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JUL 27 2017

Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Farmington Field Office
Bureau of Land Management

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2		7. If Unit of CA/Agreement, Name and/or No.
1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		8. Well Name and No. HEROS 2308 09L 2H
2. Name of Operator LOGOS Operating, LLC		9. API Well No. 30-045-35687
3a. Address 2010 Afton Place Farmington, NM 87401	3b. Phone No. (include area code) (505) 324-4145	10. Field and Pool or Exploratory Area Nageezi Gallup
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) 1476 FSL & 240 FWL, NW/SW, L Sec 9 T23N R08W		11. Country or Parish, State San Juan County, NM

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

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

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

LOGOS is requesting permission to change the well name from Chaco 23 08 9 #2H to HEROS 2308 09L 2H.
LOGOS is revising the directional drill plan to maximize the producing interval as per attached Plat, Drilling Plan & Directional Drill Plan.
LOGOS is revising the surface hole location from 1425' FSL & 200' FWL to better align the well head location for this second well on the same well pad.
LOGOS is revising the bottom hole location from the approved APD footages of 380' FSL & 380' FEL of Section 9 T23N R08W to 1480' FSL & 280' FEL of Section 9 T23N R08W. Plug back depth of this well will be the RSI(or similar) tool assembly, which will put the first perfor within the legal setbacks as noted on the C-102.

OIL CONS. DIV DIST. 3

LOGOS proposes to make the following changes:
Change the drill depth of the 12-1/4" surface hole from 500' to 320' and will land the 9-5/8" casing @ 320'.
Change the 7" Intermediate casing from J-55 26# to J-55 23#.
Change the 4-1/2" Production casing from L-80 11.6# to P-110 11.6#.

AUG 10 2017

Cement volumes will be adjusted accordingly.

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

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed) Tamra Sessions	Title Regulatory Specialist
Signature 	Date 07/27/2017

THE SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by 	Title PE	Date 8/4/17
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office FFO	

Title 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

NMOCDAV

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DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 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 Erasos Rd., Artesia, 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) 476-3482

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 30-045-35687		² Pool Code 47540		³ Pool Name NAGEEZI GALLUP	
⁴ Property Code 319463		⁵ Property Name HEROS 2308 09L			⁶ Well Number #2H
⁷ GRID No. 289408		⁸ Operator Name LOGOS OPERATING, LLC			⁹ Elevation 6913

¹⁰ Surface Location

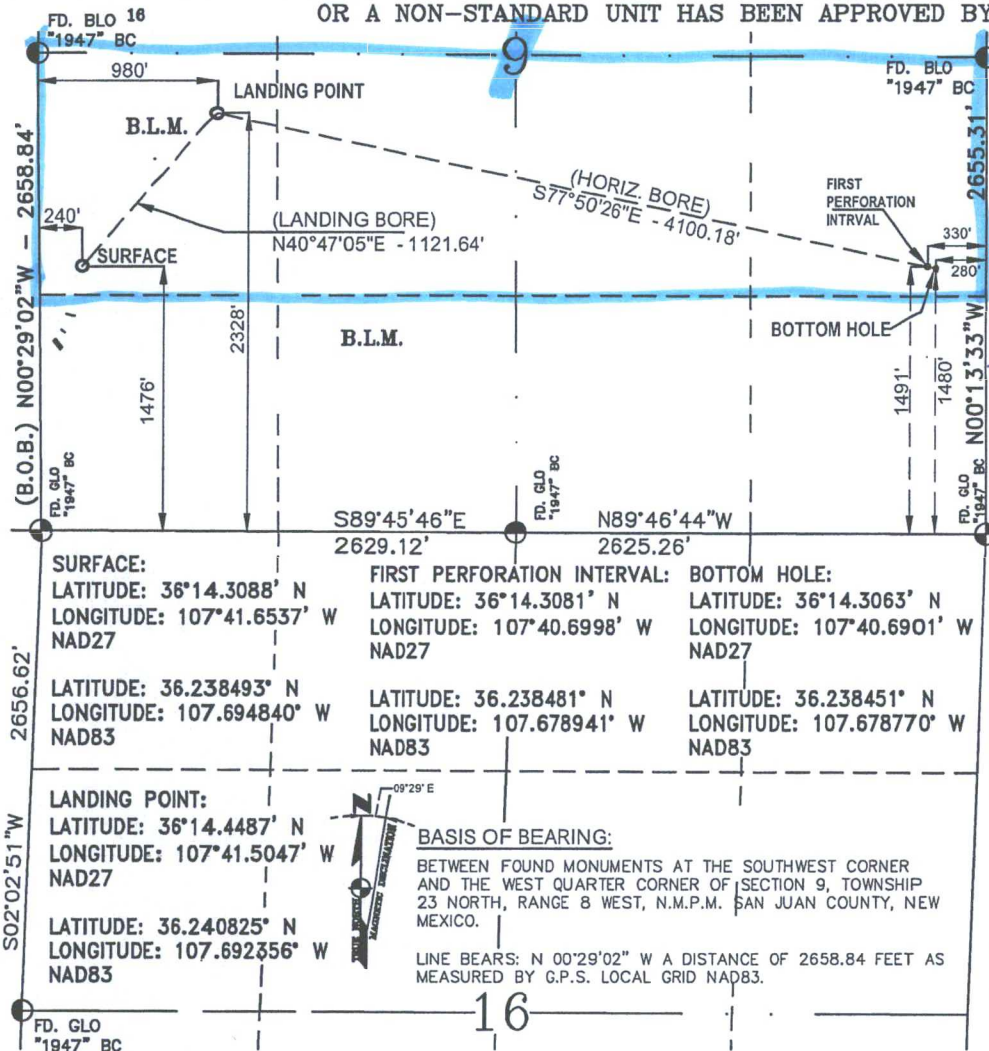
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	9	23-N	8-W		1476	SOUTH	240	WEST	SAN JUAN

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
I	9	23-N	8-W		1480	SOUTH	280	EAST	SAN JUAN

¹² Dedicated Acres Sec 9: N2S2 160 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.

Tamra Sessions 7/27/17
Signature Date

Tamra Sessions

Printed Name

tsessions@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.

JUNE 21, 2017

Date of Survey

Signature and Seal of Professional Surveyor



GLEN W. RUSSELL

Certificate Number

15703

Sundry Drilling Plan
LOGOS Operating, LLC

Change of Plans 7/26/2017

HEROS 2308 09L 2H
API # 30-045-35687
Lease Serial # NMNM18463

Surface Location: 1476 FSL, 240FWL

Legal Description: Sec 9, T23N, R8W (36.238493° N, 107.694840° W – NAD83)

Bottom Hole Location: 1480 FSL, 280 FEL

Legal Description: Sec 9, T23N, R8W (36.238451° N, 107.678770° W – NAD83)

San Juan County, NM

1. The elevation of the unprepared ground is 6,913 feet above sea level.
2. The geological name of the surface formation is the Nacimiento.
3. A rotary rig will be used to drill the well to a Proposed Total Depth of 5,209' TVD/9,906' MD.
4. Estimated top of important geological markers:

<u>Formation</u>	<u>Depth (TVD)(ft)</u>	<u>Depth (MD)(ft)</u>
Nacimiento	Surface	Surface
Ojo Alamo	850	850
Kirtland	1,055	1,057
Fruitland	1,186	1,189
Pictured Cliffs	1,560	1,575
Chacra	2,515	2,529
Cliff House	3,076	3,233
Menefee	3,101	3,261
Point Lookout	4,001	4,242
Mancos	4,177	4,435
Mancos/Niobrara "C"	5,117	5,492

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	1,186	Gas
Pictured Cliffs	1,540	Gas
Cliffhouse	3,076	Gas
Point Lookout	4,001	Gas
Mancos	4,177	Oil/Gas

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

Casing	Size	Depth		Grade	Weight	Connection	PSI		
		MD	TVD				Burst	Collapse	Tension
Surface	9-5/8"	0-320'	0-320'	J-55	36.00	STC	3520	2020	394
Intermediate	7"	0-5,724'	0-5,205'	J-55	23.00	LTC	4360	3270	313
Production	4-1/2"	5,574'-9,906'	5,205'-5,262'	P-110	11.60	Ultra DQX	10690	7580	367

7. Cementing Program:

- a. 12-1/4" hole x 9-5/8" casing at 320' will have cement circulated to surface with 270 sks (100% excess true hole) Class H Cement with 1.0 % CaCl₂, 1/2 #/sk Poly-E-Flake 15.8 ppg, 1.17 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 750 psi.
- a. 8-3/4" hole x 7" casing at 5,724'. Cement will be circulated to surface in a single stage with 578 sks (70% excess true hole) of HALCEM with 1.0 % CaCl₂. 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal (Gilsonite) – 12.3 ppg, 1.95 ft³/sk followed by 246 sks (70% 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.
- a. 6-1/8" hole x 4-1/2" liner at 9906' MD in a single stage using excess of approximately 30% for TOC at 5574'. Base slurry to consist of 391 sks EXTENDACEM -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

- a. BOPE to be installed prior to Surface Casing drillout.
- b. Pressure control equipment will be used to meet 2,000 (2M) psi specifications.
- c. BOPE working pressure of 3,000 psi.
- d. Function test and visual inspection to be done at each casing size change prior to drill out.
- e. BOP annular to be tested to 85% of working pressure.
- f. All BOP and related equipment will be tested in accordance with the requirements outlined in Onshore Order No. 2 and Notice to Operators dated May 27, 2005.
- g. BOP remote controls to be located on rig floor and readily accessible, master control on ground at accumulator will be able to function all preventors.
- h. Kill line will be 2 in min and have two kill line valves, one being a check valve.
- i. Choke line will be 2 in min and have two choke line valves, choke manifold with have two adjustable chokes, one manual and one remote. All choke lines will be as straight as possible. Any turns will be properly targeted using block and/or running tees. Choke line and manifold to be pressure tested to 1,500 psi.
- j. Float sub and TIW valve will be on the rig floor at all times.
- k. If high pressure co-flex hoses are used, they will be run as straight as possible and anchored to prevent whip.
- l. The main discharge line (panic line) will be at least 100' from the choke manifold and discharged into an appropriately sized discharge facility.

9. Mud Program:

0' - 320'	Fresh water/Spud Mud. Paper for losses and seepage. 8.5 to 9.0 ppg, 32 to 75 vis, PV 3 to 5, YP 5 to 7, WL NC
320' – 5,724'	Fresh water/LSND. As needed LCM for losses and seepage. 8.5 to 9.5 ppg, pH 10, 28 to 60 vis, PV 1, YP 1, WL 8-15
5,724' – 9,906'	WBM with shale and clay stabilizers. As needed LCM for losses and seepage. 8.3 to 9.3 ppg, 15 to 35 vis, PV 4-6, YP 4-6, WL < 20

****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 10 or above 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, LLC 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:

2-Mongoose Shale Shakers

2-3400 High Speed Centrifuges with stands and pumps

2-Roll off bins with Tracks

2-200 bbl Open top Frac tanks

1-Mud/Gas Separator and Degasser

1-Trip/Surge Tank

Electronic or Visual monitoring system to indicate lost returns

10. Testing, Logging and Coring Program:

- a. Testing Program: No drillstem tests are anticipated
- b. Electric Logging Program: TBD
- c. LWD Program: TBD
- d. Coring Program: None.
- e. CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.

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

12. Bottom Hole Temperature expected to be 160 deg F.

Well Control Equipment Schematic for 2M Service

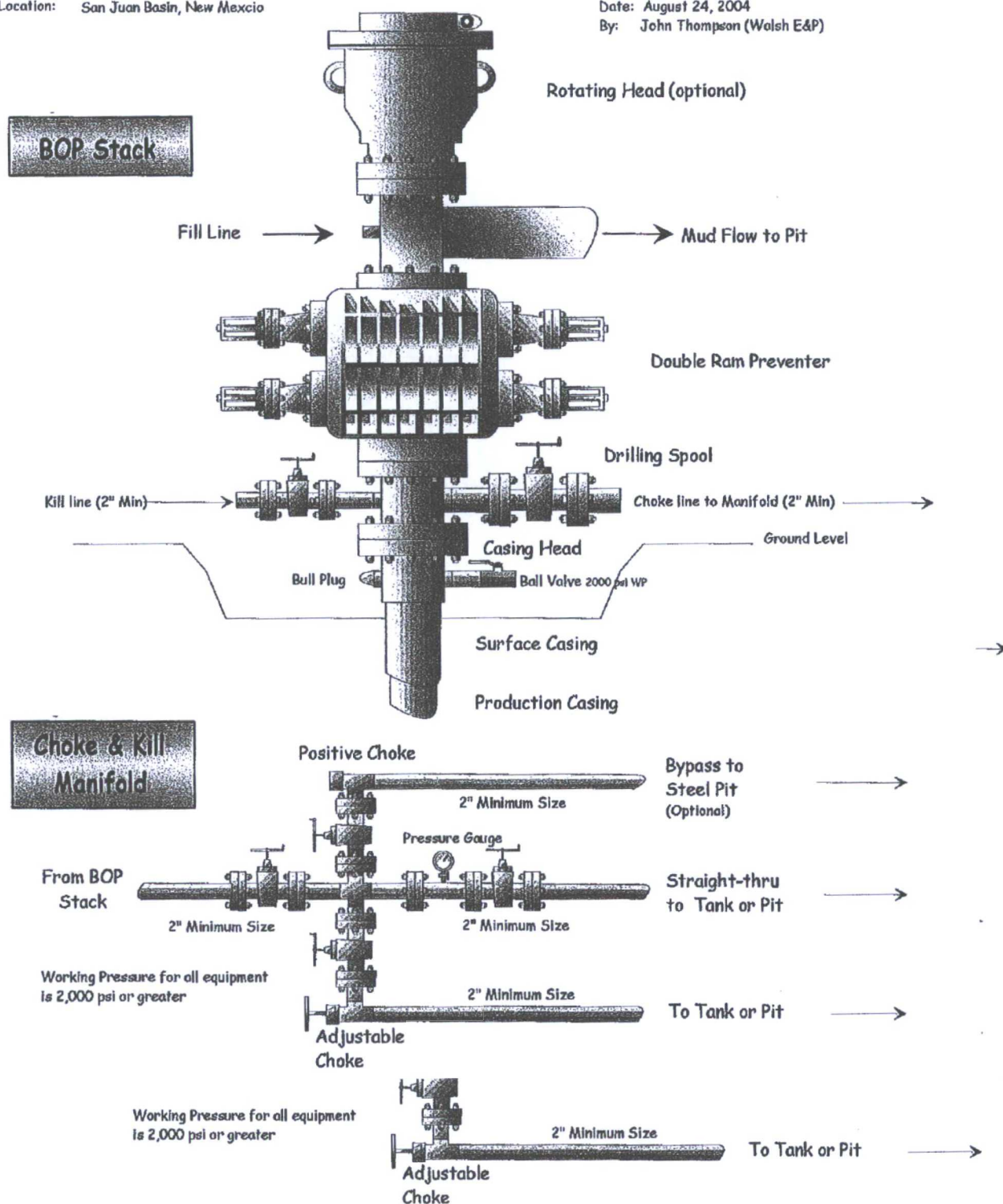
Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Walsh E&P)





SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	
3	1271.66	11.43	357.39	1267.87	56.79	-2.59	2.00	357.39	-2.77	
4	4516.79	11.43	357.39	4448.60	699.39	-31.91	0.00	0.00	-34.11	
5	5723.70	89.94	90.30	5205.00	848.00	732.00	7.50	92.87	729.33	
6	7023.70	89.94	90.30	5206.36	841.19	2031.98	0.00	0.00	2029.33	
7	9906.17	89.96	124.80	5209.00	-14.90	4738.96	1.20	89.99	4738.99	HEROS 2H PBHL P3

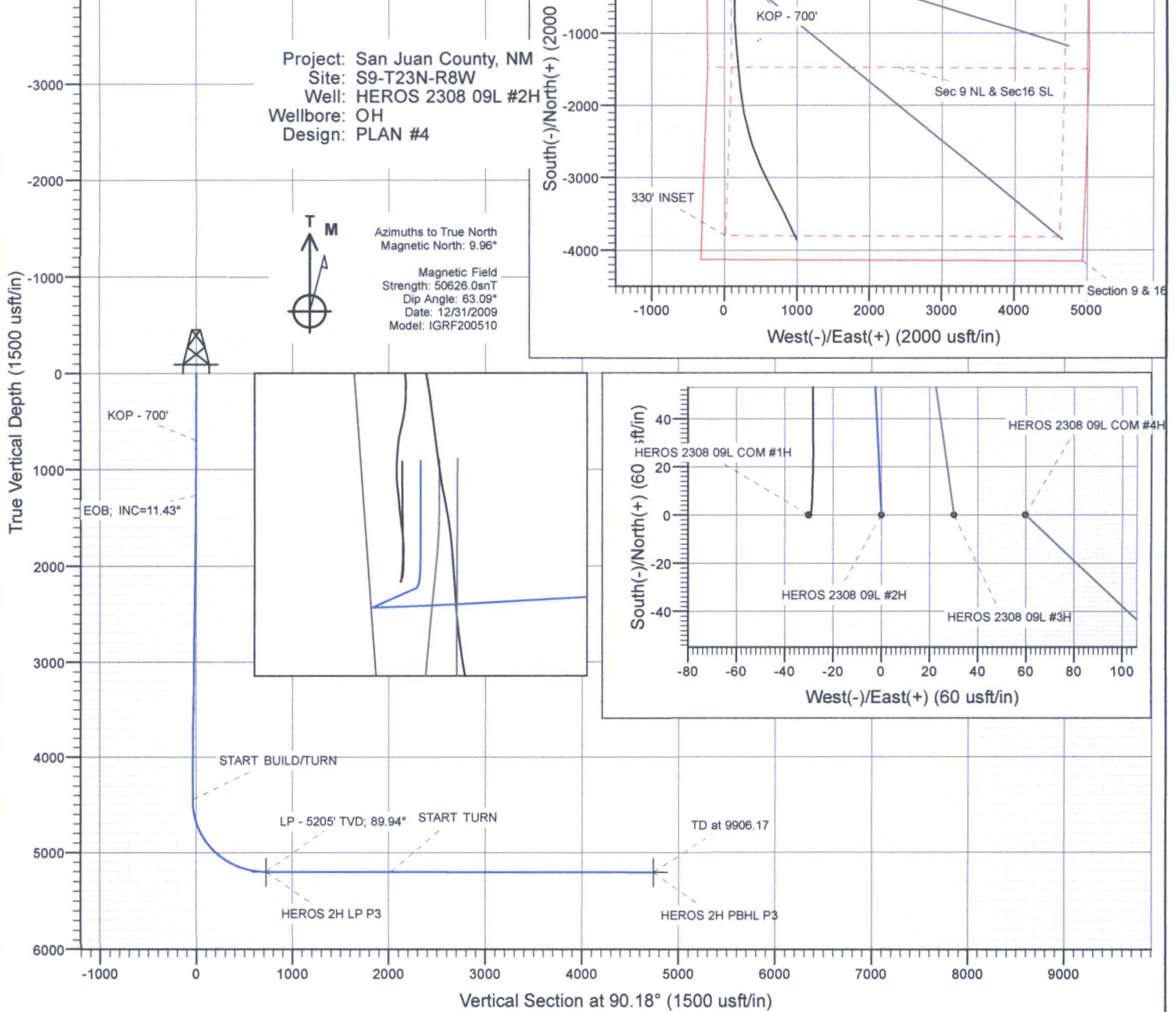
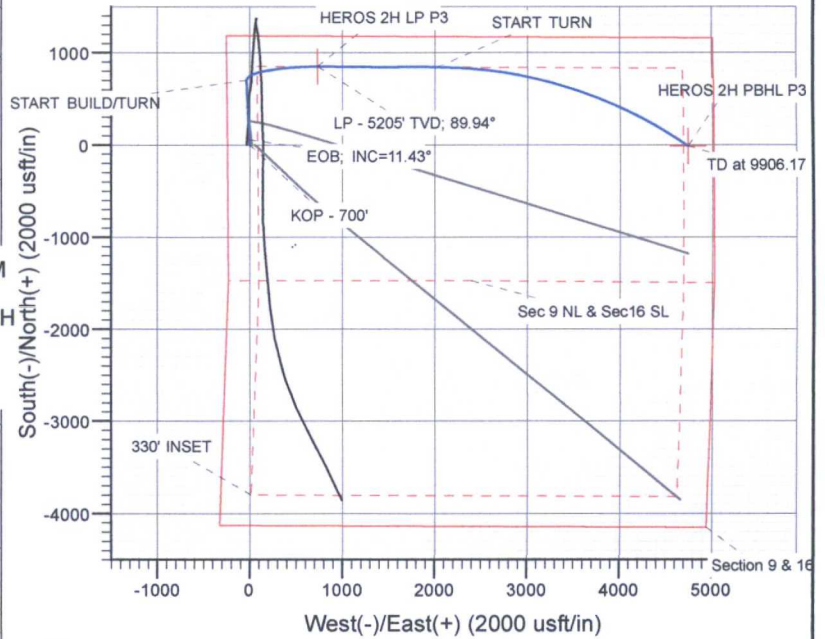
PLAN #4
HEROS 2308 09L #2H
14 KB @ 6927.00usft
Ground Level @ 6913.00
North American Datum 1983
Well HEROS 2308 09L #2H, True North

Type	Target	TD	No Target (Freehand)	Azimuth	Origin	Type	N/S	EW	From	TVD
Name				90.18	Spot		0.00	0.00	0.00	
HEROS 2H LP				TVD						
HEROS 2H PBHL				5188.00						
HEROS 2H LP P3				5193.00						
HEROS 2H LP P2				5205.00						
HEROS 2H PBHL P3				5209.00						
HEROS 2H PBHL P2				5213.00						

Project: San Juan County, NM
Site: S9-T23N-R8W
Well: HEROS 2308 09L #2H
Wellbore: OH
Design: PLAN #4

Azimuths to True North
Magnetic North: 9.96°

Magnetic Field
Strength: 50626.0snT
Dip Angle: 63.09°
Date: 12/31/2009
Model: IGRF200510



WELL DETAILS: HEROS 2308 09L #2H

6913.00
+N-S 0.00 +E-W 0.00 Northing 1906138.88 Easting 2763932.56 Latitude 36.238493 Longitude -107.694840



Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: LOGOS Operating LLC
Project: San Juan County, NM
Site: S9-T23N-R8W
Well: HEROS 2308 09L #2H
Wellbore: OH
Design: PLAN #4

Local Co-ordinate Reference: Well HEROS 2308 09L #2H
TVD Reference: 14' KB @ 6927.00usft
MD Reference: 14' KB @ 6927.00usft
North Reference: True
Survey Calculation Method: Minimum Curvature

Project: San Juan County, NM

Map System: US State Plane 1983 System Datum: Mean Sea Level
Geo Datum: North American Datum 1983
Map Zone: New Mexico Western Zone

Site: S9-T23N-R8W

Site Position: Northing: 1,906,138.83 usft Latitude: 36.238493
From: Map Easting: 2,763,902.48 usft Longitude: -107.694942
Position Uncertainty: 0.00 usft Slot Radius: 13-3/16" Grid Convergence: 0.08 °

Well: HEROS 2308 09L #2H

Well Position: +N/-S 0.00 usft Northing: 1,906,138.88 usft Latitude: 36.238493
+E/-W 0.00 usft Easting: 2,763,932.56 usft Longitude: -107.694840
Position Uncertainty: 0.00 usft Wellhead Elevation: usft Ground Level: 6,913.00 usft

Wellbore: OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.97	63.09	50,626.00266961

Design: PLAN #4

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	90.18

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	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,271.66	11.43	357.39	1,267.87	56.79	-2.59	2.00	2.00	0.00	357.39	
4,516.79	11.43	357.39	4,448.60	699.39	-31.91	0.00	0.00	0.00	0.00	
5,723.70	89.94	90.30	5,205.00	848.00	732.00	7.50	6.50	7.70	92.87	
7,023.70	89.94	90.30	5,206.36	841.19	2,031.98	0.00	0.00	0.00	0.00	
9,906.17	89.96	124.80	5,209.00	-14.90	4,738.96	1.20	0.00	1.20	89.99	HEROS 2H PBHL P3

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HEROS 2308 09L #2H
Company:	LOGOS Operating LLC	TVD Reference:	14' KB @ 6927.00usft
Project:	San Juan County, NM	MD Reference:	14' KB @ 6927.00usft
Site:	S9-T23N-R8W	North Reference:	True
Well:	HEROS 2308 09L #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #4		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
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	
200.00	0.00	0.00	200.00	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	
400.00	0.00	0.00	400.00	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	
600.00	0.00	0.00	600.00	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	KOP - 700'
800.00	2.00	357.39	799.98	1.74	-0.08	-0.09	2.00	2.00	
900.00	4.00	357.39	899.84	6.97	-0.32	-0.34	2.00	2.00	
1,000.00	6.00	357.39	999.45	15.68	-0.72	-0.76	2.00	2.00	
1,100.00	8.00	357.39	1,098.70	27.85	-1.27	-1.36	2.00	2.00	
1,200.00	10.00	357.39	1,197.47	43.48	-1.98	-2.12	2.00	2.00	
1,271.66	11.43	357.39	1,267.87	56.79	-2.59	-2.77	2.00	2.00	EOB; INC=11.43°
1,300.00	11.43	357.39	1,295.65	62.40	-2.85	-3.04	0.00	0.00	
1,400.00	11.43	357.39	1,393.67	82.20	-3.75	-4.01	0.00	0.00	
1,500.00	11.43	357.39	1,491.68	102.00	-4.65	-4.97	0.00	0.00	
1,600.00	11.43	357.39	1,589.70	121.81	-5.56	-5.94	0.00	0.00	
1,700.00	11.43	357.39	1,687.71	141.61	-6.46	-6.91	0.00	0.00	
1,800.00	11.43	357.39	1,785.73	161.41	-7.36	-7.87	0.00	0.00	
1,900.00	11.43	357.39	1,883.75	181.21	-8.27	-8.84	0.00	0.00	
2,000.00	11.43	357.39	1,981.76	201.01	-9.17	-9.80	0.00	0.00	
2,100.00	11.43	357.39	2,079.78	220.82	-10.07	-10.77	0.00	0.00	
2,200.00	11.43	357.39	2,177.79	240.62	-10.98	-11.73	0.00	0.00	
2,300.00	11.43	357.39	2,275.81	260.42	-11.88	-12.70	0.00	0.00	
2,400.00	11.43	357.39	2,373.82	280.22	-12.79	-13.67	0.00	0.00	
2,500.00	11.43	357.39	2,471.84	300.02	-13.69	-14.63	0.00	0.00	
2,600.00	11.43	357.39	2,569.85	319.83	-14.59	-15.60	0.00	0.00	
2,700.00	11.43	357.39	2,667.87	339.63	-15.50	-16.56	0.00	0.00	
2,800.00	11.43	357.39	2,765.89	359.43	-16.40	-17.53	0.00	0.00	
2,900.00	11.43	357.39	2,863.90	379.23	-17.30	-18.49	0.00	0.00	
3,000.00	11.43	357.39	2,961.92	399.03	-18.21	-19.46	0.00	0.00	
3,100.00	11.43	357.39	3,059.93	418.84	-19.11	-20.43	0.00	0.00	
3,200.00	11.43	357.39	3,157.95	438.64	-20.01	-21.39	0.00	0.00	
3,300.00	11.43	357.39	3,255.96	458.44	-20.92	-22.36	0.00	0.00	
3,400.00	11.43	357.39	3,353.98	478.24	-21.82	-23.32	0.00	0.00	
3,500.00	11.43	357.39	3,452.00	498.04	-22.72	-24.29	0.00	0.00	
3,600.00	11.43	357.39	3,550.01	517.84	-23.63	-25.25	0.00	0.00	
3,700.00	11.43	357.39	3,648.03	537.65	-24.53	-26.22	0.00	0.00	
3,800.00	11.43	357.39	3,746.04	557.45	-25.43	-27.19	0.00	0.00	
3,900.00	11.43	357.39	3,844.06	577.25	-26.34	-28.15	0.00	0.00	
4,000.00	11.43	357.39	3,942.07	597.05	-27.24	-29.12	0.00	0.00	
4,100.00	11.43	357.39	4,040.09	616.85	-28.14	-30.08	0.00	0.00	
4,200.00	11.43	357.39	4,138.11	636.66	-29.05	-31.05	0.00	0.00	
4,300.00	11.43	357.39	4,236.12	656.46	-29.95	-32.01	0.00	0.00	
4,400.00	11.43	357.39	4,334.14	676.26	-30.85	-32.98	0.00	0.00	
4,500.00	11.43	357.39	4,432.15	696.06	-31.76	-33.95	0.00	0.00	
4,516.79	11.43	357.39	4,448.60	699.39	-31.91	-34.11	0.00	0.00	START BUILD/TURN
4,600.00	12.73	26.91	4,530.05	715.82	-28.13	-30.38	7.50	1.56	
4,700.00	17.36	50.06	4,626.68	735.24	-11.69	-14.00	7.50	4.63	
4,800.00	23.49	62.61	4,720.40	754.01	17.49	15.12	7.50	6.13	
4,900.00	30.21	70.02	4,809.59	771.80	58.88	56.46	7.50	6.73	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HEROS 2308 09L #2H
Company:	LOGOS Operating LLC	TVD Reference:	14' KB @ 6927.00usft
Project:	San Juan County, NM	MD Reference:	14' KB @ 6927.00usft
Site:	S9-T23N-R8W	North Reference:	True
Well:	HEROS 2308 09L #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #4		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,000.00	37.21	74.89	4,892.74	788.31	111.80	109.32	7.50	7.00	
5,100.00	44.36	78.39	4,968.42	803.25	175.32	172.80	7.50	7.14	
5,200.00	51.59	81.10	5,035.33	816.36	248.37	245.81	7.50	7.23	
5,300.00	58.86	83.30	5,092.33	827.44	329.70	327.10	7.50	7.28	
5,400.00	66.17	85.19	5,138.45	836.27	417.91	415.28	7.50	7.31	
5,500.00	73.50	86.88	5,172.90	842.72	511.49	508.84	7.50	7.33	
5,600.00	80.85	88.45	5,195.08	846.67	608.85	606.18	7.50	7.34	
5,700.00	88.20	89.95	5,204.62	848.05	708.31	705.64	7.50	7.35	
5,723.70	89.94	90.30	5,205.00	848.00	732.00	729.33	7.50	7.35	LP - 5205' TVD; 89.94°
5,800.00	89.94	90.30	5,205.08	847.60	808.30	805.63	0.00	0.00	
5,900.00	89.94	90.30	5,205.18	847.08	908.30	905.63	0.00	0.00	
6,000.00	89.94	90.30	5,205.29	846.55	1,008.30	1,005.63	0.00	0.00	
6,100.00	89.94	90.30	5,205.39	846.03	1,108.30	1,105.63	0.00	0.00	
6,200.00	89.94	90.30	5,205.50	845.51	1,208.30	1,205.63	0.00	0.00	
6,300.00	89.94	90.30	5,205.60	844.98	1,308.30	1,305.63	0.00	0.00	
6,400.00	89.94	90.30	5,205.71	844.46	1,408.29	1,405.63	0.00	0.00	
6,500.00	89.94	90.30	5,205.81	843.94	1,508.29	1,505.63	0.00	0.00	
6,600.00	89.94	90.30	5,205.92	843.41	1,608.29	1,605.63	0.00	0.00	
6,700.00	89.94	90.30	5,206.02	842.89	1,708.29	1,705.63	0.00	0.00	
6,800.00	89.94	90.30	5,206.13	842.36	1,808.29	1,805.63	0.00	0.00	
6,900.00	89.94	90.30	5,206.23	841.84	1,908.29	1,905.63	0.00	0.00	
7,000.00	89.94	90.30	5,206.34	841.32	2,008.29	2,005.63	0.00	0.00	
7,023.70	89.94	90.30	5,206.36	841.19	2,031.98	2,029.33	0.00	0.00	START TURN
7,100.00	89.94	91.21	5,206.44	840.19	2,108.28	2,105.63	1.20	0.00	
7,200.00	89.94	92.41	5,206.55	837.02	2,208.23	2,205.58	1.20	0.00	
7,300.00	89.94	93.61	5,206.65	831.78	2,308.09	2,305.46	1.20	0.00	
7,400.00	89.94	94.80	5,206.75	824.44	2,407.82	2,405.21	1.20	0.00	
7,500.00	89.94	96.00	5,206.85	815.03	2,507.37	2,504.80	1.20	0.00	
7,600.00	89.94	97.20	5,206.96	803.54	2,606.71	2,604.17	1.20	0.00	
7,700.00	89.94	98.39	5,207.06	789.97	2,705.78	2,703.28	1.20	0.00	
7,800.00	89.94	99.59	5,207.16	774.34	2,804.55	2,802.10	1.20	0.00	
7,900.00	89.94	100.79	5,207.25	756.65	2,902.97	2,900.58	1.20	0.00	
8,000.00	89.94	101.99	5,207.35	736.91	3,001.00	2,998.67	1.20	0.00	
8,100.00	89.94	103.18	5,207.45	715.12	3,098.59	3,096.33	1.20	0.00	
8,200.00	89.95	104.38	5,207.55	691.30	3,195.71	3,193.53	1.20	0.00	
8,300.00	89.95	105.58	5,207.64	665.46	3,292.32	3,290.21	1.20	0.00	
8,400.00	89.95	106.77	5,207.74	637.60	3,388.36	3,386.33	1.20	0.00	
8,500.00	89.95	107.97	5,207.83	607.75	3,483.79	3,481.87	1.20	0.00	
8,600.00	89.95	109.17	5,207.92	575.91	3,578.59	3,576.76	1.20	0.00	
8,700.00	89.95	110.36	5,208.01	542.09	3,672.69	3,670.97	1.20	0.00	
8,800.00	89.95	111.56	5,208.10	506.32	3,766.07	3,764.46	1.20	0.00	
8,900.00	89.95	112.76	5,208.19	468.60	3,858.69	3,857.19	1.20	0.00	
9,000.00	89.95	113.95	5,208.28	428.96	3,950.49	3,949.12	1.20	0.00	
9,100.00	89.95	115.15	5,208.36	387.41	4,041.45	4,040.21	1.20	0.00	
9,200.00	89.95	116.35	5,208.45	343.97	4,131.52	4,130.42	1.20	0.00	
9,300.00	89.95	117.54	5,208.53	298.65	4,220.66	4,219.70	1.20	0.00	
9,400.00	89.95	118.74	5,208.61	251.49	4,308.83	4,308.02	1.20	0.00	
9,500.00	89.95	119.94	5,208.69	202.49	4,396.01	4,395.35	1.20	0.00	
9,600.00	89.96	121.13	5,208.77	151.68	4,482.13	4,481.64	1.20	0.00	
9,700.00	89.96	122.33	5,208.85	99.08	4,567.18	4,566.85	1.20	0.00	
9,800.00	89.96	123.53	5,208.92	44.72	4,651.12	4,650.95	1.20	0.00	
9,900.00	89.96	124.73	5,209.00	-11.38	4,733.89	4,733.91	1.20	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HEROS 2308 09L #2H
Company:	LOGOS Operating LLC	TVD Reference:	14' KB @ 6927.00usft
Project:	San Juan County, NM	MD Reference:	14' KB @ 6927.00usft
Site:	S9-T23N-R8W	North Reference:	True
Well:	HEROS 2308 09L #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #4		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
9,906.17	89.96	124.80	5,209.00	-14.90	4,738.96	4,738.99	1.20	0.00	TD at 9906.17

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
HEROS 2H LP P2	0.00	0.00	5,209.00	795.76	740.17	1,906,935.70	2,764,671.59	36.240679	-107.692330
- plan misses target center by 52.35usft at 5732.14usft MD (5205.01 TVD, 847.96 N, 740.44 E)									
- Point									
HEROS 2H LP P3	0.00	0.00	5,205.00	848.91	732.50	1,906,988.84	2,764,663.84	36.240825	-107.692356
- plan misses target center by 0.91usft at 5724.19usft MD (5205.00 TVD, 848.00 N, 732.49 E)									
- Point									
HEROS 2H PBHL P2	0.00	0.00	5,213.00	-219.22	4,689.48	1,905,926.37	2,768,622.35	36.237890	-107.678938
- plan misses target center by 210.27usft at 9906.17usft MD (5209.00 TVD, -14.90 N, 4738.96 E)									
- Point									
HEROS 2H LP	0.00	0.00	5,189.00	795.76	740.17	1,906,935.70	2,764,671.59	36.240679	-107.692330
- plan misses target center by 54.59usft at 5732.12usft MD (5205.01 TVD, 847.96 N, 740.42 E)									
- Point									
HEROS 2H PBHL P3	0.00	0.00	5,209.00	-14.90	4,738.96	1,906,130.76	2,768,671.54	36.238451	-107.678770
- plan hits target center									
- Point									
HEROS 2H PBHL	0.00	0.00	5,193.00	780.79	4,685.64	1,906,926.37	2,768,617.08	36.240637	-107.678950
- plan misses target center by 646.01usft at 9469.11usft MD (5208.67 TVD, 217.82 N, 4369.19 E)									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.00	700.00	0.00	0.00	KOP - 700'
1,271.66	1,267.87	56.79	-2.59	EOB; INC=11.43°
4,516.79	4,448.60	699.39	-31.91	START BUILD/TURN
5,723.70	5,205.00	848.00	732.00	LP - 5205' TVD; 89.94°
7,023.70	5,206.36	841.19	2,031.98	START TURN
9,906.17	5,209.00	-14.90	4,738.96	TD at 9906.17