

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

Heather Riley, Division Director
Oil Conservation Division



New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 5/3/2018

Well information:

Operator LOGOS, Well Name and Number Heros 2308 09L Com SH

API# 30-045-35877, Section 9, Township 23 NS, Range 8 E/W

Conditions of Approval: (See the below checked and handwritten conditions)

- ☒ Notify Aztec OCD 24hrs prior to casing & cement.
- ☒ Hold C-104 for directional survey & "As Drilled" Plat
- ☒ Hold C-104 for NSL, NSP, DHC
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
 - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
 - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
 - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ☐ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ☐ Submit Gas Capture Plan form prior to spudding or initiating recompletion operations
- ☒ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ☒ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ☒ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

Charlene
NMOCD Approved by Signature

6-5-2018
Date

NMOCB

JUN 04 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DISTRICT III

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

5. Lease Serial No.
NMNM018463

6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.
HEROS 2308 09L COM 5H

9. API Well No.

30-045-35877

10. Field and Pool, or Exploratory
NAGEEZI GALLUP / GALLUP

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 9 / T23N / R8W / NMP

12. County or Parish
SAN JUAN

13. State
NM

1a. Type of work: ☒ DRILL ☐ REENTER

1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone

2. Name of Operator
LOGOS OPERATING LLC

3a. Address
2010 Afton Place FARMINGTON NM 87401

3b. Phone No. (include area code)
(505)324-4145

4. Location of Well (Report location clearly and in accordance with any State requirements.)
At surface NWSW / 1476 FSL / 330 FWL / LAT 36.238493 / LONG -107.694535
At proposed prod. zone NENE / 947 FNL / 253 FEL / LAT 36.231786 / LONG -107.678761

14. Distance in miles and direction from nearest town or post office*
39.1 miles

15. Distance from proposed*
location to nearest 253 feet
property or lease line, ft.
(Also to nearest drig. unit line, if any)

16. No. of acres in lease
2243.16

17. Spacing Unit dedicated to this well
280

18. Distance from proposed location*
to nearest well, drilling, completed, 30 feet
applied for, on this lease, ft.

19. Proposed Depth
5245 feet / 10245 feet

20. BLM/BIA Bond No. on file
FED: NMB001387

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
6913 feet

22. Approximate date work will start*
06/15/2018

23. Estimated duration
45 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature
(Electronic Submission)

Name (Printed/Typed)
Marie Florez / Ph: (505)419-8420

Date
05/03/2018

Title
Permitting Tech III

Approved by (Signature)

Name (Printed/Typed)

Date
6/4/18

Title

Office
FARMINGTON

Application approval 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.
Conditions of approval, if any, are attached.

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.

(Continued on page 2)

*(Instructions on page 2)

DRILLING OPERATIONS
AUTHORIZED ARE SUBJECT TO
COMPLIANCE WITH ATTACHED
"GENERAL REQUIREMENTS"

BLM'S APPROVAL OR ACCEPTANCE OF
THIS ACTION DOES NOT RELIEVE THE
LESSEE AND OPERATOR FROM
OBTAINING ANY OTHER AUTHORIZATION
REQUIRED FOR OPERATIONS ON
FEDERAL AND INDIAN LANDS

This action is subject to technical
and procedural review pursuant to
43 CFR 3165.3 and appeal
pursuant to 43 CFR 3165.4

NMOCB

DISTRICT I
1825 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6181 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3480 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-045-35877	² Pool Code 47540	³ Pool Name NAGEEZI GALLUP
⁴ Property Code 317282	⁵ Property Name HEROS 2308 09L COM	⁶ Well Number #5H
⁷ OGRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC	⁹ Elevation 6913

¹⁰ Surface Location

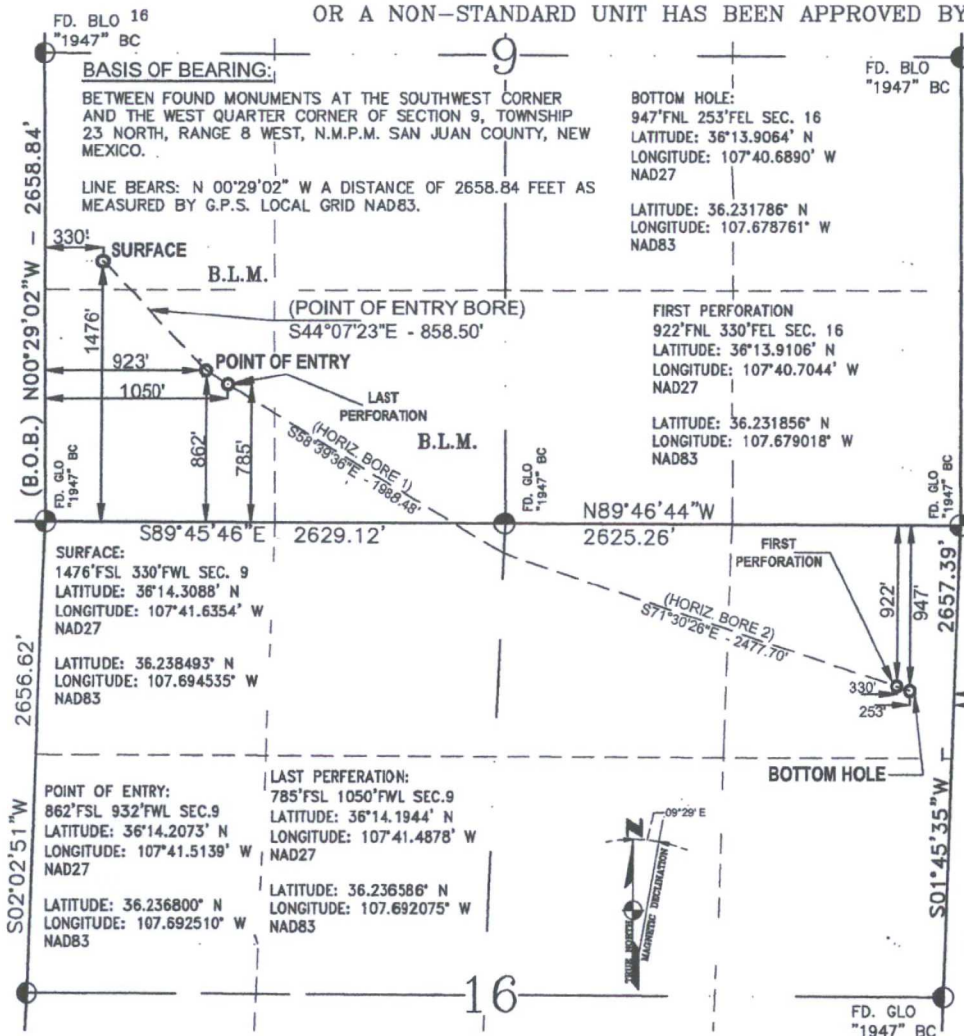
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	9	23-N	8-W		1476	SOUTH	330	WEST	SAN JUAN

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	16	23-N	8-W		947	NORTH	253	EAST	SAN JUAN

¹² Dedicated Acres SEC 9-S/2/SW, NW/SW 120 ACRES SEC 16-NE/NW, NW/NE, S/2/NE 180 ACRES	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



¹⁷ OPERATOR CERTIFICATION

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

Marie E. Florez 5/2/18
Signature Date
Marie E. Florez
Printed Name
mflorez@logosresourcesllc.com
E-mail Address

¹⁸ SURVEYOR CERTIFICATION

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

MAY 2, 2018
Date of Survey
Signature and Seal of Professional Surveyor



GLEN W. RUSSELL
Certificate Number 15703

**Sundry Drilling Plan
LOGOS Operating,
LLC**

5/02/2018

**Heros 2308 9L Com #5H
API # 30-045-
Lease Serial # NMNM 18463**

Surface Location: 1476 FSL, 330 FWL

Legal Description: Sec 9, T23N, R8W (36.238493° N, 107.694535° W – NAD83)

Bottom Hole Location: 947 FNL, 253 FEL

Legal Description: Sec 16, T23N, R8W (36.231786° N, 107.678761° W – NAD83)

San Juan County, NM

1. The elevation of the unprepared ground is 6,913 feet above sea level. Estimated KB Elevation = 6938' (25'KB)
2. The geological name of the surface formation is the Nacimientos.
3. A rotary rig will be used to drill the well to a Proposed Total measured Depth of 5,245' TVD/10,245' MD with the first perforation at the PBHL 10,164'MD/5,245'TVD, 922' FNL, 330' FEL. Sec. 16.
4. Estimated top of important geological markers:

<u>Formation</u>	<u>Depth TVD (ft)</u>	<u>MD (ft)</u>
Nacimientos	Surface	Surface
Ojo Alamo	872	872
Kirtland	1,077	1,077
Fruitland	1,208	1,208
Pictured Cliffs	1,562	1,562
Cliff House	3,098	3,098
Menefee	3,123	3,123
Point Lookout	4,023	4,023
Mancos	4,199	4,199

*estimated vertical tops at SHL"

5. Estimated depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered:

<u>Formation</u>	<u>Depth TVD (ft)</u>	<u>Water/Hydrocarbon</u>
Fruitland	1,208	Gas
Pictured Cliffs	1,562	Gas
Cliff House	3,098	Gas
Point Lookout	4,023	Gas
Mancos	4,199	Oil/Gas

6. All proposed casing is new and the program is as follows:

<u>Casing</u>	<u>Size</u>	<u>Depth</u>		<u>Grade</u>	<u>Weight</u>	<u>Connection</u>	<u>PSI x1000 lbs</u>		
		<u>MD</u>	<u>TVD</u>				<u>Burst</u>	<u>Collapse</u>	<u>Tension</u>
Surface	9-5/8"	0-320'	0-320'	J-55	36.00	STC	3520	2020	394
Intermediate	7"	0-5,763'	0-5,249'	J-55	23.00	LTC	4360	3270	313
Production	4-1/2 "	5,613'-10,245'	5,235'-5,158'	P-110	11.60	LTC	10690	7560	278

7. Cementing Program:

- a. **12-1/4" hole x 9-5/8" casing at 320' MD.** will have cement circulated to surface with 100 sks (50% excess true hole) Type I-II neat cement with 20% flyash 14.5 ppg, 1.61 ft³/sk. Note: CEMENT MUST BE CIRCULATED TO SURFACE. STANDARD BOW SPRING CENTRALIZERS SHALL BE PLACED ON THE FIRST 3 (BOTTOM 3) JOINTS OF CASING (1 PER JOINT) AND 1 EVERY 3RD JOINT TO SURFACE. 20 BBLS OF WATER FOLLOWED BY 20 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Surface Casing to 1500 psi.
- b. **8-3/4" hole x 7" casing at 5,763' MD.** Cement will be circulated to surface in a single stage with 538 sks (60% excess true hole) of HALCEM with 1.0 % CaC₂. 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal (Gilsonite) - 12.3 ppg, 1.95 ft³/sk followed by 248 sks (60% excess true hole) VARICEM with 0.15% Versaset, 0.30% HALAD-9, 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal - 13.5 ppg, 1.3 ft³/sk. ONE CENTRALIZER PER JOINT FOR THE FIRST 3 JOINTS, THEN EVERY OTHER JOINT TO KOP, THEN ONE EVERY 3RD JOINT TO SURFACE. 20 BBLS OF WATER FOLLOWED BY 30 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Intermediate Casing to 1500 psi. Cement additives subject to change based on wellbore conditions and cement design criteria.
- c. **6-1/8" hole x 4-1/2" liner at 10,245' MD.** It will be a conventional liner job using 30% excess for TOC at 5,613' MD liner top, Cement slurry consist of 417 sks EXTENDACEM cement, -13.3 ppg, 1.36 ft³/sk. CENTRALIZERS TO BE USED AT DISCRETION IN LATERAL TO ACHIEVE 70% STAND OFF. CENTRALIZERS TO BE USED TO TIE BACK DEPTH OF 6000' TO ACHIEVE 70% STAND OFF. PACKOFF SEAL ASSEMBLY TO BE USED FOR LINER TOP ISOLATION. Cement additives subject to change based on wellbore conditions and cement design criteria. Liner to be pressure tested during completion operations.

8. Pressure Control Equipment

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

A 2000 psig double ram hydraulic BOP will be used (see attached diagram). Since maximum anticipated formation pressure is 1909 psig (0.364 psi/ft @ 5245' TVD), accessories to the BOP will meet BLM requirements for a 2000 psig system. In accordance with Onshore Order #2 (111.A well requirements) the anticipated surface pressure assuming a partially evacuated hole with normal pressure gradient of 0.22 psi/ft will be 1154 psi (5245' TVD x 0.22 psi/ft).

The accumulator system capacity will be sufficient to close all BOPE with a 50% safety factor. Fill line, kill line and line to the choke manifold will be 2".

BOPs will be function tested every 24 hours and will be recorded on an IADC log. Accessories to the BOPE will include upper and lower Kelly cocks with handles with a stabbing valve to fit drill pipe on the floor at all times, string float at bit, 3000 psig choke manifold with 2" adjustable and 2" positive chokes, and pressure gauge.

All BOP equipment will be hydraulically operated with controls accessible both on the rig floor.

The wellhead BOP equipment will be nipped-up on the 9-5/8" x 11" 2,000 psi WP casing head prior to drilling out from under surface casing. All ram preventers and related equipment will be tested to 2,000 psi for 10 minutes. Annular preventers will be tested to 50% of rated working pressure for 10 minutes. Surface casing will be tested to 1500 psi. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe rams will be activated daily and blind rams shall be activated each trip or at least weekly. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE.

9. Mud Program:

0' - 320'	Fresh water/Spud Mud. Paper for losses and seepage. 8.4 to 8.8 ppg, 32 to 44 vis, PV <8, YP 2 to 13, FLNC, LGS < 3%
320' - 5,763'	KCL WBM. As needed LCM for losses and seepage. 9.0 to 9.5 ppg, pH 9.0-9.5, 38 to 45 vis, PV 8-14, YP 8-14, FL <20cc/30min, LGS <6%
5,763' - 10,245'	LSND WBM. As needed LCM for losses and seepage. 8.8 to 9.0 ppg, PH 9.0-9.5, 34 to 38 vis, PV 4-8, YP 6-8, FL <8cc/30min, LGS < 4%

**During drilling operations, all necessary products will be sufficiently stored on location for abnormal situations. The characteristics, use, testing of drilling mud and the implementation of related drilling procedures shall be designed to prevent the loss of well control. Sufficient quantities of mud materials shall be maintained or readily accessible for the purpose of assuring well control.

**A pH of 8.0-9.0 in the fresh water base mud system shall be maintained to control the effects corrosion has on metallurgy of equipment used.

Operating and Maintenance

LOGOS Operating will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times. A trip/surge tank will be used to monitor returns for any "kicks" of formation fluids.

Equipment:

1- Drying Shaker

2- Centrifuges with stands and pumps

2- Cuttings Drive in Bins

2-Roll off bins

1-400 bbl Diffuser/Cement tank

1-Flock Tank

Electronic or Visual monitoring system to indicate lost returns and gas detection sensors

10. Testing, Logging and Coring Program:

- a. Testing Program: No drillstem tests are anticipated
- b. Electric Logging Program: None
- c. LWD Program: TBD
- d. Coring Program: None anticipated.
- e. CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.
- f. MudLogging: On location from 4500' TVD to TD.

11. Bottom Hole Pressure expected to be 2,500 +/- psi

12. Bottom Hole Temperature expected to be 150 deg F.



Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Heros 2308-09L
Well: Heros 2308-09L 5H
Wellbore: OH
Design: Plan #2

PROJECT DETAILS: San Juan, NM NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: True



Azimuths to True North
Magnetic North: 8.92

Magnetic Field
Strength: 49561.4sn
Dip Angle: 62.83
Date: 5/2/201
Model: HDG1

WELL DETAILS: Heros 2308-09L 5H

GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
+N/-S +E/-W Northing Easting Latitude Longitude 5H
0.00 0.00 1906138.88 2764022.56 36.2384926 -107.6945348

Plan: Plan #2 (Heros 2308-09L 5H/OH)

Created By: Janie Collins Date: 14:39, May 10 2018

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
Heros 5H LP	5253.00	-573.93	628.08	1905565.86	2764651.46
Heros 5H BHL	5228.00	-2337.98	4651.40	1903807.57	2768677.31
Heros 5H First Perf	5228.00	-2305.95	4578.26	1903839.49	2768604.12
Heros 5H Last Perf	5253.00	-633.26	765.21	1905506.72	2764788.68

SECTION DETAILS

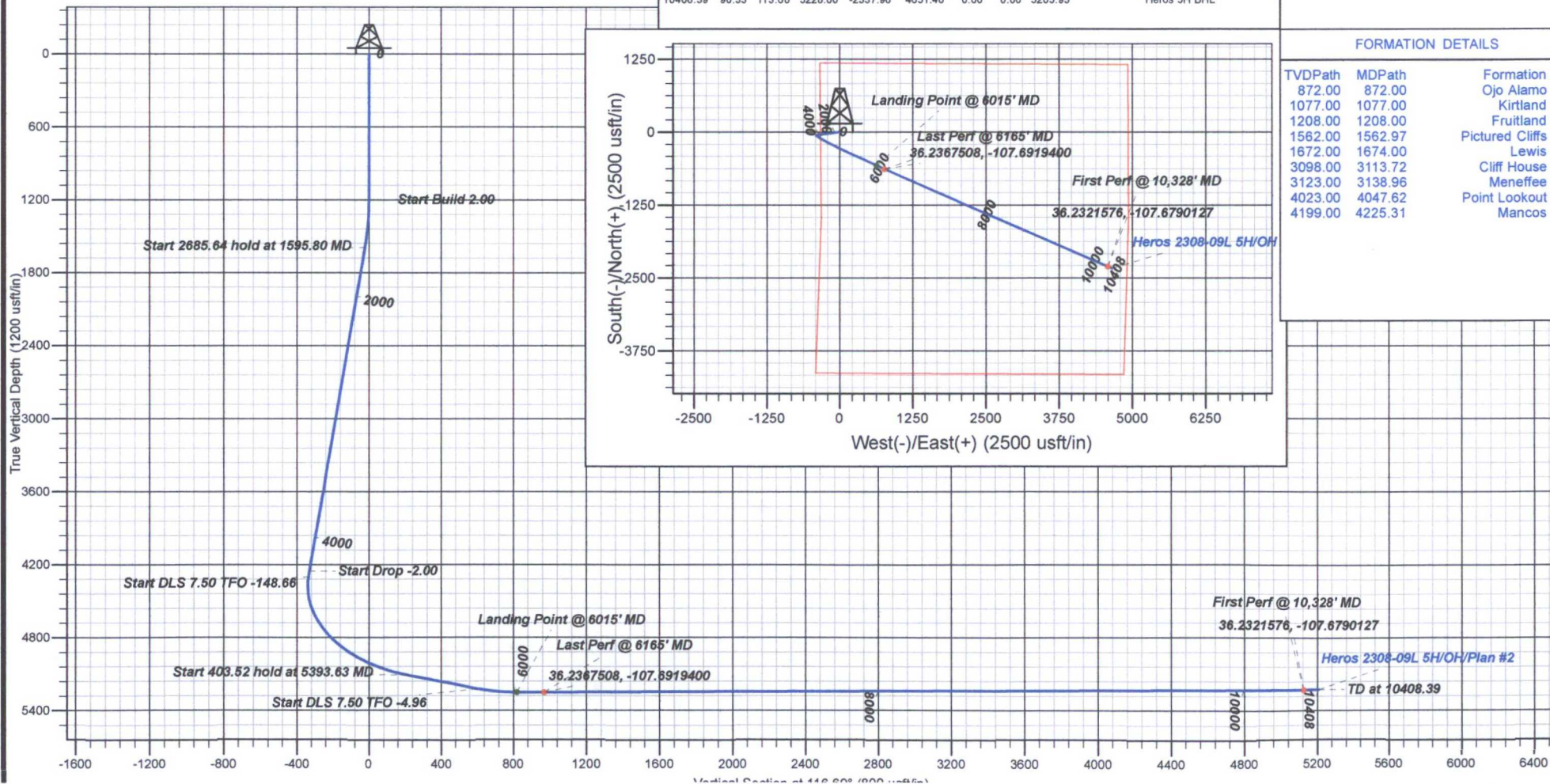
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00	
1595.80	7.92	262.87	1594.54	-3.39	-27.09	2.00	262.87	-22.68	
4281.44	7.92	262.87	4254.59	-49.26	-394.10	0.00	0.00	-330.00	
4327.24	7.00	262.87	4300.00	-50.00	-400.00	2.00	180.00	-334.94	
5393.63	74.03	115.07	5112.36	-320.73	80.52	7.50	-148.66	215.98	
5797.15	74.03	115.07	5223.41	-485.11	431.91	0.00	0.00	603.77	
6015.26	90.33	113.68	5253.00	-573.93	628.08	7.50	-4.96	818.93	Heros 5H LP
10408.39	90.33	113.68	5228.00	-2337.98	4651.40	0.00	0.00	5205.93	Heros 5H BHL

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
872.00	872.00	Ojo Alamo
1077.00	1077.00	Kirtland
1208.00	1208.00	Fruitland
1562.00	1562.97	Pictured Cliffs
1672.00	1674.00	Lewis
3098.00	3113.72	Cliff House
3123.00	3138.96	Menefee
4023.00	4047.62	Point Lookout
4199.00	4225.31	Mancos





Logos Operating LLC

San Juan, NM NAD83

Heros 2308-09L

Heros 2308-09L 5H - Slot 5H

OH

Plan: Plan #2

Standard Planning Report

10 May, 2018



www.scientificdrilling.com

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Company:	Logos Operating LLC	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site:	Heros 2308-09L	North Reference:	True
Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Project	San Juan, 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		Heros 2308-09L			
Site Position:		Northing:	1,906,138.89 usft	Latitude:	36.2384930
From:	Map	Easting:	2,763,932.56 usft	Longitude:	-107.6948400
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.08 °

Well	Heros 2308-09L 5H - Slot 5H					
Well Position	+N/-S	-0.13 usft	Northing:	1,906,138.89 usft	Latitude:	36.2384926
	+E/-W	90.00 usft	Easting:	2,764,022.56 usft	Longitude:	-107.6945348
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,913.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/2/2018	8.92	62.83	49,561

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	116.69

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	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,595.80	7.92	262.87	1,594.54	-3.39	-27.09	2.00	2.00	0.00	262.87	
4,281.44	7.92	262.87	4,254.59	-49.26	-394.10	0.00	0.00	0.00	0.00	
4,327.24	7.00	262.87	4,300.00	-50.00	-400.00	2.00	-2.00	0.00	180.00	
5,393.63	74.03	115.07	5,112.36	-320.73	80.52	7.50	6.29	-13.86	-148.66	
5,797.15	74.03	115.07	5,223.41	-485.11	431.91	0.00	0.00	0.00	0.00	
6,015.26	90.33	113.68	5,253.00	-573.93	628.08	7.50	7.47	-0.64	-4.96	Heros 5H LP
10,408.39	90.33	113.68	5,228.00	-2,337.98	4,651.40	0.00	0.00	0.00	0.00	Heros 5H BHL

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Company:	Logos Operating LLC	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site:	Heros 2308-09L	North Reference:	True
Well:	Heros 2308-09L 5H	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
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
872.00	0.00	0.00	872.00	0.00	0.00	0.00	0.00	0.00	0.00
Ojo Alamo									
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,077.00	0.00	0.00	1,077.00	0.00	0.00	0.00	0.00	0.00	0.00
Kirtland									
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,208.00	0.16	262.87	1,208.00	0.00	-0.01	-0.01	2.00	2.00	0.00
Fruitland									
1,300.00	2.00	262.87	1,299.98	-0.22	-1.73	-1.45	2.00	2.00	0.00
1,400.00	4.00	262.87	1,399.84	-0.87	-6.92	-5.80	2.00	2.00	0.00
1,500.00	6.00	262.87	1,499.45	-1.95	-15.57	-13.04	2.00	2.00	0.00
1,562.97	7.26	262.87	1,562.00	-2.85	-22.79	-19.08	2.00	2.00	0.00
Pictured Cliffs									
1,595.80	7.92	262.87	1,594.54	-3.39	-27.09	-22.68	2.00	2.00	0.00
Start 2685.64 hold at 1595.80 MD									
1,600.00	7.92	262.87	1,598.70	-3.46	-27.66	-23.16	0.00	0.00	0.00
1,674.00	7.92	262.87	1,672.00	-4.72	-37.77	-31.63	0.00	0.00	0.00
Lewis									
1,700.00	7.92	262.87	1,697.75	-5.17	-41.33	-34.61	0.00	0.00	0.00
1,800.00	7.92	262.87	1,796.80	-6.87	-54.99	-46.05	0.00	0.00	0.00
1,900.00	7.92	262.87	1,895.84	-8.58	-68.66	-57.49	0.00	0.00	0.00
2,000.00	7.92	262.87	1,994.89	-10.29	-82.32	-68.93	0.00	0.00	0.00
2,100.00	7.92	262.87	2,093.94	-12.00	-95.99	-80.38	0.00	0.00	0.00
2,200.00	7.92	262.87	2,192.98	-13.71	-109.66	-91.82	0.00	0.00	0.00
2,300.00	7.92	262.87	2,292.03	-15.42	-123.32	-103.26	0.00	0.00	0.00
2,400.00	7.92	262.87	2,391.08	-17.12	-136.99	-114.71	0.00	0.00	0.00
2,500.00	7.92	262.87	2,490.13	-18.83	-150.65	-126.15	0.00	0.00	0.00
2,600.00	7.92	262.87	2,589.17	-20.54	-164.32	-137.59	0.00	0.00	0.00
2,700.00	7.92	262.87	2,688.22	-22.25	-177.99	-149.04	0.00	0.00	0.00
2,800.00	7.92	262.87	2,787.27	-23.96	-191.65	-160.48	0.00	0.00	0.00
2,900.00	7.92	262.87	2,886.31	-25.66	-205.32	-171.92	0.00	0.00	0.00
3,000.00	7.92	262.87	2,985.36	-27.37	-218.98	-183.36	0.00	0.00	0.00
3,100.00	7.92	262.87	3,084.41	-29.08	-232.65	-194.81	0.00	0.00	0.00
3,113.72	7.92	262.87	3,098.00	-29.32	-234.52	-196.38	0.00	0.00	0.00
Cliff House									
3,138.96	7.92	262.87	3,123.00	-29.75	-237.97	-199.27	0.00	0.00	0.00
Meneffee									
3,200.00	7.92	262.87	3,183.46	-30.79	-246.31	-206.25	0.00	0.00	0.00
3,300.00	7.92	262.87	3,282.50	-32.50	-259.98	-217.69	0.00	0.00	0.00

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Company:	Logos Operating LLC	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site:	Heros 2308-09L	North Reference:	True
Well:	Heros 2308-09L 5H	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)
3,400.00	7.92	262.87	3,381.55	-34.21	-273.65	-229.14	0.00	0.00	0.00
3,500.00	7.92	262.87	3,480.60	-35.91	-287.31	-240.58	0.00	0.00	0.00
3,600.00	7.92	262.87	3,579.64	-37.62	-300.98	-252.02	0.00	0.00	0.00
3,700.00	7.92	262.87	3,678.69	-39.33	-314.64	-263.46	0.00	0.00	0.00
3,800.00	7.92	262.87	3,777.74	-41.04	-328.31	-274.91	0.00	0.00	0.00
3,900.00	7.92	262.87	3,876.79	-42.75	-341.97	-286.35	0.00	0.00	0.00
4,000.00	7.92	262.87	3,975.83	-44.46	-355.64	-297.79	0.00	0.00	0.00
4,047.62	7.92	262.87	4,023.00	-45.27	-362.15	-303.24	0.00	0.00	0.00
Point Lookout									
4,100.00	7.92	262.87	4,074.88	-46.16	-369.31	-309.24	0.00	0.00	0.00
4,200.00	7.92	262.87	4,173.93	-47.87	-382.97	-320.68	0.00	0.00	0.00
4,225.31	7.92	262.87	4,199.00	-48.30	-386.43	-323.58	0.00	0.00	0.00
Mancos									
4,281.44	7.92	262.87	4,254.59	-49.26	-394.10	-330.00	0.00	0.00	0.00
Start Drop -2.00									
4,300.00	7.54	262.87	4,272.98	-49.57	-396.58	-332.07	2.00	-2.00	0.00
4,327.24	7.00	262.87	4,300.00	-50.00	-400.00	-334.94	2.00	-2.00	0.00
Start DLS 7.50 TFO -148.66									
4,400.00	3.67	212.32	4,372.47	-52.52	-405.65	-338.85	7.50	-4.57	-69.48
4,500.00	7.86	141.43	4,472.04	-60.58	-403.10	-332.95	7.50	4.18	-70.89
4,600.00	14.91	127.83	4,570.03	-73.84	-388.65	-314.09	7.50	7.05	-13.61
4,700.00	22.25	122.96	4,664.76	-92.06	-362.57	-282.60	7.50	7.34	-4.87
4,800.00	29.67	120.43	4,754.60	-114.93	-325.28	-239.02	7.50	7.42	-2.53
4,900.00	37.12	118.84	4,838.03	-142.06	-277.44	-184.08	7.50	7.45	-1.59
5,000.00	44.59	117.72	4,913.61	-172.99	-219.85	-118.74	7.50	7.46	-1.12
5,100.00	52.06	116.87	4,980.06	-207.19	-153.51	-44.11	7.50	7.47	-0.86
5,200.00	59.54	116.17	5,036.23	-244.07	-79.54	38.54	7.50	7.48	-0.70
5,300.00	67.02	115.57	5,081.16	-283.00	0.77	127.79	7.50	7.48	-0.60
5,393.63	74.03	115.07	5,112.36	-320.73	80.52	215.98	7.50	7.48	-0.54
Start 403.52 hold at 5393.63 MD									
5,400.00	74.03	115.07	5,114.11	-323.32	86.07	222.10	0.00	0.00	0.00
5,500.00	74.03	115.07	5,141.63	-364.06	173.15	318.20	0.00	0.00	0.00
5,600.00	74.03	115.07	5,169.15	-404.80	260.23	414.30	0.00	0.00	0.00
5,700.00	74.03	115.07	5,196.67	-445.53	347.31	510.40	0.00	0.00	0.00
5,797.15	74.03	115.07	5,223.41	-485.11	431.91	603.77	0.00	0.00	0.00
Start DLS 7.50 TFO -4.96									
5,800.00	74.24	115.05	5,224.19	-486.27	434.39	606.51	7.50	7.47	-0.67
5,900.00	81.71	114.40	5,245.01	-527.14	523.17	704.18	7.50	7.47	-0.65
6,000.00	89.19	113.77	5,252.94	-567.79	614.12	803.69	7.50	7.47	-0.63
6,015.26	90.33	113.68	5,253.00	-573.93	628.08	818.93	7.50	7.47	-0.62
Landing Point @ 6015' MD - Heros 5H LP									
6,100.00	90.33	113.68	5,252.52	-607.96	705.69	903.56	0.00	0.00	0.00
6,164.67	90.33	113.68	5,252.15	-633.92	764.91	968.13	0.00	0.00	0.00
Heros 5H Last Perf									
6,165.00	90.33	113.68	5,252.15	-634.06	765.22	968.47	0.00	0.00	0.00
Last Perf @ 6165' MD - 36.2367508, -107.6919400									
6,200.00	90.33	113.68	5,251.95	-648.11	797.27	1,003.42	0.00	0.00	0.00
6,300.00	90.33	113.68	5,251.38	-688.27	888.86	1,103.28	0.00	0.00	0.00
6,400.00	90.33	113.68	5,250.81	-728.42	980.44	1,203.14	0.00	0.00	0.00
6,500.00	90.33	113.68	5,250.24	-768.58	1,072.02	1,303.00	0.00	0.00	0.00
6,600.00	90.33	113.68	5,249.67	-808.73	1,163.60	1,402.86	0.00	0.00	0.00

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Company:	Logos Operating LLC	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site:	Heros 2308-09L	North Reference:	True
Well:	Heros 2308-09L 5H	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)
6,700.00	90.33	113.68	5,249.10	-848.89	1,255.18	1,502.72	0.00	0.00	0.00
6,800.00	90.33	113.68	5,248.53	-889.04	1,346.76	1,602.58	0.00	0.00	0.00
6,900.00	90.33	113.68	5,247.97	-929.20	1,438.35	1,702.44	0.00	0.00	0.00
7,000.00	90.33	113.68	5,247.40	-969.35	1,529.93	1,802.30	0.00	0.00	0.00
7,100.00	90.33	113.68	5,246.83	-1,009.51	1,621.51	1,902.16	0.00	0.00	0.00
7,200.00	90.33	113.68	5,246.26	-1,049.66	1,713.09	2,002.02	0.00	0.00	0.00
7,300.00	90.33	113.68	5,245.69	-1,089.82	1,804.67	2,101.88	0.00	0.00	0.00
7,400.00	90.33	113.68	5,245.12	-1,129.98	1,896.26	2,201.74	0.00	0.00	0.00
7,500.00	90.33	113.68	5,244.55	-1,170.13	1,987.84	2,301.60	0.00	0.00	0.00
7,600.00	90.33	113.68	5,243.98	-1,210.29	2,079.42	2,401.46	0.00	0.00	0.00
7,700.00	90.33	113.68	5,243.41	-1,250.44	2,171.00	2,501.32	0.00	0.00	0.00
7,800.00	90.33	113.68	5,242.84	-1,290.60	2,262.58	2,601.18	0.00	0.00	0.00
7,900.00	90.33	113.68	5,242.27	-1,330.75	2,354.16	2,701.04	0.00	0.00	0.00
8,000.00	90.33	113.68	5,241.71	-1,370.91	2,445.75	2,800.90	0.00	0.00	0.00
8,100.00	90.33	113.68	5,241.14	-1,411.06	2,537.33	2,900.76	0.00	0.00	0.00
8,200.00	90.33	113.68	5,240.57	-1,451.22	2,628.91	3,000.62	0.00	0.00	0.00
8,300.00	90.33	113.68	5,240.00	-1,491.37	2,720.49	3,100.48	0.00	0.00	0.00
8,400.00	90.33	113.68	5,239.43	-1,531.53	2,812.07	3,200.35	0.00	0.00	0.00
8,500.00	90.33	113.68	5,238.86	-1,571.68	2,903.66	3,300.21	0.00	0.00	0.00
8,600.00	90.33	113.68	5,238.29	-1,611.84	2,995.24	3,400.07	0.00	0.00	0.00
8,700.00	90.33	113.68	5,237.72	-1,651.99	3,086.82	3,499.93	0.00	0.00	0.00
8,800.00	90.33	113.68	5,237.15	-1,692.15	3,178.40	3,599.79	0.00	0.00	0.00
8,900.00	90.33	113.68	5,236.58	-1,732.30	3,269.98	3,699.65	0.00	0.00	0.00
9,000.00	90.33	113.68	5,236.01	-1,772.46	3,361.57	3,799.51	0.00	0.00	0.00
9,100.00	90.33	113.68	5,235.45	-1,812.61	3,453.15	3,899.37	0.00	0.00	0.00
9,200.00	90.33	113.68	5,234.88	-1,852.77	3,544.73	3,999.23	0.00	0.00	0.00
9,300.00	90.33	113.68	5,234.31	-1,892.93	3,636.31	4,099.09	0.00	0.00	0.00
9,400.00	90.33	113.68	5,233.74	-1,933.08	3,727.89	4,198.95	0.00	0.00	0.00
9,500.00	90.33	113.68	5,233.17	-1,973.24	3,819.47	4,298.81	0.00	0.00	0.00
9,600.00	90.33	113.68	5,232.60	-2,013.39	3,911.06	4,398.67	0.00	0.00	0.00
9,700.00	90.33	113.68	5,232.03	-2,053.55	4,002.64	4,498.53	0.00	0.00	0.00
9,800.00	90.33	113.68	5,231.46	-2,093.70	4,094.22	4,598.39	0.00	0.00	0.00
9,900.00	90.33	113.68	5,230.89	-2,133.86	4,185.80	4,698.25	0.00	0.00	0.00
10,000.00	90.33	113.68	5,230.32	-2,174.01	4,277.38	4,798.11	0.00	0.00	0.00
10,100.00	90.33	113.68	5,229.76	-2,214.17	4,368.97	4,897.97	0.00	0.00	0.00
10,200.00	90.33	113.68	5,229.19	-2,254.32	4,460.55	4,997.83	0.00	0.00	0.00
10,300.00	90.33	113.68	5,228.62	-2,294.48	4,552.13	5,097.69	0.00	0.00	0.00
10,328.00	90.33	113.68	5,228.46	-2,305.72	4,577.77	5,125.65	0.00	0.00	0.00
36.2321576, -107.6790127 - First Perf @ 10,328' MD									
10,328.54	90.33	113.68	5,228.45	-2,305.94	4,578.27	5,126.19	0.00	0.00	0.00
Heros 5H First Perf									
10,400.00	90.33	113.68	5,228.05	-2,334.63	4,643.71	5,197.55	0.00	0.00	0.00
10,408.39	90.33	113.68	5,228.00	-2,337.98	4,651.40	5,205.93	0.00	0.00	0.00
TD at 10408.39 - Heros 5H BHL									

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Company:	Logos Operating LLC	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site:	Heros 2308-09L	North Reference:	True
Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Heros 5H BHL	0.00	0.00	5,228.00	-2,337.98	4,651.40	1,903,807.57	2,768,677.31	36.2320690	-107.6787630
- plan hits target center									
- Point									
Heros 5H First Perf	0.00	0.00	5,228.00	-2,305.95	4,578.26	1,903,839.49	2,768,604.12	36.2321570	-107.6790110
- plan misses target center by 0.45usft at 10328.54usft MD (5228.45 TVD, -2305.94 N, 4578.27 E)									
- Point									
Heros 5H LP	0.00	0.00	5,253.00	-573.93	628.08	1,905,565.86	2,764,651.47	36.2369160	-107.6924050
- plan hits target center									
- Point									
Heros 5H Last Perf	0.00	0.00	5,253.00	-633.26	765.21	1,905,506.72	2,764,788.68	36.2367530	-107.6919400
- plan misses target center by 1.12usft at 6164.67usft MD (5252.15 TVD, -633.92 N, 764.91 E)									
- Point									

Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
872.00	872.00	Ojo Alamo		0.00	0.00
1,077.00	1,077.00	Kirtland		0.00	0.00
1,208.00	1,208.00	Fruitland		0.00	0.00
1,562.97	1,562.00	Pictured Cliffs		0.00	0.00
1,674.00	1,672.00	Lewis		0.00	0.00
3,113.72	3,098.00	Cliff House		0.00	0.00
3,138.96	3,123.00	Meneffee		0.00	0.00
4,047.62	4,023.00	Point Lookout		0.00	0.00
4,225.31	4,199.00	Mancos		0.00	0.00

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
1,200.00	1,200.00	0.00	0.00	Start Build 2.00
1,595.80	1,594.54	-3.39	-27.09	Start 2685.64 hold at 1595.80 MD
4,281.44	4,254.59	-49.26	-394.10	Start Drop -2.00
4,327.24	4,300.00	-50.00	-400.00	Start DLS 7.50 TFO -148.66
5,393.63	5,112.36	-320.73	80.52	Start 403.52 hold at 5393.63 MD
5,797.15	5,223.41	-485.11	431.91	Start DLS 7.50 TFO -4.96
6,015.26	5,253.00	-573.93	628.08	Landing Point @ 6015' MD
6,165.00	5,252.15	-634.06	765.22	Last Perf @ 6165' MD
6,165.00	5,252.15	-634.06	765.22	36.2367508, -107.6919400
10,328.00	5,228.46	-2,305.72	4,577.77	36.2321576, -107.6790127
10,328.00	5,228.46	-2,305.72	4,577.77	First Perf @ 10,328' MD
10,408.39	5,228.00	-2,337.98	4,651.40	TD at 10408.39



Logos Operating LLC

San Juan, NM NAD83

Heros 2308-09L

Heros 2308-09L 5H

OH

Plan #2

Anticollision Report

10 May, 2018



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Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference	Plan #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 15,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	5/10/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	10,408.39	Plan #2 (OH)	MWD+HDGM	OWSG MWD + HDGM	

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						
Heros 2308-09L						
Heros 2308-09L 1H - OH - OH	765.27	743.39	118.81	114.39	26.885	CC
Heros 2308-09L 1H - OH - OH	900.00	877.44	119.40	114.02	22.180	ES
Heros 2308-09L 1H - OH - OH	5,500.00	6,941.23	174.25	137.45	4.736	SF
Heros 2308-09L 2H - OH - Plan #6	500.00	500.00	90.00	86.86	28.693	CC
Heros 2308-09L 2H - OH - Plan #6	600.00	598.86	90.62	86.77	23.521	ES
Heros 2308-09L 2H - OH - Plan #6	10,300.00	10,350.70	2,457.85	2,151.79	8.031	SF
Heros 2308-09L 3H - OH - Plan #6	1,612.13	1,605.54	55.58	44.52	5.026	CC, ES
Heros 2308-09L 3H - OH - Plan #6	10,300.00	10,251.18	1,440.95	1,132.76	4.675	SF
Heros 2308-09L 4H - OH - Plan #6	1,526.96	1,524.51	24.35	13.94	2.340	CC, ES, SF
State NM 16 #21 Unit C - OH - OH	7,767.38	5,218.32	1,198.44	962.43	5.078	CC
State NM 16 #21 Unit C - OH - OH	7,800.00	5,218.13	1,198.88	961.94	5.060	ES
State NM 16 #21 Unit C - OH - OH	7,900.00	5,217.56	1,205.75	966.31	5.036	SF

Offset Design	Heros 2308-09L - Heros 2308-09L 1H - OH - OH												Offset Site Error:	0.00 usft
Survey Program:	404-MWD												Offset Well Error:	0.00 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	-89.93	0.14	-120.09	122.09					
100.00	100.00	78.08	78.08	0.13	0.14	-89.94	0.12	-120.07	120.07	119.79	0.27	437.132		
200.00	200.00	178.18	178.18	0.49	0.32	-89.97	0.06	-119.96	119.96	119.15	0.81	147.631		
300.00	300.00	278.27	278.27	0.85	0.50	-90.02	-0.05	-119.77	119.78	118.42	1.35	88.688		
400.00	400.00	378.37	378.37	1.21	0.88	-90.10	-0.20	-119.51	119.51	117.62	1.89	63.281		
471.49	471.49	449.49	449.49	1.47	0.88	-90.13	-0.27	-119.35	119.35	117.00	2.35	50.861		
500.00	500.00	477.89	477.89	1.57	0.98	-90.11	-0.23	-119.37	119.37	116.82	2.55	46.885		
600.00	600.00	578.22	578.22	1.93	1.32	-90.10	-0.21	-119.36	119.36	116.11	3.25	36.722		
700.00	700.00	678.55	678.53	2.29	1.67	-89.30	1.44	-119.00	119.01	115.05	3.96	30.069		
765.27	765.27	743.39	743.27	2.52	1.90	-87.60	4.97	-118.70	118.81	114.39	4.42	26.885	CC	
800.00	800.00	777.75	777.56	2.64	2.02	-86.54	7.17	-118.66	118.88	114.21	4.67	25.482		
900.00	900.00	877.44	876.91	3.00	2.38	-82.60	15.38	-118.40	119.40	114.02	5.38	22.180	ES	
1,000.00	1,000.00	976.33	975.25	3.36	2.74	-77.73	25.69	-118.16	120.95	114.84	6.11	19.788		
1,100.00	1,100.00	1,074.62	1,072.90	3.72	3.12	-72.67	36.94	-118.38	124.11	117.26	6.85	18.115		

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

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Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
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Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 1H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 404-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						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)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,200.00	1,200.00	1,172.63	1,169.92	4.08	3.50	-66.74	50.83	-118.26	128.97	121.37	7.61	16.959		
1,300.00	1,299.98	1,269.01	1,264.72	4.43	3.90	37.44	68.15	-118.18	135.68	127.31	8.37	16.212		
1,400.00	1,399.84	1,366.04	1,359.50	4.77	4.32	46.08	88.81	-116.64	142.88	133.75	9.13	15.653		
1,500.00	1,499.45	1,460.36	1,450.91	5.12	4.76	55.70	111.86	-113.45	152.43	142.53	9.90	15.399		
1,600.00	1,598.70	1,550.85	1,537.78	5.47	5.20	65.26	136.90	-109.83	167.23	156.57	10.66	15.686		
1,700.00	1,697.75	1,637.37	1,620.26	5.84	5.66	73.48	162.93	-107.38	188.94	177.55	11.40	16.581		
1,800.00	1,796.80	1,720.94	1,698.64	6.21	6.13	80.09	191.81	-105.29	218.65	206.57	12.08	18.098		
1,900.00	1,895.84	1,805.30	1,776.71	6.58	6.64	85.52	223.64	-102.77	254.02	241.30	12.72	19.967		
2,000.00	1,994.89	1,895.73	1,859.98	6.96	7.21	89.90	258.85	-100.61	292.44	279.08	13.36	21.886		
2,100.00	2,093.94	1,982.27	1,939.66	7.34	7.76	92.96	292.60	-99.63	332.10	318.11	14.00	23.729		
2,200.00	2,192.98	2,061.80	2,012.17	7.73	8.30	95.05	325.27	-99.64	374.47	359.88	14.59	25.659		
2,300.00	2,292.03	2,138.77	2,081.35	8.11	8.84	96.75	359.00	-99.30	419.96	404.79	15.17	27.682		
2,400.00	2,391.08	2,219.75	2,153.37	8.50	9.44	98.23	396.03	-98.81	467.63	451.85	15.78	29.635		
2,500.00	2,490.13	2,300.43	2,224.66	8.89	10.05	99.38	433.80	-98.74	516.57	500.18	16.39	31.511		
2,600.00	2,589.17	2,401.64	2,314.64	9.29	10.81	100.79	480.09	-96.78	564.77	547.56	17.21	32.825		
2,700.00	2,688.22	2,482.00	2,386.30	9.68	11.42	101.93	516.28	-93.46	612.79	594.96	17.83	34.361		
2,800.00	2,787.27	2,569.76	2,464.14	10.08	12.09	103.10	556.52	-88.63	662.00	643.46	18.54	35.703		
2,900.00	2,886.31	2,684.08	2,566.98	10.48	12.94	104.63	605.72	-80.28	709.01	689.50	19.51	36.345		
3,000.00	2,985.36	2,805.90	2,678.51	10.87	13.80	106.03	653.98	-71.93	753.00	732.47	20.53	36.682		
3,100.00	3,084.41	2,893.82	2,759.93	11.27	14.41	106.80	686.89	-67.77	794.54	773.29	21.25	37.393		
3,200.00	3,183.46	2,985.59	2,844.54	11.67	15.05	107.44	722.27	-64.40	837.03	815.02	22.01	38.032		
3,300.00	3,282.50	3,108.19	2,958.79	12.07	15.87	108.15	766.62	-61.38	876.96	853.93	23.03	38.072		
3,400.00	3,381.55	3,201.87	3,046.72	12.48	16.48	108.59	798.91	-60.14	915.17	891.36	23.81	38.435		
3,500.00	3,480.60	3,272.49	3,112.54	12.88	16.95	108.87	824.47	-59.36	954.98	930.58	24.39	39.147		
3,600.00	3,579.64	3,352.35	3,186.54	13.28	17.50	109.15	854.49	-58.27	996.23	971.18	25.06	39.756		
3,700.00	3,678.69	3,424.63	3,253.15	13.68	18.01	109.39	882.52	-57.15	1,038.73	1,013.07	25.65	40.495		
3,800.00	3,777.74	3,486.37	3,309.53	14.09	18.46	109.60	907.63	-55.63	1,083.25	1,057.11	26.13	41.450		
3,900.00	3,876.79	3,577.99	3,392.69	14.49	19.13	109.92	945.94	-52.36	1,129.12	1,102.20	26.92	41.936		
4,000.00	3,975.83	3,702.97	3,506.95	14.89	20.04	110.30	996.43	-48.67	1,173.62	1,145.57	28.05	41.844		
4,100.00	4,074.88	3,790.37	3,587.49	15.30	20.66	110.56	1,030.29	-46.34	1,216.40	1,187.61	28.79	42.248		
4,200.00	4,173.93	3,679.55	3,523.80	15.70	26.70	-169.06	-105.77	60.15	1,198.32	1,173.52	24.80	48.324		
4,300.00	4,272.98	3,674.93	3,524.06	16.11	26.67	-169.39	-101.16	60.11	1,112.45	1,086.69	25.76	43.186		
4,400.00	4,372.47	3,671.83	3,524.23	16.49	26.64	-122.73	-98.07	60.08	1,026.61	999.73	26.88	38.194		
4,500.00	4,472.04	3,674.84	3,524.06	16.80	26.66	-58.54	-101.08	60.11	937.46	909.43	28.03	33.449		
4,600.00	4,570.03	3,683.87	3,523.56	17.06	26.73	-53.89	-110.09	60.19	845.43	816.28	29.15	29.004		
4,700.00	4,664.76	3,698.54	3,526.73	17.31	26.84	-61.50	-124.73	60.31	751.17	720.97	30.20	24.873		
4,800.00	4,754.60	3,718.33	3,521.57	17.54	26.98	-76.72	-144.49	60.42	655.32	624.20	31.12	21.058		
4,900.00	4,838.03	3,743.82	3,520.04	17.79	27.17	-98.71	-169.93	60.48	558.67	526.83	31.83	17.550		
5,000.00	4,913.61	3,775.15	3,528.03	18.13	27.41	-124.09	-201.20	60.26	462.07	429.88	32.19	14.354		
5,100.00	4,980.06	3,806.52	3,555.88	18.64	27.66	-146.38	-232.49	59.65	367.12	335.38	31.73	11.569		
5,200.00	5,036.23	3,837.00	3,553.88	19.42	27.90	-162.42	-262.89	58.90	277.40	247.76	29.64	9.359		
5,300.00	5,081.16	3,869.74	3,551.90	20.51	28.17	-175.08	-295.57	58.00	201.45	176.88	24.57	8.198		
5,400.00	5,114.11	3,904.07	3,550.13	21.91	28.46	-173.44	-329.83	56.98	160.80	137.75	23.06	6.974		
5,423.90	5,120.69	3,912.47	3,549.75	22.30	28.53	-170.63	-338.22	56.72	159.25	133.32	25.93	6.141		
5,500.00	5,141.63	3,941.23	3,548.44	23.57	28.79	-161.09	-366.94	55.83	174.25	137.45	36.79	4.736 SF		
5,600.00	5,169.15	3,979.30	3,546.21	25.41	29.13	-149.22	-404.92	54.64	228.21	182.99	45.22	5.047		
5,700.00	5,196.67	4,014.39	3,544.01	27.40	29.46	-139.65	-439.92	53.52	301.92	253.50	48.42	6.235		
5,800.00	5,224.19	4,050.10	3,542.06	29.52	29.80	-131.30	-475.56	52.31	384.30	334.38	49.93	7.697		
5,900.00	5,245.01	4,089.07	3,540.15	31.77	30.18	-113.48	-514.46	51.11	472.55	421.50	51.05	9.257		
6,000.00	5,252.94	4,132.99	3,538.27	34.15	30.62	-93.85	-558.33	50.06	564.18	511.90	52.28	10.792		
6,100.00	5,252.52	4,183.53	3,536.79	36.80	31.15	-90.82	-608.84	49.62	656.10	602.28	53.82	12.191		

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

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

Offset Design Heros 2308-09L - Heros 2308-09L 1H - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 404-MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Tooface (")	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
6,200.00	5,251.95	7,239.04	5,236.08	39.12	31.76	90.41	-664.34	50.33	747.15	691.54	55.61	13.435	
6,300.00	5,251.38	7,288.71	5,236.11	41.70	32.32	90.39	-713.99	51.62	837.66	780.42	57.23	14.636	
6,400.00	5,250.81	7,346.40	5,236.51	44.31	33.00	90.41	-771.64	53.86	927.62	868.39	59.23	15.661	
6,500.00	5,250.24	7,400.68	5,236.13	46.97	33.66	90.34	-825.85	56.65	1,017.01	955.86	61.15	16.632	
6,600.00	5,249.67	7,457.08	5,234.68	49.66	34.36	90.16	-882.12	60.10	1,105.96	1,042.77	63.20	17.500	
6,700.00	5,249.10	7,503.61	5,233.75	52.37	34.96	90.06	-928.54	63.23	1,194.63	1,129.74	64.89	18.411	
6,800.00	5,248.53	7,545.52	5,233.12	55.11	35.50	90.01	-970.35	65.97	1,283.39	1,216.98	66.41	19.326	
6,900.00	5,247.97	7,584.65	5,232.45	57.87	36.01	89.96	-1,009.41	68.35	1,372.36	1,304.52	67.84	20.230	
7,000.00	5,247.40	7,628.95	5,231.52	60.64	36.59	89.89	-1,053.62	70.90	1,461.47	1,391.96	69.51	21.025	
7,100.00	5,246.83	7,673.54	5,230.36	63.43	37.19	89.81	-1,098.12	73.46	1,550.59	1,479.38	71.21	21.773	
7,200.00	5,246.26	7,735.58	5,228.43	66.23	38.04	89.69	-1,160.02	77.09	1,639.72	1,566.03	73.69	22.251	
7,300.00	5,245.69	7,823.79	5,226.64	69.04	39.27	89.61	-1,247.91	84.42	1,727.51	1,650.17	77.34	22.338	
7,400.00	5,245.12	7,858.42	5,225.96	71.87	39.76	89.59	-1,282.39	87.52	1,815.15	1,736.45	78.69	23.066	
7,500.00	5,244.55	7,895.00	5,224.97	74.70	40.28	89.55	-1,318.85	90.33	1,903.32	1,823.18	80.15	23.748	
7,600.00	5,243.98	7,945.76	5,223.74	77.54	41.02	89.50	-1,369.45	94.14	1,991.65	1,909.43	82.23	24.221	
7,700.00	5,243.41	8,072.18	5,222.95	80.38	42.88	89.53	-1,495.27	106.35	2,079.12	1,991.46	87.65	23.720	
7,800.00	5,242.84	8,134.16	5,221.67	83.23	43.83	89.49	-1,556.77	113.87	2,165.14	2,074.85	90.29	23.979	
7,900.00	5,242.27	8,168.80	5,220.61	86.09	44.36	89.46	-1,591.15	118.03	2,251.25	2,159.50	91.74	24.538	
8,000.00	5,241.71	8,202.00	5,219.88	88.95	44.86	89.44	-1,624.14	121.72	2,337.78	2,244.65	93.13	25.101	
8,100.00	5,241.14	8,231.50	5,219.50	91.82	45.32	89.44	-1,653.47	124.76	2,424.71	2,330.35	94.36	25.696	
8,200.00	5,240.57	8,263.00	5,219.41	94.69	45.80	89.45	-1,684.83	127.80	2,511.99	2,416.32	95.68	26.255	
8,300.00	5,240.00	8,314.27	5,219.18	97.57	46.59	89.47	-1,735.88	132.59	2,599.42	2,501.54	97.88	26.556	
8,400.00	5,239.43	8,358.92	5,218.40	100.45	47.28	89.45	-1,780.32	136.77	2,686.84	2,587.04	99.80	26.921	
8,500.00	5,238.86	8,570.35	5,216.14	103.33	50.64	89.46	-1,990.11	162.53	2,772.88	2,663.66	109.22	25.389	
8,600.00	5,238.29	8,989.73	5,208.27	106.22	57.80	89.35	-2,399.11	253.08	2,852.95	2,725.51	127.44	22.387	
8,700.00	5,237.72	9,146.61	5,202.51	109.10	60.62	89.24	-2,549.09	298.69	2,928.93	2,794.65	134.28	21.813	
8,800.00	5,237.15	9,669.72	5,199.04	111.99	70.48	89.33	-3,031.97	497.81	2,996.82	2,841.52	155.30	19.297	
8,900.00	5,236.58	9,767.04	5,197.71	114.89	72.39	89.32	-3,118.97	541.40	3,060.77	2,900.92	159.84	19.149	
9,000.00	5,236.01	9,845.01	5,196.62	117.78	73.93	89.32	-3,188.49	576.68	3,124.26	2,960.57	163.69	19.086	
9,100.00	5,235.45	9,926.51	5,195.62	120.68	75.55	89.32	-3,261.01	613.86	3,187.43	3,019.74	167.69	19.008	
9,200.00	5,234.88	10,086.00	5,194.11	123.58	78.76	89.33	-3,402.49	687.46	3,250.54	3,075.93	174.60	18.617	
9,300.00	5,234.31	10,149.00	5,193.77	126.48	80.04	89.34	-3,457.90	717.43	3,312.00	3,134.03	177.97	18.609	
9,400.00	5,233.74	10,182.70	5,193.76	129.38	80.73	89.34	-3,487.71	733.16	3,374.26	3,194.04	180.22	18.723	
9,500.00	5,233.17	10,212.00	5,193.75	132.28	81.33	89.35	-3,513.79	746.50	3,437.55	3,255.31	182.24	18.863	
9,600.00	5,232.60	10,248.42	5,193.41	135.19	82.07	89.35	-3,546.41	762.68	3,501.82	3,317.33	184.49	18.981	
9,700.00	5,232.03	10,276.00	5,192.74	138.09	82.63	89.35	-3,571.27	774.62	3,567.05	3,380.71	186.34	19.142	
9,800.00	5,231.46	10,318.23	5,191.55	141.00	83.49	89.33	-3,609.52	792.47	3,633.12	3,444.38	188.75	19.249	
9,900.00	5,230.89	10,365.19	5,190.38	143.91	84.45	89.32	-3,652.29	811.84	3,699.94	3,508.62	191.32	19.339	
10,000.00	5,230.32	10,443.82	5,187.96	146.82	86.05	89.29	-3,723.96	844.06	3,767.03	3,571.82	195.20	19.298	
10,100.00	5,229.76	10,592.00	5,185.32	149.73	89.11	89.27	-3,857.85	907.49	3,831.97	3,629.97	202.00	18.970	
10,200.00	5,229.19	10,592.00	5,185.32	152.64	89.11	89.27	-3,857.85	907.49	3,898.21	3,695.57	202.64	19.237	
10,300.00	5,228.62	10,592.00	5,185.32	155.56	89.11	89.27	-3,857.85	907.49	3,965.85	3,762.67	203.18	19.519	
10,399.98	5,228.05	10,592.00	5,185.32	158.47	89.11	89.27	-3,857.85	907.49	4,034.83	3,831.19	203.64	19.814	
10,408.39	5,228.00	10,592.00	5,185.32	158.71	89.11	89.27	-3,857.85	907.49	4,040.71	3,837.04	203.67	19.839	

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 2H - OH - Plan #6													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	-89.92	0.13	-90.00	90.00				
100.00	100.00	100.00	100.00	0.13	0.13	-89.92	0.13	-90.00	90.00	89.73	0.27	334.754	
200.00	200.00	200.00	200.00	0.49	0.49	-89.92	0.13	-90.00	90.00	89.01	0.99	91.297	
300.00	300.00	300.00	300.00	0.85	0.85	-89.92	0.13	-90.00	90.00	88.30	1.70	52.856	
400.00	400.00	400.00	400.00	1.21	1.21	-89.92	0.13	-90.00	90.00	87.58	2.42	37.195	
500.00	500.00	500.00	500.00	1.57	1.57	-89.92	0.13	-90.00	90.00	86.86	3.14	28.693 CC	
600.00	600.00	598.86	598.84	1.93	1.92	-88.91	1.73	-90.60	90.62	86.77	3.85	23.521 ES	
700.00	700.00	697.49	697.34	2.29	2.28	-85.98	6.50	-92.39	92.66	88.08	4.58	20.245	
800.00	800.00	795.65	795.13	2.64	2.64	-81.41	14.40	-95.36	96.57	91.25	5.32	18.167	
900.00	900.00	893.12	891.89	3.00	2.99	-75.71	25.34	-99.47	102.97	96.90	6.07	16.952	
1,000.00	1,000.00	989.69	987.31	3.36	3.36	-69.47	39.21	-104.69	112.51	105.65	6.85	16.417	
1,100.00	1,100.00	1,085.14	1,081.08	3.72	3.73	-63.27	55.87	-110.95	125.66	118.01	7.64	16.442	
1,200.00	1,200.00	1,180.09	1,173.73	4.08	4.13	-57.52	75.27	-118.24	142.61	134.19	8.42	16.940	
1,300.00	1,299.98	1,277.52	1,268.60	4.43	4.54	-44.62	96.09	-126.06	160.37	151.24	9.12	17.575	
1,400.00	1,399.84	1,375.02	1,363.52	4.77	4.97	-49.41	116.92	-133.89	176.95	167.13	9.82	18.027	
1,500.00	1,499.45	1,472.47	1,458.40	5.12	5.40	-54.13	137.74	-141.71	192.63	182.13	10.51	18.334	
1,600.00	1,598.70	1,569.75	1,553.11	5.47	5.84	-58.88	158.52	-149.52	207.76	196.56	11.20	18.551	
1,700.00	1,697.75	1,666.91	1,647.71	5.84	6.28	-63.54	179.28	-157.32	223.56	211.66	11.90	18.785	
1,800.00	1,796.80	1,764.08	1,742.31	6.21	6.72	-67.58	200.04	-165.12	240.64	228.03	12.61	19.084	
1,900.00	1,895.84	1,861.24	1,836.91	6.58	7.16	-71.09	220.79	-172.92	258.76	245.43	13.33	19.417	
2,000.00	1,994.89	1,958.41	1,931.52	6.96	7.61	-74.13	241.55	-180.72	277.71	263.66	14.05	19.764	
2,100.00	2,093.94	2,055.57	2,026.12	7.34	8.06	-76.79	262.31	-188.53	297.33	282.55	14.78	20.112	
2,200.00	2,192.98	2,152.74	2,120.72	7.73	8.51	-79.12	283.07	-196.33	317.50	301.98	15.52	20.452	
2,300.00	2,292.03	2,249.91	2,215.32	8.11	8.97	-81.17	303.83	-204.13	338.13	321.85	16.27	20.781	
2,400.00	2,391.08	2,347.07	2,309.92	8.50	9.42	-82.99	324.58	-211.93	359.12	342.09	17.02	21.095	
2,500.00	2,490.13	2,444.24	2,404.52	8.89	9.87	-84.60	345.34	-219.73	380.42	362.64	17.78	21.394	
2,600.00	2,589.17	2,541.40	2,499.12	9.29	10.33	-86.05	366.10	-227.53	401.99	383.44	18.54	21.677	
2,700.00	2,688.22	2,638.57	2,593.72	9.68	10.79	-87.35	386.86	-235.33	423.78	404.46	19.31	21.944	
2,800.00	2,787.27	2,735.73	2,688.32	10.08	11.24	-88.52	407.62	-243.13	445.75	425.67	20.08	22.197	
2,900.00	2,886.31	2,832.90	2,782.92	10.48	11.70	-89.59	428.37	-250.93	467.89	447.03	20.85	22.435	
3,000.00	2,985.36	2,930.06	2,877.53	10.87	12.16	-90.55	449.13	-258.73	490.17	468.54	21.63	22.660	
3,100.00	3,084.41	3,027.23	2,972.13	11.27	12.62	-91.44	469.89	-266.53	512.57	490.16	22.41	22.873	
3,200.00	3,183.46	3,124.39	3,066.73	11.67	13.08	-92.25	490.65	-274.33	535.08	511.89	23.19	23.073	
3,300.00	3,282.50	3,221.56	3,161.33	12.07	13.54	-92.99	511.41	-282.13	557.68	533.70	23.97	23.263	
3,400.00	3,381.55	3,318.72	3,255.93	12.48	14.00	-93.68	532.16	-289.93	580.36	555.60	24.76	23.442	
3,500.00	3,480.60	3,415.89	3,350.53	12.88	14.46	-94.31	552.92	-297.74	603.12	577.58	25.54	23.612	
3,600.00	3,579.64	3,513.05	3,445.13	13.28	14.92	-94.90	573.68	-305.54	625.94	599.61	26.33	23.772	
3,700.00	3,678.69	3,610.22	3,539.73	13.68	15.38	-95.45	594.44	-313.34	648.82	621.70	27.12	23.925	
3,800.00	3,777.74	3,707.39	3,634.33	14.09	15.84	-95.96	615.20	-321.14	671.76	643.85	27.91	24.069	
3,900.00	3,876.79	3,804.55	3,728.94	14.49	16.30	-96.44	635.95	-328.94	694.74	666.04	28.70	24.207	
4,000.00	3,975.83	3,901.72	3,823.54	14.89	16.76	-96.89	656.71	-336.74	717.76	688.27	29.49	24.338	
4,100.00	4,074.88	3,998.88	3,918.14	15.30	17.22	-97.31	677.47	-344.54	740.83	710.54	30.28	24.462	
4,200.00	4,173.93	4,096.05	4,012.74	15.70	17.68	-97.70	698.23	-352.34	763.93	732.85	31.08	24.581	
4,300.00	4,272.98	4,193.22	4,107.34	16.11	18.14	-98.15	718.99	-360.14	787.05	755.18	31.87	24.695	
4,400.00	4,372.47	4,290.18	4,201.75	16.49	18.60	-98.56	739.70	-367.93	811.29	778.66	32.63	24.864	
4,500.00	4,472.04	4,383.76	4,302.64	16.80	19.09	-98.91	761.67	-376.18	839.96	806.60	33.36	25.180	
4,600.00	4,570.03	4,522.13	4,428.51	17.06	19.67	-99.22	785.17	-385.01	870.60	836.40	34.20	25.457	
4,700.00	4,664.76	4,634.35	4,539.33	17.31	20.11	-99.57	802.20	-393.69	903.25	868.41	34.84	25.925	
4,800.00	4,754.60	4,751.83	4,654.21	17.54	20.48	-99.87	817.16	-394.94	938.32	902.87	35.45	26.470	
4,900.00	4,838.03	4,875.04	4,770.55	17.79	20.79	-100.14	829.35	-396.69	974.99	938.94	36.05	27.046	
5,000.00	4,913.61	5,004.36	4,884.86	18.13	21.05	-100.44	837.92	-397.15	1,012.43	975.71	36.72	27.574	

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 2H - OH - Plan #6													Offset Site Error:	0.00 usft	
Survey Program: 0-MWD+HDGM														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							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)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
5,100.00	4,980.06	5,140.02	4,992.66	18.64	21.26	-109.08	842.03	-185.19	1,049.77	1,012.16	37.61	27.912			
5,200.00	5,036.23	5,281.88	5,088.52	19.42	21.42	-106.50	840.83	-80.89	1,086.16	1,047.16	39.00	27.853			
5,300.00	5,081.16	5,424.44	5,164.19	20.51	21.69	-103.77	834.07	39.49	1,120.82	1,079.67	41.15	27.238			
5,400.00	5,114.11	5,559.93	5,214.40	21.91	23.08	-101.11	823.54	164.70	1,153.92	1,109.80	44.13	26.150			
5,500.00	5,141.63	5,695.95	5,241.88	23.57	25.36	-100.28	809.60	297.00	1,184.42	1,136.43	48.00	24.677			
5,600.00	5,169.15	5,799.16	5,249.97	25.41	27.37	-99.07	797.38	399.15	1,212.87	1,161.07	51.81	23.411			
5,700.00	5,196.67	5,892.21	5,256.59	27.40	29.36	-98.00	786.29	491.31	1,241.66	1,185.95	55.71	22.289			
5,800.00	5,224.19	6,021.66	5,262.04	29.52	32.30	-96.35	769.41	619.46	1,269.81	1,209.02	60.79	20.887			
5,900.00	5,245.01	6,115.48	5,262.19	31.77	34.54	-93.15	755.73	712.29	1,296.85	1,231.65	65.19	19.893			
6,000.00	5,252.94	6,211.39	5,262.35	34.15	36.91	-90.65	741.74	807.17	1,323.71	1,253.90	69.82	18.960			
6,100.00	5,252.52	6,307.85	5,262.50	36.60	39.36	-90.35	727.67	902.60	1,350.10	1,275.51	74.59	18.101			
6,200.00	5,251.95	6,404.31	5,262.66	39.12	41.86	-90.37	713.60	998.02	1,376.47	1,296.99	79.48	17.318			
6,300.00	5,251.38	6,500.76	5,262.81	41.70	44.42	-90.39	699.53	1,093.45	1,402.84	1,318.36	84.49	16.604			
6,400.00	5,250.81	6,597.22	5,262.97	44.31	47.02	-90.42	685.46	1,188.88	1,429.22	1,339.64	89.58	15.955			
6,500.00	5,250.24	6,693.68	5,263.12	46.97	49.64	-90.44	671.39	1,284.30	1,455.59	1,360.84	94.75	15.363			
6,600.00	5,249.67	6,790.14	5,263.28	49.66	52.30	-90.46	657.32	1,379.73	1,481.96	1,381.99	99.98	14.823			
6,700.00	5,249.10	6,886.60	5,263.43	52.37	54.98	-90.48	643.25	1,475.16	1,508.34	1,403.08	105.26	14.330			
6,800.00	5,248.53	6,983.06	5,263.59	55.11	57.69	-90.49	629.18	1,570.58	1,534.71	1,424.12	110.58	13.878			
6,900.00	5,247.97	7,079.51	5,263.74	57.87	60.41	-90.51	615.11	1,666.01	1,561.08	1,445.13	115.95	13.463			
7,000.00	5,247.40	7,175.97	5,263.90	60.64	63.15	-90.53	601.04	1,761.44	1,587.46	1,466.11	121.35	13.082			
7,100.00	5,246.83	7,272.43	5,264.05	63.43	65.90	-90.54	586.97	1,856.86	1,613.83	1,487.05	126.78	12.730			
7,200.00	5,246.26	7,368.89	5,264.21	66.23	68.66	-90.56	572.90	1,952.29	1,640.20	1,507.97	132.23	12.404			
7,300.00	5,245.69	7,465.35	5,264.36	69.04	71.44	-90.58	558.84	2,047.72	1,666.58	1,528.87	137.71	12.102			
7,400.00	5,245.12	7,561.81	5,264.52	71.87	74.22	-90.59	544.77	2,143.14	1,692.95	1,549.74	143.21	11.822			
7,500.00	5,244.55	7,658.26	5,264.67	74.70	77.02	-90.61	530.70	2,238.57	1,719.33	1,570.60	148.72	11.561			
7,600.00	5,243.98	7,754.72	5,264.83	77.54	79.82	-90.62	516.63	2,334.00	1,745.70	1,591.45	154.26	11.317			
7,700.00	5,243.41	7,851.18	5,264.98	80.38	82.62	-90.63	502.56	2,429.42	1,772.08	1,612.27	159.80	11.089			
7,800.00	5,242.84	7,947.64	5,265.14	83.23	85.44	-90.65	488.49	2,524.85	1,798.45	1,633.09	165.36	10.876			
7,900.00	5,242.27	8,044.10	5,265.29	86.09	88.26	-90.66	474.42	2,620.28	1,824.82	1,653.89	170.93	10.676			
8,000.00	5,241.71	8,140.56	5,265.45	88.95	91.08	-90.67	460.35	2,715.70	1,851.20	1,674.69	176.51	10.488			
8,100.00	5,241.14	8,237.01	5,265.60	91.82	93.91	-90.68	446.28	2,811.13	1,877.57	1,695.47	182.10	10.311			
8,200.00	5,240.57	8,333.47	5,265.76	94.69	96.75	-90.70	432.21	2,906.56	1,903.95	1,716.25	187.70	10.144			
8,300.00	5,240.00	8,429.93	5,265.91	97.57	99.59	-90.71	418.14	3,001.98	1,930.32	1,737.02	193.31	9.986			
8,400.00	5,239.43	8,526.39	5,266.07	100.45	102.43	-90.72	404.07	3,097.41	1,956.70	1,757.78	198.92	9.836			
8,500.00	5,238.86	8,622.85	5,266.22	103.33	105.27	-90.73	390.00	3,192.84	1,983.07	1,778.53	204.54	9.695			
8,600.00	5,238.29	8,719.31	5,266.38	106.22	108.12	-90.74	375.93	3,288.26	2,009.45	1,799.28	210.17	9.561			
8,700.00	5,237.72	8,815.77	5,266.53	109.10	110.97	-90.75	361.86	3,383.69	2,035.83	1,820.02	215.80	9.434			
8,800.00	5,237.15	8,912.22	5,266.69	111.99	113.83	-90.76	347.79	3,479.12	2,062.20	1,840.76	221.44	9.313			
8,900.00	5,236.58	9,008.68	5,266.84	114.89	116.68	-90.77	333.73	3,574.54	2,088.58	1,861.49	227.08	9.197			
9,000.00	5,236.01	9,105.14	5,267.00	117.78	119.54	-90.78	319.66	3,669.97	2,114.95	1,882.22	232.73	9.088			
9,100.00	5,235.45	9,201.60	5,267.15	120.68	122.40	-90.79	305.59	3,765.40	2,141.33	1,902.94	238.38	8.983			
9,200.00	5,234.88	9,298.06	5,267.31	123.58	125.26	-90.80	291.52	3,860.82	2,167.70	1,923.66	244.04	8.883			
9,300.00	5,234.31	9,394.52	5,267.46	126.48	128.13	-90.81	277.45	3,956.25	2,194.08	1,944.38	249.70	8.787			
9,400.00	5,233.74	9,490.97	5,267.62	129.38	130.99	-90.82	263.38	4,051.68	2,220.45	1,965.09	255.36	8.695			
9,500.00	5,233.17	9,587.43	5,267.77	132.28	133.86	-90.83	249.31	4,147.10	2,246.83	1,985.80	261.03	8.608			
9,600.00	5,232.60	9,683.89	5,267.93	135.19	136.73	-90.83	235.24	4,242.53	2,273.21	2,006.51	266.69	8.524			
9,700.00	5,232.03	9,780.35	5,268.08	138.09	139.60	-90.84	221.17	4,337.96	2,299.58	2,027.22	272.37	8.443			
9,800.00	5,231.46	9,876.81	5,268.24	141.00	142.47	-90.85	207.10	4,433.38	2,325.96	2,047.92	278.04	8.366			
9,900.00	5,230.89	9,973.27	5,268.39	143.91	145.35	-90.86	193.03	4,528.81	2,352.33	2,068.62	283.72	8.291			
10,000.00	5,230.32	10,069.72	5,268.55	146.82	148.22	-90.87	178.96	4,624.24	2,378.71	2,089.31	289.39	8.220			

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 2H - OH - Plan #6												Offset Site Error:	0.00 usft
Survey Program: O-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						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	
10,100.00	5,229.76	10,166.18	5,268.70	149.73	151.10	-90.87	164.89	4,719.66	2,405.08	2,110.01	295.07	8.151	
10,200.00	5,229.19	10,262.64	5,268.86	152.64	153.97	-90.88	150.82	4,815.09	2,431.46	2,130.70	300.76	8.084	
10,300.00	5,228.62	10,350.70	5,269.00	155.56	156.60	-90.89	137.98	4,902.20	2,457.85	2,151.79	306.06	8.031 SF	
10,399.98	5,228.05	10,350.70	5,269.00	158.47	156.60	-90.89	137.98	4,902.20	2,486.42	2,179.33	307.09	8.097	
10,408.39	5,228.00	10,350.70	5,269.00	158.71	156.60	-90.89	137.98	4,902.20	2,488.96	2,181.80	307.16	8.103	

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 3H - OH - Plan #6														Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM														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	0.00	0.00	0.00	0.00	-90.87	-0.91	-60.00	60.01						
100.00	100.00	100.00	100.00	0.13	0.13	-90.87	-0.91	-60.00	60.01	59.74	0.27	223.200			
200.00	200.00	200.00	200.00	0.49	0.49	-90.87	-0.91	-60.00	60.01	59.02	0.99	60.873			
300.00	300.00	300.00	300.00	0.85	0.85	-90.87	-0.91	-60.00	60.01	58.31	1.70	35.242			
400.00	400.00	400.00	400.00	1.21	1.21	-90.87	-0.91	-60.00	60.01	57.59	2.42	24.800			
500.00	500.00	500.00	500.00	1.57	1.57	-90.87	-0.91	-60.00	60.01	56.87	3.14	19.131			
600.00	600.00	600.00	600.00	1.93	1.93	-90.87	-0.91	-60.00	60.01	56.15	3.85	15.572			
700.00	700.00	700.00	700.00	2.29	2.29	-90.87	-0.91	-60.00	60.01	55.44	4.57	13.129			
800.00	800.00	800.00	800.00	2.64	2.64	-90.87	-0.91	-60.00	60.01	54.72	5.29	11.349			
900.00	900.00	900.00	900.00	3.00	3.00	-90.87	-0.91	-60.00	60.01	54.00	6.00	9.994			
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	-90.87	-0.91	-60.00	60.01	53.29	6.72	8.928			
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	-90.87	-0.91	-60.00	60.01	52.57	7.44	8.067			
1,200.00	1,200.00	1,200.00	1,200.00	4.08	4.08	-90.87	-0.91	-60.00	60.01	51.85	8.16	7.358			
1,300.00	1,299.98	1,298.59	1,298.57	4.43	4.43	7.65	0.33	-61.16	59.44	50.59	8.86	6.711			
1,400.00	1,399.84	1,397.04	1,396.89	4.77	4.78	11.98	4.05	-64.61	57.97	48.41	9.56	6.067			
1,500.00	1,499.45	1,495.20	1,494.68	5.12	5.13	19.58	10.22	-70.34	56.31	46.05	10.26	5.487			
1,600.00	1,598.70	1,593.50	1,592.28	5.47	5.49	30.58	18.72	-78.24	55.60	44.63	10.97	5.067			
1,612.13	1,610.72	1,605.54	1,604.24	5.52	5.53	32.07	19.83	-79.27	55.58	44.52	11.06	5.026 CC, ES			
1,700.00	1,697.75	1,692.77	1,690.77	5.84	5.85	42.77	27.87	-86.73	56.57	44.89	11.68	4.843			
1,800.00	1,796.80	1,792.04	1,789.26	6.21	6.22	54.06	37.01	-95.21	60.00	47.60	12.40	4.837			
1,900.00	1,895.84	1,891.32	1,887.74	6.58	6.59	63.82	46.15	-103.70	65.49	52.36	13.13	4.986			
2,000.00	1,994.89	1,990.59	1,986.23	6.96	6.96	71.89	55.29	-112.19	72.58	58.70	13.87	5.231			
2,100.00	2,093.94	2,089.86	2,084.72	7.34	7.34	78.44	64.43	-120.68	80.85	66.22	14.62	5.529			
2,200.00	2,192.98	2,189.14	2,183.20	7.73	7.71	83.72	73.57	-129.17	89.97	74.59	15.37	5.852			
2,300.00	2,292.03	2,288.41	2,281.69	8.11	8.09	88.00	82.71	-137.66	99.71	83.58	16.13	6.181			
2,400.00	2,391.08	2,387.68	2,380.17	8.50	8.47	91.51	91.86	-146.14	109.91	93.01	16.89	6.507			
2,500.00	2,490.13	2,486.95	2,478.66	8.89	8.85	94.42	101.00	-154.63	120.44	102.79	17.65	6.822			
2,600.00	2,589.17	2,586.23	2,577.15	9.29	9.24	96.86	110.14	-163.12	131.24	112.82	18.42	7.125			
2,700.00	2,688.22	2,685.50	2,675.63	9.68	9.62	98.92	119.28	-171.61	142.23	123.04	19.19	7.413			
2,800.00	2,787.27	2,784.77	2,774.12	10.08	10.01	100.69	128.42	-180.10	153.38	133.43	19.95	7.687			
2,900.00	2,886.31	2,884.05	2,872.61	10.48	10.39	102.21	137.56	-188.59	164.65	143.93	20.72	7.945			
3,000.00	2,985.36	2,983.32	2,971.09	10.87	10.78	103.54	146.71	-197.08	176.03	154.54	21.49	8.189			
3,100.00	3,084.41	3,082.59	3,069.58	11.27	11.16	104.71	155.85	-205.56	187.49	165.22	22.27	8.420			
3,200.00	3,183.46	3,181.87	3,168.06	11.67	11.55	105.74	164.99	-214.05	199.01	175.97	23.04	8.638			
3,300.00	3,282.50	3,281.14	3,266.55	12.07	11.94	106.66	174.13	-222.54	210.60	186.78	23.81	8.843			
3,400.00	3,381.55	3,380.41	3,365.04	12.48	12.33	107.49	183.27	-231.03	222.23	197.64	24.59	9.038			
3,500.00	3,480.60	3,479.69	3,463.52	12.88	12.72	108.23	192.41	-239.52	233.90	208.53	25.36	9.221			
3,600.00	3,579.64	3,578.96	3,562.01	13.28	13.10	108.90	201.55	-248.01	245.61	219.46	26.14	9.395			
3,700.00	3,678.69	3,678.23	3,660.50	13.68	13.49	109.51	210.70	-256.50	257.34	230.42	26.92	9.560			
3,800.00	3,777.74	3,777.51	3,758.98	14.09	13.88	110.07	219.84	-264.98	269.11	241.41	27.70	9.716			
3,900.00	3,876.79	3,876.78	3,857.47	14.49	14.27	110.58	228.98	-273.47	280.89	252.42	28.47	9.865			
4,000.00	3,975.83	3,976.05	3,955.95	14.89	14.66	111.05	238.12	-281.96	292.70	263.45	29.25	10.006			
4,100.00	4,074.88	4,075.33	4,054.44	15.30	15.05	111.48	247.26	-290.45	304.52	274.49	30.03	10.140			
4,200.00	4,173.93	4,174.60	4,152.93	15.70	15.44	111.88	256.40	-298.94	316.36	285.55	30.81	10.268			
4,300.00	4,272.98	4,273.88	4,251.42	16.11	15.84	112.28	265.55	-307.43	328.20	296.60	31.59	10.389			
4,400.00	4,372.47	4,373.08	4,349.84	16.49	16.23	112.91	274.68	-315.91	340.04	307.69	32.35	10.512			
4,500.00	4,472.04	4,475.83	4,452.02	16.80	16.62	-127.59	282.91	-322.35	353.42	320.36	33.06	10.690			
4,600.00	4,570.03	4,579.54	4,555.42	17.06	16.96	-115.26	286.95	-316.86	368.15	334.46	33.69	10.929			
4,700.00	4,664.76	4,685.28	4,659.32	17.31	17.25	-111.37	286.35	-297.67	383.97	349.73	34.25	11.212			
4,800.00	4,754.60	4,793.08	4,761.60	17.54	17.53	-109.53	280.86	-264.34	400.51	365.74	34.77	11.519			
4,900.00	4,838.03	4,902.96	4,859.98	17.79	17.81	-108.35	270.29	-216.77	417.37	382.06	35.31	11.819			

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 3H - OH - Plan #6													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						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	
5,000.00	4,913.61	5,014.87	4,952.00	18.13	18.15	-107.38	254.61	-155.22	434.15	398.17	35.98	12.066	
5,100.00	4,980.06	5,128.69	5,035.09	18.64	18.66	-106.44	233.90	-80.41	450.48	413.54	36.93	12.197	
5,200.00	5,036.23	5,244.22	5,106.74	19.42	19.46	-105.46	208.45	6.43	465.98	427.62	38.36	12.147	
5,300.00	5,081.16	5,352.11	5,160.66	20.51	20.54	-104.39	181.57	95.82	480.82	440.43	40.39	11.905	
5,400.00	5,114.11	5,452.43	5,198.58	21.91	21.87	-103.27	156.63	185.20	497.31	454.33	42.98	11.571	
5,500.00	5,141.63	5,552.35	5,223.97	23.57	23.49	-102.62	132.65	278.75	514.44	468.22	46.22	11.131	
5,600.00	5,169.15	5,649.28	5,236.38	25.41	25.30	-100.66	110.60	372.25	531.70	481.71	49.99	10.635	
5,700.00	5,196.67	5,744.92	5,243.11	27.40	27.29	-98.26	89.51	465.29	549.86	495.75	54.10	10.164	
5,800.00	5,224.19	5,840.03	5,248.85	29.52	29.38	-95.88	68.57	557.87	568.95	510.60	58.35	9.750	
5,900.00	5,245.01	5,935.31	5,248.93	31.77	31.60	-92.12	47.90	650.89	589.07	526.28	62.79	9.381	
6,000.00	5,252.94	6,032.90	5,248.84	34.15	33.97	-89.77	26.74	746.15	609.03	541.58	67.46	9.028	
6,100.00	5,252.52	6,131.01	5,248.75	36.60	36.43	-89.59	5.47	841.93	628.39	556.09	72.30	8.692	
6,200.00	5,251.95	6,229.12	5,248.66	39.12	38.96	-89.64	-15.80	937.70	647.73	570.45	77.28	8.382	
6,300.00	5,251.38	6,327.23	5,248.58	41.70	41.54	-89.69	-37.07	1,033.48	667.07	584.70	82.37	8.099	
6,400.00	5,250.81	6,425.34	5,248.49	44.31	44.17	-89.74	-58.34	1,129.25	686.41	598.86	87.55	7.840	
6,500.00	5,250.24	6,523.45	5,248.40	46.97	46.84	-89.78	-79.61	1,225.03	705.76	612.95	92.81	7.604	
6,600.00	5,249.67	6,621.56	5,248.31	49.66	49.54	-89.83	-100.88	1,320.81	725.10	626.97	98.13	7.389	
6,700.00	5,249.10	6,719.67	5,248.22	52.37	52.27	-89.87	-122.15	1,416.58	744.44	640.93	103.51	7.192	
6,800.00	5,248.53	6,817.78	5,248.13	55.11	55.02	-89.91	-143.42	1,512.36	763.79	654.85	108.94	7.011	
6,900.00	5,247.97	6,915.89	5,248.04	57.87	57.79	-89.94	-164.69	1,608.14	783.13	668.73	114.40	6.845	
7,000.00	5,247.40	7,014.00	5,247.96	60.64	60.58	-89.98	-185.96	1,703.91	802.48	682.58	119.90	6.693	
7,100.00	5,246.83	7,112.11	5,247.87	63.43	63.38	-90.01	-207.24	1,799.69	821.82	696.39	125.43	6.552	
7,200.00	5,246.26	7,210.22	5,247.78	66.23	66.19	-90.04	-228.51	1,895.46	841.17	710.18	130.98	6.422	
7,300.00	5,245.69	7,308.33	5,247.69	69.04	69.02	-90.07	-249.78	1,991.24	860.51	723.95	136.56	6.301	
7,400.00	5,245.12	7,406.44	5,247.60	71.87	71.85	-90.10	-271.05	2,087.02	879.86	737.70	142.16	6.189	
7,500.00	5,244.55	7,504.55	5,247.51	74.70	74.69	-90.13	-292.32	2,182.79	899.20	751.43	147.77	6.085	
7,600.00	5,243.98	7,602.66	5,247.43	77.54	77.55	-90.15	-313.59	2,278.57	918.55	765.15	153.40	5.988	
7,700.00	5,243.41	7,700.77	5,247.34	80.38	80.40	-90.18	-334.86	2,374.35	937.90	778.85	159.05	5.897	
7,800.00	5,242.84	7,798.88	5,247.25	83.23	83.27	-90.20	-356.13	2,470.12	957.24	792.53	164.71	5.812	
7,900.00	5,242.27	7,896.98	5,247.16	86.09	86.14	-90.23	-377.40	2,565.90	976.59	806.21	170.38	5.732	
8,000.00	5,241.71	7,995.09	5,247.07	88.95	89.01	-90.25	-398.67	2,661.68	995.94	819.88	176.06	5.657	
8,100.00	5,241.14	8,093.20	5,246.98	91.82	91.89	-90.27	-419.95	2,757.45	1,015.28	833.54	181.75	5.586	
8,200.00	5,240.57	8,191.31	5,246.90	94.69	94.78	-90.29	-441.22	2,853.23	1,034.63	847.19	187.44	5.520	
8,300.00	5,240.00	8,289.42	5,246.81	97.57	97.67	-90.31	-462.49	2,949.00	1,053.98	860.83	193.15	5.457	
8,400.00	5,239.43	8,387.53	5,246.72	100.45	100.56	-90.33	-483.76	3,044.78	1,073.32	874.46	198.86	5.397	
8,500.00	5,238.86	8,485.64	5,246.63	103.33	103.45	-90.35	-505.03	3,140.56	1,092.67	888.09	204.58	5.341	
8,600.00	5,238.29	8,583.75	5,246.54	106.22	106.35	-90.37	-526.30	3,236.33	1,112.02	901.71	210.31	5.288	
8,700.00	5,237.72	8,681.86	5,246.45	109.10	109.25	-90.39	-547.57	3,332.11	1,131.37	915.33	216.04	5.237	
8,800.00	5,237.15	8,779.97	5,246.36	111.99	112.15	-90.40	-568.84	3,427.89	1,150.71	928.94	221.77	5.189	
8,900.00	5,236.58	8,878.08	5,246.28	114.89	115.06	-90.42	-590.11	3,523.66	1,170.06	942.55	227.51	5.143	
9,000.00	5,236.01	8,976.19	5,246.19	117.78	117.96	-90.44	-611.38	3,619.44	1,189.41	956.15	233.26	5.099	
9,100.00	5,235.45	9,074.30	5,246.10	120.68	120.87	-90.45	-632.66	3,715.21	1,208.76	969.75	239.01	5.057	
9,200.00	5,234.88	9,172.41	5,246.01	123.58	123.78	-90.47	-653.93	3,810.99	1,228.11	983.35	244.76	5.018	
9,300.00	5,234.31	9,270.52	5,245.92	126.48	126.70	-90.48	-675.20	3,906.77	1,247.45	996.94	250.51	4.980	
9,400.00	5,233.74	9,368.63	5,245.83	129.38	129.61	-90.49	-696.47	4,002.54	1,266.80	1,010.53	256.27	4.943	
9,500.00	5,233.17	9,466.74	5,245.75	132.28	132.53	-90.51	-717.74	4,098.32	1,286.15	1,024.12	262.04	4.908	
9,600.00	5,232.60	9,564.85	5,245.66	135.19	135.44	-90.52	-739.01	4,194.10	1,305.50	1,037.70	267.80	4.875	
9,700.00	5,232.03	9,662.96	5,245.57	138.09	138.36	-90.53	-760.28	4,289.87	1,324.85	1,051.28	273.57	4.843	
9,800.00	5,231.46	9,761.07	5,245.48	141.00	141.28	-90.54	-781.55	4,385.65	1,344.20	1,064.86	279.34	4.812	
9,900.00	5,230.89	9,859.18	5,245.39	143.91	144.20	-90.56	-802.82	4,481.42	1,363.54	1,078.43	285.11	4.783	

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 3H - OH - Plan #6													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						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		
10,000.00	5,230.32	9,957.29	5,245.30	146.82	147.12	-90.57	-824.09	4,577.20	1,382.89	1,092.01	290.88	4.754		
10,100.00	5,229.76	10,055.40	5,245.21	149.73	150.05	-90.58	-845.37	4,672.98	1,402.24	1,105.58	296.66	4.727		
10,200.00	5,229.19	10,153.51	5,245.13	152.64	152.97	-90.59	-866.64	4,768.75	1,421.59	1,119.15	302.44	4.700		
10,300.00	5,228.62	10,251.18	5,245.04	155.56	155.88	-90.60	-887.80	4,864.10	1,440.95	1,132.76	308.20	4.675	SF	
10,399.98	5,228.05	10,293.81	5,245.00	158.47	157.15	-90.61	-897.03	4,905.72	1,461.38	1,150.49	310.89	4.701		
10,408.39	5,228.00	10,293.81	5,245.00	158.71	157.15	-90.61	-897.03	4,905.72	1,463.32	1,152.44	310.88	4.707		

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 4H - OH - Plan #6													Offset Site Error: 0.00 usft
Survey Program: O-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	-89.92	0.04	-30.00	30.00				
100.00	100.00	100.00	100.00	0.13	0.13	-89.92	0.04	-30.00	30.00	29.73	0.27	111.585	
200.00	200.00	200.00	200.00	0.49	0.49	-89.92	0.04	-30.00	30.00	29.01	0.99	30.432	
300.00	300.00	300.00	300.00	0.85	0.85	-89.92	0.04	-30.00	30.00	28.30	1.70	17.619	
400.00	400.00	400.00	400.00	1.21	1.21	-89.92	0.04	-30.00	30.00	27.58	2.42	12.398	
500.00	500.00	500.00	500.00	1.57	1.57	-89.92	0.04	-30.00	30.00	26.86	3.14	9.564	
600.00	600.00	600.00	600.00	1.93	1.93	-89.92	0.04	-30.00	30.00	26.15	3.85	7.785	
700.00	700.00	700.00	700.00	2.29	2.29	-89.92	0.04	-30.00	30.00	25.43	4.57	6.564	
800.00	800.00	800.00	800.00	2.64	2.64	-89.92	0.04	-30.00	30.00	24.71	5.29	5.674	
900.00	900.00	900.00	900.00	3.00	3.00	-89.92	0.04	-30.00	30.00	24.00	6.00	4.996	
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	-89.92	0.04	-30.00	30.00	23.28	6.72	4.463	
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	-89.92	0.04	-30.00	30.00	22.56	7.44	4.033	
1,200.00	1,200.00	1,200.00	1,200.00	4.08	4.08	-89.92	0.04	-30.00	30.00	21.84	8.16	3.679	
1,300.00	1,299.98	1,299.51	1,299.49	4.43	4.42	-4.59	-1.50	-30.77	29.07	20.23	8.84	3.287	
1,400.00	1,399.84	1,398.86	1,398.70	4.77	4.75	-4.25	-6.13	-33.09	26.71	17.19	9.52	2.806	
1,500.00	1,499.45	1,497.89	1,497.35	5.12	5.08	-21.83	-13.80	-36.92	24.51	14.30	10.21	2.400	
1,526.96	1,526.25	1,524.51	1,523.81	5.21	5.17	-28.22	-16.38	-38.21	24.35	13.94	10.40	2.340 CC, ES, SF	
1,600.00	1,598.70	1,596.44	1,595.18	5.47	5.41	-47.55	-24.45	-42.25	25.81	14.89	10.92	2.363	
1,700.00	1,697.75	1,694.47	1,692.02	5.84	5.76	-68.60	-38.03	-49.04	34.24	22.61	11.63	2.945	
1,800.00	1,796.80	1,791.87	1,787.67	6.21	6.11	-78.77	-54.45	-57.25	48.49	36.17	12.32	3.935	
1,900.00	1,895.84	1,888.41	1,881.80	6.58	6.48	-82.86	-73.58	-66.81	66.52	53.50	13.02	5.108	
2,000.00	1,994.89	1,984.87	1,975.15	6.96	6.87	-84.22	-95.31	-77.68	87.40	73.68	13.72	6.369	
2,100.00	2,093.94	2,082.53	2,069.51	7.34	7.28	-84.91	-117.84	-88.94	108.85	94.40	14.44	7.535	
2,200.00	2,192.98	2,180.20	2,163.88	7.73	7.70	-85.37	-140.36	-100.20	130.30	115.12	15.18	8.585	
2,300.00	2,292.03	2,277.87	2,258.24	8.11	8.12	-85.70	-162.89	-111.47	151.76	135.84	15.92	9.533	
2,400.00	2,391.08	2,375.53	2,352.60	8.50	8.56	-85.95	-185.42	-122.73	173.22	156.55	16.67	10.392	
2,500.00	2,490.13	2,473.20	2,446.97	8.89	9.01	-86.14	-207.94	-133.99	194.69	177.26	17.43	11.172	
2,600.00	2,589.17	2,570.87	2,541.33	9.29	9.46	-86.29	-230.47	-145.26	216.16	197.97	18.19	11.883	
2,700.00	2,688.22	2,668.54	2,635.70	9.68	9.91	-86.42	-253.00	-156.52	237.62	218.67	18.96	12.533	
2,800.00	2,787.27	2,766.20	2,730.06	10.08	10.37	-86.53	-275.53	-167.79	259.09	239.36	19.73	13.130	
2,900.00	2,886.31	2,863.87	2,824.42	10.48	10.84	-86.62	-298.05	-179.05	280.56	260.05	20.51	13.678	
3,000.00	2,985.36	2,961.54	2,918.79	10.87	11.31	-86.69	-320.58	-190.31	302.04	280.74	21.29	14.184	
3,100.00	3,084.41	3,059.20	3,013.15	11.27	11.78	-86.76	-343.11	-201.58	323.51	301.43	22.08	14.652	
3,200.00	3,183.46	3,156.87	3,107.51	11.67	12.25	-86.82	-365.64	-212.84	344.98	322.11	22.87	15.085	
3,300.00	3,282.50	3,254.54	3,201.88	12.07	12.73	-86.87	-388.16	-224.10	366.45	342.79	23.66	15.488	
3,400.00	3,381.55	3,352.21	3,296.24	12.48	13.21	-86.92	-410.69	-235.37	387.92	363.47	24.45	15.864	
3,500.00	3,480.60	3,449.87	3,390.60	12.88	13.69	-86.96	-433.22	-246.63	409.39	384.14	25.25	16.214	
3,600.00	3,579.64	3,547.54	3,484.97	13.28	14.17	-86.99	-455.75	-257.89	430.87	404.82	26.05	16.541	
3,700.00	3,678.69	3,645.21	3,579.33	13.68	14.65	-87.03	-478.27	-269.16	452.34	425.49	26.85	16.848	
3,800.00	3,777.74	3,742.87	3,673.70	14.09	15.14	-87.06	-500.80	-280.42	473.81	446.16	27.65	17.136	
3,900.00	3,876.79	3,840.54	3,768.06	14.49	15.62	-87.09	-523.33	-291.69	495.29	466.83	28.45	17.407	
4,000.00	3,975.83	3,938.21	3,862.42	14.89	16.11	-87.11	-545.85	-302.95	516.76	487.50	29.26	17.663	
4,100.00	4,074.88	4,035.88	3,956.79	15.30	16.60	-87.14	-568.38	-314.21	538.23	508.17	30.06	17.903	
4,200.00	4,173.93	4,133.54	4,051.15	15.70	17.09	-87.16	-590.91	-325.48	559.71	528.83	30.87	18.131	
4,300.00	4,272.98	4,231.21	4,145.51	16.11	17.58	-87.25	-613.44	-336.74	581.18	549.50	31.68	18.347	
4,400.00	4,372.47	4,329.06	4,240.06	16.49	18.07	-37.51	-636.01	-348.03	601.09	568.65	32.44	18.528	
4,500.00	4,472.04	4,423.46	4,331.49	16.80	18.54	33.46	-657.26	-357.88	614.67	581.62	33.05	18.597	
4,600.00	4,570.03	4,500.00	4,405.48	17.06	18.91	47.38	-676.66	-359.68	625.55	592.18	33.37	18.745	
4,700.00	4,664.76	4,567.07	4,469.52	17.31	19.21	52.67	-696.05	-355.48	634.80	601.31	33.49	18.955	
4,800.00	4,754.60	4,639.98	4,537.71	17.54	19.53	55.96	-719.46	-344.83	642.56	608.89	33.67	19.082	
4,900.00	4,838.03	4,713.94	4,604.75	17.79	19.84	58.57	-745.50	-327.65	648.91	614.97	33.94	19.121	

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - Heros 2308-09L 4H - OH - Plan #6													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						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		
5,000.00	4,913.61	4,789.23	4,670.12	18.13	20.14	60.95	-774.12	-303.73	653.97	619.59	34.38	19.021		
5,100.00	4,980.06	4,866.14	4,733.25	18.64	20.43	63.31	-805.26	-272.83	657.90	622.78	35.12	18.733		
5,200.00	5,036.23	4,945.01	4,793.51	19.42	20.73	65.73	-838.86	-234.71	660.88	624.62	36.26	18.224		
5,300.00	5,081.16	5,026.20	4,850.13	20.51	21.04	68.26	-874.86	-189.05	663.10	625.20	37.91	17.492		
5,400.00	5,114.11	5,110.19	4,902.24	21.91	21.39	70.92	-913.16	-135.54	664.77	624.67	40.10	16.580		
5,500.00	5,141.63	5,200.00	4,950.01	23.57	21.85	73.27	-954.81	-71.97	667.67	624.93	42.74	15.621		
5,600.00	5,169.15	5,295.16	4,991.92	25.41	22.54	74.88	-999.09	1.05	672.14	626.38	45.77	14.686		
5,700.00	5,196.67	5,393.46	5,033.52	27.40	23.53	76.36	-1,044.83	77.47	677.19	628.03	49.16	13.774		
5,800.00	5,224.19	5,491.76	5,075.13	29.52	24.80	77.81	-1,090.56	153.90	682.69	629.84	52.85	12.918		
5,900.00	5,245.01	5,588.60	5,116.11	31.77	26.27	79.50	-1,135.62	229.19	687.96	631.10	56.85	12.100		
6,000.00	5,252.94	5,681.57	5,155.46	34.15	27.82	81.95	-1,178.88	301.47	693.31	632.19	61.12	11.344		
6,100.00	5,252.52	5,759.50	5,187.22	36.60	29.22	84.60	-1,215.63	362.38	701.00	635.77	65.23	10.747		
6,200.00	5,251.95	5,834.83	5,211.62	39.12	30.70	86.68	-1,253.54	422.70	713.08	643.77	69.31	10.288		
6,300.00	5,251.38	5,914.24	5,229.75	41.70	32.37	88.22	-1,295.89	487.33	728.62	655.11	73.51	9.912		
6,400.00	5,250.81	6,000.00	5,240.34	44.31	34.27	89.12	-1,343.86	557.58	746.78	668.84	77.94	9.581		
6,500.00	5,250.24	6,080.80	5,241.76	46.97	36.12	89.28	-1,390.64	623.40	767.00	684.69	82.31	9.318		
6,600.00	5,249.67	6,178.57	5,239.74	49.66	38.41	89.19	-1,447.80	702.69	788.00	700.75	87.24	9.032		
6,700.00	5,249.10	6,276.33	5,237.72	52.37	40.74	89.11	-1,504.95	781.98	808.99	716.75	92.25	8.770		
6,800.00	5,248.53	6,374.10	5,235.71	55.11	43.13	89.02	-1,562.11	861.27	829.99	732.67	97.32	8.529		
6,900.00	5,247.97	6,471.86	5,233.69	57.87	45.54	88.95	-1,619.26	940.56	850.99	748.55	102.44	8.307		
7,000.00	5,247.40	6,569.62	5,231.67	60.64	47.99	88.87	-1,676.42	1,019.85	871.99	764.38	107.60	8.104		
7,100.00	5,246.83	6,667.39	5,229.65	63.43	50.47	88.80	-1,733.57	1,099.15	892.99	780.18	112.81	7.916		
7,200.00	5,246.26	6,765.15	5,227.63	66.23	52.97	88.74	-1,790.73	1,178.44	913.99	795.94	118.05	7.742		
7,300.00	5,245.69	6,862.92	5,225.61	69.04	55.49	88.67	-1,847.89	1,257.73	935.00	811.67	123.32	7.582		
7,400.00	5,245.12	6,960.68	5,223.60	71.87	58.02	88.61	-1,905.04	1,337.02	956.00	827.38	128.62	7.433		
7,500.00	5,244.55	7,058.44	5,221.58	74.70	60.57	88.55	-1,962.20	1,416.31	977.01	843.06	133.94	7.294		
7,600.00	5,243.98	7,156.21	5,219.56	77.54	63.14	88.50	-2,019.35	1,495.60	998.01	858.73	139.28	7.165		
7,700.00	5,243.41	7,253.97	5,217.54	80.38	65.71	88.44	-2,076.51	1,574.89	1,019.02	874.38	144.64	7.045		
7,800.00	5,242.84	7,351.74	5,215.52	83.23	68.30	88.39	-2,133.66	1,654.18	1,040.03	890.02	150.01	6.933		
7,900.00	5,242.27	7,449.50	5,213.50	86.09	70.89	88.34	-2,190.82	1,733.47	1,061.04	905.64	155.40	6.828		
8,000.00	5,241.71	7,547.27	5,211.49	88.95	73.50	88.29	-2,247.97	1,812.76	1,082.05	921.25	160.80	6.729		
8,100.00	5,241.14	7,645.03	5,209.47	91.82	76.11	88.25	-2,305.13	1,892.05	1,103.06	936.84	166.21	6.636		
8,200.00	5,240.57	7,742.79	5,207.45	94.69	78.73	88.20	-2,362.28	1,971.35	1,124.07	952.43	171.63	6.549		
8,300.00	5,240.00	7,840.56	5,205.43	97.57	81.35	88.16	-2,419.44	2,050.64	1,145.08	968.01	177.06	6.467		
8,400.00	5,239.43	7,938.32	5,203.41	100.45	83.98	88.12	-2,476.59	2,129.93	1,166.09	983.59	182.50	6.389		
8,500.00	5,238.86	8,036.24	5,201.39	103.33	86.62	88.08	-2,533.83	2,209.34	1,187.10	999.14	187.96	6.316		
8,600.00	5,238.29	8,135.83	5,198.96	106.22	89.85	88.03	-2,603.36	2,306.62	1,207.83	1,013.54	194.29	6.217		
8,700.00	5,237.72	8,327.18	5,196.02	109.10	94.54	87.99	-2,696.74	2,450.22	1,224.13	1,021.78	202.35	6.050		
8,800.00	5,237.15	8,501.33	5,193.82	111.99	99.37	87.96	-2,782.71	2,601.62	1,234.45	1,024.53	209.92	5.880		
8,900.00	5,236.58	8,677.04	5,192.41	114.89	104.29	87.95	-2,860.00	2,759.39	1,238.69	1,021.79	216.90	5.711		
9,000.00	5,236.01	8,828.38	5,191.82	117.78	108.54	87.96	-2,918.91	2,898.78	1,237.12	1,014.03	223.09	5.545		
9,100.00	5,235.45	8,928.34	5,191.66	120.68	111.34	87.97	-2,956.31	2,991.47	1,234.14	1,005.27	228.88	5.392		
9,200.00	5,234.88	9,028.29	5,191.30	123.58	114.16	87.98	-2,993.72	3,084.16	1,231.17	996.50	234.67	5.246		
9,300.00	5,234.31	9,128.25	5,191.03	126.48	116.99	87.99	-3,031.13	3,176.86	1,228.20	987.74	240.46	5.108		
9,400.00	5,233.74	9,228.20	5,190.77	129.38	119.82	88.00	-3,068.53	3,269.55	1,225.23	978.96	246.26	4.975		
9,500.00	5,233.17	9,328.16	5,190.51	132.28	122.65	88.01	-3,105.94	3,362.24	1,222.25	970.19	252.07	4.849		
9,600.00	5,232.60	9,428.11	5,190.25	135.19	125.49	88.02	-3,143.35	3,454.93	1,219.28	961.41	257.87	4.728		
9,700.00	5,232.03	9,528.07	5,189.99	138.09	128.34	88.03	-3,180.75	3,547.62	1,216.31	952.62	263.68	4.613		
9,800.00	5,231.46	9,628.03	5,189.72	141.00	131.19	88.04	-3,218.16	3,640.32	1,213.33	943.83	269.50	4.502		
9,900.00	5,230.89	9,727.98	5,189.46	143.91	134.05	88.05	-3,255.57	3,733.01	1,210.36	935.04	275.32	4.396		

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design													Heros 2308-09L - Heros 2308-09L 4H - OH - Plan #6		Offset Site Error: 0.00 usft	
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft			
Reference		Offset		Semi Major Axis			Distance							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				
10,000.00	5,230.32	9,827.94	5,189.20	146.82	136.90	88.06	-3,292.97	3,825.70	1,207.39	926.25	281.14	4.295				
10,100.00	5,229.76	9,927.89	5,188.94	149.73	139.77	88.07	-3,330.38	3,918.39	1,204.41	917.46	286.96	4.197				
10,200.00	5,229.19	10,027.85	5,188.67	152.64	142.64	88.08	-3,367.79	4,011.08	1,201.44	908.66	292.78	4.103				
10,300.00	5,228.62	10,127.80	5,188.41	155.56	145.51	88.09	-3,405.19	4,103.77	1,198.47	899.86	298.61	4.013				
10,399.98	5,228.05	10,227.74	5,188.15	158.47	148.38	88.10	-3,442.59	4,196.45	1,195.50	891.06	304.44	3.927				
10,408.39	5,228.00	10,236.14	5,188.13	158.71	148.62	88.10	-3,445.74	4,204.24	1,195.27	890.34	304.93	3.920				

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - State NM 16 #21 Unit C - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 313-INCLINOMETER													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		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	143.59	-2,375.07	1,751.47	2,951.14					
100.00	100.00	75.00	75.00	0.13	1.14	143.59	-2,375.07	1,751.47	2,951.03	2,949.76	1.27	2,317.395		
200.00	200.00	175.00	175.00	0.49	2.66	143.59	-2,375.07	1,751.47	2,951.03	2,947.88	3.15	936.747		
300.00	300.00	275.00	275.00	0.85	4.18	143.59	-2,375.07	1,751.47	2,951.03	2,946.00	5.03	587.017		
400.00	400.00	375.00	375.00	1.21	6.64	143.59	-2,375.07	1,751.47	2,951.03	2,943.18	7.85	376.145		
500.00	500.00	475.00	475.00	1.57	9.67	143.59	-2,375.07	1,751.47	2,951.03	2,939.79	11.24	262.529		
600.00	600.00	575.00	575.00	1.93	12.71	143.59	-2,375.07	1,751.47	2,951.03	2,936.39	14.64	201.627		
700.00	700.00	675.00	675.00	2.29	15.75	143.59	-2,375.07	1,751.47	2,951.03	2,933.00	18.03	163.661		
800.00	800.00	775.00	775.00	2.64	18.78	143.59	-2,375.07	1,751.47	2,951.03	2,929.60	21.43	137.727		
900.00	900.00	875.00	875.00	3.00	21.82	143.59	-2,375.07	1,751.47	2,951.03	2,926.21	24.82	118.888		
1,000.00	1,000.00	975.00	975.00	3.36	24.86	143.59	-2,375.07	1,751.47	2,951.03	2,922.81	28.22	104.582		
1,100.00	1,100.00	1,075.00	1,075.00	3.72	27.89	143.59	-2,375.07	1,751.47	2,951.03	2,919.42	31.61	93.350		
1,200.00	1,200.00	1,175.00	1,175.00	4.08	30.93	143.59	-2,375.07	1,751.47	2,951.03	2,916.02	35.01	84.296		
1,300.00	1,299.98	1,274.98	1,274.98	4.43	33.97	-119.30	-2,375.07	1,751.47	2,951.88	2,913.49	38.39	76.886		
1,400.00	1,399.84	1,374.84	1,374.84	4.77	37.00	-119.34	-2,375.07	1,751.47	2,954.45	2,912.68	41.77	70.735		
1,500.00	1,499.45	1,474.47	1,474.45	5.12	40.02	-119.41	-2,375.07	1,751.47	2,958.74	2,913.60	45.14	65.545		
1,600.00	1,598.70	1,573.72	1,573.70	5.47	43.04	-119.52	-2,375.07	1,751.47	2,964.76	2,916.26	48.51	61.119		
1,700.00	1,697.75	1,672.76	1,672.75	5.84	46.05	-119.75	-2,375.07	1,751.47	2,971.62	2,919.75	51.88	57.284		
1,800.00	1,796.80	1,771.81	1,771.80	6.21	49.05	-119.97	-2,375.07	1,751.47	2,978.53	2,923.28	55.25	53.913		
1,900.00	1,895.84	1,870.86	1,870.84	6.58	52.06	-120.20	-2,375.07	1,751.47	2,985.48	2,926.86	58.62	50.926		
2,000.00	1,994.89	1,969.90	1,969.89	6.96	55.07	-120.43	-2,375.07	1,751.47	2,992.48	2,930.48	62.00	48.263		
2,100.00	2,093.94	2,068.95	2,068.94	7.34	58.08	-120.65	-2,375.07	1,751.47	2,999.53	2,934.14	65.39	45.874		
2,200.00	2,192.98	2,168.00	2,167.98	7.73	61.09	-120.88	-2,375.07	1,751.47	3,006.63	2,937.85	68.77	43.719		
2,300.00	2,292.03	2,267.05	2,267.03	8.11	64.09	-121.10	-2,375.07	1,751.47	3,013.77	2,941.61	72.16	41.766		
2,400.00	2,391.08	2,366.09	2,366.08	8.50	67.10	-121.32	-2,375.07	1,751.47	3,020.95	2,945.40	75.55	39.987		
2,500.00	2,490.13	2,465.14	2,465.13	8.89	70.11	-121.54	-2,375.07	1,751.47	3,028.18	2,949.25	78.94	38.361		
2,600.00	2,589.17	2,564.19	2,564.17	9.29	73.12	-121.76	-2,375.07	1,751.47	3,035.46	2,953.13	82.33	36.869		
2,700.00	2,688.22	2,663.30	2,663.22	9.68	76.13	-121.98	-2,375.07	1,751.47	3,042.78	2,957.06	85.73	35.494		
2,800.00	2,787.27	2,762.34	2,762.27	10.08	79.13	-122.20	-2,375.07	1,751.47	3,050.15	2,961.03	89.12	34.225		
2,900.00	2,886.31	2,861.39	2,861.31	10.48	82.14	-122.42	-2,375.07	1,751.47	3,057.56	2,965.05	92.52	33.049		
3,000.00	2,985.36	2,960.44	2,960.36	10.87	85.15	-122.63	-2,375.07	1,751.47	3,065.02	2,969.11	95.91	31.957		
3,100.00	3,084.41	3,059.48	3,059.41	11.27	88.16	-122.85	-2,375.07	1,751.47	3,072.52	2,973.21	99.31	30.939		
3,200.00	3,183.46	3,158.53	3,158.46	11.67	91.17	-123.06	-2,375.07	1,751.47	3,080.06	2,977.35	102.70	29.990		
3,300.00	3,282.50	3,257.58	3,257.50	12.07	94.17	-123.27	-2,375.07	1,751.47	3,087.64	2,981.54	106.10	29.101		
3,400.00	3,381.55	3,356.63	3,356.55	12.48	97.18	-123.49	-2,375.07	1,751.47	3,095.27	2,985.77	109.50	28.268		
3,500.00	3,480.60	3,455.67	3,455.60	12.88	100.19	-123.70	-2,375.07	1,751.47	3,102.94	2,990.05	112.90	27.485		
3,600.00	3,579.64	3,554.72	3,554.64	13.28	103.20	-123.91	-2,375.07	1,751.47	3,110.65	2,994.36	116.29	26.748		
3,700.00	3,678.69	3,653.77	3,653.69	13.68	106.21	-124.11	-2,375.07	1,751.47	3,118.41	2,998.72	119.69	26.053		
3,800.00	3,777.74	3,752.81	3,752.74	14.09	109.21	-124.32	-2,375.07	1,751.47	3,126.20	3,003.11	123.09	25.397		
3,900.00	3,876.79	3,851.86	3,851.79	14.49	112.22	-124.53	-2,375.07	1,751.47	3,134.04	3,007.55	126.49	24.777		
4,000.00	3,975.83	3,950.91	3,950.83	14.89	115.23	-124.73	-2,375.07	1,751.47	3,141.92	3,012.03	129.89	24.189		
4,100.00	4,074.88	4,049.96	4,049.88	15.30	118.24	-124.94	-2,375.07	1,751.47	3,149.84	3,016.55	133.29	23.632		
4,200.00	4,173.93	4,149.00	4,148.93	15.70	121.25	-125.14	-2,375.07	1,751.47	3,157.79	3,021.11	136.69	23.103		
4,300.00	4,272.98	4,248.06	4,247.98	16.11	124.25	-125.37	-2,375.07	1,751.47	3,165.76	3,025.67	140.08	22.599		
4,400.00	4,372.47	4,347.55	4,347.47	16.49	127.27	-75.23	-2,375.07	1,751.47	3,169.76	3,026.28	143.48	22.092		
4,500.00	4,472.04	4,483.00	4,482.71	16.80	131.39	-4.43	-2,375.07	1,751.47	3,162.32	3,014.40	147.92	21.379		
4,600.00	4,570.03	4,545.32	4,545.03	17.06	133.28	9.56	-2,375.07	1,751.47	3,142.57	2,992.48	150.09	20.937		
4,700.00	4,664.76	4,640.04	4,639.76	17.31	136.16	15.34	-2,375.07	1,751.47	3,111.47	2,958.24	153.23	20.306		
4,800.00	4,754.60	4,729.89	4,729.60	17.54	138.89	19.38	-2,375.07	1,751.47	3,069.38	2,913.19	156.19	19.651		
4,900.00	4,838.03	4,813.32	4,813.03	17.79	141.42	23.24	-2,375.07	1,751.47	3,017.08	2,858.14	158.94	18.983		
5,000.00	4,913.61	4,888.90	4,888.61	18.13	143.71	27.63	-2,375.07	1,751.47	2,955.54	2,794.11	161.43	18.309		

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

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - State NM 16 #21 Unit C - OH - OH														Offset Site Error:	0.00 usft
Survey Program: 313-INCLINOMETER														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)							
5,100.00	4,980.06	4,955.35	4,955.06	18.64	145.73	33.08	-2,375.07	1,751.47	2,885.93	2,722.30	163.64	17.636			
5,200.00	5,036.23	5,011.52	5,011.23	19.42	147.44	40.16	-2,375.07	1,751.47	2,809.58	2,644.03	165.55	16.971			
5,300.00	5,081.16	5,056.45	5,056.16	20.51	148.80	49.42	-2,375.07	1,751.47	2,727.94	2,560.76	167.17	16.318			
5,400.00	5,114.11	5,089.40	5,089.11	21.91	149.80	60.42	-2,375.07	1,751.47	2,642.58	2,474.07	168.51	15.682			
5,500.00	5,141.63	5,116.92	5,116.63	23.57	150.64	61.42	-2,375.07	1,751.47	2,556.41	2,386.64	169.78	15.057			
5,600.00	5,169.15	5,144.44	5,144.15	25.41	151.47	62.45	-2,375.07	1,751.47	2,470.98	2,299.80	171.18	14.435			
5,700.00	5,196.67	5,171.96	5,171.67	27.40	152.31	63.49	-2,375.07	1,751.47	2,386.37	2,213.64	172.73	13.816			
5,800.00	5,224.19	5,199.47	5,199.19	29.52	153.15	64.86	-2,375.07	1,751.47	2,302.66	2,128.22	174.44	13.201			
5,900.00	5,245.01	5,220.29	5,220.01	31.77	153.78	77.00	-2,375.07	1,751.47	2,218.90	2,042.76	176.14	12.597			
6,000.00	5,252.94	5,228.22	5,227.94	34.15	154.02	88.80	-2,375.07	1,751.47	2,135.37	1,957.68	177.69	12.018			
6,100.00	5,252.52	5,227.80	5,227.52	36.60	154.01	90.45	-2,375.07	1,751.47	2,053.37	1,874.15	179.22	11.457			
6,200.00	5,251.95	5,227.24	5,226.95	39.12	153.99	90.43	-2,375.07	1,751.47	1,973.03	1,792.03	181.00	10.901			
6,300.00	5,251.38	5,226.67	5,226.38	41.70	153.97	90.40	-2,375.07	1,751.47	1,894.57	1,711.53	183.04	10.351			
6,400.00	5,250.81	5,226.10	5,225.81	44.31	153.95	90.37	-2,375.07	1,751.47	1,818.22	1,632.86	185.36	9.809			
6,500.00	5,250.24	5,225.53	5,225.24	46.97	153.94	90.34	-2,375.07	1,751.47	1,744.26	1,556.31	187.95	9.280			
6,600.00	5,249.67	5,224.96	5,224.67	49.66	153.92	90.32	-2,375.07	1,751.47	1,673.02	1,482.18	190.83	8.767			
6,700.00	5,249.10	5,224.39	5,224.10	52.37	153.90	90.29	-2,375.07	1,751.47	1,604.84	1,410.84	194.00	8.272			
6,800.00	5,248.53	5,223.82	5,223.53	55.11	153.89	90.26	-2,375.07	1,751.47	1,540.14	1,342.70	197.45	7.800			
6,900.00	5,247.97	5,223.25	5,222.97	57.87	153.87	90.24	-2,375.07	1,751.47	1,479.38	1,278.22	201.16	7.354			
7,000.00	5,247.40	5,222.68	5,222.40	60.64	153.85	90.21	-2,375.07	1,751.47	1,423.06	1,217.94	205.12	6.938			
7,100.00	5,246.83	5,222.11	5,221.83	63.43	153.83	90.18	-2,375.07	1,751.47	1,371.73	1,162.45	209.28	6.555			
7,200.00	5,246.26	5,221.54	5,221.26	66.23	153.82	90.15	-2,375.07	1,751.47	1,325.96	1,112.38	213.58	6.208			
7,300.00	5,245.69	5,220.98	5,220.69	69.04	153.80	90.13	-2,375.07	1,751.47	1,286.35	1,068.40	217.94	5.902			
7,400.00	5,245.12	5,220.41	5,220.12	71.87	153.78	90.10	-2,375.07	1,751.47	1,253.48	1,031.21	222.27	5.639			
7,500.00	5,244.55	5,219.84	5,219.55	74.70	153.76	90.07	-2,375.07	1,751.47	1,227.90	1,001.45	226.45	5.422			
7,600.00	5,243.98	5,219.27	5,218.98	77.54	153.75	90.05	-2,375.07	1,751.47	1,210.07	979.70	230.37	5.253			
7,700.00	5,243.41	5,218.70	5,218.41	80.38	153.73	90.02	-2,375.07	1,751.47	1,200.33	966.43	233.90	5.132			
7,767.38	5,243.03	5,218.32	5,218.03	82.30	153.72	90.00	-2,375.07	1,751.47	1,198.44	962.43	236.01	5.078 CC			
7,800.00	5,242.84	5,218.13	5,217.84	83.23	153.71	89.99	-2,375.07	1,751.47	1,198.88	961.94	236.94	5.060 ES			
7,900.00	5,242.27	5,217.56	5,217.27	86.09	153.70	89.96	-2,375.07	1,751.47	1,205.75	966.31	239.44	5.036 SF			
8,000.00	5,241.71	5,216.99	5,216.71	88.95	153.68	89.94	-2,375.07	1,751.47	1,220.80	979.46	241.34	5.058			
8,100.00	5,241.14	5,216.42	5,216.14	91.82	153.66	89.91	-2,375.07	1,751.47	1,243.74	1,001.08	242.66	5.125			
8,200.00	5,240.57	5,215.85	5,215.57	94.69	153.64	89.88	-2,375.07	1,751.47	1,274.13	1,030.70	243.42	5.234			
8,300.00	5,240.00	5,215.28	5,215.00	97.57	153.63	89.86	-2,375.07	1,751.47	1,311.46	1,067.76	243.70	5.382			
8,400.00	5,239.43	5,214.72	5,214.43	100.45	153.61	89.83	-2,375.07	1,751.47	1,355.15	1,111.61	243.55	5.564			
8,500.00	5,238.86	5,214.15	5,213.86	103.33	153.59	89.80	-2,375.07	1,751.47	1,404.62	1,161.57	243.06	5.779			
8,600.00	5,238.29	5,213.58	5,213.29	106.22	153.57	89.77	-2,375.07	1,751.47	1,459.27	1,216.98	242.29	6.023			
8,700.00	5,237.72	5,213.01	5,212.72	109.10	153.56	89.75	-2,375.07	1,751.47	1,518.55	1,277.22	241.33	6.292			
8,800.00	5,237.15	5,212.44	5,212.15	111.99	153.54	89.72	-2,375.07	1,751.47	1,581.93	1,341.70	240.23	6.585			
8,900.00	5,236.58	5,211.87	5,211.58	114.89	153.52	89.69	-2,375.07	1,751.47	1,648.95	1,409.92	239.03	6.898			
9,000.00	5,236.01	5,211.30	5,211.01	117.78	153.51	89.66	-2,375.07	1,751.47	1,719.17	1,481.39	237.78	7.230			
9,100.00	5,235.45	5,210.73	5,210.45	120.68	153.49	89.64	-2,375.07	1,751.47	1,792.22	1,555.72	236.50	7.578			
9,200.00	5,234.88	5,210.16	5,209.88	123.58	153.47	89.61	-2,375.07	1,751.47	1,867.77	1,632.55	235.22	7.941			
9,300.00	5,234.31	5,209.59	5,209.31	126.48	153.45	89.58	-2,375.07	1,751.47	1,945.53	1,711.58	233.95	8.316			
9,400.00	5,233.74	5,209.03	5,208.74	129.38	153.44	89.56	-2,375.07	1,751.47	2,025.24	1,792.53	232.71	8.703			
9,500.00	5,233.17	5,208.46	5,208.17	132.28	153.42	89.53	-2,375.07	1,751.47	2,106.68	1,875.17	231.51	9.100			
9,600.00	5,232.60	5,207.89	5,207.60	135.19	153.40	89.50	-2,375.07	1,751.47	2,189.66	1,959.32	230.34	9.506			
9,700.00	5,232.03	5,207.32	5,207.03	138.09	153.38	89.47	-2,375.07	1,751.47	2,274.01	2,044.79	229.22	9.921			
9,800.00	5,231.46	5,206.75	5,206.46	141.00	153.37	89.45	-2,375.07	1,751.47	2,359.59	2,131.44	228.15	10.342			
9,900.00	5,230.89	5,206.18	5,205.89	143.91	153.35	89.42	-2,375.07	1,751.47	2,446.25	2,219.14	227.12	10.771			

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

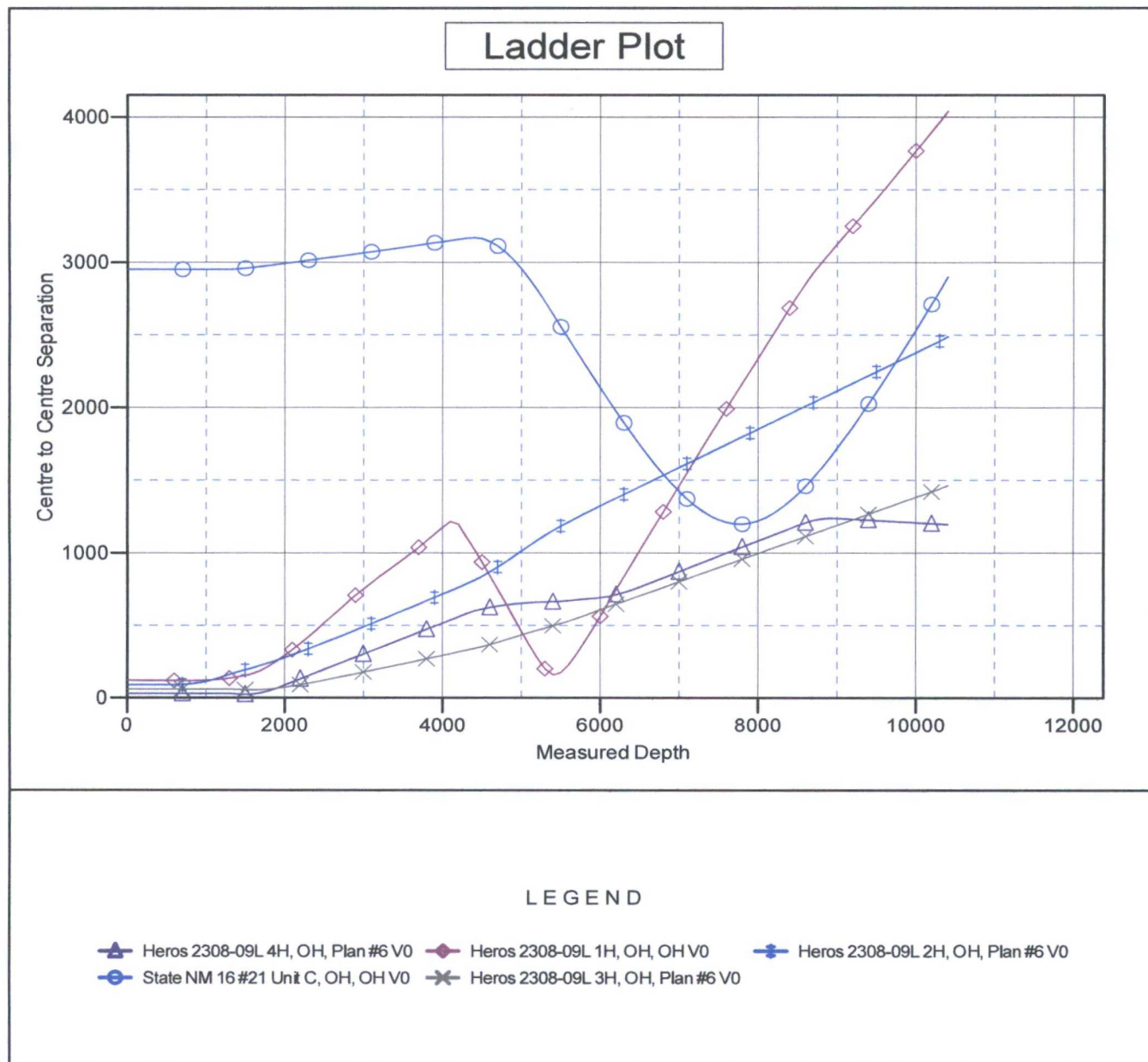
Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Heros 2308-09L - State NM 16 #21 Unit C - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 313-INCLINOMETER												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						
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	Warning
10,000.00	5,230.32	5,205.61	5,205.32	146.82	153.33	89.39	-2,375.07	1,751.47	2,533.90	2,307.77	226.13	11.205	
10,100.00	5,229.76	5,205.04	5,204.76	149.73	153.32	89.37	-2,375.07	1,751.47	2,622.44	2,397.25	225.19	11.645	
10,200.00	5,229.19	5,204.47	5,204.19	152.64	153.30	89.34	-2,375.07	1,751.47	2,711.77	2,487.47	224.29	12.090	
10,300.00	5,228.62	5,203.90	5,203.62	155.56	153.28	89.31	-2,375.07	1,751.47	2,801.82	2,578.38	223.44	12.540	
10,399.98	5,228.05	5,203.33	5,203.05	158.47	153.26	89.28	-2,375.07	1,751.47	2,892.51	2,669.88	222.62	12.993	
10,408.39	5,228.00	5,203.29	5,203.00	158.71	153.26	89.28	-2,375.07	1,751.47	2,900.17	2,677.61	222.56	13.031	

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6913' & RKB 25' @ 6938.00usft (A)
Offset Depths are relative to Offset Datum
Central Meridian is -107.833334

Coordinates are relative to: Heros 2308-09L 5H - Slot 5H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.08"

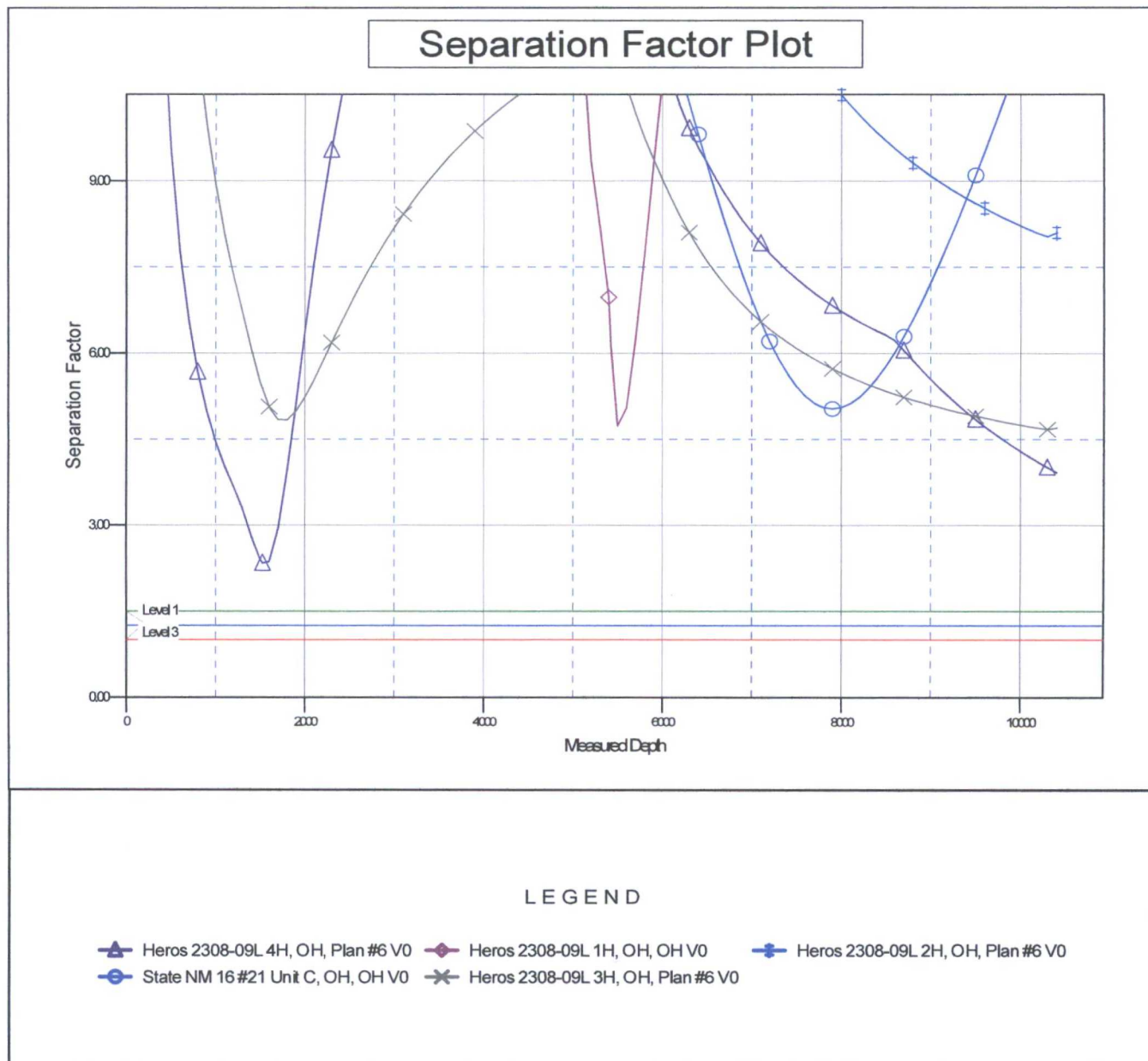


CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Heros 2308-09L 5H - Slot 5H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Reference Site:	Heros 2308-09L	MD Reference:	GL 6913' & RKB 25' @ 6938.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Heros 2308-09L 5H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6913' & RKB 25' @ 6938.00usft (A)
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Heros 2308-09L 5H - Slot 5H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.08°



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

Well Control Equipment Schematic for 2M Service

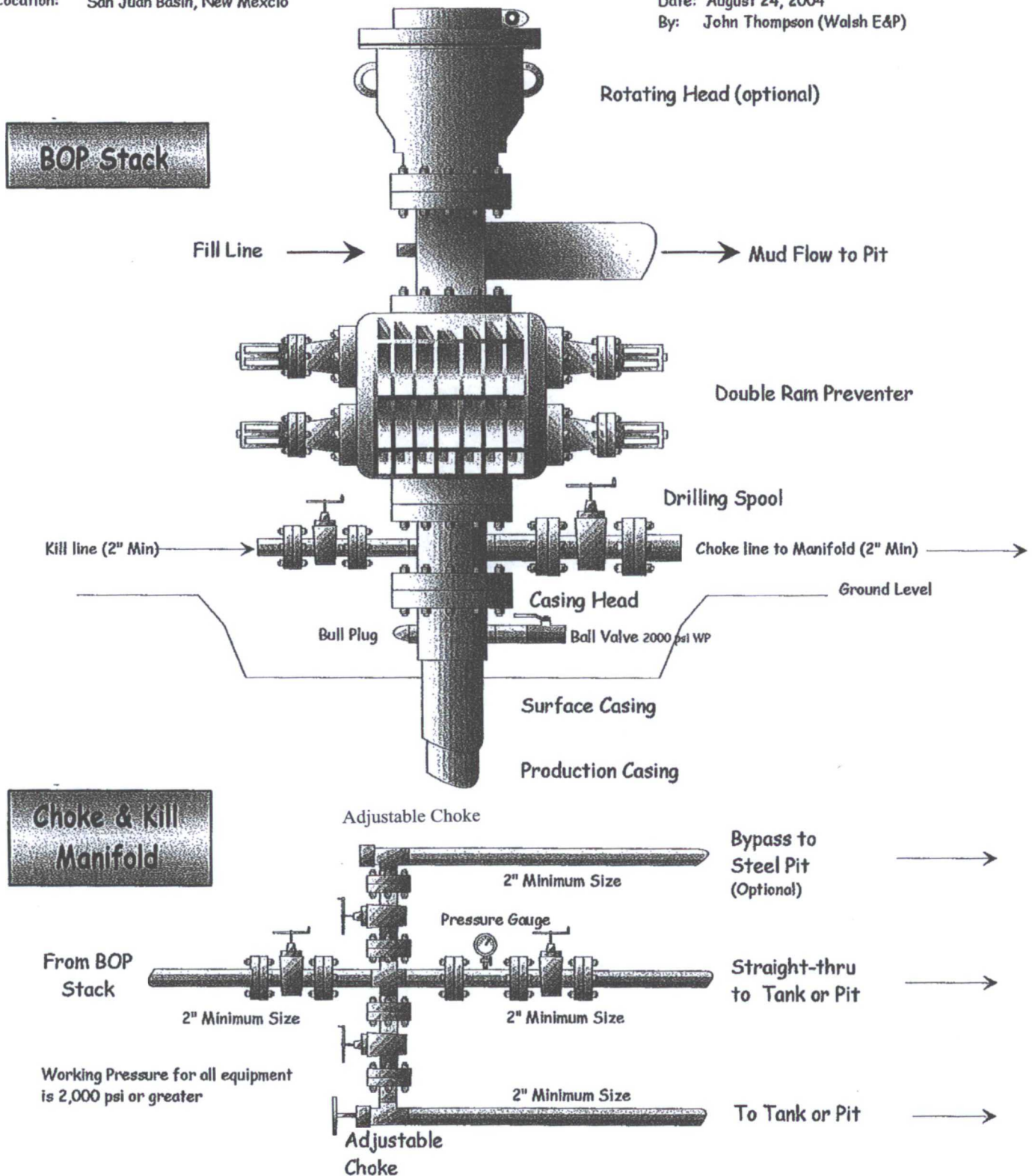
Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Walsh E&P)



**Directions from the Intersection of Highway 550 and Highway
64 in Bloomfield, NM**

to

LOGOS OPERATING, LLC

HEROS 2308 09L COM #5H

1476' FSL 330' FWL,

Section 9, T23N, R8W, N.M.P.M., San Juan County,

New Mexico

Latitude: 36° 14' 18.575" N

Longitude: 107° 41' 40.327" W

Nad 1983

**From the Intersection of Highway 550 & Highway 64
Go South on Hwy 550 for 39.1 miles to Chaco Canyon road,
turn right (southerly) for 0.3 miles
turn left (easterly) for 0.6 miles thru 2 gates
turn left (northeasterly) new location.**