State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval, 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: 2/28/2019
Well information;
Operator Enduring, Well Name and Number NE New Mexico COM 316H 1

API# 30-039-31378, Section 13, Township 23 N/S, Range 7 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.

* Comply with SWD Order # 2314

NMOCD Approved by Signature

2/12/20
Date

Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMSF0078360

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☐ Oil Well ☐ Gas Well ☑ Other INJ-DIS

1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☑ Multiple Zone

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

8. Lease Name and Well No.
NE CHACO COM SWD
001

2. Name of Operator
ENDURING RESOURCES LLC

9. API Well No.
30-039-31378

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
NE CHACO COM SWD / ENTRADA

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

At surface S NWSE / 2335 FSL / 2559 FEL / LAT 36.224758 / LONG -107.527298

At proposed prod. zone

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 13 / T23N / R7W / NMP

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

12. County or Parish
RIO ARRIBA

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
20 feet

16. No of acres in lease
2565.24

17. Spacing Unit dedicated to this well
640

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.
2335 feet

19. Proposed Depth

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
6965 feet

22. Approximate date work will start*
05/01/2019

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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Lacey Granillo / Ph: (505)947-1704	02/28/2019

Title
Permitting Specialist

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Dave Mankiewicz / Ph: (505)564-7761	08/19/2019

Title	Office
AFM-Minerals	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.

NMOCD COPY

APPROVED WITH CONDITIONS

Approval Date: 08/19/2019

NMOCD
AUG 19 2019
DISTRICT III

(Continued on page 2)

*(Instructions on page 2)

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: (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 Drive, 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. Francis Drive
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to Appropriate District Office

☐ AMENDED REPORT

NMOCD

AUG 22 2019

DISTRICT III

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-039-31378	96436	SWD;ENTRADA

4 Property Code	5 Property Name	6 Well Number
326074	NE CHACO COM SWD	001

7 OGRID No.	8 Operator Name	9 Elevation
372286	ENDURING RESOURCES, LLC	6965'

10 Surface Location

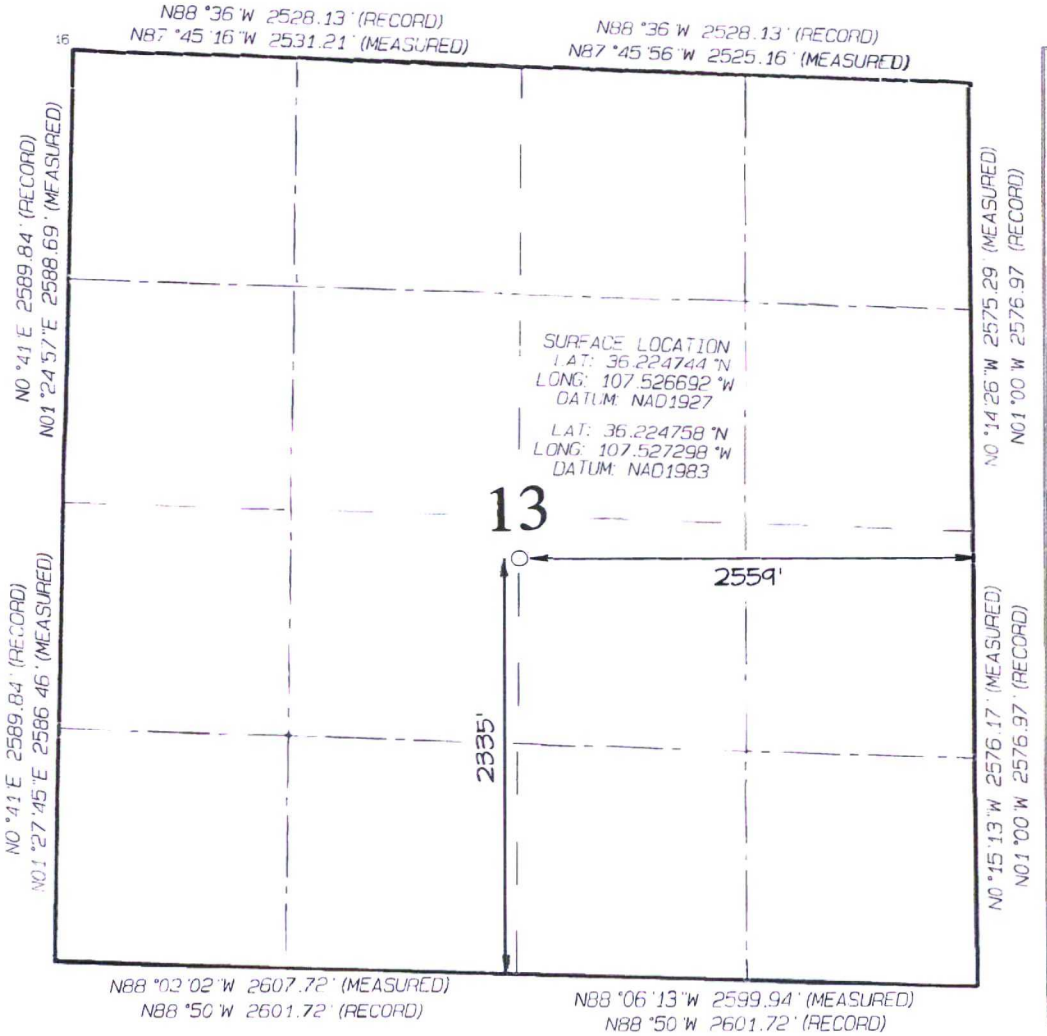
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	13	23N	7W		2335	SOUTH	2559	EAST	RIO ARRIBA

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

12 Dedicated Acres		13 Joint or Infill	14 Consolidation Code	15 Order No.
640.00	Entire Section			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



17 OPERATOR CERTIFICATION

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

Signature — Date: 4/11/19

Lacey Granillo
Printed Name

lgranillo@enduringresources.com
E-mail Address

18 SURVEYOR CERTIFICATION

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

Date Revised: DECEMBER 20, 2018
Survey Date: SEPTEMBER 15, 2018

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

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

DRILLING PLAN: *Drill, complete, and equip salt water disposal well in the Entrada formation*

WELL INFORMATION:

Name: NE CHACO COM SWD 001
API Number: 30-043-#####
AFE Number: DV0####
ER Well Number: NM0#####.##
State: New Mexico
County: Rio Arriba
Surface Elevation: 6,965 ft ASL (GL) 6,983 ft ASL (KB)
Surface Location: 13-23N-07W Sec-Twn-Rng 2335 ft FSL 2559 ft FEL
36.224758 ° N latitude 107.527298 ° W longitude (NAD 83)
BH Location: 13-23N-07W Sec-Twn-Rng 2335 ft FSL 2559 ft FEL
36.224758 ° N latitude 107.527298 ° W longitude (NAD 83)
Driving Directions: From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM: south on Hwy 550 for 50.1 miles to MM 101.9, right (south) exiting Hwy 550 for 275', left on access road for 190' to NE Chaco SWD 001 location.

GEOLOGIC AND RESERVOIR INFORMATION:

Prognosis:

	Formation Tops	TVD (ft ASL)	TVD (ft KB)	MD (ft KB)	O / G / W	Pressure
	Ojo Alamo	5,670	1,313	1,313	W	normal
	Kirtland	5,533	1,450	1,450	W	normal
	Fruitland	5,330	1,653	1,653	G, W	sub
	Pictured Cliffs	5,045	1,938	1,938	G, W	sub
	Lewis	4,940	2,043	2,043	G, W	normal
	Chacra	4,240	2,743	2,743	G, W	normal
	Cliff House	3,535	3,448	3,448	G, W	sub
	Menefee	3,510	3,473	3,473	G, W	normal
	Point Lookout	2,730	4,253	4,253	G, W	normal
Mancos Shale	Mancos	2,500	4,483	4,483	O,G,W	sub (~0.38)
	MNCS_Cms	1,920	5,063	5,063	O,G,W	sub (~0.38)
	MNCS_G**	1,595	5,388	5,388	O,G,W	sub (~0.38)
	MNCS_I**	1,460	5,523	5,523	O,G,W	sub (~0.38)
	Basal Niobrara Unconf.**	1,400	5,583	5,583	O,G,W	normal
	Juana Lopez	1,135	5,848	5,848	O,G,W	normal
	Greenhorn	790	6,193	6,193	O,G,W	normal
	Graneros	742	6,241	6,241	O,G,W	normal
	Dakota	700	6,283	6,283	O,G,W	normal
	Burro Canyon	420	6,563	6,563	O,G,W	normal
Morrison	Brushy Basin	340	6,643	6,643	O,G,W	normal
	Bluff Sandstone	20	6,963	6,963	O,G,W	normal
	Salt Wash Basin	-150	7,133	7,133	O,G,W	normal
	Summerville	-390	7,373	7,373	O,G,W	normal
	Todilto	-450	7,433	7,433	O,G,W	normal
	Entrada	-475	7,458	7,458	O,G,W	normal
	Chinle	-685	7,668	7,668	O,G,W	normal
	TOTAL DEPTH*	-835	7,818	7,818	O,G,W	normal

Surface: San Jose
Oil & Gas Zones: Several gas bearing zones will be encountered; target formation is the Entrada
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:	3,300	psi
	Maximum anticipated surface pressure, assuming partially evacuated hole:	1,620	psi
Temperature:	Maximum anticipated BHT is 170° F or less		

adjust TD as necessary to allow for ~150' of rathole from bottom of Entrada formation to PBTD (float collar).
***** offset horizontal wells in section produce from these zones; be aware of potential lost-circulation***

H_2S INFORMATION:

H_2S 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, cuttings sampling, and gas detection from drillout of 9-5/8" casing to TD
MWD / LWD: Deviation survey in surface section, GR and MWD surveys in 100' stations in production section
Open Hole Logs: Triple Combo Log from TD of 8-3/4" hole to surface
Testing: None planned
Coring: None planned
Cased Hole Logs: CBL on 7" casing from PBTD to surface

DRILLING RIG INFORMATION:

Contractor: Aztec Drilling
Rig No.: 777
Draw Works: Loadcraft 224DDR
Mast: Loadcraft (116ft, 410,000 lbs, 10 lines)
Top Drive: Tesco 250 ton
Prime Movers: 2 - CAT C-15

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 minimimize 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, run casing, install wellhead, cement casing to surface.*

0 ft (MD)	to	500 ft (MD)	Hole Section Length:	500 ft
0 ft (TVD)	to	500 ft (TVD)	Casing Required:	500 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: Mill Tooth or PDC, no motor

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

Logging: None

Procedure: Drill to TD. Run deviation survey in 100' stations from TD to surface. Wiper trip. Condition hole and fluid for casing running. TOH. Run casing and pump cement as detailed below. Monitor returns during cement job and note cement volume to surface. Notify Engineering and Regulatory Departments, BLM, and NMOCD if cement is not circulated to surface. Install API wellhead. Cement must achieve 500 psi compressive strength before drilling out.

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					218	1,649	115,697	115,697
Min. S.F.					9.25	2.14	4.87	3.92

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient
Burst: maximum anticipated surface pressure or maximum test pressure with 9.5 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): *Minumum: N/A Optimum: N/A Maximum: N/A*
Make-up as per API Buttress Connection running procedure.

Casing Details: Guide shoe, float collar, 1 jt casing, float collar, landing collar, casing to surface, API-certified 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	267

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

PRODUCTION: *Drill to TD, run OH logs, run casing, cement casing to surface.*

500 ft (MD)	to	7,818 ft (MD)	Hole Section Length:	7,318 ft

500 ft (TVD)	to	7,818 ft (TVD)	Casing Required:	7,818 ft

Fluid:	Type	MW (ppg)	FL (mL/30')	PV (cp)	YP (lb/100 ft^2)	pH	Comments
	LSND	8.8 - 9.5	20	8 - 14	8 - 14	9.0 - 9.5	

Hole Size: 8-3/4"

Bit / Motor: PDC w/mud motor

MWD / Survey: GR and MWD with surveys in 100' stations

Logging: Triple Combo from TD to surface casing shoe

Procedure: NU BOPE and test (as noted above); pressure test 9-5/8" casing to 1,500 psi for 30 minutes. Drill vertically to TD. After reaching TD, condition hole as needed for logs and casing running. Run OH logs from TD to surface. 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. Notify Engineering and Regulatory Departments, BLM, and NMOCD if cement is not 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	26.0	HCL-80	LTC	7,800	7,240	604,000	570,000
Loading					3,415	5,138	276,010	276,010
Min. S.F.					**2.28**	**1.41**	**2.19**	**2.07**

*Assumptions: **Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient in the annulus***
Burst: 4,000 psi maximum surface treating pressure with 11.2 ppg equivalent mud weight sand laden fluid during fracturing operations with 8.4 ppg equivalent external pressure gradient
Tension: buoyed weight in 8.8 ppg fluid with 100,000 lbs over-pull

MU Torque (ft lbs): *Minumum: 3,830 Optimum: 5,110 Maximum: 6,390*

Casing Details: Float shoe, float collar, 2 jts casing, float collar, casing to surface with 1 - 20' marker joint spaced 100' above Entrada top

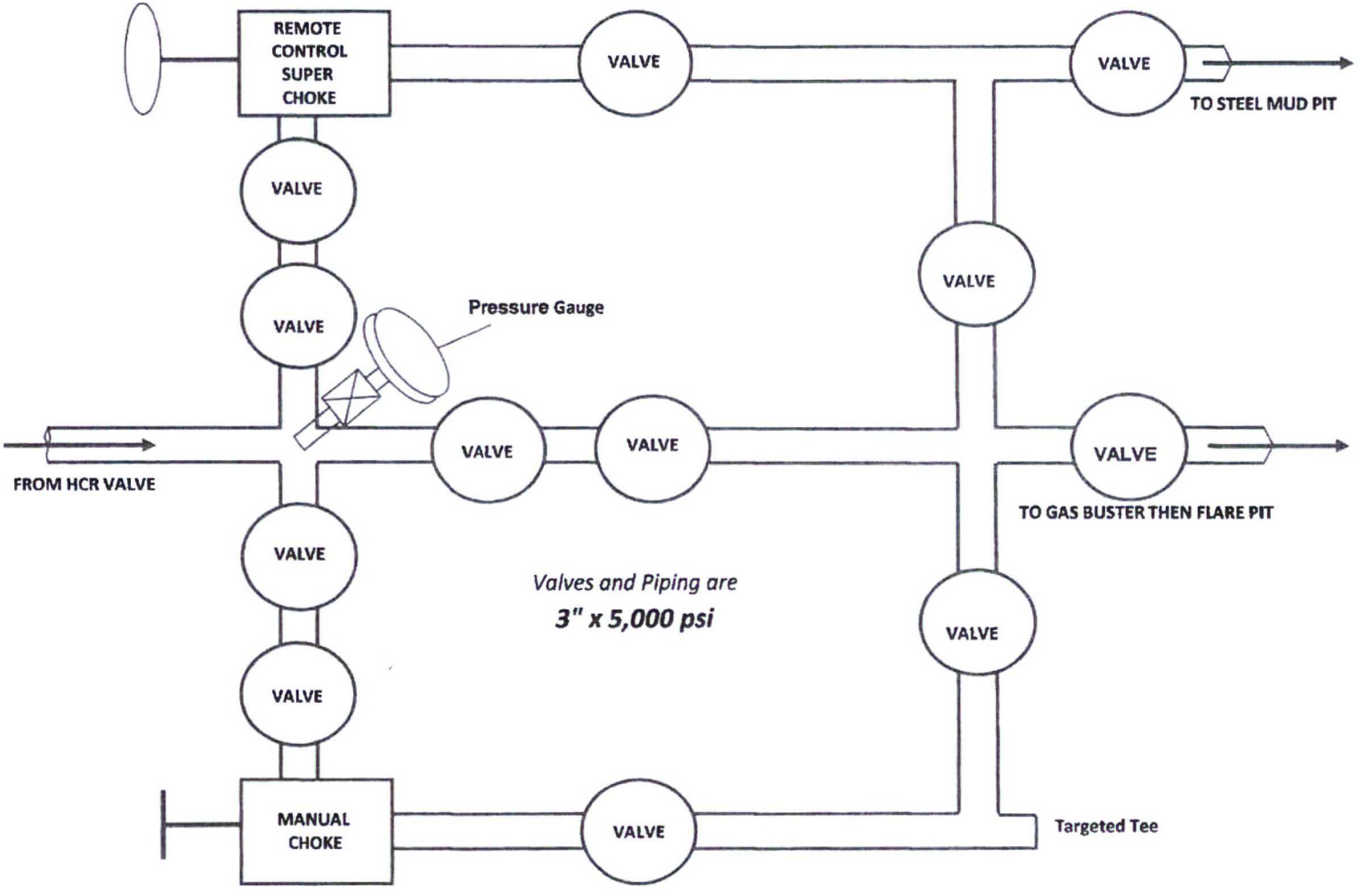
Centralizers: 2 centralizers per jt stop-banded 10' from each collar on bottom 3 jts, 1 centralizer per joint to 500' above the Entrada top, 1 centralizer per 2 jts to surface

DV Tool: The use of DV Tool is not planned at this time. A DV Tool may be used as a contingency if hole conditions warrant.

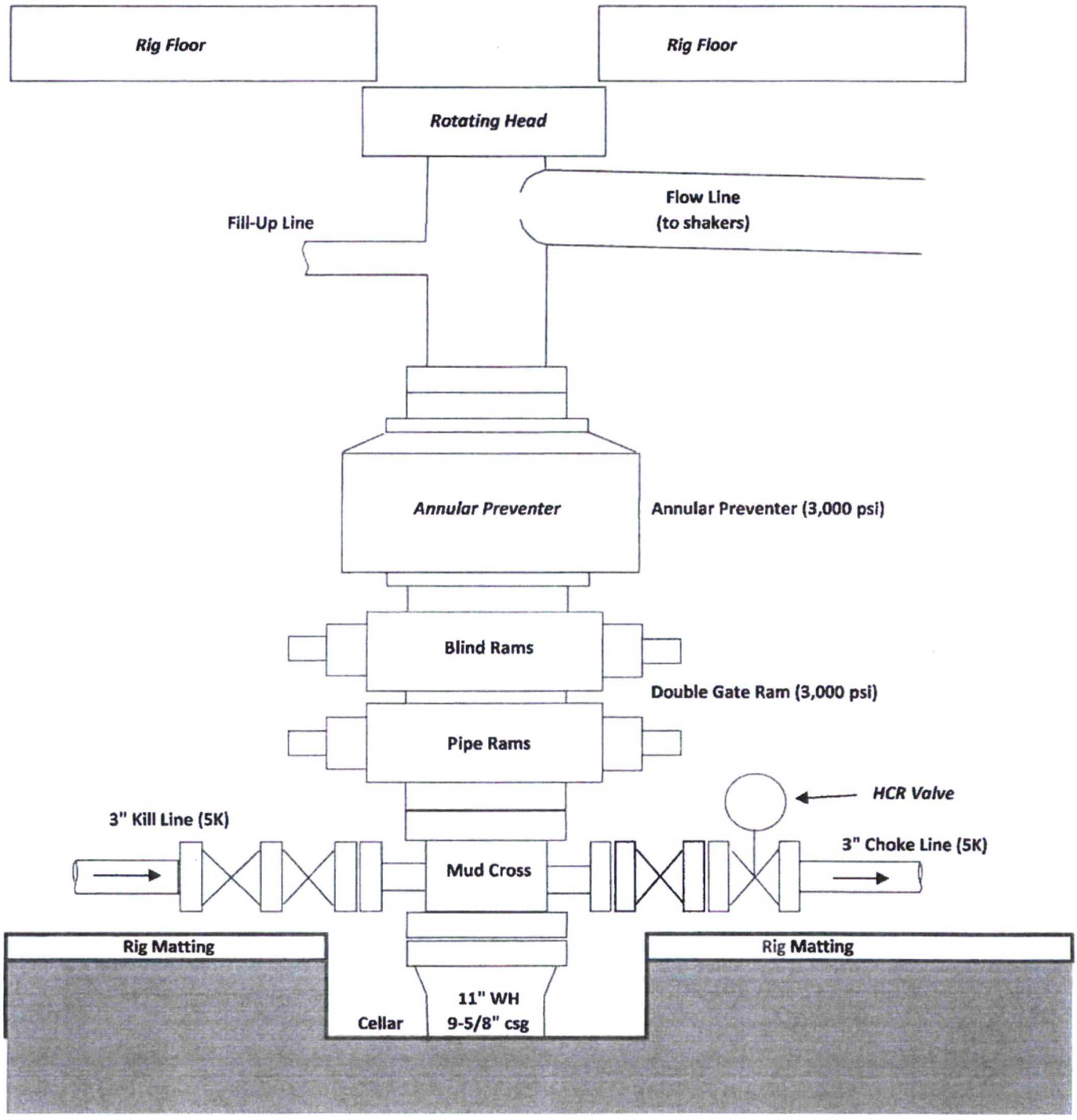
Cement:	Type	Weight (ppg)	Yield (cuft/sk)	Water (gal/sk)	% Excess	Planned TOC (ft MD)	Total Cmt (sx)
Lead	G:POZ blend	12.3	1.987	10.16	40%	0	481
Tail	G:POZ blend	13.3	1.354	5.94	10%	4,483	407

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

CHOKE MANIFOLD DIAGRAM



BOPE DIAGRAM



Directions from the Intersection of US Hwy 550 & US Hwy 64

in Bloomfield, NM to Enduring resources, LLC NE Chaco Com SWD #001

2335' FSL & 2559' FEL, Section 13, T23N, R7W, N.M.P.M., Rio Arriba County, NM

Latitude: 36.224758°N Longitude: 107.527298°W Datum: NAD1983

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, travel Southerly on US Hwy 550 for 50.1 miles to Mile Marker 101.9;

Go Right (Southerly) exiting Highway #550 for approx. 275' to begin proposed access on left-hand side of roadway, which continues for 190.5' to staked Enduring NE Chaco Com SWD #001 location.