State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

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

David R. Catanach 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: 2-16-15
Well information;
Operator Logos, Well Name and Number Dragonfly #112H
API# 30-045-35671, Section 12, Township 24 N/S, Range 8 E/W

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

- x Notify Aztec OCD 24hrs prior to casing & cement.
- x Hold C-104 for directional survey & "As Drilled" Plat
- x 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.
- ✓ 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.

NMOCD Approved by Signature

10-29-2015
Date KC

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
MAR 18 2015
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.
NM014580, NM47167

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.
Dragonfly 112H

2. Name of Operator Logos Operating, LLC

9. API Well No.
30-045-35671

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
Dufers Point - Gallup Dakota

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface D 965' FNL 808' FWL, NW/NW
At proposed prod. zone E 1650' FNL 250' FWL, SW/NW

OIL CONS. DIV DIST. 3
OCT 27 2015

11. Sec., T. R. M. or Blk. and Survey or Area
SHL Sec 12, T24N R08W, UL D
BHL Sec 11, T24N R08W, UL E

14. Distance in miles and direction from nearest town or post office*
7.2 miles northeast of Nageezi

12. County or Parish
San Juan

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
	NM014580 - 929.49 acres NM47167 - 160 acres	N/2 Sec 11 = 320 acres
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 50' from applied for Dragonfly 111H	19. Proposed Depth 11,799' MD / 6,176' TVD	20. BLM/BIA Bond No. on file BLM NMB000917 (1062415)
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7279' GL	22. Approximate date work will start* 06/15/2015	23. Estimated duration 45 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
Tamra Sessions	Tamra Sessions	02/16/2015

Title
Operations Technician

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/s/ Maurice O		10/26/15
Title AFM	Office FFO	

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)

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

NMOCD

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

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

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

RECEIVED
MAR 18 2015
Farmington Field Office
Bureau of Land Management

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-045-35671	19859	Dufers Point – Gallup Dakota

4 Property Code	5 Property Name	6 Well Number
315620	DRAGONFLY	112H

7 OGRID No.	8 Operator Name	9 Elevation
289408	Logos Operating, LLC.	7278.60'

10 Surface Location

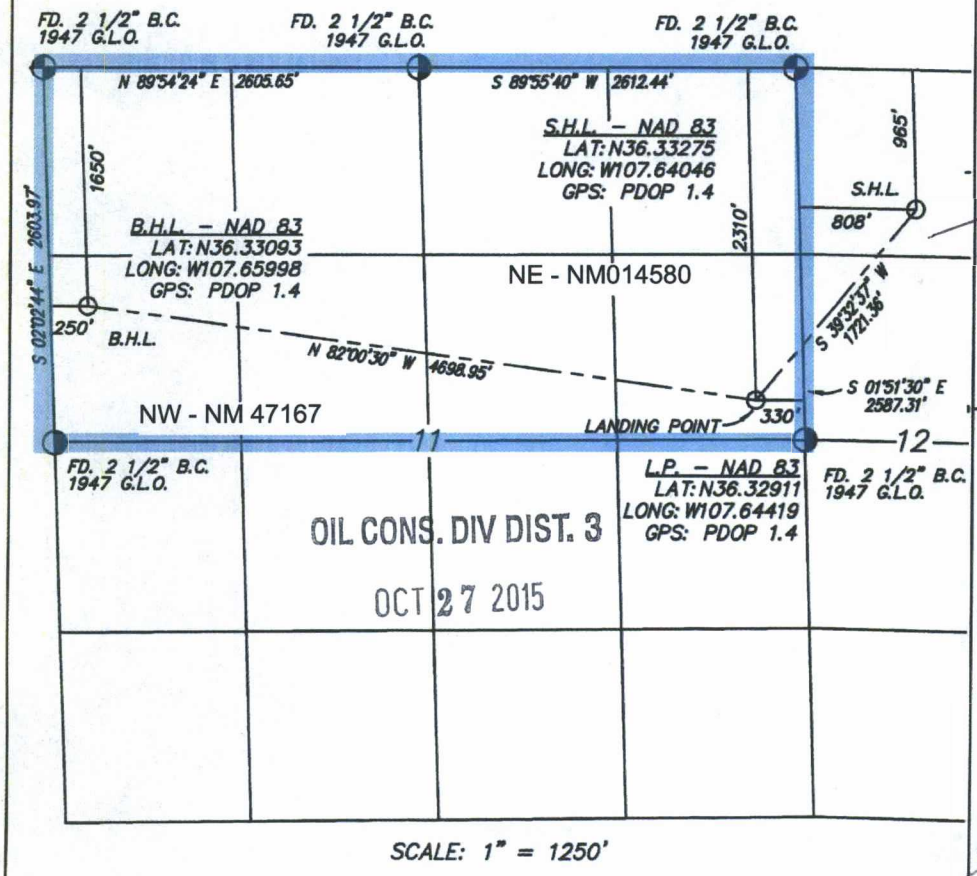
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	12	T24N	R8W		965'	NORTH	808'	WEST	SAN JUAN

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	11	T24N	R8W		1650'	NORTH	250'	WEST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
320 acres N2 Sec 11			

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.



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.

Tamra Sessions 3/17/15
Signature Date

Tamra Sessions
Printed Name

tsessions@logosresourcesllc.com
E-mail Address

18 SURVEYOR CERTIFICATION

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

11/17/2014 REV. 12/02/2014
Date of Survey

Signature and Seal of Professional Surveyor:

JOHN E. WAYNE NEW MEXICO 9673 PROFESSIONAL LAND SURVEYOR

Certificate Number N.M. PLS #9673

03/17/2015

Attachment To Application For Permit To Drill
Drilling Program

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

Dragonfly 112H
Horizontal Gallup Oil and Gas Well
Surface Location: 965' FNL – 808' FWL
Section 12, T24N, R8W
Ungraded GL Elev = 7979'
Estimate KB Elev = 7294' (15'KB)
Lat. = 36.332750 deg N
Long. = 107.640460 deg W
NAD83
San Juan County, New Mexico

Proposed Bottom Hole Location: 1650' FNL – 250' FWL
Section 11, T24N, R8W
San Juan 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)
Ojo Alamo	1856
Kirtland	2041
Fruitland	2208
Pictured Cliff's	2584
Chacra	2667
Cliff House	4132
Menefee	4140
Point Lookout	4919
Mancos	5137
Gallup	5814
Top Target Zone	6102
Landing Point	6181
Total Depth	6176

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 3900' MD.

Trip out of hole and pick up 8 ¾" kick off assembly at 3900' MD. Build angle at 2.76 deg/100' to 48.17 degrees inclination and 202.31 degrees azimuth and hold tangent until 6,218' MD / 5828' TVD. Then build up to 9 degrees / 100 feet in the Gallup formation at 6196' MD/ 5814' TVD where 7" intermediate casing will be set at 7018' MD / 6177' TVD.
7" casing will be set in a legal position 2318' FNL & 242' FEL in Section 11.

The 7" casing will be drilled out with a 6 1/8" drilling assembly building angle at 9 deg/100' to 90.06 degrees inclination and 278.11 degree azimuth to 7101' MD/ 6181' TVD. Hold 90.06 degrees, 278.11 degrees azimuth and drill to a total depth at 11799' MD/ 6176' TVD. Adjustments may be made to the directional program based on geology. Total depth will be 11799' MD/ 6176' TVD - 90.06 degrees, 278.11 degrees Azimuth.
The Bottom hole location will be in a legal location at 11799' MD at 1650' FNL & 250' FWL of section 11.
A total of 4781' 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 5814' 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 2248 psig (0.364 psi/ft @ 6176' 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 1358 psi (6176' 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 2000 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 7100' = 7" Casing point @ 85 degrees
8-3/4" Landing point = 7101' @ 90.06 degrees
6-1/8" Lateral = 7018' MD to 11799' 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" (8-3/4")	23 ppf	J or K-55	LT&C	0' – 7018' MD	New Casing. Cement to surface with one stage
4-1/2" (6-1/8")	11.6 ppf	P-110	LT&C	6600' – 11799' 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.

- 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'):
Excess – 100% over gauge hole – 12-1/4" hole and 9-5/8" casing (0.3132ft3/ft)
Top of Cement – Surface

Stage 1

Fluid 1: Water Spacer
Fresh Water

Fluid Density:	8.33 lbm/gal
Liquid 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
Slurry Yield:	1.174 ft3/sack
Total Mixing Fluid:	5.13 Gal/sack
Top Of Fluid:	0 ft
Calculated Fill:	320 ft
Liquid Volume:	35.7 bbl
Calculated sack:	170.73 sack
Proposed sack:	175 sack

Fluid 3: Water Based Spacer
Displacement

Fluid Density:	8.33 lbm/gal
Liquid Volume:	24.7 bbl

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Fresh Water	8.33		10 bbl
2	CEMENT	HalCem Primary	15.8	5	175 sack
3	SPACER	Displacement	8.33		24.7 bbl

Intermediate Casing – One Stage Job (0- 7018' 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
	Liquid Volume:	10 bbl
Fluid 2: Reactive Spacer		
Chemical Wash	Fluid Density:	8.4 lbm/gal
1000 gal/Mgal FRESH WATER	Liquid Volume:	40 bbl
Fluid 3: Lead Slurry		
HALCEM (TM) SYSTEM	Fluid Weight:	11.5 lbm/gal
11.80 Gal FRESH WATER	Slurry Yield:	2.15 ft3/sack
	Total Mixing Fluid:	11.8 Gal/sack
	Top Of Fluid:	4539 ft
	Calculated Fill:	831 ft
	Liquid Volume:	32.5 bbl
	Calculated sack:	81.33 sack
	Proposed sack:	85 sack
Fluid 4: Foamed		
ELASTISEAL (TM) SYSTEM	Fluid Weight:	13 lbm/gal
1.50 % CHEM - FOAMER 760. TOTETANK	Slurry Yield:	1.46 ft3/sack
6.73 Gal FRESH WATER	Total Mixing Fluid:	6.83 Gal/sack
	Top Of Fluid:	5370 ft
	Calculated Fill:	293 ft
	Liquid Volume:	152.1 bbl
	Calculated sack:	42.26 sack
	Proposed sack:	585 sack
Fluid 5: Tail Slurry		
HALCEM (TM) SYSTEM	Fluid Weight:	13.5 lbm/gal
5.70 Gal FRESH WATER	Slurry Yield:	1.32 ft3/sack
	Total Mixing Fluid:	5.7 Gal/sack
	Top Of Fluid:	5663 ft
	Calculated Fill:	510 ft
	Liquid Volume:	25.9 bbl
	Calculated sack:	81.33 sack
	Proposed sack:	110 sack
Fluid 6: Water Based Spacer		

Displacement

Fluid Density: 8.4 lbm/gal
Liquid Volume: 230 bbl

Stage 1

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate	Downhole Volume
1	SPACER	Fresh Water	8.33		10 bbl
2	SPACER	Chemical Wash	8.4		40 bbl
3	CEMENT	Scavenger Cement	11.5		85 sack
4	CEMENT	Foamed Lead Cement	13		585 sack
5	CEMENT	Unfoamed Tail	13.5		110 sack
6	SPACER	Displacement	8.4		230 bbl

Production Casing – Single Stage Job (6600' – 11799' 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 Spacer

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

Fluid 2: Rheologically Enhanced Spacer

10 lb/gal Tuned Spacer III	Fluid Density:	10 lbm/gal
38.32 gal/bbl FRESH WATER	Liquid Volume:	40 bbl
1 gal/bbl SEM-7		
1 gal/bbl Musol(R) A		
45 gal/bbl BAROID 41 - 50 LB BAG		

Fluid 3: Water Spacer

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

Fluid 4: Lead Slurry

ELASTISEAL (TM) SYSTEM	Fluid Weight:	13 lbm/gal
6.84 Gal FRESH WATER	Slurry Yield:	1.46 ft3/sack
	Total Mixing Fluid:	6.84 Gal/sack
	Top Of Fluid:	7007 ft
	Calculated Fill:	597 ft
	Liquid Volume:	11.5 bbl
	Calculated sack:	44.22 sack
	Proposed sack:	45 sack

Fluid 5: Foamed

ELASTISEAL (TM) SYSTEM	Fluid Weight:	13 lbm/gal
2.50 % CHEM - FOAMER 760. TOTETANK	Slurry Yield:	1.46 ft3/sack
6.68 Gal FRESH WATER	Total Mixing Fluid:	6.85 Gal/sack
	Top Of Fluid:	7605 ft
	Calculated Fill:	3031 ft
	Liquid Volume:	58.5 bbl
	Foamed Weight:	10 lbm/gal
	Avg Foamed Yield:	1.981 ft3/sack
	Foamed Volume:	58.5 bbl
	Calculated sack:	165.80 sack
	Proposed sack:	170 sack

Fluid 6: Tail Slurry

ELASTISEAL (TM) SYSTEM
5.72 Gal FRESH WATER

Fluid Weight:	13.5 lbm/gal
Slurry Yield:	1.3 ft3/sack
Total Mixing Fluid:	5.72 Gal/sack
Top Of Fluid:	10636 ft
Calculated Fill:	1164 ft
Liquid Volume:	22.5 bbl
Calculated sack:	97.18 sack
Proposed sack:	100 sack

Fluid 7: Water Based Spacer
MMCR Displacement
0.25 gal/bbl Micro Matrix Retarder

Fluid Density:	8.4 lbm/gal
Liquid Volume:	20 bbl

Fluid 8: Water Spacer
Fresh Water Displacement

Fluid Density:	8.4 lbm/gal
Liquid Volume:	130 bbl

Stage 1

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate	Downhole Volume
1	SPACER	Fresh Water	8.33		10 bbl
2	SPACER	10 lb/gal Tuned Spacer III	10		40 bbl
3	SPACER	Fresh Water	8.33		10 bbl
4	CEMENT	Unfoamed Lead	13		45 sack
5	CEMENT	Foamed Cement	13		170 sack
6	CEMENT	Unfoamed Tail	13.5		100 sack
7	SPACER	MMCR Displacement	8.4		20 bbl
8	SPACER	Fresh Water Displacement	8.4		130 bbl

Foam Output Parameter Summary:

Stage 1

Foam Calculation Method :	Constant Density	Calculated Gas :	13850.4 scf
Annulus Back Pressure :	20 psig	Additional Gas :	50000 scf
Bottom Hole Circulating Temp :	145degF	Total Gas :	63850.4 scf
Mud Outlet Temperature :	100degF		

Fluid #	Fluid Name	Unfoamed Liquid Volume (bbl)	Beginning Density (lbm/gal)	Ending Density (lbm/gal)	Beginning Rate (scf/bbl)	Ending Rate (scf/bbl)
5	Foamed Cement	43.1	10		302.16	302.74

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'-3900'	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"	3900' (KOP) - 6181' TVD/7100' MD	Fresh Water LSND	8.5-8.8	40-50	8-10
6-1/8"	7100' MD – 11799' MD	Synthetic Oil Based Mud	7.0-9.0	15-25	<1

- 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.

✓ • 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

- Drill Stem Testing - None anticipated
- Coring - None anticipated.
- Mud Logging - Mud loggers will be on location from intermediate casing point to TD.
- Logging - See Below
- 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 +/- 2890 psi based on a 9.0 ppg at 6176' 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 June 15, 2015. 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:

- The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
- 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.
- Topsoil will be salvaged and stored for use in reclamation activities.
- 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:

- Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
- 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.
- 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.
- The OCD District Office will be notified within 48 hours of discovery of a leak in the closed-loop drilling system. Ifa 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:

- Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
- 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.
- 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.
- Storage tanks will be removed from the well location during the rig move.
- The well pad will be reclaimed and seeded in accordance with subsections G, Hand I of 19.15.17.13 NMAC.

Project: San Juan County, NM
Site: S12-T24N-R8W
Well: DRAGONFLY 112H
Wellbore: HZ
Design: Plan #1

LOGOS RESOURCES LLC

CATHEDRAL

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	3900.0	0.00	0.00	3900.0	0.0	0.0	0.00	0.00	0.0	
3	5644.2	48.17	202.31	5445.9	-639.3	-262.3	2.76	202.31	169.5	
4	6217.8	48.17	202.31	5828.4	-1034.7	-424.6	0.00	0.00	274.4	
5	7101.3	90.06	278.11	6181.0	-1325.0	-1098.7	9.00	80.38	900.8	DRAGONFLY 112H LP (330' FEL, 2310' FNL)
6	11799.2	90.06	278.11	6176.0	-662.0	-5749.6	0.00	0.00	5598.7	DRAGONFLY 112H PBHL (250' FWL, 1650' FNL)

OIL CONS. DIV DIST. 3

OCT 27 2015

Surface Hole Location
DRAGONFLY 112H
Lat : 36.332750
Long : -107.640460

SHL 965' FNL, 808' FWL
9 5/8" Casing (Surface)
DRAGONFLY 112H PBHL (250' FWL, 1650' FNL)
4 1/2" Casing (Production)
7" Casing (Intermediate) 242' FEL, 2318' FNL
KOP @ 3900'
LP @ 6181' TVD; 90.06° (330' FEL, 2310' FNL)
EOB; INC=48°
TD at 11799.2
START BUILD/TURN
DRAGONFLY 112H LP (330' FEL, 2310' FNL)

South(-)/North(+) (1200 ft/in)

West(-)/East(+) (1200 ft/in)

True Vertical Depth (1200 ft/in)

Vertical Section at 278.11° (1200 ft/in)

Azimuths to True North
Magnetic North: 9.12°

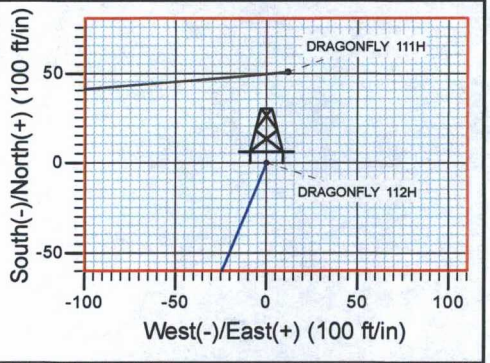
Magnetic Field
Strength: 49937.5snT
Dip Angle: 63.03°
Date: 2/24/2015
Model: HDGM

Ojo Alamo
Kirtland
Fruitland
Pictured Cliffs
Chacra
Meneffee
Point Lookout
Mancos
Gallup
Top Target Zone
Landing Point

Plan #1
DRAGONFLY 112H
15XXX; LR
15' KB @ 7294.0ft
Ground Elevation @ 7279.0
North American Datum 1983
Well DRAGONFLY 112H, True North

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1856.0	1856.0	Ojo Alamo
2041.0	2041.0	Kirtland
2208.0	2208.0	Fruitland
2584.0	2584.0	Pictured Cliffs
2667.0	2667.0	Chacra
4132.0	4132.5	Cliff House
4140.0	4140.5	Meneffee
4918.9	4965.1	Point Lookout
5136.9	5225.2	Mancos
5813.7	6195.8	Gallup
6102.4	6710.2	Top Target Zone
6180.1	7059.2	Landing Point



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
DRAGONFLY 112H PBHL (250' FWL, 1650' FNL)	-662.0	-5749.6	1939808.73	2774157.88	36.330930	-107.659980
DRAGONFLY 112H LP (330' FEL, 2310' FNL)	-1098.7	-1325.0	1939154.91	2778810.09	36.329110	-107.644190

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Project	San Juan County, NM		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	S12-T24N-R8W				
Site Position:		**Northing:**	1,940,533.13 ft	**Latitude:**	36.332890
From:	Lat/Long	**Easting:**	2,779,917.81 ft	**Longitude:**	-107.640420
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.11 °

Well	DRAGONFLY 112H				
Well Position	**+N/-S** 0.0 ft	**Northing:**	1,940,482.15 ft	**Latitude:**	36.332750
	+E/-W 0.0 ft	**Easting:**	2,779,906.13 ft	**Longitude:**	-107.640460
Position Uncertainty	0.0 ft	**Wellhead Elevation:**	0.0 ft	**Ground Level:**	7,279.0 ft

Wellbore	HZ			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	2/24/2015	9.12	63.03	49,938

Design	Plan #1			
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	278.11

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	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,644.2	48.17	202.31	5,445.9	-639.3	-262.3	2.76	2.76	0.00	202.31	
6,217.8	48.17	202.31	5,828.4	-1,034.7	-424.6	0.00	0.00	0.00	0.00	
7,101.3	90.06	278.11	6,181.0	-1,325.0	-1,098.7	9.00	4.74	8.58	80.38	DRAGONFLY 112H L
11,799.2	90.06	278.11	6,176.0	-662.0	-5,749.6	0.00	0.00	0.00	0.00	DRAGONFLY 112H P

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

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	
5.0	0.00	0.00	5.0	0.0	0.0	0.0	0.00	0.00	SHL 965' FNL, 808' 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" Casing (Surface)
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	
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	
1,700.0	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	
1,856.0	0.00	0.00	1,856.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,041.0	0.00	0.00	2,041.0	0.0	0.0	0.0	0.00	0.00	Kirtland
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	
2,208.0	0.00	0.00	2,208.0	0.0	0.0	0.0	0.00	0.00	Fruitland
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	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,584.0	0.00	0.00	2,584.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,667.0	0.00	0.00	2,667.0	0.0	0.0	0.0	0.00	0.00	Chacra
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	
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	KOP @ 3900'
4,000.0	2.76	202.31	4,000.0	-2.2	-0.9	0.6	2.76	2.76	
4,100.0	5.52	202.31	4,099.7	-8.9	-3.7	2.4	2.76	2.76	
4,132.5	6.42	202.31	4,132.0	-12.0	-4.9	3.2	2.76	2.76	Cliff House
4,140.5	6.64	202.31	4,140.0	-12.9	-5.3	3.4	2.76	2.76	Meneffee
4,200.0	8.29	202.31	4,199.0	-20.0	-8.2	5.3	2.76	2.76	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

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	11.05	202.31	4,297.5	-35.6	-14.6	9.4	2.76	2.76	
4,400.0	13.81	202.31	4,395.2	-55.5	-22.8	14.7	2.76	2.76	
4,500.0	16.57	202.31	4,491.7	-79.7	-32.7	21.1	2.76	2.76	
4,600.0	19.33	202.31	4,586.8	-108.2	-44.4	28.7	2.76	2.76	
4,700.0	22.09	202.31	4,680.3	-140.9	-57.8	37.4	2.76	2.76	
4,800.0	24.86	202.31	4,772.0	-177.8	-73.0	47.1	2.76	2.76	
4,900.0	27.62	202.31	4,861.7	-218.7	-89.7	58.0	2.76	2.76	
4,965.1	29.42	202.31	4,918.9	-247.4	-101.5	65.6	2.76	2.76	Point Lookout
5,000.0	30.38	202.31	4,949.2	-263.5	-108.1	69.9	2.76	2.76	
5,100.0	33.14	202.31	5,034.2	-312.2	-128.1	82.8	2.76	2.76	
5,200.0	35.90	202.31	5,116.6	-364.6	-149.6	96.7	2.76	2.76	
5,225.2	36.60	202.31	5,136.9	-378.4	-155.3	100.4	2.76	2.76	Mancos
5,300.0	38.67	202.31	5,196.1	-420.7	-172.6	111.6	2.76	2.76	
5,400.0	41.43	202.31	5,272.7	-480.2	-197.1	127.3	2.76	2.76	
5,500.0	44.19	202.31	5,346.0	-543.1	-222.9	144.0	2.76	2.76	
5,600.0	46.95	202.31	5,416.0	-609.1	-250.0	161.5	2.76	2.76	
5,644.2	48.17	202.31	5,445.9	-639.3	-262.3	169.5	2.76	2.76	EOB; INC=48°
5,700.0	48.17	202.31	5,483.1	-677.8	-278.1	179.7	0.00	0.00	
5,800.0	48.17	202.31	5,549.8	-746.7	-306.4	198.0	0.00	0.00	
5,900.0	48.17	202.31	5,616.4	-815.6	-334.7	216.3	0.00	0.00	
5,958.5	48.17	202.31	5,655.5	-856.0	-351.3	227.0	0.00	0.00	
6,000.0	48.17	202.31	5,683.1	-884.6	-363.0	234.6	0.00	0.00	
6,100.0	48.17	202.31	5,749.8	-953.5	-391.3	252.9	0.00	0.00	
6,195.8	48.17	202.31	5,813.7	-1,019.6	-418.4	270.4	0.00	0.00	Gallup
6,200.0	48.17	202.31	5,816.5	-1,022.4	-419.6	271.1	0.00	0.00	
6,217.8	48.17	202.31	5,828.4	-1,034.7	-424.6	274.4	0.00	0.00	START BUILD/TURN
6,300.0	49.81	211.88	5,882.4	-1,089.8	-452.9	294.6	9.00	1.99	
6,400.0	52.80	222.76	5,945.0	-1,151.6	-500.2	332.7	9.00	2.99	
6,500.0	56.70	232.70	6,002.8	-1,206.3	-560.6	384.8	9.00	3.90	
6,600.0	61.32	241.72	6,054.4	-1,252.5	-632.6	449.6	9.00	4.62	
6,700.0	66.48	249.94	6,098.4	-1,289.1	-714.5	525.5	9.00	5.16	
6,710.2	67.04	250.74	6,102.4	-1,292.2	-723.3	533.8	9.00	5.41	Top Target Zone
6,800.0	72.05	257.51	6,133.8	-1,315.1	-804.1	610.6	9.00	5.58	
6,900.0	77.88	264.60	6,159.8	-1,330.0	-899.5	702.8	9.00	5.84	
7,000.0	83.89	271.39	6,175.7	-1,333.4	-998.0	799.9	9.00	6.01	
7,018.2	85.00	272.61	6,177.4	-1,332.8	-1,016.1	817.9	9.00	6.07	7" Casing (Intermediate) 242' FEL, 2318' FNL
7,059.2	87.49	275.33	6,180.1	-1,330.0	-1,056.9	858.7	9.00	6.09	Landing Point
7,100.0	89.98	278.03	6,181.0	-1,325.2	-1,097.4	899.5	9.00	6.10	
7,101.3	90.06	278.11	6,181.0	-1,325.0	-1,098.7	900.8	9.00	6.11	LP @ 6181' TVD; 90.06° (330' FEL, 2310' FNL)
7,200.0	90.06	278.11	6,180.9	-1,311.1	-1,196.4	999.5	0.00	0.00	
7,300.0	90.06	278.11	6,180.8	-1,297.0	-1,295.4	1,099.5	0.00	0.00	
7,400.0	90.06	278.11	6,180.7	-1,282.9	-1,394.4	1,199.5	0.00	0.00	
7,500.0	90.06	278.11	6,180.6	-1,268.8	-1,493.4	1,299.5	0.00	0.00	
7,600.0	90.06	278.11	6,180.5	-1,254.7	-1,592.4	1,399.5	0.00	0.00	
7,700.0	90.06	278.11	6,180.4	-1,240.5	-1,691.4	1,499.5	0.00	0.00	
7,800.0	90.06	278.11	6,180.3	-1,226.4	-1,790.4	1,599.5	0.00	0.00	
7,900.0	90.06	278.11	6,180.1	-1,212.3	-1,889.4	1,699.5	0.00	0.00	
8,000.0	90.06	278.11	6,180.0	-1,198.2	-1,988.4	1,799.5	0.00	0.00	
8,100.0	90.06	278.11	6,179.9	-1,184.1	-2,087.4	1,899.5	0.00	0.00	
8,200.0	90.06	278.11	6,179.8	-1,170.0	-2,186.4	1,999.5	0.00	0.00	
8,300.0	90.06	278.11	6,179.7	-1,155.9	-2,285.4	2,099.5	0.00	0.00	
8,400.0	90.06	278.11	6,179.6	-1,141.7	-2,384.4	2,199.5	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

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
8,500.0	90.06	278.11	6,179.5	-1,127.6	-2,483.4	2,299.5	0.00	0.00	
8,600.0	90.06	278.11	6,179.4	-1,113.5	-2,582.4	2,399.5	0.00	0.00	
8,700.0	90.06	278.11	6,179.3	-1,099.4	-2,681.4	2,499.5	0.00	0.00	
8,800.0	90.06	278.11	6,179.2	-1,085.3	-2,780.4	2,599.5	0.00	0.00	
8,900.0	90.06	278.11	6,179.1	-1,071.2	-2,879.4	2,699.5	0.00	0.00	
9,000.0	90.06	278.11	6,179.0	-1,057.0	-2,978.4	2,799.5	0.00	0.00	
9,100.0	90.06	278.11	6,178.9	-1,042.9	-3,077.4	2,899.5	0.00	0.00	
9,200.0	90.06	278.11	6,178.8	-1,028.8	-3,176.4	2,999.5	0.00	0.00	
9,300.0	90.06	278.11	6,178.7	-1,014.7	-3,275.4	3,099.5	0.00	0.00	
9,400.0	90.06	278.11	6,178.6	-1,000.6	-3,374.4	3,199.5	0.00	0.00	
9,500.0	90.06	278.11	6,178.4	-986.5	-3,473.4	3,299.5	0.00	0.00	
9,600.0	90.06	278.11	6,178.3	-972.4	-3,572.4	3,399.5	0.00	0.00	
9,700.0	90.06	278.11	6,178.2	-958.2	-3,671.4	3,499.5	0.00	0.00	
9,800.0	90.06	278.11	6,178.1	-944.1	-3,770.4	3,599.5	0.00	0.00	
9,900.0	90.06	278.11	6,178.0	-930.0	-3,869.4	3,699.5	0.00	0.00	
10,000.0	90.06	278.11	6,177.9	-915.9	-3,968.4	3,799.5	0.00	0.00	
10,100.0	90.06	278.11	6,177.8	-901.8	-4,067.4	3,899.5	0.00	0.00	
10,200.0	90.06	278.11	6,177.7	-887.7	-4,166.4	3,999.5	0.00	0.00	
10,300.0	90.06	278.11	6,177.6	-873.6	-4,265.4	4,099.5	0.00	0.00	
10,400.0	90.06	278.11	6,177.5	-859.4	-4,364.4	4,199.5	0.00	0.00	
10,500.0	90.06	278.11	6,177.4	-845.3	-4,463.4	4,299.5	0.00	0.00	
10,600.0	90.06	278.11	6,177.3	-831.2	-4,562.4	4,399.5	0.00	0.00	
10,700.0	90.06	278.11	6,177.2	-817.1	-4,661.4	4,499.5	0.00	0.00	
10,800.0	90.06	278.11	6,177.1	-803.0	-4,760.4	4,599.5	0.00	0.00	
10,900.0	90.06	278.11	6,177.0	-788.9	-4,859.4	4,699.5	0.00	0.00	
11,000.0	90.06	278.11	6,176.9	-774.8	-4,958.4	4,799.5	0.00	0.00	
11,100.0	90.06	278.11	6,176.7	-760.6	-5,057.4	4,899.5	0.00	0.00	
11,200.0	90.06	278.11	6,176.6	-746.5	-5,156.4	4,999.5	0.00	0.00	
11,300.0	90.06	278.11	6,176.5	-732.4	-5,255.4	5,099.5	0.00	0.00	
11,400.0	90.06	278.11	6,176.4	-718.3	-5,354.4	5,199.5	0.00	0.00	
11,500.0	90.06	278.11	6,176.3	-704.2	-5,453.4	5,299.5	0.00	0.00	
11,600.0	90.06	278.11	6,176.2	-690.1	-5,552.4	5,399.5	0.00	0.00	
11,700.0	90.06	278.11	6,176.1	-676.0	-5,651.4	5,499.5	0.00	0.00	
11,799.2	90.06	278.11	6,176.0	-662.0	-5,749.6	5,598.7	0.00	0.00	TD at 11799.2 - DRAGONFLY 112H PBHL (250

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

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
DRAGONFLY 112H PBH - plan hits target center - Point	0.00	0.00	6,176.0	-662.0	-5,749.6	1,939,808.73	2,774,157.88	36.330930	-107.659980
DRAGONFLY 111H LP (- plan misses target center by 1283.4ft at 5958.5ft MD (5655.5 TVD, -856.0 N, -351.3 E) - Point	0.00	0.00	6,202.0	-3.6	-1,139.9	1,940,476.26	2,778,766.27	36.332740	-107.644330
DRAGONFLY 111H PBH - plan misses target center by 1322.3ft at 11799.2ft MD (6176.0 TVD, -662.0 N, -5749.6 E) - Point	0.00	0.00	6,191.0	659.5	-5,793.5	1,941,130.07	2,774,111.33	36.334560	-107.660130
DRAGONFLY 112H LP (- plan hits target center - Point	0.00	0.00	6,181.0	-1,325.0	-1,098.7	1,939,154.91	2,778,810.09	36.329110	-107.644190

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
320.0	320.0	9 5/8" Casing (Surface)	9.625	12.250
7,018.2	6,177.4	7" Casing (Intermediate) 242' FEL, 2318' FNL	7.000	7.000
11,799.2	6,176.0	4 1/2" Casing (Production)	4.500	4.500

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,856.0	1,856.0	Ojo Alamo		-0.06	278.11
2,041.0	2,041.0	Kirtland		-0.06	278.11
2,208.0	2,208.0	Fruitland		-0.06	278.11
2,584.0	2,584.0	Pictured Cliffs		-0.06	278.11
2,667.0	2,667.0	Chacra		-0.06	278.11
4,132.5	4,132.0	Cliff House		-0.06	278.11
4,140.5	4,140.0	Meneffee		-0.06	278.11
4,965.1	4,919.0	Point Lookout		-0.06	278.11
5,225.2	5,137.0	Mancos		-0.06	278.11
6,195.8	5,814.0	Gallup		-0.06	278.11
6,710.2	6,103.0	Top Target Zone		-0.06	278.11
7,059.2	6,181.0	Landing Point		-0.06	278.11

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Company:	LOGOS Operating LLC	**TVD Reference:**	15' KB @ 7294.0ft
Project:	San Juan County, NM	**MD Reference:**	15' KB @ 7294.0ft
Site:	S12-T24N-R8W	**North Reference:**	True
Well:	DRAGONFLY 112H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
5.0	5.0	0.0	0.0	SHL 965' FNL, 808' FWL
3,900.0	3,900.0	0.0	0.0	KOP @ 3900'
5,644.2	5,445.9	-639.3	-262.3	EOB; INC=48°
6,217.8	5,828.4	-1,034.7	-424.6	START BUILD/TURN
7,101.3	6,181.0	-1,325.0	-1,098.7	LP @ 6181' TVD; 90.06° (330' FEL, 2310' FNL)
11,799.2	6,176.0	-662.0	-5,749.6	TD at 11799.2

LOGOS Operating LLC

San Juan County, NM
S12-T24N-R8W
DRAGONFLY 112H
HZ
Plan #1

Anticollision Report

24 February, 2015

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Project:	San Juan County, NM	**TVD Reference:**	15' KB @ 7294.0ft
Reference Site:	S12-T24N-R8W	**MD Reference:**	15' KB @ 7294.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DRAGONFLY 112H	**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 #1	**Offset TVD Reference:**	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
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 1,470.5ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**		

Survey Tool Program **Date** 2/24/2015

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,799.2	Plan #1 (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
S12-T24N-R8W						
DRAGONFLY 111H - HZ - Plan #1	3,900.0	3,900.0	52.3	35.0	3.028	CC, ES, SF

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Project:	San Juan County, NM	**TVD Reference:**	15' KB @ 7294.0ft
Reference Site:	S12-T24N-R8W	**MD Reference:**	15' KB @ 7294.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DRAGONFLY 112H	**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 #1	**Offset TVD Reference:**	Offset Datum

Offset Design S12-T24N-R8W - DRAGONFLY 111H - HZ - Plan #1 — 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	13.02	51.0	11.8	52.3				
100.0	100.0	100.0	100.0	0.1	0.1	13.02	51.0	11.8	52.3	52.1	0.19	273.792	
200.0	200.0	200.0	200.0	0.3	0.3	13.02	51.0	11.8	52.3	51.7	0.64	81.657	
300.0	300.0	300.0	300.0	0.5	0.5	13.02	51.0	11.8	52.3	51.2	1.09	47.984	
400.0	400.0	400.0	400.0	0.8	0.8	13.02	51.0	11.8	52.3	50.8	1.54	33.974	
500.0	500.0	500.0	500.0	1.0	1.0	13.02	51.0	11.8	52.3	50.3	1.99	26.296	
600.0	600.0	600.0	600.0	1.2	1.2	13.02	51.0	11.8	52.3	49.9	2.44	21.449	
700.0	700.0	700.0	700.0	1.4	1.4	13.02	51.0	11.8	52.3	49.4	2.89	18.111	
800.0	800.0	800.0	800.0	1.7	1.7	13.02	51.0	11.8	52.3	49.0	3.34	15.672	
900.0	900.0	900.0	900.0	1.9	1.9	13.02	51.0	11.8	52.3	48.5	3.79	13.811	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	13.02	51.0	11.8	52.3	48.1	4.24	12.346	
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	13.02	51.0	11.8	52.3	47.6	4.69	11.162	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	13.02	51.0	11.8	52.3	47.2	5.14	10.185	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	13.02	51.0	11.8	52.3	46.7	5.59	9.365	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	13.02	51.0	11.8	52.3	46.3	6.03	8.668	
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	13.02	51.0	11.8	52.3	45.8	6.48	8.067	
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	13.02	51.0	11.8	52.3	45.4	6.93	7.544	
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	13.02	51.0	11.8	52.3	44.9	7.38	7.084	
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	13.02	51.0	11.8	52.3	44.5	7.83	6.678	
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	13.02	51.0	11.8	52.3	44.0	8.28	6.315	
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	13.02	51.0	11.8	52.3	43.6	8.73	5.990	
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	13.02	51.0	11.8	52.3	43.1	9.18	5.697	
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	13.02	51.0	11.8	52.3	42.7	9.63	5.431	
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	13.02	51.0	11.8	52.3	42.2	10.08	5.189	
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	13.02	51.0	11.8	52.3	41.8	10.53	4.967	
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	13.02	51.0	11.8	52.3	41.3	10.98	4.764	
2,600.0	2,600.0	2,600.0	2,600.0	5.7	5.7	13.02	51.0	11.8	52.3	40.9	11.43	4.577	
2,700.0	2,700.0	2,700.0	2,700.0	5.9	5.9	13.02	51.0	11.8	52.3	40.4	11.88	4.403	
2,800.0	2,800.0	2,800.0	2,800.0	6.2	6.2	13.02	51.0	11.8	52.3	40.0	12.33	4.243	
2,900.0	2,900.0	2,900.0	2,900.0	6.4	6.4	13.02	51.0	11.8	52.3	39.5	12.78	4.094	
3,000.0	3,000.0	3,000.0	3,000.0	6.6	6.6	13.02	51.0	11.8	52.3	39.1	13.23	3.955	
3,100.0	3,100.0	3,100.0	3,100.0	6.8	6.8	13.02	51.0	11.8	52.3	38.6	13.68	3.825	
3,200.0	3,200.0	3,200.0	3,200.0	7.1	7.1	13.02	51.0	11.8	52.3	38.2	14.13	3.703	
3,300.0	3,300.0	3,300.0	3,300.0	7.3	7.3	13.02	51.0	11.8	52.3	37.7	14.58	3.589	
3,400.0	3,400.0	3,400.0	3,400.0	7.5	7.5	13.02	51.0	11.8	52.3	37.3	15.03	3.481	
3,500.0	3,500.0	3,500.0	3,500.0	7.7	7.7	13.02	51.0	11.8	52.3	36.8	15.48	3.380	
3,600.0	3,600.0	3,600.0	3,600.0	8.0	8.0	13.02	51.0	11.8	52.3	36.4	15.92	3.285	
3,700.0	3,700.0	3,700.0	3,700.0	8.2	8.2	13.02	51.0	11.8	52.3	35.9	16.37	3.195	
3,800.0	3,800.0	3,800.0	3,800.0	8.4	8.4	13.02	51.0	11.8	52.3	35.5	16.82	3.109	
3,900.0	3,900.0	3,900.0	3,900.0	8.6	8.6	13.02	51.0	11.8	52.3	35.0	17.27	3.028	CC, ES, SF
4,000.0	4,000.0	4,000.0	4,000.0	8.8	8.9	171.10	51.0	11.8	54.7	37.0	17.68	3.094	
4,100.0	4,099.7	4,099.7	4,099.7	9.0	9.1	172.11	51.0	11.8	61.8	43.8	18.01	3.433	
4,200.0	4,199.0	4,199.0	4,199.0	9.2	9.3	173.35	51.0	11.8	73.8	55.4	18.31	4.028	
4,300.0	4,297.5	4,297.5	4,297.5	9.4	9.5	174.54	51.0	11.8	90.5	71.9	18.57	4.873	
4,400.0	4,395.2	4,395.2	4,395.2	9.6	9.7	175.54	51.0	11.8	111.9	93.1	18.78	5.960	
4,500.0	4,491.7	4,491.7	4,491.7	9.8	10.0	176.34	51.0	11.8	138.0	119.1	18.94	7.288	
4,600.0	4,586.8	4,586.8	4,586.8	10.1	10.2	176.96	51.0	11.8	168.8	149.8	19.06	8.857	
4,700.0	4,680.3	4,680.3	4,680.3	10.4	10.4	177.44	51.0	11.8	204.1	185.0	19.14	10.668	
4,800.0	4,772.0	4,772.0	4,772.0	10.7	10.6	177.81	51.0	11.8	243.9	224.8	19.17	12.728	
4,900.0	4,861.7	4,861.7	4,861.7	11.2	10.8	178.10	51.0	11.8	288.1	269.0	19.15	15.043	
5,000.0	4,949.2	4,949.2	4,949.2	11.7	11.0	178.33	51.0	11.8	336.6	317.5	19.10	17.623	
5,100.0	5,034.2	5,034.2	5,034.2	12.3	11.2	178.51	51.0	11.8	389.2	370.2	19.01	20.478	

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

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Project:	San Juan County, NM	**TVD Reference:**	15' KB @ 7294.0ft
Reference Site:	S12-T24N-R8W	**MD Reference:**	15' KB @ 7294.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DRAGONFLY 112H	**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 #1	**Offset TVD Reference:**	Offset Datum

Offset Design S12-T24N-R8W - DRAGONFLY 111H - HZ - Plan #1 — 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
5,200.0	5,116.6	5,116.6	5,116.6	13.0	11.4	178.66	51.0	11.8	445.9	427.0	18.88	23.621	
5,300.0	5,196.1	5,196.1	5,196.1	13.8	11.5	178.78	51.0	11.8	506.4	487.7	18.71	27.065	
5,400.0	5,272.7	5,272.7	5,272.7	14.6	11.7	178.87	51.0	11.8	570.7	552.2	18.52	30.826	
5,500.0	5,346.0	5,346.0	5,346.0	15.6	11.9	178.94	51.0	11.8	638.7	620.4	18.29	34.916	
5,600.0	5,416.0	5,416.0	5,416.0	16.6	12.0	179.00	51.0	11.8	710.1	692.0	18.04	39.351	
5,700.0	5,483.1	5,483.1	5,483.1	17.8	12.2	179.07	51.0	11.8	784.3	766.1	18.20	43.088	
5,800.0	5,549.8	5,549.8	5,549.8	18.9	12.3	179.15	51.0	11.8	858.8	840.1	18.70	45.913	
5,900.0	5,616.4	5,713.8	5,712.5	20.1	12.7	178.05	49.4	-5.1	930.7	911.3	19.34	48.123	
6,000.0	5,683.1	5,937.0	5,916.4	21.3	13.3	172.91	41.3	-92.5	992.4	972.0	20.42	48.611	
6,100.0	5,749.8	6,145.4	6,068.9	22.6	14.4	165.65	28.3	-232.7	1,044.5	1,021.9	22.60	46.221	
6,200.0	5,816.5	6,306.6	6,150.9	23.8	16.0	158.87	15.6	-370.4	1,091.7	1,065.7	25.97	42.032	
6,300.0	5,882.4	6,430.0	6,188.6	25.0	17.7	143.55	4.8	-487.2	1,137.1	1,105.9	31.23	36.416	
6,400.0	5,945.0	6,539.7	6,202.7	26.3	19.5	128.51	-5.2	-595.4	1,178.8	1,141.8	37.02	31.842	
6,500.0	6,002.8	6,616.3	6,203.1	27.6	20.9	116.90	-12.3	-671.6	1,215.7	1,174.1	41.58	29.236	
6,600.0	6,054.4	6,692.1	6,202.9	28.9	22.3	107.63	-19.3	-747.1	1,247.3	1,201.9	45.47	27.434	
6,700.0	6,098.4	6,757.0	6,202.8	30.2	23.6	100.77	-25.2	-811.8	1,271.9	1,223.6	48.32	26.321	
6,800.0	6,133.8	6,800.0	6,202.7	31.5	24.5	96.13	-27.6	-854.7	1,290.4	1,240.5	49.90	25.859	
6,900.0	6,159.8	6,840.9	6,202.6	32.8	25.3	93.02	-28.2	-895.6	1,302.5	1,251.7	50.84	25.622	
7,000.0	6,175.7	6,900.0	6,202.4	34.0	26.6	91.22	-26.4	-954.6	1,308.0	1,256.3	51.74	25.281	
7,100.0	6,181.0	6,929.4	6,202.4	35.2	27.2	90.94	-24.3	-983.9	1,306.1	1,254.6	51.47	25.374	
7,200.0	6,180.9	6,986.8	6,202.2	36.5	28.4	90.94	-17.7	-1,040.9	1,302.9	1,248.5	54.39	23.957	
7,247.0	6,180.8	7,005.3	6,202.2	37.1	28.8	90.94	-15.1	-1,059.3	1,302.6	1,247.3	55.29	23.560	
7,300.0	6,180.8	7,058.3	6,202.1	37.8	30.0	90.94	-7.6	-1,111.8	1,302.6	1,244.7	57.85	22.514	
7,400.0	6,180.7	7,158.3	6,201.8	39.3	32.2	90.93	6.5	-1,210.8	1,302.6	1,240.3	62.22	20.934	
7,500.0	6,180.6	7,258.3	6,201.6	40.8	34.5	90.92	20.6	-1,309.8	1,302.5	1,235.9	66.69	19.531	
7,600.0	6,180.5	7,358.3	6,201.4	42.5	36.7	90.92	34.7	-1,408.8	1,302.5	1,231.3	71.25	18.282	
7,700.0	6,180.4	7,458.3	6,201.1	44.3	39.1	90.91	48.8	-1,507.8	1,302.5	1,226.7	75.85	17.173	
7,800.0	6,180.3	7,558.3	6,200.9	46.1	41.4	90.91	62.9	-1,606.8	1,302.5	1,222.0	80.53	16.174	
7,900.0	6,180.1	7,658.3	6,200.7	48.0	43.8	90.90	77.0	-1,705.8	1,302.5	1,217.3	85.25	15.279	
8,000.0	6,180.0	7,758.3	6,200.4	50.0	46.2	90.90	91.1	-1,804.8	1,302.5	1,212.5	90.01	14.471	
8,100.0	6,179.9	7,858.3	6,200.2	52.0	48.6	90.89	105.2	-1,903.8	1,302.5	1,207.7	94.80	13.740	
8,200.0	6,179.8	7,958.3	6,200.0	54.1	51.0	90.89	119.3	-2,002.8	1,302.5	1,202.9	99.62	13.075	
8,300.0	6,179.7	8,058.3	6,199.7	56.2	53.4	90.88	133.4	-2,101.8	1,302.5	1,198.0	104.46	12.469	
8,400.0	6,179.6	8,158.3	6,199.5	58.3	55.9	90.87	147.5	-2,200.8	1,302.5	1,193.1	109.32	11.914	
8,500.0	6,179.5	8,258.3	6,199.3	60.5	58.3	90.87	161.7	-2,299.8	1,302.4	1,188.2	114.21	11.404	
8,600.0	6,179.4	8,358.3	6,199.0	62.7	60.8	90.86	175.8	-2,398.8	1,302.4	1,183.3	119.10	10.935	
8,700.0	6,179.3	8,458.3	6,198.8	65.0	63.2	90.86	189.9	-2,497.8	1,302.4	1,178.4	124.02	10.502	
8,800.0	6,179.2	8,558.3	6,198.6	67.2	65.7	90.85	204.0	-2,596.8	1,302.4	1,173.5	128.94	10.101	
8,900.0	6,179.1	8,658.3	6,198.3	69.5	68.1	90.85	218.1	-2,695.8	1,302.4	1,168.5	133.88	9.728	
9,000.0	6,179.0	8,758.3	6,198.1	71.8	70.6	90.84	232.2	-2,794.8	1,302.4	1,163.6	138.82	9.382	
9,100.0	6,178.9	8,858.3	6,197.9	74.1	73.1	90.84	246.3	-2,893.8	1,302.4	1,158.6	143.78	9.058	
9,200.0	6,178.8	8,958.3	6,197.6	76.4	75.6	90.83	260.4	-2,992.8	1,302.4	1,153.6	148.74	8.756	
9,300.0	6,178.7	9,058.3	6,197.4	78.8	78.1	90.82	274.5	-3,091.8	1,302.4	1,148.7	153.71	8.473	
9,400.0	6,178.6	9,158.3	6,197.2	81.2	80.6	90.82	288.6	-3,190.8	1,302.4	1,143.7	158.68	8.207	
9,500.0	6,178.4	9,258.3	6,196.9	83.5	83.1	90.81	302.7	-3,289.8	1,302.3	1,138.7	163.67	7.957	
9,600.0	6,178.3	9,358.3	6,196.7	85.9	85.5	90.81	316.8	-3,388.8	1,302.3	1,133.7	168.65	7.722	
9,700.0	6,178.2	9,458.3	6,196.5	88.3	88.0	90.80	330.9	-3,487.8	1,302.3	1,128.7	173.65	7.500	
9,800.0	6,178.1	9,558.3	6,196.2	90.7	90.5	90.80	345.0	-3,586.8	1,302.3	1,123.7	178.64	7.290	
9,900.0	6,178.0	9,658.3	6,196.0	93.1	93.0	90.79	359.1	-3,685.8	1,302.3	1,118.7	183.64	7.091	
10,000.0	6,177.9	9,758.3	6,195.7	95.5	95.5	90.78	373.3	-3,784.8	1,302.3	1,113.6	188.65	6.903	
10,100.0	6,177.8	9,858.3	6,195.5	97.9	98.1	90.78	387.4	-3,883.8	1,302.3	1,108.6	193.66	6.725	
10,200.0	6,177.7	9,958.3	6,195.3	100.4	100.6	90.77	401.5	-3,982.8	1,302.3	1,103.6	198.67	6.555	

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

Anticollision Report

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Project:	San Juan County, NM	**TVD Reference:**	15' KB @ 7294.0ft
Reference Site:	S12-T24N-R8W	**MD Reference:**	15' KB @ 7294.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DRAGONFLY 112H	**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 #1	**Offset TVD Reference:**	Offset Datum

Offset Design S12-T24N-R8W - DRAGONFLY 111H - HZ - Plan #1 — **Offset Site Error:** 0.0 ft

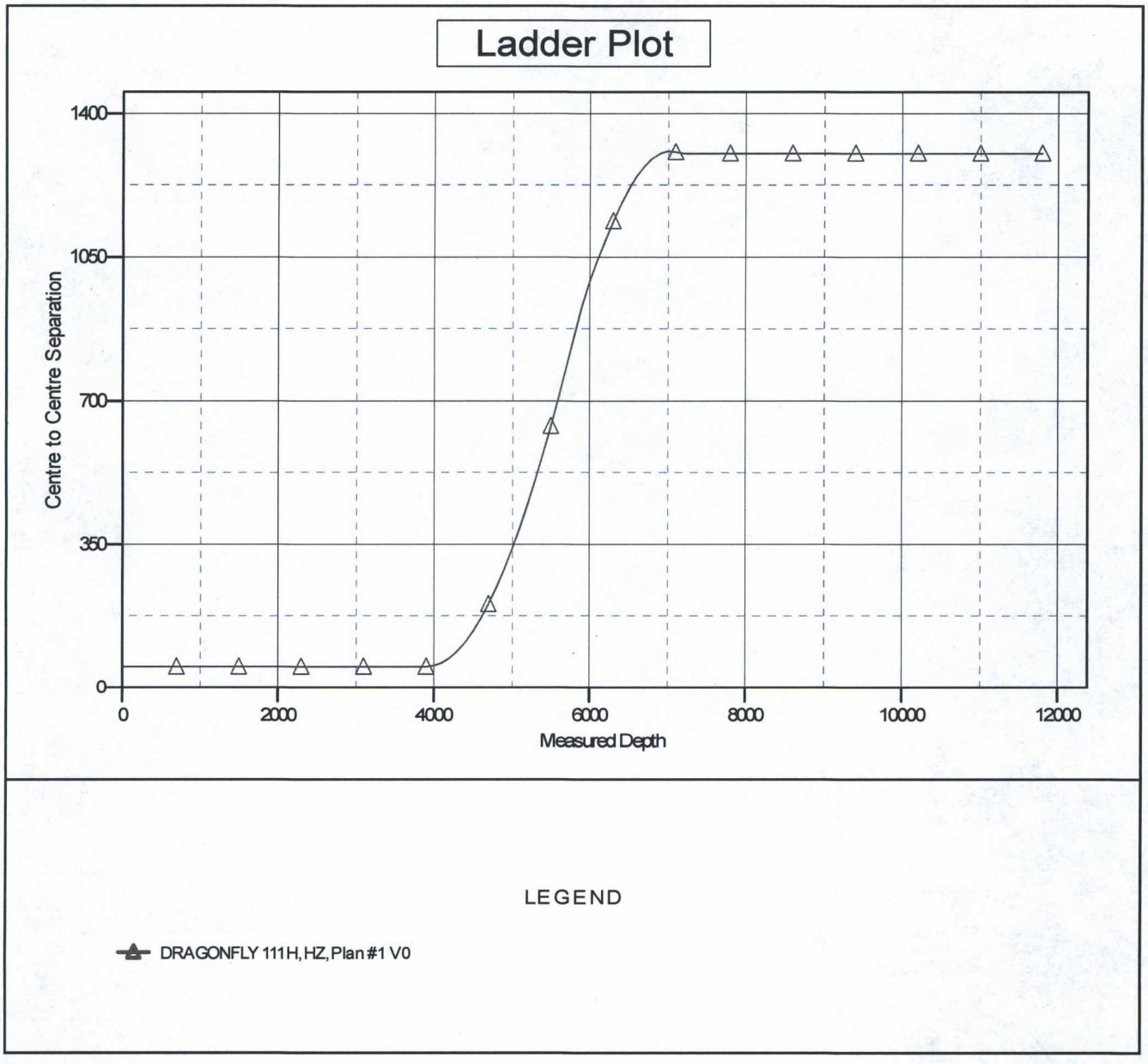
Survey Program: 0-ISCWSA MWD — **Offset Well Error:** 0.0 ft

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
10,300.0	6,177.6	10,058.3	6,195.0	102.8	103.1	90.77	415.6	-4,081.8	1,302.3	1,098.6	203.68	6.394	
10,400.0	6,177.5	10,158.3	6,194.8	105.2	105.6	90.76	429.7	-4,180.8	1,302.3	1,093.6	208.70	6.240	
10,500.0	6,177.4	10,258.3	6,194.6	107.7	108.1	90.76	443.8	-4,279.8	1,302.2	1,088.5	213.72	6.093	
10,600.0	6,177.3	10,358.3	6,194.3	110.1	110.6	90.75	457.9	-4,378.8	1,302.2	1,083.5	218.74	5.953	
10,700.0	6,177.2	10,458.3	6,194.1	112.6	113.1	90.75	472.0	-4,477.8	1,302.2	1,078.5	223.77	5.820	
10,800.0	6,177.1	10,558.3	6,193.9	115.0	115.6	90.74	486.1	-4,576.8	1,302.2	1,073.4	228.79	5.692	
10,900.0	6,177.0	10,658.3	6,193.6	117.5	118.1	90.73	500.2	-4,675.8	1,302.2	1,068.4	233.82	5.569	
11,000.0	6,176.9	10,758.3	6,193.4	119.9	120.7	90.73	514.3	-4,774.8	1,302.2	1,063.3	238.85	5.452	
11,100.0	6,176.7	10,858.3	6,193.2	122.4	123.2	90.72	528.4	-4,873.8	1,302.2	1,058.3	243.88	5.339	
11,200.0	6,176.6	10,958.3	6,192.9	124.9	125.7	90.72	542.5	-4,972.8	1,302.2	1,053.3	248.92	5.231	
11,300.0	6,176.5	11,058.3	6,192.7	127.3	128.2	90.71	556.6	-5,071.8	1,302.2	1,048.2	253.95	5.128	
11,400.0	6,176.4	11,158.3	6,192.5	129.8	130.7	90.71	570.7	-5,170.8	1,302.2	1,043.2	258.99	5.028	
11,500.0	6,176.3	11,258.3	6,192.2	132.3	133.2	90.70	584.9	-5,269.7	1,302.1	1,038.1	264.03	4.932	
11,600.0	6,176.2	11,358.3	6,192.0	134.8	135.8	90.69	599.0	-5,368.7	1,302.1	1,033.1	269.07	4.839	
11,700.0	6,176.1	11,458.3	6,191.8	137.2	138.3	90.69	613.1	-5,467.7	1,302.1	1,028.0	274.11	4.750	
11,799.2	6,176.0	11,557.5	6,191.5	139.7	140.8	90.68	627.1	-5,565.9	1,302.1	1,023.0	279.11	4.665	

Company:	LOGOS Operating LLC	**Local Co-ordinate Reference:**	Well DRAGONFLY 112H
Project:	San Juan County, NM	**TVD Reference:**	15' KB @ 7294.0ft
Reference Site:	S12-T24N-R8W	**MD Reference:**	15' KB @ 7294.0ft
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DRAGONFLY 112H	**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 #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to 15' KB @ 7294.0ft
Offset Depths are relative to Offset Datum
Central Meridian is -107.833333 °

Coordinates are relative to: DRAGONFLY 112H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.11°



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

6. Pipeline location warning signs will be installed within 90 days after construction is completed.
7. Construction of the pipeline will take approximately 5-10 days.
8. The pipeline ROW corridor will be conditioned in a manner to preclude vehicular travel upon said ROW, except for access to above-ground pipeline appurtenances.

c. Well Pad (See Plates 4a & 4b)
1. The construction phase of the project will commence upon receipt of the approved APD.
2. Vegetation removed during construction, including trees that measure less than 3 inches in diameter (at ground level) and slash/brush, will be chipped or mulched and incorporated into the topsoil as additional organic matter. If trees are present, all trees 3 inches in diameter or greater (at ground level) will be cut to ground level and delimbed. Tree trunks (left whole) and cut limbs will be stacked and brought up to the main resource road.
3. The upper 6 inches of topsoil (if available) will be stripped following vegetation and site clearing. Topsoil will not be mixed with the underlying subsoil horizons and will be stockpiled as a berm along the perimeter of the well pad and/or as dirt mound within the construction zone, separate from subsoil or other excavated material. Topsoil and sub-surface soils will be replaced in the proper order, prior to final seedbed preparation. Spreading shall not be done when the ground or topsoil is wet. Vehicle/equipment traffic will not be allowed to cross topsoil stockpiles.
4. Erosion control and stormwater management design features will be installed upon reclamation. The operator will utilize straw wattles around stockpiled soils, and at the base of fill slopes as necessary, to prevent sediment from leaving the construction site. Diversion channels will be constructed above the cut slope to divert storm water around the well pad. Silt traps will be installed within the permitted project area to reduce sediment transport off location.
5. The well pad will be leveled to provide space and a level surface for vehicles and equipment. Excavated materials from cuts will be used on fill portions of the well pad to level the pad. The well pad would require between 1.1 and 5.9 feet of cut on the west and east side of the well pad, and between 2.7 and 5.8 feet of fill on the southeast (corner six) and northwest (corner three) side of the location. No additional surfacing materials will be required for construction.
6. Well pad construction will involve preparing a level area for the equipment that will drill and complete the well. A 400-foot by 400-foot level well pad area would be constructed, resulting in approximately 3.56 acres of new surface disturbance. Construction of the well pad would include a 50-foot construction buffer zone around the perimeter of the pad, resulting in an additional 1.89 acres of new surface disturbance. The total permitted area for the construction of the well pad is 5.45 acres.
7. The well pad would be constructed from the earthen materials present on-site or imported from a predetermined borrow pit. Imported fill material will be weed-free and authorized. The additional fill will be brought in from off-site. No concrete or other foreign materials would be brought in for use in construction of the well pad.
8. The operator has proposed a closed-loop system. No pits will be used for the proposed project.
9. Construction of the well pad will take approximately 7-10 days.

G. Methods for Handling Waste

1. Cuttings - Drilling operations will utilize a closed-loop system with water based mud. All cuttings will be placed in roll-off bins and hauled to a commercial disposal facility or land farm. The operator will follow Onshore Oil and Gas Order No. 1 regarding the placement, operation and

LOGOS OPERATING, LLC

DRAGONFLY #112H

965' FNL, 808' FWL

SEC. 12, T-24-N, R-8-W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
NAD 83
LATITUDE: N36.33275°
LONGITUDE: W107.64046°
ELEVATION: 7279'

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

To
Dragonfly #112H

- Beginning at the intersection of Hwy. 550 South & Hwy. 64
- Head south on Hwy. 550 for 43.1 miles, turn left onto San Juan County Road 7997; reset odometer;
- At 3 miles along County Road 7997 come to an intersection with two dirt roads and turn right; reset odometer;
- At 1.3 miles along said dirt road, pass through a gate;
- At 1.5 miles along said dirt road bear left;
- At 2 miles along said dirt road bear left;
- At 3 miles along said dirt road bear right;
- At 3.3 miles along said dirt road bear right;
- At 3.6 miles along said dirt road bear right;
- At 4.1 miles along said dirt road bear right;
- At 4.3 miles along said dirt road turn right onto another dirt road; reset odometer;
- At 1.7 mile along this new dirt road turn right onto the access road for the Dragonfly #112H, being a previously abandoned road.

Plate 1c

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)