

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey, 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: 8-21-14

Well information;

Operator Logos, Well Name and Number Dilectione Mea #004H

API# 30-039-31280, Section 3, Township 23 N/S, Range 6 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 NSI, 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
- 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.

* will submit sundry to clarify project area & dedicated acres

Due to bent section line, well bore may be less than 330 FSL

NMOCD Approved by Signature

9-25-2014

Date

RECEIVED

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

AUG 21 2014

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. NM 130875	
6. If Indian, Allottee or Tribe Name	
7. If Unit or CA Agreement, Name and No.	
8. Lease Name and Well No. DILECTIONE MEA 004H	
9. API Well No. 30-039-31280	
10. Field and Pool, or Exploratory Counselors Gallup-Dakota	
11. Sec., T. R. M. or Blk. and Survey or Area SHL: Sec 3, T23N R06W, UL M BHL: Sec 4, T23N R06W, UL M	
12. County or Parish Rio Arriba	13. State NM
14. Distance in miles and direction from nearest town or post office* 3 miles north of Counselor	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 393' from west edge of Sec 3	16. No. of acres in lease 639.12 acres
17. Spacing Unit dedicated to this well S2/S2 = 320.00 acres 160.00	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. Dilectione Mea 3H - 50'	19. Proposed Depth 10498' MD, 5458' VD
20. BLM/BIA Bond No. on file BLM NMB000917	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6719' GL	22. Approximate date work will start* 11/15/2014
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:

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

25. Signature <i>Tamra Sessions</i>	Name (Printed/Typed) Tamra Sessions	Date 08/21/2014
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Title Operations Technician		
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Approved by (Signature) <i>[Signature]</i>	Name (Printed/Typed)	Date 9/15/14
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Title AFM	Office FFO	
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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"

NMOCDFV

BLM'S APPROVAL OR ACCEPTANCE OF
ACTION DOES NOT RELIEVE THE LESSEE
OPERATOR FROM OBTAINING ANY OTHER
AUTHORIZATION REQUIRED FOR OPERATION
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

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

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

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.

Santa Fe, NM 87505

AMENDED REPORT
FARMINGTON FIELD OFFICE

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-039-31280		² Pool Code 13379		³ Pool Name Counselors Gallup-Dakota	
⁴ Property Code 313642		⁵ Property Name Dilectione Mea			⁶ Well Number 004H
⁷ OGRID No. 289408		⁸ Operator Name Logos Operating, LLC.			⁹ Elevation 6719'

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
M	3	T23N	R6W		837'	SOUTH	393'	WEST	RIO ARRIBA

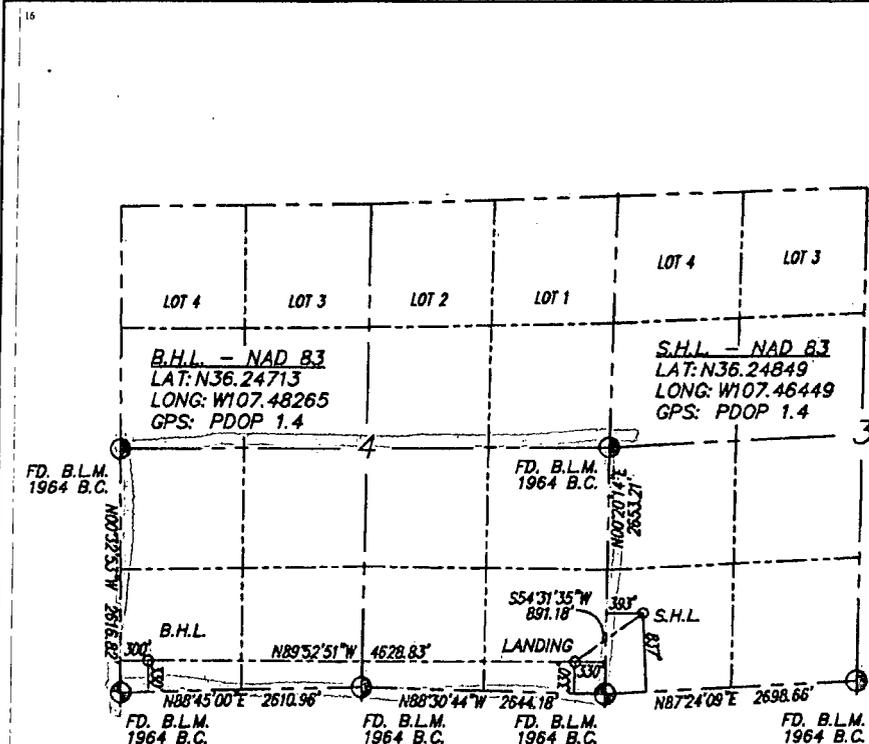
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	4	T23N	R6W		330'	SOUTH	300'	WEST	RIO ARRIBA

¹² Dedicated Acres 32016	¹³ Joint or Infill No	¹⁴ Consolidation Code 5/2 4	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.

OIL CONS. DIV DIST. 3
SEP 17 2014



¹⁷ OPERATOR CERTIFICATION

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

Signature: *Tamra Sessions* Date: 8-21-14

Printed Name: Tamra Sessions

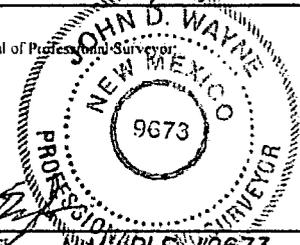
E-mail Address: tsessions@logosresourcesllc.com

¹⁸ SURVEYOR CERTIFICATION

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

Date of Survey: 03/24/2014 REV. 08/20/2014

Signature and Seal of Professional Surveyor



Certificate Number: N.M. PLS 9673

**Attachment To Application For Permit To Drill.
Drilling program**

LOGOS OPERATING, LLC
4001 N. Butler, Bldg. 7101
Farmington, NM 87401
U.S.A

DILECTIONE MEA 4H
Horizontal Gallup Oil and Gas Well
Surface Location: 837' FSL – 393' FWL
Section 3, T23N, R6W
Ungraded GL Elev = 6719'
Estimate KB Elev = 6734' (15'KB)
Lat. = 36.248490 deg N
Long. = 107.464490 deg W
NAD83
Rio Arriba County, New Mexico

Proposed Bottom Hole Location: 330' FSL – 300' FWL
Section 4, T23N, R6W
Rio Arriba County, New Mexico

Drilling program written in compliance with onshore Oil and Gas Order No. 1
(III.D.3, effective May 2007) and Onshore Order No. 2 Dated November 18, 1988

1. ESTIMATED TOPS FOR IMPORTANT GEOLOGICAL FORMATIONS

<u>Formation Tops</u>	<u>Surface (TVD)</u>
Kirtland	979
Fruitland	1604
Pictured Cliffs	1920
Chacra	2414
Cliffs House	3557
Menefee	3717
Point Lookout	4225
Mancos	4400
Gallup	5295
Landing Point	5508
Total Depth	5458

Drilling Plan

Drill 12 ¼" hole to 320' then set 9 5/8" casing. Drill 8 3/4" hole with fresh water mud from 320' MD to kick off point #1 3,338' MD and build 2 degrees per 100' to 20 degrees, 208.75 degrees azimuth and hold to approximately 5150' MD.

Trip out of hole and pick up 8 ¾" kick off assembly at 5150' MD. Build angle at 10 deg/100' to 85 degrees inclination and 270.26 degrees azimuth in the Gallup formation at 5400' MD/ 5294' TVD where 7" intermediate casing will be set at 5871' MD / 5504' TVD.

7" casing will be set in a legal position 330' FSL & 330' FEL in Section 4.

The 7" casing will be drilled out with a 6 1/8" drilling assembly building angle at 5 deg/100' to 90.63 degrees inclination and 270.26 degree azimuth to 5983' MD / 5508' TVD. Hold 90.63 degrees, 270.26 degrees azimuth and drill to a total depth at 10498' MD / 5458' TVD. Adjustments may be made to the directional program based on geology. Total depth will be 10498' MD / 5458' TVD - 90.63 degrees, 270.26 degrees Azimuth.

The Bottom hole location will be in a legal location at 10498' MD at 330' FSL & 300' FWL of Section 4.

A total of 4627' of horizontal hole will be drilled.

2. ANTICIPATED DEPTHS OF PROSPECTIVE OIL GAS AND OTHER HYDROCARBONS

Primary objective is the Gallup formation encountered first at 5295' TVD

See formation listings in #1 above for additional zones of interest.

3. MINIMUM SPECIFICATIONS FOR 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 2005 psig (0.364 psi/ft @ 5508' 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 1212 psi (5508' 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, 2000 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 70% of internal yield pressure. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested every 14 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.

4. PROPOSED BIT AND CASING PROGRAM

A. Bit Program

- 12-1/4" Surface Hole = Surface to 320'
- 8-3/4" = 320' to 5871' = 7" Casing point @ 85 degrees
- 8-3/4" Landing point = 5983' @ 90.63 degrees
- 6-1/8" Lateral = 5983' MD to 10498' MD = Gallup Pay Zone Horizontal

B. Casing Program – all casing strings are new casing

Casing & Hole Size	Weight	Grade	Coupling	Setting Depth (MD)	Comments
9-5/8" (12-1/4")	36 ppf	J or K-55	LT&C	0' - 320'	New casing. Cement to surface.
7" (8-3/4")	23 ppf	J or K-55	LT&C	0' - 5871' MD	New Casing. Cement to surface with two stages
4-1/2" (6-1/8")	11.6 ppf	P-110	LT&C	5600' - 10498' MD	New Casing - Horizontal Hole Cemented full length with foam cement - TOL at 60 degrees.

Casing strings below the conductor casing will be tested to .22 psi per foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield.

Minimum casing design factors used:

Collapse -	1.125
Burst -	1.0
Jt. Strength -	1.60

Surface casing shall have a minimum of 1 centralizer per joint on the bottom three (3) joints, starting with the shoe joint for a total of (4) minimum centralizers. Centralizers will be placed 10' above the shoe on the shoe joint, on the 1st, 2nd and 3rd casing collars.

The intermediate casing will be centralized using 1 centralizer the first 6 jts and spaced appropriately through the curve section of the well-bore and then spaced +/- 1 centralizer / 4 jts through the remainder of the cement column, using approximately 40 centralizers.

5. PROPOSED CEMENTING PROGRAM

The proposed cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

a) The proposed cementing program is as follows:

Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.

Surface Casing Single Stage Job - (0-320')

Stage 1

Fluid 1: Water Spacer

Fresh Water

Fluid Density: 8.33 lbm/gal

Volume: 10 bbl

Fluid 2: Lead Slurry

HALCEM (TM) SYSTEM

94 lbm Premium Cement

0.1250 lbm Poly-E-Flake

5.13 Gal FRESH WATER

Fluid Weight: 15.8 lbm/gal

Volume: 35.7 bbl

Slurry Yield: 1.174 ft³/sack

Total Mixing Fluid: 5.13 Gal/sack

Top Of Fluid: 0 ft

Calculated Fill: 320 ft

Calculated sack: 170.73 sack

Proposed sack: 175 sack

Fluid 3: Water Based Spacer

Displacement

Fluid Density: 8.33 lbm/gal

Volume: 24.7 bbl

Intermediate Casing – One Stage Job (0-5871' MD):
Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft3/ft)
Top of Cement – Surface

Stage 1

Fluid 1: Water Spacer

Fresh Water: Fluid Density: 8.33 lbm/gal
 Volume : 10 bbl

Fluid 2: Reactive Spacer

Chemical Wash Fluid Density: 8.4 lbm/gal
 1000 gal/Mgal FRESH WATER Volume : 40 bbl

Fluid 3: Water Spacer

Fresh Water Fluid Density: 8.33 lbm/gal
 Volume : 10 bbl

Fluid 4: Foamed

ELASTISEAL (TM) SYSTEM Fluid Weight: 13 lbm/gal
 1.50 % CHEM - FOAMER 760, TOTETANK Volume: 193.5 bbl
 6.73 Gal FRESH WATER Slurry Yield: 1.438 ft3/sack
 Total Mixing Fluid: 6.83 Gal/sack
 Top Of Fluid: 0 ft
 Calculated Fill: 5267 ft
 Calculated sack: 42.26 sack
 Proposed sack: 560 sack

Fluid 5: Tail Slurry

HALCEM (TM) SYSTEM Fluid Weight: 13.5 lbm/gal
 5.70 Gal FRESH WATER Volume: 18.7 bbl
 Slurry Yield: 1.291 ft3/sack
 Total Mixing Fluid: 5.7 Gal/sack
 Top Of Fluid: 5267 ft
 Calculated Fill: 500 ft
 Calculated sack: 81.33 sack
 Proposed sack: 85 sack

Fluid 6: Water Based Spacer

Displacement Fluid Density: 8.4 lbm/gal
 Volume : 227 bbl

Fluid 7: Top Off Annulus

HALCEM (TM) SYSTEM Fluid Weight: 15.8 lbm/gal
 2 % Calcium Chloride Volume: 20.9 bbl
 5.15 Gal FRESH WATER Slurry Yield: 1.174 ft3/sack

Total Mixing Fluid: 5.15 Gal/sack
 Calculated sack: 0 sack
 Proposed sack: 100 sack

Cement volumes are minimums and may be adjusted based on caliper log results.

Production Casing – Single Stage Job (5600' - 10498' MD):
Excess – 50% over gauge hole – 6-1/8" hole and 4-1/2" casing (0.0942 ft3/ft)
Top of Cement – Top of Liner.

Stage 1

Fluid 1: Water Based Spacer

KCL Spacer

Fluid Density: 8.4 lbm/gal

Volume: 40 bbl

Fluid 2: Water Spacer

Fresh Water

Fluid Density: 8.33 lbm/gal

Volume: 10 bbl

Fluid 3: Rheologically Enhanced Spacer

9 lb/gal Tuned Spacer III

Fluid Density: 9 lbm/gal

38.32 gal/bbl FRESH WATER

Volume: 40 bbl

1 gal/bbl SEM-7

1 gal/bbl Musol(R) A

45 gal/bbl BAROID 41 - 50 LB BAG

Fluid 4: Water Spacer

Fresh Water

Fluid Density: 8.33 lbm/gal

Volume: 10 bbl

Fluid 5: Lead Slurry

ELASTISEAL (TM) SYSTEM

Fluid Weight: 13 lbm/gal

6.91 Gal FRESH WATER

Volume: 11.5 bbl

Slurry Yield: 1.457 ft³/sack

Total Mixing Fluid: 6.91 Gal/sack

Top Of Fluid: 4750 ft

Calculated Fill: 550 ft

Calculated sack: 44.32 sack

Proposed sack: 45 sack

Fluid 6: Foamed

ELASTISEAL (TM) SYSTEM

Fluid Weight: 13 lbm/gal

1.50 % CHEM - FOAMER 760, TOTETANK

Volume: 82.5 bbl

6.81 Gal FRESH WATER

Slurry Yield: 1.458 ft³/sack

Total Mixing Fluid: 6.92 Gal/sack

Top Of Fluid: 5300 ft

Calculated Fill: 4267 ft

Calculated sack: 231.30 sack

Proposed sack: 270 sack

Fluid 7: Tail Slurry

ELASTISEAL (TM) SYSTEM

5.72 Gal FRESH WATER.

Fluid Weight: 13.5 lbm/gal
 Volume: 22.2 bbl
 Slurry Yield: 1.285 ft³/sack
 Total Mixing Fluid: 5.72 Gal/sack
 Top Of Fluid: 9567 ft
 Calculated Fill: 1150 ft
 Calculated sack: 97 sack
 Proposed sack: 100 sack

Fluid 8: Water Based Spacer

MMCR Displacement
 0.25 gal/bbl Micro Matrix Retarder

Fluid Density: 8.4 lbm/gal
 Volume: 20 bbl

Fluid 9: Water Based Spacer

KCL Displacement

Fluid Density: 8.4 lbm/gal
 Volume: 40 bbl

Fluid 10: Water Spacer

Fresh Water Displacement

Fluid Density: 8.3 lbm/gal
 Volume: 30 bbl

Fluid 11: Water Based Spacer

KCL Displacement

Fluid Density: 8.4 lbm/gal
 Volume: 53.5 bbl

Stage 1:

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate	Downhole Volume
1	SPACER	KCL Spacer	8.4		40 bbl
2	SPACER	Fresh Water	8.33		10 bbl
3	SPACER	9 lb/gal Tuned Spacer III	9		40 bbl
4	SPACER	Fresh Water	8.33		10 bbl
5	CEMENT	Unfoamed Lead	13		45 sack
6	CEMENT	Foamed Cement	13		270 sack
7	CEMENT	Unfoamed Tail	13.5		100 sack
8	SPACER	MMCR Displacement	8.4		20 bbl
9	SPACER	KCL Displacement	8.4		40 bbl
10	SPACER	Fresh Water Displacement	8.3		30 bbl
11	SPACER	KCL Displacement	8.4		53.5 bbl

6. PROPOSED DRILLING FLUIDS PROGRAM

a) Vertical Portion

Hole Size (in)	TVD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
12-1/4"	0-320'	Fresh Water	8.4-8.6	60-70	NC
8-3/4"	320'-5080'	Fresh Water LSND	8.5-8.8	40-50	8-10

b) Kick off to Horizontal Lateral:

Hole Size (in)	MD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
8-3/4"	5150' (KOP)- 5951'	Fresh Water LSND	8.5-8.8	40-50	8-10
6-1/8"	5951' - 10498'	Synthetic Oil Based Mud	7.0-9.0	15-25	<1

- c) There will be sufficient mud on location to control a blowout should one occur. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers. Mud tests shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.
- d) A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals, including fresh water and oil-based operations. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystems, Inc. The location will be lined in accordance with the Surface Use Plan of Operations.

7. TESTING, CORING and LOGGING

- a) Drill Stem Testing - None anticipated
b) Coring - None anticipated.
c) Mud Logging - Mud loggers will be on location from intermediate casing point to TD.
d) Logging - See Below
e) Gamma Ray from surface casing point to TD

Cased Hole:

CBL/CCL/GRNDL will be run as needed for perforating control

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2578 psi based on a 9.0 ppg at 5508' TVD of the landing point of the horizontal. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H₂S is encountered, the guidelines in Onshore Order No. 6 will be followed.

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on November 15, 2014. It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

It is anticipated that the drilling of this well will take approximately 25 days.

CLOSED-LOOP SYSTEM DESIGN PLAN

The closed-loop system will consist of a series of temporary above-ground storage tanks and/or haul-off bins suitable for holding the cuttings and fluids from drilling operations. The closed-loop system will not entail temporary pits, below-grade storage tanks, below-grade sumps, or drying pads.

Design considerations include:

1. The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
2. The closed-loop system storage tanks will be of adequate volume to ensure confinement of all fluids and provide sufficient freeboard to prevent uncontrolled releases.
3. Topsoil will be salvaged and stored for use in reclamation activities.
4. The closed-loop system storage tanks will be placed in bermed secondary containment sized to contain a minimum of 110percent of the volume of the largest storage tank.

CLOSED-LOOP SYSTEM OPERATING & MAINTENANCE PLAN

The closed-loop system will be operated and maintained to contain liquids and solids; minimize the amount of drilling fluids and cuttings that require disposal; maximize the amount of drilling fluid recycled and reused in the drilling process; isolate drilling wastes from the environment; prevent contamination of fresh water; and protect public health and the environment.

Operation and maintenance considerations include:

1. Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
2. Visual inspections will be conducted on a daily basis to identify any potential leaks and to ensure that the closed-loop system storage tanks have sufficient freeboard to prevent over-topping.
3. Only drilling fluids or cuttings intrinsic to, used by, or generated from, drilling operations will be stored in the closed-loop system storage tanks. Hazardous waste, miscellaneous solid waste, and/or debris will not be stored in the storage tanks.
4. The OCD District Office will be notified within 48 hours of discovery of a leak in the closed-loop drilling system. If a leak is discovered, all liquid will be removed within 48 hours and the damage repaired.

CLOSED-LOOP SYSTEM CLOSURE PLAN

The closed-loop system will be closed in accordance with 19.15.17.13 NMAC.

Closure considerations include:

1. Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
2. Residual fluids will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at Industrial Ecosystem, Inc. waste disposal facilities.
3. Remaining cuttings or sludges will be vacuumed from the storage tanks and disposed of at the Envirotech, Inc and/or Industrial Ecosystem, Inc. waste disposal facilities.
4. Storage tanks will be removed from the well location during the rig move.
5. The well pad will be reclaimed and seeded in accordance with subsections G, Hand I of 19.15.17.13NMAC.

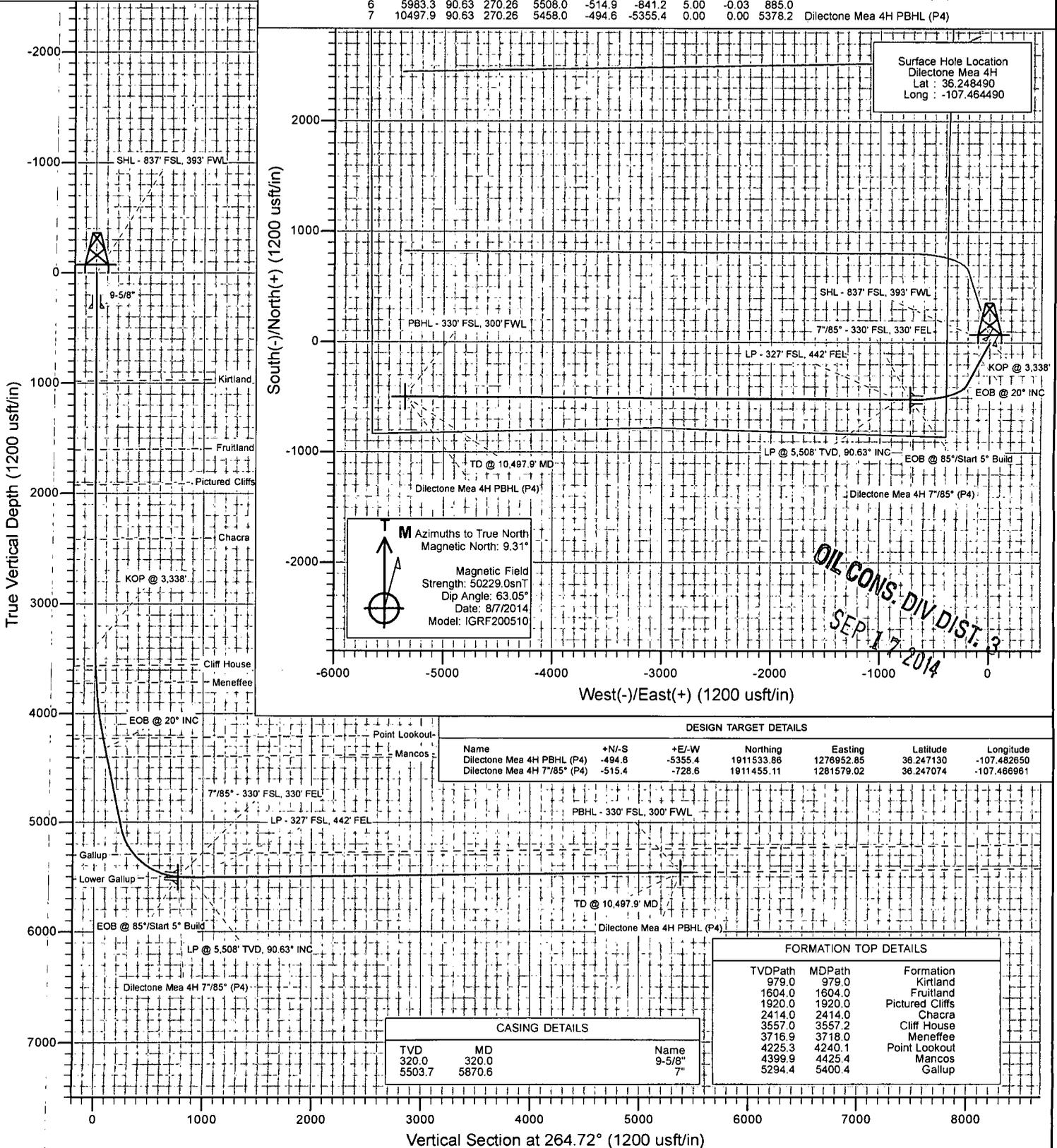


Project: Rio Arriba County, NM
 Site: S3-T23N-R6W (Dilectone Mea Pad)
 Well: Dilectone Mea 4H
 Wellbore: HZ
 Design: Plan #2



Plan #2
 Dilectone Mea 4H
 145XXX; SC
 kb = 15' @ 6734.0usft
 Ground Elevation @ 6719.0
 North American Datum 1983
 Well Dilectone Mea 4H, True North

SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0		
2	3338.0	0.00	0.00	3338.0	0.0	0.0	0.00	0.00	0.0		
3	4337.8	20.00	208.75	4317.7	-151.4	-83.1	2.00	208.75	96.6		
4	5112.1	20.00	208.75	5045.2	-383.6	-210.4	0.00	0.00	244.8		
5	5870.6	85.00	270.26	5503.7	-515.4	-728.6	10.00	64.55	772.9	Dilectone Mea 4H 7°/85° (P4)	
6	5983.3	90.63	270.26	5508.0	-514.9	-841.2	5.00	-0.03	885.0		
7	10497.9	90.63	270.26	5458.0	-494.6	-5355.4	0.00	0.00	5378.2	Dilectone Mea 4H PBHL (P4)	



OIL CONS. DIV. DIST. 3
 SEP 17 2014

Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB	Local Co-ordinate Reference: Well Dilectone Mea 4H	
Company: LOGOS Operating LLC	TVD Reference: kb = 15' @ 6734.0usft	
Project: Rio Arriba County, NM	MD Reference: kb = 15' @ 6734.0usft	
Site: S3-T23N-R6W (Dilectone Mea Pad)	North Reference: True	
Well: Dilectone Mea 4H	Survey Calculation Method: Minimum Curvature	
Wellbore: HZ		
Design: Plan #2		

Project	Rio Arriba County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	S3-T23N-R6W (Dilectone Mea Pad)				
Site Position:		Northing:	1,914,779.94 usft	Latitude:	36.256230
From:	Lat/Long	Easting:	1,282,275.64 usft	Longitude:	-107.464740
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-0.72 °

Well	Dilectone Mea 4H					
Well Position	+N/-S	0.0 usft	Northing:	1,911,961.33 usft	Latitude:	36.248490
	+E/-W	0.0 usft	Easting:	1,282,314.02 usft	Longitude:	-107.464490
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	6,719.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/7/2014	9.31	63.05	50,229

Design	Plan #2				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	264.72	

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,338.0	0.00	0.00	3,338.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,337.8	20.00	208.75	4,317.7	-151.4	-83.1	2.00	2.00	0.00	208.75	
5,112.1	20.00	208.75	5,045.2	-383.6	-210.4	0.00	0.00	0.00	0.00	
5,870.6	85.00	270.26	5,503.7	-515.4	-728.6	10.00	8.57	8.11	64.55	Dilectone Mea 4H 7"lt
5,983.3	90.63	270.26	5,508.0	-514.9	-841.2	5.00	5.00	0.00	-0.03	
10,497.9	90.63	270.26	5,458.0	-494.6	-5,355.4	0.00	0.00	0.00	0.00	Dilectone Mea 4H PB

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well-Dilectone Mea 4H
Company:	LOGOS Operating LLC	TVD Reference:	kb = 15' @ 6734.0usft
Project:	Rio Arriba County, NM	MD Reference:	kb = 15' @ 6734.0usft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	North Reference:	True
Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
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 (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
0.5	0.00	0.00	0.5	0.0	0.0	0.0	0.00	0.00	SHL - 837' FSL, 393' FWL
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	9-5/8"
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
979.0	0.00	0.00	979.0	0.0	0.0	0.0	0.00	0.00	Kirtland
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,604.0	0.00	0.00	1,604.0	0.0	0.0	0.0	0.00	0.00	Fruitland
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
1,920.0	0.00	0.00	1,920.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	
2,414.0	0.00	0.00	2,414.0	0.0	0.0	0.0	0.00	0.00	Chacra
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	
3,338.0	0.00	0.00	3,338.0	0.0	0.0	0.0	0.00	0.00	
3,380.0	0.84	208.75	3,380.0	-0.3	-0.1	0.2	2.00	2.00	KOP @ 3,338'
3,400.0	1.24	208.75	3,400.0	-0.6	-0.3	0.4	2.00	2.00	
3,500.0	3.24	208.75	3,499.9	-4.0	-2.2	2.6	2.00	2.00	
3,557.2	4.38	208.75	3,557.0	-7.3	-4.0	4.7	2.00	2.00	Cliff House
3,600.0	5.24	208.75	3,599.6	-10.5	-5.8	6.7	2.00	2.00	
3,700.0	7.24	208.75	3,699.0	-20.0	-11.0	12.8	2.00	2.00	
3,718.0	7.60	208.75	3,716.9	-22.1	-12.1	14.1	2.00	2.00	Meneffee
3,800.0	9.24	208.75	3,798.0	-32.6	-17.9	20.8	2.00	2.00	
3,900.0	11.24	208.75	3,896.4	-48.2	-26.4	30.7	2.00	2.00	
4,000.0	13.24	208.75	3,994.1	-66.8	-36.6	42.6	2.00	2.00	
4,100.0	15.24	208.75	4,091.0	-88.3	-48.5	56.4	2.00	2.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Company:	LOGOS Operating LLC	TVD Reference:	kb = 15' @ 6734.0usft
Project:	Rio Arriba County, NM	MD Reference:	kb = 15' @ 6734.0usft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	North Reference:	True
Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
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 (°/100u)	Comments / Formations	
4,200.0	17.24	208.75	4,187.1	-112.8	-61.9	72.0	2.00	2.00		
4,240.1	18.04	208.75	4,225.3	-123.5	-67.7	78.8	2.00	2.00	Point Lookout	
4,300.0	19.24	208.75	4,282.0	-140.3	-77.0	89.5	2.00	2.00		
4,337.8	20.00	208.75	4,317.6	-151.4	-83.1	96.6	2.00	2.00	EOB @ 20° INC	
4,400.0	20.00	208.75	4,376.1	-170.1	-93.3	108.5	0.00	0.00		
4,425.4	20.00	208.75	4,399.9	-177.7	-97.5	113.4	0.00	0.00	Mancos	
4,500.0	20.00	208.75	4,470.0	-200.0	-109.7	127.7	0.00	0.00		
4,600.0	20.00	208.75	4,564.0	-230.0	-126.2	146.8	0.00	0.00		
4,700.0	20.00	208.75	4,658.0	-260.0	-142.6	165.9	0.00	0.00		
4,800.0	20.00	208.75	4,752.0	-290.0	-159.1	185.1	0.00	0.00		
4,900.0	20.00	208.75	4,845.9	-320.0	-175.5	204.2	0.00	0.00		
5,000.0	20.00	208.75	4,939.9	-350.0	-192.0	223.3	0.00	0.00		
5,100.0	20.00	208.75	5,033.9	-379.9	-208.4	242.5	0.00	0.00		
5,112.1	20.00	208.75	5,045.2	-383.6	-210.4	244.8	0.00	0.00		
5,150.0	21.88	217.97	5,080.7	-394.8	-217.9	253.3	10.00	4.98		
5,200.0	25.01	227.80	5,126.5	-409.3	-231.4	268.1	10.00	6.26		
5,250.0	28.65	235.43	5,171.2	-423.2	-249.2	287.0	10.00	7.27		
5,300.0	32.62	241.40	5,214.2	-436.4	-270.9	309.9	10.00	7.94		
5,350.0	36.82	246.18	5,255.3	-449.0	-296.4	336.5	10.00	8.39		
5,400.0	41.17	250.10	5,294.1	-460.6	-325.6	366.6	10.00	8.71		
5,400.4	41.20	250.12	5,294.4	-460.7	-325.9	366.9	10.00	8.83	Gallup	
5,450.0	45.63	253.37	5,330.5	-471.3	-358.2	400.1	10.00	8.93		
5,500.0	50.18	256.18	5,364.0	-481.0	-394.0	436.6	10.00	9.09		
5,550.0	54.79	258.64	5,394.4	-489.7	-432.7	475.9	10.00	9.21		
5,600.0	59.43	260.83	5,421.6	-497.1	-474.0	517.7	10.00	9.30		
5,650.0	64.12	262.82	5,445.2	-503.4	-517.6	561.7	10.00	9.37		
5,700.0	68.82	264.66	5,465.2	-508.3	-563.2	607.5	10.00	9.42		
5,750.0	73.55	266.39	5,481.3	-512.0	-610.3	654.9	10.00	9.45		
5,800.0	78.29	268.03	5,493.4	-514.4	-658.8	703.3	10.00	9.48		
5,850.0	83.04	269.62	5,501.6	-515.4	-708.1	752.5	10.00	9.50		
5,870.6	85.00	270.26	5,503.7	-515.4	-728.6	772.9	10.00	9.51	EOB @ 85°/Start 5° Build - 7"/85° - 330' FSL, 3	
5,900.0	86.47	270.26	5,505.9	-515.3	-757.9	802.1	5.00	5.00		
5,983.3	90.63	270.26	5,508.0	-514.9	-841.1	884.9	5.00	5.00	LP @ 5,508' TVD, 90.63° INC - LP - 327' FSL, 4	
6,000.0	90.63	270.26	5,507.8	-514.8	-857.8	901.6	0.00	0.00		
6,100.0	90.63	270.26	5,506.7	-514.4	-957.8	1,001.1	0.00	0.00		
6,200.0	90.63	270.26	5,505.6	-513.9	-1,057.8	1,100.6	0.00	0.00		
6,300.0	90.63	270.26	5,504.5	-513.5	-1,157.8	1,200.1	0.00	0.00		
6,400.0	90.63	270.26	5,503.4	-513.0	-1,257.8	1,299.7	0.00	0.00		
6,500.0	90.63	270.26	5,502.3	-512.6	-1,357.8	1,399.2	0.00	0.00		
6,600.0	90.63	270.26	5,501.2	-512.1	-1,457.8	1,498.7	0.00	0.00		
6,700.0	90.63	270.26	5,500.1	-511.7	-1,557.8	1,598.3	0.00	0.00		
6,800.0	90.63	270.26	5,498.9	-511.2	-1,657.8	1,697.8	0.00	0.00		
6,900.0	90.63	270.26	5,497.8	-510.8	-1,757.8	1,797.3	0.00	0.00		
7,000.0	90.63	270.26	5,496.7	-510.3	-1,857.8	1,896.8	0.00	0.00		
7,100.0	90.63	270.26	5,495.6	-509.9	-1,957.8	1,996.4	0.00	0.00		
7,200.0	90.63	270.26	5,494.5	-509.4	-2,057.8	2,095.9	0.00	0.00		
7,300.0	90.63	270.26	5,493.4	-509.0	-2,157.8	2,195.4	0.00	0.00		
7,400.0	90.63	270.26	5,492.3	-508.5	-2,257.7	2,294.9	0.00	0.00		
7,500.0	90.63	270.26	5,491.2	-508.1	-2,357.7	2,394.5	0.00	0.00		
7,600.0	90.63	270.26	5,490.1	-507.6	-2,457.7	2,494.0	0.00	0.00		
7,700.0	90.63	270.26	5,489.0	-507.2	-2,557.7	2,593.5	0.00	0.00		
7,800.0	90.63	270.26	5,487.9	-506.7	-2,657.7	2,693.1	0.00	0.00		

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Company:	LOGOS Operating LLC	TVD Reference:	kb = 15' @ 6734.0usft
Project:	Rio Arriba County, NM	MD Reference:	kb = 15' @ 6734.0usft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	North Reference:	True
Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
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 (°/100u)	Comments / Formations
7,900.0	90.63	270.26	5,486.8	-506.3	-2,757.7	2,792.6	0.00	0.00	
8,000.0	90.63	270.26	5,485.7	-505.8	-2,857.7	2,892.1	0.00	0.00	
8,100.0	90.63	270.26	5,484.6	-505.4	-2,957.7	2,991.6	0.00	0.00	
8,200.0	90.63	270.26	5,483.4	-504.9	-3,057.7	3,091.2	0.00	0.00	
8,300.0	90.63	270.26	5,482.3	-504.5	-3,157.7	3,190.7	0.00	0.00	
8,400.0	90.63	270.26	5,481.2	-504.1	-3,257.7	3,290.2	0.00	0.00	
8,500.0	90.63	270.26	5,480.1	-503.6	-3,357.7	3,389.8	0.00	0.00	
8,600.0	90.63	270.26	5,479.0	-503.2	-3,457.7	3,489.3	0.00	0.00	
8,700.0	90.63	270.26	5,477.9	-502.7	-3,557.7	3,588.8	0.00	0.00	
8,800.0	90.63	270.26	5,476.8	-502.3	-3,657.6	3,688.3	0.00	0.00	
8,900.0	90.63	270.26	5,475.7	-501.8	-3,757.6	3,787.9	0.00	0.00	
9,000.0	90.63	270.26	5,474.6	-501.4	-3,857.6	3,887.4	0.00	0.00	
9,100.0	90.63	270.26	5,473.5	-500.9	-3,957.6	3,986.9	0.00	0.00	
9,200.0	90.63	270.26	5,472.4	-500.5	-4,057.6	4,086.4	0.00	0.00	
9,300.0	90.63	270.26	5,471.3	-500.0	-4,157.6	4,186.0	0.00	0.00	
9,400.0	90.63	270.26	5,470.2	-499.6	-4,257.6	4,285.5	0.00	0.00	
9,500.0	90.63	270.26	5,469.0	-499.1	-4,357.6	4,385.0	0.00	0.00	
9,600.0	90.63	270.26	5,467.9	-498.7	-4,457.6	4,484.6	0.00	0.00	
9,700.0	90.63	270.26	5,466.8	-498.2	-4,557.6	4,584.1	0.00	0.00	
9,800.0	90.63	270.26	5,465.7	-497.8	-4,657.6	4,683.6	0.00	0.00	
9,900.0	90.63	270.26	5,464.6	-497.3	-4,757.6	4,783.1	0.00	0.00	
10,000.0	90.63	270.26	5,463.5	-496.9	-4,857.6	4,882.7	0.00	0.00	
10,100.0	90.63	270.26	5,462.4	-496.4	-4,957.6	4,982.2	0.00	0.00	
10,200.0	90.63	270.26	5,461.3	-496.0	-5,057.5	5,081.7	0.00	0.00	
10,300.0	90.63	270.26	5,460.2	-495.5	-5,157.5	5,181.3	0.00	0.00	
10,400.0	90.63	270.26	5,459.1	-495.1	-5,257.5	5,280.8	0.00	0.00	
10,497.0	90.63	270.26	5,458.0	-494.6	-5,354.5	5,377.3	0.00	0.00	TD @ 10,497.9' MD - PBHL - 330' FSL, 300' FE
10,497.9	90.63	270.26	5,458.0	-494.6	-5,355.4	5,378.2	0.00	0.00	

Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Dilectone Mea 4H 7"/85'	- plan hits target center	0.00	0.00	5,503.7	-515.4	-728.6	1,911,455.11	1,281,579.02	36.247074	-107.466961
	- Point									
Dilectone Mea 4H 7"/85'	- plan misses target center by 4.0usft at 5868.7usft MD (5503.5 TVD, -515.4 N, -726.7 E)	0.00	0.00	5,503.7	-511.4	-726.7	1,911,459.08	1,281,580.97	36.247085	-107.466954
	- Point									
Dilectone Mea 4H PBHL	- plan misses target center by 4.2usft at 10497.5usft MD (5458.0 TVD, -494.6 N, -5355.0 E)	0.00	0.00	5,458.0	-490.4	-5,355.0	1,911,538.10	1,276,953.30	36.247142	-107.482649
	- Point									
Dilectone Mea 4H PBHL	- plan hits target center	0.00	0.00	5,458.0	-494.6	-5,355.4	1,911,533.86	1,276,952.85	36.247130	-107.482650
	- Point									

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Company:	LOGOS Operating LLC	TVD Reference:	kb = 15' @ 6734.0usft
Project:	Rio Arriba County, NM	MD Reference:	kb = 15' @ 6734.0usft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	North Reference:	True
Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #2		

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
5,870.6	5,503.7	7"	0	0	
320.0	320.0	9-5/8"	0	0	

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
979.0	979.0	Kirtland		-0.63	270.26
1,604.0	1,604.0	Fruitland		-0.63	270.26
1,920.0	1,920.0	Pictured Cliffs		-0.63	270.26
2,414.0	2,414.0	Chacra		-0.63	270.26
3,557.2	3,557.0	Cliff House		-0.63	270.26
3,718.0	3,717.0	Meneffee		-0.63	270.26
4,240.1	4,226.0	Point Lookout		-0.63	270.26
4,425.4	4,401.0	Mancos		-0.63	270.26
5,400.4	5,298.0	Gallup		-0.63	270.26

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
0.5	0.5	0.0	0.0	SHL - 837' FSL, 393' FWL	
3,380.0	3,380.0	-0.3	-0.1	KOP @ 3,338'	
4,337.8	4,317.6	-151.4	-83.1	EOB @ 20° INC	
5,870.6	5,503.7	-515.4	-728.6	EOB @ 85°/Start 5° Build	
5,870.6	5,503.7	-515.4	-728.6	7°/85° - 330' FSL, 330' FEL	
5,983.3	5,508.0	-514.9	-841.1	LP @ 5,508' TVD, 90.63° INC	
5,983.3	5,508.0	-514.9	-841.1	LP - 327' FSL, 442' FEL	
10,497.0	5,458.0	-494.6	-5,354.5	TD @ 10,497.9' MD	
10,497.0	5,458.0	-494.6	-5,354.5	PBHL - 330' FSL, 300' FEL	

LOGOS Operating LLC

Rio Arriba County, NM

S3-T23N-R6W (Dilectone Mea Pad)

Dilectone Mea 4H

HZ

Plan #2

Anticollision Report

20 August, 2014

Cathedral Energy Services Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Project:	Rio Arriba County, NM	TVD Reference:	kb = 15' @ 6734.0usft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	MD Reference:	kb = 15' @ 6734.0usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at:	2.00 sigma
Reference Wellbore:	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference:	Plan #2	Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.0usft	Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 500.0usft	Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA	Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic		

Survey Tool Program			Date	Tool Name	Description
From (usft)	To (usft)	Survey (Wellbore)			
0.0	10,497.7	Plan #2 (HZ)	8/20/2014	ISCWSA MWD	MWD - Standard

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						
S3-T23N-R6W (Dilectone Mea Pad)	2,761.7	2,761.7				Out of range
Dilectone Mea 1H - HZ - Plan #5	2,800.0	2,799.8	51.0	38.8	4.193	Out of range CC
Dilectone Mea 2H - HZ - Plan #4			51.0	38.7	4.137	ES, SF
Dilectone Mea 3H - HZ - Plan #2						

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Project:	Rio Arriba County, NM	TVD Reference:	kb = 15' @ 6734.0usft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	MD Reference:	kb = 15' @ 6734.0usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design													S3-T23N-R6W (Dilectone Mea Pad) - Dilectone Mea 3H - HZ - Plan #2		Offset Site Error:	0.0 usft
Survey Program:													0-ISCWSA MWD		Offset Well Error:	0.0 usft
Reference	Offset	Semi Major Axis		Distance		Wellbore Centre		Between Centres	Between Ellipses	Total Uncertainty	Separation Factor	Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	Axis					
0.0	0.0	0.0	0.0	0.0	0.0	0.00	51.0	0.0	51.0							
100.0	100.0	100.0	100.0	0.1	0.1	0.00	51.0	0.0	51.0	50.8	0.19	266.786				
200.0	200.0	200.0	200.0	0.3	0.3	0.00	51.0	0.0	51.0	50.3	0.64	79.568				
300.0	300.0	300.0	300.0	0.5	0.5	0.00	51.0	0.0	51.0	49.9	1.09	46.756				
400.0	400.0	400.0	400.0	0.8	0.8	0.00	51.0	0.0	51.0	49.4	1.54	33.105				
500.0	500.0	500.0	500.0	1.0	1.0	0.00	51.0	0.0	51.0	49.0	1.99	25.624				
600.0	600.0	600.0	600.0	1.2	1.2	0.00	51.0	0.0	51.0	48.5	2.44	20.900				
700.0	700.0	700.0	700.0	1.4	1.4	0.00	51.0	0.0	51.0	48.1	2.89	17.647				
800.0	800.0	800.0	800.0	1.7	1.7	0.00	51.0	0.0	51.0	47.6	3.34	15.271				
900.0	900.0	900.0	900.0	1.9	1.9	0.00	51.0	0.0	51.0	47.2	3.79	13.458				
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	51.0	0.0	51.0	46.7	4.24	12.030				
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	51.0	0.0	51.0	46.3	4.69	10.876				
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	51.0	0.0	51.0	45.8	5.14	9.924				
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	51.0	0.0	51.0	45.4	5.59	9.125				
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	51.0	0.0	51.0	44.9	6.03	8.446				
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	51.0	0.0	51.0	44.5	6.48	7.860				
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	51.0	0.0	51.0	44.0	6.93	7.351				
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	51.0	0.0	51.0	43.6	7.38	6.903				
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	51.0	0.0	51.0	43.1	7.83	6.507				
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	51.0	0.0	51.0	42.7	8.28	6.154				
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	51.0	0.0	51.0	42.2	8.73	5.837				
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	51.0	0.0	51.0	41.8	9.18	5.551				
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	51.0	0.0	51.0	41.3	9.63	5.292				
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	51.0	0.0	51.0	40.9	10.08	5.056				
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	51.0	0.0	51.0	40.4	10.53	4.840				
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	51.0	0.0	51.0	40.0	10.98	4.642				
2,600.0	2,600.0	2,600.0	2,600.0	5.7	5.7	0.00	51.0	0.0	51.0	39.5	11.43	4.460				
2,700.0	2,700.0	2,700.0	2,700.0	5.9	5.9	0.00	51.0	0.0	51.0	39.1	11.88	4.291				
2,761.7	2,761.7	2,761.7	2,761.7	6.1	6.1	0.00	51.0	0.0	51.0	38.8	12.16	4.193 CC				
2,800.0	2,800.0	2,799.8	2,799.8	6.2	6.2	-0.01	51.0	0.0	51.0	38.7	12.33	4.137 ES, SF				
2,900.0	2,900.0	2,898.1	2,898.0	6.4	6.4	-0.72	53.0	-0.7	53.1	40.3	12.77	4.154				
3,000.0	3,000.0	2,996.1	2,995.9	6.6	6.6	-2.32	58.2	-2.4	58.4	45.2	13.22	4.420				
3,100.0	3,100.0	3,093.6	3,093.0	6.8	6.8	-4.36	66.6	-5.1	67.1	53.5	13.66	4.913				
3,200.0	3,200.0	3,190.4	3,189.1	7.1	7.0	-6.42	77.9	-8.8	79.2	65.1	14.10	5.615				
3,300.0	3,300.0	3,286.3	3,283.8	7.3	7.3	-8.28	92.2	-13.4	94.6	80.1	14.54	6.505				
3,400.0	3,400.0	3,381.0	3,376.8	7.5	7.5	141.45	109.3	-19.0	113.9	98.9	14.98	7.604				
3,500.0	3,499.9	3,473.8	3,467.3	7.7	7.8	140.83	128.9	-25.4	138.8	123.4	15.35	9.043				
3,600.0	3,599.6	3,564.2	3,554.7	7.8	8.0	140.83	150.6	-32.4	169.4	153.7	15.71	10.782				
3,700.0	3,699.0	3,651.8	3,638.7	8.0	8.3	141.11	174.2	-40.1	205.4	189.3	16.05	12.796				
3,800.0	3,798.0	3,736.2	3,719.0	8.2	8.7	141.48	199.1	-48.2	246.7	230.3	16.38	15.063				
3,900.0	3,896.4	3,820.2	3,798.0	8.4	9.0	141.88	226.1	-57.0	292.9	276.2	16.70	17.540				
4,000.0	3,994.1	3,907.1	3,879.7	8.6	9.4	142.38	254.3	-66.2	342.2	325.1	17.02	20.106				
4,100.0	4,091.0	3,992.4	3,959.8	8.9	9.8	142.89	282.1	-75.2	393.9	376.5	17.33	22.731				
4,200.0	4,187.1	4,076.1	4,038.4	9.2	10.2	143.38	309.3	-84.1	448.1	430.4	17.63	25.414				

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

Cathedral Energy Services

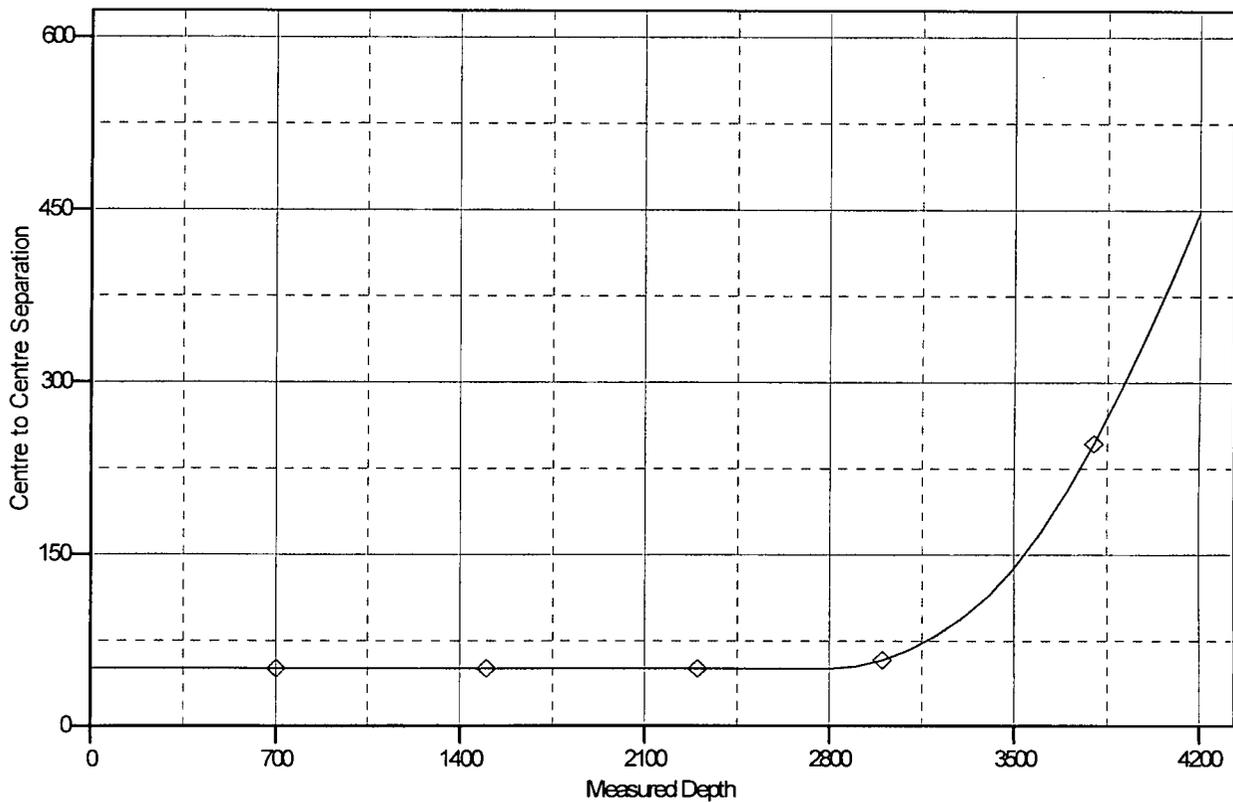
Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Dilectone Mea 4H
Project:	Rio Arriba County, NM	TVD Reference:	kb = 15' @ 6734.0usft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	MD Reference:	kb = 15' @ 6734.0usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	Dilectone Mea 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at:	2.00 sigma
Reference Wellbore:	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to kb = 15' @ 6734.0usft
 Offset Depths are relative to Offset Datum
 Central Meridian is -106.250000 °

Coordinates are relative to: Dilectone Mea 4H
 Coordinate System is US State Plane 1983, New Mexico Central Zone
 Grid Convergence at Surface is: -0.72°

Ladder Plot



LEGEND

◆ Dilectone Mea 3H, HZ, Plan #2 V0

LOGOS OPERATING, LLC

DILECTIONE MEA #004H

837' FSL, 393' FWL

SEC. 3, T-23-N, R-6-W, N.M.P.M.

RIO ARRIBA COUNTY, NEW MEXICO

NAD 83

LATITUDE: N36.24849

LONGITUDE: W107.46449

ELEVATION: 6719'

Directions from the intersection of
U.S. Highway 550 South and U.S. Highway 64
Bloomfield, NM

To

Dilecione Mea #004H

Beginning at the intersection of Hwy. 550 South & Hwy. 64
Head south on Hwy. 550 for 54.7 miles;

Turn left onto Rio Arriba County Road 379 following said road 3 miles;

Well location on left next to road.

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)

