730.41	2,723.12	0.00	0.00	0.00
10,000.00	90.02	90.31	7,172.12	1,340.36	2,830.41	2,823.12	0.00	0.00	0.00
10,100.00	90.02	90.31	7,172.08	1,339.83	2,930.41	2,923.12	0.00	0.00	0.00
10,200.00	90.02	90.31	7,172.05	1,339.29	3,030.41	3,023.12	0.00	0.00	0.00
10,300.00	90.02	90.31	7,172.01	1,338.75	3,130.41	3,123.12	0.00	0.00	0.00
10,400.00	90.02	90.31	7,171.97	1,338.22	3,230.40	3,223.12	0.00	0.00	0.00
10,500.00	90.02	90.31	7,171.93	1,337.68	3,330.40	3,323.12	0.00	0.00	0.00
10,600.00	90.02	90.31	7,171.90	1,337.14	3,430.40	3,423.12	0.00	0.00	0.00
10,700.00	90.02	90.31	7,171.86	1,336.61	3,530.40	3,523.12	0.00	0.00	0.00
10,800.00	90.02	90.31	7,171.82	1,336.07	3,630.40	3,623.12	0.00	0.00	0.00
10,900.00	90.02	90.31	7,171.78	1,335.54	3,730.40	3,723.12	0.00	0.00	0.00
11,000.00	90.02	90.31	7,171.74	1,335.00	3,830.40	3,823.12	0.00	0.00	0.00
11,100.00	90.02	90.31	7,171.71	1,334.46	3,930.39	3,923.12	0.00	0.00	0.00
11,200.00	90.02	90.31	7,171.67	1,333.93	4,030.39	4,023.12	0.00	0.00	0.00

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
11,300.00	90.02	90.31	7,171.63	1,333.39	4,130.39	4,123.12	0.00	0.00	0.00	
11,400.00	90.02	90.31	7,171.59	1,332.85	4,230.39	4,223.12	0.00	0.00	0.00	
11,500.00	90.02	90.31	7,171.56	1,332.32	4,330.39	4,323.12	0.00	0.00	0.00	
11,600.00	90.02	90.31	7,171.52	1,331.78	4,430.39	4,423.12	0.00	0.00	0.00	
11,700.00	90.02	90.31	7,171.48	1,331.24	4,530.39	4,523.12	0.00	0.00	0.00	
11,800.00	90.02	90.31	7,171.44	1,330.71	4,630.38	4,623.12	0.00	0.00	0.00	
11,900.00	90.02	90.31	7,171.40	1,330.17	4,730.38	4,723.12	0.00	0.00	0.00	
12,000.00	90.02	90.31	7,171.37	1,329.63	4,830.38	4,823.12	0.00	0.00	0.00	
12,100.00	90.02	90.31	7,171.33	1,329.10	4,930.38	4,923.12	0.00	0.00	0.00	
12,200.00	90.02	90.31	7,171.29	1,328.56	5,030.38	5,023.12	0.00	0.00	0.00	
12,300.00	90.02	90.31	7,171.25	1,328.02	5,130.38	5,123.12	0.00	0.00	0.00	
12,400.00	90.02	90.31	7,171.22	1,327.49	5,230.38	5,223.12	0.00	0.00	0.00	
12,500.00	90.02	90.31	7,171.18	1,326.95	5,330.37	5,323.12	0.00	0.00	0.00	
12,600.00	90.02	90.31	7,171.14	1,326.41	5,430.37	5,423.12	0.00	0.00	0.00	
12,700.00	90.02	90.31	7,171.10	1,325.88	5,530.37	5,523.12	0.00	0.00	0.00	
12,800.00	90.02	90.31	7,171.06	1,325.34	5,630.37	5,623.12	0.00	0.00	0.00	
12,900.00	90.02	90.31	7,171.03	1,324.80	5,730.37	5,723.12	0.00	0.00	0.00	
13,000.00	90.02	90.31	7,170.99	1,324.27	5,830.37	5,823.12	0.00	0.00	0.00	
13,100.00	90.02	90.31	7,170.95	1,323.73	5,930.37	5,923.12	0.00	0.00	0.00	
13,200.00	90.02	90.31	7,170.91	1,323.20	6,030.36	6,023.12	0.00	0.00	0.00	
13,300.00	90.02	90.31	7,170.87	1,322.66	6,130.36	6,123.12	0.00	0.00	0.00	
13,400.00	90.02	90.31	7,170.84	1,322.12	6,230.36	6,223.12	0.00	0.00	0.00	
13,500.00	90.02	90.31	7,170.80	1,321.59	6,330.36	6,323.12	0.00	0.00	0.00	
13,600.00	90.02	90.31	7,170.76	1,321.05	6,430.36	6,423.12	0.00	0.00	0.00	
13,700.00	90.02	90.31	7,170.72	1,320.51	6,530.36	6,523.12	0.00	0.00	0.00	
13,800.00	90.02	90.31	7,170.69	1,319.98	6,630.36	6,623.12	0.00	0.00	0.00	
13,900.00	90.02	90.31	7,170.65	1,319.44	6,730.35	6,723.12	0.00	0.00	0.00	
14,000.00	90.02	90.31	7,170.61	1,318.90	6,830.35	6,823.12	0.00	0.00	0.00	
14,100.00	90.02	90.31	7,170.57	1,318.37	6,930.35	6,923.12	0.00	0.00	0.00	
14,200.00	90.02	90.31	7,170.53	1,317.83	7,030.35	7,023.12	0.00	0.00	0.00	
14,300.00	90.02	90.31	7,170.50	1,317.29	7,130.35	7,123.12	0.00	0.00	0.00	
14,400.00	90.02	90.31	7,170.46	1,316.76	7,230.35	7,223.12	0.00	0.00	0.00	
14,500.00	90.02	90.31	7,170.42	1,316.22	7,330.35	7,323.12	0.00	0.00	0.00	
14,600.00	90.02	90.31	7,170.38	1,315.68	7,430.34	7,423.12	0.00	0.00	0.00	
14,700.00	90.02	90.31	7,170.35	1,315.15	7,530.34	7,523.12	0.00	0.00	0.00	
14,800.00	90.02	90.31	7,170.31	1,314.61	7,630.34	7,623.12	0.00	0.00	0.00	
14,900.00	90.02	90.31	7,170.27	1,314.07	7,730.34	7,723.12	0.00	0.00	0.00	
15,000.00	90.02	90.31	7,170.23	1,313.54	7,830.34	7,823.12	0.00	0.00	0.00	
15,100.00	90.02	90.31	7,170.19	1,313.00	7,930.34	7,923.12	0.00	0.00	0.00	
15,200.00	90.02	90.31	7,170.16	1,312.46	8,030.33	8,023.12	0.00	0.00	0.00	
15,300.00	90.02	90.31	7,170.12	1,311.93	8,130.33	8,123.12	0.00	0.00	0.00	
15,400.00	90.02	90.31	7,170.08	1,311.39	8,230.33	8,223.12	0.00	0.00	0.00	
15,500.00	90.02	90.31	7,170.04	1,310.86	8,330.33	8,323.12	0.00	0.00	0.00	
15,600.00	90.02	90.31	7,170.01	1,310.32	8,430.33	8,423.12	0.00	0.00	0.00	
15,700.00	90.02	90.31	7,169.97	1,309.78	8,530.33	8,523.12	0.00	0.00	0.00	
15,800.00	90.02	90.31	7,169.93	1,309.25	8,630.33	8,623.12	0.00	0.00	0.00	
15,900.00	90.02	90.31	7,169.89	1,308.71	8,730.32	8,723.12	0.00	0.00	0.00	
16,000.00	90.02	90.31	7,169.85	1,308.17	8,830.32	8,823.12	0.00	0.00	0.00	
16,100.00	90.02	90.31	7,169.82	1,307.64	8,930.32	8,923.12	0.00	0.00	0.00	
16,200.00	90.02	90.31	7,169.78	1,307.10	9,030.32	9,023.12	0.00	0.00	0.00	
16,300.00	90.02	90.31	7,169.74	1,306.56	9,130.32	9,123.12	0.00	0.00	0.00	
16,400.00	90.02	90.31	7,169.70	1,306.03	9,230.32	9,223.12	0.00	0.00	0.00	
16,500.00	90.02	90.31	7,169.67	1,305.49	9,330.32	9,323.12	0.00	0.00	0.00	
16,600.00	90.02	90.31	7,169.63	1,304.95	9,430.31	9,423.12	0.00	0.00	0.00	

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,700.00	90.02	90.31	7,169.59	1,304.42	9,530.31	9,523.12	0.00	0.00	0.00
16,800.00	90.02	90.31	7,169.55	1,303.88	9,630.31	9,623.12	0.00	0.00	0.00
16,900.00	90.02	90.31	7,169.51	1,303.34	9,730.31	9,723.12	0.00	0.00	0.00
17,000.00	90.02	90.31	7,169.48	1,302.81	9,830.31	9,823.12	0.00	0.00	0.00
17,100.00	90.02	90.31	7,169.44	1,302.27	9,930.31	9,923.12	0.00	0.00	0.00
17,200.00	90.02	90.31	7,169.40	1,301.73	10,030.31	10,023.12	0.00	0.00	0.00
17,300.00	90.02	90.31	7,169.36	1,301.20	10,130.30	10,123.12	0.00	0.00	0.00
17,400.00	90.02	90.31	7,169.32	1,300.66	10,230.30	10,223.12	0.00	0.00	0.00
17,500.00	90.02	90.31	7,169.29	1,300.12	10,330.30	10,323.12	0.00	0.00	0.00
17,600.00	90.02	90.31	7,169.25	1,299.59	10,430.30	10,423.12	0.00	0.00	0.00
17,700.00	90.02	90.31	7,169.21	1,299.05	10,530.30	10,523.12	0.00	0.00	0.00
17,800.00	90.02	90.31	7,169.17	1,298.52	10,630.30	10,623.12	0.00	0.00	0.00
17,900.00	90.02	90.31	7,169.14	1,297.98	10,730.30	10,723.12	0.00	0.00	0.00
18,000.00	90.02	90.31	7,169.10	1,297.44	10,830.29	10,823.12	0.00	0.00	0.00
18,100.00	90.02	90.31	7,169.06	1,296.91	10,930.29	10,923.12	0.00	0.00	0.00
18,200.00	90.02	90.31	7,169.02	1,296.37	11,030.29	11,023.12	0.00	0.00	0.00
18,300.00	90.02	90.31	7,168.98	1,295.83	11,130.29	11,123.12	0.00	0.00	0.00
18,400.00	90.02	90.31	7,168.95	1,295.30	11,230.29	11,223.12	0.00	0.00	0.00
18,500.00	90.02	90.31	7,168.91	1,294.76	11,330.29	11,323.12	0.00	0.00	0.00
18,600.00	90.02	90.31	7,168.87	1,294.22	11,430.29	11,423.12	0.00	0.00	0.00
18,700.00	90.02	90.31	7,168.83	1,293.69	11,530.28	11,523.12	0.00	0.00	0.00
18,800.00	90.02	90.31	7,168.80	1,293.15	11,630.28	11,623.12	0.00	0.00	0.00
18,900.00	90.02	90.31	7,168.76	1,292.61	11,730.28	11,723.12	0.00	0.00	0.00
19,000.00	90.02	90.31	7,168.72	1,292.08	11,830.28	11,823.12	0.00	0.00	0.00
19,100.00	90.02	90.31	7,168.68	1,291.54	11,930.28	11,923.12	0.00	0.00	0.00
19,200.00	90.02	90.31	7,168.64	1,291.00	12,030.28	12,023.12	0.00	0.00	0.00
19,300.00	90.02	90.31	7,168.61	1,290.47	12,130.28	12,123.12	0.00	0.00	0.00
19,400.00	90.02	90.31	7,168.57	1,289.93	12,230.27	12,223.12	0.00	0.00	0.00
19,500.00	90.02	90.31	7,168.53	1,289.39	12,330.27	12,323.12	0.00	0.00	0.00
19,600.00	90.02	90.31	7,168.49	1,288.86	12,430.27	12,423.12	0.00	0.00	0.00
19,700.00	90.02	90.31	7,168.46	1,288.32	12,530.27	12,523.12	0.00	0.00	0.00
19,800.00	90.02	90.31	7,168.42	1,287.78	12,630.27	12,623.12	0.00	0.00	0.00
19,900.00	90.02	90.31	7,168.38	1,287.25	12,730.27	12,723.12	0.00	0.00	0.00
20,000.00	90.02	90.31	7,168.34	1,286.71	12,830.27	12,823.12	0.00	0.00	0.00
20,100.00	90.02	90.31	7,168.30	1,286.18	12,930.26	12,923.12	0.00	0.00	0.00
20,200.00	90.02	90.31	7,168.27	1,285.64	13,030.26	13,023.12	0.00	0.00	0.00
20,300.00	90.02	90.31	7,168.23	1,285.10	13,130.26	13,123.12	0.00	0.00	0.00
20,400.00	90.02	90.31	7,168.19	1,284.57	13,230.26	13,223.12	0.00	0.00	0.00
20,500.00	90.02	90.31	7,168.15	1,284.03	13,330.26	13,323.12	0.00	0.00	0.00
20,600.00	90.02	90.31	7,168.11	1,283.49	13,430.26	13,423.12	0.00	0.00	0.00
20,700.00	90.02	90.31	7,168.08	1,282.96	13,530.26	13,523.12	0.00	0.00	0.00
20,768.77	90.02	90.31	7,168.05	1,282.59	13,599.02	13,591.88	0.00	0.00	0.00
FPP @ 1513' FEL									
20,800.00	90.02	90.31	7,168.04	1,282.42	13,630.25	13,623.12	0.00	0.00	0.00
20,903.75	90.02	90.31	7,168.00	1,281.86	13,734.00	13,726.87	0.00	0.00	0.00
TD at 20903.75 @ 1378' FEL									

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit 832H
Company:	Logos Operating LLC	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site:	Rosa Unit 42	North Reference:	True
Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Design Targets										
Target Name										
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting		Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
RU 832H SHL	0.00	0.31	0.00	0.00	-0.29	2,133,454.42	2,872,990.40		36.861891	-107.320923
- plan misses target center by 0.29usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)										
- Point										
RU 832H PBHL	0.00	0.28	7,168.00	1,281.86	13,734.00	2,134,809.95	2,886,717.62		36.865403	-107.273973
- plan hits target center										
- Circle (radius 0.00)										
RU 832H FPP	0.00	0.00	7,168.05	1,282.59	13,599.02	2,134,809.95	2,886,582.64		36.865405	-107.274435
- plan hits target center										
- Point										
RU 832H POE	0.00	0.31	7,173.00	1,352.82	509.00	2,134,809.95	2,873,492.43		36.865607	-107.319182
- plan hits target center										
- Point										

Formations						
Measured Depth	Vertical Depth					
(usft)	(usft)	Name	Lithology	Dip	Dip Direction	
				(°)	(°)	
2,816.41	2,774.00	Ojo Alamo				
2,942.20	2,897.00	Kirtland				
3,324.67	3,271.00	Fruitland		0.00		
3,367.63	3,313.00	Top of Coals		0.00		
3,456.60	3,400.00	Base of Coals		0.00		
3,685.67	3,624.00	Pictured Cliffs				
3,786.92	3,723.00	Lewis		0.00		
4,925.14	4,836.00	Chacra		0.00		
5,459.99	5,359.00	Upper Cliff House		0.00		
5,751.45	5,644.00	Cliff House				
5,786.22	5,678.00	Menefee				
5,972.35	5,860.00	Point Lookout				
6,528.67	6,404.00	Mancos				
7,219.24	7,018.00	Top Black				
7,533.68	7,157.00	Top Target				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
		(usft)	(usft)		
500.00	500.00	0.00	0.00	Start Build 2.00	
1,104.22	1,099.75	63.13	-6.64	Start 5559.45 hold at 1104.22 MD	
6,663.67	6,536.00	1,220.63	-128.40	Start DLS 9.00 TFO 96.17	
7,678.56	7,173.00	1,352.82	509.00	Start 13090.21 hold at 7678.56 MD	
20,768.77	7,168.05	1,282.59	13,599.02	FPP @ 1513' FEL	
20,903.75	7,168.00	1,281.86	13,734.00	TD at 20903.75 @ 1378' FEL	

Logos Operating LLC

Rio Arriba, NM (NAD83)

Rosa Unit 42

Rosa Unit 832H

OH

Plan #2

Anticollision Report

22 August, 2023

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
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:	Stations	Error Model:	ISCSWA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum centre distance of 100,000.00usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	8/22/2023		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	20,903.74	Plan #2 (OH)	B001Mb_MWD+HRGM	OWSG MWD + HRGM	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 30						
Rosa Unit #664H - OH - OH	6,708.35	19,340.96	12,495.36	12,434.09	203.961	CC, ES
Rosa Unit #664H - OH - OH	7,200.00	19,340.96	12,683.75	12,620.23	199.674	SF
Rosa Unit 31						
Rosa Unit #744H - OH - OH	6,907.80	20,806.96	1,108.96	794.07	3.522	CC
Rosa Unit #744H - OH - OH	6,950.00	20,806.96	1,110.38	793.61	3.505	ES, SF
Rosa Unit #745H - OH - OH	6,946.75	21,289.96	2,097.18	1,752.89	6.091	CC
Rosa Unit #745H - OH - OH	7,000.00	21,289.96	2,098.41	1,752.60	6.068	ES
Rosa Unit #745H - OH - OH	7,050.00	21,289.96	2,101.77	1,754.94	6.060	SF
Rosa Unit #746H - OH - OH	6,670.82	20,952.96	2,947.09	2,692.26	11.565	CC
Rosa Unit #746H - OH - OH	6,700.00	20,952.96	2,947.33	2,692.03	11.545	ES
Rosa Unit #746H - OH - OH	6,850.00	20,952.96	2,955.94	2,698.68	11.490	SF
Rosa Unit 42						
(O) Pre-Ongard Well #112 - OH - OH-TD	6,679.33	6,740.57	10,034.00	9,842.90	52.505	CC
(O) Pre-Ongard Well #112 - OH - OH-TD	6,700.00	6,760.79	10,034.34	9,842.54	52.318	ES
(O) Pre-Ongard Well #112 - OH - OH-TD	7,300.00	7,255.51	10,313.93	10,105.52	49.489	SF
(O) Rosa Unit #006C - OH - OH-SVY	6,709.60	7,471.33	8,585.51	8,528.90	151.680	CC, ES
(O) Rosa Unit #006C - OH - OH-SVY	7,100.00	7,834.34	8,701.14	8,642.67	148.810	SF
(O) Rosa Unit #112Y - OH - OH-INC	6,679.65	6,743.80	10,059.32	9,828.28	43.539	CC
(O) Rosa Unit #112Y - OH - OH-INC	6,700.00	6,764.23	10,059.65	9,827.90	43.408	ES
(O) Rosa Unit #112Y - OH - OH-INC	7,250.00	7,228.62	10,298.65	10,051.07	41.597	SF
(O) Rosa Unit #184C - OH - OH-INC	3,272.87	3,396.42	8,276.64	8,151.22	65.992	CC
(O) Rosa Unit #184C - OH - OH-INC	6,663.67	6,725.26	8,303.79	8,051.43	32.905	ES
(O) Rosa Unit #184C - OH - OH-INC	7,200.00	7,194.62	8,521.15	8,253.01	31.779	SF
Rosa Unit 830H - OH - Plan #2	500.00	500.00	14.81	11.44	4.396	CC
Rosa Unit 830H - OH - Plan #2	600.00	599.52	15.07	10.99	3.690	ES
Rosa Unit 830H - OH - Plan #2	7,211.45	7,193.31	161.52	106.60	2.941	SF
Rosa Unit 834H - OH - Plan #3	500.00	500.00	30.21	26.84	8.965	CC, ES
Rosa Unit 834H - OH - Plan #3	17,000.00	17,154.59	2,650.99	2,165.91	5.465	SF
Rosa Unit 836H - OH - Plan #3	500.00	500.00	15.20	11.83	4.512	CC, ES
Rosa Unit 836H - OH - Plan #3	16,900.00	17,056.99	1,293.63	811.26	2.682	SF

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 396-MWD+HDGM, 5794-Standard Keeper 104, 6450-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	19,340.96	6,975.69	0.00	373.60	-83.46	1,444.68	-12,608.29	14,566.45					
100.00	100.00	19,340.96	6,975.69	0.25	373.60	-83.46	1,444.68	-12,608.29	14,517.63	14,456.22	61.41	236.417		
200.00	200.00	19,340.96	6,975.69	0.61	373.60	-83.46	1,444.68	-12,608.29	14,469.33	14,408.16	61.17	236.543		
300.00	300.00	19,340.96	6,975.69	0.97	373.60	-83.46	1,444.68	-12,608.29	14,421.56	14,360.56	61.00	236.412		
400.00	400.00	19,340.96	6,975.69	1.33	373.60	-83.46	1,444.68	-12,608.29	14,374.33	14,313.45	60.88	236.101		
500.00	500.00	19,340.96	6,975.69	1.68	373.60	-83.46	1,444.68	-12,608.29	14,327.64	14,266.85	60.80	235.671		
600.00	599.98	19,340.96	6,975.69	2.04	373.60	-78.48	1,444.68	-12,608.29	14,281.18	14,220.46	60.71	235.220		
700.00	699.84	19,340.96	6,975.69	2.41	373.60	-79.52	1,444.68	-12,608.29	14,234.64	14,174.03	60.61	234.851		
800.00	799.45	19,340.96	6,975.69	2.77	373.60	-80.55	1,444.68	-12,608.29	14,188.09	14,127.61	60.48	234.590		
900.00	898.70	19,340.96	6,975.69	3.13	373.60	-81.59	1,444.68	-12,608.29	14,141.59	14,081.27	60.32	234.433		
1,000.00	897.47	19,340.96	6,975.69	3.51	373.60	-82.63	1,444.68	-12,608.29	14,095.19	14,035.05	60.14	234.372		
1,104.22	1,099.75	19,340.96	6,975.69	3.92	373.60	-83.71	1,444.68	-12,608.29	14,047.00	13,987.07	59.93	234.398		
1,200.00	1,193.41	19,340.96	6,975.69	4.32	373.60	-83.71	1,444.68	-12,608.29	14,003.08	13,943.35	59.73	234.447		
1,300.00	1,291.19	19,340.96	6,975.69	4.74	373.60	-83.71	1,444.68	-12,608.29	13,957.77	13,898.24	59.53	234.473		
1,400.00	1,388.98	19,340.96	6,975.69	5.16	373.60	-83.71	1,444.68	-12,608.29	13,913.03	13,853.69	59.34	234.477		
1,500.00	1,486.76	19,340.96	6,975.69	5.59	373.60	-83.71	1,444.68	-12,608.29	13,868.87	13,809.72	59.15	234.463		
1,600.00	1,584.54	19,340.96	6,975.69	6.03	373.60	-83.71	1,444.68	-12,608.29	13,825.29	13,766.32	58.97	234.438		
1,700.00	1,682.33	19,340.96	6,975.69	6.47	373.60	-83.71	1,444.68	-12,608.29	13,782.30	13,723.51	58.80	234.403		
1,800.00	1,780.11	19,340.96	6,975.69	6.91	373.60	-83.71	1,444.68	-12,608.29	13,739.91	13,681.28	58.63	234.360		
1,900.00	1,877.90	19,340.96	6,975.69	7.35	373.60	-83.71	1,444.68	-12,608.29	13,698.11	13,639.65	58.46	234.312		
2,000.00	1,975.68	19,340.96	6,975.69	7.79	373.60	-83.71	1,444.68	-12,608.29	13,656.92	13,598.62	58.30	234.259		
2,100.00	2,073.46	19,340.96	6,975.69	8.24	373.60	-83.71	1,444.68	-12,608.29	13,616.33	13,558.19	58.14	234.201		
2,200.00	2,171.25	19,340.96	6,975.69	8.68	373.60	-83.71	1,444.68	-12,608.29	13,576.36	13,518.38	57.98	234.140		
2,300.00	2,269.03	19,340.96	6,975.69	9.13	373.60	-83.71	1,444.68	-12,608.29	13,537.02	13,479.18	57.83	234.074		
2,400.00	2,366.82	19,340.96	6,975.69	9.58	373.60	-83.71	1,444.68	-12,608.29	13,498.29	13,440.61	57.68	234.003		
2,500.00	2,464.60	19,340.96	6,975.69	10.03	373.60	-83.71	1,444.68	-12,608.29	13,460.20	13,402.66	57.54	233.928		
2,600.00	2,562.38	19,340.96	6,975.69	10.48	373.60	-83.71	1,444.68	-12,608.29	13,422.75	13,365.35	57.40	233.847		
2,700.00	2,660.17	19,340.96	6,975.69	10.93	373.60	-83.71	1,444.68	-12,608.29	13,385.94	13,328.68	57.26	233.759		
2,800.00	2,757.95	19,340.96	6,975.69	11.38	373.60	-83.71	1,444.68	-12,608.29	13,349.78	13,292.65	57.13	233.664		
2,900.00	2,855.74	19,340.96	6,975.69	11.83	373.60	-83.71	1,444.68	-12,608.29	13,314.27	13,257.26	57.01	233.561		
3,000.00	2,953.52	19,340.96	6,975.69	12.29	373.60	-83.71	1,444.68	-12,608.29	13,279.42	13,222.53	56.88	233.448		
3,100.00	3,051.30	19,340.96	6,975.69	12.74	373.60	-83.71	1,444.68	-12,608.29	13,245.23	13,188.46	56.77	233.323		
3,200.00	3,149.09	19,340.96	6,975.69	13.19	373.60	-83.71	1,444.68	-12,608.29	13,211.71	13,155.05	56.66	233.186		
3,300.00	3,246.87	19,340.96	6,975.69	13.65	373.60	-83.71	1,444.68	-12,608.29	13,178.86	13,122.31	56.55	233.034		
3,400.00	3,344.66	19,340.96	6,975.69	14.10	373.60	-83.71	1,444.68	-12,608.29	13,146.69	13,090.24	56.46	232.866		
3,500.00	3,442.44	19,340.96	6,975.69	14.55	373.60	-83.71	1,444.68	-12,608.29	13,115.21	13,058.84	56.37	232.680		
3,600.00	3,540.22	19,340.96	6,975.69	15.01	373.60	-83.71	1,444.68	-12,608.29	13,084.41	13,028.13	56.28	232.474		
3,700.00	3,638.01	19,340.96	6,975.69	15.46	373.60	-83.71	1,444.68	-12,608.29	13,054.31	12,998.10	56.21	232.246		
3,800.00	3,735.79	19,340.96	6,975.69	15.91	373.60	-83.71	1,444.68	-12,608.29	13,024.90	12,968.76	56.14	231.994		
3,900.00	3,833.58	19,340.96	6,975.69	16.37	373.60	-83.71	1,444.68	-12,608.29	12,996.20	12,940.11	56.09	231.715		
4,000.00	3,931.36	19,340.96	6,975.69	16.82	373.60	-83.71	1,444.68	-12,608.29	12,968.21	12,912.17	56.04	231.407		
4,100.00	4,029.14	19,340.96	6,975.69	17.28	373.60	-83.71	1,444.68	-12,608.29	12,940.93	12,884.92	56.00	231.068		
4,200.00	4,126.93	19,340.96	6,975.69	17.73	373.60	-83.71	1,444.68	-12,608.29	12,914.36	12,858.38	55.98	230.695		
4,300.00	4,224.71	19,340.96	6,975.69	18.19	373.60	-83.71	1,444.68	-12,608.29	12,888.52	12,832.55	55.97	230.285		
4,400.00	4,322.50	19,340.96	6,975.69	18.64	373.60	-83.71	1,444.68	-12,608.29	12,863.40	12,807.43	55.97	229.836		
4,500.00	4,420.28	19,340.96	6,975.69	19.10	373.60	-83.71	1,444.68	-12,608.29	12,839.01	12,783.03	55.98	229.345		
4,600.00	4,518.06	19,340.96	6,975.69	19.55	373.60	-83.71	1,444.68	-12,608.29	12,815.35	12,759.35	56.01	228.810		
4,700.00	4,615.85	19,340.96	6,975.69	20.01	373.60	-83.71	1,444.68	-12,608.29	12,792.44	12,736.39	56.05	228.228		
4,800.00	4,713.63	19,340.96	6,975.69	20.46	373.60	-83.71	1,444.68	-12,608.29	12,770.26	12,714.15	56.11	227.596		
4,900.00	4,811.42	19,340.96	6,975.69	20.92	373.60	-83.71	1,444.68	-12,608.29	12,748.83	12,692.65	56.18	226.911		
5,000.00	4,909.20	19,340.96	6,975.69	21.38	373.60	-83.71	1,444.68	-12,608.29	12,728.15	12,671.88	56.28	226.172		
5,100.00	5,006.98	19,340.96	6,975.69	21.83	373.60	-83.71	1,444.68	-12,608.29	12,708.23	12,651.84	56.39	225.376		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH													Offset Site Error:	0.00 usft
Survey Program:		396-MWD+HDGM, 5794-Standard Keeper 104, 6450-MWD+HDGM						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,200.00	5,104.77	19,340.96	6,975.69	22.29	373.60	-83.71	1,444.68	-12,608.29	12,689.06	12,632.54	56.52	224.522		
5,300.00	5,202.55	19,340.96	6,975.69	22.74	373.60	-83.71	1,444.68	-12,608.29	12,670.65	12,613.99	56.67	223.606		
5,400.00	5,300.34	19,340.96	6,975.69	23.20	373.60	-83.71	1,444.68	-12,608.29	12,653.01	12,596.17	56.83	222.627		
5,500.00	5,398.12	19,340.96	6,975.69	23.66	373.60	-83.71	1,444.68	-12,608.29	12,636.13	12,579.10	57.03	221.585		
5,600.00	5,495.90	19,340.96	6,975.69	24.11	373.60	-83.71	1,444.68	-12,608.29	12,620.02	12,562.78	57.24	220.477		
5,700.00	5,593.69	19,340.96	6,975.69	24.57	373.60	-83.71	1,444.68	-12,608.29	12,604.68	12,547.21	57.48	219.304		
5,800.00	5,691.47	19,340.96	6,975.69	25.02	373.60	-83.71	1,444.68	-12,608.29	12,590.12	12,532.39	57.74	218.065		
5,900.00	5,789.26	19,340.96	6,975.69	25.48	373.60	-83.71	1,444.68	-12,608.29	12,576.34	12,518.32	58.02	216.759		
6,000.00	5,887.04	19,340.96	6,975.69	25.94	373.60	-83.71	1,444.68	-12,608.29	12,563.34	12,505.01	58.33	215.388		
6,100.00	5,984.83	19,340.96	6,975.69	26.39	373.60	-83.71	1,444.68	-12,608.29	12,551.12	12,492.46	58.66	213.952		
6,200.00	6,082.61	19,340.96	6,975.69	26.85	373.60	-83.71	1,444.68	-12,608.29	12,539.69	12,480.66	59.02	212.452		
6,300.00	6,180.39	19,340.96	6,975.69	27.30	373.60	-83.71	1,444.68	-12,608.29	12,529.04	12,469.63	59.41	210.891		
6,400.00	6,278.18	19,340.96	6,975.69	27.76	373.60	-83.71	1,444.68	-12,608.29	12,519.19	12,459.36	59.82	209.271		
6,500.00	6,375.96	19,340.96	6,975.69	28.22	373.60	-83.71	1,444.68	-12,608.29	12,510.12	12,449.86	60.26	207.593		
6,600.00	6,473.75	19,340.96	6,975.69	28.67	373.60	-83.71	1,444.68	-12,608.29	12,501.85	12,441.13	60.73	205.862		
6,663.67	6,536.00	19,340.96	6,975.69	28.96	373.60	-83.71	1,444.68	-12,608.29	12,497.00	12,435.96	61.04	204.734		
6,700.00	6,571.53	19,340.96	6,975.69	29.13	373.60	-98.97	1,444.68	-12,608.29	12,495.41	12,434.19	61.22	204.101		
6,708.35	6,579.69	19,340.96	6,975.69	29.17	373.60	-102.37	1,444.68	-12,608.29	12,495.36	12,434.09	61.26	203.961	CC, ES	
6,750.00	6,620.29	19,340.96	6,975.69	29.35	373.60	-117.71	1,444.68	-12,608.29	12,496.79	12,435.32	61.47	203.286		
6,800.00	6,668.62	19,340.96	6,975.69	29.56	373.60	-131.63	1,444.68	-12,608.29	12,502.28	12,440.55	61.73	202.544		
6,850.00	6,716.22	19,340.96	6,975.69	29.76	373.60	-141.26	1,444.68	-12,608.29	12,511.84	12,449.87	61.98	201.882		
6,900.00	6,762.80	19,340.96	6,975.69	29.95	373.60	-147.92	1,444.68	-12,608.29	12,525.42	12,463.19	62.22	201.302		
6,950.00	6,808.07	19,340.96	6,975.69	30.13	373.60	-152.66	1,444.68	-12,608.29	12,542.90	12,480.44	62.46	200.806		
7,000.00	6,851.75	19,340.96	6,975.69	30.30	373.60	-156.13	1,444.68	-12,608.29	12,564.17	12,501.47	62.70	200.398		
7,050.00	6,893.57	19,340.96	6,975.69	30.45	373.60	-158.75	1,444.68	-12,608.29	12,589.07	12,526.15	62.92	200.079		
7,100.00	6,933.27	19,340.96	6,975.69	30.60	373.60	-160.76	1,444.68	-12,608.29	12,617.44	12,554.31	63.13	199.852		
7,150.00	6,970.61	19,340.96	6,975.69	30.74	373.60	-162.34	1,444.68	-12,608.29	12,649.07	12,585.74	63.34	199.716		
7,200.00	7,005.36	19,340.96	6,975.69	30.87	373.60	-163.59	1,444.68	-12,608.29	12,683.75	12,620.23	63.52	199.674	SF	
7,250.00	7,037.31	19,340.96	6,975.69	30.99	373.60	-164.59	1,444.68	-12,608.29	12,721.23	12,657.54	63.69	199.725		
7,300.00	7,066.25	19,340.96	6,975.69	31.11	373.60	-165.38	1,444.68	-12,608.29	12,761.27	12,697.42	63.85	199.870		
7,350.00	7,092.02	19,340.96	6,975.69	31.22	373.60	-166.01	1,444.68	-12,608.29	12,803.59	12,739.61	63.98	200.105		
7,400.00	7,114.44	19,340.96	6,975.69	31.34	373.60	-166.50	1,444.68	-12,608.29	12,847.92	12,783.82	64.10	200.430		
7,450.00	7,133.38	19,340.96	6,975.69	31.47	373.60	-166.86	1,444.68	-12,608.29	12,893.95	12,829.75	64.20	200.842		
7,500.00	7,148.73	19,340.96	6,975.69	31.61	373.60	-167.09	1,444.68	-12,608.29	12,941.39	12,877.11	64.28	201.335		
7,550.00	7,160.40	19,340.96	6,975.69	31.78	373.60	-167.15	1,444.68	-12,608.29	12,989.94	12,925.60	64.34	201.905		
7,600.00	7,168.30	19,340.96	6,975.69	31.98	373.60	-166.93	1,444.68	-12,608.29	13,039.27	12,974.89	64.38	202.546		
7,650.00	7,172.38	19,340.96	6,975.69	32.23	373.60	-165.26	1,444.68	-12,608.29	13,089.09	13,024.69	64.40	203.250		
7,678.56	7,173.00	19,340.96	6,975.69	32.39	373.60	-37.74	1,444.68	-12,608.29	13,117.64	13,053.23	64.40	203.676		
7,700.00	7,172.99	19,340.96	6,975.69	32.53	373.60	-37.74	1,444.68	-12,608.29	13,139.08	13,074.67	64.41	204.004		
7,800.00	7,172.95	19,340.96	6,975.69	33.31	373.60	-37.74	1,444.68	-12,608.29	13,239.08	13,174.66	64.41	205.530		
7,900.00	7,172.92	19,340.96	6,975.69	34.32	373.60	-37.74	1,444.68	-12,608.29	13,339.08	13,274.66	64.42	207.054		
8,000.00	7,172.88	19,340.96	6,975.69	35.53	373.60	-37.74	1,444.68	-12,608.29	13,439.08	13,374.65	64.43	208.574		
8,100.00	7,172.84	19,340.96	6,975.69	36.89	373.60	-37.74	1,444.68	-12,608.29	13,539.08	13,474.63	64.44	210.092		
8,200.00	7,172.80	19,340.96	6,975.69	38.39	373.60	-37.74	1,444.68	-12,608.29	13,639.08	13,574.62	64.45	211.607		
8,300.00	7,172.77	19,340.96	6,975.69	39.99	373.60	-37.74	1,444.68	-12,608.29	13,739.08	13,674.61	64.47	213.119		
8,400.00	7,172.73	19,340.96	6,975.69	41.68	373.60	-37.74	1,444.68	-12,608.29	13,839.08	13,774.60	64.48	214.628		
8,500.00	7,172.69	19,340.96	6,975.69	43.45	373.60	-37.74	1,444.68	-12,608.29	13,939.08	13,874.58	64.49	216.134		
8,600.00	7,172.65	19,340.96	6,975.69	45.29	373.60	-37.74	1,444.68	-12,608.29	14,039.08	13,974.57	64.51	217.637		
8,700.00	7,172.61	19,340.96	6,975.69	47.18	373.60	-37.74	1,444.68	-12,608.29	14,139.08	14,074.55	64.52	219.136		
8,800.00	7,172.58	19,340.96	6,975.69	49.12	373.60	-37.74	1,444.68	-12,608.29	14,239.08	14,174.54	64.54	220.633		
8,900.00	7,172.54	19,340.96	6,975.69	51.11	373.60	-37.74	1,444.68	-12,608.29	14,339.08	14,274.52	64.55	222.126		
9,000.00	7,172.50	19,340.96	6,975.69	53.13	373.60	-37.74	1,444.68	-12,608.29	14,439.08	14,374.50	64.57	223.616		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH												Offset Site Error:	0.00 usft
Survey Program:		396-MWD+HDGM, 5794-Standard Keeper 104, 6450-MWD+HDGM						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,100.00	7,172.46	19,340.96	6,975.69	55.19	373.60	-37.74	1,444.68	-12,608.29	14,539.08	14,474.49	64.59	225.102	
9,200.00	7,172.42	19,340.96	6,975.69	57.28	373.60	-37.74	1,444.68	-12,608.29	14,639.07	14,574.47	64.61	226.585	
9,300.00	7,172.39	19,340.96	6,975.69	59.39	373.60	-37.74	1,444.68	-12,608.29	14,739.07	14,674.45	64.63	228.065	
9,400.00	7,172.35	19,340.96	6,975.69	61.53	373.60	-37.74	1,444.68	-12,608.29	14,839.07	14,774.43	64.65	229.541	
9,500.00	7,172.31	19,340.96	6,975.69	63.70	373.60	-37.74	1,444.68	-12,608.29	14,939.07	14,874.41	64.67	231.013	
9,600.00	7,172.27	19,340.96	6,975.69	65.88	373.60	-37.74	1,444.68	-12,608.29	15,039.07	14,974.38	64.69	232.482	
9,700.00	7,172.24	19,340.96	6,975.69	68.08	373.60	-37.74	1,444.68	-12,608.29	15,139.07	15,074.36	64.71	233.948	
9,800.00	7,172.20	19,340.96	6,975.69	70.29	373.60	-37.74	1,444.68	-12,608.29	15,239.07	15,174.34	64.73	235.409	
9,900.00	7,172.16	19,340.96	6,975.69	72.52	373.60	-37.74	1,444.68	-12,608.29	15,339.07	15,274.31	64.76	236.867	
10,000.00	7,172.12	19,340.96	6,975.69	74.76	373.60	-37.74	1,444.68	-12,608.29	15,439.07	15,374.29	64.78	238.322	
10,100.00	7,172.08	19,340.96	6,975.69	77.02	373.60	-37.74	1,444.68	-12,608.29	15,539.07	15,474.26	64.81	239.772	
10,200.00	7,172.05	19,340.96	6,975.69	79.28	373.60	-37.74	1,444.68	-12,608.29	15,639.07	15,574.24	64.83	241.219	
10,300.00	7,172.01	19,340.96	6,975.69	81.56	373.60	-37.74	1,444.68	-12,608.29	15,739.07	15,674.21	64.86	242.661	
10,400.00	7,171.97	19,340.96	6,975.69	83.84	373.60	-37.74	1,444.68	-12,608.29	15,839.07	15,774.18	64.89	244.100	
10,500.00	7,171.93	19,340.96	6,975.69	86.13	373.60	-37.74	1,444.68	-12,608.29	15,939.07	15,874.16	64.92	245.535	
10,600.00	7,171.90	19,340.96	6,975.69	88.43	373.60	-37.74	1,444.68	-12,608.29	16,039.07	15,974.13	64.94	246.966	
10,700.00	7,171.86	19,340.96	6,975.69	90.74	373.60	-37.74	1,444.68	-12,608.29	16,139.07	16,074.10	64.97	248.393	
10,800.00	7,171.82	19,340.96	6,975.69	93.05	373.60	-37.74	1,444.68	-12,608.29	16,239.07	16,174.07	65.00	249.816	
10,900.00	7,171.78	19,340.96	6,975.69	95.37	373.60	-37.74	1,444.68	-12,608.29	16,339.07	16,274.04	65.04	251.235	
11,000.00	7,171.74	19,340.96	6,975.69	97.70	373.60	-37.74	1,444.68	-12,608.29	16,439.07	16,374.00	65.07	252.649	
11,100.00	7,171.71	19,340.96	6,975.69	100.03	373.60	-37.74	1,444.68	-12,608.29	16,539.07	16,473.97	65.10	254.060	
11,200.00	7,171.67	19,340.96	6,975.69	102.37	373.60	-37.74	1,444.68	-12,608.29	16,639.07	16,573.94	65.13	255.466	
11,300.00	7,171.63	19,340.96	6,975.69	104.71	373.60	-37.74	1,444.68	-12,608.29	16,739.07	16,673.90	65.17	256.868	
11,400.00	7,171.59	19,340.96	6,975.69	107.06	373.60	-37.74	1,444.68	-12,608.29	16,839.07	16,773.87	65.20	258.266	
11,500.00	7,171.56	19,340.96	6,975.69	109.40	373.60	-37.74	1,444.68	-12,608.29	16,939.07	16,873.83	65.24	259.659	
11,600.00	7,171.52	19,340.96	6,975.69	111.76	373.60	-37.74	1,444.68	-12,608.29	17,039.07	16,973.80	65.27	261.049	
11,700.00	7,171.48	19,340.96	6,975.69	114.12	373.60	-37.74	1,444.68	-12,608.29	17,139.07	17,073.76	65.31	262.433	
11,800.00	7,171.44	19,340.96	6,975.69	116.48	373.60	-37.74	1,444.68	-12,608.29	17,239.07	17,173.72	65.35	263.814	
11,900.00	7,171.40	19,340.96	6,975.69	118.84	373.60	-37.74	1,444.68	-12,608.29	17,339.07	17,273.68	65.38	265.190	
12,000.00	7,171.37	19,340.96	6,975.69	121.20	373.60	-37.74	1,444.68	-12,608.29	17,439.07	17,373.65	65.42	266.562	
12,100.00	7,171.33	19,340.96	6,975.69	123.57	373.60	-37.74	1,444.68	-12,608.29	17,539.07	17,473.61	65.46	267.929	
12,200.00	7,171.29	19,340.96	6,975.69	125.95	373.60	-37.74	1,444.68	-12,608.29	17,639.07	17,573.57	65.50	269.291	
12,300.00	7,171.25	19,340.96	6,975.69	128.32	373.60	-37.74	1,444.68	-12,608.29	17,739.07	17,673.53	65.54	270.650	
12,400.00	7,171.22	19,340.96	6,975.69	130.70	373.60	-37.74	1,444.68	-12,608.29	17,839.07	17,773.48	65.58	272.003	
12,500.00	7,171.18	19,340.96	6,975.69	133.07	373.60	-37.74	1,444.68	-12,608.29	17,939.07	17,873.44	65.63	273.352	
12,600.00	7,171.14	19,340.96	6,975.69	135.46	373.60	-37.74	1,444.68	-12,608.29	18,039.07	17,973.40	65.67	274.697	
12,700.00	7,171.10	19,340.96	6,975.69	137.84	373.60	-37.74	1,444.68	-12,608.29	18,139.07	18,073.35	65.71	276.037	
12,800.00	7,171.06	19,340.96	6,975.69	140.22	373.60	-37.74	1,444.68	-12,608.29	18,239.07	18,173.31	65.76	277.372	
12,900.00	7,171.03	19,340.96	6,975.69	142.61	373.60	-37.74	1,444.68	-12,608.29	18,339.07	18,273.26	65.80	278.703	
13,000.00	7,170.99	19,340.96	6,975.69	145.00	373.60	-37.74	1,444.68	-12,608.29	18,439.07	18,373.22	65.85	280.029	
13,100.00	7,170.95	19,340.96	6,975.69	147.39	373.60	-37.74	1,444.68	-12,608.29	18,539.07	18,473.17	65.89	281.350	
13,200.00	7,170.91	19,340.96	6,975.69	149.78	373.60	-37.74	1,444.68	-12,608.29	18,639.07	18,573.13	65.94	282.666	
13,300.00	7,170.87	19,340.96	6,975.69	152.17	373.60	-37.74	1,444.68	-12,608.29	18,739.07	18,673.08	65.99	283.978	
13,400.00	7,170.84	19,340.96	6,975.69	154.57	373.60	-37.74	1,444.68	-12,608.29	18,839.07	18,773.03	66.04	285.285	
13,500.00	7,170.80	19,340.96	6,975.69	156.96	373.60	-37.74	1,444.68	-12,608.29	18,939.07	18,872.98	66.08	286.588	
13,600.00	7,170.76	19,340.96	6,975.69	159.36	373.60	-37.74	1,444.68	-12,608.29	19,039.07	18,972.93	66.13	287.885	
13,700.00	7,170.72	19,340.96	6,975.69	161.76	373.60	-37.74	1,444.68	-12,608.29	19,139.07	19,072.88	66.18	289.178	
13,800.00	7,170.69	19,340.96	6,975.69	164.16	373.60	-37.74	1,444.68	-12,608.29	19,239.06	19,172.83	66.24	290.466	
13,900.00	7,170.65	19,340.96	6,975.69	166.56	373.60	-37.74	1,444.68	-12,608.29	19,339.06	19,272.78	66.29	291.749	
14,000.00	7,170.61	19,340.96	6,975.69	168.96	373.60	-37.74	1,444.68	-12,608.29	19,439.06	19,372.73	66.34	293.027	
14,100.00	7,170.57	19,340.96	6,975.69	171.36	373.60	-37.74	1,444.68	-12,608.29	19,539.06	19,472.67	66.39	294.301	
14,200.00	7,170.53	19,340.96	6,975.69	173.76	373.60	-37.74	1,444.68	-12,608.29	19,639.06	19,572.62	66.44	295.569	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 396-MWD+HDGM, 5794-Standard Keeper 104, 6450-MWD+HDGM				Rule Assigned:				Offset Well Error:		0.00 usft			
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
14,300.00	7,170.50	19,340.96	6,975.69	176.17	373.60	-37.74	1,444.68	-12,608.29	19,739.06	19,672.57	66.50	296.833	
14,400.00	7,170.46	19,340.96	6,975.69	178.57	373.60	-37.74	1,444.68	-12,608.29	19,839.06	19,772.51	66.55	298.092	
14,500.00	7,170.42	19,340.96	6,975.69	180.98	373.60	-37.74	1,444.68	-12,608.29	19,939.06	19,872.45	66.61	299.346	
14,600.00	7,170.38	19,340.96	6,975.69	183.39	373.60	-37.74	1,444.68	-12,608.29	20,039.06	19,972.40	66.66	300.595	
14,700.00	7,170.35	19,340.96	6,975.69	185.80	373.60	-37.74	1,444.68	-12,608.29	20,139.06	20,072.34	66.72	301.839	
14,800.00	7,170.31	19,340.96	6,975.69	188.20	373.60	-37.74	1,444.68	-12,608.29	20,239.06	20,172.28	66.78	303.078	
14,900.00	7,170.27	19,340.96	6,975.69	190.61	373.60	-37.74	1,444.68	-12,608.29	20,339.06	20,272.23	66.84	304.312	
15,000.00	7,170.23	19,340.96	6,975.69	193.02	373.60	-37.74	1,444.68	-12,608.29	20,439.06	20,372.17	66.89	305.541	
15,100.00	7,170.19	19,340.96	6,975.69	195.43	373.60	-37.74	1,444.68	-12,608.29	20,539.06	20,472.11	66.95	306.766	
15,200.00	7,170.16	19,340.96	6,975.69	197.85	373.60	-37.74	1,444.68	-12,608.29	20,639.06	20,572.05	67.01	307.985	
15,300.00	7,170.12	19,340.96	6,975.69	200.26	373.60	-37.74	1,444.68	-12,608.29	20,739.06	20,671.99	67.07	309.199	
15,400.00	7,170.08	19,340.96	6,975.69	202.67	373.60	-37.74	1,444.68	-12,608.29	20,839.06	20,771.93	67.13	310.409	
15,500.00	7,170.04	19,340.96	6,975.69	205.08	373.60	-37.74	1,444.68	-12,608.29	20,939.06	20,871.87	67.20	311.613	
15,600.00	7,170.01	19,340.96	6,975.69	207.50	373.60	-37.74	1,444.68	-12,608.29	21,039.06	20,971.80	67.26	312.813	
15,700.00	7,169.97	19,340.96	6,975.69	209.91	373.60	-37.74	1,444.68	-12,608.29	21,139.06	21,071.74	67.32	314.007	
15,800.00	7,169.93	19,340.96	6,975.69	212.33	373.60	-37.74	1,444.68	-12,608.29	21,239.06	21,171.68	67.38	315.197	
15,900.00	7,169.89	19,340.96	6,975.69	214.74	373.60	-37.74	1,444.68	-12,608.29	21,339.06	21,271.61	67.45	316.381	
16,000.00	7,169.85	19,340.96	6,975.69	217.16	373.60	-37.74	1,444.68	-12,608.29	21,439.06	21,371.55	67.51	317.561	
16,100.00	7,169.82	19,340.96	6,975.69	219.58	373.60	-37.74	1,444.68	-12,608.29	21,539.06	21,471.48	67.58	318.735	
16,200.00	7,169.78	19,340.96	6,975.69	221.99	373.60	-37.74	1,444.68	-12,608.29	21,639.06	21,571.42	67.64	319.905	
16,300.00	7,169.74	19,340.96	6,975.69	224.41	373.60	-37.74	1,444.68	-12,608.29	21,739.06	21,671.35	67.71	321.070	
16,400.00	7,169.70	19,340.96	6,975.69	226.83	373.60	-37.74	1,444.68	-12,608.29	21,839.06	21,771.29	67.77	322.229	
16,500.00	7,169.67	19,340.96	6,975.69	229.25	373.60	-37.74	1,444.68	-12,608.29	21,939.06	21,871.22	67.84	323.384	
16,600.00	7,169.63	19,340.96	6,975.69	231.66	373.60	-37.74	1,444.68	-12,608.29	22,039.06	21,971.15	67.91	324.533	
16,700.00	7,169.59	19,340.96	6,975.69	234.08	373.60	-37.74	1,444.68	-12,608.29	22,139.06	22,071.08	67.98	325.678	
16,800.00	7,169.55	19,340.96	6,975.69	236.50	373.60	-37.74	1,444.68	-12,608.29	22,239.06	22,171.01	68.05	326.818	
16,900.00	7,169.51	19,340.96	6,975.69	238.92	373.60	-37.74	1,444.68	-12,608.29	22,339.06	22,270.94	68.12	327.952	
17,000.00	7,169.48	19,340.96	6,975.69	241.34	373.60	-37.74	1,444.68	-12,608.29	22,439.06	22,370.87	68.19	329.082	
17,100.00	7,169.44	19,340.96	6,975.69	243.76	373.60	-37.74	1,444.68	-12,608.29	22,539.06	22,470.80	68.26	330.207	
17,200.00	7,169.40	19,340.96	6,975.69	246.18	373.60	-37.74	1,444.68	-12,608.29	22,639.06	22,570.73	68.33	331.326	
17,300.00	7,169.36	19,340.96	6,975.69	248.61	373.60	-37.74	1,444.68	-12,608.29	22,739.06	22,670.66	68.40	332.441	
17,400.00	7,169.32	19,340.96	6,975.69	251.03	373.60	-37.74	1,444.68	-12,608.29	22,839.06	22,770.59	68.47	333.551	
17,500.00	7,169.29	19,340.96	6,975.69	253.45	373.60	-37.74	1,444.68	-12,608.29	22,939.06	22,870.51	68.55	334.656	
17,600.00	7,169.25	19,340.96	6,975.69	255.87	373.60	-37.74	1,444.68	-12,608.29	23,039.06	22,970.44	68.62	335.756	
17,700.00	7,169.21	19,340.96	6,975.69	258.29	373.60	-37.74	1,444.68	-12,608.29	23,139.06	23,070.37	68.69	336.851	
17,800.00	7,169.17	19,340.96	6,975.69	260.72	373.60	-37.74	1,444.68	-12,608.29	23,239.06	23,170.29	68.77	337.941	
17,900.00	7,169.14	19,340.96	6,975.69	263.14	373.60	-37.74	1,444.68	-12,608.29	23,339.06	23,270.22	68.84	339.026	
18,000.00	7,169.10	19,340.96	6,975.69	265.56	373.60	-37.74	1,444.68	-12,608.29	23,439.06	23,370.14	68.92	340.106	
18,100.00	7,169.06	19,340.96	6,975.69	267.99	373.60	-37.74	1,444.68	-12,608.29	23,539.06	23,470.07	68.99	341.181	
18,200.00	7,169.02	19,340.96	6,975.69	270.41	373.60	-37.74	1,444.68	-12,608.29	23,639.06	23,569.99	69.07	342.251	
18,300.00	7,168.98	19,340.96	6,975.69	272.84	373.60	-37.74	1,444.68	-12,608.29	23,739.06	23,669.91	69.15	343.317	
18,400.00	7,168.95	19,340.96	6,975.69	275.26	373.60	-37.74	1,444.68	-12,608.29	23,839.06	23,769.84	69.22	344.377	
18,500.00	7,168.91	19,340.96	6,975.69	277.68	373.60	-37.74	1,444.68	-12,608.29	23,939.06	23,869.76	69.30	345.433	
18,600.00	7,168.87	19,340.96	6,975.69	280.11	373.60	-37.74	1,444.68	-12,608.29	24,039.06	23,969.68	69.38	346.483	
18,700.00	7,168.83	19,340.96	6,975.69	282.53	373.60	-37.74	1,444.68	-12,608.29	24,139.06	24,069.60	69.46	347.529	
18,800.00	7,168.80	19,340.96	6,975.69	284.96	373.60	-37.74	1,444.68	-12,608.29	24,239.06	24,169.52	69.54	348.570	
18,900.00	7,168.76	19,340.96	6,975.69	287.38	373.60	-37.74	1,444.68	-12,608.29	24,339.06	24,269.44	69.62	349.607	
19,000.00	7,168.72	19,340.96	6,975.69	289.81	373.60	-37.74	1,444.68	-12,608.29	24,439.06	24,369.36	69.70	350.638	
19,100.00	7,168.68	19,340.96	6,975.69	292.24	373.60	-37.74	1,444.68	-12,608.29	24,539.06	24,469.28	69.78	351.664	
19,200.00	7,168.64	19,340.96	6,975.69	294.66	373.60	-37.74	1,444.68	-12,608.29	24,639.06	24,569.20	69.86	352.686	
19,300.00	7,168.61	19,340.96	6,975.69	297.09	373.60	-37.74	1,444.68	-12,608.29	24,739.06	24,669.11	69.94	353.703	
19,400.00	7,168.57	19,340.96	6,975.69	299.52	373.60	-37.74	1,444.68	-12,608.29	24,839.06	24,769.03	70.03	354.715	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 30 - Rosa Unit #664H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 396-MWD+HDGM, 5794-Standard Keeper 104, 6450-MWD+HDGM							Rule Assigned:						Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Minimum Separation		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,500.00	7,168.53	19,340.96	6,975.69	301.94	373.60	-37.74	1,444.68	-12,608.29	24,939.06	24,868.95	70.11	355.722	
19,600.00	7,168.49	19,340.96	6,975.69	304.37	373.60	-37.74	1,444.68	-12,608.29	25,039.06	24,968.87	70.19	356.725	
19,700.00	7,168.46	19,340.96	6,975.69	306.80	373.60	-37.74	1,444.68	-12,608.29	25,139.06	25,068.78	70.28	357.723	
19,800.00	7,168.42	19,340.96	6,975.69	309.22	373.60	-37.74	1,444.68	-12,608.29	25,239.06	25,168.70	70.36	358.716	
19,900.00	7,168.38	19,340.96	6,975.69	311.65	373.60	-37.74	1,444.68	-12,608.29	25,339.06	25,268.61	70.44	359.704	
20,000.00	7,168.34	19,340.96	6,975.69	314.08	373.60	-37.74	1,444.68	-12,608.29	25,439.06	25,368.53	70.53	360.688	
20,100.00	7,168.30	19,340.96	6,975.69	316.51	373.60	-37.74	1,444.68	-12,608.29	25,539.06	25,468.44	70.61	361.667	
20,200.00	7,168.27	19,340.96	6,975.69	318.93	373.60	-37.74	1,444.68	-12,608.29	25,639.06	25,568.36	70.70	362.641	
20,300.00	7,168.23	19,340.96	6,975.69	321.36	373.60	-37.74	1,444.68	-12,608.29	25,739.06	25,668.27	70.79	363.611	
20,400.00	7,168.19	19,340.96	6,975.69	323.79	373.60	-37.74	1,444.68	-12,608.29	25,839.06	25,768.18	70.87	364.575	
20,500.00	7,168.15	19,340.96	6,975.69	326.22	373.60	-37.74	1,444.68	-12,608.29	25,939.06	25,868.10	70.96	365.536	
20,600.00	7,168.11	19,340.96	6,975.69	328.65	373.60	-37.74	1,444.68	-12,608.29	26,039.06	25,968.01	71.05	366.491	
20,700.00	7,168.08	19,340.96	6,975.69	331.07	373.60	-37.74	1,444.68	-12,608.29	26,139.06	26,067.92	71.14	367.442	
20,768.77	7,168.05	19,340.96	6,975.69	332.74	373.60	-37.74	1,444.68	-12,608.29	26,207.82	26,136.62	71.20	368.094	
20,800.00	7,168.04	19,340.96	6,975.69	333.50	373.60	-37.74	1,444.68	-12,608.29	26,239.06	26,167.83	71.23	368.389	
20,903.75	7,168.00	19,340.96	6,975.69	336.02	373.60	-37.74	1,444.68	-12,608.29	26,342.81	26,271.49	71.32	369.366	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #744H - OH - OH													Offset Site Error:	0.00 usft
Survey Program:		100-A020Ga_GYRO-NS, 3048-B001Mb_MWD+HRGM, 20807-Project						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	20,806.96	7,074.42	0.00	336.82	-58.65	334.11	-548.42	7,174.23					
100.00	100.00	20,806.96	7,074.42	0.25	336.82	-58.65	334.11	-548.42	7,074.64	6,962.77	111.87	63.240		
200.00	200.00	20,806.96	7,074.42	0.61	336.82	-58.65	334.11	-548.42	6,975.06	6,863.16	111.90	62.333		
300.00	300.00	20,806.96	7,074.42	0.97	336.82	-58.65	334.11	-548.42	6,875.49	6,763.55	111.94	61.422		
400.00	400.00	20,806.96	7,074.42	1.33	336.82	-58.65	334.11	-548.42	6,775.93	6,663.95	111.98	60.508		
500.00	500.00	20,806.96	7,074.42	1.68	336.82	-58.65	334.11	-548.42	6,676.39	6,564.35	112.04	59.591		
600.00	599.98	20,806.96	7,074.42	2.04	336.82	-72.67	334.11	-548.42	6,576.78	6,464.69	112.09	58.677		
700.00	699.84	20,806.96	7,074.42	2.41	336.82	-97.58	334.11	-548.42	6,477.09	6,364.97	112.12	57.771		
800.00	799.45	20,806.96	7,074.42	2.77	336.82	-119.72	334.11	-548.42	6,377.45	6,265.32	112.13	56.877		
900.00	898.70	20,806.96	7,074.42	3.13	336.82	-135.04	334.11	-548.42	6,277.99	6,165.87	112.12	55.995		
1,000.00	997.47	20,806.96	7,074.42	3.51	336.82	-144.92	334.11	-548.42	6,178.83	6,066.74	112.08	55.127		
1,104.22	1,099.75	20,806.96	7,074.42	3.92	336.82	-151.67	334.11	-548.42	6,075.96	5,963.92	112.03	54.234		
1,200.00	1,193.41	20,806.96	7,074.42	4.32	336.82	-151.67	334.11	-548.42	5,981.71	5,869.73	111.99	53.415		
1,300.00	1,291.19	20,806.96	7,074.42	4.74	336.82	-151.67	334.11	-548.42	5,883.37	5,771.42	111.95	52.552		
1,400.00	1,388.98	20,806.96	7,074.42	5.16	336.82	-151.67	334.11	-548.42	5,785.08	5,673.15	111.93	51.685		
1,500.00	1,486.76	20,806.96	7,074.42	5.59	336.82	-151.67	334.11	-548.42	5,686.86	5,574.94	111.92	50.812		
1,600.00	1,584.54	20,806.96	7,074.42	6.03	336.82	-151.67	334.11	-548.42	5,588.70	5,476.78	111.92	49.935		
1,700.00	1,682.33	20,806.96	7,074.42	6.47	336.82	-151.67	334.11	-548.42	5,490.60	5,378.67	111.93	49.053		
1,800.00	1,780.11	20,806.96	7,074.42	6.91	336.82	-151.67	334.11	-548.42	5,392.57	5,280.61	111.96	48.166		
1,900.00	1,877.90	20,806.96	7,074.42	7.35	336.82	-151.67	334.11	-548.42	5,294.62	5,182.62	112.00	47.274		
2,000.00	1,975.68	20,806.96	7,074.42	7.79	336.82	-151.67	334.11	-548.42	5,196.74	5,084.69	112.05	46.378		
2,100.00	2,073.46	20,806.96	7,074.42	8.24	336.82	-151.67	334.11	-548.42	5,098.95	4,986.83	112.13	45.476		
2,200.00	2,171.25	20,806.96	7,074.42	8.68	336.82	-151.67	334.11	-548.42	5,001.25	4,889.03	112.22	44.568		
2,300.00	2,269.03	20,806.96	7,074.42	9.13	336.82	-151.67	334.11	-548.42	4,903.63	4,791.31	112.32	43.656		
2,400.00	2,366.82	20,806.96	7,074.42	9.58	336.82	-151.67	334.11	-548.42	4,806.12	4,693.66	112.46	42.738		
2,500.00	2,464.60	20,806.96	7,074.42	10.03	336.82	-151.67	334.11	-548.42	4,708.71	4,596.10	112.61	41.814		
2,600.00	2,562.38	20,806.96	7,074.42	10.48	336.82	-151.67	334.11	-548.42	4,611.41	4,498.62	112.79	40.884		
2,700.00	2,660.17	20,806.96	7,074.42	10.93	336.82	-151.67	334.11	-548.42	4,514.23	4,401.23	113.00	39.949		
2,800.00	2,757.95	20,806.96	7,074.42	11.38	336.82	-151.67	334.11	-548.42	4,417.17	4,303.93	113.24	39.007		
2,900.00	2,855.74	20,806.96	7,074.42	11.83	336.82	-151.67	334.11	-548.42	4,320.25	4,206.73	113.52	38.058		
3,000.00	2,953.52	20,806.96	7,074.42	12.29	336.82	-151.67	334.11	-548.42	4,223.47	4,109.64	113.83	37.103		
3,100.00	3,051.30	20,806.96	7,074.42	12.74	336.82	-151.67	334.11	-548.42	4,126.85	4,012.66	114.19	36.140		
3,200.00	3,149.09	20,806.96	7,074.42	13.19	336.82	-151.67	334.11	-548.42	4,030.39	3,915.79	114.59	35.171		
3,300.00	3,246.87	20,806.96	7,074.42	13.65	336.82	-151.67	334.11	-548.42	3,934.10	3,819.05	115.05	34.194		
3,400.00	3,344.66	20,806.96	7,074.42	14.10	336.82	-151.67	334.11	-548.42	3,838.01	3,722.44	115.57	33.209		
3,500.00	3,442.44	20,806.96	7,074.42	14.55	336.82	-151.67	334.11	-548.42	3,742.12	3,625.97	116.16	32.216		
3,600.00	3,540.22	20,806.96	7,074.42	15.01	336.82	-151.67	334.11	-548.42	3,646.46	3,529.64	116.82	31.215		
3,700.00	3,638.01	20,806.96	7,074.42	15.46	336.82	-151.67	334.11	-548.42	3,551.03	3,433.47	117.56	30.206		
3,800.00	3,735.79	20,806.96	7,074.42	15.91	336.82	-151.67	334.11	-548.42	3,455.86	3,337.47	118.39	29.189		
3,900.00	3,833.58	20,806.96	7,074.42	16.37	336.82	-151.67	334.11	-548.42	3,360.97	3,241.64	119.33	28.164		
4,000.00	3,931.36	20,806.96	7,074.42	16.82	336.82	-151.67	334.11	-548.42	3,266.39	3,145.99	120.39	27.131		
4,100.00	4,029.14	20,806.96	7,074.42	17.28	336.82	-151.67	334.11	-548.42	3,172.13	3,050.55	121.58	26.091		
4,200.00	4,126.93	20,806.96	7,074.42	17.73	336.82	-151.67	334.11	-548.42	3,078.24	2,955.33	122.92	25.043		
4,300.00	4,224.71	20,806.96	7,074.42	18.19	336.82	-151.67	334.11	-548.42	2,984.75	2,860.33	124.42	23.990		
4,400.00	4,322.50	20,806.96	7,074.42	18.64	336.82	-151.67	334.11	-548.42	2,891.70	2,765.59	126.11	22.931		
4,500.00	4,420.28	20,806.96	7,074.42	19.10	336.82	-151.67	334.11	-548.42	2,799.12	2,671.11	128.00	21.867		
4,600.00	4,518.06	20,806.96	7,074.42	19.55	336.82	-151.67	334.11	-548.42	2,707.07	2,576.93	130.14	20.802		
4,700.00	4,615.85	20,806.96	7,074.42	20.01	336.82	-151.67	334.11	-548.42	2,615.60	2,483.07	132.53	19.736		
4,800.00	4,713.63	20,806.96	7,074.42	20.46	336.82	-151.67	334.11	-548.42	2,524.78	2,389.56	135.22	18.671		
4,900.00	4,811.42	20,806.96	7,074.42	20.92	336.82	-151.67	334.11	-548.42	2,434.68	2,296.44	138.25	17.611		
5,000.00	4,909.20	20,806.96	7,074.42	21.38	336.82	-151.67	334.11	-548.42	2,345.39	2,203.75	141.64	16.559		
5,100.00	5,006.98	20,806.96	7,074.42	21.83	336.82	-151.67	334.11	-548.42	2,256.99	2,111.54	145.45	15.517		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #744H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 3048-B001Mb_MWD+HRGM, 20807-Project													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Rule Assigned:										
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,200.00	5,104.77	20,806.96	7,074.42	22.29	336.82	-151.67	334.11	-548.42	2,169.60	2,019.88	149.72	14.491	
5,300.00	5,202.55	20,806.96	7,074.42	22.74	336.82	-151.67	334.11	-548.42	2,083.34	1,928.84	154.50	13.484	
5,400.00	5,300.34	20,806.96	7,074.42	23.20	336.82	-151.67	334.11	-548.42	1,998.37	1,838.51	159.85	12.501	
5,500.00	5,398.12	20,806.96	7,074.42	23.66	336.82	-151.67	334.11	-548.42	1,914.84	1,749.01	165.83	11.547	
5,600.00	5,495.90	20,806.96	7,074.42	24.11	336.82	-151.67	334.11	-548.42	1,832.97	1,660.48	172.49	10.626	
5,700.00	5,593.69	20,806.96	7,074.42	24.57	336.82	-151.67	334.11	-548.42	1,752.98	1,573.08	179.90	9.744	
5,800.00	5,691.47	20,806.96	7,074.42	25.02	336.82	-151.67	334.11	-548.42	1,675.14	1,487.03	188.11	8.905	
5,900.00	5,789.26	20,806.96	7,074.42	25.48	336.82	-151.67	334.11	-548.42	1,599.77	1,402.60	197.17	8.114	
6,000.00	5,887.04	20,806.96	7,074.42	25.94	336.82	-151.67	334.11	-548.42	1,527.22	1,320.12	207.11	7.374	
6,100.00	5,984.83	20,806.96	7,074.42	26.39	336.82	-151.67	334.11	-548.42	1,457.93	1,239.99	217.94	6.690	
6,200.00	6,082.61	20,806.96	7,074.42	26.85	336.82	-151.67	334.11	-548.42	1,392.38	1,162.75	229.63	6.063	
6,300.00	6,180.39	20,806.96	7,074.42	27.30	336.82	-151.67	334.11	-548.42	1,331.12	1,089.00	242.12	5.498	
6,400.00	6,278.18	20,806.96	7,074.42	27.76	336.82	-151.67	334.11	-548.42	1,274.77	1,019.52	255.24	4.994	
6,500.00	6,375.96	20,806.96	7,074.42	28.22	336.82	-151.67	334.11	-548.42	1,224.01	955.22	268.79	4.554	
6,600.00	6,473.75	20,806.96	7,074.42	28.67	336.82	-151.67	334.11	-548.42	1,179.55	897.13	282.42	4.177	
6,663.67	6,536.00	20,806.96	7,074.42	28.96	336.82	-151.67	334.11	-548.42	1,154.88	863.92	290.96	3.969	
6,700.00	6,571.53	20,806.96	7,074.42	29.13	336.82	-165.84	334.11	-548.42	1,142.52	846.88	295.64	3.865	
6,750.00	6,620.29	20,806.96	7,074.42	29.35	336.82	176.62	334.11	-548.42	1,128.51	826.94	301.57	3.742	
6,800.00	6,668.62	20,806.96	7,074.42	29.56	336.82	163.56	334.11	-548.42	1,118.15	811.38	306.77	3.645	
6,850.00	6,716.22	20,806.96	7,074.42	29.76	336.82	154.47	334.11	-548.42	1,111.62	800.51	311.10	3.573	
6,900.00	6,762.80	20,806.96	7,074.42	29.95	336.82	148.02	334.11	-548.42	1,109.01	794.55	314.46	3.527	
6,907.80	6,769.96	20,806.96	7,074.42	29.98	336.82	147.18	334.11	-548.42	1,108.96	794.07	314.89	3.522 CC	
6,950.00	6,808.07	20,806.96	7,074.42	30.13	336.82	143.17	334.11	-548.42	1,110.38	793.61	316.77	3.505 ES, SF	
7,000.00	6,851.75	20,806.96	7,074.42	30.30	336.82	139.25	334.11	-548.42	1,115.70	797.71	317.98	3.509	
7,050.00	6,893.57	20,806.96	7,074.42	30.45	336.82	135.87	334.11	-548.42	1,124.88	806.76	318.12	3.536	
7,100.00	6,933.27	20,806.96	7,074.42	30.60	336.82	132.75	334.11	-548.42	1,137.77	820.57	317.21	3.587	
7,150.00	6,970.61	20,806.96	7,074.42	30.74	336.82	129.72	334.11	-548.42	1,154.18	838.85	315.33	3.660	
7,200.00	7,005.36	20,806.96	7,074.42	30.87	336.82	126.67	334.11	-548.42	1,173.85	861.26	312.59	3.755	
7,250.00	7,037.31	20,806.96	7,074.42	30.99	336.82	123.49	334.11	-548.42	1,196.51	887.40	309.10	3.871	
7,300.00	7,066.25	20,806.96	7,074.42	31.11	336.82	120.14	334.11	-548.42	1,221.85	916.86	304.99	4.006	
7,350.00	7,092.02	20,806.96	7,074.42	31.22	336.82	116.58	334.11	-548.42	1,249.56	949.19	300.37	4.160	
7,400.00	7,114.44	20,806.96	7,074.42	31.34	336.82	112.78	334.11	-548.42	1,279.32	983.96	295.36	4.331	
7,450.00	7,133.38	20,806.96	7,074.42	31.47	336.82	108.75	334.11	-548.42	1,310.81	1,020.76	290.06	4.519	
7,500.00	7,148.73	20,806.96	7,074.42	31.61	336.82	104.51	334.11	-548.42	1,343.73	1,059.17	284.56	4.722	
7,550.00	7,160.40	20,806.96	7,074.42	31.78	336.82	100.09	334.11	-548.42	1,377.78	1,098.83	278.96	4.939	
7,600.00	7,168.30	20,806.96	7,074.42	31.98	336.82	95.57	334.11	-548.42	1,412.68	1,139.38	273.30	5.169	
7,650.00	7,172.38	20,806.96	7,074.42	32.23	336.82	91.02	334.11	-548.42	1,448.14	1,180.50	267.64	5.411	
7,678.56	7,173.00	20,806.96	7,074.42	32.39	336.82	88.44	334.11	-548.42	1,468.56	1,204.13	264.43	5.554	
7,700.00	7,172.99	20,806.96	7,074.42	32.53	336.82	88.44	334.11	-548.42	1,484.00	1,221.95	262.04	5.663	
7,800.00	7,172.95	20,806.96	7,074.42	33.31	336.82	88.44	334.11	-548.42	1,557.86	1,306.57	251.28	6.200	
7,900.00	7,172.92	20,806.96	7,074.42	34.32	336.82	88.44	334.11	-548.42	1,634.50	1,393.34	241.17	6.778	
8,000.00	7,172.88	20,806.96	7,074.42	35.53	336.82	88.44	334.11	-548.42	1,713.55	1,481.86	231.69	7.396	
8,100.00	7,172.84	20,806.96	7,074.42	36.89	336.82	88.44	334.11	-548.42	1,794.70	1,571.85	222.85	8.054	
8,200.00	7,172.80	20,806.96	7,074.42	38.39	336.82	88.44	334.11	-548.42	1,877.66	1,663.06	214.60	8.749	
8,300.00	7,172.77	20,806.96	7,074.42	39.99	336.82	88.44	334.11	-548.42	1,962.22	1,755.29	206.93	9.483	
8,400.00	7,172.73	20,806.96	7,074.42	41.68	336.82	88.44	334.11	-548.42	2,048.16	1,848.38	199.79	10.252	
8,500.00	7,172.69	20,806.96	7,074.42	43.45	336.82	88.44	334.11	-548.42	2,135.33	1,942.20	193.13	11.056	
8,600.00	7,172.65	20,806.96	7,074.42	45.29	336.82	88.44	334.11	-548.42	2,223.58	2,036.64	186.94	11.895	
8,700.00	7,172.61	20,806.96	7,074.42	47.18	336.82	88.44	334.11	-548.42	2,312.79	2,131.63	181.16	12.766	
8,800.00	7,172.58	20,806.96	7,074.42	49.12	336.82	88.44	334.11	-548.42	2,402.84	2,227.07	175.77	13.670	
8,900.00	7,172.54	20,806.96	7,074.42	51.11	336.82	88.44	334.11	-548.42	2,493.66	2,322.92	170.74	14.605	
9,000.00	7,172.50	20,806.96	7,074.42	53.13	336.82	88.44	334.11	-548.42	2,585.15	2,419.13	166.03	15.571	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #744H - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 3048-B001Mb_MWD+HRGM, 20807-Project				Rule Assigned:								Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Distance		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
9,100.00	7,172.46	20,806.96	7,074.42	55.19	336.82	88.44	334.11	-548.42	2,677.25	2,515.64	161.61	16.566	
9,200.00	7,172.42	20,806.96	7,074.42	57.28	336.82	88.44	334.11	-548.42	2,769.90	2,612.42	157.48	17.589	
9,300.00	7,172.39	20,806.96	7,074.42	59.39	336.82	88.44	334.11	-548.42	2,863.05	2,709.45	153.60	18.640	
9,400.00	7,172.35	20,806.96	7,074.42	61.53	336.82	88.44	334.11	-548.42	2,956.64	2,806.69	149.94	19.718	
9,500.00	7,172.31	20,806.96	7,074.42	63.70	336.82	88.44	334.11	-548.42	3,050.64	2,904.13	146.51	20.822	
9,600.00	7,172.27	20,806.96	7,074.42	65.88	336.82	88.44	334.11	-548.42	3,145.01	3,001.73	143.27	21.951	
9,700.00	7,172.24	20,806.96	7,074.42	68.08	336.82	88.44	334.11	-548.42	3,239.71	3,099.50	140.22	23.105	
9,800.00	7,172.20	20,806.96	7,074.42	70.29	336.82	88.44	334.11	-548.42	3,334.73	3,197.40	137.33	24.283	
9,900.00	7,172.16	20,806.96	7,074.42	72.52	336.82	88.44	334.11	-548.42	3,430.03	3,295.43	134.60	25.483	
10,000.00	7,172.12	20,806.96	7,074.42	74.76	336.82	88.44	334.11	-548.42	3,525.59	3,393.57	132.02	26.706	
10,100.00	7,172.08	20,806.96	7,074.42	77.02	336.82	88.44	334.11	-548.42	3,621.39	3,491.82	129.57	27.950	
10,200.00	7,172.05	20,806.96	7,074.42	79.28	336.82	88.44	334.11	-548.42	3,717.41	3,590.16	127.24	29.215	
10,300.00	7,172.01	20,806.96	7,074.42	81.56	336.82	88.44	334.11	-548.42	3,813.63	3,688.59	125.04	30.500	
10,400.00	7,171.97	20,806.96	7,074.42	83.84	336.82	88.44	334.11	-548.42	3,910.05	3,787.11	122.94	31.805	
10,500.00	7,171.93	20,806.96	7,074.42	86.13	336.82	88.44	334.11	-548.42	4,006.64	3,885.69	120.94	33.129	
10,600.00	7,171.90	20,806.96	7,074.42	88.43	336.82	88.44	334.11	-548.42	4,103.39	3,984.35	119.04	34.470	
10,700.00	7,171.86	20,806.96	7,074.42	90.74	336.82	88.44	334.11	-548.42	4,200.29	4,083.07	117.23	35.830	
10,800.00	7,171.82	20,806.96	7,074.42	93.05	336.82	88.44	334.11	-548.42	4,297.34	4,181.84	115.50	37.206	
10,900.00	7,171.78	20,806.96	7,074.42	95.37	336.82	88.44	334.11	-548.42	4,394.52	4,280.67	113.85	38.599	
11,000.00	7,171.74	20,806.96	7,074.42	97.70	336.82	88.44	334.11	-548.42	4,491.83	4,379.55	112.27	40.008	
11,100.00	7,171.71	20,806.96	7,074.42	100.03	336.82	88.44	334.11	-548.42	4,589.25	4,478.48	110.77	41.432	
11,200.00	7,171.67	20,806.96	7,074.42	102.37	336.82	88.44	334.11	-548.42	4,686.77	4,577.45	109.32	42.871	
11,300.00	7,171.63	20,806.96	7,074.42	104.71	336.82	88.44	334.11	-548.42	4,784.40	4,676.46	107.94	44.324	
11,400.00	7,171.59	20,806.96	7,074.42	107.06	336.82	88.44	334.11	-548.42	4,882.13	4,775.51	106.62	45.790	
11,500.00	7,171.56	20,806.96	7,074.42	109.40	336.82	88.44	334.11	-548.42	4,979.95	4,874.60	105.35	47.270	
11,600.00	7,171.52	20,806.96	7,074.42	111.76	336.82	88.44	334.11	-548.42	5,077.85	4,973.71	104.13	48.763	
11,700.00	7,171.48	20,806.96	7,074.42	114.12	336.82	88.44	334.11	-548.42	5,175.83	5,072.86	102.97	50.267	
11,800.00	7,171.44	20,806.96	7,074.42	116.48	336.82	88.44	334.11	-548.42	5,273.89	5,172.04	101.84	51.784	
11,900.00	7,171.40	20,806.96	7,074.42	118.84	336.82	88.44	334.11	-548.42	5,372.02	5,271.25	100.77	53.311	
12,000.00	7,171.37	20,806.96	7,074.42	121.20	336.82	88.44	334.11	-548.42	5,470.21	5,370.48	99.73	54.850	
12,100.00	7,171.33	20,806.96	7,074.42	123.57	336.82	88.44	334.11	-548.42	5,568.48	5,469.74	98.73	56.398	
12,200.00	7,171.29	20,806.96	7,074.42	125.95	336.82	88.44	334.11	-548.42	5,666.80	5,569.02	97.78	57.957	
12,300.00	7,171.25	20,806.96	7,074.42	128.32	336.82	88.44	334.11	-548.42	5,765.18	5,668.32	96.85	59.525	
12,400.00	7,171.22	20,806.96	7,074.42	130.70	336.82	88.44	334.11	-548.42	5,863.61	5,767.65	95.96	61.102	
12,500.00	7,171.18	20,806.96	7,074.42	133.07	336.82	88.44	334.11	-548.42	5,962.10	5,866.99	95.11	62.688	
12,600.00	7,171.14	20,806.96	7,074.42	135.46	336.82	88.44	334.11	-548.42	6,060.63	5,966.35	94.28	64.282	
12,700.00	7,171.10	20,806.96	7,074.42	137.84	336.82	88.44	334.11	-548.42	6,159.22	6,065.73	93.49	65.884	
12,800.00	7,171.06	20,806.96	7,074.42	140.22	336.82	88.44	334.11	-548.42	6,257.85	6,165.13	92.72	67.494	
12,900.00	7,171.03	20,806.96	7,074.42	142.61	336.82	88.44	334.11	-548.42	6,356.52	6,264.54	91.98	69.110	
13,000.00	7,170.99	20,806.96	7,074.42	145.00	336.82	88.44	334.11	-548.42	6,455.23	6,363.97	91.26	70.733	
13,100.00	7,170.95	20,806.96	7,074.42	147.39	336.82	88.44	334.11	-548.42	6,553.98	6,463.41	90.57	72.363	
13,200.00	7,170.91	20,806.96	7,074.42	149.78	336.82	88.44	334.11	-548.42	6,652.77	6,562.87	89.90	73.999	
13,300.00	7,170.87	20,806.96	7,074.42	152.17	336.82	88.44	334.11	-548.42	6,751.59	6,662.33	89.26	75.640	
13,400.00	7,170.84	20,806.96	7,074.42	154.57	336.82	88.44	334.11	-548.42	6,850.45	6,761.82	88.64	77.287	
13,500.00	7,170.80	20,806.96	7,074.42	156.96	336.82	88.44	334.11	-548.42	6,949.34	6,861.31	88.03	78.939	
13,600.00	7,170.76	20,806.96	7,074.42	159.36	336.82	88.44	334.11	-548.42	7,048.26	6,960.81	87.45	80.596	
13,700.00	7,170.72	20,806.96	7,074.42	161.76	336.82	88.44	334.11	-548.42	7,147.22	7,060.33	86.89	82.257	
13,800.00	7,170.69	20,806.96	7,074.42	164.16	336.82	88.44	334.11	-548.42	7,246.20	7,159.85	86.34	83.922	
13,900.00	7,170.65	20,806.96	7,074.42	166.56	336.82	88.44	334.11	-548.42	7,345.21	7,259.39	85.82	85.591	
14,000.00	7,170.61	20,806.96	7,074.42	168.96	336.82	88.44	334.11	-548.42	7,444.24	7,358.93	85.31	87.264	
14,100.00	7,170.57	20,806.96	7,074.42	171.36	336.82	88.44	334.11	-548.42	7,543.30	7,458.49	84.81	88.940	
14,200.00	7,170.53	20,806.96	7,074.42	173.76	336.82	88.44	334.11	-548.42	7,642.39	7,558.05	84.34	90.618	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #744H - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 3048-B001Mb_MWD+HRGM, 20807-Project				Rule Assigned:								Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
14,300.00	7,170.50	20,806.96	7,074.42	176.17	336.82	88.44	334.11	-548.42	7,741.50	7,657.62	83.87	92.300	
14,400.00	7,170.46	20,806.96	7,074.42	178.57	336.82	88.44	334.11	-548.42	7,840.63	7,757.20	83.42	93.984	
14,500.00	7,170.42	20,806.96	7,074.42	180.98	336.82	88.44	334.11	-548.42	7,939.78	7,856.79	82.99	95.671	
14,600.00	7,170.38	20,806.96	7,074.42	183.39	336.82	88.44	334.11	-548.42	8,038.95	7,956.38	82.57	97.359	
14,700.00	7,170.35	20,806.96	7,074.42	185.80	336.82	88.44	334.11	-548.42	8,138.15	8,055.99	82.16	99.049	
14,800.00	7,170.31	20,806.96	7,074.42	188.20	336.82	88.44	334.11	-548.42	8,237.36	8,155.59	81.77	100.740	
14,900.00	7,170.27	20,806.96	7,074.42	190.61	336.82	88.44	334.11	-548.42	8,336.59	8,255.21	81.39	102.433	
15,000.00	7,170.23	20,806.96	7,074.42	193.02	336.82	88.44	334.11	-548.42	8,435.85	8,354.83	81.01	104.127	
15,100.00	7,170.19	20,806.96	7,074.42	195.43	336.82	88.44	334.11	-548.42	8,535.11	8,454.46	80.66	105.822	
15,200.00	7,170.16	20,806.96	7,074.42	197.85	336.82	88.44	334.11	-548.42	8,634.40	8,554.09	80.31	107.517	
15,300.00	7,170.12	20,806.96	7,074.42	200.26	336.82	88.44	334.11	-548.42	8,733.70	8,653.73	79.97	109.213	
15,400.00	7,170.08	20,806.96	7,074.42	202.67	336.82	88.44	334.11	-548.42	8,833.02	8,753.37	79.64	110.908	
15,500.00	7,170.04	20,806.96	7,074.42	205.08	336.82	88.44	334.11	-548.42	8,932.35	8,853.02	79.33	112.604	
15,600.00	7,170.01	20,806.96	7,074.42	207.50	336.82	88.44	334.11	-548.42	9,031.70	8,952.68	79.02	114.300	
15,700.00	7,169.97	20,806.96	7,074.42	209.91	336.82	88.44	334.11	-548.42	9,131.06	9,052.34	78.72	115.995	
15,800.00	7,169.93	20,806.96	7,074.42	212.33	336.82	88.44	334.11	-548.42	9,230.43	9,152.00	78.43	117.690	
15,900.00	7,169.89	20,806.96	7,074.42	214.74	336.82	88.44	334.11	-548.42	9,329.82	9,251.67	78.15	119.384	
16,000.00	7,169.85	20,806.96	7,074.42	217.16	336.82	88.44	334.11	-548.42	9,429.22	9,351.34	77.88	121.077	
16,100.00	7,169.82	20,806.96	7,074.42	219.58	336.82	88.44	334.11	-548.42	9,528.64	9,451.02	77.61	122.769	
16,200.00	7,169.78	20,806.96	7,074.42	221.99	336.82	88.44	334.11	-548.42	9,628.06	9,550.70	77.36	124.460	
16,300.00	7,169.74	20,806.96	7,074.42	224.41	336.82	88.44	334.11	-548.42	9,727.50	9,650.39	77.11	126.149	
16,400.00	7,169.70	20,806.96	7,074.42	226.83	336.82	88.44	334.11	-548.42	9,826.95	9,750.08	76.87	127.836	
16,500.00	7,169.67	20,806.96	7,074.42	229.25	336.82	88.44	334.11	-548.42	9,926.41	9,849.77	76.64	129.522	
16,600.00	7,169.63	20,806.96	7,074.42	231.66	336.82	88.44	334.11	-548.42	10,025.88	9,949.47	76.41	131.207	
16,700.00	7,169.59	20,806.96	7,074.42	234.08	336.82	88.44	334.11	-548.42	10,125.36	10,049.17	76.19	132.889	
16,800.00	7,169.55	20,806.96	7,074.42	236.50	336.82	88.44	334.11	-548.42	10,224.85	10,148.87	75.98	134.568	
16,900.00	7,169.51	20,806.96	7,074.42	238.92	336.82	88.44	334.11	-548.42	10,324.35	10,248.58	75.78	136.246	
17,000.00	7,169.48	20,806.96	7,074.42	241.34	336.82	88.44	334.11	-548.42	10,423.87	10,348.29	75.58	137.921	
17,100.00	7,169.44	20,806.96	7,074.42	243.76	336.82	88.44	334.11	-548.42	10,523.39	10,448.00	75.39	139.594	
17,200.00	7,169.40	20,806.96	7,074.42	246.18	336.82	88.44	334.11	-548.42	10,622.91	10,547.72	75.20	141.264	
17,300.00	7,169.36	20,806.96	7,074.42	248.61	336.82	88.44	334.11	-548.42	10,722.45	10,647.43	75.02	142.931	
17,400.00	7,169.32	20,806.96	7,074.42	251.03	336.82	88.44	334.11	-548.42	10,822.00	10,747.16	74.84	144.595	
17,500.00	7,169.29	20,806.96	7,074.42	253.45	336.82	88.44	334.11	-548.42	10,921.55	10,846.88	74.67	146.256	
17,600.00	7,169.25	20,806.96	7,074.42	255.87	336.82	88.44	334.11	-548.42	11,021.12	10,946.61	74.51	147.914	
17,700.00	7,169.21	20,806.96	7,074.42	258.29	336.82	88.44	334.11	-548.42	11,120.69	11,046.34	74.35	149.569	
17,800.00	7,169.17	20,806.96	7,074.42	260.72	336.82	88.44	334.11	-548.42	11,220.27	11,146.07	74.20	151.221	
17,900.00	7,169.14	20,806.96	7,074.42	263.14	336.82	88.44	334.11	-548.42	11,319.85	11,245.80	74.05	152.868	
18,000.00	7,169.10	20,806.96	7,074.42	265.56	336.82	88.44	334.11	-548.42	11,419.44	11,345.54	73.91	154.513	
18,100.00	7,169.06	20,806.96	7,074.42	267.99	336.82	88.44	334.11	-548.42	11,519.04	11,445.28	73.77	156.154	
18,200.00	7,169.02	20,806.96	7,074.42	270.41	336.82	88.44	334.11	-548.42	11,618.65	11,545.02	73.63	157.790	
18,300.00	7,168.98	20,806.96	7,074.42	272.84	336.82	88.44	334.11	-548.42	11,718.27	11,644.76	73.50	159.424	
18,400.00	7,168.95	20,806.96	7,074.42	275.26	336.82	88.44	334.11	-548.42	11,817.89	11,744.51	73.38	161.053	
18,500.00	7,168.91	20,806.96	7,074.42	277.68	336.82	88.44	334.11	-548.42	11,917.51	11,844.25	73.26	162.678	
18,600.00	7,168.87	20,806.96	7,074.42	280.11	336.82	88.44	334.11	-548.42	12,017.14	11,944.00	73.14	164.299	
18,700.00	7,168.83	20,806.96	7,074.42	282.53	336.82	88.44	334.11	-548.42	12,116.78	12,043.75	73.03	165.916	
18,800.00	7,168.80	20,806.96	7,074.42	284.96	336.82	88.44	334.11	-548.42	12,216.43	12,143.51	72.92	167.529	
18,900.00	7,168.76	20,806.96	7,074.42	287.38	336.82	88.44	334.11	-548.42	12,316.08	12,243.26	72.82	169.137	
19,000.00	7,168.72	20,806.96	7,074.42	289.81	336.82	88.44	334.11	-548.42	12,415.73	12,343.02	72.72	170.741	
19,100.00	7,168.68	20,806.96	7,074.42	292.24	336.82	88.44	334.11	-548.42	12,515.40	12,442.78	72.62	172.340	
19,200.00	7,168.64	20,806.96	7,074.42	294.66	336.82	88.44	334.11	-548.42	12,615.06	12,542.54	72.53	173.935	
19,300.00	7,168.61	20,806.96	7,074.42	297.09	336.82	88.44	334.11	-548.42	12,714.74	12,642.30	72.44	175.526	
19,400.00	7,168.57	20,806.96	7,074.42	299.52	336.82	88.44	334.11	-548.42	12,814.41	12,742.06	72.35	177.111	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #744H - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 3048-B001Mb_MWD+HRGM, 20807-Project												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,500.00	7,168.53	20,806.96	7,074.42	301.94	336.82	88.44	334.11	-548.42	12,914.09	12,841.82	72.27	178.692	
19,600.00	7,168.49	20,806.96	7,074.42	304.37	336.82	88.44	334.11	-548.42	13,013.78	12,941.59	72.19	180.268	
19,700.00	7,168.46	20,806.96	7,074.42	306.80	336.82	88.44	334.11	-548.42	13,113.47	13,041.36	72.12	181.840	
19,800.00	7,168.42	20,806.96	7,074.42	309.22	336.82	88.44	334.11	-548.42	13,213.17	13,141.13	72.04	183.406	
19,900.00	7,168.38	20,806.96	7,074.42	311.65	336.82	88.44	334.11	-548.42	13,312.87	13,240.90	71.97	184.968	
20,000.00	7,168.34	20,806.96	7,074.42	314.08	336.82	88.44	334.11	-548.42	13,412.58	13,340.67	71.91	186.524	
20,100.00	7,168.30	20,806.96	7,074.42	316.51	336.82	88.44	334.11	-548.42	13,512.29	13,440.44	71.84	188.076	
20,200.00	7,168.27	20,806.96	7,074.42	318.93	336.82	88.44	334.11	-548.42	13,612.00	13,540.22	71.78	189.622	
20,300.00	7,168.23	20,806.96	7,074.42	321.36	336.82	88.44	334.11	-548.42	13,711.72	13,639.99	71.73	191.163	
20,400.00	7,168.19	20,806.96	7,074.42	323.79	336.82	88.44	334.11	-548.42	13,811.44	13,739.77	71.67	192.700	
20,500.00	7,168.15	20,806.96	7,074.42	326.22	336.82	88.44	334.11	-548.42	13,911.17	13,839.55	71.62	194.231	
20,600.00	7,168.11	20,806.96	7,074.42	328.65	336.82	88.44	334.11	-548.42	14,010.90	13,939.32	71.57	195.756	
20,700.00	7,168.08	20,806.96	7,074.42	331.07	336.82	88.44	334.11	-548.42	14,110.63	14,039.10	71.53	197.277	
20,768.77	7,168.05	20,806.96	7,074.42	332.74	336.82	88.44	334.11	-548.42	14,179.22	14,107.72	71.50	198.319	
20,800.00	7,168.04	20,806.96	7,074.42	333.50	336.82	88.44	334.11	-548.42	14,210.37	14,138.89	71.48	198.792	
20,903.75	7,168.00	20,806.96	7,074.42	336.02	336.82	88.44	334.11	-548.42	14,313.85	14,242.41	71.44	200.358	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #745H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 409-B001Mb_MWD+HRGM, 21290-Project													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	21,289.96	7,363.81	0.00	339.92	-140.19	-664.10	-553.58	7,484.93				
100.00	100.00	21,289.96	7,363.81	0.25	339.92	-140.19	-664.10	-553.58	7,385.60	7,269.17	116.44	63.430	
200.00	200.00	21,289.96	7,363.81	0.61	339.92	-140.19	-664.10	-553.58	7,286.30	7,169.76	116.54	62.521	
300.00	300.00	21,289.96	7,363.81	0.97	339.92	-140.19	-664.10	-553.58	7,187.02	7,070.36	116.65	61.609	
400.00	400.00	21,289.96	7,363.81	1.33	339.92	-140.19	-664.10	-553.58	7,087.75	6,970.98	116.78	60.694	
500.00	500.00	21,289.96	7,363.81	1.68	339.92	-140.19	-664.10	-553.58	6,988.51	6,871.60	116.91	59.775	
600.00	599.98	21,289.96	7,363.81	2.04	339.92	-143.65	-664.10	-553.58	6,889.46	6,772.39	117.08	58.846	
700.00	699.84	21,289.96	7,363.81	2.41	339.92	-150.09	-664.10	-553.58	6,790.88	6,673.59	117.29	57.898	
800.00	799.45	21,289.96	7,363.81	2.77	339.92	-154.65	-664.10	-553.58	6,692.89	6,575.33	117.56	56.930	
900.00	898.70	21,289.96	7,363.81	3.13	339.92	-157.99	-664.10	-553.58	6,595.66	6,477.76	117.90	55.941	
1,000.00	997.47	21,289.96	7,363.81	3.51	339.92	-160.53	-664.10	-553.58	6,499.34	6,381.02	118.32	54.929	
1,104.22	1,099.75	21,289.96	7,363.81	3.92	339.92	-162.59	-664.10	-553.58	6,400.09	6,281.25	118.85	53.851	
1,200.00	1,193.41	21,289.96	7,363.81	4.32	339.92	-162.59	-664.10	-553.58	6,309.55	6,190.14	119.41	52.841	
1,300.00	1,291.19	21,289.96	7,363.81	4.74	339.92	-162.59	-664.10	-553.58	6,215.19	6,095.14	120.05	51.774	
1,400.00	1,388.98	21,289.96	7,363.81	5.16	339.92	-162.59	-664.10	-553.58	6,121.00	6,000.27	120.73	50.699	
1,500.00	1,486.76	21,289.96	7,363.81	5.59	339.92	-162.59	-664.10	-553.58	6,027.00	5,905.53	121.47	49.617	
1,600.00	1,584.54	21,289.96	7,363.81	6.03	339.92	-162.59	-664.10	-553.58	5,933.20	5,810.94	122.26	48.529	
1,700.00	1,682.33	21,289.96	7,363.81	6.47	339.92	-162.59	-664.10	-553.58	5,839.60	5,716.50	123.11	47.435	
1,800.00	1,780.11	21,289.96	7,363.81	6.91	339.92	-162.59	-664.10	-553.58	5,746.22	5,622.21	124.01	46.337	
1,900.00	1,877.90	21,289.96	7,363.81	7.35	339.92	-162.59	-664.10	-553.58	5,653.07	5,528.09	124.97	45.234	
2,000.00	1,975.68	21,289.96	7,363.81	7.79	339.92	-162.59	-664.10	-553.58	5,560.15	5,434.15	126.00	44.128	
2,100.00	2,073.46	21,289.96	7,363.81	8.24	339.92	-162.59	-664.10	-553.58	5,467.48	5,340.39	127.09	43.019	
2,200.00	2,171.25	21,289.96	7,363.81	8.68	339.92	-162.59	-664.10	-553.58	5,375.08	5,246.82	128.26	41.908	
2,300.00	2,269.03	21,289.96	7,363.81	9.13	339.92	-162.59	-664.10	-553.58	5,282.95	5,153.46	129.50	40.796	
2,400.00	2,366.82	21,289.96	7,363.81	9.58	339.92	-162.59	-664.10	-553.58	5,191.12	5,060.30	130.81	39.684	
2,500.00	2,464.60	21,289.96	7,363.81	10.03	339.92	-162.59	-664.10	-553.58	5,099.59	4,967.38	132.21	38.572	
2,600.00	2,562.38	21,289.96	7,363.81	10.48	339.92	-162.59	-664.10	-553.58	5,008.38	4,874.69	133.70	37.461	
2,700.00	2,660.17	21,289.96	7,363.81	10.93	339.92	-162.59	-664.10	-553.58	4,917.52	4,782.25	135.27	36.353	
2,800.00	2,757.95	21,289.96	7,363.81	11.38	339.92	-162.59	-664.10	-553.58	4,827.02	4,690.07	136.95	35.248	
2,900.00	2,855.74	21,289.96	7,363.81	11.83	339.92	-162.59	-664.10	-553.58	4,736.90	4,598.18	138.72	34.147	
3,000.00	2,953.52	21,289.96	7,363.81	12.29	339.92	-162.59	-664.10	-553.58	4,647.18	4,506.58	140.61	33.051	
3,100.00	3,051.30	21,289.96	7,363.81	12.74	339.92	-162.59	-664.10	-553.58	4,557.90	4,415.29	142.60	31.962	
3,200.00	3,149.09	21,289.96	7,363.81	13.19	339.92	-162.59	-664.10	-553.58	4,469.06	4,324.34	144.72	30.880	
3,300.00	3,246.87	21,289.96	7,363.81	13.65	339.92	-162.59	-664.10	-553.58	4,380.71	4,233.74	146.97	29.807	
3,400.00	3,344.66	21,289.96	7,363.81	14.10	339.92	-162.59	-664.10	-553.58	4,292.87	4,143.52	149.35	28.744	
3,500.00	3,442.44	21,289.96	7,363.81	14.55	339.92	-162.59	-664.10	-553.58	4,205.57	4,053.70	151.87	27.692	
3,600.00	3,540.22	21,289.96	7,363.81	15.01	339.92	-162.59	-664.10	-553.58	4,118.85	3,964.31	154.54	26.652	
3,700.00	3,638.01	21,289.96	7,363.81	15.46	339.92	-162.59	-664.10	-553.58	4,032.75	3,875.38	157.37	25.626	
3,800.00	3,735.79	21,289.96	7,363.81	15.91	339.92	-162.59	-664.10	-553.58	3,947.30	3,786.94	160.36	24.615	
3,900.00	3,833.58	21,289.96	7,363.81	16.37	339.92	-162.59	-664.10	-553.58	3,862.54	3,699.02	163.53	23.620	
4,000.00	3,931.36	21,289.96	7,363.81	16.82	339.92	-162.59	-664.10	-553.58	3,778.54	3,611.67	166.87	22.643	
4,100.00	4,029.14	21,289.96	7,363.81	17.28	339.92	-162.59	-664.10	-553.58	3,695.33	3,524.92	170.41	21.685	
4,200.00	4,126.93	21,289.96	7,363.81	17.73	339.92	-162.59	-664.10	-553.58	3,612.97	3,438.83	174.15	20.747	
4,300.00	4,224.71	21,289.96	7,363.81	18.19	339.92	-162.59	-664.10	-553.58	3,531.52	3,353.43	178.09	19.830	
4,400.00	4,322.50	21,289.96	7,363.81	18.64	339.92	-162.59	-664.10	-553.58	3,451.05	3,268.80	182.25	18.936	
4,500.00	4,420.28	21,289.96	7,363.81	19.10	339.92	-162.59	-664.10	-553.58	3,371.63	3,184.99	186.64	18.065	
4,600.00	4,518.06	21,289.96	7,363.81	19.55	339.92	-162.59	-664.10	-553.58	3,293.32	3,102.07	191.26	17.219	
4,700.00	4,615.85	21,289.96	7,363.81	20.01	339.92	-162.59	-664.10	-553.58	3,216.22	3,020.11	196.12	16.399	
4,800.00	4,713.63	21,289.96	7,363.81	20.46	339.92	-162.59	-664.10	-553.58	3,140.41	2,939.19	201.22	15.607	
4,900.00	4,811.42	21,289.96	7,363.81	20.92	339.92	-162.59	-664.10	-553.58	3,065.99	2,859.41	206.58	14.842	
5,000.00	4,909.20	21,289.96	7,363.81	21.38	339.92	-162.59	-664.10	-553.58	2,993.06	2,780.87	212.19	14.105	
5,100.00	5,006.98	21,289.96	7,363.81	21.83	339.92	-162.59	-664.10	-553.58	2,921.73	2,703.67	218.06	13.399	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #745H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 409-B001Mb_MWD+HRGM, 21290-Project													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Rule Assigned:										
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,200.00	5,104.77	21,289.96	7,363.81	22.29	339.92	-162.59	-664.10	-553.58	2,852.12	2,627.93	224.19	12.722	
5,300.00	5,202.55	21,289.96	7,363.81	22.74	339.92	-162.59	-664.10	-553.58	2,784.37	2,553.80	230.57	12.076	
5,400.00	5,300.34	21,289.96	7,363.81	23.20	339.92	-162.59	-664.10	-553.58	2,718.61	2,481.41	237.20	11.461	
5,500.00	5,398.12	21,289.96	7,363.81	23.66	339.92	-162.59	-664.10	-553.58	2,654.98	2,410.92	244.06	10.878	
5,600.00	5,495.90	21,289.96	7,363.81	24.11	339.92	-162.59	-664.10	-553.58	2,593.65	2,342.51	251.14	10.328	
5,700.00	5,593.69	21,289.96	7,363.81	24.57	339.92	-162.59	-664.10	-553.58	2,534.78	2,276.37	258.42	9.809	
5,800.00	5,691.47	21,289.96	7,363.81	25.02	339.92	-162.59	-664.10	-553.58	2,478.56	2,212.69	265.87	9.322	
5,900.00	5,789.26	21,289.96	7,363.81	25.48	339.92	-162.59	-664.10	-553.58	2,425.15	2,151.69	273.45	8.869	
6,000.00	5,887.04	21,289.96	7,363.81	25.94	339.92	-162.59	-664.10	-553.58	2,374.75	2,093.62	281.13	8.447	
6,100.00	5,984.83	21,289.96	7,363.81	26.39	339.92	-162.59	-664.10	-553.58	2,327.56	2,038.71	288.86	8.058	
6,200.00	6,082.61	21,289.96	7,363.81	26.85	339.92	-162.59	-664.10	-553.58	2,283.78	1,987.22	296.57	7.701	
6,300.00	6,180.39	21,289.96	7,363.81	27.30	339.92	-162.59	-664.10	-553.58	2,243.60	1,939.41	304.20	7.375	
6,400.00	6,278.18	21,289.96	7,363.81	27.76	339.92	-162.59	-664.10	-553.58	2,207.23	1,895.55	311.68	7.082	
6,500.00	6,375.96	21,289.96	7,363.81	28.22	339.92	-162.59	-664.10	-553.58	2,174.85	1,855.91	318.94	6.819	
6,600.00	6,473.75	21,289.96	7,363.81	28.67	339.92	-162.59	-664.10	-553.58	2,146.64	1,820.75	325.90	6.587	
6,663.67	6,536.00	21,289.96	7,363.81	28.96	339.92	-162.59	-664.10	-553.58	2,130.94	1,800.81	330.13	6.455	
6,700.00	6,571.53	21,289.96	7,363.81	29.13	339.92	-177.14	-664.10	-553.58	2,122.98	1,790.54	332.44	6.386	
6,750.00	6,620.29	21,289.96	7,363.81	29.35	339.92	164.95	-664.10	-553.58	2,113.69	1,778.28	335.41	6.302	
6,800.00	6,668.62	21,289.96	7,363.81	29.56	339.92	151.68	-664.10	-553.58	2,106.42	1,768.29	338.12	6.230	
6,850.00	6,716.22	21,289.96	7,363.81	29.76	339.92	142.51	-664.10	-553.58	2,101.21	1,760.67	340.54	6.170	
6,900.00	6,762.80	21,289.96	7,363.81	29.95	339.92	136.11	-664.10	-553.58	2,098.13	1,755.48	342.64	6.123	
6,946.75	6,805.17	21,289.96	7,363.81	30.12	339.92	131.72	-664.10	-553.58	2,097.18	1,752.89	344.30	6.091 CC	
6,950.00	6,808.07	21,289.96	7,363.81	30.13	339.92	131.45	-664.10	-553.58	2,097.19	1,752.79	344.40	6.089	
7,000.00	6,851.75	21,289.96	7,363.81	30.30	339.92	127.87	-664.10	-553.58	2,098.41	1,752.60	345.80	6.068 ES	
7,050.00	6,893.57	21,289.96	7,363.81	30.45	339.92	124.95	-664.10	-553.58	2,101.77	1,754.94	346.83	6.060 SF	
7,100.00	6,933.27	21,289.96	7,363.81	30.60	339.92	122.45	-664.10	-553.58	2,107.25	1,759.76	347.49	6.064	
7,150.00	6,970.61	21,289.96	7,363.81	30.74	339.92	120.19	-664.10	-553.58	2,114.79	1,767.01	347.78	6.081	
7,200.00	7,005.36	21,289.96	7,363.81	30.87	339.92	118.07	-664.10	-553.58	2,124.33	1,776.64	347.69	6.110	
7,250.00	7,037.31	21,289.96	7,363.81	30.99	339.92	116.02	-664.10	-553.58	2,135.78	1,788.52	347.26	6.150	
7,300.00	7,066.25	21,289.96	7,363.81	31.11	339.92	113.98	-664.10	-553.58	2,149.04	1,802.56	346.48	6.202	
7,350.00	7,092.02	21,289.96	7,363.81	31.22	339.92	111.93	-664.10	-553.58	2,163.99	1,818.61	345.38	6.265	
7,400.00	7,114.44	21,289.96	7,363.81	31.34	339.92	109.84	-664.10	-553.58	2,180.52	1,836.53	343.99	6.339	
7,450.00	7,133.38	21,289.96	7,363.81	31.47	339.92	107.70	-664.10	-553.58	2,198.48	1,856.15	342.33	6.422	
7,500.00	7,148.73	21,289.96	7,363.81	31.61	339.92	105.51	-664.10	-553.58	2,217.73	1,877.31	340.43	6.515	
7,550.00	7,160.40	21,289.96	7,363.81	31.78	339.92	103.27	-664.10	-553.58	2,238.12	1,899.82	338.30	6.616	
7,600.00	7,168.30	21,289.96	7,363.81	31.98	339.92	100.99	-664.10	-553.58	2,259.50	1,923.51	335.98	6.725	
7,650.00	7,172.38	21,289.96	7,363.81	32.23	339.92	98.69	-664.10	-553.58	2,281.70	1,948.20	333.50	6.842	
7,678.56	7,173.00	21,289.96	7,363.81	32.39	339.92	97.36	-664.10	-553.58	2,294.69	1,962.68	332.01	6.911	
7,700.00	7,172.99	21,289.96	7,363.81	32.53	339.92	97.36	-664.10	-553.58	2,304.60	1,973.72	330.88	6.965	
7,800.00	7,172.95	21,289.96	7,363.81	33.31	339.92	97.36	-664.10	-553.58	2,352.84	2,027.33	325.51	7.228	
7,900.00	7,172.92	21,289.96	7,363.81	34.32	339.92	97.36	-664.10	-553.58	2,404.27	2,084.23	320.04	7.512	
8,000.00	7,172.88	21,289.96	7,363.81	35.53	339.92	97.36	-664.10	-553.58	2,458.69	2,144.19	314.51	7.818	
8,100.00	7,172.84	21,289.96	7,363.81	36.89	339.92	97.36	-664.10	-553.58	2,515.91	2,206.96	308.95	8.143	
8,200.00	7,172.80	21,289.96	7,363.81	38.39	339.92	97.36	-664.10	-553.58	2,575.75	2,272.34	303.41	8.489	
8,300.00	7,172.77	21,289.96	7,363.81	39.99	339.92	97.36	-664.10	-553.58	2,638.02	2,340.11	297.91	8.855	
8,400.00	7,172.73	21,289.96	7,363.81	41.68	339.92	97.36	-664.10	-553.58	2,702.55	2,410.09	292.47	9.241	
8,500.00	7,172.69	21,289.96	7,363.81	43.45	339.92	97.36	-664.10	-553.58	2,769.20	2,482.09	287.11	9.645	
8,600.00	7,172.65	21,289.96	7,363.81	45.29	339.92	97.36	-664.10	-553.58	2,837.80	2,555.95	281.85	10.069	
8,700.00	7,172.61	21,289.96	7,363.81	47.18	339.92	97.36	-664.10	-553.58	2,908.22	2,631.52	276.70	10.510	
8,800.00	7,172.58	21,289.96	7,363.81	49.12	339.92	97.36	-664.10	-553.58	2,980.34	2,708.67	271.67	10.970	
8,900.00	7,172.54	21,289.96	7,363.81	51.11	339.92	97.36	-664.10	-553.58	3,054.03	2,787.25	266.77	11.448	
9,000.00	7,172.50	21,289.96	7,363.81	53.13	339.92	97.36	-664.10	-553.58	3,129.18	2,867.17	262.01	11.943	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #745H - OH - OH												Offset Site Error:	0.00 usft
Survey Program:		409-B001Mb_MWD+HRGM, 21290-Project						Rule Assigned:				Offset Well Error:	0.00 usft
Reference	Offset	Offset		Semi Major Axis			Offset Wellbore Centre		Distance				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,100.00	7,172.46	21,289.96	7,363.81	55.19	339.92	97.36	-664.10	-553.58	3,205.68	2,948.30	257.38	12.455	
9,200.00	7,172.42	21,289.96	7,363.81	57.28	339.92	97.36	-664.10	-553.58	3,283.45	3,030.56	252.89	12.984	
9,300.00	7,172.39	21,289.96	7,363.81	59.39	339.92	97.36	-664.10	-553.58	3,362.40	3,113.86	248.54	13.529	
9,400.00	7,172.35	21,289.96	7,363.81	61.53	339.92	97.36	-664.10	-553.58	3,442.44	3,198.11	244.33	14.089	
9,500.00	7,172.31	21,289.96	7,363.81	63.70	339.92	97.36	-664.10	-553.58	3,523.50	3,283.24	240.25	14.666	
9,600.00	7,172.27	21,289.96	7,363.81	65.88	339.92	97.36	-664.10	-553.58	3,605.51	3,369.20	236.31	15.257	
9,700.00	7,172.24	21,289.96	7,363.81	68.08	339.92	97.36	-664.10	-553.58	3,688.41	3,455.90	232.50	15.864	
9,800.00	7,172.20	21,289.96	7,363.81	70.29	339.92	97.36	-664.10	-553.58	3,772.14	3,543.31	228.82	16.485	
9,900.00	7,172.16	21,289.96	7,363.81	72.52	339.92	97.36	-664.10	-553.58	3,856.64	3,631.37	225.27	17.120	
10,000.00	7,172.12	21,289.96	7,363.81	74.76	339.92	97.36	-664.10	-553.58	3,941.87	3,720.03	221.83	17.769	
10,100.00	7,172.08	21,289.96	7,363.81	77.02	339.92	97.36	-664.10	-553.58	4,027.78	3,809.26	218.52	18.432	
10,200.00	7,172.05	21,289.96	7,363.81	79.28	339.92	97.36	-664.10	-553.58	4,114.32	3,899.01	215.32	19.108	
10,300.00	7,172.01	21,289.96	7,363.81	81.56	339.92	97.36	-664.10	-553.58	4,201.46	3,989.24	212.22	19.797	
10,400.00	7,171.97	21,289.96	7,363.81	83.84	339.92	97.36	-664.10	-553.58	4,289.17	4,079.93	209.24	20.499	
10,500.00	7,171.93	21,289.96	7,363.81	86.13	339.92	97.36	-664.10	-553.58	4,377.40	4,171.05	206.35	21.213	
10,600.00	7,171.90	21,289.96	7,363.81	88.43	339.92	97.36	-664.10	-553.58	4,466.12	4,262.56	203.56	21.940	
10,700.00	7,171.86	21,289.96	7,363.81	90.74	339.92	97.36	-664.10	-553.58	4,555.32	4,354.45	200.87	22.678	
10,800.00	7,171.82	21,289.96	7,363.81	93.05	339.92	97.36	-664.10	-553.58	4,644.95	4,446.68	198.27	23.427	
10,900.00	7,171.78	21,289.96	7,363.81	95.37	339.92	97.36	-664.10	-553.58	4,735.00	4,539.24	195.76	24.188	
11,000.00	7,171.74	21,289.96	7,363.81	97.70	339.92	97.36	-664.10	-553.58	4,825.44	4,632.12	193.33	24.960	
11,100.00	7,171.71	21,289.96	7,363.81	100.03	339.92	97.36	-664.10	-553.58	4,916.25	4,725.28	190.98	25.743	
11,200.00	7,171.67	21,289.96	7,363.81	102.37	339.92	97.36	-664.10	-553.58	5,007.42	4,818.71	188.70	26.536	
11,300.00	7,171.63	21,289.96	7,363.81	104.71	339.92	97.36	-664.10	-553.58	5,098.91	4,912.40	186.51	27.339	
11,400.00	7,171.59	21,289.96	7,363.81	107.06	339.92	97.36	-664.10	-553.58	5,190.72	5,006.34	184.38	28.152	
11,500.00	7,171.56	21,289.96	7,363.81	109.40	339.92	97.36	-664.10	-553.58	5,282.82	5,100.50	182.32	28.976	
11,600.00	7,171.52	21,289.96	7,363.81	111.76	339.92	97.36	-664.10	-553.58	5,375.21	5,194.88	180.33	29.808	
11,700.00	7,171.48	21,289.96	7,363.81	114.12	339.92	97.36	-664.10	-553.58	5,467.86	5,289.47	178.40	30.650	
11,800.00	7,171.44	21,289.96	7,363.81	116.48	339.92	97.36	-664.10	-553.58	5,560.77	5,384.24	176.53	31.501	
11,900.00	7,171.40	21,289.96	7,363.81	118.84	339.92	97.36	-664.10	-553.58	5,653.92	5,479.21	174.71	32.361	
12,000.00	7,171.37	21,289.96	7,363.81	121.20	339.92	97.36	-664.10	-553.58	5,747.30	5,574.34	172.96	33.229	
12,100.00	7,171.33	21,289.96	7,363.81	123.57	339.92	97.36	-664.10	-553.58	5,840.90	5,669.65	171.26	34.106	
12,200.00	7,171.29	21,289.96	7,363.81	125.95	339.92	97.36	-664.10	-553.58	5,934.71	5,765.11	169.61	34.991	
12,300.00	7,171.25	21,289.96	7,363.81	128.32	339.92	97.36	-664.10	-553.58	6,028.72	5,860.72	168.00	35.884	
12,400.00	7,171.22	21,289.96	7,363.81	130.70	339.92	97.36	-664.10	-553.58	6,122.92	5,956.47	166.45	36.785	
12,500.00	7,171.18	21,289.96	7,363.81	133.07	339.92	97.36	-664.10	-553.58	6,217.30	6,052.35	164.94	37.694	
12,600.00	7,171.14	21,289.96	7,363.81	135.46	339.92	97.36	-664.10	-553.58	6,311.85	6,148.37	163.48	38.610	
12,700.00	7,171.10	21,289.96	7,363.81	137.84	339.92	97.36	-664.10	-553.58	6,406.57	6,244.51	162.06	39.533	
12,800.00	7,171.06	21,289.96	7,363.81	140.22	339.92	97.36	-664.10	-553.58	6,501.44	6,340.76	160.68	40.463	
12,900.00	7,171.03	21,289.96	7,363.81	142.61	339.92	97.36	-664.10	-553.58	6,596.47	6,437.13	159.34	41.400	
13,000.00	7,170.99	21,289.96	7,363.81	145.00	339.92	97.36	-664.10	-553.58	6,691.64	6,533.61	158.03	42.343	
13,100.00	7,170.95	21,289.96	7,363.81	147.39	339.92	97.36	-664.10	-553.58	6,786.95	6,630.19	156.77	43.293	
13,200.00	7,170.91	21,289.96	7,363.81	149.78	339.92	97.36	-664.10	-553.58	6,882.40	6,726.86	155.54	44.250	
13,300.00	7,170.87	21,289.96	7,363.81	152.17	339.92	97.36	-664.10	-553.58	6,977.97	6,823.63	154.34	45.212	
13,400.00	7,170.84	21,289.96	7,363.81	154.57	339.92	97.36	-664.10	-553.58	7,073.66	6,920.49	153.17	46.181	
13,500.00	7,170.80	21,289.96	7,363.81	156.96	339.92	97.36	-664.10	-553.58	7,169.47	7,017.43	152.04	47.155	
13,600.00	7,170.76	21,289.96	7,363.81	159.36	339.92	97.36	-664.10	-553.58	7,265.40	7,114.46	150.94	48.135	
13,700.00	7,170.72	21,289.96	7,363.81	161.76	339.92	97.36	-664.10	-553.58	7,361.43	7,211.57	149.86	49.121	
13,800.00	7,170.69	21,289.96	7,363.81	164.16	339.92	97.36	-664.10	-553.58	7,457.57	7,308.75	148.82	50.111	
13,900.00	7,170.65	21,289.96	7,363.81	166.56	339.92	97.36	-664.10	-553.58	7,553.81	7,406.00	147.80	51.108	
14,000.00	7,170.61	21,289.96	7,363.81	168.96	339.92	97.36	-664.10	-553.58	7,650.14	7,503.33	146.81	52.109	
14,100.00	7,170.57	21,289.96	7,363.81	171.36	339.92	97.36	-664.10	-553.58	7,746.57	7,600.72	145.85	53.115	
14,200.00	7,170.53	21,289.96	7,363.81	173.76	339.92	97.36	-664.10	-553.58	7,843.08	7,698.18	144.91	54.125	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #745H - OH - OH													Offset Site Error:	0.00 usft
Survey Program:		409-B001Mb_MWD+HRGM, 21290-Project						Rule Assigned:				Offset Well Error:		0.00 usft
Reference	Offset	Offset		Semi Major Axis			Offset Wellbore Centre		Distance					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
14,300.00	7,170.50	21,289.96	7,363.81	176.17	339.92	97.36	-664.10	-553.58	7,939.69	7,795.70	143.99	55.141		
14,400.00	7,170.46	21,289.96	7,363.81	178.57	339.92	97.36	-664.10	-553.58	8,036.37	7,893.28	143.10	56.161		
14,500.00	7,170.42	21,289.96	7,363.81	180.98	339.92	97.36	-664.10	-553.58	8,133.14	7,990.91	142.23	57.185		
14,600.00	7,170.38	21,289.96	7,363.81	183.39	339.92	97.36	-664.10	-553.58	8,229.98	8,088.60	141.38	58.213		
14,700.00	7,170.35	21,289.96	7,363.81	185.80	339.92	97.36	-664.10	-553.58	8,326.90	8,186.35	140.55	59.246		
14,800.00	7,170.31	21,289.96	7,363.81	188.20	339.92	97.36	-664.10	-553.58	8,423.89	8,284.15	139.74	60.282		
14,900.00	7,170.27	21,289.96	7,363.81	190.61	339.92	97.36	-664.10	-553.58	8,520.95	8,382.00	138.95	61.322		
15,000.00	7,170.23	21,289.96	7,363.81	193.02	339.92	97.36	-664.10	-553.58	8,618.08	8,479.89	138.18	62.366		
15,100.00	7,170.19	21,289.96	7,363.81	195.43	339.92	97.36	-664.10	-553.58	8,715.27	8,577.83	137.43	63.414		
15,200.00	7,170.16	21,289.96	7,363.81	197.85	339.92	97.36	-664.10	-553.58	8,812.52	8,675.82	136.70	64.465		
15,300.00	7,170.12	21,289.96	7,363.81	200.26	339.92	97.36	-664.10	-553.58	8,909.84	8,773.85	135.99	65.519		
15,400.00	7,170.08	21,289.96	7,363.81	202.67	339.92	97.36	-664.10	-553.58	9,007.21	8,871.92	135.29	66.577		
15,500.00	7,170.04	21,289.96	7,363.81	205.08	339.92	97.36	-664.10	-553.58	9,104.64	8,970.03	134.61	67.638		
15,600.00	7,170.01	21,289.96	7,363.81	207.50	339.92	97.36	-664.10	-553.58	9,202.13	9,068.18	133.94	68.701		
15,700.00	7,169.97	21,289.96	7,363.81	209.91	339.92	97.36	-664.10	-553.58	9,299.67	9,166.37	133.29	69.768		
15,800.00	7,169.93	21,289.96	7,363.81	212.33	339.92	97.36	-664.10	-553.58	9,397.26	9,264.60	132.66	70.837		
15,900.00	7,169.89	21,289.96	7,363.81	214.74	339.92	97.36	-664.10	-553.58	9,494.90	9,362.86	132.04	71.910		
16,000.00	7,169.85	21,289.96	7,363.81	217.16	339.92	97.36	-664.10	-553.58	9,592.59	9,461.16	131.43	72.984		
16,100.00	7,169.82	21,289.96	7,363.81	219.58	339.92	97.36	-664.10	-553.58	9,690.33	9,559.49	130.84	74.062		
16,200.00	7,169.78	21,289.96	7,363.81	221.99	339.92	97.36	-664.10	-553.58	9,788.11	9,657.85	130.26	75.141		
16,300.00	7,169.74	21,289.96	7,363.81	224.41	339.92	97.36	-664.10	-553.58	9,885.94	9,756.24	129.70	76.223		
16,400.00	7,169.70	21,289.96	7,363.81	226.83	339.92	97.36	-664.10	-553.58	9,983.81	9,854.66	129.14	77.307		
16,500.00	7,169.67	21,289.96	7,363.81	229.25	339.92	97.36	-664.10	-553.58	10,081.72	9,953.12	128.60	78.393		
16,600.00	7,169.63	21,289.96	7,363.81	231.66	339.92	97.36	-664.10	-553.58	10,179.67	10,051.60	128.08	79.481		
16,700.00	7,169.59	21,289.96	7,363.81	234.08	339.92	97.36	-664.10	-553.58	10,277.67	10,150.11	127.56	80.571		
16,800.00	7,169.55	21,289.96	7,363.81	236.50	339.92	97.36	-664.10	-553.58	10,375.70	10,248.64	127.05	81.663		
16,900.00	7,169.51	21,289.96	7,363.81	238.92	339.92	97.36	-664.10	-553.58	10,473.76	10,347.20	126.56	82.757		
17,000.00	7,169.48	21,289.96	7,363.81	241.34	339.92	97.36	-664.10	-553.58	10,571.87	10,445.79	126.08	83.852		
17,100.00	7,169.44	21,289.96	7,363.81	243.76	339.92	97.36	-664.10	-553.58	10,670.01	10,544.40	125.60	84.949		
17,200.00	7,169.40	21,289.96	7,363.81	246.18	339.92	97.36	-664.10	-553.58	10,768.18	10,643.04	125.14	86.048		
17,300.00	7,169.36	21,289.96	7,363.81	248.61	339.92	97.36	-664.10	-553.58	10,866.39	10,741.70	124.69	87.147		
17,400.00	7,169.32	21,289.96	7,363.81	251.03	339.92	97.36	-664.10	-553.58	10,964.63	10,840.38	124.25	88.249		
17,500.00	7,169.29	21,289.96	7,363.81	253.45	339.92	97.36	-664.10	-553.58	11,062.90	10,939.08	123.81	89.351		
17,600.00	7,169.25	21,289.96	7,363.81	255.87	339.92	97.36	-664.10	-553.58	11,161.20	11,037.81	123.39	90.454		
17,700.00	7,169.21	21,289.96	7,363.81	258.29	339.92	97.36	-664.10	-553.58	11,259.53	11,136.55	122.98	91.559		
17,800.00	7,169.17	21,289.96	7,363.81	260.72	339.92	97.36	-664.10	-553.58	11,357.89	11,235.32	122.57	92.665		
17,900.00	7,169.14	21,289.96	7,363.81	263.14	339.92	97.36	-664.10	-553.58	11,456.28	11,334.11	122.17	93.771		
18,000.00	7,169.10	21,289.96	7,363.81	265.56	339.92	97.36	-664.10	-553.58	11,554.69	11,432.91	121.78	94.879		
18,100.00	7,169.06	21,289.96	7,363.81	267.99	339.92	97.36	-664.10	-553.58	11,653.14	11,531.73	121.40	95.987		
18,200.00	7,169.02	21,289.96	7,363.81	270.41	339.92	97.36	-664.10	-553.58	11,751.61	11,630.58	121.03	97.096		
18,300.00	7,168.98	21,289.96	7,363.81	272.84	339.92	97.36	-664.10	-553.58	11,850.10	11,729.44	120.67	98.206		
18,400.00	7,168.95	21,289.96	7,363.81	275.26	339.92	97.36	-664.10	-553.58	11,948.62	11,828.31	120.31	99.316		
18,500.00	7,168.91	21,289.96	7,363.81	277.68	339.92	97.36	-664.10	-553.58	12,047.17	11,927.21	119.96	100.427		
18,600.00	7,168.87	21,289.96	7,363.81	280.11	339.92	97.36	-664.10	-553.58	12,145.74	12,026.12	119.62	101.538		
18,700.00	7,168.83	21,289.96	7,363.81	282.53	339.92	97.36	-664.10	-553.58	12,244.33	12,125.05	119.28	102.649		
18,800.00	7,168.80	21,289.96	7,363.81	284.96	339.92	97.36	-664.10	-553.58	12,342.94	12,223.99	118.96	103.761		
18,900.00	7,168.76	21,289.96	7,363.81	287.38	339.92	97.36	-664.10	-553.58	12,441.58	12,322.95	118.63	104.874		
19,000.00	7,168.72	21,289.96	7,363.81	289.81	339.92	97.36	-664.10	-553.58	12,540.24	12,421.92	118.32	105.986		
19,100.00	7,168.68	21,289.96	7,363.81	292.24	339.92	97.36	-664.10	-553.58	12,638.92	12,520.90	118.01	107.099		
19,200.00	7,168.64	21,289.96	7,363.81	294.66	339.92	97.36	-664.10	-553.58	12,737.62	12,619.91	117.71	108.212		
19,300.00	7,168.61	21,289.96	7,363.81	297.09	339.92	97.36	-664.10	-553.58	12,836.34	12,718.92	117.42	109.324		
19,400.00	7,168.57	21,289.96	7,363.81	299.52	339.92	97.36	-664.10	-553.58	12,935.08	12,817.95	117.13	110.437		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #745H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 409-B001Mb_MWD+HRGM, 21290-Project							Rule Assigned:						Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
19,500.00	7,168.53	21,289.96	7,363.81	301.94	339.92	97.36	-664.10	-553.58	13,033.83	12,916.99	116.84	111.550		
19,600.00	7,168.49	21,289.96	7,363.81	304.37	339.92	97.36	-664.10	-553.58	13,132.61	13,016.05	116.57	112.663		
19,700.00	7,168.46	21,289.96	7,363.81	306.80	339.92	97.36	-664.10	-553.58	13,231.41	13,115.11	116.29	113.775		
19,800.00	7,168.42	21,289.96	7,363.81	309.22	339.92	97.36	-664.10	-553.58	13,330.22	13,214.19	116.03	114.887		
19,900.00	7,168.38	21,289.96	7,363.81	311.65	339.92	97.36	-664.10	-553.58	13,429.05	13,313.28	115.77	115.999		
20,000.00	7,168.34	21,289.96	7,363.81	314.08	339.92	97.36	-664.10	-553.58	13,527.90	13,412.39	115.51	117.111		
20,100.00	7,168.30	21,289.96	7,363.81	316.51	339.92	97.36	-664.10	-553.58	13,626.77	13,511.50	115.26	118.222		
20,200.00	7,168.27	21,289.96	7,363.81	318.93	339.92	97.36	-664.10	-553.58	13,725.65	13,610.63	115.02	119.333		
20,300.00	7,168.23	21,289.96	7,363.81	321.36	339.92	97.36	-664.10	-553.58	13,824.55	13,709.77	114.78	120.443		
20,400.00	7,168.19	21,289.96	7,363.81	323.79	339.92	97.36	-664.10	-553.58	13,923.46	13,808.91	114.55	121.553		
20,500.00	7,168.15	21,289.96	7,363.81	326.22	339.92	97.36	-664.10	-553.58	14,022.39	13,908.07	114.32	122.663		
20,600.00	7,168.11	21,289.96	7,363.81	328.65	339.92	97.36	-664.10	-553.58	14,121.33	14,007.24	114.09	123.771		
20,700.00	7,168.08	21,289.96	7,363.81	331.07	339.92	97.36	-664.10	-553.58	14,220.29	14,106.42	113.87	124.879		
20,768.77	7,168.05	21,289.96	7,363.81	332.74	339.92	97.36	-664.10	-553.58	14,288.35	14,174.63	113.72	125.641		
20,800.00	7,168.04	21,289.96	7,363.81	333.50	339.92	97.36	-664.10	-553.58	14,319.27	14,205.61	113.66	125.987		
20,903.75	7,168.00	21,289.96	7,363.81	336.02	339.92	97.36	-664.10	-553.58	14,421.97	14,308.53	113.44	127.135		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #746H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 450-B001Mb_MWD+HRGM, 6613-MWD+HRGM+MS, 20953-A026Ua_BLIND													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	20,952.96	7,074.90	0.00	233.58	-161.41	-1,631.83	-548.98	7,350.40				
100.00	100.00	20,952.96	7,074.90	0.25	233.58	-161.41	-1,631.83	-548.98	7,253.22	7,129.60	123.62	58.676	
200.00	200.00	20,952.96	7,074.90	0.61	233.58	-161.41	-1,631.83	-548.98	7,156.12	7,032.24	123.87	57.769	
300.00	300.00	20,952.96	7,074.90	0.97	233.58	-161.41	-1,631.83	-548.98	7,059.10	6,934.95	124.15	56.859	
400.00	400.00	20,952.96	7,074.90	1.33	233.58	-161.41	-1,631.83	-548.98	6,962.16	6,837.71	124.45	55.945	
500.00	500.00	20,952.96	7,074.90	1.68	233.58	-161.41	-1,631.83	-548.98	6,865.31	6,740.55	124.76	55.028	
600.00	599.98	20,952.96	7,074.90	2.04	233.58	-158.23	-1,631.83	-548.98	6,768.97	6,643.87	125.11	54.105	
700.00	699.84	20,952.96	7,074.90	2.41	233.58	-160.45	-1,631.83	-548.98	6,673.69	6,548.18	125.51	53.172	
800.00	799.45	20,952.96	7,074.90	2.77	233.58	-162.23	-1,631.83	-548.98	6,579.61	6,453.63	125.98	52.226	
900.00	898.70	20,952.96	7,074.90	3.13	233.58	-163.68	-1,631.83	-548.98	6,486.91	6,360.38	126.53	51.268	
1,000.00	997.47	20,952.96	7,074.90	3.51	233.58	-164.88	-1,631.83	-548.98	6,395.77	6,268.61	127.16	50.299	
1,104.22	1,099.75	20,952.96	7,074.90	3.92	233.58	-165.93	-1,631.83	-548.98	6,302.63	6,174.73	127.90	49.276	
1,200.00	1,193.41	20,952.96	7,074.90	4.32	233.58	-165.93	-1,631.83	-548.98	6,218.13	6,089.46	128.67	48.326	
1,300.00	1,291.19	20,952.96	7,074.90	4.74	233.58	-165.93	-1,631.83	-548.98	6,130.26	6,000.73	129.53	47.326	
1,400.00	1,388.98	20,952.96	7,074.90	5.16	233.58	-165.93	-1,631.83	-548.98	6,042.76	5,912.32	130.44	46.326	
1,500.00	1,486.76	20,952.96	7,074.90	5.59	233.58	-165.93	-1,631.83	-548.98	5,955.66	5,824.27	131.39	45.326	
1,600.00	1,584.54	20,952.96	7,074.90	6.03	233.58	-165.93	-1,631.83	-548.98	5,868.97	5,736.57	132.40	44.328	
1,700.00	1,682.33	20,952.96	7,074.90	6.47	233.58	-165.93	-1,631.83	-548.98	5,782.71	5,649.26	133.45	43.331	
1,800.00	1,780.11	20,952.96	7,074.90	6.91	233.58	-165.93	-1,631.83	-548.98	5,696.90	5,562.34	134.56	42.337	
1,900.00	1,877.90	20,952.96	7,074.90	7.35	233.58	-165.93	-1,631.83	-548.98	5,611.56	5,475.84	135.72	41.347	
2,000.00	1,975.68	20,952.96	7,074.90	7.79	233.58	-165.93	-1,631.83	-548.98	5,526.71	5,389.78	136.93	40.362	
2,100.00	2,073.46	20,952.96	7,074.90	8.24	233.58	-165.93	-1,631.83	-548.98	5,442.38	5,304.18	138.20	39.381	
2,200.00	2,171.25	20,952.96	7,074.90	8.68	233.58	-165.93	-1,631.83	-548.98	5,358.58	5,219.06	139.52	38.406	
2,300.00	2,269.03	20,952.96	7,074.90	9.13	233.58	-165.93	-1,631.83	-548.98	5,275.35	5,134.44	140.91	37.438	
2,400.00	2,366.82	20,952.96	7,074.90	9.58	233.58	-165.93	-1,631.83	-548.98	5,192.71	5,050.35	142.35	36.477	
2,500.00	2,464.60	20,952.96	7,074.90	10.03	233.58	-165.93	-1,631.83	-548.98	5,110.69	4,966.82	143.86	35.524	
2,600.00	2,562.38	20,952.96	7,074.90	10.48	233.58	-165.93	-1,631.83	-548.98	5,029.32	4,883.88	145.44	34.580	
2,700.00	2,660.17	20,952.96	7,074.90	10.93	233.58	-165.93	-1,631.83	-548.98	4,948.63	4,801.55	147.08	33.646	
2,800.00	2,757.95	20,952.96	7,074.90	11.38	233.58	-165.93	-1,631.83	-548.98	4,868.67	4,719.87	148.79	32.721	
2,900.00	2,855.74	20,952.96	7,074.90	11.83	233.58	-165.93	-1,631.83	-548.98	4,789.45	4,638.87	150.58	31.807	
3,000.00	2,953.52	20,952.96	7,074.90	12.29	233.58	-165.93	-1,631.83	-548.98	4,711.03	4,558.59	152.43	30.905	
3,100.00	3,051.30	20,952.96	7,074.90	12.74	233.58	-165.93	-1,631.83	-548.98	4,633.43	4,479.06	154.37	30.016	
3,200.00	3,149.09	20,952.96	7,074.90	13.19	233.58	-165.93	-1,631.83	-548.98	4,556.71	4,400.33	156.38	29.139	
3,300.00	3,246.87	20,952.96	7,074.90	13.65	233.58	-165.93	-1,631.83	-548.98	4,480.91	4,322.44	158.47	28.277	
3,400.00	3,344.66	20,952.96	7,074.90	14.10	233.58	-165.93	-1,631.83	-548.98	4,406.07	4,245.43	160.64	27.429	
3,500.00	3,442.44	20,952.96	7,074.90	14.55	233.58	-165.93	-1,631.83	-548.98	4,332.25	4,169.36	162.89	26.596	
3,600.00	3,540.22	20,952.96	7,074.90	15.01	233.58	-165.93	-1,631.83	-548.98	4,259.49	4,094.27	165.23	25.779	
3,700.00	3,638.01	20,952.96	7,074.90	15.46	233.58	-165.93	-1,631.83	-548.98	4,187.87	4,020.22	167.65	24.980	
3,800.00	3,735.79	20,952.96	7,074.90	15.91	233.58	-165.93	-1,631.83	-548.98	4,117.42	3,947.26	170.16	24.198	
3,900.00	3,833.58	20,952.96	7,074.90	16.37	233.58	-165.93	-1,631.83	-548.98	4,048.22	3,875.47	172.75	23.434	
4,000.00	3,931.36	20,952.96	7,074.90	16.82	233.58	-165.93	-1,631.83	-548.98	3,980.33	3,804.90	175.43	22.689	
4,100.00	4,029.14	20,952.96	7,074.90	17.28	233.58	-165.93	-1,631.83	-548.98	3,913.81	3,735.62	178.19	21.964	
4,200.00	4,126.93	20,952.96	7,074.90	17.73	233.58	-165.93	-1,631.83	-548.98	3,848.74	3,667.71	181.04	21.259	
4,300.00	4,224.71	20,952.96	7,074.90	18.19	233.58	-165.93	-1,631.83	-548.98	3,785.20	3,601.24	183.97	20.576	
4,400.00	4,322.50	20,952.96	7,074.90	18.64	233.58	-165.93	-1,631.83	-548.98	3,723.26	3,536.29	186.97	19.914	
4,500.00	4,420.28	20,952.96	7,074.90	19.10	233.58	-165.93	-1,631.83	-548.98	3,663.01	3,472.96	190.05	19.274	
4,600.00	4,518.06	20,952.96	7,074.90	19.55	233.58	-165.93	-1,631.83	-548.98	3,604.52	3,411.32	193.20	18.657	
4,700.00	4,615.85	20,952.96	7,074.90	20.01	233.58	-165.93	-1,631.83	-548.98	3,547.88	3,351.47	196.41	18.064	
4,800.00	4,713.63	20,952.96	7,074.90	20.46	233.58	-165.93	-1,631.83	-548.98	3,493.19	3,293.51	199.68	17.494	
4,900.00	4,811.42	20,952.96	7,074.90	20.92	233.58	-165.93	-1,631.83	-548.98	3,440.54	3,237.54	203.00	16.949	
5,000.00	4,909.20	20,952.96	7,074.90	21.38	233.58	-165.93	-1,631.83	-548.98	3,390.02	3,183.67	206.35	16.428	
5,100.00	5,006.98	20,952.96	7,074.90	21.83	233.58	-165.93	-1,631.83	-548.98	3,341.73	3,131.99	209.74	15.933	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #746H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 450-B001Mb_MWD+HRGM, 6613-MWD+HRGM+MS, 20953-A026Ua_BLIND													Offset Well Error: 0.00 usft
Reference													
Offset													
Semi Major Axis													
Offset Wellbore Centre													
Distance													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,104.77	20,952.96	7,074.90	22.29	233.58	-165.93	-1,631.83	-548.98	3,295.77	3,082.63	213.14	15.463	
5,300.00	5,202.55	20,952.96	7,074.90	22.74	233.58	-165.93	-1,631.83	-548.98	3,252.23	3,035.69	216.54	15.019	
5,400.00	5,300.34	20,952.96	7,074.90	23.20	233.58	-165.93	-1,631.83	-548.98	3,211.22	2,991.28	219.94	14.601	
5,500.00	5,398.12	20,952.96	7,074.90	23.66	233.58	-165.93	-1,631.83	-548.98	3,172.83	2,949.52	223.30	14.209	
5,600.00	5,495.90	20,952.96	7,074.90	24.11	233.58	-165.93	-1,631.83	-548.98	3,137.16	2,910.53	226.63	13.843	
5,700.00	5,593.69	20,952.96	7,074.90	24.57	233.58	-165.93	-1,631.83	-548.98	3,104.30	2,874.41	229.89	13.503	
5,800.00	5,691.47	20,952.96	7,074.90	25.02	233.58	-165.93	-1,631.83	-548.98	3,074.35	2,841.27	233.08	13.190	
5,900.00	5,789.26	20,952.96	7,074.90	25.48	233.58	-165.93	-1,631.83	-548.98	3,047.38	2,811.22	236.17	12.904	
6,000.00	5,887.04	20,952.96	7,074.90	25.94	233.58	-165.93	-1,631.83	-548.98	3,023.48	2,784.35	239.14	12.643	
6,100.00	5,984.83	20,952.96	7,074.90	26.39	233.58	-165.93	-1,631.83	-548.98	3,002.73	2,760.75	241.98	12.409	
6,200.00	6,082.61	20,952.96	7,074.90	26.85	233.58	-165.93	-1,631.83	-548.98	2,985.18	2,740.51	244.67	12.201	
6,300.00	6,180.39	20,952.96	7,074.90	27.30	233.58	-165.93	-1,631.83	-548.98	2,970.90	2,723.71	247.19	12.019	
6,400.00	6,278.18	20,952.96	7,074.90	27.76	233.58	-165.93	-1,631.83	-548.98	2,959.92	2,710.40	249.52	11.862	
6,500.00	6,375.96	20,952.96	7,074.90	28.22	233.58	-165.93	-1,631.83	-548.98	2,952.30	2,700.64	251.66	11.731	
6,600.00	6,473.75	20,952.96	7,074.90	28.67	233.58	-165.93	-1,631.83	-548.98	2,948.05	2,694.45	253.59	11.625	
6,663.67	6,536.00	20,952.96	7,074.90	28.96	233.58	-165.93	-1,631.83	-548.98	2,947.11	2,692.40	254.71	11.570	
6,670.82	6,543.00	20,952.96	7,074.90	29.00	233.58	-168.93	-1,631.83	-548.98	2,947.09	2,692.26	254.83	11.565 CC	
6,700.00	6,571.53	20,952.96	7,074.90	29.13	233.58	178.79	-1,631.83	-548.98	2,947.33	2,692.03	255.30	11.545 ES	
6,750.00	6,620.29	20,952.96	7,074.90	29.35	233.58	159.91	-1,631.83	-548.98	2,948.83	2,692.79	256.04	11.517	
6,800.00	6,668.62	20,952.96	7,074.90	29.56	233.58	145.74	-1,631.83	-548.98	2,951.71	2,695.01	256.70	11.499	
6,850.00	6,716.22	20,952.96	7,074.90	29.76	233.58	135.73	-1,631.83	-548.98	2,955.94	2,698.68	257.26	11.490 SF	
6,900.00	6,762.80	20,952.96	7,074.90	29.95	233.58	128.57	-1,631.83	-548.98	2,961.49	2,703.75	257.73	11.490	
6,950.00	6,808.07	20,952.96	7,074.90	30.13	233.58	123.21	-1,631.83	-548.98	2,968.32	2,710.20	258.11	11.500	
7,000.00	6,851.75	20,952.96	7,074.90	30.30	233.58	119.00	-1,631.83	-548.98	2,976.38	2,717.98	258.40	11.519	
7,050.00	6,893.57	20,952.96	7,074.90	30.45	233.58	115.54	-1,631.83	-548.98	2,985.60	2,727.01	258.59	11.546	
7,100.00	6,933.27	20,952.96	7,074.90	30.60	233.58	112.57	-1,631.83	-548.98	2,995.93	2,737.24	258.69	11.581	
7,150.00	6,970.61	20,952.96	7,074.90	30.74	233.58	109.93	-1,631.83	-548.98	3,007.29	2,748.58	258.70	11.624	
7,200.00	7,005.36	20,952.96	7,074.90	30.87	233.58	107.52	-1,631.83	-548.98	3,019.59	2,760.96	258.63	11.675	
7,250.00	7,037.31	20,952.96	7,074.90	30.99	233.58	105.28	-1,631.83	-548.98	3,032.75	2,774.26	258.49	11.733	
7,300.00	7,066.25	20,952.96	7,074.90	31.11	233.58	103.16	-1,631.83	-548.98	3,046.68	2,788.41	258.27	11.796	
7,350.00	7,092.02	20,952.96	7,074.90	31.22	233.58	101.13	-1,631.83	-548.98	3,061.28	2,803.29	257.99	11.866	
7,400.00	7,114.44	20,952.96	7,074.90	31.34	233.58	99.17	-1,631.83	-548.98	3,076.45	2,818.80	257.65	11.940	
7,450.00	7,133.38	20,952.96	7,074.90	31.47	233.58	97.28	-1,631.83	-548.98	3,092.10	2,834.83	257.27	12.019	
7,500.00	7,148.73	20,952.96	7,074.90	31.61	233.58	95.45	-1,631.83	-548.98	3,108.11	2,851.27	256.84	12.101	
7,550.00	7,160.40	20,952.96	7,074.90	31.78	233.58	93.68	-1,631.83	-548.98	3,124.39	2,868.02	256.37	12.187	
7,600.00	7,168.30	20,952.96	7,074.90	31.98	233.58	91.98	-1,631.83	-548.98	3,140.83	2,884.96	255.87	12.275	
7,650.00	7,172.38	20,952.96	7,074.90	32.23	233.58	90.36	-1,631.83	-548.98	3,157.33	2,902.00	255.33	12.366	
7,678.56	7,173.00	20,952.96	7,074.90	32.39	233.58	89.47	-1,631.83	-548.98	3,166.74	2,911.72	255.01	12.418	
7,700.00	7,172.99	20,952.96	7,074.90	32.53	233.58	89.47	-1,631.83	-548.98	3,173.86	2,919.09	254.77	12.458	
7,800.00	7,172.95	20,952.96	7,074.90	33.31	233.58	89.47	-1,631.83	-548.98	3,208.75	2,955.14	253.61	12.652	
7,900.00	7,172.92	20,952.96	7,074.90	34.32	233.58	89.47	-1,631.83	-548.98	3,246.34	2,993.95	252.39	12.862	
8,000.00	7,172.88	20,952.96	7,074.90	35.53	233.58	89.47	-1,631.83	-548.98	3,286.55	3,035.44	251.11	13.088	
8,100.00	7,172.84	20,952.96	7,074.90	36.89	233.58	89.47	-1,631.83	-548.98	3,329.28	3,079.50	249.77	13.329	
8,200.00	7,172.80	20,952.96	7,074.90	38.39	233.58	89.47	-1,631.83	-548.98	3,374.43	3,126.05	248.38	13.586	
8,300.00	7,172.77	20,952.96	7,074.90	39.99	233.58	89.47	-1,631.83	-548.98	3,421.91	3,174.97	246.93	13.858	
8,400.00	7,172.73	20,952.96	7,074.90	41.68	233.58	89.47	-1,631.83	-548.98	3,471.62	3,226.18	245.44	14.145	
8,500.00	7,172.69	20,952.96	7,074.90	43.45	233.58	89.47	-1,631.83	-548.98	3,523.46	3,279.57	243.89	14.447	
8,600.00	7,172.65	20,952.96	7,074.90	45.29	233.58	89.47	-1,631.83	-548.98	3,577.36	3,335.04	242.31	14.763	
8,700.00	7,172.61	20,952.96	7,074.90	47.18	233.58	89.47	-1,631.83	-548.98	3,633.20	3,392.51	240.69	15.095	
8,800.00	7,172.58	20,952.96	7,074.90	49.12	233.58	89.47	-1,631.83	-548.98	3,690.91	3,451.87	239.04	15.440	
8,900.00	7,172.54	20,952.96	7,074.90	51.11	233.58	89.47	-1,631.83	-548.98	3,750.40	3,513.03	237.37	15.800	
9,000.00	7,172.50	20,952.96	7,074.90	53.13	233.58	89.47	-1,631.83	-548.98	3,811.59	3,575.91	235.68	16.173	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #746H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 450-B001Mb_MWD+HRGM, 6613-MWD+HRGM+MS, 20953-A026Ua_BLIND													Offset Well Error: 0.00 usft
Reference													
Offset													
Semi Major Axis													
Offset Wellbore Centre													
Distance													
Between Centres													
Between Ellipses													
Minimum Separation													
Separation Factor													
Warning													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,100.00	7,172.46	20,952.96	7,074.90	55.19	233.58	89.47	-1,631.83	-548.98	3,874.39	3,640.42	233.97	16.560	
9,200.00	7,172.42	20,952.96	7,074.90	57.28	233.58	89.47	-1,631.83	-548.98	3,938.72	3,706.47	232.25	16.959	
9,300.00	7,172.39	20,952.96	7,074.90	59.39	233.58	89.47	-1,631.83	-548.98	4,004.52	3,774.00	230.52	17.371	
9,400.00	7,172.35	20,952.96	7,074.90	61.53	233.58	89.47	-1,631.83	-548.98	4,071.72	3,842.92	228.80	17.796	
9,500.00	7,172.31	20,952.96	7,074.90	63.70	233.58	89.47	-1,631.83	-548.98	4,140.24	3,913.16	227.08	18.233	
9,600.00	7,172.27	20,952.96	7,074.90	65.88	233.58	89.47	-1,631.83	-548.98	4,210.02	3,984.65	225.36	18.681	
9,700.00	7,172.24	20,952.96	7,074.90	68.08	233.58	89.47	-1,631.83	-548.98	4,281.00	4,057.34	223.66	19.141	
9,800.00	7,172.20	20,952.96	7,074.90	70.29	233.58	89.47	-1,631.83	-548.98	4,353.11	4,131.15	221.97	19.612	
9,900.00	7,172.16	20,952.96	7,074.90	72.52	233.58	89.47	-1,631.83	-548.98	4,426.32	4,206.03	220.29	20.093	
10,000.00	7,172.12	20,952.96	7,074.90	74.76	233.58	89.47	-1,631.83	-548.98	4,500.55	4,281.92	218.63	20.586	
10,100.00	7,172.08	20,952.96	7,074.90	77.02	233.58	89.47	-1,631.83	-548.98	4,575.77	4,358.78	216.99	21.088	
10,200.00	7,172.05	20,952.96	7,074.90	79.28	233.58	89.47	-1,631.83	-548.98	4,651.92	4,436.55	215.37	21.600	
10,300.00	7,172.01	20,952.96	7,074.90	81.56	233.58	89.47	-1,631.83	-548.98	4,728.95	4,515.18	213.77	22.122	
10,400.00	7,171.97	20,952.96	7,074.90	83.84	233.58	89.47	-1,631.83	-548.98	4,806.84	4,594.64	212.19	22.653	
10,500.00	7,171.93	20,952.96	7,074.90	86.13	233.58	89.47	-1,631.83	-548.98	4,885.52	4,674.88	210.65	23.193	
10,600.00	7,171.90	20,952.96	7,074.90	88.43	233.58	89.47	-1,631.83	-548.98	4,964.98	4,755.86	209.12	23.742	
10,700.00	7,171.86	20,952.96	7,074.90	90.74	233.58	89.47	-1,631.83	-548.98	5,045.17	4,837.54	207.62	24.299	
10,800.00	7,171.82	20,952.96	7,074.90	93.05	233.58	89.47	-1,631.83	-548.98	5,126.05	4,919.90	206.15	24.865	
10,900.00	7,171.78	20,952.96	7,074.90	95.37	233.58	89.47	-1,631.83	-548.98	5,207.60	5,002.89	204.71	25.439	
11,000.00	7,171.74	20,952.96	7,074.90	97.70	233.58	89.47	-1,631.83	-548.98	5,289.78	5,086.48	203.29	26.020	
11,100.00	7,171.71	20,952.96	7,074.90	100.03	233.58	89.47	-1,631.83	-548.98	5,372.56	5,170.66	201.90	26.610	
11,200.00	7,171.67	20,952.96	7,074.90	102.37	233.58	89.47	-1,631.83	-548.98	5,455.92	5,255.38	200.54	27.206	
11,300.00	7,171.63	20,952.96	7,074.90	104.71	233.58	89.47	-1,631.83	-548.98	5,539.84	5,340.63	199.21	27.810	
11,400.00	7,171.59	20,952.96	7,074.90	107.06	233.58	89.47	-1,631.83	-548.98	5,624.27	5,426.37	197.90	28.420	
11,500.00	7,171.56	20,952.96	7,074.90	109.40	233.58	89.47	-1,631.83	-548.98	5,709.21	5,512.60	196.62	29.037	
11,600.00	7,171.52	20,952.96	7,074.90	111.76	233.58	89.47	-1,631.83	-548.98	5,794.64	5,599.27	195.36	29.661	
11,700.00	7,171.48	20,952.96	7,074.90	114.12	233.58	89.47	-1,631.83	-548.98	5,880.52	5,686.38	194.14	30.291	
11,800.00	7,171.44	20,952.96	7,074.90	116.48	233.58	89.47	-1,631.83	-548.98	5,966.84	5,773.90	192.94	30.927	
11,900.00	7,171.40	20,952.96	7,074.90	118.84	233.58	89.47	-1,631.83	-548.98	6,053.58	5,861.82	191.76	31.568	
12,000.00	7,171.37	20,952.96	7,074.90	121.20	233.58	89.47	-1,631.83	-548.98	6,140.73	5,950.12	190.61	32.216	
12,100.00	7,171.33	20,952.96	7,074.90	123.57	233.58	89.47	-1,631.83	-548.98	6,228.26	6,038.77	189.49	32.869	
12,200.00	7,171.29	20,952.96	7,074.90	125.95	233.58	89.47	-1,631.83	-548.98	6,316.16	6,127.77	188.39	33.528	
12,300.00	7,171.25	20,952.96	7,074.90	128.32	233.58	89.47	-1,631.83	-548.98	6,404.42	6,217.11	187.31	34.192	
12,400.00	7,171.22	20,952.96	7,074.90	130.70	233.58	89.47	-1,631.83	-548.98	6,493.01	6,306.76	186.26	34.861	
12,500.00	7,171.18	20,952.96	7,074.90	133.07	233.58	89.47	-1,631.83	-548.98	6,581.94	6,396.71	185.23	35.535	
12,600.00	7,171.14	20,952.96	7,074.90	135.46	233.58	89.47	-1,631.83	-548.98	6,671.18	6,486.96	184.22	36.213	
12,700.00	7,171.10	20,952.96	7,074.90	137.84	233.58	89.47	-1,631.83	-548.98	6,760.72	6,577.48	183.24	36.896	
12,800.00	7,171.06	20,952.96	7,074.90	140.22	233.58	89.47	-1,631.83	-548.98	6,850.54	6,668.27	182.27	37.584	
12,900.00	7,171.03	20,952.96	7,074.90	142.61	233.58	89.47	-1,631.83	-548.98	6,940.65	6,759.32	181.33	38.276	
13,000.00	7,170.99	20,952.96	7,074.90	145.00	233.58	89.47	-1,631.83	-548.98	7,031.02	6,850.61	180.41	38.972	
13,100.00	7,170.95	20,952.96	7,074.90	147.39	233.58	89.47	-1,631.83	-548.98	7,121.66	6,942.15	179.51	39.673	
13,200.00	7,170.91	20,952.96	7,074.90	149.78	233.58	89.47	-1,631.83	-548.98	7,212.53	7,033.91	178.63	40.377	
13,300.00	7,170.87	20,952.96	7,074.90	152.17	233.58	89.47	-1,631.83	-548.98	7,303.65	7,125.88	177.77	41.085	
13,400.00	7,170.84	20,952.96	7,074.90	154.57	233.58	89.47	-1,631.83	-548.98	7,395.00	7,218.07	176.93	41.797	
13,500.00	7,170.80	20,952.96	7,074.90	156.96	233.58	89.47	-1,631.83	-548.98	7,486.57	7,310.47	176.10	42.513	
13,600.00	7,170.76	20,952.96	7,074.90	159.36	233.58	89.47	-1,631.83	-548.98	7,578.35	7,403.05	175.30	43.232	
13,700.00	7,170.72	20,952.96	7,074.90	161.76	233.58	89.47	-1,631.83	-548.98	7,670.34	7,495.83	174.51	43.954	
13,800.00	7,170.69	20,952.96	7,074.90	164.16	233.58	89.47	-1,631.83	-548.98	7,762.52	7,588.78	173.74	44.679	
13,900.00	7,170.65	20,952.96	7,074.90	166.56	233.58	89.47	-1,631.83	-548.98	7,854.90	7,681.91	172.98	45.408	
14,000.00	7,170.61	20,952.96	7,074.90	168.96	233.58	89.47	-1,631.83	-548.98	7,947.46	7,775.21	172.25	46.140	
14,100.00	7,170.57	20,952.96	7,074.90	171.36	233.58	89.47	-1,631.83	-548.98	8,040.20	7,868.67	171.53	46.875	
14,200.00	7,170.53	20,952.96	7,074.90	173.76	233.58	89.47	-1,631.83	-548.98	8,133.11	7,962.29	170.82	47.612	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #746H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 450-B001Mb_MWD+HRGM, 6613-MWD+HRGM+MS, 20953-A026Ua_BLIND													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
14,300.00	7,170.50	20,952.96	7,074.90	176.17	233.58	89.47	-1,631.83	-548.98	8,226.18	8,056.06	170.13	48.353	
14,400.00	7,170.46	20,952.96	7,074.90	178.57	233.58	89.47	-1,631.83	-548.98	8,319.42	8,149.97	169.45	49.096	
14,500.00	7,170.42	20,952.96	7,074.90	180.98	233.58	89.47	-1,631.83	-548.98	8,412.82	8,244.02	168.79	49.842	
14,600.00	7,170.38	20,952.96	7,074.90	183.39	233.58	89.47	-1,631.83	-548.98	8,506.36	8,338.22	168.14	50.590	
14,700.00	7,170.35	20,952.96	7,074.90	185.80	233.58	89.47	-1,631.83	-548.98	8,600.05	8,432.54	167.51	51.340	
14,800.00	7,170.31	20,952.96	7,074.90	188.20	233.58	89.47	-1,631.83	-548.98	8,693.88	8,526.99	166.89	52.093	
14,900.00	7,170.27	20,952.96	7,074.90	190.61	233.58	89.47	-1,631.83	-548.98	8,787.84	8,621.56	166.28	52.848	
15,000.00	7,170.23	20,952.96	7,074.90	193.02	233.58	89.47	-1,631.83	-548.98	8,881.94	8,716.25	165.69	53.606	
15,100.00	7,170.19	20,952.96	7,074.90	195.43	233.58	89.47	-1,631.83	-548.98	8,976.17	8,811.06	165.11	54.365	
15,200.00	7,170.16	20,952.96	7,074.90	197.85	233.58	89.47	-1,631.83	-548.98	9,070.51	8,905.97	164.54	55.127	
15,300.00	7,170.12	20,952.96	7,074.90	200.26	233.58	89.47	-1,631.83	-548.98	9,164.98	9,001.00	163.98	55.890	
15,400.00	7,170.08	20,952.96	7,074.90	202.67	233.58	89.47	-1,631.83	-548.98	9,259.57	9,096.13	163.44	56.656	
15,500.00	7,170.04	20,952.96	7,074.90	205.08	233.58	89.47	-1,631.83	-548.98	9,354.26	9,191.36	162.90	57.423	
15,600.00	7,170.01	20,952.96	7,074.90	207.50	233.58	89.47	-1,631.83	-548.98	9,449.07	9,286.69	162.38	58.192	
15,700.00	7,169.97	20,952.96	7,074.90	209.91	233.58	89.47	-1,631.83	-548.98	9,543.98	9,382.12	161.86	58.963	
15,800.00	7,169.93	20,952.96	7,074.90	212.33	233.58	89.47	-1,631.83	-548.98	9,639.00	9,477.64	161.36	59.735	
15,900.00	7,169.89	20,952.96	7,074.90	214.74	233.58	89.47	-1,631.83	-548.98	9,734.11	9,573.24	160.87	60.509	
16,000.00	7,169.85	20,952.96	7,074.90	217.16	233.58	89.47	-1,631.83	-548.98	9,829.33	9,668.94	160.39	61.284	
16,100.00	7,169.82	20,952.96	7,074.90	219.58	233.58	89.47	-1,631.83	-548.98	9,924.63	9,764.71	159.92	62.061	
16,200.00	7,169.78	20,952.96	7,074.90	221.99	233.58	89.47	-1,631.83	-548.98	10,020.03	9,860.58	159.45	62.839	
16,300.00	7,169.74	20,952.96	7,074.90	224.41	233.58	89.47	-1,631.83	-548.98	10,115.52	9,956.51	159.00	63.619	
16,400.00	7,169.70	20,952.96	7,074.90	226.83	233.58	89.47	-1,631.83	-548.98	10,211.09	10,052.53	158.56	64.400	
16,500.00	7,169.67	20,952.96	7,074.90	229.25	233.58	89.47	-1,631.83	-548.98	10,306.75	10,148.62	158.12	65.182	
16,600.00	7,169.63	20,952.96	7,074.90	231.66	233.58	89.47	-1,631.83	-548.98	10,402.49	10,244.79	157.70	65.965	
16,700.00	7,169.59	20,952.96	7,074.90	234.08	233.58	89.47	-1,631.83	-548.98	10,498.30	10,341.03	157.28	66.750	
16,800.00	7,169.55	20,952.96	7,074.90	236.50	233.58	89.47	-1,631.83	-548.98	10,594.20	10,437.33	156.87	67.535	
16,900.00	7,169.51	20,952.96	7,074.90	238.92	233.58	89.47	-1,631.83	-548.98	10,690.17	10,533.70	156.47	68.322	
17,000.00	7,169.48	20,952.96	7,074.90	241.34	233.58	89.47	-1,631.83	-548.98	10,786.21	10,630.14	156.08	69.109	
17,100.00	7,169.44	20,952.96	7,074.90	243.76	233.58	89.47	-1,631.83	-548.98	10,882.33	10,726.64	155.69	69.898	
17,200.00	7,169.40	20,952.96	7,074.90	246.18	233.58	89.47	-1,631.83	-548.98	10,978.51	10,823.20	155.31	70.687	
17,300.00	7,169.36	20,952.96	7,074.90	248.61	233.58	89.47	-1,631.83	-548.98	11,074.77	10,919.83	154.94	71.477	
17,400.00	7,169.32	20,952.96	7,074.90	251.03	233.58	89.47	-1,631.83	-548.98	11,171.08	11,016.51	154.58	72.268	
17,500.00	7,169.29	20,952.96	7,074.90	253.45	233.58	89.47	-1,631.83	-548.98	11,267.47	11,113.24	154.22	73.060	
17,600.00	7,169.25	20,952.96	7,074.90	255.87	233.58	89.47	-1,631.83	-548.98	11,363.91	11,210.04	153.87	73.852	
17,700.00	7,169.21	20,952.96	7,074.90	258.29	233.58	89.47	-1,631.83	-548.98	11,460.42	11,306.89	153.53	74.646	
17,800.00	7,169.17	20,952.96	7,074.90	260.72	233.58	89.47	-1,631.83	-548.98	11,556.98	11,403.79	153.20	75.439	
17,900.00	7,169.14	20,952.96	7,074.90	263.14	233.58	89.47	-1,631.83	-548.98	11,653.61	11,500.74	152.87	76.234	
18,000.00	7,169.10	20,952.96	7,074.90	265.56	233.58	89.47	-1,631.83	-548.98	11,750.29	11,597.74	152.54	77.029	
18,100.00	7,169.06	20,952.96	7,074.90	267.99	233.58	89.47	-1,631.83	-548.98	11,847.02	11,694.79	152.23	77.825	
18,200.00	7,169.02	20,952.96	7,074.90	270.41	233.58	89.47	-1,631.83	-548.98	11,943.81	11,791.89	151.92	78.621	
18,300.00	7,168.98	20,952.96	7,074.90	272.84	233.58	89.47	-1,631.83	-548.98	12,040.65	11,889.04	151.61	79.417	
18,400.00	7,168.95	20,952.96	7,074.90	275.26	233.58	89.47	-1,631.83	-548.98	12,137.54	11,986.23	151.31	80.214	
18,500.00	7,168.91	20,952.96	7,074.90	277.68	233.58	89.47	-1,631.83	-548.98	12,234.48	12,083.46	151.02	81.011	
18,600.00	7,168.87	20,952.96	7,074.90	280.11	233.58	89.47	-1,631.83	-548.98	12,331.47	12,180.74	150.73	81.809	
18,700.00	7,168.83	20,952.96	7,074.90	282.53	233.58	89.47	-1,631.83	-548.98	12,428.51	12,278.06	150.45	82.607	
18,800.00	7,168.80	20,952.96	7,074.90	284.96	233.58	89.47	-1,631.83	-548.98	12,525.60	12,375.42	150.18	83.406	
18,900.00	7,168.76	20,952.96	7,074.90	287.38	233.58	89.47	-1,631.83	-548.98	12,622.73	12,472.82	149.91	84.204	
19,000.00	7,168.72	20,952.96	7,074.90	289.81	233.58	89.47	-1,631.83	-548.98	12,719.90	12,570.26	149.64	85.003	
19,100.00	7,168.68	20,952.96	7,074.90	292.24	233.58	89.47	-1,631.83	-548.98	12,817.12	12,667.74	149.38	85.802	
19,200.00	7,168.64	20,952.96	7,074.90	294.66	233.58	89.47	-1,631.83	-548.98	12,914.38	12,765.26	149.12	86.601	
19,300.00	7,168.61	20,952.96	7,074.90	297.09	233.58	89.47	-1,631.83	-548.98	13,011.69	12,862.81	148.87	87.401	
19,400.00	7,168.57	20,952.96	7,074.90	299.52	233.58	89.47	-1,631.83	-548.98	13,109.03	12,960.40	148.63	88.200	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 31 - Rosa Unit #746H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 100-A020Ga_GYRO-NS, 450-B001Mb_MWD+HRGM, 6613-MWD+HRGM+MS, 20953-A026Ua_BLIND													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,500.00	7,168.53	20,952.96	7,074.90	301.94	233.58	89.47	-1,631.83	-548.98	13,206.41	13,058.03	148.39	89.000	
19,600.00	7,168.49	20,952.96	7,074.90	304.37	233.58	89.47	-1,631.83	-548.98	13,303.84	13,155.69	148.15	89.800	
19,700.00	7,168.46	20,952.96	7,074.90	306.80	233.58	89.47	-1,631.83	-548.98	13,401.30	13,253.38	147.92	90.600	
19,800.00	7,168.42	20,952.96	7,074.90	309.22	233.58	89.47	-1,631.83	-548.98	13,498.79	13,351.10	147.69	91.399	
19,900.00	7,168.38	20,952.96	7,074.90	311.65	233.58	89.47	-1,631.83	-548.98	13,596.33	13,448.86	147.47	92.199	
20,000.00	7,168.34	20,952.96	7,074.90	314.08	233.58	89.47	-1,631.83	-548.98	13,693.90	13,546.65	147.25	92.999	
20,100.00	7,168.30	20,952.96	7,074.90	316.51	233.58	89.47	-1,631.83	-548.98	13,791.50	13,644.47	147.03	93.799	
20,200.00	7,168.27	20,952.96	7,074.90	318.93	233.58	89.47	-1,631.83	-548.98	13,889.14	13,742.31	146.82	94.598	
20,300.00	7,168.23	20,952.96	7,074.90	321.36	233.58	89.47	-1,631.83	-548.98	13,986.81	13,840.19	146.62	95.398	
20,400.00	7,168.19	20,952.96	7,074.90	323.79	233.58	89.47	-1,631.83	-548.98	14,084.51	13,938.10	146.41	96.197	
20,500.00	7,168.15	20,952.96	7,074.90	326.22	233.58	89.47	-1,631.83	-548.98	14,182.25	14,036.03	146.21	96.997	
20,600.00	7,168.11	20,952.96	7,074.90	328.65	233.58	89.47	-1,631.83	-548.98	14,280.02	14,134.00	146.02	97.796	
20,700.00	7,168.08	20,952.96	7,074.90	331.07	233.58	89.47	-1,631.83	-548.98	14,377.81	14,231.99	145.83	98.595	
20,768.77	7,168.05	20,952.96	7,074.90	332.74	233.58	89.47	-1,631.83	-548.98	14,445.08	14,299.38	145.70	99.144	
20,800.00	7,168.04	20,952.96	7,074.90	333.50	233.58	89.47	-1,631.83	-548.98	14,475.64	14,330.00	145.64	99.394	
20,903.75	7,168.00	20,952.96	7,074.90	336.02	233.58	89.47	-1,631.83	-548.98	14,577.17	14,431.72	145.45	100.222	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Pre-Ongard Well #112 - OH - OH-TD													Offset Site Error: 0.00 usft
Survey Program: 400-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	187.00	187.00	0.00	3.46	-82.40	1,355.13	-10,161.70	10,251.66				
100.00	100.00	287.00	287.00	0.25	5.31	-82.40	1,355.13	-10,161.70	10,251.66	10,246.10	5.56	1,845.053	
200.00	200.00	387.00	387.00	0.61	7.15	-82.40	1,355.13	-10,161.70	10,251.66	10,243.90	7.76	1,320.536	
300.00	300.00	487.01	487.00	0.97	8.96	-82.40	1,355.13	-10,161.70	10,251.66	10,241.73	9.93	1,032.411	
400.00	400.00	587.01	587.00	1.33	10.76	-82.40	1,355.13	-10,161.70	10,251.66	10,239.57	12.09	847.928	
500.00	500.00	687.01	687.00	1.68	12.57	-82.40	1,355.13	-10,161.70	10,251.66	10,237.41	14.25	719.381	
600.00	599.98	787.82	787.81	2.04	14.38	-76.41	1,355.86	-10,161.70	10,251.35	10,234.92	16.43	624.126	
700.00	699.84	889.43	889.42	2.41	16.21	-76.47	1,355.73	-10,161.70	10,250.10	10,231.49	18.61	550.655	
800.00	799.45	990.77	990.76	2.77	18.04	-76.56	1,355.47	-10,161.70	10,248.03	10,227.22	20.80	492.648	
900.00	898.70	1,085.72	1,085.70	3.13	19.75	-76.68	1,355.13	-10,161.70	10,245.14	10,222.26	22.88	447.704	
1,000.00	997.47	1,184.49	1,184.47	3.51	21.58	-76.83	1,355.13	-10,161.70	10,241.51	10,216.43	25.09	408.234	
1,104.22	1,099.75	1,286.77	1,286.75	3.92	23.47	-77.03	1,355.13	-10,161.70	10,236.92	10,209.53	27.39	373.776	
1,200.00	1,193.41	1,380.43	1,380.41	4.32	25.20	-77.14	1,355.13	-10,161.70	10,232.34	10,202.83	29.51	346.756	
1,300.00	1,291.19	1,478.21	1,478.19	4.74	27.00	-77.25	1,355.13	-10,161.70	10,227.60	10,195.87	31.73	322.321	
1,400.00	1,388.98	1,576.00	1,575.98	5.16	28.81	-77.36	1,355.13	-10,161.70	10,222.90	10,188.94	33.96	301.028	
1,500.00	1,486.76	1,674.14	1,674.12	5.59	30.62	-77.47	1,355.69	-10,161.70	10,218.30	10,182.10	36.20	282.270	
1,600.00	1,584.54	1,772.41	1,772.39	6.03	32.44	-77.58	1,355.64	-10,161.70	10,213.68	10,175.23	38.45	265.655	
1,700.00	1,682.33	1,870.66	1,870.63	6.47	34.25	-77.69	1,355.55	-10,161.70	10,209.09	10,168.39	40.70	250.858	
1,800.00	1,780.11	1,968.89	1,968.86	6.91	36.07	-77.81	1,355.42	-10,161.70	10,204.53	10,161.59	42.95	237.599	
1,900.00	1,877.90	2,067.10	2,067.08	7.35	37.88	-77.92	1,355.25	-10,161.70	10,200.02	10,154.82	45.20	225.653	
2,000.00	1,975.68	2,162.74	2,162.68	7.79	39.87	-78.03	1,355.13	-10,161.70	10,195.55	10,147.92	47.63	214.038	
2,100.00	2,073.46	2,260.53	2,260.46	8.24	42.26	-78.15	1,355.13	-10,161.70	10,191.14	10,140.67	50.46	201.951	
2,200.00	2,171.25	2,358.31	2,358.25	8.68	44.65	-78.26	1,355.13	-10,161.70	10,186.76	10,133.47	53.29	191.143	
2,300.00	2,269.03	2,456.67	2,456.60	9.13	47.05	-78.37	1,356.12	-10,161.70	10,182.53	10,126.39	56.14	181.379	
2,400.00	2,366.82	2,556.64	2,556.56	9.58	49.49	-78.48	1,355.96	-10,161.70	10,178.22	10,119.20	59.03	172.438	
2,500.00	2,464.60	2,656.51	2,656.43	10.03	51.92	-78.60	1,355.59	-10,161.70	10,173.94	10,112.03	61.91	164.334	
2,600.00	2,562.38	2,749.76	2,749.38	10.48	54.27	-78.71	1,355.13	-10,161.70	10,169.68	10,104.98	64.70	157.174	
2,700.00	2,660.17	2,847.64	2,847.17	10.93	57.18	-78.82	1,355.13	-10,161.70	10,165.52	10,097.45	68.06	149.352	
2,800.00	2,757.95	2,945.42	2,944.95	11.38	60.04	-78.94	1,355.13	-10,161.70	10,161.39	10,090.02	71.37	142.374	
2,900.00	2,855.74	3,043.50	3,043.99	11.83	63.08	-79.05	1,356.52	-10,161.70	10,157.43	10,082.57	74.86	135.682	
3,000.00	2,953.52	3,159.22	3,158.66	12.29	66.29	-79.19	1,355.04	-10,161.70	10,153.27	10,074.75	78.52	129.311	
3,100.00	3,051.30	3,239.02	3,238.30	12.74	68.46	-79.28	1,355.13	-10,161.70	10,149.26	10,068.12	81.14	125.079	
3,200.00	3,149.09	3,345.67	3,344.92	13.19	71.38	-79.40	1,356.02	-10,161.70	10,145.38	10,060.87	84.51	120.051	
3,300.00	3,246.87	3,434.73	3,433.87	13.65	73.74	-79.51	1,355.13	-10,161.70	10,141.39	10,054.06	87.32	116.135	
3,400.00	3,344.66	3,532.51	3,531.66	14.10	76.18	-79.62	1,355.13	-10,161.70	10,137.51	10,047.30	90.22	112.370	
3,500.00	3,442.44	3,630.30	3,629.44	14.55	78.62	-79.73	1,355.13	-10,161.70	10,133.68	10,040.57	93.11	108.839	
3,600.00	3,540.22	3,728.08	3,727.22	15.01	81.06	-79.85	1,355.13	-10,161.70	10,129.88	10,033.89	96.00	105.521	
3,700.00	3,638.01	3,825.86	3,825.01	15.46	83.50	-79.96	1,355.13	-10,161.70	10,126.13	10,027.24	98.89	102.397	
3,800.00	3,735.79	3,923.65	3,922.79	15.91	85.94	-80.08	1,355.13	-10,161.70	10,122.43	10,020.64	101.78	99.450	
3,900.00	3,833.58	4,021.94	4,021.03	16.37	88.39	-80.17	1,358.95	-10,161.70	10,119.03	10,014.34	104.69	96.658	
4,000.00	3,931.36	4,121.28	4,120.36	16.82	90.87	-80.29	1,358.77	-10,161.70	10,115.38	10,007.76	107.62	93.991	
4,100.00	4,029.14	4,220.52	4,219.59	17.28	93.34	-80.40	1,358.37	-10,161.70	10,111.77	10,001.22	110.55	91.467	
4,200.00	4,126.93	4,319.68	4,318.74	17.73	95.82	-80.52	1,357.75	-10,161.70	10,108.18	9,994.70	113.48	89.076	
4,300.00	4,224.71	4,418.76	4,417.80	18.19	98.29	-80.64	1,356.91	-10,161.70	10,104.62	9,988.22	116.40	86.806	
4,400.00	4,322.50	4,517.74	4,516.77	18.64	100.76	-80.77	1,355.85	-10,161.70	10,101.10	9,981.77	119.33	84.650	
4,500.00	4,420.28	4,608.54	4,607.28	19.10	103.06	-80.88	1,355.13	-10,161.70	10,097.64	9,975.56	122.08	82.710	
4,600.00	4,518.06	4,706.32	4,705.06	19.55	105.60	-80.99	1,355.13	-10,161.70	10,094.27	9,969.19	125.09	80.699	
4,700.00	4,615.85	4,804.11	4,802.85	20.01	108.15	-81.11	1,355.13	-10,161.70	10,090.94	9,962.86	128.09	78.782	
4,800.00	4,713.63	4,902.23	4,900.95	20.46	110.71	-81.21	1,357.16	-10,161.70	10,087.76	9,956.66	131.10	76.948	
4,900.00	4,811.42	5,002.14	5,000.85	20.92	113.31	-81.33	1,356.89	-10,161.70	10,084.50	9,950.34	134.16	75.170	
5,000.00	4,909.20	5,101.89	5,100.58	21.38	115.91	-81.45	1,356.19	-10,161.70	10,081.26	9,944.05	137.21	73.474	
5,100.00	5,006.98	5,201.46	5,200.14	21.83	118.50	-81.57	1,355.08	-10,161.70	10,078.05	9,937.79	140.26	71.854	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Pre-Ongard Well #112 - OH - OH-TD												Offset Site Error:	0.00 usft	
Survey Program:		400-A027Ua_INC-ONLY				Rule Assigned:							Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)	
5,200.00	5,104.77	5,293.28	5,291.77	22.29	121.10	-81.68	1,355.13	-10,161.70	10,074.93	9,931.62	143.31	70.301		
5,300.00	5,202.55	5,391.06	5,389.55	22.74	123.86	-81.80	1,355.13	-10,161.70	10,071.86	9,925.33	146.53	68.737		
5,400.00	5,300.34	5,488.84	5,487.34	23.20	126.62	-81.91	1,355.13	-10,161.70	10,068.83	9,919.08	149.74	67.240		
5,500.00	5,398.12	5,586.63	5,585.12	23.66	129.38	-82.03	1,355.13	-10,161.70	10,065.84	9,912.88	152.96	65.807		
5,600.00	5,495.90	5,684.41	5,682.90	24.11	132.14	-82.14	1,355.13	-10,161.70	10,062.89	9,906.71	156.18	64.433		
5,700.00	5,593.69	5,782.20	5,780.69	24.57	134.90	-82.26	1,355.13	-10,161.70	10,059.99	9,900.59	159.39	63.115		
5,800.00	5,691.47	5,879.98	5,878.47	25.02	137.66	-82.37	1,355.13	-10,161.70	10,057.12	9,894.52	162.61	61.849		
5,900.00	5,789.26	5,978.34	5,976.74	25.48	140.43	-82.46	1,360.37	-10,161.70	10,054.46	9,888.62	165.84	60.628		
6,000.00	5,887.04	6,076.73	6,075.12	25.94	143.21	-82.58	1,360.08	-10,161.70	10,051.66	9,882.59	169.07	59.452		
6,100.00	5,984.83	6,175.03	6,173.41	26.39	145.98	-82.70	1,359.58	-10,161.70	10,048.91	9,876.61	172.30	58.321		
6,200.00	6,082.61	6,273.25	6,271.61	26.85	148.75	-82.82	1,358.87	-10,161.70	10,046.19	9,870.66	175.53	57.233		
6,300.00	6,180.39	6,371.39	6,369.73	27.30	151.52	-82.94	1,357.95	-10,161.70	10,043.52	9,864.76	178.76	56.185		
6,400.00	6,278.18	6,469.45	6,467.76	27.76	154.29	-83.06	1,356.82	-10,161.70	10,040.89	9,858.91	181.98	55.175		
6,500.00	6,375.96	6,567.42	6,565.70	28.22	157.06	-83.19	1,355.48	-10,161.70	10,038.30	9,853.10	185.21	54.201		
6,600.00	6,473.75	6,663.00	6,660.75	28.67	159.85	-83.30	1,355.13	-10,161.70	10,035.78	9,847.32	188.45	53.253		
6,663.67	6,536.00	6,725.25	6,723.00	28.96	161.68	-83.38	1,355.13	-10,161.70	10,034.20	9,843.62	190.58	52.650		
6,679.33	6,551.32	6,740.57	6,738.32	29.04	162.13	-89.99	1,355.13	-10,161.70	10,034.00	9,842.90	191.10	52.505 CC		
6,700.00	6,571.53	6,760.79	6,758.53	29.13	162.73	-98.68	1,355.13	-10,161.70	10,034.34	9,842.54	191.80	52.318 ES		
6,750.00	6,620.29	6,809.55	6,807.29	29.35	164.17	-117.48	1,355.13	-10,161.70	10,037.93	9,844.47	193.46	51.887		
6,800.00	6,668.62	6,857.88	6,855.62	29.56	165.60	-131.46	1,355.13	-10,161.70	10,045.43	9,850.33	195.10	51.488		
6,850.00	6,716.22	6,905.48	6,903.22	29.76	167.00	-141.14	1,355.13	-10,161.70	10,056.80	9,860.09	196.71	51.124		
6,900.00	6,762.80	6,952.06	6,949.80	29.95	168.38	-147.85	1,355.13	-10,161.70	10,071.96	9,873.68	198.29	50.795		
6,950.00	6,808.07	6,997.32	6,995.07	30.13	169.71	-152.65	1,355.13	-10,161.70	10,090.83	9,891.01	199.81	50.502		
7,000.00	6,851.75	7,041.00	7,038.75	30.30	171.00	-156.18	1,355.13	-10,161.70	10,113.27	9,911.99	201.28	50.245		
7,050.00	6,893.57	7,082.82	7,080.57	30.45	172.23	-158.86	1,355.13	-10,161.70	10,139.16	9,936.48	202.68	50.026		
7,100.00	6,933.27	7,122.52	7,120.27	30.60	173.41	-160.93	1,355.13	-10,161.70	10,168.33	9,964.32	204.00	49.844		
7,150.00	6,970.61	7,159.87	7,157.61	30.74	174.51	-162.58	1,355.13	-10,161.70	10,200.60	9,995.35	205.25	49.700		
7,200.00	7,005.36	7,194.62	7,192.36	30.87	175.53	-163.91	1,355.13	-10,161.70	10,235.77	10,029.37	206.40	49.592		
7,250.00	7,037.31	7,226.56	7,224.31	30.99	176.48	-165.00	1,355.13	-10,161.70	10,273.63	10,066.17	207.45	49.522		
7,300.00	7,066.25	7,255.51	7,253.25	31.11	177.33	-165.90	1,355.13	-10,161.70	10,313.93	10,105.52	208.41	49.489 SF		
7,350.00	7,092.02	7,281.27	7,279.02	31.22	178.09	-166.66	1,355.13	-10,161.70	10,356.43	10,147.18	209.26	49.492		
7,400.00	7,114.44	7,303.71	7,301.35	31.34	178.75	-167.23	1,361.16	-10,161.70	10,400.88	10,190.89	209.99	49.530		
7,450.00	7,133.38	7,322.67	7,320.30	31.47	179.31	-167.80	1,361.15	-10,161.70	10,446.97	10,236.37	210.61	49.604		
7,500.00	7,148.73	7,338.03	7,335.66	31.61	179.77	-168.35	1,361.13	-10,161.70	10,494.45	10,283.34	211.11	49.712		
7,550.00	7,160.40	7,349.69	7,347.32	31.78	180.11	-168.96	1,361.11	-10,161.70	10,543.00	10,331.52	211.48	49.852		
7,600.00	7,168.30	7,357.60	7,355.23	31.98	180.34	-169.94	1,361.09	-10,161.70	10,592.34	10,380.60	211.74	50.025		
7,650.00	7,172.38	7,361.69	7,359.32	32.23	180.46	-173.76	1,361.09	-10,161.70	10,642.15	10,430.28	211.87	50.229		
7,678.56	7,173.00	7,362.30	7,359.93	32.39	180.48	85.21	1,361.09	-10,161.70	10,670.70	10,458.81	211.89	50.359		
7,700.00	7,172.99	7,362.30	7,359.92	32.53	180.48	85.20	1,361.09	-10,161.70	10,692.14	10,480.25	211.89	50.460		
7,800.00	7,172.95	7,362.26	7,359.89	33.31	180.48	85.16	1,361.09	-10,161.70	10,792.14	10,580.25	211.89	50.932		
7,900.00	7,172.92	7,362.22	7,359.85	34.32	180.48	85.12	1,361.09	-10,161.70	10,892.14	10,680.25	211.90	51.403		
8,000.00	7,172.88	7,362.19	7,359.81	35.53	180.48	85.08	1,361.09	-10,161.70	10,992.14	10,780.24	211.90	51.875		
8,100.00	7,172.84	7,362.15	7,359.78	36.89	180.48	85.03	1,361.09	-10,161.70	11,092.14	10,880.24	211.90	52.346		
8,200.00	7,172.80	7,362.11	7,359.74	38.39	180.48	84.99	1,361.09	-10,161.70	11,192.14	10,980.23	211.91	52.816		
8,300.00	7,172.77	7,362.08	7,359.70	39.99	180.48	84.95	1,361.09	-10,161.70	11,292.14	11,080.23	211.91	53.287		
8,400.00	7,172.73	7,362.04	7,359.67	41.68	180.47	84.90	1,361.09	-10,161.70	11,392.14	11,180.22	211.92	53.757		
8,500.00	7,172.69	7,362.00	7,359.63	43.45	180.47	84.86	1,361.09	-10,161.70	11,492.14	11,280.21	211.93	54.227		
8,600.00	7,172.65	7,361.96	7,359.59	45.29	180.47	84.82	1,361.09	-10,161.70	11,592.14	11,380.20	211.93	54.697		
8,700.00	7,172.61	7,361.93	7,359.56	47.18	180.47	84.78	1,361.09	-10,161.70	11,692.14	11,480.19	211.94	55.166		
8,800.00	7,172.58	7,361.89	7,359.52	49.12	180.47	84.73	1,361.09	-10,161.70	11,792.13	11,580.18	211.95	55.636		
8,900.00	7,172.54	7,361.85	7,359.48	51.11	180.47	84.69	1,361.09	-10,161.70	11,892.13	11,680.17	211.96	56.105		
9,000.00	7,172.50	7,361.82	7,359.45	53.13	180.47	84.65	1,361.09	-10,161.70	11,992.13	11,780.16	211.97	56.573		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Pre-Ongard Well #112 - OH - OH-TD												Offset Site Error:	0.00 usft
Survey Program:		400-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
9,100.00	7,172.46	7,361.78	7,359.41	55.19	180.47	84.61	1,361.09	-10,161.70	12,092.13	11,880.14	211.99	57.042	
9,200.00	7,172.42	7,361.74	7,359.37	57.28	180.47	84.56	1,361.09	-10,161.70	12,192.13	11,980.13	212.00	57.510	
9,300.00	7,172.39	7,361.71	7,359.34	59.39	180.47	84.52	1,361.09	-10,161.70	12,292.13	12,080.12	212.01	57.978	
9,400.00	7,172.35	7,361.67	7,359.30	61.53	180.46	84.48	1,361.09	-10,161.70	12,392.13	12,180.10	212.03	58.446	
9,500.00	7,172.31	7,361.63	7,359.26	63.70	180.46	84.43	1,361.09	-10,161.70	12,492.13	12,280.08	212.04	58.913	
9,600.00	7,172.27	7,361.60	7,359.22	65.88	180.46	84.39	1,361.09	-10,161.70	12,592.13	12,380.07	212.06	59.380	
9,700.00	7,172.24	7,361.56	7,359.19	68.08	180.46	84.35	1,361.09	-10,161.70	12,692.13	12,480.05	212.08	59.847	
9,800.00	7,172.20	7,361.52	7,359.15	70.29	180.46	84.31	1,361.09	-10,161.70	12,792.13	12,580.03	212.09	60.313	
9,900.00	7,172.16	7,361.49	7,359.11	72.52	180.46	84.26	1,361.09	-10,161.70	12,892.13	12,680.01	212.11	60.779	
10,000.00	7,172.12	7,361.45	7,359.08	74.76	180.46	84.22	1,361.09	-10,161.70	12,992.12	12,779.99	212.13	61.245	
10,100.00	7,172.08	7,361.41	7,359.04	77.02	180.46	84.18	1,361.09	-10,161.70	13,092.12	12,879.97	212.15	61.711	
10,200.00	7,172.05	7,361.38	7,359.00	79.28	180.46	84.14	1,361.09	-10,161.70	13,192.12	12,979.95	212.17	62.176	
10,300.00	7,172.01	7,361.34	7,358.97	81.56	180.45	84.09	1,361.09	-10,161.70	13,292.12	13,079.93	212.20	62.641	
10,400.00	7,171.97	7,361.30	7,358.93	83.84	180.45	84.05	1,361.09	-10,161.70	13,392.12	13,179.90	212.22	63.105	
10,500.00	7,171.93	7,361.26	7,358.89	86.13	180.45	84.01	1,361.09	-10,161.70	13,492.12	13,279.88	212.24	63.570	
10,600.00	7,171.90	7,361.23	7,358.86	88.43	180.45	83.97	1,361.09	-10,161.70	13,592.12	13,379.85	212.27	64.034	
10,700.00	7,171.86	7,361.19	7,358.82	90.74	180.45	83.92	1,361.09	-10,161.70	13,692.12	13,479.83	212.29	64.497	
10,800.00	7,171.82	7,361.15	7,358.78	93.05	180.45	83.88	1,361.09	-10,161.70	13,792.12	13,579.80	212.32	64.960	
10,900.00	7,171.78	7,361.12	7,358.75	95.37	180.45	83.84	1,361.09	-10,161.70	13,892.12	13,679.78	212.34	65.423	
11,000.00	7,171.74	7,361.08	7,358.71	97.70	180.45	83.79	1,361.09	-10,161.70	13,992.12	13,779.75	212.37	65.886	
11,100.00	7,171.71	7,361.04	7,358.67	100.03	180.45	83.75	1,361.09	-10,161.70	14,092.12	13,879.72	212.40	66.348	
11,200.00	7,171.67	7,361.01	7,358.63	102.37	180.44	83.71	1,361.09	-10,161.70	14,192.12	13,979.69	212.43	66.810	
11,300.00	7,171.63	7,360.97	7,358.60	104.71	180.44	83.67	1,361.09	-10,161.70	14,292.12	14,079.66	212.46	67.271	
11,400.00	7,171.59	7,360.93	7,358.56	107.06	180.44	83.62	1,361.09	-10,161.70	14,392.12	14,179.63	212.49	67.732	
11,500.00	7,171.56	7,360.90	7,358.52	109.40	180.44	83.58	1,361.09	-10,161.70	14,492.12	14,279.60	212.52	68.193	
11,600.00	7,171.52	7,360.86	7,358.49	111.76	180.44	83.54	1,361.09	-10,161.70	14,592.11	14,379.57	212.55	68.653	
11,700.00	7,171.48	7,360.82	7,358.45	114.12	180.44	83.50	1,361.09	-10,161.70	14,692.11	14,479.53	212.58	69.113	
11,800.00	7,171.44	7,360.79	7,358.41	116.48	180.44	83.45	1,361.09	-10,161.70	14,792.11	14,579.50	212.61	69.572	
11,900.00	7,171.40	7,360.75	7,358.38	118.84	180.44	83.41	1,361.09	-10,161.70	14,892.11	14,679.46	212.65	70.031	
12,000.00	7,171.37	7,360.71	7,358.34	121.20	180.44	83.37	1,361.09	-10,161.70	14,992.11	14,779.43	212.68	70.490	
12,100.00	7,171.33	7,360.68	7,358.30	123.57	180.43	83.33	1,361.09	-10,161.70	15,092.11	14,879.39	212.72	70.949	
12,200.00	7,171.29	7,360.64	7,358.27	125.95	180.43	83.28	1,361.09	-10,161.70	15,192.11	14,979.36	212.76	71.407	
12,300.00	7,171.25	7,360.60	7,358.23	128.32	180.43	83.24	1,361.09	-10,161.70	15,292.11	15,079.32	212.79	71.864	
12,400.00	7,171.22	7,360.56	7,358.19	130.70	180.43	83.20	1,361.09	-10,161.70	15,392.11	15,179.28	212.83	72.321	
12,500.00	7,171.18	7,360.53	7,358.16	133.07	180.43	83.16	1,361.09	-10,161.70	15,492.11	15,279.24	212.87	72.778	
12,600.00	7,171.14	7,360.49	7,358.12	135.46	180.43	83.11	1,361.09	-10,161.70	15,592.11	15,379.20	212.91	73.234	
12,700.00	7,171.10	7,360.45	7,358.08	137.84	180.43	83.07	1,361.09	-10,161.70	15,692.11	15,479.16	212.95	73.690	
12,800.00	7,171.06	7,360.42	7,358.05	140.22	180.43	83.03	1,361.09	-10,161.70	15,792.11	15,579.12	212.99	74.146	
12,900.00	7,171.03	7,360.38	7,358.01	142.61	180.43	82.99	1,361.09	-10,161.70	15,892.11	15,679.08	213.03	74.601	
13,000.00	7,170.99	7,360.34	7,357.97	145.00	180.42	82.94	1,361.09	-10,161.70	15,992.11	15,779.04	213.07	75.055	
13,100.00	7,170.95	7,360.31	7,357.93	147.39	180.42	82.90	1,361.09	-10,161.70	16,092.11	15,878.99	213.11	75.509	
13,200.00	7,170.91	7,360.27	7,357.90	149.78	180.42	82.86	1,361.09	-10,161.70	16,192.11	15,978.95	213.16	75.963	
13,300.00	7,170.87	7,360.23	7,357.86	152.17	180.42	82.82	1,361.09	-10,161.70	16,292.11	16,078.90	213.20	76.417	
13,400.00	7,170.84	7,360.20	7,357.82	154.57	180.42	82.77	1,361.09	-10,161.70	16,392.11	16,178.86	213.25	76.869	
13,500.00	7,170.80	7,360.16	7,357.79	156.96	180.42	82.73	1,361.09	-10,161.70	16,492.10	16,278.81	213.29	77.322	
13,600.00	7,170.76	7,360.12	7,357.75	159.36	180.42	82.69	1,361.09	-10,161.70	16,592.10	16,378.77	213.34	77.774	
13,700.00	7,170.72	7,360.09	7,357.71	161.76	180.42	82.65	1,361.09	-10,161.70	16,692.10	16,478.72	213.38	78.225	
13,800.00	7,170.69	7,360.05	7,357.68	164.16	180.42	82.60	1,361.09	-10,161.70	16,792.10	16,578.67	213.43	78.676	
13,900.00	7,170.65	7,360.01	7,357.64	166.56	180.41	82.56	1,361.09	-10,161.70	16,892.10	16,678.62	213.48	79.127	
14,000.00	7,170.61	7,359.97	7,357.60	168.96	180.41	82.52	1,361.09	-10,161.70	16,992.10	16,778.57	213.53	79.577	
14,100.00	7,170.57	7,359.94	7,357.57	171.36	180.41	82.48	1,361.09	-10,161.70	17,092.10	16,878.52	213.58	80.027	
14,200.00	7,170.53	7,359.90	7,357.53	173.76	180.41	82.43	1,361.09	-10,161.70	17,192.10	16,978.47	213.63	80.476	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Pre-Ongard Well #112 - OH - OH-TD											Offset Site Error: 0.00 usft
Survey Program: 400-A027Ua_INC-ONLY							Rule Assigned:				Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre	Distance	Minimum Separation (usft)	Separation Factor	Warning
				(usft)	(usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
14,300.00	7,170.50	7,359.86	7,357.49	176.17	180.41	82.39	1,361.09	-10,161.70	17,292.10	17,078.42	213.68
14,400.00	7,170.46	7,359.83	7,357.46	178.57	180.41	82.35	1,361.09	-10,161.70	17,392.10	17,178.37	213.73
14,500.00	7,170.42	7,359.79	7,357.42	180.98	180.41	82.31	1,361.09	-10,161.70	17,492.10	17,278.32	213.78
14,600.00	7,170.38	7,359.75	7,357.38	183.39	180.41	82.26	1,361.09	-10,161.70	17,592.10	17,378.26	213.84
14,700.00	7,170.35	7,359.72	7,357.34	185.80	180.41	82.22	1,361.09	-10,161.70	17,692.10	17,478.21	213.89
14,800.00	7,170.31	7,359.68	7,357.31	188.20	180.41	82.18	1,361.09	-10,161.70	17,792.10	17,578.15	213.95
14,900.00	7,170.27	7,359.64	7,357.27	190.61	180.40	82.14	1,361.09	-10,161.70	17,892.10	17,678.10	214.00
15,000.00	7,170.23	7,359.61	7,357.23	193.02	180.40	82.10	1,361.09	-10,161.70	17,992.10	17,778.04	214.06
15,100.00	7,170.19	7,359.57	7,357.20	195.43	180.40	82.05	1,361.09	-10,161.70	18,092.10	17,877.99	214.11
15,200.00	7,170.16	7,359.53	7,357.16	197.85	180.40	82.01	1,361.09	-10,161.70	18,192.10	17,977.93	214.17
15,300.00	7,170.12	7,359.49	7,357.12	200.26	180.40	81.97	1,361.09	-10,161.70	18,292.10	18,077.87	214.23
15,400.00	7,170.08	7,359.46	7,357.09	202.67	180.40	81.93	1,361.09	-10,161.70	18,392.10	18,177.81	214.28
15,500.00	7,170.04	7,359.42	7,357.05	205.08	180.40	81.88	1,361.09	-10,161.70	18,492.10	18,277.75	214.34
15,600.00	7,170.01	7,359.38	7,357.01	207.50	180.40	81.84	1,361.09	-10,161.70	18,592.10	18,377.69	214.40
15,700.00	7,169.97	7,359.35	7,356.98	209.91	180.40	81.80	1,361.09	-10,161.70	18,692.10	18,477.63	214.46
15,800.00	7,169.93	7,359.31	7,356.94	212.33	180.39	81.76	1,361.09	-10,161.70	18,792.10	18,577.57	214.52
15,900.00	7,169.89	7,359.27	7,356.90	214.74	180.39	81.71	1,361.09	-10,161.70	18,892.10	18,677.51	214.58
16,000.00	7,169.85	7,359.24	7,356.86	217.16	180.39	81.67	1,361.09	-10,161.70	18,992.10	18,777.45	214.65
16,100.00	7,169.82	7,359.20	7,356.83	219.58	180.39	81.63	1,361.09	-10,161.70	19,092.09	18,877.39	214.71
16,200.00	7,169.78	7,359.16	7,356.79	221.99	180.39	81.59	1,361.09	-10,161.70	19,192.09	18,977.32	214.77
16,300.00	7,169.74	7,359.13	7,356.75	224.41	180.39	81.55	1,361.09	-10,161.70	19,292.09	19,077.26	214.83
16,400.00	7,169.70	7,359.09	7,356.72	226.83	180.39	81.50	1,361.09	-10,161.70	19,392.09	19,177.19	214.90
16,500.00	7,169.67	7,359.05	7,356.68	229.25	180.39	81.46	1,361.09	-10,161.70	19,492.09	19,277.13	214.96
16,600.00	7,169.63	7,359.02	7,356.64	231.66	180.39	81.42	1,361.09	-10,161.70	19,592.09	19,377.06	215.03
16,700.00	7,169.59	7,358.98	7,356.61	234.08	180.38	81.38	1,361.09	-10,161.70	19,692.09	19,477.00	215.10
16,800.00	7,169.55	7,358.94	7,356.57	236.50	180.38	81.33	1,361.09	-10,161.70	19,792.09	19,576.93	215.16
16,900.00	7,169.51	7,358.90	7,356.53	238.92	180.38	81.29	1,361.09	-10,161.70	19,892.09	19,676.86	215.23
17,000.00	7,169.48	7,358.87	7,356.50	241.34	180.38	81.25	1,361.09	-10,161.70	19,992.09	19,776.80	215.30
17,100.00	7,169.44	7,358.83	7,356.46	243.76	180.38	81.21	1,361.09	-10,161.70	20,092.09	19,876.73	215.36
17,200.00	7,169.40	7,358.79	7,356.42	246.18	180.38	81.17	1,361.09	-10,161.70	20,192.09	19,976.66	215.43
17,300.00	7,169.36	7,358.76	7,356.39	248.61	180.38	81.12	1,361.09	-10,161.70	20,292.09	20,076.59	215.50
17,400.00	7,169.32	7,358.72	7,356.35	251.03	180.38	81.08	1,361.09	-10,161.70	20,392.09	20,176.52	215.57
17,500.00	7,169.29	7,358.68	7,356.31	253.45	180.38	81.04	1,361.09	-10,161.70	20,492.09	20,276.45	215.64
17,600.00	7,169.25	7,358.65	7,356.27	255.87	180.37	81.00	1,361.09	-10,161.70	20,592.09	20,376.38	215.71
17,700.00	7,169.21	7,358.61	7,356.24	258.29	180.37	80.95	1,361.09	-10,161.70	20,692.09	20,476.30	215.79
17,800.00	7,169.17	7,358.57	7,356.20	260.72	180.37	80.91	1,361.09	-10,161.70	20,792.09	20,576.23	215.86
17,900.00	7,169.14	7,358.54	7,356.16	263.14	180.37	80.87	1,361.09	-10,161.70	20,892.09	20,676.16	215.93
18,000.00	7,169.10	7,358.50	7,356.13	265.56	180.37	80.83	1,361.09	-10,161.70	20,992.09	20,776.08	216.00
18,100.00	7,169.06	7,358.46	7,356.09	267.99	180.37	80.79	1,361.09	-10,161.70	21,092.09	20,876.01	216.08
18,200.00	7,169.02	7,358.42	7,356.05	270.41	180.37	80.74	1,361.09	-10,161.70	21,192.09	20,975.94	216.15
18,300.00	7,168.98	7,358.39	7,356.02	272.84	180.37	80.70	1,361.09	-10,161.70	21,292.09	21,075.86	216.23
18,400.00	7,168.95	7,358.35	7,355.98	275.26	180.37	80.66	1,361.09	-10,161.70	21,392.09	21,175.79	216.30
18,500.00	7,168.91	7,358.31	7,355.94	277.68	180.36	80.62	1,361.09	-10,161.70	21,492.09	21,275.71	216.38
18,600.00	7,168.87	7,358.28	7,355.91	280.11	180.36	80.58	1,361.09	-10,161.70	21,592.09	21,375.63	216.46
18,700.00	7,168.83	7,358.24	7,355.87	282.53	180.36	80.53	1,361.09	-10,161.70	21,692.09	21,475.56	216.53
18,800.00	7,168.80	7,358.20	7,355.83	284.96	180.36	80.49	1,361.09	-10,161.70	21,792.09	21,575.48	216.61
18,900.00	7,168.76	7,358.17	7,355.79	287.38	180.36	80.45	1,361.09	-10,161.70	21,892.09	21,675.40	216.69
19,000.00	7,168.72	7,358.13	7,355.76	289.81	180.36	80.41	1,361.09	-10,161.70	21,992.09	21,775.32	216.77
19,100.00	7,168.68	7,358.09	7,355.72	292.24	180.36	80.37	1,361.09	-10,161.70	22,092.09	21,875.24	216.84
19,200.00	7,168.64	7,358.06	7,355.68	294.66	180.36	80.32	1,361.09	-10,161.70	22,192.09	21,975.16	216.92
19,300.00	7,168.61	7,358.02	7,355.65	297.09	180.36	80.28	1,361.09	-10,161.70	22,292.09	22,075.08	217.00
19,400.00	7,168.57	7,357.98	7,355.61	299.52	180.36	80.24	1,361.09	-10,161.70	22,392.09	22,175.00	217.08

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Pre-Ongard Well #112 - OH - OH-TD												Offset Site Error:	0.00 usft
Survey Program: 400-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,500.00	7,168.53	7,357.94	7,355.57	301.94	180.35	80.20	1,361.09	-10,161.70	22,492.09	22,274.92	217.17	103.571	
19,600.00	7,168.49	7,357.91	7,355.54	304.37	180.35	80.16	1,361.09	-10,161.70	22,592.09	22,374.84	217.25	103.993	
19,700.00	7,168.46	7,357.87	7,355.50	306.80	180.35	80.11	1,361.09	-10,161.70	22,692.08	22,474.76	217.33	104.413	
19,800.00	7,168.42	7,357.83	7,355.46	309.22	180.35	80.07	1,361.09	-10,161.70	22,792.08	22,574.67	217.41	104.834	
19,900.00	7,168.38	7,357.80	7,355.43	311.65	180.35	80.03	1,361.09	-10,161.70	22,892.08	22,674.59	217.49	105.254	
20,000.00	7,168.34	7,357.76	7,355.39	314.08	180.35	79.99	1,361.09	-10,161.70	22,992.08	22,774.51	217.58	105.673	
20,100.00	7,168.30	7,357.72	7,355.35	316.51	180.35	79.95	1,361.09	-10,161.70	23,092.08	22,874.42	217.66	106.092	
20,200.00	7,168.27	7,357.69	7,355.31	318.93	180.35	79.90	1,361.09	-10,161.70	23,192.08	22,974.34	217.75	106.510	
20,300.00	7,168.23	7,357.65	7,355.28	321.36	180.35	79.86	1,361.09	-10,161.70	23,292.08	23,074.25	217.83	106.928	
20,400.00	7,168.19	7,357.61	7,355.24	323.79	180.34	79.82	1,361.09	-10,161.70	23,392.08	23,174.17	217.92	107.345	
20,500.00	7,168.15	7,357.57	7,355.20	326.22	180.34	79.78	1,361.09	-10,161.70	23,492.08	23,274.08	218.00	107.761	
20,600.00	7,168.11	7,357.54	7,355.17	328.65	180.34	79.74	1,361.09	-10,161.70	23,592.08	23,374.00	218.09	108.177	
20,700.00	7,168.08	7,357.50	7,355.13	331.07	180.34	79.70	1,361.09	-10,161.70	23,692.08	23,473.91	218.17	108.593	
20,768.77	7,168.05	7,357.48	7,355.10	332.74	180.34	79.67	1,361.09	-10,161.70	23,760.85	23,542.61	218.23	108.878	
20,800.00	7,168.04	7,357.46	7,355.09	333.50	180.34	79.65	1,361.09	-10,161.70	23,792.08	23,573.82	218.26	109.007	
20,903.75	7,168.00	7,357.43	7,355.05	336.02	180.34	79.61	1,361.09	-10,161.70	23,895.83	23,677.48	218.35	109.437	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #006C - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 348-APC_ISCWSA REV 2 MWD													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	3,511.59	3,073.61	0.00	29.71	-76.91	2,072.39	-8,911.66	9,593.41				
100.00	100.00	3,594.32	3,149.43	0.25	30.35	-76.76	2,089.40	-8,883.25	9,563.46	9,540.15	23.31	410.237	
200.00	200.00	3,596.00	3,150.97	0.61	30.37	-76.76	2,089.75	-8,882.67	9,534.01	9,510.49	23.52	405.292	
300.00	300.00	3,626.00	3,178.54	0.97	30.59	-76.71	2,096.07	-8,872.69	9,505.36	9,481.37	23.99	396.228	
400.00	400.00	3,626.00	3,178.54	1.33	30.59	-76.71	2,096.07	-8,872.69	9,477.55	9,453.23	24.32	389.703	
500.00	500.00	3,643.66	3,194.92	1.68	30.71	-76.68	2,099.67	-8,867.12	9,450.62	9,425.85	24.77	381.541	
600.00	599.98	3,672.57	3,221.84	2.04	30.91	-71.15	2,105.42	-8,858.32	9,423.95	9,398.66	25.29	372.610	
700.00	699.84	3,722.00	3,267.95	2.41	31.25	-71.62	2,115.15	-8,843.40	9,396.68	9,370.75	25.93	362.445	
800.00	799.45	3,753.00	3,296.97	2.77	31.46	-72.14	2,121.09	-8,834.27	9,368.97	9,342.52	26.45	354.176	
900.00	898.70	3,753.00	3,296.97	3.13	31.46	-72.69	2,121.09	-8,834.27	9,341.09	9,314.27	26.82	348.306	
1,000.00	997.47	3,753.00	3,296.97	3.51	31.46	-73.25	2,121.09	-8,834.27	9,313.19	9,286.00	27.19	342.549	
1,104.22	1,099.75	3,753.00	3,296.97	3.92	31.46	-73.83	2,121.09	-8,834.27	9,284.14	9,256.56	27.58	336.623	
1,200.00	1,193.41	3,753.00	3,296.97	4.32	31.46	-73.83	2,121.09	-8,834.27	9,257.92	9,229.97	27.95	331.251	
1,300.00	1,291.19	3,753.00	3,296.97	4.74	31.46	-73.83	2,121.09	-8,834.27	9,231.53	9,203.19	28.34	325.749	
1,400.00	1,388.98	3,753.00	3,296.97	5.16	31.46	-73.83	2,121.09	-8,834.27	9,206.15	9,177.41	28.74	320.360	
1,500.00	1,486.76	3,753.00	3,296.97	5.59	31.46	-73.83	2,121.09	-8,834.27	9,181.79	9,152.65	29.14	315.102	
1,600.00	1,584.54	3,753.00	3,296.97	6.03	31.46	-73.83	2,121.09	-8,834.27	9,158.45	9,128.91	29.54	309.986	
1,700.00	1,682.33	3,753.00	3,296.97	6.47	31.46	-73.83	2,121.09	-8,834.27	9,136.16	9,106.20	29.95	305.019	
1,800.00	1,780.11	3,753.00	3,296.97	6.91	31.46	-73.83	2,121.09	-8,834.27	9,114.90	9,084.54	30.36	300.203	
1,900.00	1,877.90	4,006.00	3,540.34	7.35	32.63	-73.84	2,159.82	-8,785.85	9,092.23	9,060.46	31.77	286.184	
2,000.00	1,975.68	4,023.25	3,557.25	7.79	32.69	-73.85	2,161.38	-8,782.78	9,070.32	9,038.08	32.24	281.378	
2,100.00	2,073.46	4,037.00	3,570.73	8.24	32.74	-73.86	2,162.62	-8,780.39	9,049.22	9,016.52	32.69	276.811	
2,200.00	2,171.25	4,068.00	3,601.19	8.68	32.85	-73.88	2,165.34	-8,775.35	9,028.95	8,995.76	33.19	272.022	
2,300.00	2,269.03	4,068.00	3,601.19	9.13	32.85	-73.88	2,165.34	-8,775.35	9,009.60	8,975.99	33.61	268.072	
2,400.00	2,366.82	4,351.00	3,874.87	9.58	33.95	-73.99	2,196.15	-8,729.14	8,988.84	8,953.91	34.93	257.358	
2,500.00	2,464.60	4,351.00	3,874.87	10.03	33.95	-73.99	2,196.15	-8,729.14	8,968.59	8,933.24	35.35	253.709	
2,600.00	2,562.38	4,351.00	3,874.87	10.48	33.95	-73.99	2,196.15	-8,729.14	8,949.41	8,913.64	35.77	250.186	
2,700.00	2,660.17	4,351.00	3,874.87	10.93	33.95	-73.99	2,196.15	-8,729.14	8,931.31	8,895.12	36.19	246.786	
2,800.00	2,757.95	4,351.00	3,874.87	11.38	33.95	-73.99	2,196.15	-8,729.14	8,914.29	8,877.69	36.61	243.505	
2,900.00	2,855.74	4,351.00	3,874.87	11.83	33.95	-73.99	2,196.15	-8,729.14	8,898.37	8,861.35	37.02	240.342	
3,000.00	2,953.52	4,351.00	3,874.87	12.29	33.95	-73.99	2,196.15	-8,729.14	8,883.54	8,846.11	37.44	237.294	
3,100.00	3,051.30	4,351.00	3,874.87	12.74	33.95	-73.99	2,196.15	-8,729.14	8,869.82	8,831.97	37.85	234.357	
3,200.00	3,149.09	4,351.00	3,874.87	13.19	33.95	-73.99	2,196.15	-8,729.14	8,857.21	8,818.95	38.26	231.530	
3,300.00	3,246.87	4,351.00	3,874.87	13.65	33.95	-73.99	2,196.15	-8,729.14	8,845.70	8,807.04	38.66	228.809	
3,400.00	3,344.66	4,362.19	3,886.04	14.10	33.96	-74.00	2,196.53	-8,728.59	8,835.29	8,796.22	39.08	226.100	
3,500.00	3,442.44	4,382.00	3,905.82	14.55	33.99	-74.02	2,197.17	-8,727.72	8,825.76	8,786.26	39.50	223.418	
3,600.00	3,540.22	4,414.00	3,937.79	15.01	34.03	-74.06	2,198.06	-8,726.60	8,817.04	8,777.09	39.94	220.749	
3,700.00	3,638.01	4,444.00	3,967.77	15.46	34.06	-74.09	2,198.70	-8,725.88	8,809.15	8,768.78	40.37	218.207	
3,800.00	3,735.79	4,508.00	4,031.76	15.91	34.11	-74.17	2,199.63	-8,724.75	8,801.83	8,761.00	40.83	215.564	
3,900.00	3,833.58	4,674.14	4,197.85	16.37	34.27	-74.37	2,201.62	-8,721.33	8,794.05	8,752.63	41.42	212.304	
4,000.00	3,931.36	4,773.66	4,297.34	16.82	34.39	-74.49	2,202.79	-8,719.10	8,786.28	8,744.32	41.96	209.412	
4,100.00	4,029.14	4,873.19	4,396.84	17.28	34.51	-74.61	2,203.98	-8,716.84	8,778.52	8,736.03	42.49	206.590	
4,200.00	4,126.93	4,972.72	4,496.33	17.73	34.63	-74.73	2,205.17	-8,714.57	8,770.79	8,727.76	43.03	203.838	
4,300.00	4,224.71	5,072.25	4,595.83	18.19	34.75	-74.86	2,206.38	-8,712.27	8,763.07	8,719.51	43.56	201.151	
4,400.00	4,322.50	5,171.79	4,695.33	18.64	34.86	-74.98	2,207.59	-8,709.95	8,755.38	8,711.28	44.10	198.528	
4,500.00	4,420.28	5,271.33	4,794.83	19.10	34.98	-75.10	2,208.82	-8,707.62	8,747.71	8,703.07	44.64	195.967	
4,600.00	4,518.06	5,370.86	4,894.34	19.55	35.10	-75.22	2,210.06	-8,705.26	8,740.07	8,694.89	45.18	193.466	
4,700.00	4,615.85	5,470.41	4,993.84	20.01	35.22	-75.34	2,211.30	-8,702.89	8,732.44	8,686.73	45.71	191.022	
4,800.00	4,713.63	5,569.95	5,093.35	20.46	35.34	-75.47	2,212.56	-8,700.49	8,724.84	8,678.58	46.25	188.634	
4,900.00	4,811.42	5,669.50	5,192.86	20.92	35.46	-75.59	2,213.83	-8,698.08	8,717.25	8,670.46	46.79	186.299	
5,000.00	4,909.20	5,769.05	5,292.37	21.38	35.58	-75.71	2,215.11	-8,695.64	8,709.70	8,662.36	47.33	184.017	
5,100.00	5,006.98	5,868.60	5,391.88	21.83	35.70	-75.83	2,216.40	-8,693.18	8,702.16	8,654.29	47.87	181.785	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #006C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		348-APC_ISCWSA REV 2 MWD						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
5,200.00	5,104.77	5,968.15	5,491.40	22.29	35.82	-75.96	2,217.70	-8,690.71	8,694.64	8,646.23	48.41	179.602	
5,300.00	5,202.55	6,067.71	5,590.91	22.74	35.94	-76.08	2,219.01	-8,688.21	8,687.15	8,638.20	48.95	177.467	
5,400.00	5,300.34	6,167.26	5,690.43	23.20	36.06	-76.20	2,220.33	-8,685.70	8,679.68	8,630.18	49.49	175.377	
5,500.00	5,398.12	6,266.82	5,789.95	23.66	36.18	-76.33	2,221.66	-8,683.16	8,672.23	8,622.19	50.03	173.331	
5,600.00	5,495.90	6,366.39	5,889.47	24.11	36.30	-76.45	2,223.00	-8,680.60	8,664.80	8,614.22	50.57	171.329	
5,700.00	5,593.69	6,465.95	5,988.99	24.57	36.42	-76.57	2,224.36	-8,678.03	8,657.39	8,606.28	51.12	169.368	
5,800.00	5,691.47	6,565.52	6,088.52	25.02	36.54	-76.70	2,225.72	-8,675.43	8,650.01	8,598.35	51.66	167.448	
5,900.00	5,789.26	6,665.09	6,188.04	25.48	36.66	-76.82	2,227.09	-8,672.81	8,642.65	8,590.45	52.20	165.567	
6,000.00	5,887.04	6,764.66	6,287.57	25.94	36.79	-76.94	2,228.48	-8,670.18	8,635.31	8,582.56	52.74	163.724	
6,100.00	5,984.83	6,864.23	6,387.10	26.39	36.91	-77.07	2,229.87	-8,667.52	8,627.99	8,574.70	53.29	161.918	
6,200.00	6,082.61	6,963.81	6,486.63	26.85	37.03	-77.19	2,231.28	-8,664.84	8,620.69	8,566.86	53.83	160.147	
6,300.00	6,180.39	7,063.39	6,586.16	27.30	37.15	-77.32	2,232.69	-8,662.15	8,613.42	8,559.05	54.37	158.412	
6,400.00	6,278.18	7,162.97	6,685.69	27.76	37.27	-77.44	2,234.12	-8,659.43	8,606.17	8,551.25	54.92	156.711	
6,500.00	6,375.96	7,262.55	6,785.23	28.22	37.39	-77.56	2,235.56	-8,656.69	8,598.94	8,543.48	55.46	155.042	
6,600.00	6,473.75	7,362.13	6,884.76	28.67	37.51	-77.69	2,237.00	-8,653.94	8,591.73	8,535.73	56.01	153.406	
6,663.67	6,536.00	7,425.54	6,948.13	28.96	37.59	-77.77	2,237.93	-8,652.17	8,587.16	8,530.80	56.35	152.380	
6,700.00	6,571.53	7,461.76	6,984.33	29.13	37.63	-93.09	2,238.46	-8,651.16	8,585.58	8,529.03	56.55	151.820	
6,709.60	6,580.91	7,471.33	6,993.90	29.17	37.64	-97.01	2,238.60	-8,650.89	8,585.51	8,528.90	56.60	151.680 CC, ES	
6,750.00	6,620.29	7,511.55	7,034.11	29.35	37.69	-111.89	2,239.19	-8,649.76	8,586.78	8,529.96	56.82	151.121	
6,800.00	6,668.62	7,561.02	7,083.55	29.56	37.75	-125.83	2,239.93	-8,648.37	8,591.89	8,534.81	57.08	150.511	
6,850.00	6,716.22	7,609.86	7,132.37	29.76	37.81	-135.44	2,240.65	-8,646.99	8,600.87	8,543.53	57.34	149.995	
6,900.00	6,762.80	7,657.77	7,180.25	29.95	37.87	-142.06	2,241.36	-8,645.63	8,613.67	8,556.08	57.59	149.572	
6,950.00	6,808.07	7,704.46	7,226.91	30.13	37.93	-146.71	2,242.06	-8,644.31	8,630.21	8,572.38	57.83	149.244	
7,000.00	6,851.75	7,749.63	7,272.06	30.30	37.98	-150.05	2,242.74	-8,643.02	8,650.39	8,592.33	58.05	149.008	
7,050.00	6,893.57	7,793.01	7,315.42	30.45	38.04	-152.49	2,243.39	-8,641.78	8,674.08	8,615.81	58.27	148.864	
7,100.00	6,933.27	7,834.34	7,356.73	30.60	38.09	-154.26	2,244.01	-8,640.59	8,701.14	8,642.67	58.47	148.810 SF	
7,150.00	6,970.61	7,873.35	7,395.72	30.74	38.13	-155.53	2,244.60	-8,639.47	8,731.41	8,672.75	58.66	148.845	
7,200.00	7,005.36	7,909.82	7,432.16	30.87	38.18	-156.38	2,245.15	-8,638.42	8,764.69	8,705.85	58.84	148.965	
7,250.00	7,037.31	7,943.50	7,465.83	30.99	38.22	-156.86	2,245.66	-8,637.44	8,800.78	8,741.78	59.00	149.168	
7,300.00	7,066.25	7,974.20	7,496.52	31.11	38.26	-156.98	2,246.13	-8,636.55	8,839.46	8,780.32	59.15	149.451	
7,350.00	7,092.02	8,001.73	7,524.03	31.22	38.29	-156.72	2,246.55	-8,635.75	8,880.49	8,821.21	59.28	149.809	
7,400.00	7,114.44	8,025.91	7,548.20	31.34	38.32	-155.99	2,246.92	-8,635.05	8,923.61	8,864.21	59.40	150.240	
7,450.00	7,133.38	8,046.60	7,568.88	31.47	38.34	-154.65	2,247.24	-8,634.44	8,968.55	8,909.06	59.50	150.738	
7,500.00	7,148.73	8,063.67	7,585.93	31.61	38.37	-152.36	2,247.50	-8,633.95	9,015.05	8,955.47	59.58	151.299	
7,550.00	7,160.40	8,077.01	7,599.26	31.78	38.38	-148.40	2,247.70	-8,633.56	9,062.81	9,003.15	59.66	151.916	
7,600.00	7,168.30	8,086.53	7,608.78	31.98	38.39	-141.01	2,247.85	-8,633.28	9,111.53	9,051.81	59.71	152.586	
7,650.00	7,172.38	8,092.18	7,614.43	32.23	38.40	-124.87	2,247.93	-8,633.11	9,160.91	9,101.15	59.76	153.299	
7,678.56	7,173.00	8,093.66	7,615.91	32.39	38.40	-106.49	2,247.96	-8,633.07	9,189.30	9,129.52	59.78	153.723	
7,700.00	7,172.99	8,094.29	7,616.53	32.53	38.40	-106.53	2,247.97	-8,633.05	9,210.64	9,150.85	59.79	154.047	
7,800.00	7,172.95	8,097.22	7,619.47	33.31	38.41	-106.71	2,248.01	-8,632.97	9,310.19	9,250.34	59.85	155.556	
7,900.00	7,172.92	8,100.15	7,622.40	34.32	38.41	-106.89	2,248.06	-8,632.88	9,409.74	9,349.83	59.91	157.059	
8,000.00	7,172.88	8,103.09	7,625.33	35.53	38.41	-107.07	2,248.10	-8,632.79	9,509.30	9,449.33	59.97	158.558	
8,100.00	7,172.84	8,106.02	7,628.27	36.89	38.42	-107.25	2,248.15	-8,632.71	9,608.87	9,548.83	60.04	160.052	
8,200.00	7,172.80	8,108.96	7,631.20	38.39	38.42	-107.43	2,248.19	-8,632.62	9,708.45	9,648.35	60.10	161.541	
8,300.00	7,172.77	8,111.90	7,634.14	39.99	38.42	-107.61	2,248.24	-8,632.54	9,808.03	9,747.87	60.16	163.025	
8,400.00	7,172.73	8,114.84	7,637.08	41.68	38.43	-107.79	2,248.28	-8,632.45	9,907.63	9,847.40	60.23	164.504	
8,500.00	7,172.69	8,117.78	7,640.01	43.45	38.43	-107.97	2,248.33	-8,632.36	10,007.23	9,946.94	60.29	165.979	
8,600.00	7,172.65	8,120.72	7,642.96	45.29	38.44	-108.15	2,248.37	-8,632.28	10,106.83	10,046.48	60.36	167.449	
8,700.00	7,172.61	8,123.66	7,645.90	47.18	38.44	-108.33	2,248.42	-8,632.19	10,206.45	10,146.02	60.42	168.914	
8,800.00	7,172.58	8,126.61	7,648.84	49.12	38.44	-108.51	2,248.46	-8,632.10	10,306.07	10,245.58	60.49	170.374	
8,900.00	7,172.54	8,129.56	7,651.78	51.11	38.45	-108.69	2,248.51	-8,632.02	10,405.70	10,345.14	60.56	171.831	
9,000.00	7,172.50	8,132.50	7,654.73	53.13	38.45	-108.86	2,248.56	-8,631.93	10,505.33	10,444.71	60.63	173.282	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #006C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		348-APC_ISCWSA REV 2 MWD						Rule Assigned:		Offset Well Error:		0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,100.00	7,172.46	8,135.45	7,657.68	55.19	38.45	-109.04	2,248.60	-8,631.85	10,604.97	10,544.28	60.69	174.730		
9,200.00	7,172.42	8,138.40	7,660.62	57.28	38.46	-109.22	2,248.65	-8,631.76	10,704.62	10,643.85	60.76	176.173		
9,300.00	7,172.39	8,141.35	7,663.57	59.39	38.46	-109.39	2,248.69	-8,631.67	10,804.27	10,743.44	60.83	177.611		
9,400.00	7,172.35	8,144.30	7,666.52	61.53	38.46	-109.57	2,248.74	-8,631.59	10,903.92	10,843.02	60.90	179.045		
9,500.00	7,172.31	8,147.25	7,669.47	63.70	38.47	-109.75	2,248.78	-8,631.50	11,003.59	10,942.62	60.97	180.475		
9,600.00	7,172.27	8,150.21	7,672.43	65.88	38.47	-109.92	2,248.83	-8,631.41	11,103.25	11,042.21	61.04	181.901		
9,700.00	7,172.24	8,153.16	7,675.38	68.08	38.48	-110.10	2,248.87	-8,631.32	11,202.93	11,141.82	61.11	183.322		
9,800.00	7,172.20	8,156.12	7,678.33	70.29	38.48	-110.27	2,248.92	-8,631.24	11,302.61	11,241.42	61.18	184.739		
9,900.00	7,172.16	8,159.08	7,681.29	72.52	38.48	-110.45	2,248.96	-8,631.15	11,402.29	11,341.04	61.25	186.152		
10,000.00	7,172.12	8,162.04	7,684.25	74.76	38.49	-110.62	2,249.01	-8,631.06	11,501.98	11,440.65	61.32	187.561		
10,100.00	7,172.08	8,165.00	7,687.21	77.02	38.49	-110.80	2,249.06	-8,630.98	11,601.67	11,540.27	61.40	188.966		
10,200.00	7,172.05	8,167.96	7,690.17	79.28	38.49	-110.97	2,249.10	-8,630.89	11,701.36	11,639.90	61.47	190.366		
10,300.00	7,172.01	8,170.92	7,693.13	81.56	38.50	-111.14	2,249.15	-8,630.80	11,801.07	11,739.53	61.54	191.762		
10,400.00	7,171.97	8,173.89	7,696.09	83.84	38.50	-111.32	2,249.19	-8,630.72	11,900.77	11,839.16	61.61	193.155		
10,500.00	7,171.93	8,176.85	7,699.05	86.13	38.50	-111.49	2,249.24	-8,630.63	12,000.48	11,938.79	61.69	194.543		
10,600.00	7,171.90	8,179.82	7,702.02	88.43	38.51	-111.66	2,249.29	-8,630.54	12,100.19	12,038.44	61.76	195.927		
10,700.00	7,171.86	8,182.78	7,704.98	90.74	38.51	-111.83	2,249.33	-8,630.45	12,199.91	12,138.08	61.83	197.307		
10,800.00	7,171.82	8,185.75	7,707.95	93.05	38.51	-112.00	2,249.38	-8,630.37	12,299.63	12,237.73	61.91	198.682		
10,900.00	7,171.78	8,188.72	7,710.92	95.37	38.52	-112.18	2,249.42	-8,630.28	12,399.36	12,337.38	61.98	200.054		
11,000.00	7,171.74	8,191.69	7,713.89	97.70	38.52	-112.35	2,249.47	-8,630.19	12,499.09	12,437.03	62.05	201.422		
11,100.00	7,171.71	8,194.67	7,716.86	100.03	38.53	-112.52	2,249.51	-8,630.10	12,598.82	12,536.69	62.13	202.785		
11,200.00	7,171.67	8,197.64	7,719.83	102.37	38.53	-112.69	2,249.56	-8,630.02	12,698.56	12,636.35	62.20	204.145		
11,300.00	7,171.63	8,200.62	7,722.81	104.71	38.53	-112.86	2,249.61	-8,629.93	12,798.30	12,736.02	62.28	205.500		
11,400.00	7,171.59	8,203.59	7,725.78	107.06	38.54	-113.03	2,249.65	-8,629.84	12,898.04	12,835.69	62.35	206.852		
11,500.00	7,171.56	8,206.57	7,728.76	109.40	38.54	-113.20	2,249.70	-8,629.75	12,997.79	12,935.36	62.43	208.199		
11,600.00	7,171.52	8,209.55	7,731.73	111.76	38.54	-113.36	2,249.75	-8,629.67	13,097.53	13,035.03	62.51	209.543		
11,700.00	7,171.48	8,212.53	7,734.71	114.12	38.55	-113.53	2,249.79	-8,629.58	13,197.29	13,134.71	62.58	210.882		
11,800.00	7,171.44	8,215.51	7,737.69	116.48	38.55	-113.70	2,249.84	-8,629.49	13,297.04	13,234.39	62.66	212.217		
11,900.00	7,171.40	8,218.49	7,740.67	118.84	38.55	-113.87	2,249.88	-8,629.40	13,396.80	13,334.07	62.73	213.548		
12,000.00	7,171.37	8,221.47	7,743.65	121.20	38.56	-114.03	2,249.93	-8,629.31	13,496.56	13,433.75	62.81	214.876		
12,100.00	7,171.33	8,224.46	7,746.64	123.57	38.56	-114.20	2,249.98	-8,629.22	13,596.33	13,533.44	62.89	216.199		
12,200.00	7,171.29	8,227.45	7,749.62	125.95	38.57	-114.37	2,250.02	-8,629.14	13,696.10	13,633.13	62.97	217.518		
12,300.00	7,171.25	8,230.43	7,752.61	128.32	38.57	-114.53	2,250.07	-8,629.05	13,795.87	13,732.82	63.04	218.833		
12,400.00	7,171.22	8,233.42	7,755.59	130.70	38.57	-114.70	2,250.12	-8,628.96	13,895.64	13,832.52	63.12	220.144		
12,500.00	7,171.18	8,236.41	7,758.58	133.07	38.58	-114.86	2,250.16	-8,628.87	13,995.41	13,932.21	63.20	221.451		
12,600.00	7,171.14	8,239.40	7,761.57	135.46	38.58	-115.03	2,250.21	-8,628.78	14,095.19	14,031.91	63.28	222.754		
12,700.00	7,171.10	8,242.39	7,764.56	137.84	38.58	-115.19	2,250.25	-8,628.70	14,194.97	14,131.62	63.36	224.053		
12,800.00	7,171.06	8,245.39	7,767.55	140.22	38.59	-115.36	2,250.30	-8,628.61	14,294.75	14,231.32	63.43	225.348		
12,900.00	7,171.03	8,248.38	7,770.54	142.61	38.59	-115.52	2,250.35	-8,628.52	14,394.54	14,331.03	63.51	226.639		
13,000.00	7,170.99	8,251.38	7,773.54	145.00	38.60	-115.68	2,250.39	-8,628.43	14,494.33	14,430.73	63.59	227.926		
13,100.00	7,170.95	8,254.38	7,776.53	147.39	38.60	-115.85	2,250.44	-8,628.34	14,594.12	14,530.45	63.67	229.209		
13,200.00	7,170.91	8,257.37	7,779.53	149.78	38.60	-116.01	2,250.49	-8,628.25	14,693.91	14,630.16	63.75	230.488		
13,300.00	7,170.87	8,260.37	7,782.53	152.17	38.61	-116.17	2,250.53	-8,628.16	14,793.70	14,729.87	63.83	231.762		
13,400.00	7,170.84	8,263.37	7,785.53	154.57	38.61	-116.33	2,250.58	-8,628.07	14,893.50	14,829.59	63.91	233.033		
13,500.00	7,170.80	8,266.38	7,788.53	156.96	38.61	-116.49	2,250.63	-8,627.99	14,993.30	14,929.31	63.99	234.300		
13,600.00	7,170.76	8,269.38	7,791.53	159.36	38.62	-116.65	2,250.67	-8,627.90	15,093.10	15,029.03	64.07	235.562		
13,700.00	7,170.72	8,272.38	7,794.53	161.76	38.62	-116.82	2,250.72	-8,627.81	15,192.90	15,128.75	64.15	236.821		
13,800.00	7,170.69	8,275.39	7,797.54	164.16	38.62	-116.98	2,250.77	-8,627.72	15,292.71	15,228.47	64.23	238.075		
13,900.00	7,170.65	8,278.40	7,800.54	166.56	38.63	-117.13	2,250.81	-8,627.63	15,392.51	15,328.20	64.32	239.326		
14,000.00	7,170.61	8,281.41	7,803.55	168.96	38.63	-117.29	2,250.86	-8,627.54	15,492.32	15,427.93	64.40	240.572		
14,100.00	7,170.57	8,284.41	7,806.56	171.36	38.64	-117.45	2,250.91	-8,627.45	15,592.13	15,527.65	64.48	241.815		
14,200.00	7,170.53	8,287.43	7,809.57	173.76	38.64	-117.61	2,250.95	-8,627.36	15,691.95	15,627.38	64.56	243.053		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #006C - OH - OH-SVY											Offset Site Error: 0.00 usft
Survey Program: 348-APC_ISCWSA REV 2 MWD											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
14,300.00	7,170.50	8,290.44	7,812.58	176.17	38.64	-117.77	2,251.00	-8,627.27	15,791.76	15,727.12	64.64 244.287
14,400.00	7,170.46	8,293.45	7,815.59	178.57	38.65	-117.93	2,251.05	-8,627.18	15,891.58	15,826.85	64.73 245.517
14,500.00	7,170.42	8,296.47	7,818.60	180.98	38.65	-118.08	2,251.10	-8,627.09	15,991.39	15,926.58	64.81 246.743
14,600.00	7,170.38	8,299.48	7,821.62	183.39	38.65	-118.24	2,251.14	-8,627.00	16,091.21	16,026.32	64.89 247.965
14,700.00	7,170.35	8,302.50	7,824.63	185.80	38.66	-118.40	2,251.19	-8,626.91	16,191.03	16,126.06	64.98 249.183
14,800.00	7,170.31	8,305.52	7,827.65	188.20	38.66	-118.55	2,251.24	-8,626.83	16,290.86	16,225.80	65.06 250.397
14,900.00	7,170.27	8,308.54	7,830.67	190.61	38.66	-118.71	2,251.28	-8,626.74	16,390.68	16,325.54	65.14 251.607
15,000.00	7,170.23	8,311.56	7,833.68	193.02	38.67	-118.86	2,251.33	-8,626.65	16,490.51	16,425.28	65.23 252.812
15,100.00	7,170.19	8,314.58	7,836.71	195.43	38.67	-119.02	2,251.38	-8,626.56	16,590.34	16,525.02	65.31 254.014
15,200.00	7,170.16	8,317.60	7,839.73	197.85	38.68	-119.17	2,251.42	-8,626.47	16,690.17	16,624.77	65.40 255.212
15,300.00	7,170.12	8,320.63	7,842.75	200.26	38.68	-119.33	2,251.47	-8,626.38	16,790.00	16,724.51	65.48 256.405
15,400.00	7,170.08	8,323.65	7,845.77	202.67	38.68	-119.48	2,251.52	-8,626.29	16,889.83	16,824.26	65.57 257.594
15,500.00	7,170.04	8,326.68	7,848.80	205.08	38.69	-119.63	2,251.57	-8,626.20	16,989.66	16,924.01	65.65 258.780
15,600.00	7,170.01	8,329.71	7,851.83	207.50	38.69	-119.78	2,251.61	-8,626.11	17,089.50	17,023.76	65.74 259.961
15,700.00	7,169.97	8,332.74	7,854.85	209.91	38.69	-119.94	2,251.66	-8,626.02	17,189.33	17,123.51	65.82 261.138
15,800.00	7,169.93	8,335.77	7,857.88	212.33	38.70	-120.09	2,251.71	-8,625.93	17,289.17	17,223.26	65.91 262.311
15,900.00	7,169.89	8,338.80	7,860.91	214.74	38.70	-120.24	2,251.76	-8,625.84	17,389.01	17,323.01	66.00 263.480
16,000.00	7,169.85	8,341.84	7,863.95	217.16	38.71	-120.39	2,251.80	-8,625.75	17,488.85	17,422.77	66.08 264.645
16,100.00	7,169.82	8,344.87	7,866.98	219.58	38.71	-120.54	2,251.85	-8,625.66	17,588.69	17,522.52	66.17 265.806
16,200.00	7,169.78	8,347.91	7,870.01	221.99	38.71	-120.69	2,251.90	-8,625.56	17,688.54	17,622.28	66.26 266.963
16,300.00	7,169.74	8,350.94	7,873.05	224.41	38.72	-120.84	2,251.95	-8,625.47	17,788.38	17,722.03	66.35 268.115
16,400.00	7,169.70	8,353.98	7,876.09	226.83	38.72	-120.99	2,251.99	-8,625.38	17,888.23	17,821.79	66.43 269.264
16,500.00	7,169.67	8,357.02	7,879.12	229.25	38.72	-121.14	2,252.04	-8,625.29	17,988.07	17,921.55	66.52 270.408
16,600.00	7,169.63	8,360.06	7,882.16	231.66	38.73	-121.29	2,252.09	-8,625.20	18,087.92	18,021.31	66.61 271.549
16,700.00	7,169.59	8,363.11	7,885.20	234.08	38.73	-121.44	2,252.14	-8,625.11	18,187.77	18,121.07	66.70 272.685
16,800.00	7,169.55	8,366.15	7,888.25	236.50	38.74	-121.58	2,252.18	-8,625.02	18,287.62	18,220.83	66.79 273.817
16,900.00	7,169.51	8,369.19	7,891.29	238.92	38.74	-121.73	2,252.23	-8,624.93	18,387.47	18,320.59	66.88 274.946
17,000.00	7,169.48	8,372.24	7,894.33	241.34	38.74	-121.88	2,252.28	-8,624.84	18,487.32	18,420.36	66.97 276.070
17,100.00	7,169.44	8,375.29	7,897.38	243.76	38.75	-122.02	2,252.33	-8,624.75	18,587.18	18,520.12	67.06 277.190
17,200.00	7,169.40	8,378.34	7,900.43	246.18	38.75	-122.17	2,252.37	-8,624.66	18,687.03	18,619.89	67.15 278.306
17,300.00	7,169.36	8,381.39	7,903.47	248.61	38.75	-122.31	2,252.42	-8,624.57	18,786.89	18,719.65	67.24 279.418
17,400.00	7,169.32	8,384.44	7,906.52	251.03	38.76	-122.46	2,252.47	-8,624.48	18,886.75	18,819.42	67.33 280.526
17,500.00	7,169.29	8,387.49	7,909.57	253.45	38.76	-122.60	2,252.52	-8,624.38	18,986.60	18,919.19	67.42 281.630
17,600.00	7,169.25	8,390.54	7,912.63	255.87	38.77	-122.75	2,252.57	-8,624.29	19,086.46	19,018.95	67.51 282.729
17,700.00	7,169.21	8,393.60	7,915.68	258.29	38.77	-122.89	2,252.61	-8,624.20	19,186.32	19,118.72	67.60 283.825
17,800.00	7,169.17	8,396.66	7,918.73	260.72	38.77	-123.04	2,252.66	-8,624.11	19,286.18	19,218.49	67.69 284.917
17,900.00	7,169.14	8,399.71	7,921.79	263.14	38.78	-123.18	2,252.71	-8,624.02	19,386.04	19,318.26	67.78 286.004
18,000.00	7,169.10	8,402.77	7,924.85	265.56	38.78	-123.32	2,252.76	-8,623.93	19,485.91	19,418.03	67.87 287.088
18,100.00	7,169.06	8,405.83	7,927.91	267.99	38.78	-123.46	2,252.81	-8,623.84	19,585.77	19,517.81	67.97 288.168
18,200.00	7,169.02	8,408.89	7,930.97	270.41	38.79	-123.60	2,252.85	-8,623.74	19,685.64	19,617.58	68.06 289.243
18,300.00	7,168.98	8,411.96	7,934.03	272.84	38.79	-123.75	2,252.90	-8,623.65	19,785.50	19,717.35	68.15 290.315
18,400.00	7,168.95	8,415.02	7,937.09	275.26	38.80	-123.89	2,252.95	-8,623.56	19,885.37	19,817.12	68.24 291.382
18,500.00	7,168.91	8,418.09	7,940.15	277.68	38.80	-124.03	2,253.00	-8,623.47	19,985.24	19,916.90	68.34 292.446
18,600.00	7,168.87	8,421.15	7,943.22	280.11	38.80	-124.17	2,253.05	-8,623.38	20,085.10	20,016.67	68.43 293.505
18,700.00	7,168.83	8,424.22	7,946.28	282.53	38.81	-124.31	2,253.09	-8,623.29	20,184.97	20,116.45	68.53 294.560
18,800.00	7,168.80	8,427.29	7,949.35	284.96	38.81	-124.45	2,253.14	-8,623.19	20,284.84	20,216.22	68.62 295.612
18,900.00	7,168.76	8,430.36	7,952.42	287.38	38.81	-124.58	2,253.19	-8,623.10	20,384.71	20,316.00	68.71 296.659
19,000.00	7,168.72	8,433.43	7,955.49	289.81	38.82	-124.72	2,253.24	-8,623.01	20,484.59	20,415.78	68.81 297.703
19,100.00	7,168.68	8,436.50	7,958.56	292.24	38.82	-124.86	2,253.29	-8,622.92	20,584.46	20,515.55	68.90 298.742
19,200.00	7,168.64	8,439.58	7,961.63	294.66	38.83	-125.00	2,253.34	-8,622.83	20,684.33	20,615.33	69.00 299.777
19,300.00	7,168.61	8,442.65	7,964.71	297.09	38.83	-125.13	2,253.38	-8,622.73	20,784.21	20,715.11	69.09 300.809
19,400.00	7,168.57	8,445.73	7,967.78	299.52	38.83	-125.27	2,253.43	-8,622.64	20,884.08	20,814.89	69.19 301.836

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #006C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 348-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (")	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,500.00	7,168.53	8,448.81	7,970.86	301.94	38.84	-125.41	2,253.48	-8,622.55	20,983.96	20,914.67	69.29	302.860	
19,600.00	7,168.49	8,451.89	7,973.94	304.37	38.84	-125.54	2,253.53	-8,622.46	21,083.83	21,014.45	69.38	303.879	
19,700.00	7,168.46	8,454.97	7,977.02	306.80	38.84	-125.68	2,253.58	-8,622.37	21,183.71	21,114.23	69.48	304.895	
19,800.00	7,168.42	8,458.05	7,980.10	309.22	38.85	-125.81	2,253.63	-8,622.27	21,283.59	21,214.01	69.58	305.907	
19,900.00	7,168.38	8,461.14	7,983.18	311.65	38.85	-125.95	2,253.67	-8,622.18	21,383.47	21,313.79	69.67	306.914	
20,000.00	7,168.34	8,464.22	7,986.26	314.08	38.86	-126.08	2,253.72	-8,622.09	21,483.35	21,413.58	69.77	307.918	
20,100.00	7,168.30	8,467.31	7,989.34	316.51	38.86	-126.22	2,253.77	-8,622.00	21,583.22	21,513.36	69.87	308.918	
20,200.00	7,168.27	8,470.39	7,992.43	318.93	38.86	-126.35	2,253.82	-8,621.90	21,683.11	21,613.14	69.96	309.914	
20,300.00	7,168.23	8,473.48	7,995.52	321.36	38.87	-126.48	2,253.87	-8,621.81	21,782.99	21,712.92	70.06	310.906	
20,400.00	7,168.19	8,476.57	7,998.61	323.79	38.87	-126.61	2,253.92	-8,621.72	21,882.87	21,812.71	70.16	311.894	
20,500.00	7,168.15	8,479.66	8,001.69	326.22	38.87	-126.75	2,253.97	-8,621.62	21,982.75	21,912.49	70.26	312.878	
20,600.00	7,168.11	8,482.76	8,004.79	328.65	38.88	-126.88	2,254.02	-8,621.53	22,082.63	22,012.28	70.36	313.859	
20,700.00	7,168.08	8,485.85	8,007.88	331.07	38.88	-127.01	2,254.06	-8,621.44	22,182.52	22,112.06	70.46	314.835	
20,768.77	7,168.05	8,487.98	8,010.00	332.74	38.88	-127.10	2,254.10	-8,621.37	22,251.20	22,180.68	70.53	315.504	
20,800.00	7,168.04	8,488.94	8,010.97	333.50	38.89	-127.14	2,254.11	-8,621.35	22,282.40	22,211.85	70.56	315.808	
20,903.75	7,168.00	8,492.16	8,014.18	336.02	38.89	-127.28	2,254.16	-8,621.25	22,386.03	22,315.37	70.66	316.812	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #112Y - OH - OH-INC											Offset Site Error: 0.00 usft
Survey Program: 200-A027Ua_INC-ONLY											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
0.00	0.00	187.00	187.00	0.00	5.60	-82.27	1,383.36	-10,186.60	10,280.11		
100.00	100.00	287.04	287.00	0.25	8.60	-82.27	1,383.36	-10,186.60	10,280.11	10,271.25	8.85 1,161.336
200.00	200.00	414.82	414.73	0.61	12.43	-82.27	1,383.08	-10,186.60	10,280.11	10,267.07	13.04 788.397
212.40	212.40	431.18	431.08	0.65	12.92	-82.27	1,382.73	-10,186.60	10,280.07	10,266.50	13.57 757.340
300.00	300.00	487.16	487.00	0.97	14.60	-82.27	1,383.36	-10,186.60	10,280.11	10,264.54	15.57 660.443
400.00	400.00	614.98	614.77	1.33	18.43	-82.27	1,383.07	-10,186.60	10,280.11	10,260.35	19.75 520.410
412.40	412.40	631.34	631.12	1.37	18.92	-82.27	1,382.72	-10,186.60	10,280.07	10,259.78	20.29 506.694
500.00	500.00	687.28	687.00	1.68	20.59	-82.27	1,383.36	-10,186.60	10,280.11	10,257.83	22.28 461.427
600.00	599.98	815.07	814.74	2.04	24.42	-76.29	1,383.07	-10,186.60	10,279.69	10,253.23	26.47 388.414
700.00	699.84	887.24	886.84	2.41	26.59	-76.33	1,383.36	-10,186.60	10,278.45	10,249.46	28.99 354.591
800.00	799.45	1,014.17	1,013.72	2.77	30.39	-76.44	1,383.09	-10,186.60	10,276.39	10,243.24	33.15 309.984
900.00	898.70	1,086.23	1,085.70	3.13	32.55	-76.54	1,383.36	-10,186.60	10,273.52	10,237.84	35.68 287.943
1,000.00	997.47	1,211.01	1,210.44	3.51	36.29	-76.72	1,383.15	-10,186.60	10,269.86	10,230.07	39.80 258.056
1,104.22	1,099.75	1,287.40	1,286.75	3.92	38.58	-76.89	1,383.36	-10,186.60	10,265.21	10,222.72	42.50 241.552
1,200.00	1,193.41	1,404.92	1,404.23	4.32	42.10	-77.03	1,383.27	-10,186.60	10,260.60	10,214.20	46.41 221.092
1,300.00	1,291.19	1,478.96	1,478.19	4.74	44.32	-77.11	1,383.36	-10,186.60	10,255.80	10,206.75	49.04 209.116
1,400.00	1,388.98	1,598.41	1,597.60	5.16	47.90	-77.25	1,383.38	-10,186.60	10,251.07	10,198.03	53.04 193.253
1,500.00	1,486.76	1,674.65	1,673.76	5.59	50.18	-77.33	1,383.36	-10,186.60	10,246.34	10,190.58	55.76 183.768
1,600.00	1,584.54	1,792.03	1,791.10	6.03	53.70	-77.47	1,383.49	-10,186.60	10,241.70	10,182.00	59.71 171.538
1,700.00	1,682.33	1,870.34	1,869.33	6.47	56.04	-77.56	1,383.36	-10,186.60	10,237.04	10,174.55	62.49 163.828
1,800.00	1,780.11	1,985.76	1,984.71	6.91	59.50	-77.69	1,383.59	-10,186.60	10,232.49	10,166.11	66.38 154.146
1,900.00	1,877.90	2,066.03	2,064.90	7.35	61.91	-77.78	1,383.36	-10,186.60	10,227.91	10,158.68	69.23 147.745
2,000.00	1,975.68	2,179.60	2,178.43	7.79	65.31	-77.91	1,383.67	-10,186.60	10,223.45	10,150.38	73.07 139.912
2,100.00	2,073.46	2,261.72	2,260.46	8.24	67.77	-78.01	1,383.36	-10,186.60	10,218.93	10,142.96	75.97 134.505
2,200.00	2,171.25	2,373.56	2,372.27	8.68	71.12	-78.13	1,383.76	-10,186.60	10,214.56	10,134.79	79.77 128.052
2,300.00	2,269.03	2,457.41	2,456.03	9.13	73.64	-78.23	1,383.36	-10,186.60	10,210.13	10,127.40	82.73 123.420
2,400.00	2,366.82	2,567.62	2,566.21	9.58	76.94	-78.36	1,383.83	-10,186.60	10,205.84	10,119.37	86.48 118.020
2,500.00	2,464.60	2,653.10	2,651.60	10.03	79.50	-78.46	1,383.36	-10,186.60	10,201.48	10,112.00	89.48 114.004
2,600.00	2,562.38	2,761.79	2,760.26	10.48	82.76	-78.58	1,383.89	-10,186.60	10,197.28	10,104.09	93.19 109.427
2,700.00	2,660.17	2,848.79	2,847.17	10.93	85.36	-78.68	1,383.36	-10,186.60	10,193.01	10,096.76	96.24 105.908
2,800.00	2,757.95	2,956.06	2,954.41	11.38	88.58	-78.80	1,383.95	-10,186.60	10,188.89	10,088.98	99.91 101.984
2,900.00	2,855.74	3,044.48	3,042.74	11.83	91.23	-78.91	1,383.36	-10,186.60	10,184.69	10,081.69	103.01 98.874
3,000.00	2,953.52	3,150.43	3,148.66	12.29	94.40	-79.03	1,384.01	-10,186.60	10,180.66	10,074.03	106.63 95.475
3,100.00	3,051.30	3,240.17	3,238.30	12.74	97.09	-79.13	1,383.36	-10,186.60	10,176.54	10,066.77	109.77 92.707
3,200.00	3,149.09	3,344.90	3,343.01	13.19	100.23	-79.25	1,384.05	-10,186.60	10,172.60	10,059.24	113.36 89.737
3,300.00	3,246.87	3,435.86	3,433.87	13.65	102.95	-79.36	1,383.36	-10,186.60	10,168.56	10,052.03	116.54 87.256
3,400.00	3,344.66	3,539.46	3,537.45	14.10	106.06	-79.48	1,384.09	-10,186.60	10,164.70	10,044.60	120.09 84.640
3,500.00	3,442.44	3,631.55	3,629.44	14.55	108.82	-79.59	1,383.36	-10,186.60	10,160.75	10,037.44	123.31 82.403
3,600.00	3,540.22	3,734.12	3,731.98	15.01	111.89	-79.70	1,384.13	-10,186.60	10,156.96	10,030.13	126.83 80.083
3,700.00	3,638.01	3,827.24	3,825.01	15.46	114.68	-79.82	1,383.36	-10,186.60	10,153.10	10,023.02	130.07 78.056
3,800.00	3,735.79	3,928.86	3,926.61	15.91	117.73	-79.93	1,384.16	-10,186.60	10,149.40	10,015.82	133.57 75.984
3,900.00	3,833.58	4,022.93	4,020.58	16.37	120.55	-80.04	1,383.36	-10,186.60	10,145.62	10,008.77	136.84 74.140
4,000.00	3,931.36	4,123.69	4,121.32	16.82	123.56	-80.16	1,384.18	-10,186.60	10,142.00	10,001.68	140.32 72.279
4,100.00	4,029.14	4,218.62	4,216.14	17.28	126.41	-80.27	1,383.36	-10,186.60	10,138.30	9,994.69	143.62 70.593
4,200.00	4,126.93	4,318.61	4,316.11	17.73	129.41	-80.38	1,384.20	-10,186.60	10,134.76	9,987.70	147.07 68.913
4,300.00	4,224.71	4,414.31	4,411.71	18.19	132.27	-80.50	1,383.36	-10,186.60	10,131.15	9,980.77	150.39 67.367
4,400.00	4,322.50	4,513.61	4,510.99	18.64	135.25	-80.61	1,384.21	-10,186.60	10,127.70	9,973.88	153.82 65.842
4,500.00	4,420.28	4,610.00	4,607.28	19.10	138.14	-80.73	1,383.36	-10,186.60	10,124.18	9,967.01	157.16 64.419
4,600.00	4,518.06	4,708.69	4,705.95	19.55	141.09	-80.84	1,384.22	-10,186.60	10,120.80	9,960.23	160.57 63.029
4,700.00	4,615.85	4,805.69	4,802.85	20.01	144.00	-80.96	1,383.36	-10,186.60	10,117.37	9,953.43	163.93 61.716
4,800.00	4,713.63	4,903.85	4,900.99	20.46	146.94	-81.07	1,384.23	-10,186.60	10,114.07	9,946.74	167.33 60.443
4,900.00	4,811.42	5,001.38	4,998.42	20.92	149.86	-81.19	1,383.36	-10,186.60	10,110.72	9,940.02	170.71 59.228

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #112Y - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		200-A027Ua_INC-ONLY					Rule Assigned:						Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,000.00	4,909.20	5,099.17	5,096.20	21.38	152.79	-81.30	1,383.36	-10,186.60	10,107.47	9,933.37	174.09	58.057		
5,100.00	5,006.98	5,206.03	5,203.02	21.83	156.00	-81.43	1,383.25	-10,186.60	10,104.25	9,926.50	177.75	56.845		
5,200.00	5,104.77	5,294.86	5,291.77	22.29	158.66	-81.53	1,383.36	-10,186.60	10,101.08	9,920.21	180.87	55.847		
5,300.00	5,202.55	5,400.52	5,397.39	22.74	161.82	-81.66	1,383.35	-10,186.60	10,097.95	9,913.46	184.49	54.734		
5,400.00	5,300.34	5,490.55	5,487.34	23.20	164.52	-81.76	1,383.36	-10,186.60	10,094.86	9,907.22	187.65	53.797		
5,500.00	5,398.12	5,595.09	5,591.84	23.66	167.65	-81.88	1,383.44	-10,186.60	10,091.82	9,900.59	191.23	52.772		
5,600.00	5,495.90	5,686.24	5,682.90	24.11	170.39	-81.99	1,383.36	-10,186.60	10,088.81	9,894.39	194.42	51.891		
5,700.00	5,593.69	5,789.74	5,786.38	24.57	173.49	-82.11	1,383.52	-10,186.60	10,085.86	9,887.88	197.98	50.944		
5,800.00	5,691.47	5,881.93	5,878.47	25.02	176.25	-82.22	1,383.36	-10,186.60	10,082.94	9,881.74	201.20	50.114		
5,900.00	5,789.26	5,984.48	5,981.00	25.48	179.32	-82.34	1,383.60	-10,186.60	10,080.07	9,875.34	204.73	49.236		
6,000.00	5,887.04	6,077.61	6,074.04	25.94	182.11	-82.45	1,383.36	-10,186.60	10,077.23	9,869.25	207.98	48.454		
6,100.00	5,984.83	6,179.30	6,175.70	26.39	185.16	-82.57	1,383.68	-10,186.60	10,074.45	9,862.97	211.48	47.638		
6,200.00	6,082.61	6,273.30	6,269.61	26.85	187.98	-82.68	1,383.36	-10,186.60	10,071.69	9,856.94	214.75	46.899		
6,300.00	6,180.39	6,374.20	6,370.47	27.30	191.00	-82.80	1,383.75	-10,186.60	10,069.00	9,850.76	218.23	46.139		
6,400.00	6,278.18	6,468.99	6,465.18	27.76	193.84	-82.91	1,383.36	-10,186.60	10,066.33	9,844.80	221.53	45.440		
6,500.00	6,375.96	6,569.18	6,565.33	28.22	196.84	-83.03	1,383.81	-10,186.60	10,063.72	9,838.73	224.99	44.730		
6,600.00	6,473.75	6,664.68	6,660.75	28.67	199.70	-83.15	1,383.36	-10,186.60	10,061.13	9,832.82	228.31	44.068		
6,663.67	6,536.00	6,727.73	6,723.77	28.96	201.59	-83.22	1,384.16	-10,186.60	10,059.53	9,829.04	230.49	43.644		
6,679.65	6,551.64	6,743.80	6,739.84	29.04	202.07	-89.97	1,384.06	-10,186.60	10,059.32	9,828.28	231.04	43.539	CC	
6,700.00	6,571.53	6,764.23	6,760.26	29.13	202.69	-98.52	1,383.87	-10,186.60	10,059.65	9,827.90	231.75	43.408	ES	
6,750.00	6,620.29	6,811.36	6,807.29	29.35	204.10	-117.32	1,383.36	-10,186.60	10,063.20	9,829.82	233.38	43.119		
6,800.00	6,668.62	6,859.68	6,855.62	29.56	205.55	-131.30	1,383.36	-10,186.60	10,070.67	9,835.62	235.05	42.845		
6,850.00	6,716.22	6,907.45	6,903.37	29.76	206.98	-140.97	1,384.22	-10,186.60	10,082.02	9,845.34	236.69	42.596		
6,900.00	6,762.80	6,954.98	6,950.89	29.95	208.40	-147.69	1,383.96	-10,186.60	10,097.15	9,858.84	238.31	42.369		
6,950.00	6,808.07	7,001.02	6,996.92	30.13	209.78	-152.48	1,383.34	-10,186.60	10,115.98	9,876.10	239.88	42.171		
7,000.00	6,851.75	7,042.93	7,038.75	30.30	211.04	-156.00	1,383.36	-10,186.60	10,138.40	9,897.09	241.31	42.013		
7,050.00	6,893.57	7,084.75	7,080.57	30.45	212.29	-158.67	1,383.36	-10,186.60	10,164.26	9,921.53	242.73	41.874		
7,100.00	6,933.27	7,124.80	7,120.60	30.60	213.49	-160.73	1,384.17	-10,186.60	10,193.42	9,949.33	244.09	41.761		
7,150.00	6,970.61	7,162.59	7,158.38	30.74	214.62	-162.37	1,383.89	-10,186.60	10,225.66	9,980.30	245.36	41.676		
7,200.00	7,005.36	7,197.67	7,193.45	30.87	215.67	-163.69	1,383.39	-10,186.60	10,260.81	10,014.27	246.54	41.619		
7,250.00	7,037.31	7,228.62	7,224.31	30.99	216.60	-164.75	1,383.36	-10,186.60	10,298.65	10,051.07	247.58	41.597	SF	
7,300.00	7,066.25	7,257.56	7,253.25	31.11	217.47	-165.63	1,383.36	-10,186.60	10,338.94	10,090.39	248.55	41.597		
7,350.00	7,092.02	7,283.32	7,279.02	31.22	218.24	-166.35	1,383.36	-10,186.60	10,381.42	10,132.02	249.41	41.624		
7,400.00	7,114.44	7,305.79	7,301.47	31.34	218.91	-166.94	1,384.23	-10,186.60	10,425.85	10,175.70	250.15	41.678		
7,450.00	7,133.38	7,324.86	7,320.53	31.47	219.49	-167.45	1,384.17	-10,186.60	10,471.94	10,221.16	250.78	41.757		
7,500.00	7,148.73	7,340.29	7,335.96	31.61	219.95	-167.90	1,384.09	-10,186.60	10,519.40	10,268.11	251.29	41.861		
7,550.00	7,160.40	7,352.01	7,347.68	31.78	220.30	-168.35	1,383.99	-10,186.60	10,567.95	10,316.28	251.68	41.990		
7,600.00	7,168.30	7,359.94	7,355.61	31.98	220.54	-168.96	1,383.91	-10,186.60	10,617.29	10,365.35	251.94	42.143		
7,650.00	7,172.38	7,364.04	7,359.71	32.23	220.66	-171.01	1,383.87	-10,186.60	10,667.10	10,415.03	252.07	42.318		
7,678.56	7,173.00	7,364.66	7,360.33	32.39	220.68	81.98	1,383.86	-10,186.60	10,695.65	10,443.56	252.09	42.427		
7,700.00	7,172.99	7,364.66	7,360.32	32.53	220.68	81.96	1,383.86	-10,186.60	10,717.09	10,465.00	252.09	42.512		
7,800.00	7,172.95	7,364.62	7,360.29	33.31	220.68	81.89	1,383.86	-10,186.60	10,817.09	10,565.00	252.10	42.908		
7,900.00	7,172.92	7,364.59	7,360.26	34.32	220.68	81.82	1,383.86	-10,186.60	10,917.09	10,664.99	252.10	43.304		
8,000.00	7,172.88	7,364.56	7,360.23	35.53	220.68	81.75	1,383.86	-10,186.60	11,017.09	10,764.99	252.11	43.700		
8,100.00	7,172.84	7,364.53	7,360.19	36.89	220.67	81.68	1,383.86	-10,186.60	11,117.09	10,864.98	252.11	44.096		
8,200.00	7,172.80	7,364.50	7,360.16	38.39	220.67	81.62	1,383.86	-10,186.60	11,217.09	10,964.97	252.12	44.492		
8,300.00	7,172.77	7,364.46	7,360.13	39.99	220.67	81.55	1,383.86	-10,186.60	11,317.09	11,064.97	252.12	44.887		
8,400.00	7,172.73	7,364.43	7,360.10	41.68	220.67	81.48	1,383.87	-10,186.60	11,417.09	11,164.96	252.13	45.282		
8,500.00	7,172.69	7,364.40	7,360.06	43.45	220.67	81.41	1,383.87	-10,186.60	11,517.09	11,264.95	252.14	45.677		
8,600.00	7,172.65	7,364.37	7,360.03	45.29	220.67	81.34	1,383.87	-10,186.60	11,617.09	11,364.94	252.15	46.072		
8,700.00	7,172.61	7,364.33	7,360.00	47.18	220.67	81.27	1,383.87	-10,186.60	11,717.09	11,464.93	252.16	46.467		
8,800.00	7,172.58	7,364.30	7,359.97	49.12	220.67	81.20	1,383.87	-10,186.60	11,817.09	11,564.92	252.17	46.861		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #112Y - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		200-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		
8,900.00	7,172.54	7,364.27	7,359.94	51.11	220.67	81.13	1,383.87	-10,186.60	11,917.09	11,664.91	252.18	47.256	
9,000.00	7,172.50	7,364.24	7,359.90	53.13	220.67	81.06	1,383.87	-10,186.60	12,017.09	11,764.89	252.20	47.650	
9,100.00	7,172.46	7,364.20	7,359.87	55.19	220.66	81.00	1,383.87	-10,186.60	12,117.09	11,864.88	252.21	48.044	
9,200.00	7,172.42	7,364.17	7,359.84	57.28	220.66	80.93	1,383.87	-10,186.60	12,217.09	11,964.87	252.22	48.438	
9,300.00	7,172.39	7,364.14	7,359.81	59.39	220.66	80.86	1,383.87	-10,186.60	12,317.09	12,064.85	252.24	48.831	
9,400.00	7,172.35	7,364.11	7,359.77	61.53	220.66	80.79	1,383.87	-10,186.60	12,417.09	12,164.83	252.25	49.225	
9,500.00	7,172.31	7,364.07	7,359.74	63.70	220.66	80.72	1,383.87	-10,186.60	12,517.09	12,264.82	252.27	49.618	
9,600.00	7,172.27	7,364.04	7,359.71	65.88	220.66	80.65	1,383.87	-10,186.60	12,617.09	12,364.80	252.29	50.011	
9,700.00	7,172.24	7,364.01	7,359.68	68.08	220.66	80.58	1,383.87	-10,186.60	12,717.09	12,464.78	252.31	50.404	
9,800.00	7,172.20	7,363.98	7,359.64	70.29	220.66	80.51	1,383.87	-10,186.60	12,817.09	12,564.76	252.32	50.796	
9,900.00	7,172.16	7,363.94	7,359.61	72.52	220.66	80.44	1,383.87	-10,186.60	12,917.09	12,664.74	252.34	51.188	
10,000.00	7,172.12	7,363.91	7,359.58	74.76	220.66	80.38	1,383.87	-10,186.60	13,017.09	12,764.72	252.36	51.580	
10,100.00	7,172.08	7,363.88	7,359.55	77.02	220.66	80.31	1,383.87	-10,186.60	13,117.09	12,864.70	252.39	51.972	
10,200.00	7,172.05	7,363.85	7,359.51	79.28	220.65	80.24	1,383.87	-10,186.60	13,217.09	12,964.68	252.41	52.364	
10,300.00	7,172.01	7,363.81	7,359.48	81.56	220.65	80.17	1,383.87	-10,186.60	13,317.09	13,064.66	252.43	52.755	
10,400.00	7,171.97	7,363.78	7,359.45	83.84	220.65	80.10	1,383.87	-10,186.60	13,417.09	13,164.63	252.45	53.147	
10,500.00	7,171.93	7,363.75	7,359.42	86.13	220.65	80.03	1,383.87	-10,186.60	13,517.09	13,264.61	252.48	53.538	
10,600.00	7,171.90	7,363.72	7,359.38	88.43	220.65	79.96	1,383.87	-10,186.60	13,617.09	13,364.58	252.50	53.928	
10,700.00	7,171.86	7,363.68	7,359.35	90.74	220.65	79.89	1,383.87	-10,186.60	13,717.09	13,464.56	252.53	54.319	
10,800.00	7,171.82	7,363.65	7,359.32	93.05	220.65	79.83	1,383.87	-10,186.60	13,817.09	13,564.53	252.56	54.709	
10,900.00	7,171.78	7,363.62	7,359.29	95.37	220.65	79.76	1,383.87	-10,186.60	13,917.09	13,664.50	252.58	55.099	
11,000.00	7,171.74	7,363.59	7,359.25	97.70	220.65	79.69	1,383.87	-10,186.60	14,017.08	13,764.47	252.61	55.489	
11,100.00	7,171.71	7,363.55	7,359.22	100.03	220.65	79.62	1,383.87	-10,186.60	14,117.08	13,864.44	252.64	55.878	
11,200.00	7,171.67	7,363.52	7,359.19	102.37	220.64	79.55	1,383.88	-10,186.60	14,217.08	13,964.42	252.67	56.268	
11,300.00	7,171.63	7,363.49	7,359.16	104.71	220.64	79.48	1,383.88	-10,186.60	14,317.08	14,064.38	252.70	56.656	
11,400.00	7,171.59	7,363.46	7,359.12	107.06	220.64	79.41	1,383.88	-10,186.60	14,417.08	14,164.35	252.73	57.045	
11,500.00	7,171.56	7,363.42	7,359.09	109.40	220.64	79.34	1,383.88	-10,186.60	14,517.08	14,264.32	252.76	57.434	
11,600.00	7,171.52	7,363.39	7,359.06	111.76	220.64	79.28	1,383.88	-10,186.60	14,617.08	14,364.29	252.80	57.822	
11,700.00	7,171.48	7,363.36	7,359.03	114.12	220.64	79.21	1,383.88	-10,186.60	14,717.08	14,464.26	252.83	58.210	
11,800.00	7,171.44	7,363.33	7,358.99	116.48	220.64	79.14	1,383.88	-10,186.60	14,817.08	14,564.22	252.86	58.597	
11,900.00	7,171.40	7,363.29	7,358.96	118.84	220.64	79.07	1,383.88	-10,186.60	14,917.08	14,664.19	252.90	58.985	
12,000.00	7,171.37	7,363.26	7,358.93	121.20	220.64	79.00	1,383.88	-10,186.60	15,017.08	14,764.15	252.93	59.372	
12,100.00	7,171.33	7,363.23	7,358.90	123.57	220.64	78.93	1,383.88	-10,186.60	15,117.08	14,864.11	252.97	59.759	
12,200.00	7,171.29	7,363.20	7,358.86	125.95	220.63	78.87	1,383.88	-10,186.60	15,217.08	14,964.08	253.01	60.145	
12,300.00	7,171.25	7,363.16	7,358.83	128.32	220.63	78.80	1,383.88	-10,186.60	15,317.08	15,064.04	253.04	60.531	
12,400.00	7,171.22	7,363.13	7,358.80	130.70	220.63	78.73	1,383.88	-10,186.60	15,417.08	15,164.00	253.08	60.917	
12,500.00	7,171.18	7,363.10	7,358.76	133.07	220.63	78.66	1,383.88	-10,186.60	15,517.08	15,263.96	253.12	61.303	
12,600.00	7,171.14	7,363.07	7,358.73	135.46	220.63	78.59	1,383.88	-10,186.60	15,617.08	15,363.92	253.16	61.688	
12,700.00	7,171.10	7,363.03	7,358.70	137.84	220.63	78.52	1,383.88	-10,186.60	15,717.08	15,463.88	253.20	62.073	
12,800.00	7,171.06	7,363.00	7,358.67	140.22	220.63	78.46	1,383.88	-10,186.60	15,817.08	15,563.84	253.24	62.458	
12,900.00	7,171.03	7,362.97	7,358.63	142.61	220.63	78.39	1,383.88	-10,186.60	15,917.08	15,663.80	253.28	62.843	
13,000.00	7,170.99	7,362.93	7,358.60	145.00	220.63	78.32	1,383.88	-10,186.60	16,017.08	15,763.75	253.33	63.227	
13,100.00	7,170.95	7,362.90	7,358.57	147.39	220.63	78.25	1,383.88	-10,186.60	16,117.08	15,863.71	253.37	63.611	
13,200.00	7,170.91	7,362.87	7,358.54	149.78	220.62	78.18	1,383.88	-10,186.60	16,217.08	15,963.67	253.41	63.994	
13,300.00	7,170.87	7,362.84	7,358.50	152.17	220.62	78.11	1,383.88	-10,186.60	16,317.08	16,063.62	253.46	64.378	
13,400.00	7,170.84	7,362.80	7,358.47	154.57	220.62	78.05	1,383.88	-10,186.60	16,417.08	16,163.58	253.50	64.761	
13,500.00	7,170.80	7,362.77	7,358.44	156.96	220.62	77.98	1,383.88	-10,186.60	16,517.08	16,263.53	253.55	65.143	
13,600.00	7,170.76	7,362.74	7,358.41	159.36	220.62	77.91	1,383.88	-10,186.60	16,617.08	16,363.48	253.60	65.525	
13,700.00	7,170.72	7,362.71	7,358.37	161.76	220.62	77.84	1,383.88	-10,186.60	16,717.08	16,463.44	253.64	65.907	
13,800.00	7,170.69	7,362.67	7,358.34	164.16	220.62	77.77	1,383.88	-10,186.60	16,817.08	16,563.39	253.69	66.289	
13,900.00	7,170.65	7,362.64	7,358.31	166.56	220.62	77.70	1,383.88	-10,186.60	16,917.08	16,663.34	253.74	66.670	
14,000.00	7,170.61	7,362.61	7,358.28	168.96	220.62	77.64	1,383.89	-10,186.60	17,017.08	16,763.29	253.79	67.052	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #112Y - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		200-A027Ua_INC-ONLY							Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)			
14,100.00	7,170.57	7,362.58	7,358.24	171.36	220.62	77.57	1,383.89	-10,186.60	17,117.08	16,863.24	253.84	67.432		
14,200.00	7,170.53	7,362.54	7,358.21	173.76	220.62	77.50	1,383.89	-10,186.60	17,217.08	16,963.19	253.89	67.813		
14,300.00	7,170.50	7,362.51	7,358.18	176.17	220.61	77.43	1,383.89	-10,186.60	17,317.08	17,063.14	253.94	68.193		
14,400.00	7,170.46	7,362.48	7,358.14	178.57	220.61	77.36	1,383.89	-10,186.60	17,417.08	17,163.08	254.00	68.572		
14,500.00	7,170.42	7,362.44	7,358.11	180.98	220.61	77.30	1,383.89	-10,186.60	17,517.08	17,263.03	254.05	68.952		
14,600.00	7,170.38	7,362.41	7,358.08	183.39	220.61	77.23	1,383.89	-10,186.60	17,617.08	17,362.98	254.10	69.331		
14,700.00	7,170.35	7,362.38	7,358.05	185.80	220.61	77.16	1,383.89	-10,186.60	17,717.08	17,462.92	254.16	69.709		
14,800.00	7,170.31	7,362.35	7,358.01	188.20	220.61	77.09	1,383.89	-10,186.60	17,817.08	17,562.87	254.21	70.088		
14,900.00	7,170.27	7,362.31	7,357.98	190.61	220.61	77.02	1,383.89	-10,186.60	17,917.08	17,662.81	254.27	70.466		
15,000.00	7,170.23	7,362.28	7,357.95	193.02	220.61	76.96	1,383.89	-10,186.60	18,017.08	17,762.76	254.32	70.844		
15,100.00	7,170.19	7,362.25	7,357.91	195.43	220.61	76.89	1,383.89	-10,186.60	18,117.08	17,862.70	254.38	71.221		
15,200.00	7,170.16	7,362.21	7,357.88	197.85	220.61	76.82	1,383.89	-10,186.60	18,217.08	17,962.64	254.44	71.598		
15,300.00	7,170.12	7,362.18	7,357.85	200.26	220.60	76.75	1,383.89	-10,186.60	18,317.08	18,062.59	254.49	71.975		
15,400.00	7,170.08	7,362.15	7,357.82	202.67	220.60	76.69	1,383.89	-10,186.60	18,417.08	18,162.53	254.55	72.351		
15,500.00	7,170.04	7,362.12	7,357.78	205.08	220.60	76.62	1,383.89	-10,186.60	18,517.08	18,262.47	254.61	72.727		
15,600.00	7,170.01	7,362.08	7,357.75	207.50	220.60	76.55	1,383.89	-10,186.60	18,617.08	18,362.41	254.67	73.102		
15,700.00	7,169.97	7,362.05	7,357.72	209.91	220.60	76.48	1,383.89	-10,186.60	18,717.08	18,462.35	254.73	73.478		
15,800.00	7,169.93	7,362.02	7,357.69	212.33	220.60	76.41	1,383.89	-10,186.60	18,817.08	18,562.29	254.79	73.853		
15,900.00	7,169.89	7,361.99	7,357.65	214.74	220.60	76.35	1,383.89	-10,186.60	18,917.08	18,662.22	254.85	74.227		
16,000.00	7,169.85	7,361.95	7,357.62	217.16	220.60	76.28	1,383.89	-10,186.60	19,017.08	18,762.16	254.92	74.601		
16,100.00	7,169.82	7,361.92	7,357.59	219.58	220.60	76.21	1,383.89	-10,186.60	19,117.08	18,862.10	254.98	74.975		
16,200.00	7,169.78	7,361.89	7,357.55	221.99	220.60	76.14	1,383.89	-10,186.60	19,217.08	18,962.04	255.04	75.349		
16,300.00	7,169.74	7,361.85	7,357.52	224.41	220.59	76.08	1,383.89	-10,186.60	19,317.08	19,061.97	255.11	75.722		
16,400.00	7,169.70	7,361.82	7,357.49	226.83	220.59	76.01	1,383.89	-10,186.60	19,417.08	19,161.91	255.17	76.094		
16,500.00	7,169.67	7,361.79	7,357.46	229.25	220.59	75.94	1,383.89	-10,186.60	19,517.08	19,261.84	255.24	76.467		
16,600.00	7,169.63	7,361.76	7,357.42	231.66	220.59	75.87	1,383.89	-10,186.60	19,617.08	19,361.78	255.30	76.839		
16,700.00	7,169.59	7,361.72	7,357.39	234.08	220.59	75.81	1,383.89	-10,186.60	19,717.08	19,461.71	255.37	77.210		
16,800.00	7,169.55	7,361.69	7,357.36	236.50	220.59	75.74	1,383.90	-10,186.60	19,817.08	19,561.64	255.43	77.582		
16,900.00	7,169.51	7,361.66	7,357.32	238.92	220.59	75.67	1,383.90	-10,186.60	19,917.08	19,661.58	255.50	77.953		
17,000.00	7,169.48	7,361.62	7,357.29	241.34	220.59	75.60	1,383.90	-10,186.60	20,017.08	19,761.51	255.57	78.323		
17,100.00	7,169.44	7,361.59	7,357.26	243.76	220.59	75.54	1,383.90	-10,186.60	20,117.08	19,861.44	255.64	78.693		
17,200.00	7,169.40	7,361.56	7,357.23	246.18	220.59	75.47	1,383.90	-10,186.60	20,217.08	19,961.37	255.71	79.063		
17,300.00	7,169.36	7,361.53	7,357.19	248.61	220.58	75.40	1,383.90	-10,186.60	20,317.08	20,061.30	255.78	79.433		
17,400.00	7,169.32	7,361.49	7,357.16	251.03	220.58	75.34	1,383.90	-10,186.60	20,417.08	20,161.23	255.85	79.802		
17,500.00	7,169.29	7,361.46	7,357.13	253.45	220.58	75.27	1,383.90	-10,186.60	20,517.08	20,261.16	255.92	80.170		
17,600.00	7,169.25	7,361.43	7,357.09	255.87	220.58	75.20	1,383.90	-10,186.60	20,617.08	20,361.09	255.99	80.539		
17,700.00	7,169.21	7,361.39	7,357.06	258.29	220.58	75.13	1,383.90	-10,186.60	20,717.08	20,461.01	256.06	80.906		
17,800.00	7,169.17	7,361.36	7,357.03	260.72	220.58	75.07	1,383.90	-10,186.60	20,817.08	20,560.94	256.13	81.274		
17,900.00	7,169.14	7,361.33	7,357.00	263.14	220.58	75.00	1,383.90	-10,186.60	20,917.08	20,660.87	256.21	81.641		
18,000.00	7,169.10	7,361.29	7,356.96	265.56	220.58	74.93	1,383.90	-10,186.60	21,017.08	20,760.80	256.28	82.008		
18,100.00	7,169.06	7,361.26	7,356.93	267.99	220.58	74.87	1,383.90	-10,186.60	21,117.08	20,860.72	256.35	82.374		
18,200.00	7,169.02	7,361.23	7,356.90	270.41	220.58	74.80	1,383.90	-10,186.60	21,217.08	20,960.65	256.43	82.740		
18,300.00	7,168.98	7,361.20	7,356.86	272.84	220.57	74.73	1,383.90	-10,186.60	21,317.08	21,060.57	256.50	83.106		
18,400.00	7,168.95	7,361.16	7,356.83	275.26	220.57	74.66	1,383.90	-10,186.60	21,417.08	21,160.50	256.58	83.471		
18,500.00	7,168.91	7,361.13	7,356.80	277.68	220.57	74.60	1,383.90	-10,186.60	21,517.08	21,260.42	256.66	83.836		
18,600.00	7,168.87	7,361.10	7,356.76	280.11	220.57	74.53	1,383.90	-10,186.60	21,617.08	21,360.34	256.73	84.201		
18,700.00	7,168.83	7,361.06	7,356.73	282.53	220.57	74.46	1,383.90	-10,186.60	21,717.08	21,460.27	256.81	84.565		
18,800.00	7,168.80	7,361.03	7,356.70	284.96	220.57	74.40	1,383.90	-10,186.60	21,817.08	21,560.19	256.89	84.928		
18,900.00	7,168.76	7,361.00	7,356.67	287.38	220.57	74.33	1,383.90	-10,186.60	21,917.08	21,660.11	256.97	85.292		
19,000.00	7,168.72	7,360.97	7,356.63	289.81	220.57	74.26	1,383.90	-10,186.60	22,017.08	21,760.03	257.04	85.655		
19,100.00	7,168.68	7,360.93	7,356.60	292.24	220.57	74.20	1,383.90	-10,186.60	22,117.08	21,859.95	257.12	86.017		
19,200.00	7,168.64	7,360.90	7,356.57	294.66	220.57	74.13	1,383.90	-10,186.60	22,217.08	21,959.87	257.20	86.379		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #112Y - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		200-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
19,300.00	7,168.61	7,360.87	7,356.53	297.09	220.56	74.06	1,383.90	-10,186.60	22,317.08	22,059.79	257.28	86.741	
19,400.00	7,168.57	7,360.83	7,356.50	299.52	220.56	74.00	1,383.90	-10,186.60	22,417.08	22,159.71	257.36	87.102	
19,500.00	7,168.53	7,360.80	7,356.47	301.94	220.56	73.93	1,383.90	-10,186.60	22,517.08	22,259.63	257.45	87.463	
19,600.00	7,168.49	7,360.77	7,356.43	304.37	220.56	73.86	1,383.91	-10,186.60	22,617.08	22,359.55	257.53	87.824	
19,700.00	7,168.46	7,360.73	7,356.40	306.80	220.56	73.80	1,383.91	-10,186.60	22,717.08	22,459.47	257.61	88.184	
19,800.00	7,168.42	7,360.70	7,356.37	309.22	220.56	73.73	1,383.91	-10,186.60	22,817.08	22,559.38	257.69	88.544	
19,900.00	7,168.38	7,360.67	7,356.34	311.65	220.56	73.66	1,383.91	-10,186.60	22,917.07	22,659.30	257.77	88.903	
20,000.00	7,168.34	7,360.64	7,356.30	314.08	220.56	73.60	1,383.91	-10,186.60	23,017.07	22,759.22	257.86	89.262	
20,100.00	7,168.30	7,360.60	7,356.27	316.51	220.56	73.53	1,383.91	-10,186.60	23,117.07	22,859.13	257.94	89.621	
20,200.00	7,168.27	7,360.57	7,356.24	318.93	220.56	73.46	1,383.91	-10,186.60	23,217.07	22,959.05	258.03	89.979	
20,300.00	7,168.23	7,360.54	7,356.20	321.36	220.55	73.40	1,383.91	-10,186.60	23,317.07	23,058.96	258.11	90.337	
20,400.00	7,168.19	7,360.50	7,356.17	323.79	220.55	73.33	1,383.91	-10,186.60	23,417.07	23,158.88	258.20	90.695	
20,500.00	7,168.15	7,360.47	7,356.14	326.22	220.55	73.27	1,383.91	-10,186.60	23,517.07	23,258.79	258.28	91.052	
20,600.00	7,168.11	7,360.44	7,356.10	328.65	220.55	73.20	1,383.91	-10,186.60	23,617.07	23,358.71	258.37	91.408	
20,700.00	7,168.08	7,360.40	7,356.07	331.07	220.55	73.13	1,383.91	-10,186.60	23,717.07	23,458.62	258.46	91.764	
20,768.77	7,168.05	7,360.38	7,356.05	332.74	220.55	73.09	1,383.91	-10,186.60	23,785.84	23,527.32	258.52	92.009	
20,800.00	7,168.04	7,360.37	7,356.04	333.50	220.55	73.07	1,383.91	-10,186.60	23,817.07	23,558.53	258.54	92.120	
20,903.75	7,168.00	7,360.34	7,356.00	336.02	220.55	73.00	1,383.91	-10,186.60	23,920.82	23,662.19	258.63	92.489	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #184C - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 159-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	183.00	183.00	0.00	3.27	-92.13	-308.63	-8,290.16	8,295.90				
100.00	100.00	283.00	283.00	0.25	5.16	-92.13	-308.63	-8,290.16	8,295.90	8,290.49	5.42	1,531.990	
200.00	200.00	383.00	383.00	0.61	7.06	-92.13	-308.63	-8,290.16	8,295.90	8,288.24	7.67	1,082.101	
262.79	262.79	445.78	445.78	0.83	8.25	-92.13	-308.32	-8,290.16	8,295.89	8,286.81	9.08	913.651	
300.00	300.00	482.90	482.90	0.97	8.95	-92.13	-308.32	-8,290.16	8,295.89	8,285.98	9.92	836.618	
400.00	400.00	582.66	582.66	1.33	10.84	-92.13	-308.39	-8,290.16	8,295.90	8,283.73	12.16	682.069	
500.00	500.00	682.43	682.43	1.68	12.72	-92.13	-308.54	-8,290.16	8,295.90	8,281.49	14.41	575.716	
600.00	599.98	783.02	782.98	2.04	14.79	-86.14	-308.63	-8,290.16	8,295.79	8,278.96	16.83	492.941	
700.00	699.84	882.88	882.84	2.41	16.95	-86.18	-308.63	-8,290.16	8,295.44	8,276.09	19.35	428.735	
800.00	799.45	982.49	982.45	2.77	19.10	-86.26	-308.63	-8,290.16	8,294.86	8,272.99	21.87	379.346	
900.00	898.70	1,080.75	1,080.70	3.13	21.23	-86.35	-307.60	-8,290.16	8,294.03	8,269.66	24.36	340.454	
1,000.00	997.47	1,178.36	1,178.30	3.51	23.34	-86.47	-308.05	-8,290.16	8,293.05	8,266.20	26.85	308.816	
1,104.22	1,099.75	1,282.89	1,282.75	3.92	25.78	-86.64	-308.63	-8,290.16	8,291.86	8,262.15	29.70	279.142	
1,200.00	1,193.41	1,376.55	1,376.41	4.32	28.42	-86.78	-308.63	-8,290.16	8,290.68	8,257.95	32.74	253.264	
1,300.00	1,291.19	1,474.33	1,474.19	4.74	31.17	-86.92	-308.63	-8,290.16	8,289.50	8,253.60	35.91	230.855	
1,400.00	1,388.98	1,571.33	1,571.17	5.16	33.90	-87.05	-307.20	-8,290.16	8,288.30	8,249.24	39.06	212.169	
1,500.00	1,486.76	1,667.34	1,667.17	5.59	36.61	-87.19	-307.56	-8,290.16	8,287.25	8,245.05	42.20	196.386	
1,600.00	1,584.54	1,763.20	1,763.02	6.03	39.31	-87.33	-308.29	-8,290.16	8,286.27	8,240.94	45.33	182.788	
1,700.00	1,682.33	1,865.81	1,865.33	6.47	43.03	-87.48	-308.63	-8,290.16	8,285.32	8,235.82	49.50	167.390	
1,800.00	1,780.11	1,963.60	1,963.11	6.91	46.96	-87.62	-308.63	-8,290.16	8,284.41	8,230.54	53.86	153.803	
1,900.00	1,877.90	2,061.38	2,060.90	7.35	50.89	-87.77	-308.63	-8,290.16	8,283.54	8,225.31	58.23	142.250	
2,000.00	1,975.68	2,155.14	2,154.55	7.79	54.65	-87.88	-305.64	-8,290.16	8,282.54	8,220.09	62.44	132.645	
2,100.00	2,073.46	2,248.23	2,247.60	8.24	58.39	-88.02	-306.71	-8,290.16	8,281.85	8,215.23	66.62	124.306	
2,200.00	2,171.25	2,355.62	2,354.25	8.68	62.81	-88.19	-308.63	-8,290.16	8,281.28	8,209.79	71.49	115.842	
2,300.00	2,269.03	2,448.34	2,446.91	9.13	67.53	-88.32	-307.37	-8,290.16	8,280.54	8,203.88	76.66	108.017	
2,400.00	2,366.82	2,551.65	2,549.82	9.58	72.79	-88.47	-308.63	-8,290.16	8,280.03	8,197.66	82.37	100.524	
2,500.00	2,464.60	2,649.43	2,647.60	10.03	77.77	-88.61	-308.63	-8,290.16	8,279.49	8,191.69	87.79	94.305	
2,600.00	2,562.38	2,743.32	2,741.29	10.48	82.54	-88.72	-304.48	-8,290.16	8,278.65	8,185.63	93.02	88.996	
2,700.00	2,660.17	2,829.18	2,827.05	10.93	86.91	-88.86	-305.72	-8,290.16	8,278.33	8,180.48	97.84	84.609	
2,800.00	2,757.95	2,943.85	2,940.95	11.38	92.55	-89.04	-308.63	-8,290.16	8,278.17	8,174.24	103.94	79.648	
2,900.00	2,855.74	3,041.64	3,038.74	11.83	96.73	-89.18	-308.63	-8,290.16	8,277.84	8,169.27	108.57	76.247	
3,000.00	2,953.52	3,139.42	3,136.52	12.29	100.91	-89.32	-308.63	-8,290.16	8,277.56	8,164.36	113.20	73.124	
3,100.00	3,051.30	3,237.20	3,234.30	12.74	105.09	-89.46	-308.63	-8,290.16	8,277.34	8,159.50	117.83	70.248	
3,200.00	3,149.09	3,330.00	3,326.91	13.19	109.06	-89.57	-303.67	-8,290.16	8,276.68	8,154.43	122.25	67.703	
3,272.87	3,220.34	3,396.42	3,393.28	13.52	111.90	-89.67	-304.29	-8,290.16	8,276.64	8,151.22	125.42	65.992 CC	
3,300.00	3,246.87	3,421.11	3,417.96	13.65	112.95	-89.70	-304.62	-8,290.16	8,276.65	8,150.05	126.60	65.378	
3,400.00	3,344.66	3,511.95	3,508.73	14.10	116.84	-89.85	-306.31	-8,290.16	8,276.76	8,145.82	130.93	63.213	
3,500.00	3,442.44	3,629.44	3,625.44	14.55	121.71	-90.03	-308.63	-8,290.16	8,276.96	8,140.70	136.26	60.743	
3,600.00	3,540.22	3,727.22	3,723.22	15.01	125.39	-90.17	-308.63	-8,290.16	8,277.00	8,136.60	140.40	58.953	
3,700.00	3,638.01	3,825.00	3,821.01	15.46	129.08	-90.32	-308.63	-8,290.16	8,277.09	8,132.55	144.54	57.265	
3,730.63	3,667.96	3,852.85	3,848.76	15.60	130.13	-90.34	-305.61	-8,290.16	8,276.79	8,131.06	145.73	56.796	
3,800.00	3,735.79	3,914.29	3,910.18	15.91	132.44	-90.43	-305.97	-8,290.16	8,276.94	8,128.58	148.36	55.790	
3,900.00	3,833.58	4,002.59	3,998.43	16.37	135.77	-90.56	-307.22	-8,290.16	8,277.29	8,125.15	152.14	54.406	
4,000.00	3,931.36	4,118.89	4,114.36	16.82	139.87	-90.74	-308.63	-8,290.16	8,277.68	8,120.98	156.70	52.826	
4,100.00	4,029.14	4,216.68	4,212.14	17.28	143.05	-90.88	-308.63	-8,290.16	8,277.98	8,117.66	160.33	51.632	
4,200.00	4,126.93	4,314.46	4,309.93	17.73	146.23	-91.02	-308.63	-8,290.16	8,278.34	8,114.38	163.96	50.490	
4,300.00	4,224.71	4,412.25	4,407.71	18.19	149.40	-91.17	-308.63	-8,290.16	8,278.75	8,111.16	167.59	49.399	
4,400.00	4,322.50	4,510.03	4,505.50	18.64	152.58	-91.31	-308.63	-8,290.16	8,279.21	8,107.99	171.22	48.354	
4,500.00	4,420.28	4,607.81	4,603.28	19.10	155.75	-91.45	-308.63	-8,290.16	8,279.72	8,104.87	174.85	47.353	
4,600.00	4,518.06	4,705.60	4,701.06	19.55	158.93	-91.59	-308.63	-8,290.16	8,280.29	8,101.81	178.48	46.393	
4,700.00	4,615.85	4,803.38	4,798.85	20.01	162.10	-91.73	-308.63	-8,290.16	8,280.91	8,098.80	182.11	45.471	
4,800.00	4,713.63	4,901.17	4,896.63	20.46	165.28	-91.87	-308.63	-8,290.16	8,281.59	8,095.84	185.74	44.586	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #184C - OH - OH-INC													Offset Site Error:	0.00 usft	
Survey Program:		159-A027Ua_INC-ONLY				Rule Assigned:								Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)				
4,900.00	4,811.42	4,998.95	4,994.42	20.92	168.46	-92.01	-308.63	-8,290.16	8,282.31	8,092.94	189.38	43.735			
5,000.00	4,909.20	5,096.73	5,092.20	21.38	171.63	-92.16	-308.63	-8,290.16	8,283.09	8,090.08	193.01	42.916			
5,085.75	4,993.05	5,180.53	5,175.73	21.77	174.35	-92.20	-296.49	-8,290.16	8,282.05	8,085.93	196.12	42.230			
5,100.00	5,006.98	5,194.15	5,189.35	21.83	174.80	-92.22	-296.49	-8,290.16	8,282.16	8,085.54	196.63	42.121			
5,200.00	5,104.77	5,289.73	5,284.91	22.29	177.90	-92.35	-296.61	-8,290.16	8,283.04	8,082.85	200.19	41.377			
5,300.00	5,202.55	5,385.25	5,380.40	22.74	181.00	-92.49	-296.91	-8,290.16	8,283.99	8,080.25	203.74	40.659			
5,400.00	5,300.34	5,480.70	5,475.82	23.20	184.10	-92.64	-297.38	-8,290.16	8,285.03	8,077.73	207.30	39.967			
5,500.00	5,398.12	5,576.09	5,571.18	23.66	187.20	-92.78	-298.04	-8,290.16	8,286.14	8,075.29	210.85	39.298			
5,600.00	5,495.90	5,671.41	5,666.47	24.11	190.30	-92.92	-298.87	-8,290.16	8,287.35	8,072.94	214.40	38.653			
5,700.00	5,593.69	5,766.66	5,761.69	24.57	193.39	-93.07	-299.88	-8,290.16	8,288.64	8,070.69	217.95	38.030			
5,800.00	5,691.47	5,861.85	5,856.84	25.02	196.48	-93.21	-301.06	-8,290.16	8,290.01	8,068.52	221.50	37.427			
5,900.00	5,789.26	5,956.97	5,951.91	25.48	199.57	-93.36	-302.42	-8,290.16	8,291.48	8,066.44	225.04	36.844			
6,000.00	5,887.04	6,052.02	6,046.92	25.94	202.66	-93.51	-303.96	-8,290.16	8,293.03	8,064.45	228.58	36.280			
6,100.00	5,984.83	6,147.01	6,141.85	26.39	205.74	-93.65	-305.67	-8,290.16	8,294.68	8,062.56	232.12	35.734			
6,200.00	6,082.61	6,241.92	6,236.71	26.85	208.83	-93.80	-307.56	-8,290.16	8,296.42	8,060.76	235.66	35.205			
6,300.00	6,180.39	6,369.65	6,363.39	27.30	212.78	-93.99	-308.63	-8,290.16	8,298.02	8,057.95	240.07	34.565			
6,400.00	6,278.18	6,467.43	6,461.18	27.76	215.70	-94.13	-308.63	-8,290.16	8,299.54	8,056.09	243.45	34.092			
6,500.00	6,375.96	6,565.22	6,558.96	28.22	218.62	-94.27	-308.63	-8,290.16	8,301.11	8,054.28	246.83	33.631			
6,600.00	6,473.75	6,663.00	6,656.75	28.67	221.55	-94.42	-308.63	-8,290.16	8,302.73	8,052.52	250.21	33.184			
6,663.67	6,536.00	6,725.26	6,719.00	28.96	223.41	-94.51	-308.63	-8,290.16	8,303.79	8,051.43	252.36	32.905 ES			
6,700.00	6,571.53	6,760.79	6,754.53	29.13	224.47	-109.85	-308.63	-8,290.16	8,305.42	8,051.84	253.58	32.752			
6,750.00	6,620.29	6,809.55	6,803.29	29.35	225.93	-128.75	-308.63	-8,290.16	8,311.00	8,055.74	255.26	32.559			
6,800.00	6,668.62	6,857.88	6,851.62	29.56	227.38	-142.89	-308.63	-8,290.16	8,320.39	8,063.48	256.91	32.386			
6,850.00	6,716.22	6,905.48	6,899.22	29.76	228.80	-152.82	-308.63	-8,290.16	8,333.55	8,075.02	258.53	32.235			
6,900.00	6,762.80	6,952.06	6,945.80	29.95	230.19	-159.86	-308.63	-8,290.16	8,350.38	8,090.28	260.10	32.104			
6,950.00	6,808.07	6,997.33	6,991.07	30.13	231.55	-165.06	-308.63	-8,290.16	8,370.78	8,109.16	261.62	31.996			
7,000.00	6,851.75	7,041.00	7,034.75	30.30	232.85	-169.10	-308.63	-8,290.16	8,394.62	8,131.54	263.08	31.909			
7,050.00	6,893.57	7,082.82	7,076.57	30.45	234.10	-172.42	-308.63	-8,290.16	8,421.76	8,157.29	264.47	31.844			
7,100.00	6,933.27	7,122.53	7,116.27	30.60	235.29	-175.29	-308.63	-8,290.16	8,452.02	8,186.24	265.78	31.801			
7,150.00	6,970.61	7,159.87	7,153.61	30.74	236.41	-177.92	-308.63	-8,290.16	8,485.22	8,218.21	267.01	31.779			
7,200.00	7,005.36	7,194.62	7,188.36	30.87	237.45	-179.53	-308.63	-8,290.16	8,521.15	8,253.01	268.14	31.779 SF			
7,250.00	7,037.31	7,226.57	7,220.31	30.99	238.40	-176.89	-308.63	-8,290.16	8,559.59	8,290.42	269.17	31.800			
7,300.00	7,066.25	7,255.51	7,249.25	31.11	239.27	-174.00	-308.63	-8,290.16	8,600.30	8,330.21	270.09	31.842			
7,350.00	7,092.02	7,281.27	7,275.02	31.22	240.04	-170.63	-308.63	-8,290.16	8,643.04	8,372.13	270.91	31.904			
7,400.00	7,114.44	7,303.70	7,297.44	31.34	240.71	-166.45	-308.63	-8,290.16	8,687.53	8,415.93	271.60	31.986			
7,450.00	7,133.38	7,322.64	7,316.38	31.47	241.27	-160.95	-308.63	-8,290.16	8,733.52	8,461.33	272.18	32.087			
7,500.00	7,148.73	7,337.99	7,331.73	31.61	241.73	-153.27	-308.63	-8,290.16	8,780.71	8,508.07	272.64	32.206			
7,550.00	7,160.40	7,349.65	7,343.40	31.78	242.08	-141.99	-308.63	-8,290.16	8,828.81	8,555.84	272.97	32.343			
7,600.00	7,168.30	7,357.55	7,351.30	31.98	242.32	-125.33	-308.63	-8,290.16	8,877.54	8,604.36	273.18	32.497			
7,650.00	7,172.38	7,361.64	7,355.38	32.23	242.44	-103.20	-308.63	-8,290.16	8,926.60	8,653.33	273.27	32.666			
7,678.56	7,173.00	7,362.26	7,356.00	32.39	242.46	-89.89	-308.63	-8,290.16	8,954.64	8,681.38	273.27	32.769			
7,700.00	7,172.99	7,362.25	7,355.99	32.53	242.46	-89.89	-308.63	-8,290.16	8,975.69	8,702.45	273.25	32.848			
7,800.00	7,172.95	7,362.21	7,355.95	33.31	242.46	-89.89	-308.63	-8,290.16	9,073.89	8,800.72	273.16	33.218			
7,900.00	7,172.92	7,362.17	7,355.92	34.32	242.46	-89.89	-308.63	-8,290.16	9,172.12	8,899.03	273.09	33.587			
8,000.00	7,172.88	7,362.14	7,355.88	35.53	242.45	-89.88	-308.63	-8,290.16	9,270.38	8,997.37	273.02	33.955			
8,100.00	7,172.84	7,362.10	7,355.84	36.89	242.45	-89.88	-308.63	-8,290.16	9,368.69	9,095.73	272.96	34.323			
8,200.00	7,172.80	7,362.06	7,355.80	38.39	242.45	-89.88	-308.63	-8,290.16	9,467.03	9,194.12	272.91	34.690			
8,300.00	7,172.77	7,362.02	7,355.77	39.99	242.45	-89.88	-308.63	-8,290.16	9,565.41	9,292.54	272.86	35.056			
8,400.00	7,172.73	7,361.99	7,355.73	41.68	242.45	-89.88	-308.63	-8,290.16	9,663.81	9,390.99	272.82	35.422			
8,500.00	7,172.69	7,361.95	7,355.69	43.45	242.45	-89.88	-308.63	-8,290.16	9,762.25	9,489.47	272.79	35.787			
8,600.00	7,172.65	7,361.91	7,355.65	45.29	242.45	-89.88	-308.63	-8,290.16	9,860.73	9,587.96	272.76	36.152			
8,700.00	7,172.61	7,361.87	7,355.61	47.18	242.45	-89.88	-308.63	-8,290.16	9,959.23	9,686.49	272.74	36.516			

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #184C - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		159-A027Ua_INC-ONLY				Rule Assigned:				Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
8,800.00	7,172.58	7,361.83	7,355.58	49.12	242.45	89.87	-308.63	-8,290.16	10,057.76	9,785.04	272.72	36.879	
8,900.00	7,172.54	7,361.80	7,355.54	51.11	242.44	89.87	-308.63	-8,290.16	10,156.32	9,883.61	272.71	37.242	
9,000.00	7,172.50	7,361.76	7,355.50	53.13	242.44	89.87	-308.63	-8,290.16	10,254.91	9,982.20	272.71	37.604	
9,100.00	7,172.46	7,361.72	7,355.46	55.19	242.44	89.87	-308.63	-8,290.16	10,353.52	10,080.82	272.71	37.966	
9,200.00	7,172.42	7,361.68	7,355.42	57.28	242.44	89.87	-308.63	-8,290.16	10,452.17	10,179.46	272.71	38.327	
9,300.00	7,172.39	7,361.64	7,355.39	59.39	242.44	89.87	-308.63	-8,290.16	10,550.83	10,278.12	272.72	38.688	
9,400.00	7,172.35	7,361.61	7,355.35	61.53	242.44	89.87	-308.63	-8,290.16	10,649.53	10,376.80	272.73	39.048	
9,500.00	7,172.31	7,361.57	7,355.31	63.70	242.44	89.87	-308.63	-8,290.16	10,748.24	10,475.50	272.75	39.407	
9,600.00	7,172.27	7,361.53	7,355.27	65.88	242.44	89.86	-308.63	-8,290.16	10,846.98	10,574.22	272.77	39.767	
9,700.00	7,172.24	7,361.49	7,355.24	68.08	242.44	89.86	-308.63	-8,290.16	10,945.75	10,672.96	272.79	40.125	
9,800.00	7,172.20	7,361.46	7,355.20	70.29	242.43	89.86	-308.63	-8,290.16	11,044.53	10,771.71	272.82	40.483	
9,900.00	7,172.16	7,361.42	7,355.16	72.52	242.43	89.86	-308.63	-8,290.16	11,143.34	10,870.49	272.85	40.841	
10,000.00	7,172.12	7,361.38	7,355.12	74.76	242.43	89.86	-308.63	-8,290.16	11,242.17	10,969.28	272.88	41.198	
10,100.00	7,172.08	7,361.34	7,355.08	77.02	242.43	89.86	-308.63	-8,290.16	11,341.01	11,068.10	272.92	41.555	
10,200.00	7,172.05	7,361.30	7,355.05	79.28	242.43	89.86	-308.63	-8,290.16	11,439.88	11,166.93	272.96	41.911	
10,300.00	7,172.01	7,361.27	7,355.01	81.56	242.43	89.86	-308.63	-8,290.16	11,538.77	11,265.77	273.00	42.267	
10,400.00	7,171.97	7,361.23	7,354.97	83.84	242.43	89.85	-308.63	-8,290.16	11,637.68	11,364.63	273.04	42.622	
10,500.00	7,171.93	7,361.19	7,354.93	86.13	242.43	89.85	-308.63	-8,290.16	11,736.60	11,463.51	273.09	42.977	
10,600.00	7,171.90	7,361.15	7,354.90	88.43	242.43	89.85	-308.63	-8,290.16	11,835.55	11,562.40	273.14	43.331	
10,700.00	7,171.86	7,361.12	7,354.86	90.74	242.42	89.85	-308.63	-8,290.16	11,934.51	11,661.31	273.19	43.685	
10,800.00	7,171.82	7,361.08	7,354.82	93.05	242.42	89.85	-308.63	-8,290.16	12,033.49	11,760.24	273.25	44.039	
10,900.00	7,171.78	7,361.04	7,354.78	95.37	242.42	89.85	-308.63	-8,290.16	12,132.48	11,859.18	273.31	44.392	
11,000.00	7,171.74	7,361.00	7,354.74	97.70	242.42	89.85	-308.63	-8,290.16	12,231.49	11,958.13	273.36	44.744	
11,100.00	7,171.71	7,360.96	7,354.71	100.03	242.42	89.85	-308.63	-8,290.16	12,330.52	12,057.10	273.42	45.097	
11,200.00	7,171.67	7,360.93	7,354.67	102.37	242.42	89.84	-308.63	-8,290.16	12,429.56	12,156.08	273.49	45.448	
11,300.00	7,171.63	7,360.89	7,354.63	104.71	242.42	89.84	-308.63	-8,290.16	12,528.62	12,255.07	273.55	45.800	
11,400.00	7,171.59	7,360.85	7,354.59	107.06	242.42	89.84	-308.63	-8,290.16	12,627.69	12,354.08	273.62	46.151	
11,500.00	7,171.56	7,360.81	7,354.56	109.40	242.41	89.84	-308.63	-8,290.16	12,726.78	12,453.10	273.68	46.502	
11,600.00	7,171.52	7,360.78	7,354.52	111.76	242.41	89.84	-308.63	-8,290.16	12,825.88	12,552.13	273.75	46.852	
11,700.00	7,171.48	7,360.74	7,354.48	114.12	242.41	89.84	-308.63	-8,290.16	12,925.00	12,651.18	273.82	47.202	
11,800.00	7,171.44	7,360.70	7,354.44	116.48	242.41	89.84	-308.63	-8,290.16	13,024.13	12,750.23	273.90	47.551	
11,900.00	7,171.40	7,360.66	7,354.40	118.84	242.41	89.84	-308.63	-8,290.16	13,123.27	12,849.30	273.97	47.900	
12,000.00	7,171.37	7,360.62	7,354.37	121.20	242.41	89.83	-308.63	-8,290.16	13,222.43	12,948.38	274.04	48.249	
12,100.00	7,171.33	7,360.59	7,354.33	123.57	242.41	89.83	-308.63	-8,290.16	13,321.59	13,047.47	274.12	48.598	
12,200.00	7,171.29	7,360.55	7,354.29	125.95	242.41	89.83	-308.63	-8,290.16	13,420.77	13,146.58	274.20	48.946	
12,300.00	7,171.25	7,360.51	7,354.25	128.32	242.41	89.83	-308.63	-8,290.16	13,519.97	13,245.69	274.28	49.293	
12,400.00	7,171.22	7,360.47	7,354.22	130.70	242.40	89.83	-308.63	-8,290.16	13,619.17	13,344.81	274.36	49.641	
12,500.00	7,171.18	7,360.44	7,354.18	133.07	242.40	89.83	-308.63	-8,290.16	13,718.39	13,443.95	274.44	49.988	
12,600.00	7,171.14	7,360.40	7,354.14	135.46	242.40	89.83	-308.63	-8,290.16	13,817.61	13,543.09	274.52	50.334	
12,700.00	7,171.10	7,360.36	7,354.10	137.84	242.40	89.82	-308.63	-8,290.16	13,916.85	13,642.25	274.60	50.680	
12,800.00	7,171.06	7,360.32	7,354.06	140.22	242.40	89.82	-308.63	-8,290.16	14,016.10	13,741.42	274.68	51.026	
12,900.00	7,171.03	7,360.28	7,354.03	142.61	242.40	89.82	-308.63	-8,290.16	14,115.36	13,840.59	274.77	51.372	
13,000.00	7,170.99	7,360.25	7,353.99	145.00	242.40	89.82	-308.63	-8,290.16	14,214.63	13,939.78	274.85	51.717	
13,100.00	7,170.95	7,360.21	7,353.95	147.39	242.40	89.82	-308.63	-8,290.16	14,313.91	14,038.97	274.94	52.062	
13,200.00	7,170.91	7,360.17	7,353.91	149.78	242.40	89.82	-308.63	-8,290.16	14,413.20	14,138.17	275.03	52.406	
13,300.00	7,170.87	7,360.13	7,353.87	152.17	242.39	89.82	-308.63	-8,290.16	14,512.50	14,237.38	275.12	52.751	
13,400.00	7,170.84	7,360.09	7,353.84	154.57	242.39	89.82	-308.63	-8,290.16	14,611.81	14,336.60	275.20	53.095	
13,500.00	7,170.80	7,360.06	7,353.80	156.96	242.39	89.81	-308.63	-8,290.16	14,711.13	14,435.83	275.29	53.438	
13,600.00	7,170.76	7,360.02	7,353.76	159.36	242.39	89.81	-308.63	-8,290.16	14,810.45	14,535.07	275.38	53.781	
13,700.00	7,170.72	7,359.98	7,353.72	161.76	242.39	89.81	-308.63	-8,290.16	14,909.79	14,634.32	275.47	54.124	
13,800.00	7,170.69	7,359.94	7,353.69	164.16	242.39	89.81	-308.63	-8,290.16	15,009.14	14,733.57	275.56	54.467	
13,900.00	7,170.65	7,359.91	7,353.65	166.56	242.39	89.81	-308.63	-8,290.16	15,108.49	14,832.83	275.66	54.809	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #184C - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		159-A027Ua_INC-ONLY				Rule Assigned:				Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
14,000.00	7,170.61	7,359.87	7,353.61	168.96	242.39	89.81	-308.63	-8,290.16	15,207.85	14,932.10	275.75	55.151	
14,100.00	7,170.57	7,359.83	7,353.57	171.36	242.39	89.81	-308.63	-8,290.16	15,307.22	15,031.38	275.84	55.493	
14,200.00	7,170.53	7,359.79	7,353.53	173.76	242.38	89.81	-308.63	-8,290.16	15,406.60	15,130.67	275.94	55.834	
14,300.00	7,170.50	7,359.75	7,353.50	176.17	242.38	89.80	-308.63	-8,290.16	15,505.99	15,229.96	276.03	56.175	
14,400.00	7,170.46	7,359.72	7,353.46	178.57	242.38	89.80	-308.63	-8,290.16	15,605.39	15,329.26	276.13	56.516	
14,500.00	7,170.42	7,359.68	7,353.42	180.98	242.38	89.80	-308.63	-8,290.16	15,704.79	15,428.57	276.22	56.856	
14,600.00	7,170.38	7,359.64	7,353.38	183.39	242.38	89.80	-308.63	-8,290.16	15,804.20	15,527.88	276.32	57.196	
14,700.00	7,170.35	7,359.60	7,353.35	185.80	242.38	89.80	-308.63	-8,290.16	15,903.62	15,627.20	276.41	57.536	
14,800.00	7,170.31	7,359.57	7,353.31	188.20	242.38	89.80	-308.63	-8,290.16	16,003.04	15,726.53	276.51	57.875	
14,900.00	7,170.27	7,359.53	7,353.27	190.61	242.38	89.80	-308.63	-8,290.16	16,102.47	15,825.87	276.61	58.214	
15,000.00	7,170.23	7,359.49	7,353.23	193.02	242.38	89.80	-308.63	-8,290.16	16,201.91	15,925.21	276.70	58.553	
15,100.00	7,170.19	7,359.45	7,353.19	195.43	242.37	89.79	-308.63	-8,290.16	16,301.36	16,024.56	276.80	58.892	
15,200.00	7,170.16	7,359.41	7,353.16	197.85	242.37	89.79	-308.63	-8,290.16	16,400.81	16,123.91	276.90	59.230	
15,300.00	7,170.12	7,359.38	7,353.12	200.26	242.37	89.79	-308.63	-8,290.16	16,500.27	16,223.27	277.00	59.568	
15,400.00	7,170.08	7,359.34	7,353.08	202.67	242.37	89.79	-308.63	-8,290.16	16,599.73	16,322.64	277.10	59.906	
15,500.00	7,170.04	7,359.30	7,353.04	205.08	242.37	89.79	-308.63	-8,290.16	16,699.21	16,422.01	277.20	60.243	
15,600.00	7,170.01	7,359.26	7,353.01	207.50	242.37	89.79	-308.63	-8,290.16	16,798.68	16,521.39	277.30	60.580	
15,700.00	7,169.97	7,359.23	7,352.97	209.91	242.37	89.79	-308.63	-8,290.16	16,898.17	16,620.77	277.40	60.917	
15,800.00	7,169.93	7,359.19	7,352.93	212.33	242.37	89.79	-308.63	-8,290.16	16,997.66	16,720.16	277.50	61.253	
15,900.00	7,169.89	7,359.15	7,352.89	214.74	242.37	89.78	-308.63	-8,290.16	17,097.16	16,819.56	277.60	61.589	
16,000.00	7,169.85	7,359.11	7,352.85	217.16	242.36	89.78	-308.63	-8,290.16	17,196.66	16,918.96	277.70	61.925	
16,100.00	7,169.82	7,359.07	7,352.82	219.58	242.36	89.78	-308.63	-8,290.16	17,296.17	17,018.36	277.80	62.261	
16,200.00	7,169.78	7,359.04	7,352.78	221.99	242.36	89.78	-308.63	-8,290.16	17,395.68	17,117.78	277.90	62.596	
16,300.00	7,169.74	7,359.00	7,352.74	224.41	242.36	89.78	-308.63	-8,290.16	17,495.20	17,217.19	278.01	62.931	
16,400.00	7,169.70	7,358.96	7,352.70	226.83	242.36	89.78	-308.63	-8,290.16	17,594.72	17,316.61	278.11	63.265	
16,500.00	7,169.67	7,358.92	7,352.67	229.25	242.36	89.78	-308.63	-8,290.16	17,694.25	17,416.04	278.21	63.600	
16,600.00	7,169.63	7,358.89	7,352.63	231.66	242.36	89.78	-308.63	-8,290.16	17,793.79	17,515.47	278.32	63.934	
16,700.00	7,169.59	7,358.85	7,352.59	234.08	242.36	89.77	-308.63	-8,290.16	17,893.33	17,614.91	278.42	64.268	
16,800.00	7,169.55	7,358.81	7,352.55	236.50	242.36	89.77	-308.63	-8,290.16	17,992.88	17,714.35	278.52	64.601	
16,900.00	7,169.51	7,358.77	7,352.51	238.92	242.35	89.77	-308.63	-8,290.16	18,092.43	17,813.80	278.63	64.934	
17,000.00	7,169.48	7,358.73	7,352.48	241.34	242.35	89.77	-308.63	-8,290.16	18,191.98	17,913.25	278.73	65.267	
17,100.00	7,169.44	7,358.70	7,352.44	243.76	242.35	89.77	-308.63	-8,290.16	18,291.54	18,012.71	278.83	65.600	
17,200.00	7,169.40	7,358.66	7,352.40	246.18	242.35	89.77	-308.63	-8,290.16	18,391.11	18,112.17	278.94	65.932	
17,300.00	7,169.36	7,358.62	7,352.36	248.61	242.35	89.77	-308.63	-8,290.16	18,490.68	18,211.63	279.04	66.264	
17,400.00	7,169.32	7,358.58	7,352.32	251.03	242.35	89.77	-308.63	-8,290.16	18,590.25	18,311.10	279.15	66.596	
17,500.00	7,169.29	7,358.54	7,352.29	253.45	242.35	89.76	-308.63	-8,290.16	18,689.83	18,410.58	279.25	66.928	
17,600.00	7,169.25	7,358.51	7,352.25	255.87	242.35	89.76	-308.63	-8,290.16	18,789.41	18,510.05	279.36	67.259	
17,700.00	7,169.21	7,358.47	7,352.21	258.29	242.34	89.76	-308.63	-8,290.16	18,889.00	18,609.54	279.47	67.590	
17,800.00	7,169.17	7,358.43	7,352.17	260.72	242.34	89.76	-308.63	-8,290.16	18,988.59	18,709.02	279.57	67.920	
17,900.00	7,169.14	7,358.39	7,352.14	263.14	242.34	89.76	-308.63	-8,290.16	19,088.19	18,808.51	279.68	68.251	
18,000.00	7,169.10	7,358.36	7,352.10	265.56	242.34	89.76	-308.63	-8,290.16	19,187.79	18,908.01	279.78	68.581	
18,100.00	7,169.06	7,358.32	7,352.06	267.99	242.34	89.76	-308.63	-8,290.16	19,287.40	19,007.50	279.89	68.910	
18,200.00	7,169.02	7,358.28	7,352.02	270.41	242.34	89.76	-308.63	-8,290.16	19,387.00	19,107.01	280.00	69.240	
18,300.00	7,168.98	7,358.24	7,351.98	272.84	242.34	89.75	-308.63	-8,290.16	19,486.62	19,206.51	280.10	69.569	
18,400.00	7,168.95	7,358.20	7,351.95	275.26	242.34	89.75	-308.63	-8,290.16	19,586.23	19,306.02	280.21	69.898	
18,500.00	7,168.91	7,358.17	7,351.91	277.68	242.34	89.75	-308.63	-8,290.16	19,685.85	19,405.54	280.32	70.227	
18,600.00	7,168.87	7,358.13	7,351.87	280.11	242.33	89.75	-308.63	-8,290.16	19,785.48	19,505.05	280.43	70.555	
18,700.00	7,168.83	7,358.09	7,351.83	282.53	242.33	89.75	-308.63	-8,290.16	19,885.11	19,604.57	280.53	70.883	
18,800.00	7,168.80	7,358.05	7,351.80	284.96	242.33	89.75	-308.63	-8,290.16	19,984.74	19,704.10	280.64	71.211	
18,900.00	7,168.76	7,358.02	7,351.76	287.38	242.33	89.75	-308.63	-8,290.16	20,084.38	19,803.62	280.75	71.538	
19,000.00	7,168.72	7,357.98	7,351.72	289.81	242.33	89.75	-308.63	-8,290.16	20,184.01	19,903.16	280.86	71.865	
19,100.00	7,168.68	7,357.94	7,351.68	292.24	242.33	89.74	-308.63	-8,290.16	20,283.66	20,002.69	280.97	72.192	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - (O) Rosa Unit #184C - OH - OH-INC												Offset Site Error:	0.00 usft		
Survey Program: 159-A027Ua_INC-ONLY				Reference Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
19,200.00	7,168.64	7,357.90	7,351.64	294.66	242.33	89.74	-308.63	-8,290.16	20,383.30	20,102.23	281.08	72.519			
19,300.00	7,168.61	7,357.86	7,351.61	297.09	242.33	89.74	-308.63	-8,290.16	20,482.95	20,201.77	281.19	72.845			
19,400.00	7,168.57	7,357.83	7,351.57	299.52	242.33	89.74	-308.63	-8,290.16	20,582.61	20,301.31	281.29	73.171			
19,500.00	7,168.53	7,357.79	7,351.53	301.94	242.32	89.74	-308.63	-8,290.16	20,682.26	20,400.86	281.40	73.497			
19,600.00	7,168.49	7,357.75	7,351.49	304.37	242.32	89.74	-308.63	-8,290.16	20,781.92	20,500.41	281.51	73.822			
19,700.00	7,168.46	7,357.71	7,351.46	306.80	242.32	89.74	-308.63	-8,290.16	20,881.59	20,599.96	281.62	74.148			
19,800.00	7,168.42	7,357.68	7,351.42	309.22	242.32	89.73	-308.63	-8,290.16	20,981.25	20,699.52	281.73	74.472			
19,900.00	7,168.38	7,357.64	7,351.38	311.65	242.32	89.73	-308.63	-8,290.16	21,080.92	20,799.08	281.84	74.797			
20,000.00	7,168.34	7,357.60	7,351.34	314.08	242.32	89.73	-308.63	-8,290.16	21,180.59	20,898.64	281.95	75.121			
20,100.00	7,168.30	7,357.56	7,351.30	316.51	242.32	89.73	-308.63	-8,290.16	21,280.27	20,998.21	282.06	75.445			
20,200.00	7,168.27	7,357.52	7,351.27	318.93	242.32	89.73	-308.63	-8,290.16	21,379.95	21,097.78	282.17	75.769			
20,300.00	7,168.23	7,357.49	7,351.23	321.36	242.32	89.73	-308.63	-8,290.16	21,479.63	21,197.35	282.28	76.093			
20,400.00	7,168.19	7,357.45	7,351.19	323.79	242.31	89.73	-308.63	-8,290.16	21,579.31	21,296.92	282.39	76.416			
20,500.00	7,168.15	7,357.41	7,351.15	326.22	242.31	89.73	-308.63	-8,290.16	21,679.00	21,396.50	282.50	76.739			
20,600.00	7,168.11	7,357.37	7,351.12	328.65	242.31	89.72	-308.63	-8,290.16	21,778.69	21,496.08	282.62	77.061			
20,700.00	7,168.08	7,357.33	7,351.08	331.07	242.31	89.72	-308.63	-8,290.16	21,878.39	21,595.66	282.73	77.384			
20,768.77	7,168.05	7,357.31	7,351.05	332.74	242.31	89.72	-308.63	-8,290.16	21,946.94	21,664.14	282.80	77.605			
20,800.00	7,168.04	7,357.30	7,351.04	333.50	242.31	89.72	-308.63	-8,290.16	21,978.08	21,695.24	282.84	77.706			
20,903.75	7,168.00	7,357.26	7,351.00	336.02	242.31	89.72	-308.63	-8,290.16	22,081.52	21,798.57	282.95	78.039			

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 830H - OH - Plan #2													Offset Site Error: 0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	33.57	12.34	8.19	14.81				
100.00	100.00	100.00	100.00	0.25	0.25	33.57	12.34	8.19	14.81	14.31	0.50	29.516	
200.00	200.00	200.00	200.00	0.61	0.61	33.57	12.34	8.19	14.81	13.59	1.22	12.154	
300.00	300.00	300.00	300.00	0.97	0.97	33.57	12.34	8.19	14.81	12.88	1.94	7.652	
400.00	400.00	400.00	400.00	1.33	1.33	33.57	12.34	8.19	14.81	12.16	2.65	5.584	
500.00	500.00	500.00	500.00	1.68	1.68	33.57	12.34	8.19	14.81	11.44	3.37	4.396 CC	
600.00	599.98	599.52	599.50	2.04	2.04	41.18	14.04	8.50	15.07	10.99	4.08	3.690 ES	
700.00	699.84	699.04	698.88	2.41	2.40	45.68	19.14	9.43	15.91	11.11	4.80	3.317	
800.00	799.45	798.52	797.98	2.77	2.76	52.12	27.63	10.97	17.49	11.98	5.51	3.175	
900.00	898.70	897.96	896.68	3.13	3.13	59.29	39.49	13.12	20.00	13.77	6.23	3.209	
1,000.00	997.47	997.35	994.85	3.51	3.50	66.10	54.71	15.89	23.57	16.59	6.97	3.379	
1,104.22	1,099.75	1,100.86	1,096.46	3.92	3.91	72.18	74.11	19.41	28.46	20.68	7.78	3.657	
1,200.00	1,193.41	1,195.98	1,189.16	4.32	4.30	74.30	95.08	23.22	34.40	25.85	8.55	4.022	
1,300.00	1,291.19	1,295.75	1,286.13	4.74	4.73	74.45	118.18	27.42	41.24	31.86	9.38	4.395	
1,400.00	1,388.98	1,395.51	1,383.09	5.16	5.17	74.55	141.29	31.62	48.07	37.85	10.23	4.701	
1,500.00	1,486.76	1,495.28	1,480.05	5.59	5.61	74.63	164.40	35.82	54.91	43.83	11.08	4.956	
1,600.00	1,584.54	1,595.05	1,577.01	6.03	6.06	74.69	187.51	40.02	61.75	49.80	11.94	5.171	
1,700.00	1,682.33	1,694.81	1,673.97	6.47	6.51	74.74	210.62	44.22	68.58	55.77	12.81	5.354	
1,800.00	1,780.11	1,794.58	1,770.94	6.91	6.97	74.78	233.73	48.42	75.42	61.73	13.68	5.511	
1,900.00	1,877.90	1,894.34	1,867.90	7.35	7.43	74.82	256.83	52.61	82.25	67.69	14.56	5.648	
2,000.00	1,975.68	1,994.11	1,964.86	7.79	7.89	74.85	279.94	56.81	89.09	73.64	15.45	5.768	
2,100.00	2,073.46	2,093.88	2,061.82	8.24	8.35	74.87	303.05	61.01	95.92	79.59	16.33	5.874	
2,200.00	2,171.25	2,193.64	2,158.79	8.68	8.82	74.89	326.16	65.21	102.76	85.54	17.22	5.968	
2,300.00	2,269.03	2,293.41	2,255.75	9.13	9.28	74.91	349.27	69.41	109.60	91.49	18.11	6.052	
2,400.00	2,366.82	2,393.17	2,352.71	9.58	9.75	74.93	372.38	73.61	116.43	97.43	19.00	6.127	
2,500.00	2,464.60	2,492.94	2,449.67	10.03	10.22	74.94	395.48	77.81	123.27	103.37	19.90	6.196	
2,600.00	2,562.38	2,592.71	2,546.63	10.48	10.69	74.95	418.59	82.01	130.10	109.31	20.79	6.258	
2,700.00	2,660.17	2,692.47	2,643.60	10.93	11.16	74.97	441.70	86.20	136.94	115.25	21.69	6.314	
2,800.00	2,757.95	2,792.24	2,740.56	11.38	11.63	74.98	464.81	90.40	143.77	121.19	22.59	6.366	
2,900.00	2,855.74	2,892.00	2,837.52	11.83	12.10	74.99	487.92	94.60	150.61	127.13	23.48	6.413	
3,000.00	2,953.52	2,991.77	2,934.48	12.29	12.58	74.99	511.03	98.80	157.45	133.06	24.38	6.457	
3,100.00	3,051.30	3,091.54	3,031.44	12.74	13.05	75.00	534.13	103.00	164.28	139.00	25.28	6.497	
3,200.00	3,149.09	3,191.30	3,128.41	13.19	13.52	75.01	557.24	107.20	171.12	144.93	26.19	6.535	
3,300.00	3,246.87	3,291.07	3,225.37	13.65	14.00	75.02	580.35	111.40	177.95	150.87	27.09	6.570	
3,400.00	3,344.66	3,390.83	3,322.33	14.10	14.47	75.02	603.46	115.60	184.79	156.80	27.99	6.602	
3,500.00	3,442.44	3,490.60	3,419.29	14.55	14.94	75.03	626.57	119.79	191.62	162.73	28.89	6.632	
3,600.00	3,540.22	3,590.37	3,516.25	15.01	15.42	75.03	649.68	123.99	198.46	168.66	29.80	6.661	
3,700.00	3,638.01	3,690.13	3,613.22	15.46	15.89	75.04	672.78	128.19	205.30	174.60	30.70	6.687	
3,800.00	3,735.79	3,789.90	3,710.18	15.91	16.37	75.04	695.89	132.39	212.13	180.53	31.60	6.712	
3,900.00	3,833.58	3,889.66	3,807.14	16.37	16.84	75.05	719.00	136.59	218.97	186.46	32.51	6.736	
4,000.00	3,931.36	3,989.43	3,904.10	16.82	17.32	75.05	742.11	140.79	225.80	192.39	33.41	6.758	
4,100.00	4,029.14	4,089.20	4,001.06	17.28	17.79	75.06	765.22	144.99	232.64	198.32	34.32	6.779	
4,200.00	4,126.93	4,188.96	4,098.03	17.73	18.27	75.06	788.33	149.19	239.48	204.25	35.23	6.798	
4,300.00	4,224.71	4,288.73	4,194.99	18.19	18.74	75.06	811.43	153.38	246.31	210.18	36.13	6.817	
4,400.00	4,322.50	4,388.50	4,291.95	18.64	19.22	75.07	834.54	157.58	253.15	216.11	37.04	6.835	
4,500.00	4,420.28	4,488.26	4,388.91	19.10	19.70	75.07	857.65	161.78	259.98	222.04	37.94	6.852	
4,600.00	4,518.06	4,588.03	4,485.88	19.55	20.17	75.07	880.76	165.98	266.82	227.97	38.85	6.868	
4,700.00	4,615.85	4,687.79	4,582.84	20.01	20.65	75.08	903.87	170.18	273.65	233.90	39.76	6.883	
4,800.00	4,713.63	4,787.56	4,679.80	20.46	21.13	75.08	926.98	174.38	280.49	239.83	40.66	6.898	
4,900.00	4,811.42	4,887.33	4,776.76	20.92	21.60	75.08	950.08	178.58	287.33	245.76	41.57	6.912	
5,000.00	4,909.20	4,987.09	4,873.72	21.38	22.08	75.08	973.19	182.78	294.16	251.68	42.48	6.925	
5,100.00	5,006.98	5,086.86	4,970.69	21.83	22.56	75.09	996.30	186.97	301.00	257.61	43.39	6.938	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 830H - OH - Plan #2												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,200.00	5,104.77	5,186.62	5,067.65	22.29	23.03	75.09	1,019.41	191.17	307.83	263.54	44.29	6.950	
5,300.00	5,202.55	5,286.39	5,164.61	22.74	23.51	75.09	1,042.52	195.37	314.67	269.47	45.20	6.962	
5,400.00	5,300.34	5,386.16	5,261.57	23.20	23.99	75.09	1,065.63	199.57	321.51	275.40	46.11	6.973	
5,500.00	5,398.12	5,485.92	5,358.53	23.66	24.46	75.10	1,088.73	203.77	328.34	281.33	47.02	6.984	
5,600.00	5,495.90	5,585.69	5,455.50	24.11	24.94	75.10	1,111.84	207.97	335.18	287.25	47.92	6.994	
5,700.00	5,593.69	5,685.45	5,552.46	24.57	25.42	75.10	1,134.95	212.17	342.01	293.18	48.83	7.004	
5,800.00	5,691.47	5,785.22	5,649.42	25.02	25.89	75.10	1,158.06	216.37	348.85	299.11	49.74	7.013	
5,900.00	5,789.26	5,884.99	5,746.38	25.48	26.37	75.10	1,181.17	220.56	355.68	305.04	50.65	7.023	
6,000.00	5,887.04	5,984.75	5,843.34	25.94	26.85	75.10	1,204.28	224.76	362.52	310.96	51.56	7.031	
6,100.00	5,984.83	6,084.52	5,940.31	26.39	27.33	75.11	1,227.38	228.96	369.36	316.89	52.47	7.040	
6,200.00	6,082.61	6,184.28	6,037.27	26.85	27.80	75.11	1,250.49	233.16	376.19	322.82	53.37	7.048	
6,300.00	6,180.39	6,284.05	6,134.23	27.30	28.28	75.11	1,273.60	237.36	383.03	328.75	54.28	7.056	
6,400.00	6,278.18	6,383.82	6,231.19	27.76	28.76	75.11	1,296.71	241.56	389.86	334.67	55.19	7.064	
6,500.00	6,375.96	6,483.58	6,328.15	28.22	29.24	75.11	1,319.82	245.76	396.70	340.60	56.10	7.071	
6,600.00	6,473.75	6,583.35	6,425.12	28.67	29.71	75.11	1,342.93	249.96	403.54	346.53	57.01	7.078	
6,663.67	6,536.00	6,646.87	6,486.85	28.96	30.02	75.11	1,357.64	252.63	407.89	350.30	57.59	7.083	
6,700.00	6,571.53	6,683.16	6,522.12	29.13	30.19	59.85	1,366.04	254.16	409.41	351.49	57.91	7.070	
6,750.00	6,620.29	6,722.14	6,627.92	29.35	30.70	39.99	1,391.42	250.90	405.35	347.02	58.33	6.949	
6,800.00	6,668.62	6,902.49	6,732.83	29.56	31.16	22.69	1,416.99	228.83	389.73	332.34	57.39	6.790	
6,850.00	6,716.22	6,992.62	6,814.68	29.76	31.49	7.24	1,437.25	197.18	364.75	309.05	55.71	6.548	
6,900.00	6,762.80	7,061.22	6,873.56	29.95	31.72	-7.86	1,452.01	165.30	333.32	279.30	54.03	6.170	
6,950.00	6,808.07	7,111.01	6,914.00	30.13	31.87	-23.35	1,462.27	138.16	298.18	245.38	52.80	5.648	
7,000.00	6,851.75	7,145.76	6,940.94	30.30	31.97	-38.64	1,469.15	117.33	261.80	209.61	52.20	5.016	
7,050.00	6,893.57	7,168.94	6,958.28	30.45	32.03	-52.12	1,473.61	102.60	226.67	174.39	52.29	4.335	
7,100.00	6,933.27	7,183.31	6,968.76	30.60	32.07	-62.37	1,476.32	93.15	195.71	142.70	53.01	3.692	
7,150.00	6,970.61	7,190.94	6,974.23	30.74	32.09	-68.96	1,477.74	88.03	172.71	118.61	54.10	3.193	
7,200.00	7,005.36	7,193.37	6,975.96	30.87	32.10	-72.08	1,478.19	86.39	161.92	107.06	54.86	2.951	
7,211.45	7,012.94	7,193.31	6,975.93	30.89	32.10	-72.35	1,478.18	86.42	161.52	106.60	54.92	2.941 SF	
7,250.00	7,037.31	7,191.73	6,974.80	30.99	32.10	-72.15	1,477.89	87.49	166.01	111.31	54.70	3.035	
7,300.00	7,066.25	7,186.88	6,971.33	31.11	32.08	-69.53	1,476.99	90.76	183.88	130.01	53.87	3.413	
7,350.00	7,092.02	7,179.45	6,965.96	31.22	32.06	-64.63	1,475.60	95.71	211.74	158.67	53.07	3.990	
7,400.00	7,114.44	7,169.93	6,959.01	31.34	32.04	-58.03	1,473.80	101.96	245.79	193.15	52.64	4.669	
7,450.00	7,133.38	7,158.70	6,950.69	31.47	32.01	-50.44	1,471.66	109.19	283.34	230.77	52.57	5.390	
7,500.00	7,148.73	7,150.00	6,944.15	31.61	31.98	-43.58	1,469.98	114.68	322.71	269.56	53.14	6.073	
7,550.00	7,160.40	7,132.22	6,930.58	31.78	31.93	-35.38	1,466.50	125.63	362.72	309.56	53.16	6.823	
7,600.00	7,168.30	7,117.38	6,919.03	31.98	31.89	-28.94	1,463.55	134.45	402.80	349.12	53.68	7.504	
7,650.00	7,172.38	7,100.00	6,905.24	32.23	31.84	-23.28	1,460.04	144.44	442.45	388.29	54.16	8.170	
7,678.56	7,173.00	7,100.00	6,905.24	32.39	31.84	-21.45	1,460.04	144.44	464.86	409.73	55.13	8.432	
7,700.00	7,172.99	7,085.47	6,893.52	32.53	31.80	-20.10	1,457.06	152.49	481.51	426.60	54.91	8.769	
7,800.00	7,172.95	7,050.00	6,864.16	33.31	31.69	-17.09	1,449.64	170.96	562.12	506.36	55.76	10.081	
7,900.00	7,172.92	7,030.41	6,847.53	34.32	31.62	-15.60	1,445.46	180.43	645.91	588.87	57.04	11.324	
8,000.00	7,172.88	7,000.00	6,821.17	35.53	31.52	-13.48	1,438.87	194.07	732.37	674.85	57.52	12.732	
8,100.00	7,172.84	7,000.00	6,821.17	36.89	31.52	-13.48	1,438.87	194.07	820.80	761.95	58.85	13.948	
8,200.00	7,172.80	6,971.67	6,796.06	38.39	31.42	-11.71	1,432.61	205.60	910.56	851.53	59.03	15.426	
8,300.00	7,172.77	6,950.00	6,776.53	39.99	31.34	-10.48	1,427.77	213.63	1,001.83	942.51	59.32	16.889	
8,400.00	7,172.73	6,950.00	6,776.53	41.68	31.34	-10.48	1,427.77	213.63	1,094.11	1,034.08	60.02	18.228	
8,500.00	7,172.69	6,930.80	6,759.00	43.45	31.27	-9.47	1,423.44	220.18	1,187.19	1,127.01	60.18	19.726	
8,600.00	7,172.65	6,919.86	6,748.93	45.29	31.23	-8.92	1,420.96	223.66	1,281.08	1,220.62	60.46	21.189	
8,700.00	7,172.61	6,900.00	6,730.51	47.18	31.15	-7.99	1,416.42	229.53	1,375.71	1,315.18	60.52	22.731	
8,800.00	7,172.58	6,900.00	6,730.51	49.12	31.15	-7.99	1,416.42	229.53	1,470.64	1,409.75	60.89	24.154	
8,900.00	7,172.54	6,900.00	6,730.51	51.11	31.15	-7.99	1,416.42	229.53	1,566.21	1,505.02	61.19	25.596	
9,000.00	7,172.50	6,900.00	6,730.51	53.13	31.15	-7.99	1,416.42	229.53	1,662.29	1,600.85	61.45	27.053	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 830H - OH - Plan #2												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
9,100.00	7,172.46	6,878.28	6,710.17	55.19	31.06	-7.04	1,411.43	235.26	1,758.31	1,696.93	61.38	28.647	
9,200.00	7,172.42	6,871.90	6,704.16	57.28	31.04	-6.77	1,409.96	236.81	1,854.88	1,793.37	61.50	30.158	
9,300.00	7,172.39	6,850.00	6,683.41	59.39	30.95	-5.90	1,404.90	241.66	1,951.98	1,890.55	61.43	31.778	
9,400.00	7,172.35	6,850.00	6,683.41	61.53	30.95	-5.90	1,404.90	241.66	2,048.90	1,987.30	61.60	33.261	
9,500.00	7,172.31	6,850.00	6,683.41	63.70	30.95	-5.90	1,404.90	241.66	2,146.11	2,084.35	61.75	34.752	
9,600.00	7,172.27	6,850.00	6,683.41	65.88	30.95	-5.90	1,404.90	241.66	2,243.56	2,181.66	61.89	36.249	
9,700.00	7,172.24	6,850.00	6,683.41	68.08	30.95	-5.90	1,404.90	241.66	2,341.22	2,279.20	62.02	37.751	
9,800.00	7,172.20	6,850.00	6,683.41	70.29	30.95	-5.90	1,404.90	241.66	2,439.08	2,376.95	62.13	39.257	
9,900.00	7,172.16	6,850.00	6,683.41	72.52	30.95	-5.90	1,404.90	241.66	2,537.10	2,474.86	62.23	40.767	
10,000.00	7,172.12	6,850.00	6,683.41	74.76	30.95	-5.90	1,404.90	241.66	2,635.27	2,572.94	62.33	42.280	
10,100.00	7,172.08	6,850.00	6,683.41	77.02	30.95	-5.90	1,404.90	241.66	2,733.57	2,671.16	62.42	43.795	
10,200.00	7,172.05	6,827.87	6,662.29	79.28	30.85	-5.09	1,399.76	245.80	2,831.52	2,769.22	62.31	45.445	
10,300.00	7,172.01	6,824.80	6,659.35	81.56	30.84	-4.98	1,399.04	246.32	2,929.92	2,867.55	62.36	46.982	
10,400.00	7,171.97	6,821.90	6,656.56	83.84	30.83	-4.88	1,398.36	246.79	3,028.40	2,965.98	62.42	48.519	
10,500.00	7,171.93	6,800.00	6,635.51	86.13	30.73	-4.15	1,393.26	249.94	3,127.31	3,065.00	62.31	50.188	
10,600.00	7,171.90	6,800.00	6,635.51	88.43	30.73	-4.15	1,393.26	249.94	3,225.86	3,163.47	62.39	51.708	
10,700.00	7,171.86	6,800.00	6,635.51	90.74	30.73	-4.15	1,393.26	249.94	3,324.49	3,262.04	62.46	53.228	
10,800.00	7,171.82	6,800.00	6,635.51	93.05	30.73	-4.15	1,393.26	249.94	3,423.21	3,360.68	62.53	54.749	
10,900.00	7,171.78	6,800.00	6,635.51	95.37	30.73	-4.15	1,393.26	249.94	3,522.00	3,459.41	62.59	56.270	
11,000.00	7,171.74	6,800.00	6,635.51	97.70	30.73	-4.15	1,393.26	249.94	3,620.85	3,558.20	62.65	57.790	
11,100.00	7,171.71	6,800.00	6,635.51	100.03	30.73	-4.15	1,393.26	249.94	3,719.77	3,657.05	62.72	59.311	
11,200.00	7,171.67	6,800.00	6,635.51	102.37	30.73	-4.15	1,393.26	249.94	3,818.74	3,755.96	62.78	60.831	
11,300.00	7,171.63	6,800.00	6,635.51	104.71	30.73	-4.15	1,393.26	249.94	3,917.76	3,854.93	62.83	62.351	
11,400.00	7,171.59	6,800.00	6,635.51	107.06	30.73	-4.15	1,393.26	249.94	4,016.84	3,953.95	62.89	63.869	
11,500.00	7,171.56	6,800.00	6,635.51	109.40	30.73	-4.15	1,393.26	249.94	4,115.95	4,053.01	62.95	65.387	
11,600.00	7,171.52	6,800.00	6,635.51	111.76	30.73	-4.15	1,393.26	249.94	4,215.11	4,152.11	63.00	66.903	
11,700.00	7,171.48	6,800.00	6,635.51	114.12	30.73	-4.15	1,393.26	249.94	4,314.31	4,251.25	63.06	68.419	
11,800.00	7,171.44	6,800.00	6,635.51	116.48	30.73	-4.15	1,393.26	249.94	4,413.55	4,350.43	63.11	69.933	
11,900.00	7,171.40	6,800.00	6,635.51	118.84	30.73	-4.15	1,393.26	249.94	4,512.81	4,449.65	63.16	71.445	
12,000.00	7,171.37	6,800.00	6,635.51	121.20	30.73	-4.15	1,393.26	249.94	4,612.11	4,548.90	63.22	72.956	
12,100.00	7,171.33	6,800.00	6,635.51	123.57	30.73	-4.15	1,393.26	249.94	4,711.44	4,648.17	63.27	74.465	
12,200.00	7,171.29	6,800.00	6,635.51	125.95	30.73	-4.15	1,393.26	249.94	4,810.80	4,747.48	63.32	75.973	
12,300.00	7,171.25	6,800.00	6,635.51	128.32	30.73	-4.15	1,393.26	249.94	4,910.18	4,846.81	63.37	77.478	
12,400.00	7,171.22	6,800.00	6,635.51	130.70	30.73	-4.15	1,393.26	249.94	5,009.59	4,946.16	63.43	78.982	
12,500.00	7,171.18	6,800.00	6,635.51	133.07	30.73	-4.15	1,393.26	249.94	5,109.02	5,045.54	63.48	80.483	
12,600.00	7,171.14	6,800.00	6,635.51	135.46	30.73	-4.15	1,393.26	249.94	5,208.47	5,144.94	63.53	81.983	
12,700.00	7,171.10	6,800.00	6,635.51	137.84	30.73	-4.15	1,393.26	249.94	5,307.95	5,244.36	63.58	83.480	
12,800.00	7,171.06	6,800.00	6,635.51	140.22	30.73	-4.15	1,393.26	249.94	5,407.44	5,343.80	63.64	84.975	
12,900.00	7,171.03	6,800.00	6,635.51	142.61	30.73	-4.15	1,393.26	249.94	5,506.95	5,443.26	63.69	86.467	
13,000.00	7,170.99	6,800.00	6,635.51	145.00	30.73	-4.15	1,393.26	249.94	5,606.48	5,542.74	63.74	87.958	
13,100.00	7,170.95	6,800.00	6,635.51	147.39	30.73	-4.15	1,393.26	249.94	5,706.02	5,642.23	63.79	89.445	
13,200.00	7,170.91	6,776.86	6,613.15	149.78	30.63	-3.44	1,387.86	252.47	5,805.12	5,741.41	63.70	91.128	
13,300.00	7,170.87	6,775.96	6,612.28	152.17	30.62	-3.41	1,387.65	252.55	5,904.66	5,840.91	63.75	92.620	
13,400.00	7,170.84	6,775.09	6,611.43	154.57	30.62	-3.39	1,387.44	252.62	6,004.21	5,940.41	63.80	94.109	
13,500.00	7,170.80	6,774.24	6,610.61	156.96	30.62	-3.36	1,387.25	252.70	6,103.78	6,039.93	63.85	95.596	
13,600.00	7,170.76	6,773.42	6,609.82	159.36	30.61	-3.34	1,387.05	252.77	6,203.36	6,139.46	63.90	97.079	
13,700.00	7,170.72	6,750.00	6,587.10	161.76	30.51	-2.68	1,381.59	254.34	6,303.39	6,239.58	63.81	98.777	
13,800.00	7,170.69	6,750.00	6,587.10	164.16	30.51	-2.68	1,381.59	254.34	6,402.96	6,339.09	63.87	100.249	
13,900.00	7,170.65	6,750.00	6,587.10	166.56	30.51	-2.68	1,381.59	254.34	6,502.55	6,438.62	63.93	101.718	
14,000.00	7,170.61	6,750.00	6,587.10	168.96	30.51	-2.68	1,381.59	254.34	6,602.15	6,538.16	63.98	103.185	
14,100.00	7,170.57	6,750.00	6,587.10	171.36	30.51	-2.68	1,381.59	254.34	6,701.76	6,637.72	64.04	104.648	
14,200.00	7,170.53	6,750.00	6,587.10	173.76	30.51	-2.68	1,381.59	254.34	6,801.38	6,737.28	64.10	106.108	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 830H - OH - Plan #2												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
14,300.00	7,170.50	6,750.00	6,587.10	176.17	30.51	-2.68	1,381.59	254.34	6,901.01	6,836.86	64.16	107.565	
14,400.00	7,170.46	6,750.00	6,587.10	178.57	30.51	-2.68	1,381.59	254.34	7,000.66	6,936.44	64.21	109.020	
14,500.00	7,170.42	6,750.00	6,587.10	180.98	30.51	-2.68	1,381.59	254.34	7,100.31	7,036.03	64.27	110.470	
14,600.00	7,170.38	6,750.00	6,587.10	183.39	30.51	-2.68	1,381.59	254.34	7,199.97	7,135.64	64.33	111.918	
14,700.00	7,170.35	6,750.00	6,587.10	185.80	30.51	-2.68	1,381.59	254.34	7,299.64	7,235.25	64.39	113.363	
14,800.00	7,170.31	6,750.00	6,587.10	188.20	30.51	-2.68	1,381.59	254.34	7,399.32	7,334.87	64.45	114.804	
14,900.00	7,170.27	6,750.00	6,587.10	190.61	30.51	-2.68	1,381.59	254.34	7,499.01	7,434.50	64.51	116.241	
15,000.00	7,170.23	6,750.00	6,587.10	193.02	30.51	-2.68	1,381.59	254.34	7,598.71	7,534.14	64.57	117.676	
15,100.00	7,170.19	6,750.00	6,587.10	195.43	30.51	-2.68	1,381.59	254.34	7,698.42	7,633.78	64.63	119.107	
15,200.00	7,170.16	6,750.00	6,587.10	197.85	30.51	-2.68	1,381.59	254.34	7,798.13	7,733.43	64.70	120.535	
15,300.00	7,170.12	6,750.00	6,587.10	200.26	30.51	-2.68	1,381.59	254.34	7,897.85	7,833.09	64.76	121.959	
15,400.00	7,170.08	6,750.00	6,587.10	202.67	30.51	-2.68	1,381.59	254.34	7,997.58	7,932.76	64.82	123.379	
15,500.00	7,170.04	6,750.00	6,587.10	205.08	30.51	-2.68	1,381.59	254.34	8,097.31	8,032.43	64.88	124.796	
15,600.00	7,170.01	6,750.00	6,587.10	207.50	30.51	-2.68	1,381.59	254.34	8,197.05	8,132.10	64.95	126.210	
15,700.00	7,169.97	6,750.00	6,587.10	209.91	30.51	-2.68	1,381.59	254.34	8,296.80	8,231.79	65.01	127.620	
15,800.00	7,169.93	6,750.00	6,587.10	212.33	30.51	-2.68	1,381.59	254.34	8,396.55	8,331.47	65.08	129.026	
15,900.00	7,169.89	6,750.00	6,587.10	214.74	30.51	-2.68	1,381.59	254.34	8,496.31	8,431.17	65.14	130.429	
16,000.00	7,169.85	6,750.00	6,587.10	217.16	30.51	-2.68	1,381.59	254.34	8,596.07	8,530.87	65.21	131.827	
16,100.00	7,169.82	6,750.00	6,587.10	219.58	30.51	-2.68	1,381.59	254.34	8,695.84	8,630.57	65.27	133.223	
16,200.00	7,169.78	6,750.00	6,587.10	221.99	30.51	-2.68	1,381.59	254.34	8,795.62	8,730.28	65.34	134.614	
16,300.00	7,169.74	6,750.00	6,587.10	224.41	30.51	-2.68	1,381.59	254.34	8,895.40	8,829.99	65.41	136.002	
16,400.00	7,169.70	6,750.00	6,587.10	226.83	30.51	-2.68	1,381.59	254.34	8,995.18	8,929.71	65.47	137.386	
16,500.00	7,169.67	6,750.00	6,587.10	229.25	30.51	-2.68	1,381.59	254.34	9,094.97	9,029.43	65.54	138.766	
16,600.00	7,169.63	6,750.00	6,587.10	231.66	30.51	-2.68	1,381.59	254.34	9,194.77	9,129.16	65.61	140.142	
16,700.00	7,169.59	6,750.00	6,587.10	234.08	30.51	-2.68	1,381.59	254.34	9,294.56	9,228.88	65.68	141.515	
16,800.00	7,169.55	6,750.00	6,587.10	236.50	30.51	-2.68	1,381.59	254.34	9,394.37	9,328.62	65.75	142.883	
16,900.00	7,169.51	6,750.00	6,587.10	238.92	30.51	-2.68	1,381.59	254.34	9,494.17	9,428.36	65.82	144.248	
17,000.00	7,169.48	6,750.00	6,587.10	241.34	30.51	-2.68	1,381.59	254.34	9,593.98	9,528.10	65.89	145.609	
17,100.00	7,169.44	6,750.00	6,587.10	243.76	30.51	-2.68	1,381.59	254.34	9,693.80	9,627.84	65.96	146.965	
17,200.00	7,169.40	6,750.00	6,587.10	246.18	30.51	-2.68	1,381.59	254.34	9,793.62	9,727.59	66.03	148.318	
17,300.00	7,169.36	6,750.00	6,587.10	248.61	30.51	-2.68	1,381.59	254.34	9,893.44	9,827.34	66.10	149.667	
17,400.00	7,169.32	6,750.00	6,587.10	251.03	30.51	-2.68	1,381.59	254.34	9,993.27	9,927.09	66.18	151.012	
17,500.00	7,169.29	6,750.00	6,587.10	253.45	30.51	-2.68	1,381.59	254.34	10,093.10	10,026.85	66.25	152.353	
17,600.00	7,169.25	6,750.00	6,587.10	255.87	30.51	-2.68	1,381.59	254.34	10,192.93	10,126.61	66.32	153.690	
17,700.00	7,169.21	6,750.00	6,587.10	258.29	30.51	-2.68	1,381.59	254.34	10,292.76	10,226.37	66.40	155.023	
17,800.00	7,169.17	6,750.00	6,587.10	260.72	30.51	-2.68	1,381.59	254.34	10,392.60	10,326.13	66.47	156.352	
17,900.00	7,169.14	6,750.00	6,587.10	263.14	30.51	-2.68	1,381.59	254.34	10,492.45	10,425.90	66.54	157.677	
18,000.00	7,169.10	6,750.00	6,587.10	265.56	30.51	-2.68	1,381.59	254.34	10,592.29	10,525.67	66.62	158.997	
18,100.00	7,169.06	6,750.00	6,587.10	267.99	30.51	-2.68	1,381.59	254.34	10,692.14	10,625.44	66.70	160.314	
18,200.00	7,169.02	6,750.00	6,587.10	270.41	30.51	-2.68	1,381.59	254.34	10,791.99	10,725.22	66.77	161.626	
18,300.00	7,168.98	6,750.00	6,587.10	272.84	30.51	-2.68	1,381.59	254.34	10,891.84	10,824.99	66.85	162.935	
18,400.00	7,168.95	6,750.00	6,587.10	275.26	30.51	-2.68	1,381.59	254.34	10,991.70	10,924.77	66.92	164.239	
18,500.00	7,168.91	6,750.00	6,587.10	277.68	30.51	-2.68	1,381.59	254.34	11,091.56	11,024.55	67.00	165.539	
18,600.00	7,168.87	6,750.00	6,587.10	280.11	30.51	-2.68	1,381.59	254.34	11,191.42	11,124.34	67.08	166.835	
18,700.00	7,168.83	6,750.00	6,587.10	282.53	30.51	-2.68	1,381.59	254.34	11,291.28	11,224.12	67.16	168.127	
18,800.00	7,168.80	6,750.00	6,587.10	284.96	30.51	-2.68	1,381.59	254.34	11,391.15	11,323.91	67.24	169.415	
18,900.00	7,168.76	6,750.00	6,587.10	287.38	30.51	-2.68	1,381.59	254.34	11,491.02	11,423.70	67.32	170.699	
19,000.00	7,168.72	6,750.00	6,587.10	289.81	30.51	-2.68	1,381.59	254.34	11,590.89	11,523.49	67.40	171.978	
19,100.00	7,168.68	6,750.00	6,587.10	292.24	30.51	-2.68	1,381.59	254.34	11,690.76	11,623.28	67.48	173.253	
19,200.00	7,168.64	6,750.00	6,587.10	294.66	30.51	-2.68	1,381.59	254.34	11,790.64	11,723.08	67.56	174.525	
19,300.00	7,168.61	6,750.00	6,587.10	297.09	30.51	-2.68	1,381.59	254.34	11,890.51	11,822.87	67.64	175.791	
19,400.00	7,168.57	6,750.00	6,587.10	299.52	30.51	-2.68	1,381.59	254.34	11,990.39	11,922.67	67.72	177.054	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 830H - OH - Plan #2												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,500.00	7,168.53	6,750.00	6,587.10	301.94	30.51	-2.68	1,381.59	254.34	12,090.27	12,022.47	67.80	178.313	
19,600.00	7,168.49	6,750.00	6,587.10	304.37	30.51	-2.68	1,381.59	254.34	12,190.16	12,122.27	67.89	179.567	
19,700.00	7,168.46	6,750.00	6,587.10	306.80	30.51	-2.68	1,381.59	254.34	12,290.04	12,222.07	67.97	180.817	
19,800.00	7,168.42	6,750.00	6,587.10	309.22	30.51	-2.68	1,381.59	254.34	12,389.93	12,321.88	68.05	182.063	
19,900.00	7,168.38	6,750.00	6,587.10	311.65	30.51	-2.68	1,381.59	254.34	12,489.82	12,421.68	68.14	183.305	
20,000.00	7,168.34	6,750.00	6,587.10	314.08	30.51	-2.68	1,381.59	254.34	12,589.71	12,521.49	68.22	184.542	
20,100.00	7,168.30	6,750.00	6,587.10	316.51	30.51	-2.68	1,381.59	254.34	12,689.60	12,621.29	68.31	185.775	
20,200.00	7,168.27	6,750.00	6,587.10	318.93	30.51	-2.68	1,381.59	254.34	12,789.49	12,721.10	68.39	187.004	
20,300.00	7,168.23	6,750.00	6,587.10	321.36	30.51	-2.68	1,381.59	254.34	12,889.39	12,820.91	68.48	188.229	
20,400.00	7,168.19	6,750.00	6,587.10	323.79	30.51	-2.68	1,381.59	254.34	12,989.29	12,920.72	68.56	189.450	
20,500.00	7,168.15	6,750.00	6,587.10	326.22	30.51	-2.68	1,381.59	254.34	13,089.19	13,020.54	68.65	190.666	
20,600.00	7,168.11	6,750.00	6,587.10	328.65	30.51	-2.68	1,381.59	254.34	13,189.09	13,120.35	68.74	191.878	
20,700.00	7,168.08	6,750.00	6,587.10	331.07	30.51	-2.68	1,381.59	254.34	13,288.99	13,220.16	68.82	193.086	
20,768.77	7,168.05	6,750.00	6,587.10	332.74	30.51	-2.68	1,381.59	254.34	13,357.69	13,288.80	68.88	193.914	
20,800.00	7,168.04	6,750.00	6,587.10	333.50	30.51	-2.68	1,381.59	254.34	13,388.89	13,319.98	68.91	194.289	
20,903.75	7,168.00	6,750.00	6,587.10	336.02	30.51	-2.68	1,381.59	254.34	13,492.54	13,423.54	69.00	195.534	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 834H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-145.16	-24.79	-17.26	30.21				
100.00	100.00	100.00	100.00	0.25	0.25	-145.16	-24.79	-17.26	30.21	29.71	0.50	60.195	
200.00	200.00	200.00	200.00	0.61	0.61	-145.16	-24.79	-17.26	30.21	28.99	1.22	24.786	
300.00	300.00	300.00	300.00	0.97	0.97	-145.16	-24.79	-17.26	30.21	28.27	1.94	15.606	
400.00	400.00	400.00	400.00	1.33	1.33	-145.16	-24.79	-17.26	30.21	27.56	2.65	11.388	
500.00	500.00	500.00	500.00	1.68	1.68	-145.16	-24.79	-17.26	30.21	26.84	3.37	8.965 CC, ES	
600.00	599.98	598.87	598.85	2.04	2.02	-141.65	-26.36	-17.93	33.25	29.19	4.07	8.175	
700.00	699.84	697.07	696.91	2.41	2.35	-146.95	-31.02	-19.93	42.64	37.88	4.76	8.962	
800.00	799.45	793.96	793.44	2.77	2.69	-151.89	-38.64	-23.21	58.68	53.24	5.45	10.771	
900.00	898.70	888.93	887.74	3.13	3.03	-155.46	-49.01	-27.66	81.37	75.24	6.13	13.270	
1,000.00	997.47	981.42	979.16	3.51	3.37	-157.83	-61.87	-33.19	110.51	103.71	6.80	16.243	
1,104.22	1,099.75	1,075.02	1,071.17	3.92	3.74	-159.43	-77.63	-39.95	147.45	139.96	7.49	19.687	
1,200.00	1,193.41	1,163.41	1,157.83	4.32	4.10	-160.65	-93.60	-46.81	184.20	176.06	8.15	22.606	
1,300.00	1,291.19	1,255.69	1,248.31	4.74	4.48	-161.50	-110.28	-53.98	222.63	213.80	8.83	25.221	
1,400.00	1,388.98	1,347.97	1,338.79	5.16	4.87	-162.10	-126.96	-61.14	261.08	251.57	9.52	27.432	
1,500.00	1,486.76	1,440.25	1,429.27	5.59	5.27	-162.54	-143.63	-68.30	299.55	289.34	10.21	29.334	
1,600.00	1,584.54	1,532.53	1,519.75	6.03	5.67	-162.88	-160.31	-75.46	338.04	327.13	10.91	30.983	
1,700.00	1,682.33	1,624.82	1,610.23	6.47	6.07	-163.16	-176.99	-82.63	376.53	364.92	11.61	32.426	
1,800.00	1,780.11	1,717.10	1,700.71	6.91	6.48	-163.38	-193.66	-89.79	415.03	402.71	12.32	33.697	
1,900.00	1,877.90	1,809.38	1,791.18	7.35	6.89	-163.56	-210.34	-96.95	453.53	440.51	13.02	34.824	
2,000.00	1,975.68	1,901.66	1,881.66	7.79	7.30	-163.72	-227.02	-104.11	492.04	478.30	13.73	35.831	
2,100.00	2,073.46	1,993.94	1,972.14	8.24	7.71	-163.85	-243.69	-111.28	530.54	516.10	14.44	36.734	
2,200.00	2,171.25	2,086.22	2,062.62	8.68	8.12	-163.97	-260.37	-118.44	569.05	553.90	15.16	37.549	
2,300.00	2,269.03	2,178.51	2,153.10	9.13	8.53	-164.07	-277.04	-125.60	607.57	591.70	15.87	38.288	
2,400.00	2,366.82	2,270.79	2,243.58	9.58	8.95	-164.16	-293.72	-132.76	646.08	629.50	16.58	38.960	
2,500.00	2,464.60	2,363.07	2,334.06	10.03	9.36	-164.24	-310.40	-139.93	684.60	667.30	17.30	39.575	
2,600.00	2,562.38	2,455.35	2,424.54	10.48	9.78	-164.31	-327.07	-147.09	723.11	705.10	18.02	40.139	
2,700.00	2,660.17	2,547.63	2,515.02	10.93	10.20	-164.37	-343.75	-154.25	761.63	742.90	18.73	40.658	
2,800.00	2,757.95	2,639.91	2,605.50	11.38	10.61	-164.43	-360.43	-161.41	800.14	780.69	19.45	41.138	
2,900.00	2,855.74	2,732.20	2,696.98	11.83	11.03	-164.48	-377.10	-168.57	838.66	818.49	20.17	41.582	
3,000.00	2,953.52	2,824.48	2,786.46	12.29	11.45	-164.53	-393.78	-175.74	877.18	856.29	20.89	41.994	
3,100.00	3,051.30	2,916.76	2,876.94	12.74	11.87	-164.57	-410.46	-182.90	915.70	894.09	21.61	42.377	
3,200.00	3,149.09	3,009.04	2,967.42	13.19	12.29	-164.61	-427.13	-190.06	954.22	931.89	22.33	42.735	
3,300.00	3,246.87	3,101.32	3,057.89	13.65	12.71	-164.65	-443.81	-197.22	992.74	969.69	23.05	43.070	
3,400.00	3,344.66	3,193.60	3,148.37	14.10	13.13	-164.68	-460.49	-204.39	1,031.26	1,007.49	23.77	43.383	
3,500.00	3,442.44	3,285.89	3,238.85	14.55	13.55	-164.71	-477.16	-211.55	1,069.78	1,045.29	24.49	43.678	
3,600.00	3,540.22	3,378.17	3,329.33	15.01	13.97	-164.74	-493.84	-218.71	1,108.30	1,083.08	25.21	43.954	
3,700.00	3,638.01	3,470.45	3,419.81	15.46	14.39	-164.77	-510.51	-225.87	1,146.82	1,120.88	25.94	44.215	
3,800.00	3,735.79	3,562.73	3,510.29	15.91	14.81	-164.79	-527.19	-233.04	1,185.34	1,158.68	26.66	44.461	
3,900.00	3,833.58	3,655.01	3,600.77	16.37	15.23	-164.82	-543.87	-240.20	1,223.86	1,196.48	27.38	44.694	
4,000.00	3,931.36	3,747.29	3,691.25	16.82	15.65	-164.84	-560.54	-247.36	1,262.38	1,234.28	28.11	44.914	
4,100.00	4,029.14	3,839.58	3,781.73	17.28	16.07	-164.86	-577.22	-254.52	1,300.91	1,272.07	28.83	45.123	
4,200.00	4,126.93	3,931.86	3,872.21	17.73	16.49	-164.88	-593.90	-261.69	1,339.43	1,309.87	29.55	45.320	
4,300.00	4,224.71	4,024.14	3,962.69	18.19	16.91	-164.90	-610.57	-268.85	1,377.95	1,347.67	30.28	45.508	
4,400.00	4,322.50	4,116.42	4,053.17	18.64	17.33	-164.92	-627.25	-276.01	1,416.47	1,385.47	31.00	45.687	
4,500.00	4,420.28	4,208.70	4,143.65	19.10	17.76	-164.94	-643.93	-283.17	1,454.99	1,423.26	31.73	45.858	
4,600.00	4,518.06	4,300.98	4,234.13	19.55	18.18	-164.95	-660.60	-290.34	1,493.51	1,461.06	32.45	46.020	
4,700.00	4,615.85	4,393.27	4,324.60	20.01	18.60	-164.97	-677.28	-297.50	1,532.04	1,498.86	33.18	46.175	
4,800.00	4,713.63	4,485.55	4,415.08	20.46	19.02	-164.98	-693.96	-304.66	1,570.56	1,536.65	33.90	46.323	
4,900.00	4,811.42	4,577.83	4,505.56	20.92	19.44	-164.99	-710.63	-311.82	1,609.08	1,574.45	34.63	46.464	
5,000.00	4,909.20	4,670.11	4,596.04	21.38	19.87	-165.01	-727.31	-318.99	1,647.60	1,612.25	35.36	46.599	
5,100.00	5,006.98	4,762.39	4,686.52	21.83	20.29	-165.02	-743.99	-326.15	1,686.13	1,650.04	36.08	46.729	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 834H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program:		0-B001Mb_MWD+HRGM						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor
5,200.00	5,104.77	4,854.67	4,777.00	22.29	20.71	-165.03	-760.66	-333.31	1,724.65	1,687.84	36.81	46.853	
5,300.00	5,202.55	4,946.96	4,867.48	22.74	21.13	-165.04	-777.34	-340.47	1,763.17	1,725.63	37.54	46.972	
5,400.00	5,300.34	5,039.24	4,957.96	23.20	21.55	-165.05	-794.01	-347.64	1,801.69	1,763.43	38.26	47.086	
5,500.00	5,398.12	5,131.52	5,048.44	23.66	21.98	-165.06	-810.69	-354.80	1,840.22	1,801.23	38.99	47.196	
5,600.00	5,495.90	5,223.80	5,138.92	24.11	22.40	-165.08	-827.37	-361.96	1,878.74	1,839.02	39.72	47.301	
5,700.00	5,593.69	5,316.08	5,229.40	24.57	22.82	-165.08	-844.04	-369.12	1,917.26	1,876.82	40.45	47.402	
5,800.00	5,691.47	5,408.36	5,319.88	25.02	23.24	-165.09	-860.72	-376.29	1,955.78	1,914.61	41.17	47.500	
5,900.00	5,789.26	5,500.65	5,410.36	25.48	23.67	-165.10	-877.40	-383.45	1,994.31	1,952.41	41.90	47.594	
6,000.00	5,887.04	5,592.93	5,500.84	25.94	24.09	-165.11	-894.07	-390.61	2,032.83	1,990.20	42.63	47.684	
6,100.00	5,984.83	5,685.21	5,591.31	26.39	24.51	-165.12	-910.75	-397.77	2,071.35	2,027.99	43.36	47.771	
6,200.00	6,082.61	5,777.49	5,681.79	26.85	24.93	-165.13	-927.43	-404.93	2,109.88	2,065.79	44.09	47.855	
6,300.00	6,180.39	5,869.77	5,772.27	27.30	25.36	-165.14	-944.10	-412.10	2,148.40	2,103.58	44.82	47.937	
6,400.00	6,278.18	5,962.05	5,862.75	27.76	25.78	-165.14	-960.78	-419.26	2,186.92	2,141.38	45.55	48.015	
6,500.00	6,375.96	6,054.34	5,953.23	28.22	26.20	-165.15	-977.46	-426.42	2,225.45	2,179.17	46.28	48.090	
6,600.00	6,473.75	6,146.62	6,043.71	28.67	26.62	-165.16	-994.13	-433.58	2,263.97	2,216.96	47.01	48.163	
6,663.67	6,536.00	6,205.37	6,101.32	28.96	26.89	-165.16	-1,004.75	-438.14	2,288.50	2,241.02	47.47	48.208	
6,700.00	6,571.53	6,238.82	6,134.12	29.13	27.05	178.23	-1,010.79	-440.74	2,302.63	2,254.90	47.73	48.239	
6,750.00	6,620.29	6,284.47	6,178.87	29.35	27.26	157.68	-1,019.04	-444.28	2,322.47	2,274.39	48.09	48.298	
6,800.00	6,668.62	6,329.41	6,222.94	29.56	27.46	142.00	-1,027.17	-447.77	2,342.68	2,294.25	48.43	48.376	
6,850.00	6,716.22	6,373.38	6,266.04	29.76	27.66	130.66	-1,035.11	-451.18	2,363.17	2,314.42	48.75	48.471	
6,900.00	6,762.80	6,416.08	6,307.91	29.95	27.86	122.34	-1,042.83	-454.50	2,383.87	2,334.80	49.07	48.584	
6,950.00	6,808.07	6,457.27	6,348.30	30.13	28.05	115.99	-1,050.27	-457.70	2,404.72	2,355.36	49.37	48.712	
7,000.00	6,851.75	6,496.69	6,386.95	30.30	28.23	110.95	-1,057.40	-460.76	2,425.68	2,376.03	49.65	48.856	
7,050.00	6,893.57	6,534.10	6,423.63	30.45	28.40	106.79	-1,064.15	-463.66	2,446.71	2,396.79	49.92	49.012	
7,100.00	6,933.27	6,569.26	6,458.10	30.60	28.56	103.26	-1,070.51	-466.39	2,467.77	2,417.59	50.18	49.180	
7,150.00	6,970.61	6,643.96	6,531.45	30.74	28.89	100.89	-1,084.06	-469.70	2,488.71	2,437.99	50.73	49.063	
7,200.00	7,005.36	6,806.02	6,688.79	30.87	29.48	100.09	-1,113.56	-447.45	2,508.32	2,456.57	51.75	48.471	
7,250.00	7,037.31	7,035.61	6,891.13	30.99	30.02	99.58	-1,152.49	-349.02	2,525.26	2,472.42	52.83	47.798	
7,300.00	7,066.25	7,282.96	7,055.13	31.11	30.27	98.12	-1,185.47	-169.04	2,537.90	2,483.95	53.94	47.046	
7,350.00	7,092.02	7,598.25	7,147.93	31.22	30.32	94.95	-1,206.93	128.03	2,545.66	2,489.38	56.28	45.230	
7,400.00	7,114.44	7,672.87	7,149.01	31.34	30.43	93.23	-1,208.19	202.62	2,550.47	2,493.20	57.27	44.532	
7,450.00	7,133.38	7,718.92	7,149.02	31.47	30.64	92.04	-1,208.85	248.66	2,554.73	2,496.67	58.07	43.997	
7,500.00	7,148.73	7,766.35	7,149.03	31.61	31.00	91.07	-1,209.53	296.09	2,558.38	2,499.44	58.95	43.402	
7,550.00	7,160.40	7,814.87	7,149.04	31.78	31.49	90.33	-1,210.23	344.60	2,561.33	2,501.43	59.90	42.762	
7,600.00	7,168.30	7,864.19	7,149.05	31.98	32.07	89.81	-1,210.93	393.91	2,563.50	2,502.56	60.94	42.065	
7,650.00	7,172.38	7,913.99	7,149.06	32.23	32.70	89.52	-1,211.65	443.71	2,564.86	2,502.81	62.04	41.339	
7,678.56	7,173.00	7,942.53	7,149.06	32.39	33.09	89.47	-1,212.06	472.25	2,565.25	2,502.53	62.72	40.902	
7,700.00	7,172.99	7,963.98	7,149.07	32.53	33.38	89.47	-1,212.36	493.69	2,565.44	2,502.21	63.23	40.574	
7,800.00	7,172.95	8,063.97	7,149.09	33.31	34.83	89.47	-1,213.80	593.68	2,566.34	2,500.55	65.79	39.009	
7,900.00	7,172.92	8,163.97	7,149.11	34.32	36.39	89.47	-1,215.23	693.67	2,567.23	2,498.63	68.60	37.423	
8,000.00	7,172.88	8,263.96	7,149.13	35.53	38.05	89.47	-1,216.66	793.65	2,568.13	2,496.49	71.63	35.850	
8,100.00	7,172.84	8,363.96	7,149.15	36.89	39.78	89.47	-1,218.09	893.64	2,569.03	2,494.16	74.87	34.315	
8,200.00	7,172.80	8,463.96	7,149.17	38.39	41.58	89.47	-1,219.53	993.62	2,569.92	2,491.65	78.27	32.835	
8,300.00	7,172.77	8,563.95	7,149.20	39.99	43.45	89.47	-1,220.96	1,093.61	2,570.82	2,489.00	81.82	31.421	
8,400.00	7,172.73	8,663.95	7,149.22	41.68	45.37	89.48	-1,222.39	1,193.59	2,571.71	2,486.21	85.50	30.077	
8,500.00	7,172.69	8,763.94	7,149.24	43.45	47.33	89.48	-1,223.83	1,293.58	2,572.61	2,483.31	89.30	28.808	
8,600.00	7,172.65	8,863.94	7,149.26	45.29	49.34	89.48	-1,225.26	1,393.57	2,573.50	2,480.30	93.20	27.612	
8,700.00	7,172.61	8,963.94	7,149.28	47.18	51.38	89.48	-1,226.69	1,493.55	2,574.40	2,477.21	97.19	26.488	
8,800.00	7,172.58	9,063.93	7,149.30	49.12	53.46	89.48	-1,228.12	1,593.54	2,575.30	2,474.04	101.26	25.433	
8,900.00	7,172.54	9,163.93	7,149.32	51.11	55.57	89.48	-1,229.56	1,693.52	2,576.19	2,470.79	105.40	24.443	
9,000.00	7,172.50	9,263.92	7,149.34	53.13	57.70	89.48	-1,230.99	1,793.51	2,577.09	2,467.49	109.59	23.515	
9,100.00	7,172.46	9,363.92	7,149.36	55.19	59.85	89.49	-1,232.42	1,893.49	2,577.98	2,464.14	113.85	22.644	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 834H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
9,200.00	7,172.42	9,463.92	7,149.38	57.28	62.03	89.49	-1,233.85	1,993.48	2,578.88	2,460.73	118.15	21.828	
9,300.00	7,172.39	9,563.91	7,149.41	59.39	64.22	89.49	-1,235.29	2,093.47	2,579.77	2,457.28	122.49	21.061	
9,400.00	7,172.35	9,663.91	7,149.43	61.53	66.43	89.49	-1,236.72	2,193.45	2,580.67	2,453.79	126.88	20.340	
9,500.00	7,172.31	9,763.90	7,149.45	63.70	68.66	89.49	-1,238.15	2,293.44	2,581.56	2,450.27	131.29	19.662	
9,600.00	7,172.27	9,863.90	7,149.47	65.88	70.90	89.49	-1,239.58	2,393.42	2,582.46	2,446.72	135.74	19.024	
9,700.00	7,172.24	9,963.90	7,149.49	68.08	73.15	89.50	-1,241.02	2,493.41	2,583.36	2,443.13	140.22	18.423	
9,800.00	7,172.20	10,063.89	7,149.51	70.29	75.42	89.50	-1,242.45	2,593.39	2,584.25	2,439.52	144.73	17.856	
9,900.00	7,172.16	10,163.89	7,149.53	72.52	77.69	89.50	-1,243.88	2,693.38	2,585.15	2,435.89	149.26	17.320	
10,000.00	7,172.12	10,263.88	7,149.55	74.76	79.98	89.50	-1,245.32	2,793.37	2,586.04	2,432.24	153.81	16.814	
10,100.00	7,172.08	10,363.88	7,149.57	77.02	82.27	89.50	-1,246.75	2,893.35	2,586.94	2,428.56	158.37	16.334	
10,200.00	7,172.05	10,463.88	7,149.59	79.28	84.57	89.50	-1,248.18	2,993.34	2,587.83	2,424.87	162.96	15.880	
10,300.00	7,172.01	10,563.87	7,149.62	81.56	86.88	89.50	-1,249.61	3,093.32	2,588.73	2,421.17	167.57	15.449	
10,400.00	7,171.97	10,663.87	7,149.64	83.84	89.20	89.51	-1,251.05	3,193.31	2,589.63	2,417.44	172.18	15.040	
10,500.00	7,171.93	10,763.86	7,149.66	86.13	91.52	89.51	-1,252.48	3,293.29	2,590.52	2,413.71	176.82	14.651	
10,600.00	7,171.90	10,863.86	7,149.68	88.43	93.85	89.51	-1,253.91	3,393.28	2,591.42	2,409.96	181.46	14.281	
10,700.00	7,171.86	10,963.86	7,149.70	90.74	96.18	89.51	-1,255.34	3,493.27	2,592.31	2,406.19	186.12	13.928	
10,800.00	7,171.82	11,063.85	7,149.72	93.05	98.52	89.51	-1,256.78	3,593.25	2,593.21	2,402.42	190.79	13.592	
10,900.00	7,171.78	11,163.85	7,149.74	95.37	100.86	89.51	-1,258.21	3,693.24	2,594.10	2,398.64	195.47	13.271	
11,000.00	7,171.74	11,263.84	7,149.76	97.70	103.21	89.51	-1,259.64	3,793.22	2,595.00	2,394.85	200.16	12.965	
11,100.00	7,171.71	11,363.84	7,149.78	100.03	105.56	89.52	-1,261.07	3,893.21	2,595.90	2,391.04	204.85	12.672	
11,200.00	7,171.67	11,463.84	7,149.80	102.37	107.92	89.52	-1,262.51	3,993.19	2,596.79	2,387.23	209.56	12.392	
11,300.00	7,171.63	11,563.83	7,149.83	104.71	110.28	89.52	-1,263.94	4,093.18	2,597.69	2,383.42	214.27	12.123	
11,400.00	7,171.59	11,663.83	7,149.85	107.06	112.64	89.52	-1,265.37	4,193.17	2,598.58	2,379.59	218.99	11.866	
11,500.00	7,171.56	11,763.82	7,149.87	109.40	115.01	89.52	-1,266.81	4,293.15	2,599.48	2,375.76	223.72	11.619	
11,600.00	7,171.52	11,863.82	7,149.89	111.76	117.37	89.52	-1,268.24	4,393.14	2,600.37	2,371.92	228.45	11.383	
11,700.00	7,171.48	11,963.82	7,149.91	114.12	119.75	89.52	-1,269.67	4,493.12	2,601.27	2,368.08	233.19	11.155	
11,800.00	7,171.44	12,063.81	7,149.93	116.48	122.12	89.53	-1,271.10	4,593.11	2,602.17	2,364.23	237.94	10.936	
11,900.00	7,171.40	12,163.81	7,149.95	118.84	124.50	89.53	-1,272.54	4,693.09	2,603.06	2,360.38	242.69	10.726	
12,000.00	7,171.37	12,263.80	7,149.97	121.20	126.88	89.53	-1,273.97	4,793.08	2,603.96	2,356.52	247.44	10.524	
12,100.00	7,171.33	12,363.80	7,149.99	123.57	129.26	89.53	-1,275.40	4,893.07	2,604.85	2,352.65	252.20	10.328	
12,200.00	7,171.29	12,463.80	7,150.01	125.95	131.64	89.53	-1,276.83	4,993.05	2,605.75	2,348.78	256.96	10.140	
12,300.00	7,171.25	12,563.79	7,150.04	128.32	134.03	89.53	-1,278.27	5,093.04	2,606.64	2,344.91	261.73	9.959	
12,400.00	7,171.22	12,663.79	7,150.06	130.70	136.42	89.53	-1,279.70	5,193.02	2,607.54	2,341.03	266.51	9.784	
12,500.00	7,171.18	12,763.78	7,150.08	133.07	138.81	89.54	-1,281.13	5,293.01	2,608.44	2,337.15	271.28	9.615	
12,600.00	7,171.14	12,863.78	7,150.10	135.46	141.20	89.54	-1,282.56	5,392.99	2,609.33	2,333.27	276.06	9.452	
12,700.00	7,171.10	12,963.78	7,150.12	137.84	143.59	89.54	-1,284.00	5,492.98	2,610.23	2,329.38	280.84	9.294	
12,800.00	7,171.06	13,063.77	7,150.14	140.22	145.98	89.54	-1,285.43	5,592.96	2,611.12	2,325.49	285.63	9.142	
12,900.00	7,171.03	13,163.77	7,150.16	142.61	148.38	89.54	-1,286.86	5,692.95	2,612.02	2,321.60	290.42	8.994	
13,000.00	7,170.99	13,263.76	7,150.18	145.00	150.78	89.54	-1,288.30	5,792.94	2,612.91	2,317.70	295.21	8.851	
13,100.00	7,170.95	13,363.76	7,150.20	147.39	153.17	89.55	-1,289.73	5,892.92	2,613.81	2,313.80	300.01	8.712	
13,200.00	7,170.91	13,463.75	7,150.22	149.78	155.57	89.55	-1,291.16	5,992.91	2,614.71	2,309.90	304.80	8.578	
13,300.00	7,170.87	13,563.75	7,150.25	152.17	157.97	89.55	-1,292.59	6,092.89	2,615.60	2,306.00	309.60	8.448	
13,400.00	7,170.84	13,663.75	7,150.27	154.57	160.38	89.55	-1,294.03	6,192.88	2,616.50	2,302.09	314.41	8.322	
13,500.00	7,170.80	13,763.74	7,150.29	156.96	162.78	89.55	-1,295.46	6,292.86	2,617.39	2,298.18	319.21	8.200	
13,600.00	7,170.76	13,863.74	7,150.31	159.36	165.18	89.55	-1,296.89	6,392.85	2,618.29	2,294.27	324.02	8.081	
13,700.00	7,170.72	13,963.73	7,150.33	161.76	167.59	89.55	-1,298.32	6,492.84	2,619.19	2,290.36	328.83	7.965	
13,800.00	7,170.69	14,063.73	7,150.35	164.16	170.00	89.56	-1,299.76	6,592.82	2,620.08	2,286.44	333.64	7.853	
13,900.00	7,170.65	14,163.73	7,150.37	166.56	172.40	89.56	-1,301.19	6,692.81	2,620.98	2,282.52	338.45	7.744	
14,000.00	7,170.61	14,263.72	7,150.39	168.96	174.81	89.56	-1,302.62	6,792.79	2,621.87	2,278.61	343.27	7.638	
14,100.00	7,170.57	14,363.72	7,150.41	171.36	177.22	89.56	-1,304.05	6,892.78	2,622.77	2,274.68	348.08	7.535	
14,200.00	7,170.53	14,463.71	7,150.43	173.76	179.63	89.56	-1,305.49	6,992.76	2,623.66	2,270.76	352.90	7.435	
14,300.00	7,170.50	14,563.71	7,150.46	176.17	182.04	89.56	-1,306.92	7,092.75	2,624.56	2,266.84	357.72	7.337	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 834H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
14,400.00	7,170.46	14,663.71	7,150.48	178.57	184.45	89.56	-1,308.35	7,192.74	2,625.46	2,262.91	362.54	7.242	
14,500.00	7,170.42	14,763.70	7,150.50	180.98	186.86	89.57	-1,309.79	7,292.72	2,626.35	2,258.99	367.37	7.149	
14,600.00	7,170.38	14,863.70	7,150.52	183.39	189.28	89.57	-1,311.22	7,392.71	2,627.25	2,255.06	372.19	7.059	
14,700.00	7,170.35	14,963.69	7,150.54	185.80	191.69	89.57	-1,312.65	7,492.69	2,628.14	2,251.13	377.01	6.971	
14,800.00	7,170.31	15,063.69	7,150.56	188.20	194.10	89.57	-1,314.08	7,592.68	2,629.04	2,247.20	381.84	6.885	
14,900.00	7,170.27	15,163.69	7,150.58	190.61	196.52	89.57	-1,315.52	7,692.66	2,629.93	2,243.26	386.67	6.801	
15,000.00	7,170.23	15,263.68	7,150.60	193.02	198.93	89.57	-1,316.95	7,792.65	2,630.83	2,239.33	391.50	6.720	
15,100.00	7,170.19	15,363.68	7,150.62	195.43	201.35	89.57	-1,318.38	7,892.64	2,631.73	2,235.40	396.33	6.640	
15,200.00	7,170.16	15,463.67	7,150.64	197.85	203.77	89.58	-1,319.81	7,992.62	2,632.62	2,231.46	401.16	6.562	
15,300.00	7,170.12	15,563.67	7,150.67	200.26	206.18	89.58	-1,321.25	8,092.61	2,633.52	2,227.52	405.99	6.487	
15,400.00	7,170.08	15,663.67	7,150.69	202.67	208.60	89.58	-1,322.68	8,192.59	2,634.41	2,223.58	410.83	6.412	
15,500.00	7,170.04	15,763.66	7,150.71	205.08	211.02	89.58	-1,324.11	8,292.58	2,635.31	2,219.65	415.66	6.340	
15,600.00	7,170.01	15,863.66	7,150.73	207.50	213.44	89.58	-1,325.55	8,392.56	2,636.20	2,215.71	420.50	6.269	
15,700.00	7,169.97	15,963.65	7,150.75	209.91	215.86	89.58	-1,326.98	8,492.55	2,637.10	2,211.76	425.34	6.200	
15,800.00	7,169.93	16,063.65	7,150.77	212.33	218.28	89.58	-1,328.41	8,592.54	2,638.00	2,207.82	430.17	6.132	
15,900.00	7,169.89	16,163.65	7,150.79	214.74	220.70	89.59	-1,329.84	8,692.52	2,638.89	2,203.88	435.01	6.066	
16,000.00	7,169.85	16,263.64	7,150.81	217.16	223.12	89.59	-1,331.28	8,792.51	2,639.79	2,199.94	439.85	6.002	
16,100.00	7,169.82	16,363.64	7,150.83	219.58	225.54	89.59	-1,332.71	8,892.49	2,640.68	2,195.99	444.69	5.938	
16,200.00	7,169.78	16,463.63	7,150.85	221.99	227.96	89.59	-1,334.14	8,992.48	2,641.58	2,192.05	449.53	5.876	
16,300.00	7,169.74	16,563.63	7,150.88	224.41	230.38	89.59	-1,335.57	9,092.46	2,642.48	2,188.10	454.38	5.816	
16,400.00	7,169.70	16,663.63	7,150.90	226.83	232.80	89.59	-1,337.01	9,192.45	2,643.37	2,184.15	459.22	5.756	
16,500.00	7,169.67	16,763.62	7,150.92	229.25	235.22	89.59	-1,338.44	9,292.44	2,644.27	2,180.21	464.06	5.698	
16,600.00	7,169.63	16,863.62	7,150.94	231.66	237.65	89.59	-1,339.87	9,392.42	2,645.16	2,176.26	468.91	5.641	
16,700.00	7,169.59	16,963.61	7,150.96	234.08	240.07	89.60	-1,341.30	9,492.41	2,646.06	2,172.31	473.75	5.585	
16,800.00	7,169.55	17,063.61	7,150.98	236.50	242.49	89.60	-1,342.74	9,592.39	2,646.95	2,168.36	478.60	5.531	
16,900.00	7,169.51	17,154.59	7,151.00	238.92	244.70	89.60	-1,344.04	9,683.36	2,647.87	2,164.66	483.21	5.480	
17,000.00	7,169.48	17,154.59	7,151.00	241.34	244.70	89.60	-1,344.04	9,683.36	2,650.99	2,165.91	485.08	5.465 SF	
17,100.00	7,169.44	17,154.59	7,151.00	243.76	244.70	89.60	-1,344.04	9,683.36	2,657.87	2,171.60	486.28	5.466	
17,200.00	7,169.40	17,154.59	7,151.00	246.18	244.70	89.60	-1,344.04	9,683.36	2,668.49	2,181.69	486.80	5.482	
17,300.00	7,169.36	17,154.59	7,151.00	248.61	244.70	89.60	-1,344.04	9,683.36	2,682.79	2,196.14	486.66	5.513	
17,400.00	7,169.32	17,154.59	7,151.00	251.03	244.70	89.60	-1,344.04	9,683.36	2,700.73	2,214.85	485.88	5.558	
17,500.00	7,169.29	17,154.59	7,151.00	253.45	244.70	89.60	-1,344.04	9,683.36	2,722.22	2,237.73	484.48	5.619	
17,600.00	7,169.25	17,154.59	7,151.00	255.87	244.70	89.60	-1,344.04	9,683.36	2,747.18	2,264.67	482.52	5.693	
17,700.00	7,169.21	17,154.59	7,151.00	258.29	244.70	89.60	-1,344.04	9,683.36	2,775.53	2,295.52	480.01	5.782	
17,800.00	7,169.17	17,154.59	7,151.00	260.72	244.70	89.60	-1,344.04	9,683.36	2,807.16	2,330.15	477.01	5.885	
17,900.00	7,169.14	17,154.59	7,151.00	263.14	244.70	89.60	-1,344.04	9,683.36	2,841.95	2,368.39	473.56	6.001	
18,000.00	7,169.10	17,154.59	7,151.00	265.56	244.70	89.60	-1,344.04	9,683.36	2,879.79	2,410.09	469.70	6.131	
18,100.00	7,169.06	17,154.59	7,151.00	267.99	244.70	89.60	-1,344.04	9,683.36	2,920.58	2,455.09	465.49	6.274	
18,200.00	7,169.02	17,154.59	7,151.00	270.41	244.70	89.60	-1,344.04	9,683.36	2,964.17	2,503.21	460.96	6.430	
18,300.00	7,168.98	17,154.59	7,151.00	272.84	244.70	89.60	-1,344.04	9,683.36	3,010.46	2,554.28	456.17	6.599	
18,400.00	7,168.95	17,154.59	7,151.00	275.26	244.70	89.60	-1,344.04	9,683.36	3,059.31	2,608.15	451.16	6.781	
18,500.00	7,168.91	17,154.59	7,151.00	277.68	244.70	89.60	-1,344.04	9,683.36	3,110.62	2,664.66	445.96	6.975	
18,600.00	7,168.87	17,154.59	7,151.00	280.11	244.70	89.60	-1,344.04	9,683.36	3,164.25	2,723.63	440.62	7.181	
18,700.00	7,168.83	17,154.59	7,151.00	282.53	244.70	89.60	-1,344.04	9,683.36	3,220.10	2,784.94	435.16	7.400	
18,800.00	7,168.80	17,154.59	7,151.00	284.96	244.70	89.60	-1,344.04	9,683.36	3,278.05	2,848.42	429.63	7.630	
18,900.00	7,168.76	17,154.59	7,151.00	287.38	244.70	89.60	-1,344.04	9,683.36	3,337.99	2,913.94	424.04	7.872	
19,000.00	7,168.72	17,154.59	7,151.00	289.81	244.70	89.60	-1,344.04	9,683.36	3,399.81	2,981.38	418.43	8.125	
19,100.00	7,168.68	17,154.59	7,151.00	292.24	244.70	89.60	-1,344.04	9,683.36	3,463.41	3,050.60	412.82	8.390	
19,200.00	7,168.64	17,154.59	7,151.00	294.66	244.70	89.60	-1,344.04	9,683.36	3,528.71	3,121.49	407.22	8.665	
19,300.00	7,168.61	17,154.59	7,151.00	297.09	244.70	89.60	-1,344.04	9,683.36	3,595.60	3,193.95	401.65	8.952	
19,400.00	7,168.57	17,154.59	7,151.00	299.52	244.70	89.60	-1,344.04	9,683.36	3,664.00	3,267.87	396.13	9.249	
19,500.00	7,168.53	17,154.59	7,151.00	301.94	244.70	89.60	-1,344.04	9,683.36	3,733.82	3,343.15	390.68	9.557	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 834H - OH - Plan #3													Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM							Rule Assigned:						Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
19,600.00	7,168.49	17,154.59	7,151.00	304.37	244.70	89.60	-1,344.04	9,683.36	3,804.99	3,419.70	385.29	9.876		
19,700.00	7,168.46	17,154.59	7,151.00	306.80	244.70	89.60	-1,344.04	9,683.36	3,877.44	3,497.45	379.99	10.204		
19,800.00	7,168.42	17,154.59	7,151.00	309.22	244.70	89.60	-1,344.04	9,683.36	3,951.09	3,576.31	374.77	10.543		
19,900.00	7,168.38	17,154.59	7,151.00	311.65	244.70	89.60	-1,344.04	9,683.36	4,025.87	3,656.22	369.65	10.891		
20,000.00	7,168.34	17,154.59	7,151.00	314.08	244.70	89.60	-1,344.04	9,683.36	4,101.73	3,737.10	364.62	11.249		
20,100.00	7,168.30	17,154.59	7,151.00	316.51	244.70	89.60	-1,344.04	9,683.36	4,178.60	3,818.90	359.70	11.617		
20,200.00	7,168.27	17,154.59	7,151.00	318.93	244.70	89.60	-1,344.04	9,683.36	4,256.44	3,901.55	354.88	11.994		
20,300.00	7,168.23	17,154.59	7,151.00	321.36	244.70	89.60	-1,344.04	9,683.36	4,335.18	3,985.01	350.17	12.380		
20,400.00	7,168.19	17,154.59	7,151.00	323.79	244.70	89.60	-1,344.04	9,683.36	4,414.79	4,069.22	345.57	12.775		
20,500.00	7,168.15	17,154.59	7,151.00	326.22	244.70	89.60	-1,344.04	9,683.36	4,495.21	4,154.14	341.07	13.180		
20,600.00	7,168.11	17,154.59	7,151.00	328.65	244.70	89.60	-1,344.04	9,683.36	4,576.40	4,239.72	336.68	13.593		
20,700.00	7,168.08	17,154.59	7,151.00	331.07	244.70	89.60	-1,344.04	9,683.36	4,658.33	4,325.93	332.40	14.014		
20,768.77	7,168.05	17,154.59	7,151.00	332.74	244.70	89.60	-1,344.04	9,683.36	4,715.07	4,385.55	329.52	14.309		
20,800.00	7,168.04	17,154.59	7,151.00	333.50	244.70	89.60	-1,344.04	9,683.36	4,740.94	4,412.72	328.22	14.444		
20,903.75	7,168.00	17,154.59	7,151.00	336.02	244.70	89.60	-1,344.04	9,683.36	4,827.36	4,503.36	324.00	14.899		

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 836H - OH - Plan #3													Offset Site Error: 0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-144.74	-12.41	-8.78	15.20				
100.00	100.00	100.00	100.00	0.25	0.25	-144.74	-12.41	-8.78	15.20	14.70	0.50	30.294	
200.00	200.00	200.00	200.00	0.61	0.61	-144.74	-12.41	-8.78	15.20	13.98	1.22	12.474	
300.00	300.00	300.00	300.00	0.97	0.97	-144.74	-12.41	-8.78	15.20	13.27	1.94	7.854	
400.00	400.00	400.00	400.00	1.33	1.33	-144.74	-12.41	-8.78	15.20	12.55	2.65	5.731	
500.00	500.00	500.00	500.00	1.68	1.68	-144.74	-12.41	-8.78	15.20	11.83	3.37	4.512 CC, ES	
600.00	599.98	599.69	599.67	2.04	2.04	-137.54	-12.26	-10.50	17.39	13.31	4.08	4.263	
700.00	699.84	699.08	698.92	2.41	2.38	-135.25	-11.78	-15.66	23.97	19.18	4.79	5.007	
800.00	799.45	798.42	797.97	2.77	2.74	-134.68	-11.09	-23.24	34.37	28.87	5.50	6.248	
900.00	898.70	897.56	896.81	3.13	3.09	-137.22	-10.39	-30.89	47.32	41.09	6.22	7.603	
1,000.00	997.47	996.26	995.21	3.51	3.45	-140.67	-9.69	-38.51	62.97	56.01	6.95	9.056	
1,104.22	1,099.75	1,098.54	1,097.18	3.92	3.83	-144.29	-8.97	-46.41	82.38	74.66	7.72	10.675	
1,200.00	1,193.41	1,192.22	1,190.58	4.32	4.17	-147.06	-8.30	-53.65	101.86	93.44	8.42	12.095	
1,300.00	1,291.19	1,290.02	1,288.09	4.74	4.53	-149.01	-7.61	-61.20	122.35	113.20	9.16	13.364	
1,400.00	1,388.98	1,387.83	1,385.60	5.16	4.90	-150.40	-6.92	-68.75	142.95	133.06	9.89	14.450	
1,500.00	1,486.76	1,485.63	1,483.11	5.59	5.26	-151.44	-6.23	-76.30	163.60	152.97	10.63	15.387	
1,600.00	1,584.54	1,583.44	1,580.62	6.03	5.62	-152.24	-5.54	-83.85	184.30	172.92	11.37	16.202	
1,700.00	1,682.33	1,681.25	1,678.14	6.47	5.98	-152.89	-4.84	-91.41	205.02	192.90	12.12	16.918	
1,800.00	1,780.11	1,779.05	1,775.65	6.91	6.35	-153.41	-4.15	-98.96	225.76	212.90	12.86	17.550	
1,900.00	1,877.90	1,876.86	1,873.16	7.35	6.71	-153.85	-3.46	-106.51	246.52	232.91	13.61	18.113	
2,000.00	1,975.68	1,974.66	1,970.67	7.79	7.08	-154.22	-2.77	-114.06	267.29	252.93	14.36	18.616	
2,100.00	2,073.46	2,072.47	2,068.18	8.24	7.44	-154.53	-2.08	-121.61	288.07	272.96	15.11	19.069	
2,200.00	2,171.25	2,170.28	2,165.69	8.68	7.81	-154.81	-1.38	-129.17	308.85	293.00	15.86	19.479	
2,300.00	2,269.03	2,268.08	2,263.21	9.13	8.17	-155.04	-0.69	-136.72	329.64	313.04	16.61	19.851	
2,400.00	2,366.82	2,365.89	2,360.72	9.58	8.54	-155.26	0.00	-144.27	350.44	333.08	17.36	20.191	
2,500.00	2,464.60	2,463.70	2,458.23	10.03	8.90	-155.44	0.69	-151.82	371.24	353.13	18.11	20.502	
2,600.00	2,562.38	2,561.50	2,555.74	10.48	9.27	-155.61	1.38	-159.37	392.04	373.18	18.86	20.788	
2,700.00	2,660.17	2,659.31	2,653.25	10.93	9.63	-155.76	2.08	-166.93	412.85	393.24	19.61	21.052	
2,800.00	2,757.95	2,757.11	2,750.76	11.38	10.00	-155.90	2.77	-174.48	433.66	413.30	20.36	21.296	
2,900.00	2,855.74	2,854.92	2,848.28	11.83	10.37	-156.02	3.46	-182.03	454.47	433.35	21.12	21.523	
3,000.00	2,953.52	2,952.73	2,945.79	12.29	10.73	-156.13	4.15	-189.58	475.28	453.41	21.87	21.733	
3,100.00	3,051.30	3,050.53	3,043.30	12.74	11.10	-156.23	4.85	-197.13	496.10	473.48	22.62	21.930	
3,200.00	3,149.09	3,148.34	3,140.81	13.19	11.46	-156.33	5.54	-204.69	516.91	493.54	23.38	22.113	
3,300.00	3,246.87	3,246.14	3,238.32	13.65	11.83	-156.42	6.23	-212.24	537.73	513.60	24.13	22.285	
3,400.00	3,344.66	3,343.95	3,335.83	14.10	12.20	-156.50	6.92	-219.79	558.55	533.67	24.88	22.446	
3,500.00	3,442.44	3,441.76	3,433.35	14.55	12.56	-156.57	7.61	-227.34	579.37	553.73	25.64	22.598	
3,600.00	3,540.22	3,539.56	3,530.86	15.01	12.93	-156.64	8.31	-234.89	600.19	573.80	26.39	22.741	
3,700.00	3,638.01	3,637.37	3,628.37	15.46	13.29	-156.71	9.00	-242.45	621.01	593.86	27.15	22.876	
3,800.00	3,735.79	3,735.17	3,725.88	15.91	13.66	-156.77	9.69	-250.00	641.83	613.93	27.90	23.003	
3,900.00	3,833.58	3,832.98	3,823.39	16.37	14.03	-156.83	10.38	-257.55	662.65	634.00	28.66	23.124	
4,000.00	3,931.36	3,930.79	3,920.90	16.82	14.39	-156.88	11.07	-265.10	683.48	654.06	29.41	23.238	
4,100.00	4,029.14	4,028.59	4,018.42	17.28	14.76	-156.93	11.77	-272.65	704.30	674.13	30.17	23.347	
4,200.00	4,126.93	4,126.40	4,115.93	17.73	15.13	-156.98	12.46	-280.21	725.12	694.20	30.92	23.450	
4,300.00	4,224.71	4,224.20	4,213.44	18.19	15.49	-157.02	13.15	-287.76	745.95	714.27	31.68	23.548	
4,400.00	4,322.50	4,322.01	4,310.95	18.64	15.86	-157.07	13.84	-295.31	766.77	734.34	32.43	23.642	
4,500.00	4,420.28	4,419.82	4,408.46	19.10	16.22	-157.11	14.53	-302.86	787.60	754.41	33.19	23.731	
4,600.00	4,518.06	4,517.62	4,505.97	19.55	16.59	-157.14	15.23	-310.42	808.42	774.48	33.94	23.816	
4,700.00	4,615.85	4,615.43	4,603.48	20.01	16.96	-157.18	15.92	-317.97	829.25	794.55	34.70	23.898	
4,800.00	4,713.63	4,713.23	4,701.00	20.46	17.32	-157.21	16.61	-325.52	850.08	814.62	35.46	23.975	
4,900.00	4,811.42	4,811.04	4,798.51	20.92	17.69	-157.25	17.30	-333.07	870.90	834.69	36.21	24.050	
5,000.00	4,909.20	4,908.85	4,896.02	21.38	18.06	-157.28	17.99	-340.62	891.73	854.76	36.97	24.121	
5,100.00	5,006.98	5,006.65	4,993.53	21.83	18.42	-157.31	18.69	-348.18	912.56	874.83	37.72	24.190	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 836H - OH - Plan #3													Offset Site Error: 0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
5,200.00	5,104.77	5,104.46	5,091.04	22.29	18.79	-157.34	19.38	-355.73	933.38	894.90	38.48	24.256	
5,300.00	5,202.55	5,202.26	5,188.55	22.74	19.16	-157.36	20.07	-363.28	954.21	914.97	39.24	24.319	
5,400.00	5,300.34	5,300.07	5,286.07	23.20	19.52	-157.39	20.76	-370.83	975.04	935.04	39.99	24.380	
5,500.00	5,398.12	5,397.88	5,383.58	23.66	19.89	-157.42	21.45	-378.38	995.87	955.12	40.75	24.438	
5,600.00	5,495.90	5,495.68	5,481.09	24.11	20.26	-157.44	22.15	-385.94	1,016.69	975.19	41.51	24.494	
5,700.00	5,593.69	5,593.49	5,578.60	24.57	20.62	-157.46	22.84	-393.49	1,037.52	995.26	42.26	24.549	
5,800.00	5,691.47	5,691.30	5,676.11	25.02	20.99	-157.49	23.53	-401.04	1,058.35	1,015.33	43.02	24.601	
5,900.00	5,789.26	5,789.10	5,773.62	25.48	21.36	-157.51	24.22	-408.59	1,079.18	1,035.40	43.78	24.651	
6,000.00	5,887.04	5,886.91	5,871.14	25.94	21.72	-157.53	24.91	-416.14	1,100.01	1,055.47	44.53	24.700	
6,100.00	5,984.83	5,984.71	5,968.65	26.39	22.09	-157.55	25.61	-423.70	1,120.84	1,075.54	45.29	24.747	
6,200.00	6,082.61	6,082.52	6,066.16	26.85	22.46	-157.57	26.30	-431.25	1,141.66	1,095.62	46.05	24.793	
6,300.00	6,180.39	6,180.33	6,163.67	27.30	22.82	-157.58	26.99	-438.80	1,162.49	1,115.69	46.81	24.836	
6,400.00	6,278.18	6,278.13	6,261.18	27.76	23.19	-157.60	27.68	-446.35	1,183.32	1,135.76	47.56	24.879	
6,500.00	6,375.96	6,375.94	6,358.69	28.22	23.56	-157.62	28.37	-453.90	1,204.15	1,155.83	48.32	24.920	
6,600.00	6,473.75	6,473.74	6,456.21	28.67	23.92	-157.64	29.07	-461.46	1,224.98	1,175.90	49.08	24.960	
6,663.67	6,536.00	6,583.69	6,566.02	28.96	24.29	-157.95	29.83	-463.47	1,237.41	1,187.59	49.81	24.841	
6,700.00	6,571.53	6,657.34	6,639.06	29.13	24.51	-174.30	30.31	-454.42	1,243.35	1,193.15	50.20	24.769	
6,750.00	6,620.29	6,755.62	6,733.99	29.35	24.76	165.27	30.91	-429.33	1,250.71	1,200.10	50.60	24.715	
6,800.00	6,668.62	6,849.23	6,819.79	29.56	24.98	149.51	31.42	-392.14	1,257.24	1,206.32	50.92	24.691	
6,850.00	6,716.22	6,937.41	6,894.83	29.76	25.18	137.97	31.83	-345.95	1,263.09	1,211.89	51.19	24.673	
6,900.00	6,762.80	7,019.92	6,985.63	29.95	25.39	129.36	32.15	-293.73	1,268.40	1,216.93	51.48	24.641	
6,950.00	6,808.07	7,096.87	7,011.59	30.13	25.61	122.68	32.39	-237.97	1,273.32	1,221.52	51.80	24.582	
7,000.00	6,851.75	7,168.59	7,054.57	30.30	25.87	117.30	32.55	-180.60	1,277.96	1,225.77	52.19	24.487	
7,050.00	6,893.57	7,235.56	7,088.64	30.45	26.16	112.82	32.66	-122.98	1,282.40	1,229.76	52.64	24.361	
7,100.00	6,933.27	7,298.27	7,114.90	30.60	26.49	109.01	32.71	-66.06	1,286.70	1,233.55	53.15	24.209	
7,150.00	6,970.61	7,357.23	7,134.36	30.74	26.86	105.70	32.71	-10.43	1,290.90	1,237.18	53.72	24.031	
7,200.00	7,005.36	7,412.89	7,147.95	30.87	27.26	102.79	32.68	43.53	1,295.00	1,240.67	54.32	23.839	
7,250.00	7,037.31	7,465.67	7,156.43	30.99	27.68	100.19	32.62	95.61	1,299.00	1,244.04	54.96	23.636	
7,300.00	7,066.25	7,515.94	7,160.47	31.11	28.11	97.86	32.53	145.70	1,302.88	1,247.27	55.62	23.427	
7,350.00	7,092.02	7,561.93	7,161.00	31.22	28.54	95.83	32.43	191.68	1,306.64	1,250.37	56.27	23.219	
7,400.00	7,114.44	7,606.37	7,161.01	31.34	28.99	94.09	32.33	236.12	1,310.29	1,253.33	56.96	23.003	
7,450.00	7,133.38	7,652.46	7,161.02	31.47	29.50	92.61	32.22	282.22	1,313.65	1,255.90	57.75	22.747	
7,500.00	7,148.73	7,699.94	7,161.03	31.61	30.03	91.40	32.11	329.69	1,316.54	1,257.95	58.59	22.470	
7,550.00	7,160.40	7,748.49	7,161.04	31.78	30.64	90.47	32.00	378.25	1,318.82	1,259.26	59.56	22.142	
7,600.00	7,168.30	7,797.83	7,161.05	31.98	31.26	89.84	31.88	427.58	1,320.37	1,259.78	60.59	21.793	
7,650.00	7,172.38	7,847.64	7,161.06	32.23	31.96	89.53	31.77	477.40	1,321.12	1,259.39	61.73	21.401	
7,678.56	7,173.00	7,876.19	7,161.07	32.39	32.35	89.48	31.70	505.95	1,321.17	1,258.77	62.41	21.170	
7,700.00	7,172.99	7,897.63	7,161.07	32.53	32.65	89.48	31.65	527.39	1,321.11	1,258.18	62.92	20.995	
7,800.00	7,172.95	7,997.63	7,161.10	33.31	34.16	89.49	31.42	627.39	1,320.80	1,255.25	65.55	20.150	
7,900.00	7,172.92	8,097.63	7,161.12	34.32	35.78	89.49	31.19	727.39	1,320.50	1,252.08	68.42	19.300	
8,000.00	7,172.88	8,197.63	7,161.14	35.53	37.48	89.49	30.96	827.39	1,320.19	1,248.68	71.51	18.462	
8,100.00	7,172.84	8,297.63	7,161.16	36.89	39.26	89.49	30.73	927.39	1,319.89	1,245.10	74.79	17.648	
8,200.00	7,172.80	8,397.63	7,161.18	38.39	41.10	89.50	30.50	1,027.39	1,319.58	1,241.35	78.23	16.867	
8,300.00	7,172.77	8,497.63	7,161.20	39.99	43.01	89.50	30.26	1,127.39	1,319.27	1,237.45	81.83	16.123	
8,400.00	7,172.73	8,597.63	7,161.22	41.68	44.97	89.50	30.03	1,227.38	1,318.97	1,233.42	85.55	15.418	
8,500.00	7,172.69	8,697.63	7,161.24	43.45	46.97	89.50	29.80	1,327.38	1,318.66	1,229.28	89.38	14.753	
8,600.00	7,172.65	8,797.63	7,161.26	45.29	49.01	89.51	29.57	1,427.38	1,318.36	1,225.05	93.31	14.129	
8,700.00	7,172.61	8,897.63	7,161.29	47.18	51.09	89.51	29.34	1,527.38	1,318.05	1,220.72	97.33	13.542	
8,800.00	7,172.58	8,997.63	7,161.31	49.12	53.19	89.51	29.11	1,627.38	1,317.75	1,216.33	101.42	12.993	
8,900.00	7,172.54	9,097.63	7,161.33	51.11	55.33	89.51	28.88	1,727.38	1,317.44	1,211.86	105.58	12.478	
9,000.00	7,172.50	9,197.63	7,161.35	53.13	57.49	89.51	28.65	1,827.38	1,317.13	1,207.34	109.80	11.996	
9,100.00	7,172.46	9,297.63	7,161.37	55.19	59.67	89.52	28.41	1,927.38	1,316.83	1,202.76	114.07	11.544	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 836H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program:		0-B001Mb_MWD+HRGM						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
9,200.00	7,172.42	9,397.63	7,161.39	57.28	61.86	89.52	28.18	2,027.38	1,316.52	1,198.14	118.39	11.120	
9,300.00	7,172.39	9,497.63	7,161.41	59.39	64.08	89.52	27.95	2,127.38	1,316.22	1,193.47	122.75	10.723	
9,400.00	7,172.35	9,597.63	7,161.43	61.53	66.31	89.52	27.72	2,227.38	1,315.91	1,188.77	127.15	10.350	
9,500.00	7,172.31	9,697.63	7,161.45	63.70	68.56	89.53	27.49	2,327.38	1,315.61	1,184.03	131.58	9.999	
9,600.00	7,172.27	9,797.63	7,161.47	65.88	70.82	89.53	27.26	2,427.38	1,315.30	1,179.26	136.04	9.668	
9,700.00	7,172.24	9,897.62	7,161.50	68.08	73.09	89.53	27.03	2,527.37	1,314.99	1,174.46	140.53	9.357	
9,800.00	7,172.20	9,997.62	7,161.52	70.29	75.37	89.53	26.79	2,627.37	1,314.69	1,169.64	145.05	9.064	
9,900.00	7,172.16	10,097.62	7,161.54	72.52	77.66	89.54	26.56	2,727.37	1,314.38	1,164.80	149.58	8.787	
10,000.00	7,172.12	10,197.62	7,161.56	74.76	79.95	89.54	26.33	2,827.37	1,314.08	1,159.94	154.14	8.525	
10,100.00	7,172.08	10,297.62	7,161.58	77.02	82.26	89.54	26.10	2,927.37	1,313.77	1,155.05	158.72	8.277	
10,200.00	7,172.05	10,397.62	7,161.60	79.28	84.58	89.54	25.87	3,027.37	1,313.47	1,150.15	163.31	8.043	
10,300.00	7,172.01	10,497.62	7,161.62	81.56	86.90	89.55	25.64	3,127.37	1,313.16	1,145.24	167.92	7.820	
10,400.00	7,171.97	10,597.62	7,161.64	83.84	89.22	89.55	25.41	3,227.37	1,312.86	1,140.31	172.55	7.609	
10,500.00	7,171.93	10,697.62	7,161.66	86.13	91.56	89.55	25.18	3,327.37	1,312.55	1,135.36	177.19	7.408	
10,600.00	7,171.90	10,797.62	7,161.69	88.43	93.89	89.55	24.94	3,427.37	1,312.24	1,130.40	181.84	7.216	
10,700.00	7,171.86	10,897.62	7,161.71	90.74	96.24	89.56	24.71	3,527.37	1,311.94	1,125.44	186.50	7.034	
10,800.00	7,171.82	10,997.62	7,161.73	93.05	98.58	89.56	24.48	3,627.37	1,311.63	1,120.46	191.18	6.861	
10,900.00	7,171.78	11,097.62	7,161.75	95.37	100.94	89.56	24.25	3,727.37	1,311.33	1,115.47	195.86	6.695	
11,000.00	7,171.74	11,197.62	7,161.77	97.70	103.29	89.56	24.02	3,827.36	1,311.02	1,110.47	200.55	6.537	
11,100.00	7,171.71	11,297.62	7,161.79	100.03	105.65	89.57	23.79	3,927.36	1,310.72	1,105.46	205.25	6.386	
11,200.00	7,171.67	11,397.62	7,161.81	102.37	108.01	89.57	23.56	4,027.36	1,310.41	1,100.45	209.96	6.241	
11,300.00	7,171.63	11,497.62	7,161.83	104.71	110.38	89.57	23.32	4,127.36	1,310.10	1,095.43	214.68	6.103	
11,400.00	7,171.59	11,597.62	7,161.85	107.06	112.75	89.57	23.09	4,227.36	1,309.80	1,090.40	219.40	5.970	
11,500.00	7,171.56	11,697.62	7,161.87	109.40	115.12	89.58	22.86	4,327.36	1,309.49	1,085.36	224.13	5.843	
11,600.00	7,171.52	11,797.62	7,161.90	111.76	117.49	89.58	22.63	4,427.36	1,309.19	1,080.32	228.87	5.720	
11,700.00	7,171.48	11,897.62	7,161.92	114.12	119.87	89.58	22.40	4,527.36	1,308.88	1,075.27	233.61	5.603	
11,800.00	7,171.44	11,997.61	7,161.94	116.48	122.25	89.58	22.17	4,627.36	1,308.58	1,070.22	238.36	5.490	
11,900.00	7,171.40	12,097.61	7,161.96	118.84	124.63	89.59	21.94	4,727.36	1,308.27	1,065.16	243.11	5.381	
12,000.00	7,171.37	12,197.61	7,161.98	121.20	127.02	89.59	21.71	4,827.36	1,307.97	1,060.10	247.87	5.277	
12,100.00	7,171.33	12,297.61	7,162.00	123.57	129.40	89.59	21.47	4,927.36	1,307.66	1,055.03	252.63	5.176	
12,200.00	7,171.29	12,397.61	7,162.02	125.95	131.79	89.59	21.24	5,027.36	1,307.35	1,049.96	257.39	5.079	
12,300.00	7,171.25	12,497.61	7,162.04	128.32	134.18	89.60	21.01	5,127.36	1,307.05	1,044.89	262.16	4.986	
12,400.00	7,171.22	12,597.61	7,162.06	130.70	136.57	89.60	20.78	5,227.35	1,306.74	1,039.81	266.94	4.895	
12,500.00	7,171.18	12,697.61	7,162.08	133.07	138.96	89.60	20.55	5,327.35	1,306.44	1,034.72	271.71	4.808	
12,600.00	7,171.14	12,797.61	7,162.11	135.46	141.36	89.60	20.32	5,427.35	1,306.13	1,029.64	276.49	4.724	
12,700.00	7,171.10	12,897.61	7,162.13	137.84	143.75	89.61	20.09	5,527.35	1,305.83	1,024.55	281.28	4.642	
12,800.00	7,171.06	12,997.61	7,162.15	140.22	146.15	89.61	19.85	5,627.35	1,305.52	1,019.45	286.07	4.564	
12,900.00	7,171.03	13,097.61	7,162.17	142.61	148.55	89.61	19.62	5,727.35	1,305.22	1,014.36	290.86	4.487	
13,000.00	7,170.99	13,197.61	7,162.19	145.00	150.95	89.61	19.39	5,827.35	1,304.91	1,009.26	295.65	4.414	
13,100.00	7,170.95	13,297.61	7,162.21	147.39	153.35	89.62	19.16	5,927.35	1,304.60	1,004.16	300.44	4.342	
13,200.00	7,170.91	13,397.61	7,162.23	149.78	155.75	89.62	18.93	6,027.35	1,304.30	999.06	305.24	4.273	
13,300.00	7,170.87	13,497.61	7,162.25	152.17	158.16	89.62	18.70	6,127.35	1,303.99	993.95	310.04	4.206	
13,400.00	7,170.84	13,597.61	7,162.27	154.57	160.56	89.62	18.47	6,227.35	1,303.69	988.84	314.85	4.141	
13,500.00	7,170.80	13,697.61	7,162.30	156.96	162.97	89.63	18.23	6,327.35	1,303.38	983.73	319.65	4.078	
13,600.00	7,170.76	13,797.61	7,162.32	159.36	165.37	89.63	18.00	6,427.35	1,303.08	978.62	324.46	4.016	
13,700.00	7,170.72	13,897.61	7,162.34	161.76	167.78	89.63	17.77	6,527.34	1,302.77	973.50	329.27	3.957	
13,800.00	7,170.69	13,997.61	7,162.36	164.16	170.19	89.63	17.54	6,627.34	1,302.47	968.39	334.08	3.899	
13,900.00	7,170.65	14,097.60	7,162.38	166.56	172.59	89.64	17.31	6,727.34	1,302.16	963.27	338.89	3.842	
14,000.00	7,170.61	14,197.60	7,162.40	168.96	175.00	89.64	17.08	6,827.34	1,301.85	958.15	343.71	3.788	
14,100.00	7,170.57	14,297.60	7,162.42	171.36	177.41	89.64	16.85	6,927.34	1,301.55	953.03	348.52	3.734	
14,200.00	7,170.53	14,397.60	7,162.44	173.76	179.83	89.64	16.62	7,027.34	1,301.24	947.90	353.34	3.683	
14,300.00	7,170.50	14,497.60	7,162.46	176.17	182.24	89.65	16.38	7,127.34	1,300.94	942.78	358.16	3.632	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 836H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
14,400.00	7,170.46	14,597.60	7,162.48	178.57	184.65	89.65	16.15	7,227.34	1,300.63	937.65	362.98	3.583	
14,500.00	7,170.42	14,697.60	7,162.51	180.98	187.06	89.65	15.92	7,327.34	1,300.33	932.52	367.80	3.535	
14,600.00	7,170.38	14,797.60	7,162.53	183.39	189.48	89.65	15.69	7,427.34	1,300.02	927.39	372.63	3.489	
14,700.00	7,170.35	14,897.60	7,162.55	185.80	191.89	89.66	15.46	7,527.34	1,299.72	922.26	377.45	3.443	
14,800.00	7,170.31	14,997.60	7,162.57	188.20	194.30	89.66	15.23	7,627.34	1,299.41	917.13	382.28	3.399	
14,900.00	7,170.27	15,097.60	7,162.59	190.61	196.72	89.66	15.00	7,727.34	1,299.10	912.00	387.11	3.356	
15,000.00	7,170.23	15,197.60	7,162.61	193.02	199.14	89.66	14.76	7,827.33	1,298.80	906.86	391.94	3.314	
15,100.00	7,170.19	15,297.60	7,162.63	195.43	201.55	89.67	14.53	7,927.33	1,298.49	901.73	396.77	3.273	
15,200.00	7,170.16	15,397.60	7,162.65	197.85	203.97	89.67	14.30	8,027.33	1,298.19	896.59	401.60	3.233	
15,300.00	7,170.12	15,497.60	7,162.67	200.26	206.39	89.67	14.07	8,127.33	1,297.88	891.45	406.43	3.193	
15,400.00	7,170.08	15,597.60	7,162.69	202.67	208.80	89.67	13.84	8,227.33	1,297.58	886.31	411.26	3.155	
15,500.00	7,170.04	15,697.60	7,162.72	205.08	211.22	89.68	13.61	8,327.33	1,297.27	881.18	416.10	3.118	
15,600.00	7,170.01	15,797.60	7,162.74	207.50	213.64	89.68	13.38	8,427.33	1,296.97	876.03	420.93	3.081	
15,700.00	7,169.97	15,897.60	7,162.76	209.91	216.06	89.68	13.15	8,527.33	1,296.66	870.89	425.77	3.045	
15,800.00	7,169.93	15,997.60	7,162.78	212.33	218.48	89.68	12.91	8,627.33	1,296.35	865.75	430.60	3.011	
15,900.00	7,169.89	16,097.59	7,162.80	214.74	220.90	89.69	12.68	8,727.33	1,296.05	860.61	435.44	2.976	
16,000.00	7,169.85	16,197.59	7,162.82	217.16	223.32	89.69	12.45	8,827.33	1,295.74	855.46	440.28	2.943	
16,100.00	7,169.82	16,297.59	7,162.84	219.58	225.74	89.69	12.22	8,927.33	1,295.44	850.32	445.12	2.910	
16,200.00	7,169.78	16,397.59	7,162.86	221.99	228.16	89.69	11.99	9,027.33	1,295.13	845.17	449.96	2.878	
16,300.00	7,169.74	16,497.59	7,162.88	224.41	230.58	89.70	11.76	9,127.33	1,294.83	840.03	454.80	2.847	
16,400.00	7,169.70	16,597.59	7,162.91	226.83	233.00	89.70	11.53	9,227.32	1,294.52	834.88	459.64	2.816	
16,500.00	7,169.67	16,697.59	7,162.93	229.25	235.43	89.70	11.29	9,327.32	1,294.22	829.73	464.49	2.786	
16,600.00	7,169.63	16,797.59	7,162.95	231.66	237.85	89.70	11.06	9,427.32	1,293.91	824.58	469.33	2.757	
16,700.00	7,169.59	16,897.59	7,162.97	234.08	240.27	89.71	10.83	9,527.32	1,293.61	819.43	474.17	2.728	
16,800.00	7,169.55	16,997.59	7,162.99	236.50	242.69	89.71	10.60	9,627.32	1,293.30	814.28	479.02	2.700	
16,863.36	7,169.53	17,056.99	7,163.00	238.04	244.13	89.71	10.46	9,686.72	1,293.11	811.15	481.96	2.683	
16,900.00	7,169.51	17,056.99	7,163.00	238.92	244.13	89.71	10.46	9,686.72	1,293.63	811.26	482.37	2.682 SF	
17,000.00	7,169.48	17,056.99	7,163.00	241.34	244.13	89.71	10.46	9,686.72	1,300.31	818.74	481.57	2.700	
17,100.00	7,169.44	17,056.99	7,163.00	243.76	244.13	89.71	10.46	9,686.72	1,314.59	836.54	478.05	2.750	
17,200.00	7,169.40	17,056.99	7,163.00	246.18	244.13	89.71	10.46	9,686.72	1,336.21	864.18	472.04	2.831	
17,300.00	7,169.36	17,056.99	7,163.00	248.61	244.13	89.71	10.46	9,686.72	1,364.84	900.97	463.87	2.942	
17,400.00	7,169.32	17,056.99	7,163.00	251.03	244.13	89.71	10.46	9,686.72	1,400.05	946.10	453.95	3.084	
17,500.00	7,169.29	17,056.99	7,163.00	253.45	244.13	89.71	10.46	9,686.72	1,441.34	998.66	442.67	3.256	
17,600.00	7,169.25	17,056.99	7,163.00	255.87	244.13	89.71	10.46	9,686.72	1,488.22	1,057.77	430.45	3.457	
17,700.00	7,169.21	17,056.99	7,163.00	258.29	244.13	89.71	10.46	9,686.72	1,540.17	1,122.54	417.63	3.688	
17,800.00	7,169.17	17,056.99	7,163.00	260.72	244.13	89.71	10.46	9,686.72	1,596.70	1,192.17	404.53	3.947	
17,900.00	7,169.14	17,056.99	7,163.00	263.14	244.13	89.71	10.46	9,686.72	1,657.34	1,265.96	391.38	4.235	
18,000.00	7,169.10	17,056.99	7,163.00	265.56	244.13	89.71	10.46	9,686.72	1,721.66	1,343.27	378.39	4.550	
18,100.00	7,169.06	17,056.99	7,163.00	267.99	244.13	89.71	10.46	9,686.72	1,789.26	1,423.56	365.69	4.893	
18,200.00	7,169.02	17,056.99	7,163.00	270.41	244.13	89.71	10.46	9,686.72	1,859.78	1,506.38	353.40	5.263	
18,300.00	7,168.98	17,056.99	7,163.00	272.84	244.13	89.71	10.46	9,686.72	1,932.90	1,591.32	341.57	5.659	
18,400.00	7,168.95	17,056.99	7,163.00	275.26	244.13	89.71	10.46	9,686.72	2,008.34	1,678.08	330.26	6.081	
18,500.00	7,168.91	17,056.99	7,163.00	277.68	244.13	89.71	10.46	9,686.72	2,085.85	1,766.37	319.48	6.529	
18,600.00	7,168.87	17,056.99	7,163.00	280.11	244.13	89.71	10.46	9,686.72	2,165.20	1,855.97	309.23	7.002	
18,700.00	7,168.83	17,056.99	7,163.00	282.53	244.13	89.71	10.46	9,686.72	2,246.20	1,946.69	299.51	7.500	
18,800.00	7,168.80	17,056.99	7,163.00	284.96	244.13	89.71	10.46	9,686.72	2,328.68	2,038.36	290.31	8.021	
18,900.00	7,168.76	17,056.99	7,163.00	287.38	244.13	89.71	10.46	9,686.72	2,412.48	2,130.87	281.61	8.567	
19,000.00	7,168.72	17,056.99	7,163.00	289.81	244.13	89.71	10.46	9,686.72	2,497.48	2,224.09	273.39	9.135	
19,100.00	7,168.68	17,056.99	7,163.00	292.24	244.13	89.71	10.46	9,686.72	2,583.55	2,317.93	265.62	9.727	
19,200.00	7,168.64	17,056.99	7,163.00	294.66	244.13	89.71	10.46	9,686.72	2,670.59	2,412.32	258.27	10.340	
19,300.00	7,168.61	17,056.99	7,163.00	297.09	244.13	89.71	10.46	9,686.72	2,758.51	2,507.17	251.34	10.975	
19,400.00	7,168.57	17,056.99	7,163.00	299.52	244.13	89.71	10.46	9,686.72	2,847.23	2,602.45	244.78	11.632	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 42 - Rosa Unit 836H - OH - Plan #3												Offset Site Error:	0.00 usft
Survey Program: 0-B001Mb_MWD+HRGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Offset Wellbore Centre		Rule Assigned:				Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,500.00	7,168.53	17,056.99	7,163.00	301.94	244.13	89.71	10.46	9,686.72	2,936.67	2,698.10	238.58	12.309	
19,600.00	7,168.49	17,056.99	7,163.00	304.37	244.13	89.71	10.46	9,686.72	3,026.78	2,794.07	232.71	13.007	
19,700.00	7,168.46	17,056.99	7,163.00	306.80	244.13	89.71	10.46	9,686.72	3,117.48	2,890.33	227.16	13.724	
19,800.00	7,168.42	17,056.99	7,163.00	309.22	244.13	89.71	10.46	9,686.72	3,208.74	2,986.85	221.89	14.461	
19,900.00	7,168.38	17,056.99	7,163.00	311.65	244.13	89.71	10.46	9,686.72	3,300.51	3,083.60	216.91	15.216	
20,000.00	7,168.34	17,056.99	7,163.00	314.08	244.13	89.71	10.46	9,686.72	3,392.74	3,180.56	212.18	15.990	
20,100.00	7,168.30	17,056.99	7,163.00	316.51	244.13	89.71	10.46	9,686.72	3,485.40	3,277.71	207.69	16.782	
20,200.00	7,168.27	17,056.99	7,163.00	318.93	244.13	89.71	10.46	9,686.72	3,578.46	3,375.03	203.42	17.591	
20,300.00	7,168.23	17,056.99	7,163.00	321.36	244.13	89.71	10.46	9,686.72	3,671.88	3,472.51	199.37	18.417	
20,400.00	7,168.19	17,056.99	7,163.00	323.79	244.13	89.71	10.46	9,686.72	3,765.64	3,570.12	195.52	19.260	
20,500.00	7,168.15	17,056.99	7,163.00	326.22	244.13	89.71	10.46	9,686.72	3,859.71	3,667.86	191.85	20.119	
20,600.00	7,168.11	17,056.99	7,163.00	328.65	244.13	89.71	10.46	9,686.72	3,954.07	3,765.72	188.35	20.993	
20,700.00	7,168.08	17,056.99	7,163.00	331.07	244.13	89.71	10.46	9,686.72	4,048.70	3,863.69	185.02	21.883	
20,768.77	7,168.05	17,056.99	7,163.00	332.74	244.13	89.71	10.46	9,686.72	4,113.93	3,931.11	182.82	22.503	
20,800.00	7,168.04	17,056.99	7,163.00	333.50	244.13	89.71	10.46	9,686.72	4,143.59	3,961.75	181.84	22.787	
20,903.75	7,168.00	17,056.99	7,163.00	336.02	244.13	89.71	10.46	9,686.72	4,242.28	4,063.59	178.69	23.740	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 6563+30 @ 6593.00usft (H&P 530)

Offset Depths are relative to Offset Datum

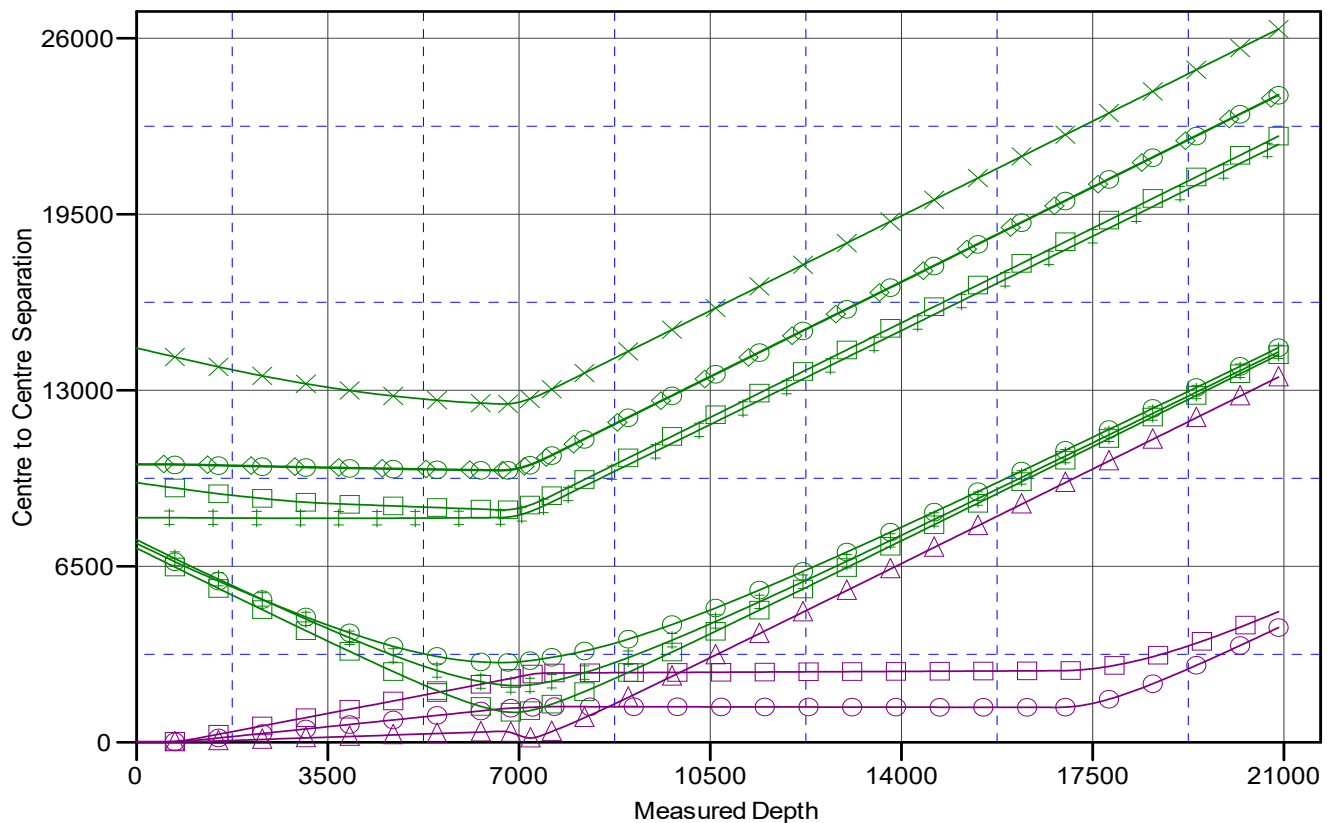
Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit 832H

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

Grid Convergence at Surface is: 0.31°

Ladder Plot



LEGEND

Rosa Unit#664H, OH, OH V0	(O) Pre-Ongard Well#112, OH, OH-TD V0	Rosa Unit#746H, OH, OH V0
Rosa Unit#834H, OH, Plan #3 V0	(O) Rosa Unit#005C, OH, OH-SVY V0	Rosa Unit#745H, OH, OH V0
(O) Rosa Unit#154C, OH, OH-NC V0	Rosa Unit#836H, OH, Plan #3 V0	Rosa Unit#744H, OH, OH V0
Rosa Unit#830H, OH, Plan #2 V0	(O) Rosa Unit#112Y, OH, OH-NC V0	

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

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit 832H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6563+30 @ 6593.00usft (H&P 530)
Reference Site:	Rosa Unit 42	MD Reference:	6563+30 @ 6593.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit 832H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 6563+30 @ 6593.00usft (H&P 530)

Offset Depths are relative to Offset Datum

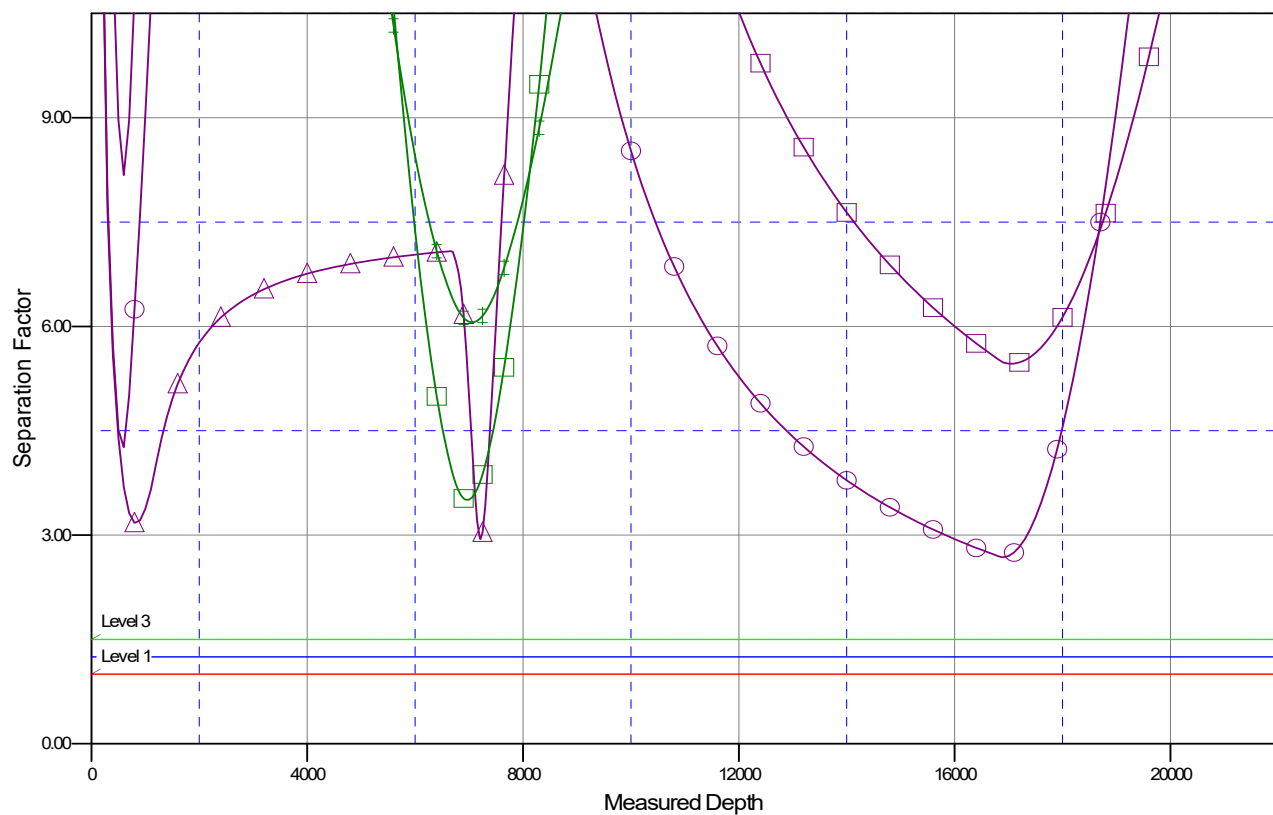
Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit 832H

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

Grid Convergence at Surface is: 0.31°

Separation Factor Plot



LEGEND

Rosa Unit#664H, OH, OH V0	(O) Pre-Ordard Well#112, OH, OH-TD V0	Rosa Unit#746H, OH, OH V0
Rosa Unit#834H, OH, Plan #3 V0	(O) Rosa Unit#006C, OH, OH-SV V0	Rosa Unit#745H, OH, OH V0
(O) Rosa Unit#184C, OH, OH-NC V0	Rosa Unit#836H, OH, Plan #3 V0	Rosa Unit#744H, OH, OH V0
Rosa Unit#830H, OH, Plan #2 V0	(O) Rosa Unit#112YOH, OH-NC V0	

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

District I
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Phone:(575) 393-6161 Fax:(575) 393-0720
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District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 263673

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 263673
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
ward.rikala	Original COA's still apply.	9/14/2023