State of New Mexico
Energy, Minerals and Natural Resources Department

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: 8/7/14
Well information;
Operator Logos, Well Name and Number Dilectone Mea # 2H
API# 30-039-31261, 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 (NSL), NSP, DHC
- o Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- o 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
- o 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.

Charlie Perrin
NMOCD Approved by Signature

9-5-2014
Date

1220 South St. Francis Drive • Santa Fe, New Mexico 87505
Phone (505) 476-3460 • Fax (505) 476-3462 • www.emnrd.state.nm.us/ocd

Form 3160-3
(March 2012)

RECEIVED
AUG 07 2014
Farmington Field Office
Bureau of Land Management

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NM 130875

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

8. Lease Name and Well No.
DILECTIONE MEA 002H

2. Name of Operator Logos Operating, LLC

9. API Well No.
30-039-31261

3a. Address 4001 North Butler Ave, Building 7101
Farmington, NM 87401

3b. Phone No. *(include area code)*
505-330-9333

10. Field and Pool, or Exploratory
Counselors Gallup-Dakota

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 1743' FNL & 255' FWL (SW/NW)
At proposed prod. zone 1967' FNL & 300' FWL (SW/NW)

11. Sec., T. R. M. or Blk. and Survey or Area
SHL: Sec 3, T23N R06W, UL E
BHL: Sec 4, T23N R06W, UL E

14. Distance in miles and direction from nearest town or post office*
3 miles north of Counselor

12. County or Parish
Rio Arriba

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
255' from west edge of Sec 3

16. No. of acres in lease
639.12 acres

17. Spacing Unit dedicated to this well
S2/N2 = 160.00 acres

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.
Dilectione Mea 1H - 50'

19. Proposed Depth
10241' MD, 5458' VD

20. BLM/BIA Bond No. on file
BLM NMB000917

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
6693' GL

22. Approximate date work will start*
10/15/2014

23. Estimated duration
45 days

24. Attachments

RCVD AUG 18'14
OIL CONS. DIV.
DIST. 3

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	Name *(Printed/Typed)*	Date
Tamra Sessions	Tamra Sessions	08/07/2014

Title
Operations Technician

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
Title AFM	Office FFO	8/14/14

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)

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

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

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

NMOCD

CONFIDENTIAL

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
OIL CONSERVATION DIVISION
1220 South St. Fancis Dr.
Santa Fe, NM 87505

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

☑ AMENDED REPORT

RCVD AUG 27 '14
OIL CONS. DIV.
DIST. 3

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-039-31261	13379	Counselors Gallup-Dakota

4 Property Code	5 Property Name	6 Well Number
313042	Dilectione Mea	002H

7 OGRID No.	8 Operator Name	9 Elevation
289408	Logos Operating, LLC.	6693'

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
E	3	T23N	R6W		1743'	NORTH	255'	WEST	RIO ARRIBA

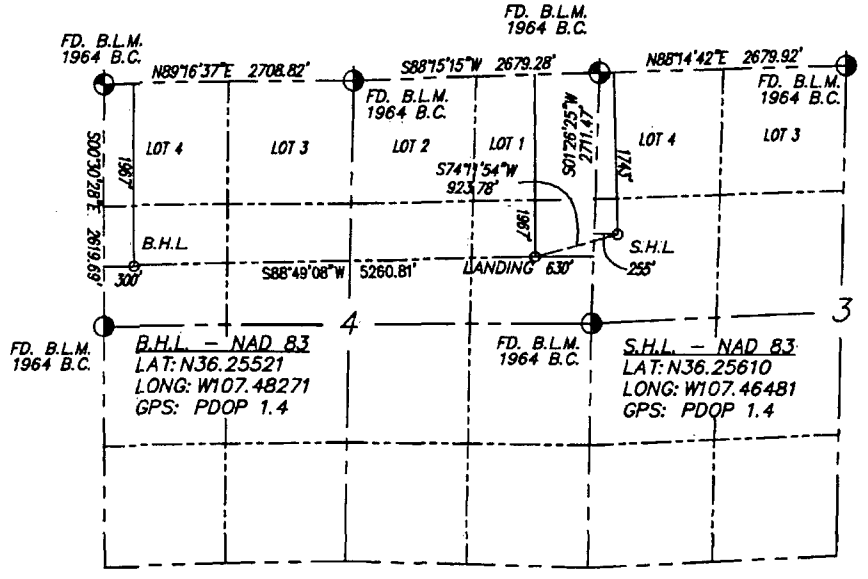
11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	4	T23N	R6W		1967'	NORTH	300'	WEST	RIO ARRIBA

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
319.12	W/2 4		

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.

16



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 — Date: 8-26-14

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 the best of my belief.

01/29/2014 — Date of Survey: 08/25/2014

Signature and Seal of Professional Surveyor:

JOHN D. JAQUE
NEW MEXICO
9673
PROFESSIONAL LAND 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 #2H
Horizontal Gallup Oil and Gas Well
Surface Location: 1743' FSL – 255' FWL
Section 3, T23N, R6W
Ungraded GL Elev = 6693'
Estimate KB Elev =6708' (15'KB)
Lat. = 36.256100 deg N
Long. = 107.464800 deg W
NAD83
Rio Arriba County, New Mexico

Proposed Bottom Hole Location: 1967' FNL – 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**

Formation Tops	Surface (TVD)
Kirtland	979
Fruitland	1604
Pictured Cliff's	1920
Chacra	2414
Cliffs House	3557
Menefee	3716
Point Lookout	4224
Mancos	4399
Gallup	5292
Lower Gallup	5507
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 3408' MD and build 2 degrees per 100' to 20 degrees, 244.78 degrees azimuth and hold to approximately 4394' MD.

Trip out of hole and pick up 8 ¾" kick off assembly at 4394' MD. Build angle at 10 deg/100' to 85 degrees inclination and 269.03 degrees azimuth in the Gallup formation at 5387' MD/ 5292' TVD where 7" intermediate casing will be set at 5851' MD / 5503' TVD.
7" casing will be set in a legal position 1967' FNL & 630' 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 90.67 degrees inclination and 269.03 degree azimuth to 5964' MD / 5508' TVD. Hold 90.67 degrees, 269.03 degrees azimuth and drill to a total depth at 10241' MD / 5458' TVD. Adjustments may be made to the directional program based on geology. Total depth will be 10241' MD / 5458' - 90.67 degrees, 269.03 degrees Azimuth.
The Bottom hole location will be in a legal location at 10241' MD at 1967' FNL & 300' FWL of section 6.
A total of 4390' 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 5292' 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 2004 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 1211 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 nippled-up on the 9-5/8" x 11" 2000 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 5851' = 7" Casing point @ 85 degrees
8-3/4" Landing point = 5964' @ 90.67 degrees
6-1/8" Lateral = 5964' MD to 10241' MD = Gallup Pay Zone Horizontal

B. Casing Program – all casing stings 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" (8-¾")	23 ppf	J or K-55	LT&C	0' - 5851' MD	New Casing. Cement to surface with two stages
4-½" (6-1/8")	11.6 ppf	P-110	LT&C	5600' - 10241' 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	Fluid Weight:	15.8 lbm/gal
94 lbm Premium Cement	Volume:	55.8 bbl
0.1250 lbm Poly-E-Flake	Slurry Yield:	1.174 ft3/sack
5.13 Gal FRESH WATER	Total Mixing Fluid:	5.13 Gal/sack
	Top Of Fluid:	0 ft
	Calculated Fill:	500 ft
	Calculated sack:	266.77 sack
	Proposed sack:	270 sack

Fluid 3: Water Based Spacer

Displacement	Fluid Density:	8.33 lbm/gal
	Volume:	38.7 bbl

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate	Downhole Volume
1	SPACER	Fresh Water	8.33		10 bbl
2	CEMENT	HalCem Primary	15.8		270 sack
3	SPACER	Displacement	8.33		38.7 bbl

Intermediate Casing – One Stage Job (0-5851' 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' - 10241' 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	Fluid Weight:	13.5 lbm/gal
5.72 Gal FRESH WATER	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	Fluid Density:	8.4 lbm/gal
0.25 gal/bbl Micro Matrix Retarder	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

Foam Output Parameter Summary:

Stage 1

Foam Calculation Method	Constant Density	Calculated Gas	22274.8 scf
Annulus Back Pressure	20 psig	Additional Gas	50000 scf
Bottom Hole Circulating Temp	145degF	Total Gas	72274.8 scf
Mud Outlet Temperature	degF		

Fluid #	Fluid Name	Unfoamed Liquid Volume (bbl)	Beginning Density (lbm/gal)	Ending Density (lbm/gal)	Beginning Rate (scf/bbl)	Ending Rate (scf/bbl)
3	9 lb/gal Tuned	45	10		42.58	43.5

	Spacer III					
6	Foamed Cement	6.9	10		298.61	302.91
6	Foamed Cement	1.2	10		328.81	327.4
6	Foamed Cement	3.1	10		327.57	331.73
6	Foamed Cement	3.9	10		340.74	344.91
6	Foamed Cement	1.8	10		357.22	361.16
6	Foamed Cement	7.1	10		364.9	369
6	Foamed Cement	36.2	10		394.44	398.33

Foam Design Specifications:

Foam Calculation Method: Constant Density
Backpressure: 14 psig
Bottom Hole Circulating Temp: 158 degF
Mud Outlet Temperature: 100 degF

Calculated Gas = 20792.1 scf
Additional Gas = 50000 scf
Total Gas = 70792.1 scf

Production liner clarification: Utilizing foam cement for zonal isolation in the production liner.

Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected.

All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

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'-5115'	Fresh Water LSND	8.5-8.8	40-50	8-10

b) Kick off to Horizontal Lateral:

Hole Size (in)	TVD/MD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (CC)
8-3/4"	5182' (KOP)-5964'	Fresh Water LSND	8.5-8.8	40-50	8-10
6-1/8"	5964' - 10241'	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 +/- 2577 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 H_2S 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 October 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 110 percent 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, H and I of 19.15.17.13 NMAC.

LOGOS RESOURCES LLC

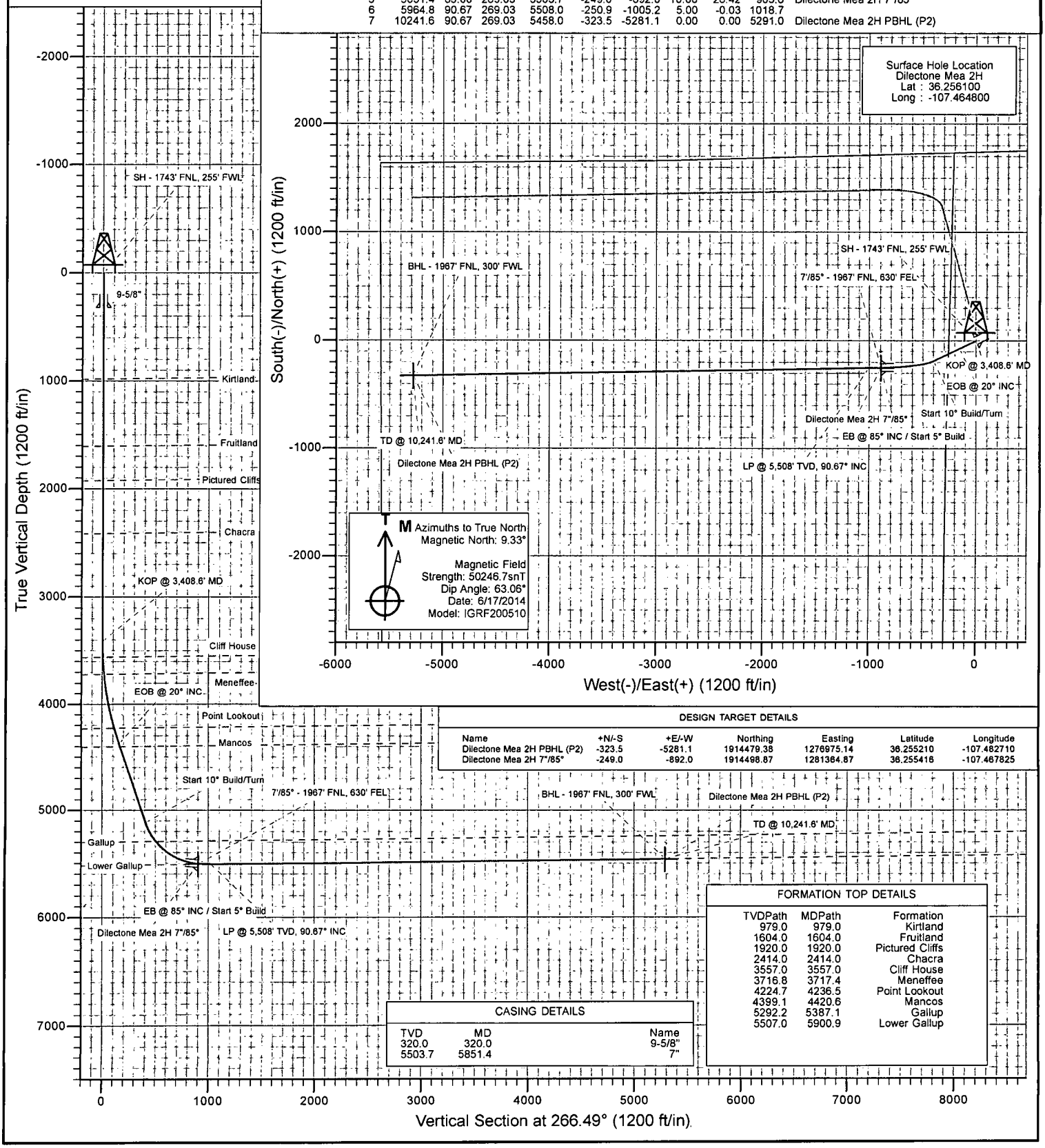
Project: Rio Arriba County, NM
Site: S3-T23N-R6W (Dilectone Mea Pad)
Well: Dilectone Mea 2H
Wellbore: HZ
Design: Plan #3

CATHEDRAL

Plan #3
Dilectone Mea 2H
145XXX; SC
KB=15' @ 6708.0ft
Ground Elevation @ 6693.0
North American Datum 1983
Well Dilectone Mea 2H, True North

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	3408.6	0.00	0.00	3408.6	0.0	0.0	0.00	0.00	0.0	
3	4394.5	20.00	244.78	4374.6	-72.6	-154.1	2.03	244.78	158.3	
4	5182.6	20.00	244.78	5115.2	-187.5	-398.0	0.00	0.00	408.7	
5	5851.4	85.00	269.03	5503.7	-249.0	-892.0	10.00	26.42	905.6	Dilectone Mea 2H 7"/85°
6	5964.8	90.67	269.03	5508.0	-250.9	-1005.2	5.00	-0.03	1018.7	
7	10241.6	90.67	269.03	5458.0	-323.5	-5281.1	0.00	0.00	5291.0	Dilectone Mea 2H PBHL (P2)



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Dilectone Mea 2H PBHL (P2)	-323.5	-5281.1	1914479.38	1276975.14	36.255210	-107.482710
Dilectone Mea 2H 7"/85°	-249.0	-892.0	1914498.87	1281364.87	36.255416	-107.467825

CASING DETAILS

TVD	MD	Name
320.0	320.0	9-5/8"
5503.7	5851.4	7"

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
979.0	979.0	Kirtland
1604.0	1604.0	Fruitland
1920.0	1920.0	Pictured Cliffs
2414.0	2414.0	Chacra
3557.0	3557.0	Cliff House
3716.8	3717.4	Meneffee
4224.7	4236.5	Point Lookout
4399.1	4420.6	Mancos
5292.2	5387.1	Gallup
5507.0	5900.9	Lower Gallup

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Company:	LOGOS Operating LLC	**TVD Reference:**	KB=15' @ 6708.0ft
Project:	Rio Arriba County, NM	**MD Reference:**	KB=15' @ 6708.0ft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	**North Reference:**	True
Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

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:**	1,914,783.77 ft	**Latitude:**	36.256230
From:	Lat/Long	**Easting:**	1,282,278.20 ft	**Longitude:**	-107.464740
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-0.72 °

Well	Dilectone Mea 2H				
Well Position	**+N/-S**	0.0 ft	**Northing:**	1,914,736.67 ft	**Latitude:** 36.256100
	+E/-W	0.0 ft	**Easting:**	1,282,259.92 ft	**Longitude:** -107.464800
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	0.0 ft	**Ground Level:** 6,693.0 ft

Wellbore	HZ			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	6/17/2014	9.33	63.06	50,247

Design	Plan #3				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.0	0.0	0.0	266.49	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,408.6	0.00	0.00	3,408.6	0.0	0.0	0.00	0.00	0.00	0.00	
4,394.5	20.00	244.78	4,374.6	-72.6	-154.1	2.03	2.03	0.00	244.78	
5,182.6	20.00	244.78	5,115.2	-187.5	-398.0	0.00	0.00	0.00	0.00	
5,851.4	85.00	269.03	5,503.7	-249.0	-892.0	10.00	9.72	3.63	26.42	Dilectone Mea 2H 7"/I
5,964.8	90.67	269.03	5,508.0	-250.9	-1,005.2	5.00	5.00	0.00	-0.03	
10,241.6	90.67	269.03	5,458.0	-323.5	-5,281.1	0.00	0.00	0.00	0.00	Dilectone Mea 2H PB

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Company:	LOGOS Operating LLC	**TVD Reference:**	KB=15' @ 6708.0ft
Project:	Rio Arriba County, NM	**MD Reference:**	KB=15' @ 6708.0ft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	**North Reference:**	True
Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	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	SH - 1743' FNL, 255' 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	
3,408.6	0.00	0.00	3,408.6	0.0	0.0	0.0	0.00	0.00	KOP @ 3,408.6' MD
3,500.0	1.85	244.78	3,500.0	-0.6	-1.3	1.4	2.03	2.03	
3,557.0	3.01	244.78	3,557.0	-1.7	-3.5	3.6	2.03	2.03	Cliff House
3,600.0	3.88	244.78	3,599.9	-2.8	-5.9	6.0	2.03	2.03	
3,700.0	5.91	244.78	3,699.5	-6.4	-13.6	14.0	2.03	2.03	
3,717.4	6.27	244.78	3,716.8	-7.2	-15.3	15.7	2.03	2.03	Meneffee
3,800.0	7.94	244.78	3,798.7	-11.5	-24.5	25.2	2.03	2.03	
3,900.0	9.97	244.78	3,897.5	-18.2	-38.6	39.6	2.03	2.03	
4,000.0	12.00	244.78	3,995.7	-26.3	-55.8	57.3	2.03	2.03	
4,100.0	14.03	244.78	4,093.1	-35.9	-76.2	78.2	2.03	2.03	
4,200.0	16.06	244.78	4,189.7	-46.9	-99.7	102.3	2.03	2.03	
4,236.5	16.80	244.78	4,224.7	-51.3	-109.0	111.9	2.03	2.03	Point Lookout

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Company:	LOGOS Operating LLC	**TVD Reference:**	KB=15' @ 6708.0ft
Project:	Rio Arriba County, NM	**MD Reference:**	KB=15' @ 6708.0ft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	**North Reference:**	True
Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,300.0	18.09	244.78	4,285.3	-59.5	-126.2	129.6	2.03	2.03	
4,394.5	20.00	244.78	4,374.6	-72.6	-154.1	158.3	2.03	2.03	EOB @ 20° INC
4,400.0	20.00	244.78	4,379.8	-73.4	-155.8	160.0	0.00	0.00	
4,420.6	20.00	244.78	4,399.1	-76.4	-162.2	166.6	0.00	0.00	Mancos
4,500.0	20.00	244.78	4,473.7	-88.0	-186.8	191.8	0.00	0.00	
4,600.0	20.00	244.78	4,567.7	-102.5	-217.7	223.6	0.00	0.00	
4,700.0	20.00	244.78	4,661.7	-117.1	-248.7	255.3	0.00	0.00	
4,800.0	20.00	244.78	4,755.6	-131.7	-279.6	287.1	0.00	0.00	
4,900.0	20.00	244.78	4,849.6	-146.3	-310.5	318.9	0.00	0.00	
5,000.0	20.00	244.78	4,943.6	-160.8	-341.5	350.7	0.00	0.00	
5,100.0	20.00	244.78	5,037.5	-175.4	-372.4	382.5	0.00	0.00	
5,182.6	20.00	244.78	5,115.2	-187.5	-398.0	408.7	0.00	0.00	Start 10° Build/Turn
5,200.0	21.57	246.88	5,131.4	-190.0	-403.6	414.5	10.00	9.03	
5,250.0	26.20	251.57	5,177.1	-197.1	-422.6	433.8	10.00	9.26	
5,300.0	30.94	254.92	5,221.0	-203.9	-445.5	457.1	10.00	9.48	
5,350.0	35.75	257.45	5,262.8	-210.5	-472.2	484.1	10.00	9.61	
5,387.1	39.34	258.97	5,292.2	-215.1	-494.3	506.5	10.00	9.68	Gallup
5,400.0	40.59	259.45	5,302.1	-216.6	-502.4	514.7	10.00	9.72	
5,450.0	45.46	261.09	5,338.6	-222.4	-536.0	548.6	10.00	9.75	
5,500.0	50.36	262.47	5,372.1	-227.6	-572.7	585.6	10.00	9.79	
5,550.0	55.27	263.67	5,402.3	-232.4	-612.3	625.3	10.00	9.82	
5,600.0	60.18	264.74	5,429.0	-236.7	-654.3	667.6	10.00	9.84	
5,650.0	65.11	265.71	5,452.0	-240.4	-698.6	712.0	10.00	9.85	
5,700.0	70.04	266.60	5,471.1	-243.5	-744.7	758.2	10.00	9.86	
5,750.0	74.98	267.43	5,486.1	-245.9	-792.3	805.8	10.00	9.87	
5,800.0	79.92	268.23	5,497.0	-247.8	-841.0	854.6	10.00	9.88	
5,851.4	85.00	269.03	5,503.7	-249.0	-892.0	905.5	10.00	9.88	EB @ 85° INC / Start 5° Build - 7'/85° - 1967' Fl
5,900.0	87.43	269.03	5,506.9	-249.8	-940.4	954.0	5.00	5.00	
5,900.9	87.47	269.03	5,507.0	-249.8	-941.3	954.8	5.00	5.00	Lower Gallup
5,964.8	90.67	269.03	5,508.0	-250.9	-1,005.2	1,018.7	5.00	5.00	LP @ 5,508' TVD, 90.67° INC
6,000.0	90.67	269.03	5,507.6	-251.5	-1,040.4	1,053.8	0.00	0.00	
6,100.0	90.67	269.03	5,506.4	-253.2	-1,140.4	1,153.7	0.00	0.00	
6,200.0	90.67	269.03	5,505.2	-254.9	-1,240.4	1,253.6	0.00	0.00	
6,300.0	90.67	269.03	5,504.1	-256.6	-1,340.3	1,353.5	0.00	0.00	
6,400.0	90.67	269.03	5,502.9	-258.3	-1,440.3	1,453.4	0.00	0.00	
6,500.0	90.67	269.03	5,501.7	-260.0	-1,540.3	1,553.3	0.00	0.00	
6,600.0	90.67	269.03	5,500.6	-261.7	-1,640.3	1,653.2	0.00	0.00	
6,700.0	90.67	269.03	5,499.4	-263.4	-1,740.3	1,753.1	0.00	0.00	
6,800.0	90.67	269.03	5,498.2	-265.1	-1,840.2	1,853.0	0.00	0.00	
6,900.0	90.67	269.03	5,497.1	-266.8	-1,940.2	1,952.9	0.00	0.00	
7,000.0	90.67	269.03	5,495.9	-268.5	-2,040.2	2,052.8	0.00	0.00	
7,100.0	90.67	269.03	5,494.7	-270.2	-2,140.2	2,152.7	0.00	0.00	
7,200.0	90.67	269.03	5,493.6	-271.9	-2,240.1	2,252.6	0.00	0.00	
7,300.0	90.67	269.03	5,492.4	-273.6	-2,340.1	2,352.5	0.00	0.00	
7,400.0	90.67	269.03	5,491.2	-275.3	-2,440.1	2,452.4	0.00	0.00	
7,500.0	90.67	269.03	5,490.1	-277.0	-2,540.1	2,552.3	0.00	0.00	
7,600.0	90.67	269.03	5,488.9	-278.7	-2,640.1	2,652.2	0.00	0.00	
7,700.0	90.67	269.03	5,487.7	-280.4	-2,740.0	2,752.1	0.00	0.00	
7,800.0	90.67	269.03	5,486.5	-282.1	-2,840.0	2,852.0	0.00	0.00	
7,900.0	90.67	269.03	5,485.4	-283.8	-2,940.0	2,951.9	0.00	0.00	
8,000.0	90.67	269.03	5,484.2	-285.5	-3,040.0	3,051.7	0.00	0.00	
8,100.0	90.67	269.03	5,483.0	-287.2	-3,140.0	3,151.6	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Company:	LOGOS Operating LLC	**TVD Reference:**	KB=15' @ 6708.0ft
Project:	Rio Arriba County, NM	**MD Reference:**	KB=15' @ 6708.0ft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	**North Reference:**	True
Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
8,200.0	90.67	269.03	5,481.9	-288.9	-3,239.9	3,251.5	0.00	0.00	
8,300.0	90.67	269.03	5,480.7	-290.6	-3,339.9	3,351.4	0.00	0.00	
8,400.0	90.67	269.03	5,479.5	-292.3	-3,439.9	3,451.3	0.00	0.00	
8,500.0	90.67	269.03	5,478.4	-294.0	-3,539.9	3,551.2	0.00	0.00	
8,600.0	90.67	269.03	5,477.2	-295.7	-3,639.9	3,651.1	0.00	0.00	
8,700.0	90.67	269.03	5,476.0	-297.4	-3,739.8	3,751.0	0.00	0.00	
8,800.0	90.67	269.03	5,474.9	-299.1	-3,839.8	3,850.9	0.00	0.00	
8,900.0	90.67	269.03	5,473.7	-300.8	-3,939.8	3,950.8	0.00	0.00	
9,000.0	90.67	269.03	5,472.5	-302.5	-4,039.8	4,050.7	0.00	0.00	
9,100.0	90.67	269.03	5,471.4	-304.2	-4,139.7	4,150.6	0.00	0.00	
9,200.0	90.67	269.03	5,470.2	-305.9	-4,239.7	4,250.5	0.00	0.00	
9,300.0	90.67	269.03	5,469.0	-307.6	-4,339.7	4,350.4	0.00	0.00	
9,400.0	90.67	269.03	5,467.8	-309.2	-4,439.7	4,450.3	0.00	0.00	
9,500.0	90.67	269.03	5,466.7	-310.9	-4,539.7	4,550.2	0.00	0.00	
9,600.0	90.67	269.03	5,465.5	-312.6	-4,639.6	4,650.1	0.00	0.00	
9,700.0	90.67	269.03	5,464.3	-314.3	-4,739.6	4,750.0	0.00	0.00	
9,800.0	90.67	269.03	5,463.2	-316.0	-4,839.6	4,849.9	0.00	0.00	
9,900.0	90.67	269.03	5,462.0	-317.7	-4,939.6	4,949.8	0.00	0.00	
10,000.0	90.67	269.03	5,460.8	-319.4	-5,039.6	5,049.7	0.00	0.00	
10,100.0	90.67	269.03	5,459.7	-321.1	-5,139.5	5,149.6	0.00	0.00	
10,200.0	90.67	269.03	5,458.5	-322.8	-5,239.5	5,249.4	0.00	0.00	
10,241.6	90.67	269.03	5,458.0	-323.5	-5,281.1	5,291.0	0.00	0.00	BHL - 1967' FNL, 300' FWL - TD @ 10,241.6' M

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Dilectone Mea 2H PBHL - plan hits target center - Point	0.00	0.00	5,458.0	-323.5	-5,281.1	1,914,479.38	1,276,975.14	36.255210	-107.482710
Dilectone Mea 2H 7"/85' - plan hits target center - Point	0.00	0.00	5,503.7	-249.0	-892.0	1,914,498.87	1,281,364.87	36.255416	-107.467825
Dilectone Mea 2H PBHL - plan misses target center by 0.4ft at 10241.6ft MD (5458.0 TVD, -323.5 N, -5281.1 E) - Point	0.00	0.00	5,457.6	-323.5	-5,281.1	1,914,479.38	1,276,975.14	36.255210	-107.482710

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
5,851.4	5,503.7	7"	0.000	0.000
320.0	320.0	9-5/8"	0.000	0.000

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Company:	LOGOS Operating LLC	**TVD Reference:**	KB=15' @ 6708.0ft
Project:	Rio Arriba County, NM	**MD Reference:**	KB=15' @ 6708.0ft
Site:	S3-T23N-R6W (Dilectone Mea Pad)	**North Reference:**	True
Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
979.0	979.0	Kirtland		-0.67	269.03
1,604.0	1,604.0	Fruitland		-0.67	269.03
1,920.0	1,920.0	Pictured Cliffs		-0.67	269.03
2,414.0	2,414.0	Chacra		-0.67	269.03
3,557.0	3,557.0	Cliff House		-0.67	269.03
3,717.4	3,717.0	Meneffee		-0.67	269.03
4,236.5	4,226.0	Point Lookout		-0.67	269.03
4,420.6	4,401.0	Mancos		-0.67	269.03
5,387.1	5,298.0	Gallup		-0.67	269.03
5,900.9	5,518.0	Lower Gallup		-0.67	269.03

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
0.5	0.5	0.0	0.0	SH - 1743' FNL, 255' FWL
3,408.6	3,408.6	0.0	0.0	KOP @ 3,408.6' MD
4,394.5	4,374.6	-72.6	-154.1	EOB @ 20° INC
5,182.6	5,115.2	-187.5	-398.0	Start 10° Build/Turn
5,851.4	5,503.7	-249.0	-892.0	EB @ 85° INC / Start 5° Build
5,851.4	5,503.7	-249.0	-892.0	7'/85° - 1967' FNL, 630' FEL
5,964.8	5,508.0	-250.9	-1,005.2	LP @ 5,508' TVD, 90.67° INC
10,241.6	5,458.0	-323.5	-5,281.1	BHL - 1967' FNL, 300' FWL
10,241.6	5,458.0	-323.5	-5,281.1	TD @ 10,241.6' MD

LOGOS Operating LLC

Rio Arriba County, NM
S3-T23N-R6W (Dilectone Mea Pad)
Dilectone Mea 2H
HZ
Plan #3

Anticollision Report

11 July, 2014

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Project:	Rio Arriba County, NM	**TVD Reference:**	KB=15' @ 6708.0ft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	**MD Reference:**	KB=15' @ 6708.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	HZ	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Plan #3

Filter type:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,224.2ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**		

Survey Tool Program **Date** 7/11/2014

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	10,241.6	Plan #3 (HZ)	ISCWSA MWD	MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
S3-T23N-R6W (Dilectone Mea Pad)						
Dilectone Mea 1H - HZ - Plan #3	1,100.0	1,100.0	50.5	45.8	10.782	CC, ES
Dilectone Mea 1H - HZ - Plan #3	1,300.0	1,297.4	54.8	49.2	9.816	SF

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Project:	Rio Arriba County, NM	**TVD Reference:**	KB=15' @ 6708.0ft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	**MD Reference:**	KB=15' @ 6708.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	HZ	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design S3-T23N-R6W (Dilectone Mea Pad) - Dilectone Mea 1H - HZ - Plan #3 — **Offset Site Error:** 0.0 ft

Survey Program: 0-ISCWSA MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	20.50	47.3	17.7	50.5				
100.0	100.0	100.0	100.0	0.1	0.1	20.50	47.3	17.7	50.5	50.3	0.19	264.473	
200.0	200.0	200.0	200.0	0.3	0.3	20.50	47.3	17.7	50.5	49.9	0.64	78.878	
300.0	300.0	300.0	300.0	0.5	0.5	20.50	47.3	17.7	50.5	49.4	1.09	46.351	
400.0	400.0	400.0	400.0	0.8	0.8	20.50	47.3	17.7	50.5	49.0	1.54	32.818	
500.0	500.0	500.0	500.0	1.0	1.0	20.50	47.3	17.7	50.5	48.5	1.99	25.401	
600.0	600.0	600.0	600.0	1.2	1.2	20.50	47.3	17.7	50.5	48.1	2.44	20.719	
700.0	700.0	700.0	700.0	1.4	1.4	20.50	47.3	17.7	50.5	47.6	2.89	17.494	
800.0	800.0	800.0	800.0	1.7	1.7	20.50	47.3	17.7	50.5	47.2	3.34	15.138	
900.0	900.0	900.0	900.0	1.9	1.9	20.50	47.3	17.7	50.5	46.7	3.79	13.341	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	20.50	47.3	17.7	50.5	46.3	4.24	11.926	
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	20.50	47.3	17.7	50.5	45.8	4.69	10.782	CC, ES
1,200.0	1,200.0	1,199.0	1,199.0	2.6	2.6	19.90	48.2	17.4	51.3	46.1	5.13	9.988	
1,300.0	1,300.0	1,297.4	1,297.3	2.8	2.8	17.36	52.2	16.3	54.8	49.2	5.58	9.816	SF
1,400.0	1,400.0	1,395.4	1,395.0	3.0	3.0	13.51	59.4	14.3	61.3	55.3	6.03	10.175	
1,500.0	1,500.0	1,492.8	1,491.8	3.2	3.2	9.24	69.8	11.4	71.2	64.7	6.48	10.989	
1,600.0	1,600.0	1,589.3	1,587.3	3.5	3.5	5.20	83.1	7.6	84.5	77.5	6.93	12.179	
1,700.0	1,700.0	1,684.8	1,681.3	3.7	3.8	1.71	99.4	3.0	101.2	93.8	7.41	13.662	
1,800.0	1,800.0	1,779.1	1,773.5	3.9	4.1	-1.16	118.4	-2.4	121.4	113.5	7.90	15.359	
1,900.0	1,900.0	1,871.9	1,863.5	4.1	4.4	-3.47	140.0	-8.5	144.9	136.5	8.43	17.186	
2,000.0	2,000.0	1,963.2	1,951.4	4.4	4.8	-5.32	163.9	-15.3	171.7	162.7	9.00	19.083	
2,100.0	2,100.0	2,052.7	2,036.7	4.6	5.2	-6.79	190.0	-22.6	201.6	192.0	9.60	21.004	
2,200.0	2,200.0	2,141.6	2,120.5	4.8	5.6	-7.99	218.4	-30.6	234.4	224.2	10.23	22.910	
2,300.0	2,300.0	2,235.5	2,208.8	5.0	6.1	-8.98	249.3	-39.4	268.4	257.4	10.93	24.555	
2,400.0	2,400.0	2,329.5	2,297.1	5.3	6.7	-9.74	280.2	-48.1	302.4	290.7	11.65	25.965	
2,500.0	2,500.0	2,423.5	2,385.4	5.5	7.2	-10.36	311.1	-56.9	336.4	324.0	12.38	27.177	
2,600.0	2,600.0	2,517.4	2,473.7	5.7	7.8	-10.86	342.1	-65.6	370.5	357.4	13.13	28.226	
2,700.0	2,700.0	2,611.4	2,562.0	5.9	8.3	-11.27	373.0	-74.3	404.6	390.7	13.88	29.140	
2,800.0	2,800.0	2,705.4	2,650.3	6.2	8.9	-11.62	403.9	-83.1	438.7	424.0	14.65	29.942	
2,900.0	2,900.0	2,799.4	2,738.6	6.4	9.5	-11.92	434.8	-91.8	472.8	457.4	15.43	30.649	
3,000.0	3,000.0	2,893.3	2,827.0	6.6	10.1	-12.18	465.8	-100.5	506.9	490.7	16.21	31.277	
3,100.0	3,100.0	2,987.3	2,915.3	6.8	10.7	-12.41	496.7	-109.3	541.1	524.1	16.99	31.838	
3,200.0	3,200.0	3,081.3	3,003.6	7.1	11.2	-12.61	527.6	-118.0	575.2	557.4	17.79	32.342	
3,300.0	3,300.0	3,175.3	3,091.9	7.3	11.8	-12.79	558.5	-126.8	609.4	590.8	18.58	32.795	
3,400.0	3,400.0	3,269.2	3,180.2	7.5	12.4	-12.95	589.4	-135.5	643.5	624.1	19.38	33.207	
3,500.0	3,500.0	3,363.1	3,268.4	7.7	13.0	101.60	620.3	-144.2	678.0	661.9	16.09	42.137	
3,600.0	3,599.9	3,456.7	3,356.3	7.9	13.6	101.13	651.1	-152.9	713.1	696.6	16.53	43.145	
3,700.0	3,699.5	3,549.8	3,443.9	8.1	14.2	100.91	681.8	-161.6	748.9	731.9	16.97	44.128	
3,800.0	3,798.7	3,642.4	3,530.9	8.3	14.8	100.89	712.3	-170.2	785.4	768.0	17.42	45.090	
3,900.0	3,897.5	3,734.4	3,617.3	8.5	15.4	101.03	742.5	-178.8	822.7	804.8	17.87	46.032	
4,000.0	3,995.7	3,825.5	3,703.0	8.7	16.0	101.32	772.5	-187.2	860.8	842.5	18.33	46.952	
4,100.0	4,093.1	3,915.8	3,787.8	9.0	16.6	101.71	802.2	-195.6	899.9	881.1	18.81	47.845	
4,200.0	4,189.7	4,005.1	3,871.7	9.3	17.2	102.18	831.6	-203.9	940.1	920.8	19.30	48.708	
4,300.0	4,285.3	4,093.3	3,954.6	9.6	17.8	102.72	860.6	-212.1	981.5	961.6	19.82	49.514	
4,400.0	4,379.8	4,180.3	4,036.3	10.0	18.3	103.35	889.2	-220.2	1,024.1	1,003.7	20.41	50.169	
4,500.0	4,473.7	4,266.6	4,117.5	10.4	18.9	104.83	917.7	-228.2	1,067.7	1,046.6	21.07	50.667	
4,600.0	4,567.7	4,353.0	4,198.7	10.9	19.5	106.20	946.1	-236.3	1,111.8	1,090.1	21.77	51.079	
4,700.0	4,661.7	4,439.4	4,279.8	11.3	20.0	107.47	974.5	-244.3	1,156.5	1,134.0	22.49	51.418	
4,800.0	4,755.6	4,525.8	4,361.0	11.8	20.6	108.65	1,002.9	-252.3	1,201.6	1,178.4	23.24	51.698	

Cathedral Energy Services

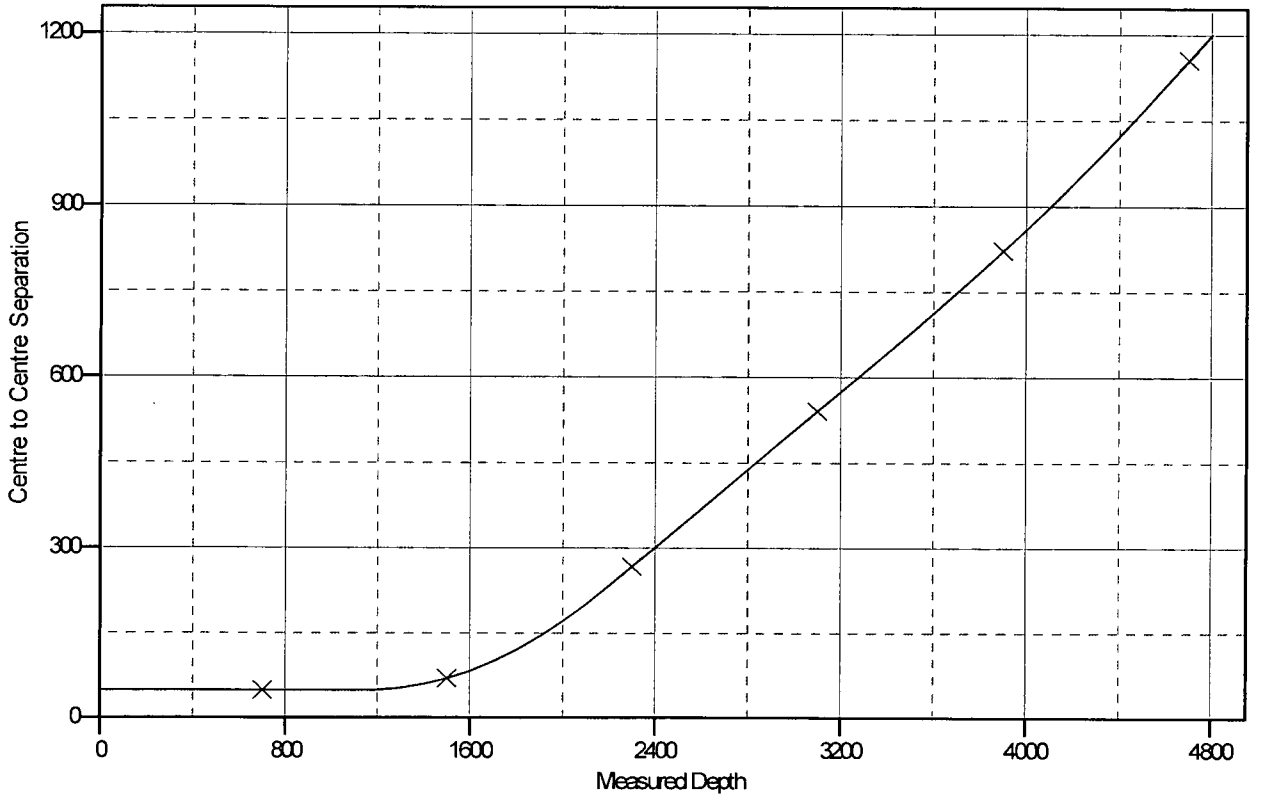
Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well Dilectone Mea 2H
Project:	Rio Arriba County, NM	**TVD Reference:**	KB=15' @ 6708.0ft
Reference Site:	S3-T23N-R6W (Dilectone Mea Pad)	**MD Reference:**	KB=15' @ 6708.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Dilectone Mea 2H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	HZ	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB=15' @ 6708.0ft
Offset Depths are relative to Offset Datum
Central Meridian is -106.250000 °

Coordinates are relative to: Dilectone Mea 2H
Coordinate System is US State Plane 1983, New Mexico Central Zone
Grid Convergence at Surface is: -0.72°

Ladder Plot



LEGEND

Dilectone Mea 1H, HZ, Plan #3 V0

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

LOGOS OPERATING, LLC

DILECTIONE MEA #002H

1743' FNL, 255' FWL

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

RIO ARRIBA COUNTY, NEW MEXICO

NAD 83

LATITUDE: N36.25610

LONGITUDE: W107.46480

ELEVATION: 6693'

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

To
Dilecione Mea #002H

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 3.1 miles;

Turn left onto a two track dirt road following said two track 0.2 miles;

Well location sits directly to right.

Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1
Typical BOP setup

Location: San Juan Basin, New Mexcio

Date: August 24, 2004
By: John Thompson (Walsh E&P)