

State of New Mexico  
Energy, Minerals and Natural Resources Department

**Susana Martinez**  
Governor

**Ken McQueen**  
Cabinet Secretary

**Matthias Sayer**  
Deputy Cabinet Secretary

**Heather Riley**, Division Director  
Oil Conservation Division



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

Operator Signature Date: 10/8/2018

Well information;

Operator Enduring, Well Name and Number Lore Mesa 2 Int 1H

API# 30-045-35895, Section 28, Township 22 N/S, Range 8 E/W

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

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

NMOCD Approved by Signature

11/5/19

Date

NMOC

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

DEC 13 2018

APPLICATION FOR PERMIT TO DRILL OR REENTER

- 1a. Type of work: ☒ DRILL ☐ REENTER  
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other  
1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☒ Multiple Zone

5. Lease Serial No.  
NMNM122639

6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.  
LONE MESA UNIT  
001H

2. Name of Operator  
ENDURING RESOURCES LLC

9. API Well No.

30-045-35895

3a. Address  
1050 17TH ST STE 2500 DENVER CO 80265

3b. Phone No. (include area code)  
(505)386-8205

10. Field and Pool, or Exploratory  
BASIN FRUITLAND COAL / FRUITLAND

4. Location of Well (Report location clearly and in accordance with any State requirements. \*)

At surface NWSE / 1863 FSL / 1936 FEL / LAT 36.108471 / LONG -107.685035

At proposed prod. zone NWSW / 1835 FSL / 0 FWL / LAT 36.108484 / LONG -107.696165

11. Sec., T. R. M. or Blk. and Survey or Area  
SEC 28 / T22N / R8W / NMP

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

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)  
20 feet

16. No of acres in lease  
1560

17. Spacing Unit dedicated to this well  
320

18. Distance from proposed location\*  
to nearest well, drilling, completed,  
applied for, on this lease, ft.  
1863 feet

19. Proposed Depth  
710 feet / 3855 feet

20. BLM/BIA Bond No. in file  
FED: NMB001492

21. Elevations (Show whether DF, KDB, RT, GL, etc.)  
6756 feet

22. Approximate date work will start\*  
11/01/2018

23. Estimated duration  
30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

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 requested by the BLM.

25. Signature  
(Electronic Submission)

Name (Printed/Typed)  
Lacey Granillo / Ph: (505)636-9743

Date  
10/08/2018

Title  
Permitting Specialist

Approved by (Signature)

Name (Printed/Typed)

Richard A. Fieles

Date

DEC 11 2018

Title

Field Manager

Office  
FARMINGTON

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

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

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

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

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

NMOC



District I  
1625 N. French Drive, Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720

District II  
811 S. First Street, Artesia, NM 88210  
Phone: (505) 748-1283 Fax: (505) 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 Drive, Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department

Form C-102  
Revised August 1, 2011

Submit one copy to  
Appropriate District Office

OIL CONSERVATION DIVISION  
1220 South St. Francis Drive  
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number <b>30-015-35895</b>		*Pool Code 71629	*Pool Name BASIN FRUITLAND COAL
*Property Code <b>323130</b>	*Property Name LONE MESA UNIT		*Well Number 001H
*GRID No. 372286	*Operator Name ENDURING RESOURCES, LLC		*Elevation 6756'

<sup>10</sup> Surface Location

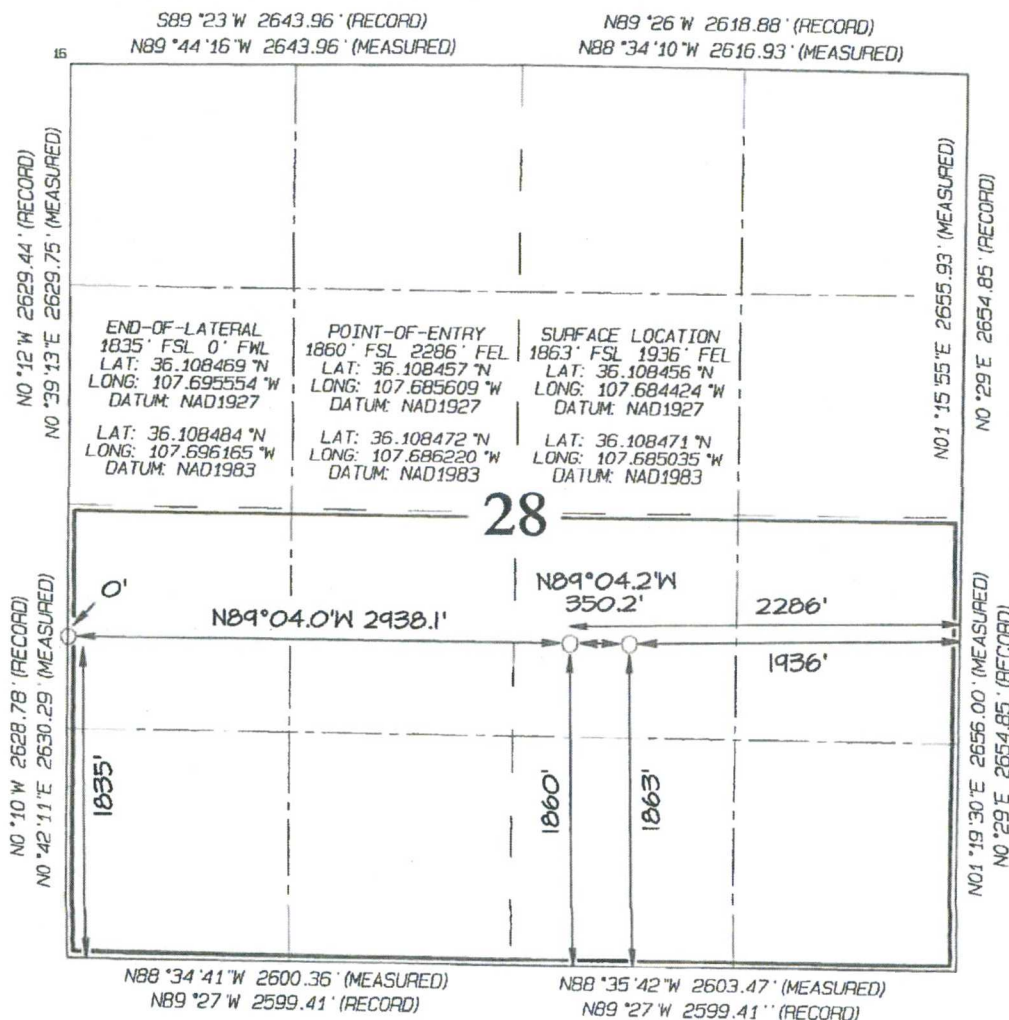
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	28	22N	8W		1863	SOUTH	1936	EAST	SAN JUAN

<sup>11</sup> 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
L	28	22N	8W		1835	SOUTH	0	WEST	SAN JUAN

<sup>12</sup> Dedicated Acres 320.00 Acres - (S/2)	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE  
BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



<sup>17</sup> 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: *[Signature]* Date: 10/9/18

Printed Name: *[Name]*

E-mail Address:

<sup>18</sup> SURVEYOR CERTIFICATION

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

Date Revised: OCTOBER 4, 2018  
Date of Survey: APRIL 21, 2018

Signature and Seal of Professional Surveyor



JASON C. EDWARDS  
Certificate Number 15269

Surface = Indian



**ENDURING RESOURCES IV, LLC**  
**1050 SEVENTEENTH STREET, SUITE 2500**  
**DENVER, COLORADO 80265**

**DRILLING PLAN:** *Drill, complete, and equip horizontal Fruitland Coal well*

**WELL INFORMATION:**

**Name:** Lone Mesa Unit 001H

**State:** New Mexico

**County:** San Juan

**Surface Elevation:** 6,756 ft ASL (GL) 6,770 ft ASL (KB)

**Surface Location:** 28-22N-08W Sec-Twn-Rng 1863 ft FSL 1936 ft FEL

36.108471 ° N latitude 107.685035 ° W longitude (NAD 83)

**BH Location:** 28-22N-08W Sec-Twn-Rng 1835 ft FSL 0 ft FEL

36.108484 ° N latitude 107.696165 ° W longitude (NAD 83)

**Driving Directions:** From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM: south on 550 for 38.7 miles to MM 112.7, South (right) on CR #7900 for 5.2 miles, Southeast (straight) at fork remaining on CR #7900 for 5.2 miles, West (right) at fork onto CR #7970 for 1.5 miles, right on new access road for 200' to location.

**GEOLOGIC AND RESERVOIR INFORMATION:**

<b>Prognosis:</b>	<b>Formation Tops</b>	<b>TVD (ft ASL)</b>	<b>TVD (ft KB)</b>	<b>MD (ft KB)</b>	<b>O / G / W</b>	<b>Pressure</b>
	Ojo Alamo	6,637	133	133	W	normal
	Kirtland	6,560	210	210	W	normal
	Fruitland	6,258	512	600	G, W	sub (~0.38)
	FC (TARGET - POE)	6,053	717	917	G, W	sub (~0.38)
	Pictured Cliffs	6,029	741	N/A	G,W	sub (~0.38)
	FC (TARGET - BHL)	6,060	710	3,855	G,W	sub (~0.38)

**Surface:** Nacimiento

**Oil & Gas Zones:** Fruitland Coal and Pictured Cliffs are expected to be gas-bearing

**Pressure:** Normal (0.43 psi/ft) or sub-normal pressure gradient anticipated in all formations

Max. pressure gradient: 0.43 psi/ft Evacuated hole gradient: 0.22 psi/ft

Maximum anticipated BH pressure, assuming maximum pressure gradient: 320 psi

Maximum anticipated surface pressure, assuming partially evacuated hole: 160 psi

**Temperature:** Maximum anticipated BHT is 130° F or less

**H<sub>2</sub>S INFORMATION:**

**H<sub>2</sub>S Zones:** Encountering hydrogen-sulfide bearing zones is NOT anticipated.

**Safety:** Sensors and alarms will be placed in the substructure, on the rig floor, above the pits, and at the shakers.

**LOGGING, CORING, AND TESTING:**

**Mud Logs:** Mud logging and cuttings sampling is planned during the lateral section; total gas chromatograph will be run from drillout of 9-5/8" casing to TD

**MWD / LWD:** GR from drillout of 9-5/8" casing to TD

**Open Hole Logs:** None planned

**Testing:** None planned

**Coring:** None planned

**Cased Hole Logs:** If cement is NOT circulated to surface, CBL on 7" casing from deepest free-fall depth to surface

**DRILLING RIG INFORMATION:**



**Contractor:** Aztec  
**Rig No.:** 920  
**Draw Works:** TSM-850, 1,000 hp  
**Mast:** 106', 440,000 lbs  
**Top Drive:** Tesco 250 ton  
**Prime Movers:** 2 CAT C-18  
**Pumps:** 2 - RSF-1300 (3,000 psi)  
**BOPE 1:** Double Gate Ram (11" 3,000 psi)  
**BOPE 2:** Annular Preventer (11" 3,000 psi)  
**Choke** 3" x 5,000 psi  
**KB-GL (ft):** 14

#### **BOPE REQUIREMENTS:**

*See attached diagram for details regarding BOPE specifications and configuration.*

- 1) Rig will be equipped with upper and lower kelly cocks with handles available.
- 2) Inside BOP and TIW valves will be available to use on all sizes and threads of drill pipe used while drilling the well.
- 2) BOP accumulator will have enough capacity to open the HCR valve, close all rams and annular preventer, and retain minimum of 200 psi above precharge on the closing manifold without the use of closing pumps. The fluid reservoir capacity shall be at least double the usable fluid volume of the accumulator system capacity, and the fluid level shall be maintained at manufacturer's recommendation. There will be two additional sources of power for the closing pumps (electric and air). Sufficient nitrogen bottles will be available and will be recharged when pressure falls below manufacturer's recommended minimum.
- 3) BOP testing shall be conducted (a) when initially installed, (b) whenever any seal is broken or repaired, (c) if the time since the previous test exceeds 30 days. Tests will be conducted using a test plug. BOP ram preventers will be tested to 3,000 psi for 10 minutes, and the annular preventer will be tested to 1,500 psi for 10 minutes. Ram and annular preventers will be tested to 250 psi for 5 minutes. Additionally, BOP and casing strings will be tested to .22 psi/ft (or 1,500 psi minimum) for 30 minutes, prior to drilling out 9-5/8" casing and 7" casing. Rams and hydraulically operated remote choke line valve will be function tested daily at a minimum.
- 4) Remote valve for BOP rams, HCR, and choke shall be placed in a location that is readily available to the driller. The remote BOP valve shall be capable of closing and opening the rams.
- 5) Manual locking devices (hand wheels) shall be intalled on rams. A valve will be installed on the annular preventer's closing line as close as possible to the preventer to act as a locking device. The valve will be maintained in the open position and shall only be closed when there is no power to the accumulator.

#### **FLUIDS AND SOLIDS CONTROL PROGRAM:**

**Fluid Measurement:** Pumps shall be equipped with stroke counters with displays in the dog-house. Slow pump speed shall be recorded daily and after mudding up, at a minimum, on drilling report. A Pit Volume Totalizer will be installed and the readout will be displayed in the dog-house. Gas-detecting equipment will be installed at the shakers, and readouts will be available in the dog-house and the in the geologist's work-station.

**Closed-Loop System:** A fully, closed-loop system will be utilized. The system will consist of above-ground piping and above-ground storage tanks and bins. The system will not entail any earthen pits, below-grade storage, or drying pads. All equipment will be disassembled and removed from the site when drilling operations cease. The system will be capable of storing all fluids and generated cuttings and of preventing uncontrolled releases of the same. The system will be operated in an efficient manner to allow the recycling and reuse of as much fluid as possible and to minimize the amount of fluids and solids that require disposal.

**Fluid Disposal:** Fluids that cannot be reused, recycled, or returned to the supplier will be hauled to and disposed of at an approved disposal site (Industrial Ecosystem, Inc. or Envirotech, Inc.).

**Solids Disposal:** Drilling solids will be stored (until haul-off) on-site in separate containers with no other waste, debris, or garbage products. Waste solids will be hauled to and disposed of at an approved disposal site (Industrial Ecosystem, Inc. or Envirotech, Inc.).

**Fluid Program:** See "Detailed Drilling Plan" section for specifics.

#### **DETAILED DRILLING PLAN:**

**SURFACE:** Drill vertically to casing setting depth (plus rat hole), run casing, install wellhead, cement casing to surface.

0 ft (MD)	to	320 ft (MD)	Hole Section Length:	320 ft
0 ft (TVD)	to	320 ft (TVD)	Casing Required:	320 ft

Note: Surface hole may be drilled, cased, and cemented with a smaller rig in advance of the drilling rig.

Fluid:	Type	MW (ppg)	FL (mL/30 min)	PV (cp)	YP (lb/100 sqft)	pH	Comments
	Fresh Water	8.4	N/C	2 - 8	2 - 12	9.0	Spud mud

Hole Size: 12-1/4"

Bit / Motor: PDC or TCI, no motor

MWD / Survey: No MWD, run deviation survey in 100' stations after drilling

Logging: None

Casing Specs:		Wt (lb/ft)	Grade	Conn.	Collapse (psi)	Burst (psi)	Tens. Body (lbs)	Tens. Conn (lbs)
Specs	9.625	36.0	J-55	LTC	2,020	3,520	564,000	453,000
Loading					140	1,510	110,046	110,046
Min. S.F.					14.45	2.33	5.13	4.12

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient

Burst: maximum anticipated surface pressure or maximum test pressure with 9.0 ppg fluid inside casing while drilling production hole and 8.4 ppg equivalent external pressure gradient

Tension: buoyed weight in 8.4 ppg fluid with 100,000 lbs over-pull

MU Torque (ft lbs): Minimum: 3,400 Optimum: 4,530 Maximum: 5,660

Casing Details: Guide shoe, float collar, 1 jt casing, float collar, casing to surface, wellhead

Centralizers: 2 centralizers per jt stop-banded 10' from each collar on bottom 3 jts, 1 centralizer per 2 jts to surface

Cement:	Type	Weight (ppg)	Yield (cuft/sk)	Water (gal/sk)	% Excess	Planned TOC (ft MD)	Total Cmt (sx)
	Class G	15.8	1.174	5.15	100%	0	171

Annular Capacity 0.3132 cuft/ft (12-1/4" hole x 9-5/8" casing annulus)

Calculated cement volumes assume gauge hole and the excess noted in table

Halliburton HALCEM surface cementing blend

**INTERMEDIATE:** Build curve and land well in Fruitland Coal, run casing, cement casing to surface.

320 ft (MD)	to	917 ft (MD)	Hole Section Length:	597 ft
320 ft (TVD)	to	717 ft (TVD)	Casing Required:	917 ft

Fluid:	Type	MW (ppg)	FL (mL/30')	PV (cp)	YP (lb/100 ft <sup>2</sup> )	pH	Comments
	WBM	8.4	20	8 - 14	8 - 14	9.0 - 9.5	

Hole Size: 8-3/4"

Bit / Motor: PDC or TCI w/mud motor

MWD / Survey: MWD with inclination and azimuth in 30' stations during curve, GR

Logging: GR MWD

Procedure: NU BOPE and test (as noted above); pressure test 9-5/8" casing to 1,500 psi for 30 minutes.

Drill out surface casing shoe. Build curve and land at 90 degrees inclination in the Fruitland Coal. After reaching TD, condition hole casing running. TOH. Run casing as described below. Space out casing as close to TD as possible.

Pump cement as detailed below. Note cement volume circulated to surface.

Casing Specs:	Size (in)	Wt (lb/ft)	Grade	Conn.	Collapse (psi)	Burst (psi)	Tens. Body (lbs)	Tens. Conn (lbs)
Specs	7.000	20.0	J-55	LTC	2,270	3,740	316,000	234,000
Loading					313	1,500	115,993	115,993
Min. S.F.					7.25	2.49	2.72	2.02

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient in the annulus



Burst: 1,500 psi maximum surface pressure during pressure test with 8.4 ppg fluid in the casing  
Tension: buoyed weight in 8.4 ppg fluid with 100,000 lbs over-pull

MU Torque (ft lbs): Minimum: 2,350 Optimum: 3,130 Maximum: 3,910

Casing Details: Float shoe, float collar, 1 jt casing, float collar, casing to surface

Centralizers: 2 centralizers per joint stop-banded 10' from each collar on bottom 3 joints, 1 centralizer per joint to surface

Cement:	Type	Weight (ppg)	Yield (cuft/sk)	Water (gal/sk)	% Excess	Planned TOC (ft MD)	Total Cmt (sx)
Lead	G:POZ blend	12.3	1.987	10.16	75%	0	47
Tail	G:POZ blend	13.3	1.354	5.94	25%	320	83

Annular Capacity 0.1668 cuft/ft (9-5/8" casing x 7" casing annulus)  
0.1503 cuft/ft (8-3/4" hole x 7" casing annulus)

Calculated cement volumes assume gauge hole and the excess noted in table  
Halliburton ECONOCEM & EXTENDACEM cementing blend

**PRODUCTION:** Drill to TD following directional plan, land in Fruitland Coal, run pre-perforated liner

917 ft (MD)	to	3,855 ft (MD)	Hole Section Length:	2,938 ft
717 ft (TVD)	to	710 ft (TVD)	Casing Required:	2,938 ft

Fluid:	Type	MW (ppg)	FL (mL/30')	PV (cp)	YP (lb/100 ft <sup>2</sup> )	pH	Comments
	WBM	8.4	20	8 - 14	8 - 14	9.0 - 9.5	

Hole Size: 6-1/8"

Bit / Motor: PDC or TCI w/mud motor

MWD / Survey: MWD with inclination and azimuth in 100' stations (minimum) for entire lateral, GR

Logging: GR MWD

Procedure: NU BOPE and test (as noted above); pressure test 7" casing to 1,500 psi for 30 minutes.  
Drill to lateral TD. Condition hole as needed for casing running. TOH. Run 4-1/2" pre-perforated liner and pump off sub. Space out liner as close to TD as possible. Pump off liner. TOH.

Casing Specs:	Size (in)	Wt (lb/ft)	Grade	Conn.	Collapse (psi)	Burst (psi)	Tens. Body (lbs)	Tens. Conn (lbs)
Specs	4.500	10.5	J-55	LTC	4,010	4,790	165,000	132,000
Loading					313	1,500	110,298	110,298
Min. S.F.					12.80	3.19	1.50	1.20

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient in the annulus  
Burst: 1,500 psi maximum surface pressure with 8.4 ppg internal and external pressure gradients  
Tension: buoyed weight in 8.4 ppg fluid with 75,000 lbs over-pull

MU Torque (ft lbs): Minimum: 1,220 Optimum: 1,620 Maximum: 2,030

Casing Details: Guide shoe, pre-perforated casing, 2 joints blank pipe, liner pump off tools

**FINISH WELL:** ND BOP, NU WH, RDMO.

Procedure: ND BOP. Install WH. RDMO.

#### COMPLETION AND PRODUCTION PLAN:

**Completion:** Run production tubing. Swab to kick well off. Run artificial lift equipment as required to unload well.

**Production:** Well will produce up 2-3/8" or 2-7/8" production tubing

#### ESTIMATED START DATES:

Drilling: 11/1/2017  
Completion: 11/11/2017  
Production: 11/13/2017

Prepared by: Alec Bridge 9/24/2018



# **Enduring Resources LLC**

**San Juan Basin - Lone Mesa Unit**

**Lone Mesa Unit 001H Pad**

**001H**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**08 October, 2018**





# Planning Report

Database:	EDM	Local Co-ordinate Reference:	Well 001H
Company:	Enduring Resources LLC	TVD Reference:	KB @ 6770.0usft (Original Well Elev)
Project:	San Juan Basin - Lone Mesa Unit	MD Reference:	KB @ 6770.0usft (Original Well Elev)
Site:	Lone Mesa Unit 001H Pad	North Reference:	Grid
Well:	001H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	San Juan Basin - Lone Mesa Unit		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	Lone Mesa Unit 001H Pad, San Juan County, New Mexico		
Site Position:		Northing:	1,858,812.74 usft
From:	Lat/Long	Easting:	2,766,896.31 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	36.108471°N
		Longitude:	107.685035°W
		Grid Convergence:	0.09 °

Well	001H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
		Latitude:	36.108471°N
		Longitude:	107.685035°W
		Ground Level:	6,756.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.94	62.98	50,553.37874335

Design	Design #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	269.97

Plan Survey Tool Program	Date	10/8/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	3,854.8	Design #1 (Wellbore #1)	MWD
				OWSG MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
320.0	0.00	0.00	320.0	0.0	0.0	0.00	0.00	0.00	0.00	
350.0	0.00	0.00	350.0	0.0	0.0	0.00	0.00	0.00	0.00	
367.9	0.00	0.00	367.9	0.0	0.0	0.00	0.00	0.00	0.00	
917.1	90.14	269.97	717.0	-0.2	-349.9	16.41	16.41	0.00	269.97	
917.2	90.14	269.97	717.0	-0.2	-350.0	0.00	0.00	0.00	0.00	001H - POE
3,854.8	90.14	269.97	709.8	-1.6	-3,287.6	0.00	0.00	0.00	0.00	001H - BHL



# Planning Report

<b>Database:</b>	EDM	<b>Local Co-ordinate Reference:</b>	Well 001H
<b>Company:</b>	Enduring Resources LLC	<b>TVD Reference:</b>	KB @ 6770.0usft (Original Well Elev)
<b>Project:</b>	San Juan Basin - Lone Mesa Unit	<b>MD Reference:</b>	KB @ 6770.0usft (Original Well Elev)
<b>Site:</b>	Lone Mesa Unit 001H Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	001H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

## Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
350.0	0.00	0.00	350.0	0.0	0.0	0.0	0.00	0.00	0.00
367.9	0.00	0.00	367.9	0.0	0.0	0.0	0.00	0.00	0.00
400.0	5.27	269.97	400.0	0.0	-1.5	1.5	16.41	16.41	0.00
500.0	21.68	269.97	496.9	0.0	-24.7	24.7	16.41	16.41	0.00
600.0	38.09	269.97	583.3	0.0	-74.3	74.3	16.41	16.41	0.00
700.0	54.51	269.97	652.1	-0.1	-146.4	146.4	16.41	16.41	0.00
800.0	70.92	269.97	697.8	-0.1	-235.0	235.0	16.41	16.41	0.00
900.0	87.33	269.97	716.6	-0.2	-332.8	332.8	16.41	16.41	0.00
917.1	90.14	269.97	717.0	-0.2	-349.9	349.9	16.41	16.41	0.00
917.2	90.14	269.97	717.0	-0.2	-350.0	350.0	0.00	0.00	0.00
1,000.0	90.14	269.97	716.8	-0.2	-432.8	432.8	0.00	0.00	0.00
1,100.0	90.14	269.97	716.6	-0.3	-532.8	532.8	0.00	0.00	0.00
1,200.0	90.14	269.97	716.3	-0.3	-632.8	632.8	0.00	0.00	0.00
1,300.0	90.14	269.97	716.1	-0.4	-732.8	732.8	0.00	0.00	0.00
1,400.0	90.14	269.97	715.8	-0.4	-832.8	832.8	0.00	0.00	0.00
1,500.0	90.14	269.97	715.6	-0.4	-932.8	932.8	0.00	0.00	0.00
1,600.0	90.14	269.97	715.3	-0.5	-1,032.8	1,032.8	0.00	0.00	0.00
1,700.0	90.14	269.97	715.1	-0.5	-1,132.8	1,132.8	0.00	0.00	0.00
1,800.0	90.14	269.97	714.8	-0.6	-1,232.8	1,232.8	0.00	0.00	0.00
1,900.0	90.14	269.97	714.6	-0.6	-1,332.8	1,332.8	0.00	0.00	0.00
2,000.0	90.14	269.97	714.4	-0.7	-1,432.8	1,432.8	0.00	0.00	0.00
2,100.0	90.14	269.97	714.1	-0.7	-1,532.8	1,532.8	0.00	0.00	0.00
2,200.0	90.14	269.97	713.9	-0.8	-1,632.8	1,632.8	0.00	0.00	0.00
2,300.0	90.14	269.97	713.6	-0.8	-1,732.8	1,732.8	0.00	0.00	0.00
2,400.0	90.14	269.97	713.4	-0.9	-1,832.8	1,832.8	0.00	0.00	0.00
2,500.0	90.14	269.97	713.1	-0.9	-1,932.8	1,932.8	0.00	0.00	0.00
2,600.0	90.14	269.97	712.9	-1.0	-2,032.8	2,032.8	0.00	0.00	0.00
2,700.0	90.14	269.97	712.6	-1.0	-2,132.8	2,132.8	0.00	0.00	0.00
2,800.0	90.14	269.97	712.4	-1.1	-2,232.8	2,232.8	0.00	0.00	0.00
2,900.0	90.14	269.97	712.2	-1.1	-2,332.8	2,332.8	0.00	0.00	0.00
3,000.0	90.14	269.97	711.9	-1.2	-2,432.8	2,432.8	0.00	0.00	0.00
3,100.0	90.14	269.97	711.7	-1.2	-2,532.8	2,532.8	0.00	0.00	0.00
3,200.0	90.14	269.97	711.4	-1.3	-2,632.8	2,632.8	0.00	0.00	0.00
3,300.0	90.14	269.97	711.2	-1.3	-2,732.8	2,732.8	0.00	0.00	0.00
3,400.0	90.14	269.97	710.9	-1.4	-2,832.8	2,832.8	0.00	0.00	0.00
3,500.0	90.14	269.97	710.7	-1.4	-2,932.8	2,932.8	0.00	0.00	0.00
3,600.0	90.14	269.97	710.4	-1.5	-3,032.8	3,032.8	0.00	0.00	0.00
3,700.0	90.14	269.97	710.2	-1.5	-3,132.8	3,132.8	0.00	0.00	0.00
3,800.0	90.14	269.97	710.0	-1.5	-3,232.8	3,232.8	0.00	0.00	0.00
3,854.8	90.14	269.97	709.8	-1.6	-3,287.6	3,287.6	0.00	0.00	0.00





## Planning Report

Database: EDM  
Company: Enduring Resources LLC  
Project: San Juan Basin - Lone Mesa Unit  
Site: Lone Mesa Unit 001H Pad  
Well: 001H  
Wellbore: Wellbore #1  
Design: Design #1

Local Co-ordinate Reference: Well 001H  
TVD Reference: KB @ 6770.0usft (Original Well Elev)  
MD Reference: KB @ 6770.0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

### Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
001H - KOP - plan hits target center - Point	0.00	0.00	350.0	0.0	0.0	1,858,812.74	2,766,896.31	36.108471°N	107.685035°W
001H - BHL - plan misses target center by 1.5usft at 3854.8usft MD (709.8 TVD, -1.6 N, -3287.6 E) - Point	0.00	0.00	710.0	-0.1	-3,287.6	1,858,812.64	2,763,608.70	36.108484°N	107.696165°W
001H - POE - plan hits target center - Point	0.00	0.00	717.0	-0.2	-350.0	1,858,812.57	2,766,546.28	36.108472°N	107.686220°W

### Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
320.0	320.0	9 5/8"	9-5/8	12-1/4
919.0	717.0	7"	7	8-3/4



Enduring Resources LLC

Directional Drilling Plan  
Plan View & Section View

Lone Mesa Unit 001H

San Juan County, New Mexico

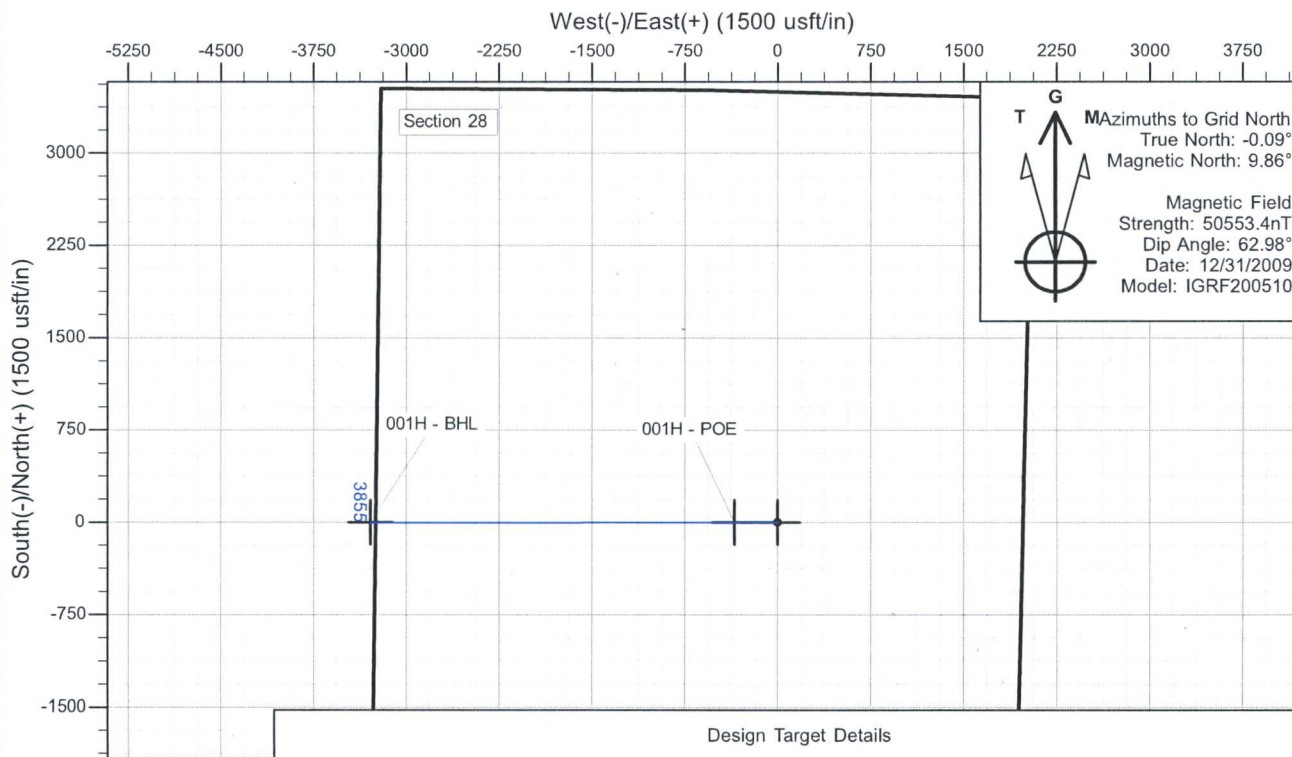
T22N, R08W, Sec.28

Surface Latitude: 36.108471°N

Surface Longitude: 107.685035°W

Ground Level: 6756.0

Reference Elevation: KB @ 6770.0usft (Original Well Elev)

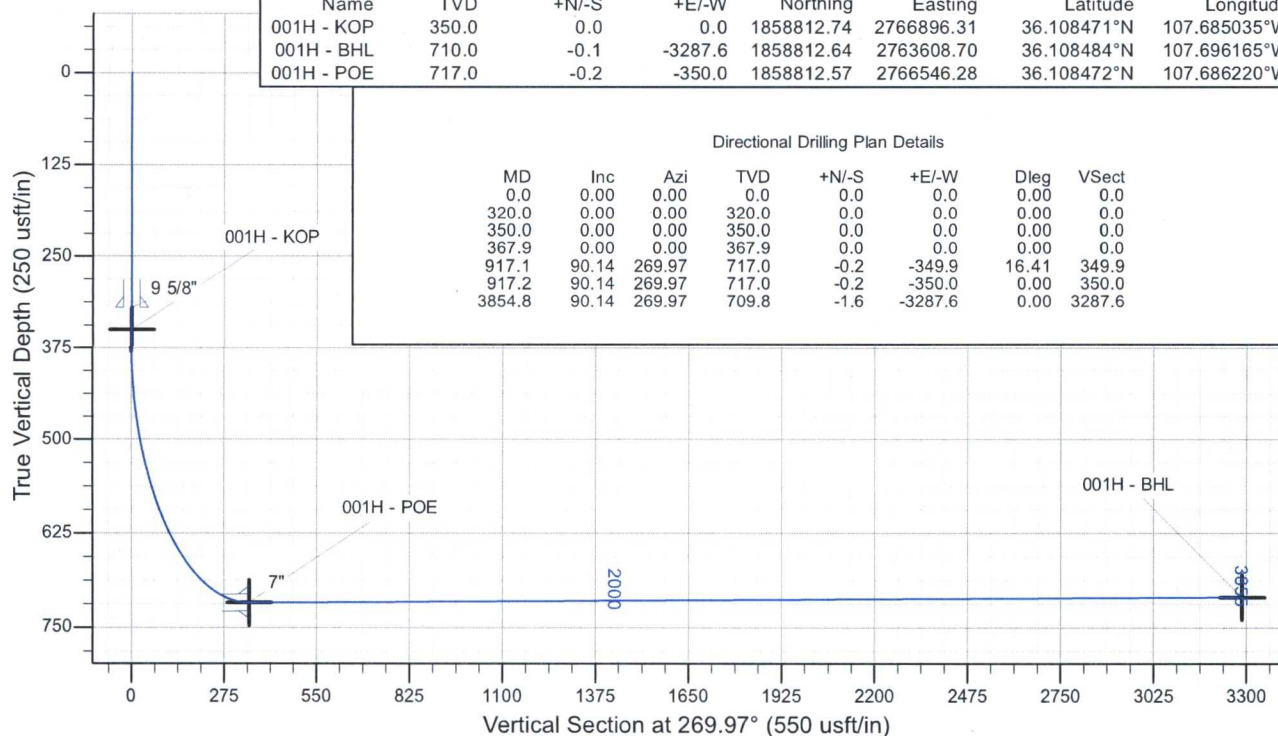


Design Target Details

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
001H - KOP	350.0	0.0	0.0	1858812.74	2766896.31	36.108471°N	107.685035°W
001H - BHL	710.0	-0.1	-3287.6	1858812.64	2763608.70	36.108484°N	107.696165°W
001H - POE	717.0	-0.2	-350.0	1858812.57	2766546.28	36.108472°N	107.686220°W

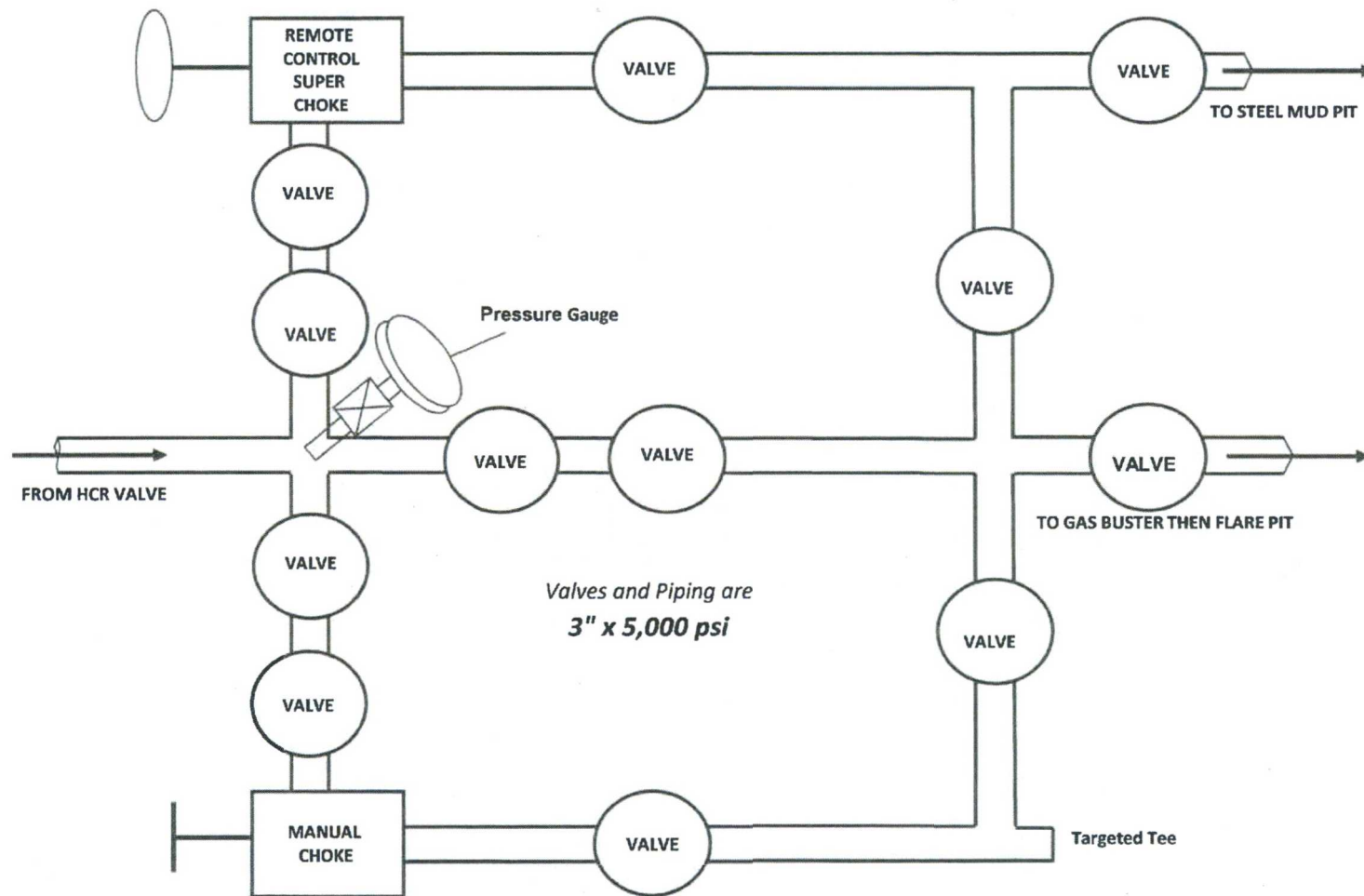
Directional Drilling Plan Details

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
320.0	0.00	0.00	320.0	0.0	0.0	0.00	0.0
350.0	0.00	0.00	350.0	0.0	0.0	0.00	0.0
367.9	0.00	0.00	367.9	0.0	0.0	0.00	0.0
917.1	90.14	269.97	717.0	-0.2	-349.9	16.41	349.9
917.2	90.14	269.97	717.0	-0.2	-350.0	0.00	350.0
3854.8	90.14	269.97	709.8	-1.6	-3287.6	0.00	3287.6

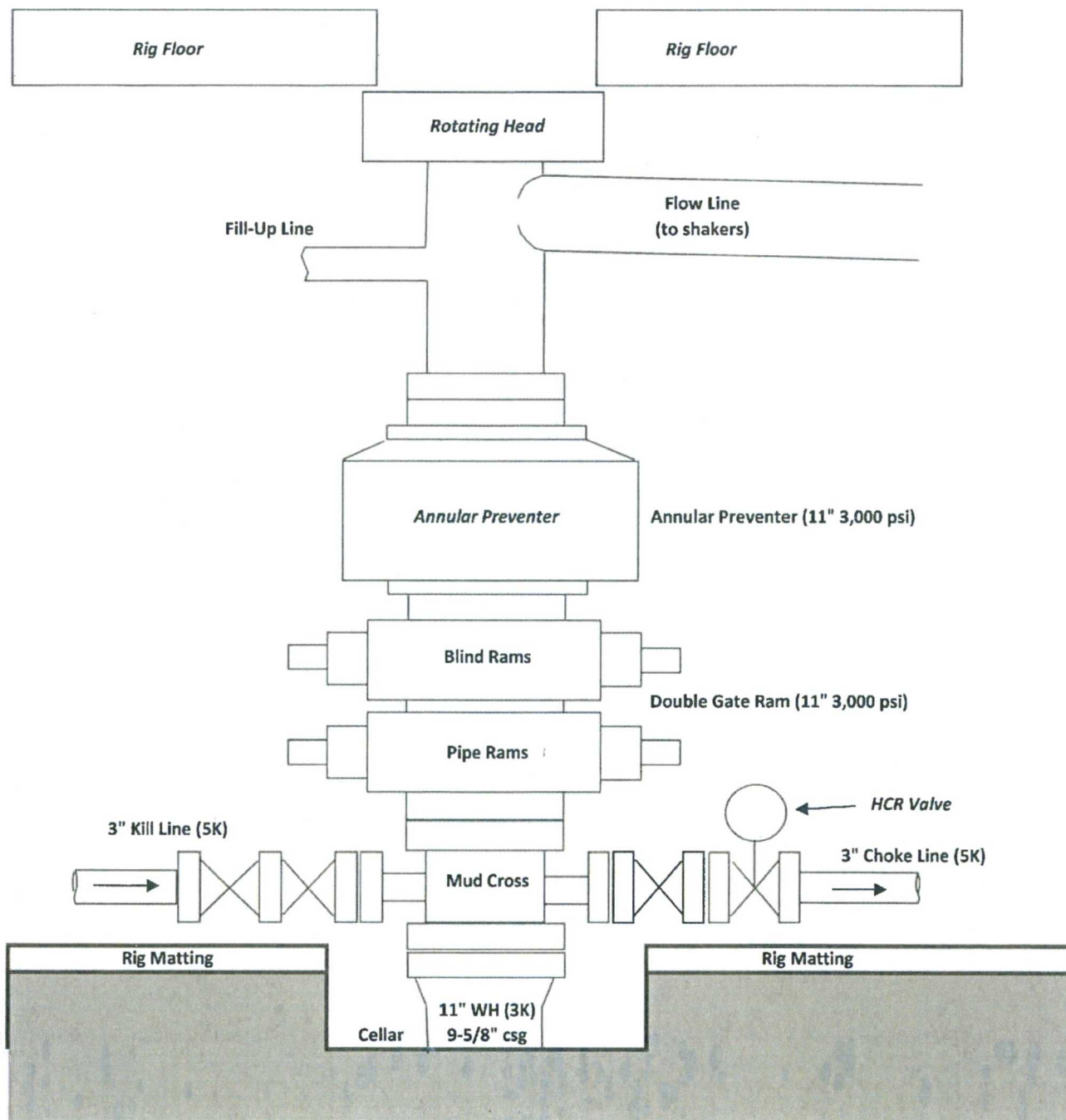




## CHOKE MANIFOLD DIAGRAM



## BOPE DIAGRAM





**Directions from the Intersection of US Hwy 550 & US Hwy 64**  
**in Bloomfield, NM to Enduring Resources, LLC Lone Mesa Unit #001H**  
**1863' FSL & 1936' FEL, Section 28, T22N, R8W, N.M.P.M., San Juan County, NM**

**Latitude: 36.108471°N Longitude: 107.685035°W Datum: NAD1983**

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, travel Southerly on US Hwy 550 for 38.7 miles to Mile Marker 112.7;

Go Right (Southerly) on County Road #7900 for 5.2 miles to fork in road at County Road #7950;

Go Straight (South-easterly) remaining on County Road #7900 for 5.2 miles to fork in road;

Go Right (Westerly) exiting County Road #7900 onto County Road #7970 for 1.5 miles to new access on right-hand side of existing roadway which continues for 197.3' to staked Enduring Lone Mesa Unit #001H location.