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.: NMNM0031186

6. If Indian, Allotee or Tribe Name:

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

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

8. Lease Name and Well No.: HAWK 9 FEDERAL COM 2H

2. Name of Operator: LIME ROCK RESOURCES II A LP

9. API Well No.: 30 015 46977

3a. Address: 1111 Bagby Street, Suite 4600, Houston, TX 77002

3b. Phone No. *(include area code)*: (713) 292-9500

10. Field and Pool, or Exploratory: RED LAKE/GLORIETA YESO

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

At surface: NENE / 387 FNL / 373 FEL / LAT 32.7684682 / LONG -104.2931893

At proposed prod. zone: NENE / 820 FNL / 100 FEL / LAT 32.7673124 / LONG -104.2752026

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 8/T18S/R27E/NMP

14. Distance in miles and direction from nearest town or post office*: 8 miles

12. County or Parish: EDDY

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 373 feet

16. No of acres in lease: 160

17. Spacing Unit dedicated to this well: 160.0

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 40 feet

19. Proposed Depth: 3580 feet / 8877 feet

20. BLM/BIA Bond No. in file: FED: NMB000797

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3477 feet

22. Approximate date work will start*: 12/01/2019

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)	Brian Wood / Ph: (713) 292-9500	09/25/2019

Title: President

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Christopher Walls / Ph: (575) 234-2234	04/01/2020

Title	Office
Petroleum Engineer	Carlsbad Field Office

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.

Entered 04/06/2020 - Kurt Simmons NMOCD

APPROVED WITH CONDITIONS

Approval Date: 04/01/2020

(Continued on page 2)

*(Instructions on page 2)

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. Francis Dr.
Santa Fe, NM 87505

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
30-015- 46977	51120	RED LAKE; GLORIETA-YESO

[4] Property Code	[5] Property Name	[6] Well Number
327299	HAWK 9 FEDERAL COM	2H

[7] OGRID No.	[8] Operator Name	[9] Elevation
277558	LIME ROCK RESOURCES II-A, L.P.	3477.1

[10] Surface Location

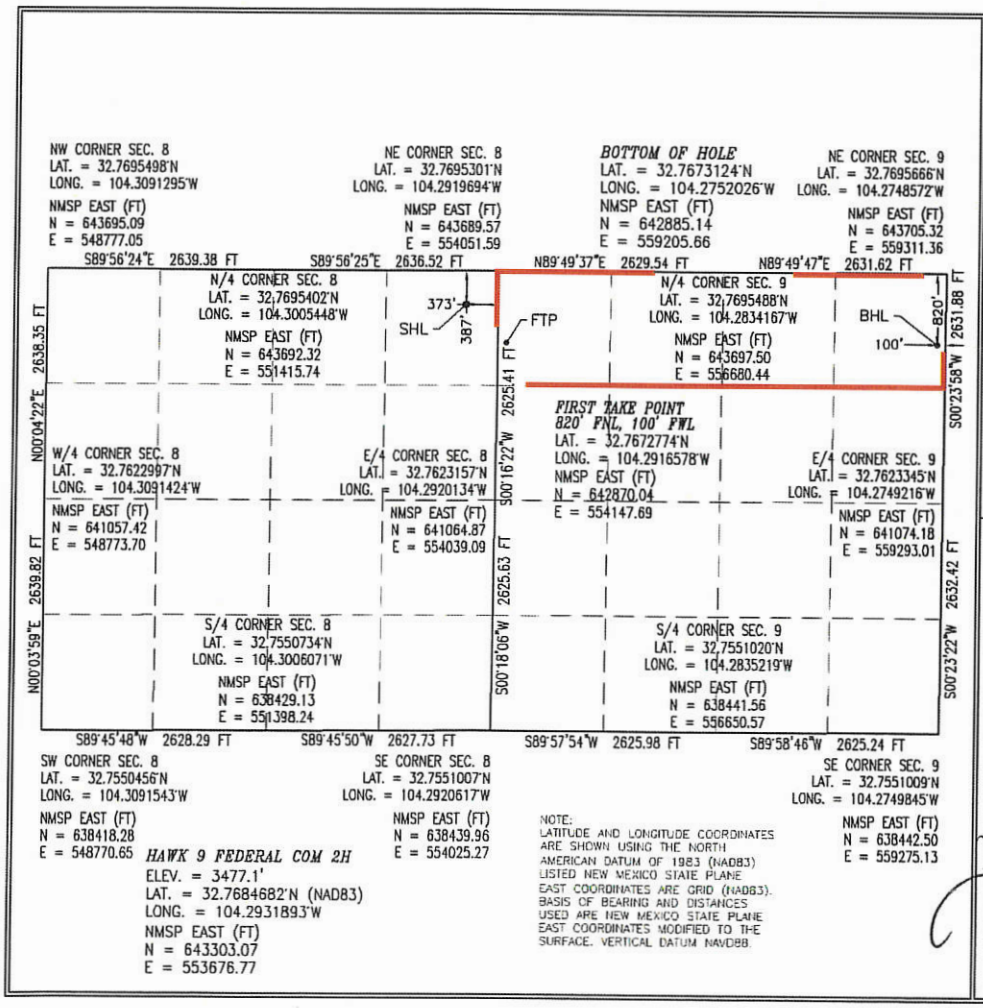
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	8	18 S	27 E		387	NORTH	373	EAST	EDDY

[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
A	9	18 S	27 E		820	NORTH	100	EAST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
160.00		C	

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: 9-24-19

Printed Name: BRIAN WOOD

E-mail Address: brian@permitswest.com

505 466-8120

[18] SURVEYOR CERTIFICATION

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

Date of Survey: JUNE 12, 2019

FILIMON F. JARAMILLO — NEW MEXICO — REGISTERED PROFESSIONAL SURVEYOR

Signature and Seal of Professional Surveyor:

Certificate Number: FILIMON F. JARAMILLO, PLS 12797

SURVEY NO. 7035

District I
1625 N. French Dr., Hobbs, NM 88240
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District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: 9-22-19

X Original
□ Amended - Reason for Amendment:

Operator & OGRID No.: Lime Rock Resources II-A, L. P. (277558)

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	SHL (ULSTR)	SHL Footages	Expected MCF/D	Flared or Vented	Comments
Hawk Federal Com 1H	30-015-	A-8-18s-27e	347' FNL & 373' FEL	100	<30 days	flare until well clean, then connect
Hawk Federal Com 2H	30-015-	A-8-18s-27e	387' FNL & 373' FEL	100	<30 days	flare until well clean, then connect

Gathering System and Pipeline Notification

Gas line will be laid 532.3' to DCP line in A-8-18s-27e. Well will be connected after flowback operations are complete. Operator will provide (periodically) to DCP a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Operator and Gas Transporter will have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at DCP's Processing Plant. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the well will be turned to production facilities. Gas sales should start as soon as the well starts flowing through the production facilities, unless there are operational issues on Gas Transporter system at that time. Based on current information, it is Operator's belief the system ultimately can take this gas upon completion of the well.

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
  - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
  - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
  - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

Drilling Plan Data Report

04/02/2020

APD ID: 10400047991 **Submission Date:** 09/25/2019

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
546358	YATES	3477	0	0	GYPSUM	NONE	N
546359	SEVEN RIVERS	3327	150	150	DOLOMITE	NATURAL GAS, OIL	N
546360	QUEEN	2783	694	694	SANDSTONE	NATURAL GAS, OIL	N
546361	GRAYBURG	2448	1029	1029	DOLOMITE	NATURAL GAS, OIL	N
546362	PREMIER	2224	1253	1253	SANDSTONE	NATURAL GAS, OIL	N
546363	SAN ANDRES	2183	1294	1294	DOLOMITE	NATURAL GAS, OIL	N
546364	GLORIETA	807	2670	2675	SANDSTONE	NATURAL GAS, OIL	N
546365	YESO	637	2840	2872	SANDSTONE	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 2M **Rating Depth:** 10000

Equipment: A 2000 psi BOP stack and manifold system will be used. A typical 2000 psi system is attached. If the equipment changes, then a Sundry Notice will be filed. System will meet Onshore Orders 2 (BOP) and 6 (H2S) requirements. The blowout preventer equipment (BOP) will consist of a 2000 psi rated, XLT type, National VARCO double ram preventer that will be tested to a maximum pressure of 2000 psi. The unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top and drill pipe rams on bottom. The BOP equipment will consist of the following: - Double ram with blind rams (top) and pipe rams (bottom), - Drilling spool, or blowout preventer with 2 side outlets (choke side and kill side shall be at least 2 diameter), - Kill line (2 minimum), - At least 2 choke line valves (2 minimum), - 2 diameter choke line, - 2 kill valves, one of which will be a check valve (2 minimum), - 2 chokes, one of which will be capable of remote operation, - Pressure gauge on choke manifold, - Upper Kelly cock valve with handle available, - Safety valve and subs to fit all drill string connections in use, - All BOPE connections subjected to well pressure will be flanged, welded, or clamped, - A fill-up line above the uppermost preventer.

Requesting Variance? NO

Variance request:

Testing Procedure: The 2M BOP will be installed on the 8.625 surface casing and used continuously until total depth is reached. All casing strings will be tested as per Onshore Order #2. This also includes a thirty-day test, should the rig still be operating on the same well in thirty days. Pipe rams will be operated and checked each 24-hour period and each time the drill pipe is out of the hole. These functional tests will be documented on the daily drilling logs.

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

Choke Diagram Attachment:

Hawk9_2H_BOP_Choke_20190925101349.pdf

BOP Diagram Attachment:

Hawk9_2H_BOP_Choke_20190925101354.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	CONDUCTOR	20	14.0	NEW	API	N	0	80	0	80	3477	3397	80	OTHER	68.7	OTHER - Weld						
2	OTHER	17.6	13.375	NEW	API	N	0	375	0	375	3477	3102	375	H-40	48	ST&C	1.2	1.18	DRY	2	DRY	2
3	SURFACE	11	8.625	NEW	API	N	0	1230	0	1230	3477	2247	1230	J-55	24	ST&C	1.2	1.18	DRY	2	DRY	2
4	PRODUCTION	7.875	5.5	NEW	API	N	0	8877	0	3580	3477	-103	8877	J-55	17	LT&C	1.2	1.18	DRY	2	DRY	2

Casing Attachments

Casing ID: 1 **String Type:** CONDUCTOR

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

Casing Attachments

Casing ID: 2 **String Type:** OTHER - Contingency

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Hawk9_2H_Casing_Design_Assumptions_20200211173339.pdf

Casing ID: 3 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Hawk9_2H_Casing_Design_Assumptions_20190925101529.pdf

Casing ID: 4 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Hawk9_2H_Casing_Design_Assumptions_20190925101626.pdf

Section 4 - Cement

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
CONDUCTOR	Lead		0	80	267	0.67	12	180	50	Ready Mix	None
OTHER	Lead		0	375	400	1.34	14.8	536	100	Class C	¼ pound/sack cello flake + 2% CaCl2
SURFACE	Lead		0	1230	530	1.4	14.8	742	75	Class C	¼ pound/sack cello flake + 2% CaCl2
PRODUCTION	Lead		0	8877	395	1.9	12.8	750	80	Class C	/4 pound/sack cello flake + 5 pounds per sack LCM-1 + 0.2% R-3 + 6% gel
PRODUCTION	Tail		0	8877	1230	1.3	14.8	1599	50	Class C	0.6% R-3 + ¼ pound/sack cello flake

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: All necessary mud products will be on site to handle any abnormal hole condition that may be encountered while drilling this well. Circulation could be lost in the Grayburg and San Andres.

Describe the mud monitoring system utilized: An electronic/mechanical mud monitor with a minimum pit volume totalizer, stroke counter, and flow sensor will be used.

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	1230	OTHER : Fresh water	8.5	9.2							
1230	3326	OTHER : Brine	9.9	10.2							
3326	8403	OTHER : Brine with gel & starch	9.9	10.2							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

None

List of open and cased hole logs run in the well:

OTHER,

Other log type(s):

None

Coring operation description for the well:

No core, drill stem test, or log is planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 1375 **Anticipated Surface Pressure:** 587

Anticipated Bottom Hole Temperature(F): 100

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Hawk9_2H_H2S_Plan_20190925102236.pdf

Operator Name: LIME ROCK RESOURCES II A LP

Well Name: HAWK 9 FEDERAL COM **Well Number:** 2H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Hawk9_2H_Horizontal_Plan_20190925102258.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Hawk9_2H_Drill_Plan_20200211173640.pdf

Other Variance attachment:

Lime Rock Resources II-A, L.P.
Hawk 9 Federal Com 2H
SHL: 387' FNL & 373' FEL Section 8
BHL: 820' FNL & 100' FEL Section 9
T. 18 S., R. 27 E., Eddy County, NM

Drilling Program

1. ESTIMATED TOPS

Name	TVD	MD	Content
Yates gypsum	0'	0'	---
Seven Rivers dolomite	150'	150'	hydrocarbons
Queen sandstone	694'	694'	hydrocarbons
Grayburg dolomite	1029'	1029'	hydrocarbons
Premier sandstone (surf csg @ 1230')	1253'	1253'	hydrocarbons
San Andres dolomite	1294'	1294'	hydrocarbons
Glorieta sandstone	2670'	2675'	hydrocarbons
Yeso sandstone	2840'	2872'	hydrocarbons
(kick off point	3495'	3724'	hydrocarbons)
Total Depth	3580'	8877'	hydrocarbons

2. NOTABLE ZONES

Closest (0.37 mile south) water well (RA 03714) is 381' deep. Water bearing strata were reported from 325' to 350'. Yeso is the goal.

3. PRESSURE CONTROL

A 2000 psi BOP stack and manifold system will be used. A typical 2000 psi system is attached. If the equipment changes, then a Sundry Notice will be filed. System will meet Onshore Orders 2 (BOP) and 6 (H_2S) requirements.

The blowout preventer equipment (BOP) will consist of a 2000 psi rated, "XLT" type, National VARCO double ram preventer that will be tested to a maximum pressure of 2000 psi. The unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top and drill pipe rams on bottom.

The 2M BOP will be installed on the 8.625" surface casing and used continuously until total depth is reached. All casing strings will be tested as per Onshore Order #2. This also includes a thirty-day test, should the rig still be operating on the same well in thirty days.

Pipe rams will be operated and checked each 24-hour period and each time the drill pipe is out of the hole. These functional tests will be documented on the daily drilling logs.

The BOP equipment will consist of the following:

- Double ram with blind rams (top) and pipe rams (bottom),
- Drilling spool, or blowout preventer with 2 side outlets (choke side and kill side shall be at least 2" diameter),
- Kill line (2" minimum),
- At least 2 choke line valves (2" minimum),
- 2" diameter choke line,
- 2 kill valves, one of which will be a check valve (2" minimum),
- 2 chokes, one of which will be capable of remote operation,
- Pressure gauge on choke manifold,
- Upper Kelly cock valve with handle available,
- Safety valve and subs to fit all drill string connections in use,
- All BOPE connections subjected to well pressure will be flanged, welded, or clamped,
- A fill-up line above the uppermost preventer.

4. CASING & CEMENT

Type	Depth Set MD / TVD	Hole	Csg	#/ft	Grade	Csg Thread	API	Age
Conductor	80' / 80'	20"	14"	68.7	B	Weld	No	New
Contingency	375' / 375'	17.5"	13.375"	48	H-40	ST&C	Yes	New
Surface	1230' / 1230'	11"	8.625"	24	J-55	S T & C	Yes	New
Production	8877' / 3580'	7.875"	5.5"	17	J-55	L T & C	Yes	New

All casing is designed with a minimum of:

Burst Safety Factor	Collapse Safety Factor	Tension Safety Factor
1.18	1.20	2.00

casing	depth set MD	sacks cement	top	gallons per sack	density (ppg)	yield (cu ft per sack)	total cubic feet	% excess	blend
conductor	80'	267	GL	ready mix	12.0	0.67	180	50	ready mix
contingency	375'	400	GL	6.2	14.8	1.34	536	100	1
surface	1230'	530	GL	6.2	14.8	1.4	742	75	2
production lead	8877'	395	GL	9.8	12.8	1.9	750	80	3
production tail	8877'	1230	GL	6.2	14.8	1.3	1599	50	4

Contingency casing blend (1) will be Class C + ¼ pound/sack cello flake + 2% $CaCl_2$.

Surface casing blend (2) will be Class C + ¼ pound/sack cello flake + 2% $CaCl_2$. Centralizers will be installed as required by Onshore Order 2.

Production casing lead blend (3) will be 35:65 poz Class C + 5% NaCl + 1/4 pound/sack cello flake + 5 pounds per sack LCM-1 + 0.2% R-3 + 6% gel.

Production casing tail blend (4) will be Class C + 0.6% R-3 + ¼ pound/sack cello flake.

Cement volumes will be adjusted based on caliper log volumes and depths of casing and adjusted proportionately for depth changes of the multi stage tool if applicable.

A 13.375", 48#, H-40, ST&C, New, API contingency string will be set at 375' in a reamed 17.5" hole if circulation is lost in cave or karst (cave & karst potential to 350') and not regained. Contingency string will be cemented to the surface with 400 sacks (536 cubic feet) Class C + ¼ pound per sack cello flake + 2% $CaCl_2$ mixed with 6.2 gallons per sack to yield 1.34 cubic feet per sack and 14.8 pounds per gallon. Excess >100%

Upon the setting of a 13.375" contingency casing string, a 13.625" x 13.375" weld on wellhead will be installed. A 13.375" to 11" adapter flange will be installed and the 11" XLT 2000 psi NOV double ram BOP/BOPE (Schematic attached) will be installed. The BOP will be tested against the casing to 70% of the internal yield pressure of the 13.375", 48#, H-40, ST&C (1211 psi) casing and held for 30 minutes before drilling out the 13.375" casing shoe. The formation will be drilled with a 10.75" bit approximately 50 feet past the 13.375" casing shoe into a competent formation and 8.625" casing will be set at approximately 425' (≥50' beyond the previous casing shoe) in the Seven Rivers and cemented with 410 sacks (549 cubic feet) Class C + ¼ pound per sack cello flake + 2% $CaCl_2$ mixed with 6.2 gallons per sack to yield 1.34 cubic feet per sack and 14.8 pounds per gallon. Excess >125%

5. MUD PROGRAM

An electronic/mechanical mud monitor with a minimum pit volume totalizer, stroke counter, and flow sensor will be used. All necessary mud products will be on site to handle any abnormal hole condition that may be encountered while drilling this well. Circulation could be lost in the Grayburg and San Andres.

Interval (MD):	*0' – 375' (if contingency string run)*	0' - 1230'	1230' - 3724'	3326' – 8877'
Type	*fresh water*	fresh water	brine	brine w/ gel & starch
weight	*8.5 - 9.2*	8.5 - 9.2	9.9 - 10.2	9.9 - 10.2
pH	*10*	10	10 - 11.5	10 - 11.5
WL	*NC*	NC	NC	15 - 20
viscosity	*28 - 34*	28 - 34	30 - 32	32 - 35
MC	*NC*	NC	NC	1
solids	*NC*	NC	<2%	<3%
pump rate	*300 - 350 gpm*	300 - 350 gpm	350 - 400 gpm	400 - 450 gpm
other	*LCM as needed*	LCM as needed	salt gel & MF as needed, pump high viscosity sweeps to control solids	salt gel, acid, & MF as needed; pump high viscosity sweeps to control solids

6. CORES, TESTS, & LOGS

No core, drill stem test, or log is planned.

7. DOWN HOLE CONDITIONS

No abnormal pressure or temperature is expected. Maximum expected pressure is ≈1550 psi. Maximum expected temperature is ≈100° F.

No H_2S is expected during the drilling phase. Nevertheless, H_2S monitoring equipment will be on the rig floor and air packs will be available before drilling out of the surface casing. The mud logger will be warned to use a gas trap to detect H_2S. If any H_2S is detected, then the mud weight will be increased and H_2S inhibitors will be added to control the gas. An H_2S drilling operations contingency plan is attached.

The well is located in a potential cave or karst area. Thus, lost circulation is possible down to 350'. Contingency casing string and cement plan is on Page 4.

8. OTHER INFORMATION

The anticipated spud date is upon approval. It is expected it will take ≈1 month to drill and complete the well.

LIME ROCK

Project: Eddy County, NM
Site: SEC 8 T18S R27E
Well: Hawk 9 Federal 2H
Wellbore: Original Wellbore
Design: Plan 3

Reference Details

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Latitude: 32° 46' 6.485 N
Longitude: 104° 17' 35.481 W
Ground Elevation: 3481.0
KB Elevation: KB @ 3494.0usft

RPM

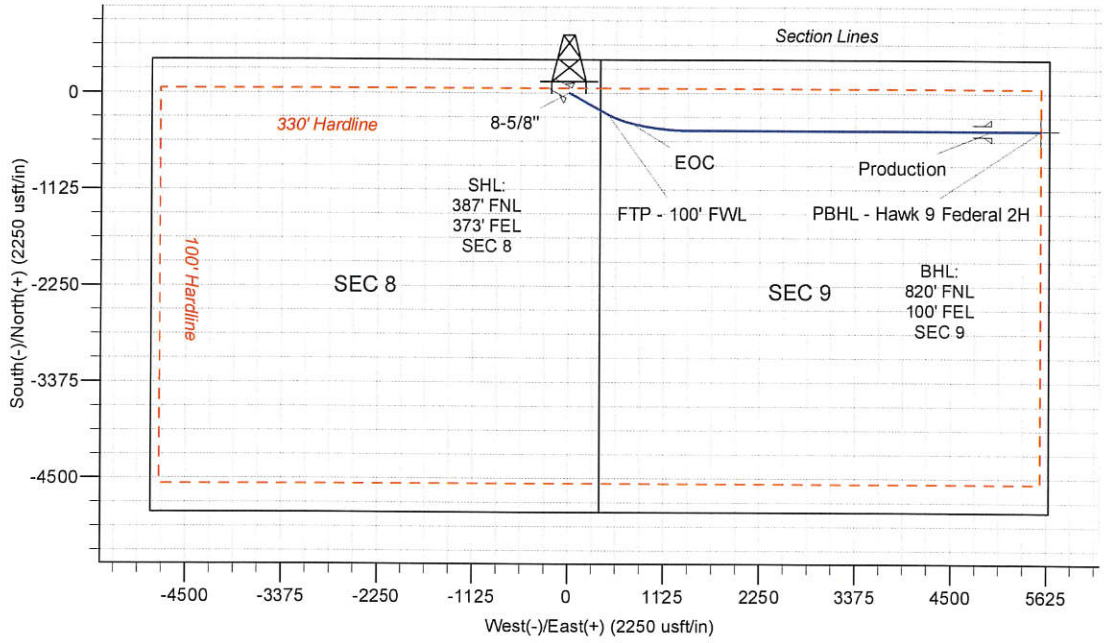
RPM Consulting, Inc.
1600 Broadway, Suite 1510
Denver, CO 80013
303-595-7625

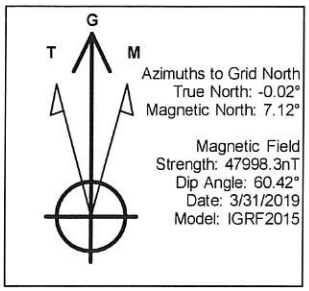
SECTION DETAILS

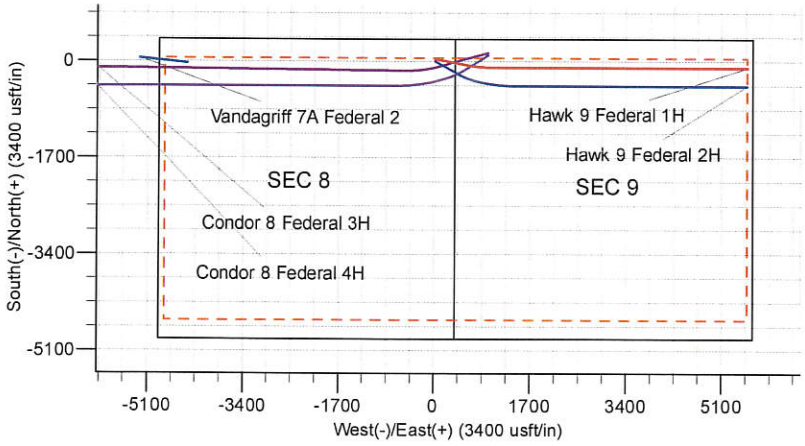
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2873.6	0.00	0.00	2873.6	0.0	0.0	0.00	0.00	0.0
3473.6	60.00	118.50	3369.8	-136.7	251.8	10.00	118.50	261.6
3723.6	60.00	118.50	3494.8	-240.0	442.0	0.00	0.00	459.4
4054.8	90.00	103.75	3580.0	-350.9	737.2	10.00	332.23	762.3
4742.3	90.00	90.00	3580.0	-433.0	1418.1	2.00	-90.00	1447.5
8877.2	90.00	90.00	3580.0	-433.0	5553.0	0.00	0.00	5569.9

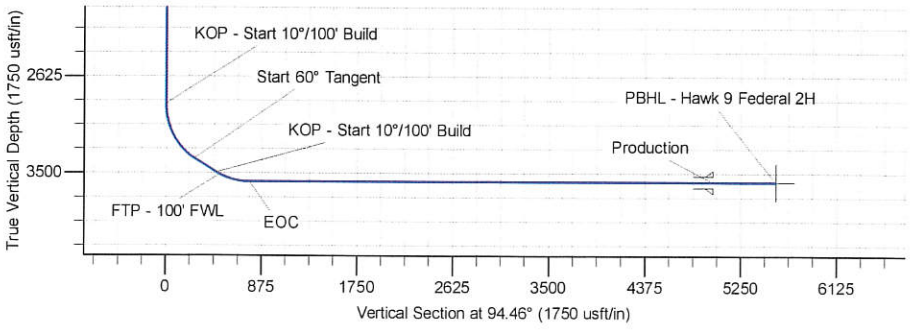
CASING DETAILS

TVD	MD	Name	Size
1230.0	1230.0	Surface	8-5/8
3580.0	8300.0	Production	5-1/2









Database:	EDM Server Database	**Local Co-ordinate Reference:**	Well Hawk 9 Federal 2H
Company:	Lime Rock Resources	**TVD Reference:**	KB @ 3494.0usft
Project:	Eddy County, NM	**MD Reference:**	KB @ 3494.0usft
Site:	SEC 8 T18S R27E	**North Reference:**	Grid
Well:	Hawk 9 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 3		

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

Site	SEC 8 T18S R27E				
Site Position:		**Northing:**	643,270.65 usft	**Latitude:**	32° 46' 6.178 N
From:	Lat/Long	**Easting:**	549,271.45 usft	**Longitude:**	104° 18' 27.077 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.01 °

Well	Hawk 9 Federal 2H				
Well Position	**+N/-S** 32.4 usft	**Northing:**	643,303.08 usft	**Latitude:**	32° 46' 6.485 N
	+E/-W 4,405.3 usft	**Easting:**	553,676.77 usft	**Longitude:**	104° 17' 35.481 W
Position Uncertainty	0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,481.0 usft

Wellbore	Original Wellbore			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	3/31/2019	7.14	60.42	47,998.29193220

Design	Plan 3				
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	94.46	

Plan Survey Tool Program **Date** 4/19/2019

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	8,876.4	Plan 3 (Original Wellbore)	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	
2,873.6	0.00	0.00	2,873.6	0.0	0.0	0.00	0.00	0.00	0.00	
3,473.6	60.00	118.50	3,369.8	-136.7	251.8	10.00	10.00	0.00	118.50	
3,723.6	60.00	118.50	3,494.8	-240.0	442.0	0.00	0.00	0.00	0.00	
4,054.8	90.00	103.75	3,580.0	-350.9	737.2	10.00	9.06	-4.45	332.23	
4,742.3	90.00	90.00	3,580.0	-433.0	1,418.1	2.00	0.00	-2.00	-90.00	
8,877.2	90.00	90.00	3,580.0	-433.0	5,553.0	0.00	0.00	0.00	0.00	PBHL - Hawk 9 Feder

Database:	EDM Server Database	**Local Co-ordinate Reference:**	Well Hawk 9 Federal 2H
Company:	Lime Rock Resources	**TVD Reference:**	KB @ 3494.0usft
Project:	Eddy County, NM	**MD Reference:**	KB @ 3494.0usft
Site:	SEC 8 T18S R27E	**North Reference:**	Grid
Well:	Hawk 9 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 3		

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
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,230.0	0.00	0.00	1,230.0	0.0	0.0	0.0	0.00	0.00	0.00
8-5/8" - Surface									
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,873.6	0.00	0.00	2,873.6	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start 10°/100' Build									
2,900.0	2.64	118.50	2,900.0	-0.3	0.5	0.6	10.00	10.00	0.00
3,000.0	12.64	118.50	2,999.0	-6.6	12.2	12.7	10.00	10.00	0.00
3,100.0	22.64	118.50	3,094.2	-21.1	38.8	40.3	10.00	10.00	0.00
3,200.0	32.64	118.50	3,182.6	-43.2	79.5	82.6	10.00	10.00	0.00
3,300.0	42.64	118.50	3,261.7	-72.3	133.1	138.3	10.00	10.00	0.00
3,400.0	52.64	118.50	3,329.0	-107.5	198.0	205.7	10.00	10.00	0.00
3,473.6	60.00	118.50	3,369.8	-136.7	251.8	261.6	10.00	10.00	0.00
Start 60° Tangent									
3,500.0	60.00	118.50	3,383.0	-147.6	271.9	282.5	0.00	0.00	0.00
3,600.0	60.00	118.50	3,433.0	-188.9	348.0	361.6	0.00	0.00	0.00
3,700.0	60.00	118.50	3,483.0	-230.3	424.1	440.7	0.00	0.00	0.00
3,723.6	60.00	118.50	3,494.8	-240.0	442.0	459.4	0.00	0.00	0.00
KOP - Start 10°/100' Build									
3,763.5	63.55	116.42	3,513.7	-256.2	473.2	491.7	10.00	8.89	-5.20
FTP - 100' FWL									
3,800.0	66.82	114.64	3,529.0	-270.5	503.1	522.6	10.00	8.96	-4.90
3,900.0	75.86	110.13	3,561.0	-306.4	590.6	612.7	10.00	9.04	-4.51
4,000.0	84.98	105.97	3,577.6	-336.9	684.3	708.4	10.00	9.12	-4.16
4,054.8	90.00	103.75	3,580.0	-350.9	737.2	762.2	10.00	9.15	-4.05
EOC									

Database:	EDM Server Database	**Local Co-ordinate Reference:**	Well Hawk 9 Federal 2H
Company:	Lime Rock Resources	**TVD Reference:**	KB @ 3494.0usft
Project:	Eddy County, NM	**MD Reference:**	KB @ 3494.0usft
Site:	SEC 8 T18S R27E	**North Reference:**	Grid
Well:	Hawk 9 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 3		

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)
4,100.0	90.00	102.85	3,580.0	-361.3	781.2	806.9	2.00	0.01	-2.00
4,200.0	90.00	100.85	3,580.0	-381.8	879.0	906.1	2.00	0.00	-2.00
4,300.0	90.00	98.85	3,580.0	-398.9	977.6	1,005.6	2.00	0.00	-2.00
4,400.0	90.00	96.85	3,580.0	-412.6	1,076.6	1,105.4	2.00	0.00	-2.00
4,500.0	90.00	94.85	3,580.0	-422.8	1,176.1	1,205.4	2.00	0.00	-2.00
4,600.0	90.00	92.85	3,580.0	-429.5	1,275.9	1,305.4	2.00	0.00	-2.00
4,700.0	90.00	90.85	3,580.0	-432.7	1,375.8	1,405.3	2.00	0.00	-2.00
4,742.3	90.00	90.00	3,580.0	-433.0	1,418.1	1,447.5	2.00	0.00	-2.00
4,800.0	90.00	90.00	3,580.0	-433.0	1,475.8	1,505.0	0.00	0.00	0.00
4,900.0	90.00	90.00	3,580.0	-433.0	1,575.8	1,604.7	0.00	0.00	0.00
5,000.0	90.00	90.00	3,580.0	-433.0	1,675.8	1,704.4	0.00	0.00	0.00
5,100.0	90.00	90.00	3,580.0	-433.0	1,775.8	1,804.1	0.00	0.00	0.00
5,200.0	90.00	90.00	3,580.0	-433.0	1,875.8	1,903.8	0.00	0.00	0.00
5,300.0	90.00	90.00	3,580.0	-433.0	1,975.8	2,003.5	0.00	0.00	0.00
5,400.0	90.00	90.00	3,580.0	-433.0	2,075.8	2,103.2	0.00	0.00	0.00
5,500.0	90.00	90.00	3,580.0	-433.0	2,175.8	2,202.9	0.00	0.00	0.00
5,600.0	90.00	90.00	3,580.0	-433.0	2,275.8	2,302.6	0.00	0.00	0.00
5,700.0	90.00	90.00	3,580.0	-433.0	2,375.8	2,402.3	0.00	0.00	0.00
5,800.0	90.00	90.00	3,580.0	-433.0	2,475.8	2,502.0	0.00	0.00	0.00
5,900.0	90.00	90.00	3,580.0	-433.0	2,575.8	2,601.7	0.00	0.00	0.00
6,000.0	90.00	90.00	3,580.0	-433.0	2,675.8	2,701.4	0.00	0.00	0.00
6,100.0	90.00	90.00	3,580.0	-433.0	2,775.8	2,801.1	0.00	0.00	0.00
6,200.0	90.00	90.00	3,580.0	-433.0	2,875.8	2,900.8	0.00	0.00	0.00
6,300.0	90.00	90.00	3,580.0	-433.0	2,975.8	3,000.5	0.00	0.00	0.00
6,400.0	90.00	90.00	3,580.0	-433.0	3,075.8	3,100.2	0.00	0.00	0.00
6,500.0	90.00	90.00	3,580.0	-433.0	3,175.8	3,199.9	0.00	0.00	0.00
6,600.0	90.00	90.00	3,580.0	-433.0	3,275.8	3,299.6	0.00	0.00	0.00
6,700.0	90.00	90.00	3,580.0	-433.0	3,375.8	3,399.2	0.00	0.00	0.00
6,800.0	90.00	90.00	3,580.0	-433.0	3,475.8	3,498.9	0.00	0.00	0.00
6,900.0	90.00	90.00	3,580.0	-433.0	3,575.8	3,598.6	0.00	0.00	0.00
7,000.0	90.00	90.00	3,580.0	-433.0	3,675.8	3,698.3	0.00	0.00	0.00
7,100.0	90.00	90.00	3,580.0	-433.0	3,775.8	3,798.0	0.00	0.00	0.00
7,200.0	90.00	90.00	3,580.0	-433.0	3,875.8	3,897.7	0.00	0.00	0.00
7,300.0	90.00	90.00	3,580.0	-433.0	3,975.8	3,997.4	0.00	0.00	0.00
7,400.0	90.00	90.00	3,580.0	-433.0	4,075.8	4,097.1	0.00	0.00	0.00
7,500.0	90.00	90.00	3,580.0	-433.0	4,175.8	4,196.8	0.00	0.00	0.00
7,600.0	90.00	90.00	3,580.0	-433.0	4,275.8	4,296.5	0.00	0.00	0.00
7,700.0	90.00	90.00	3,580.0	-433.0	4,375.8	4,396.2	0.00	0.00	0.00
7,800.0	90.00	90.00	3,580.0	-433.0	4,475.8	4,495.9	0.00	0.00	0.00
7,900.0	90.00	90.00	3,580.0	-433.0	4,575.8	4,595.6	0.00	0.00	0.00
8,000.0	90.00	90.00	3,580.0	-433.0	4,675.8	4,695.3	0.00	0.00	0.00
8,100.0	90.00	90.00	3,580.0	-433.0	4,775.8	4,795.0	0.00	0.00	0.00
8,200.0	90.00	90.00	3,580.0	-433.0	4,875.8	4,894.7	0.00	0.00	0.00
8,300.0	90.00	90.00	3,580.0	-433.0	4,975.8	4,994.4	0.00	0.00	0.00
Production									
8,400.0	90.00	90.00	3,580.0	-433.0	5,075.8	5,094.1	0.00	0.00	0.00
8,500.0	90.00	90.00	3,580.0	-433.0	5,175.8	5,193.8	0.00	0.00	0.00
8,600.0	90.00	90.00	3,580.0	-433.0	5,275.8	5,293.5	0.00	0.00	0.00
8,700.0	90.00	90.00	3,580.0	-433.0	5,375.8	5,393.2	0.00	0.00	0.00
8,800.0	90.00	90.00	3,580.0	-433.0	5,475.8	5,492.9	0.00	0.00	0.00
8,877.2	90.00	90.00	3,580.0	-433.0	5,553.0	5,569.9	0.00	0.00	0.00
PBHL									

Database:	EDM Server Database	**Local Co-ordinate Reference:**	Well Hawk 9 Federal 2H
Company:	Lime Rock Resources	**TVD Reference:**	KB @ 3494.0usft
Project:	Eddy County, NM	**MD Reference:**	KB @ 3494.0usft
Site:	SEC 8 T18S R27E	**North Reference:**	Grid
Well:	Hawk 9 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 3		

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
PBHL - Hawk 9 Federal - plan hits target center - Point	0.00	0.00	3,580.0	-433.0	5,553.0	642,870.08	559,229.77	32° 46' 2.175 N	104° 16' 30.447 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,230.0	1,230.0	Surface	8-5/8	8-5/8
8,300.0	3,580.0	Production	5-1/2	5-1/2

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,230.0	1,230.0	0.0	0.0	8-5/8"
2,873.6	2,873.6	0.0	0.0	KOP - Start 10°/100' Build
3,473.6	3,369.8	-136.7	251.8	Start 60° Tangent
3,723.6	3,494.8	-240.0	442.0	KOP - Start 10°/100' Build
3,763.5	3,513.7	-256.2	473.2	FTP - 100' FWL
4,054.8	3,580.0	-350.9	737.2	EOC
8,877.2	3,580.0	-433.0	5,553.0	PBHL

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

Lime Rock Resources II-A, L.P.

Lease Number NMNM0031186

County: Eddy

Hawk 9 Federal Com 1H
Surface Hole Location: 347' FNL & 373' FEL, Section 8, T. 18 S., R. 27 E.
Bottom Hole Location: 500' FNL & 100' FEL, Section 9, T. 18 S., R. 27 E.

Hawk 9 Federal Com 2H
Surface Hole Location: 387' FNL & 373' FEL, Section 8, T. 18 S., R. 27 E.
Bottom Hole Location: 820' FNL & 100' FEL, Section 9, T. 18 S., R. 27 E.

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

OR

If the entire project is covered under the Permian Basin Programmatic Agreement (cultural resources only):

The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. See information below discussing NAGPRA.

If the proposed project is split between a Class III inventory and a Permian Basin Programmatic Agreement contribution, the portion of the project covered under Class III inventory should default to the first paragraph stipulations.

The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

SPECIAL REQUIREMENT(S)

Watershed:

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

SURFACE LINE(S):

When crossing ephemeral drainages the pipeline(s) will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

Prior to pipeline installation/construction a leak detection plan will be developed. The method(s) could incorporate gauges to detect pressure drops, situating valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

Cave/Karst:

Construction Mitigation

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

Road Construction:

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

Buried Pipeline/Cable Construction:

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

Powerline Construction:

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

Surface Flowlines Installation:

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

Drilling Mitigation
Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required:

- Closed loop system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly at an authorized site
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

Production Mitigation
In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Residual and Cumulative Mitigation
The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be taken to correct the problem to the BLM's approval.

Plugging and Abandonment Mitigation
Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

V. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing
The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width
The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing
Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

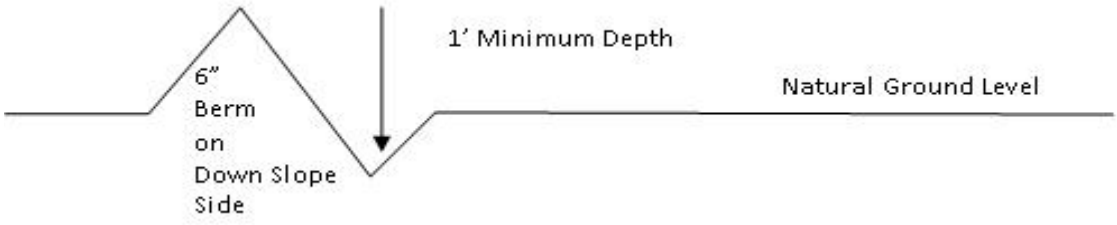
Ditching
Ditching shall be required on both sides of the road.

Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage
Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$\text{400 foot road with 4\% road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Cattle guards
An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

Fence Requirement
Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access
Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road
3. Redistribute topsoil
4. Revegetate slopes

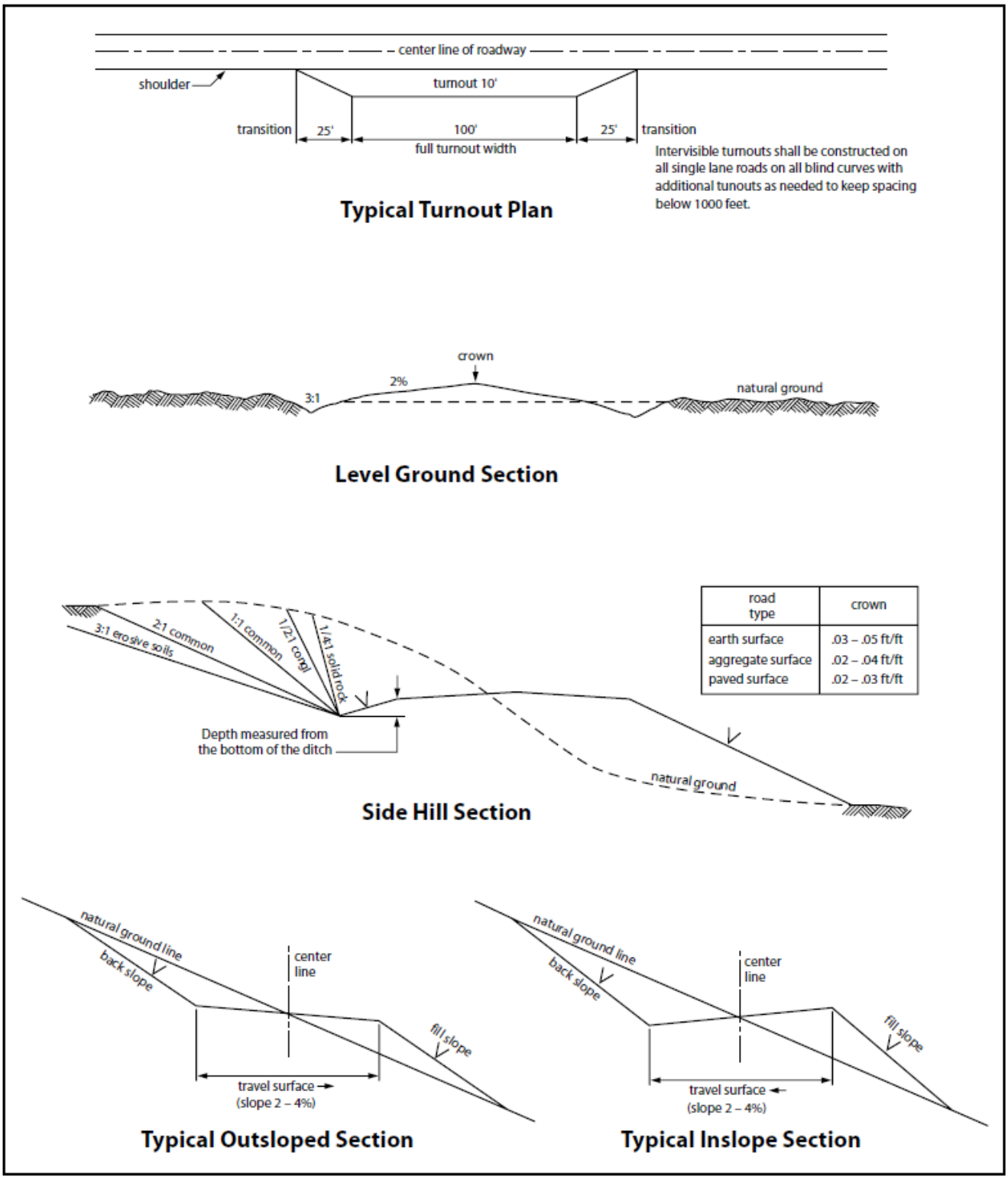


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VI. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities
Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)
Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening
The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures
The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone*.) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures
Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement
All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

B. PIPELINES

- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, passages, or voids are intersected by trenching, and no pipe will be laid in the trench at that point until clearance has been issued by the Authorized Officer.
- If a void is encountered alignments may be rerouted to avoid the karst feature and lessen; the potential of subsidence or collapse of karst features, buildup of toxic or combustible gas, or other possible impacts to cave and karst resources from the buried pipeline.
- Special restoration stipulations or realignment may be required at such intersections, if any.
- A leak detection plan **will be submitted to the BLM Carlsbad Field Office for approval** prior to pipeline installation. The method could incorporate gauges to detect pressure drops, situating values and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.
- Regular monitoring is required to quickly identify leaks for their immediate and proper treatment.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES

A copy of the Grant and attachments, including stipulations, survey plat(s) and/or map(s), shall be on location during construction. BLM personnel may request to review a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.

2. Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, Holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC § 2601 *et seq*. (1982) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant (*see* 40 CFR, Part 702-799 and in particular, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. Holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601, *et seq*. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, *et seq*.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way Holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way Holder on the Right-of-Way. This provision applies without regard to whether a release is caused by Holder, its agent, or unrelated third parties.

4. Holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. Holder shall be held to a standard of strict liability for damage or injury to

the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

a. Activities of Holder including, but not limited to: construction, operation, maintenance, and termination of the facility;

b. Activities of other parties including, but not limited to:
   (1) Land clearing
   (2) Earth-disturbing and earth-moving work
   (3) Blasting
   (4) Vandalism and sabotage;

c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil, salt water, or other pollutant, wherever found, shall be the responsibility of Holder, regardless of fault. Upon failure of Holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he/she deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of Holder. Such action by the Authorized Officer shall not relieve Holder of any responsibility as provided herein.

6. All construction and maintenance activity shall be confined to the authorized right-of-way width of **30** feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline shall be installed no farther than 10 feet from the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline shall be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity shall be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

8. Holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky of duney areas, the pipeline shall be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of 6 inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

10. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No

permanent gates will be allowed unless approved by the Authorized Officer.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

13. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. Signs will be maintained in a legible condition for the life of the pipeline.

14. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

15. Any cultural resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

16. The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

17. Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

18. The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, powerline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

19. Surface pipelines shall be less than or equal to 4 inches and a working pressure below 125 psi.

VII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

VIII. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Mixture 4, for Gypsum Sites

The holder shall seed all the disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Alkali Sacaton (*Sporobolus airoides*)	1.5
DWS~ Four-wing saltbush (*Atriplex canescens*)	8.0

~DWS: DeWinged Seed

*Pounds of pure live seed:

Pounds of seed **x** percent purity **x** percent germination = pounds pure live seed

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EXHIBIT NO. **1**

Bureau of Land Management, Carlsbad Field Office
620 E. Greene Street Carlsbad, NM 88220

Date of Issue:
January 13, 2020

NM-0031186

BLM Report No.
20-0335

Cultural and Archaeological Resources

NOTICE OF STIPULATIONS

Historic properties in the vicinity of this project are protected by federal law. In order to ensure that they are not damaged or destroyed by construction activities, the project proponent and construction supervisors shall ensure that the following stipulations are implemented.

Project Name:	Hawk 9 Federal Com 1H and 2H, Lime Rock Resources II-A, L.P.
	1). A 3-day preconstruction call-in notification. Contact BLM Inspection and Enforcement at
Required	*2. Professional archaeological monitoring*. Contact your BLM project archaeologist at (575) 234-6231 for assistance.
A. ☒	These stipulations must be given to your monitor at least 5 days prior to the start of construction.
B. ☒	No construction, including vegetation removal or other site prep may begin prior to the arrival of the monitor.
	3. Cultural site barrier fencing. (Your monitor will assist you).
A. ☐	A temporary site protection barrier(s) shall be erected prior to all ground-disturbing activities. The minimum barrier(s) shall consist of upright wooden survey lath spaced no more than ten (10) feet apart and marked with blue ribbon flagging or blue paint. There shall be no construction activities or vehicular traffic past the barrier(s) at any time.
B. ☐	A permanent, 4-strand barbed wire fence strung on standard "T-posts" shall be erected prior to all ground-disturbing activities. No construction activities or vehicle traffic are allowed past the fence.
Required	*4. The archaeological monitor shall:*
A. ☐	
B. ☒	Observe all ground-disturbing activities within 100 feet of cultural site(s) LA 102896. The site is in proximity of the proposed undertaking.
C. ☐	Ensure that the proposed
D. ☐	Ensure the proposed reroute for the .
E. ☒	Submit a brief monitoring report within 30 days of completion of monitoring.
	If any human skeletal remains or funerary objects, or other significant subsurface cultural resources are encountered during the monitoring, all activities shall cease and a BLM-CFO archaeologist shall be notified immediately.
Other:	IF THE CONTRACT ARCHAEOLOGIST DOES NOT KNOW WHERE THE SITE(S) ARE LOCATED, PLEASE COME BY THE CARLSBAD BLM AND MAPS AND OTHER DATA WILL BE PROVIDED, UPON REQUEST, TO THE CONTRACT ARCHAEOLOGIST.

Site Protection and Employee Education: It is the responsibility of the project proponent and his construction supervisor to inform all employees and subcontractors that cultural and archaeological sites are to be avoided by all personnel, vehicles, and equipment; and that it is illegal to collect, damage, or disturb cultural resources on Public Lands.

For assistance contact: Elia Perez (575) 234-6231 Aaron Whaley (575) 234-5986
Trish Byers (575) 234-2239

Approval Date: 04/01/2020

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Lime Rock Resources**
LEASE NO.:	**NMNM0031186**
WELL NAME & NO.:	**Hawk 9 Federal Com 2H**
SURFACE HOLE FOOTAGE:	**387' FNL & 373' FEL**
BOTTOM HOLE FOOTAGE	**820' FNL & 100' FEL**
LOCATION:	**Section 8, T 18S, R 27E, NMPM**
COUNTY:	**Eddy County, New Mexico**

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	○ Medium	◉ High
Variance	◉ None	○ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ Unit

A. HYDROGEN SULFIDE

1. Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **8-5/8"** surface casing shall be set at approximately **1230'** and cemented to surface.
   a. **If cement does not circulate to surface,** the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of **6 hours** after pumping cement, ideally between 8-10 hours after.
   b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
   c. If cement falls back, remedial cementing will be done prior to drilling out the shoe.
   d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The **5-1/2"** production casing shall be cemented to surface.
   a. **If cement does not circulate to surface,** see B.1.a, c & d.

3. **If a contingency 13-3/8" casing is ran due to lost circulation, it shall be set at approximately 375' and all casing strings shall be cemented to surface.**

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

D. SPECIAL REQUIREMENTS

1. Submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
   a. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 02/29/2020

GENERAL REQUIREMENTS

1. The BLM is to be notified in advance for a representative to witness:
   a. Spudding the well (minimum of 24 hours)
   b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
   c. BOP/BOPE tests (minimum of 4 hours)

      ☒ Eddy County: Call the Carlsbad Field Office, (575) 361-2822

      ☒ Lea County: Call the Hobbs Field Station, (575) 393-3612
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig:
      i. Notify the BLM when moving in and removing the Spudder Rig.
      ii. Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      iii. BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be available upon request. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the

following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well-specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On the portion of well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.

b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.

c. Manufacturer representative shall install the test plug for the initial BOP test.

d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

e. Whenever any seal subject to test pressure is broken, all the tests in Onshore Order 2 III.A.2.i must be followed.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the BOP/BOPE tests.

   a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

   b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test which can be initiated immediately after bumping the plug (only applies to single-stage cement jobs).

   c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be made available upon request.

   d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

   e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.

   f. BOP/BOPE must be tested within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth

exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

1. Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

1. All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.
2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

Lime Rock Hydrogen Sulfide Drilling Plan Summary

A. All personnel shall receive proper H2S training in accordance with Onshore Order 6 III.C.3.a.

B. Briefing Area: two perpendicular areas will be designated by signs and readily accessible.

C. Required Emergency Equipment:

- Well control equipment
  a. Flare line 150' from wellhead to be ignited by flare gun.
  b. Choke manifold with a remotely operated choke.
  c. Mud/gas separator

- Protective equipment for essential personnel.

  Breathing apparatus:
  a. Rescue Packs (SCBA) — 1 unit shall be placed at each breathing area, 2 shall be stored in the safety trailer.
  b. Work/Escape packs — 4 packs shall be stored on the rig floor and contain sufficiently long air hoses as to not to restrict work activity.
  c. Emergency Escape Packs — 4 packs shall be stored in the doghouse for emergency evacuation.

  Auxiliary Rescue Equipment:
  a. Stretcher
  b. Two OSHA full body harness
  c. 100 ft 5/8 inch OSHA approved rope
  d. 1-20# class ABC fire extinguisher

- H2S detection and monitoring equipment:
  The stationary detector with three sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible @ 14 ppm. Calibrate a minimum of every 30 days or as needed. The sensors will be placed in the following places: Rig floor / Bell nipple / End of flow line or where well bore fluid is being discharged.
  (Gas sample tubes will be stored in the safety trailer)

- Visual warning systems.
  a. One color code condition sign will be placed at the entrance to the site reflecting the possible conditions at the site.
  b. A colored condition flag will be on display, reflecting the current condition at the site at the time.
  c. Two wind socks will be placed in strategic locations, visible from all angles.

- Mud program:
  The mud program has been designed to minimize the volume of H2S circulated to surface. The operator will have the necessary mud products to minimize hazards while drilling in H2S bearing zones.

- Metallurgy:
  a. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
  b. All elastomers used for packing and seals shall be H2S trim.

- Communication:
  Communication will be via two-way radio in emergency and company vehicles. Cell phones and land lines where available.

H2S CONTINGENCY DRILLING PLAN EMERGENCY CONTACTS

Company Offices -	Lime Rock Houston Office	713·292·9510
	Answering Service (After Hours)	713·292-9555
	Artesia, NM Office	575-748-9724
	Roswell, NM	575-623-8424

KEY PERSONNEL					
Name	**Title**	**Location**	**Office #**	**Cell #**	**Home #**
MARK REID	OPERATIONS MANAGER	HOUSTON	713-292-9534	713-818-4438	SAME AS CELL
FRANK FALLERI	EAST ARTESIA PRODUCTION MANAGER	HOUSTON	713-360-5714	713-817-8275	
JERRY SMITH	ASSISTANT PRODUCTION SUPERVISOR	ARTESIA	575-748-9724	505-918-0556	575-746-2478
MICHAEL BARRETT	PRODUCTION SUPERVISOR	ROSWELL	575-623-8424	505-353-2644	575-623-4707
BOB CRAMER	WELL SITE SUPERVISOR	ROTATES ON SITE	NA	405-365-2727	NA
DAVE WILLIAMSON	WELL SITE SUPERVISOR	ROTATES ON SITE	NA	575-308-9980	NA

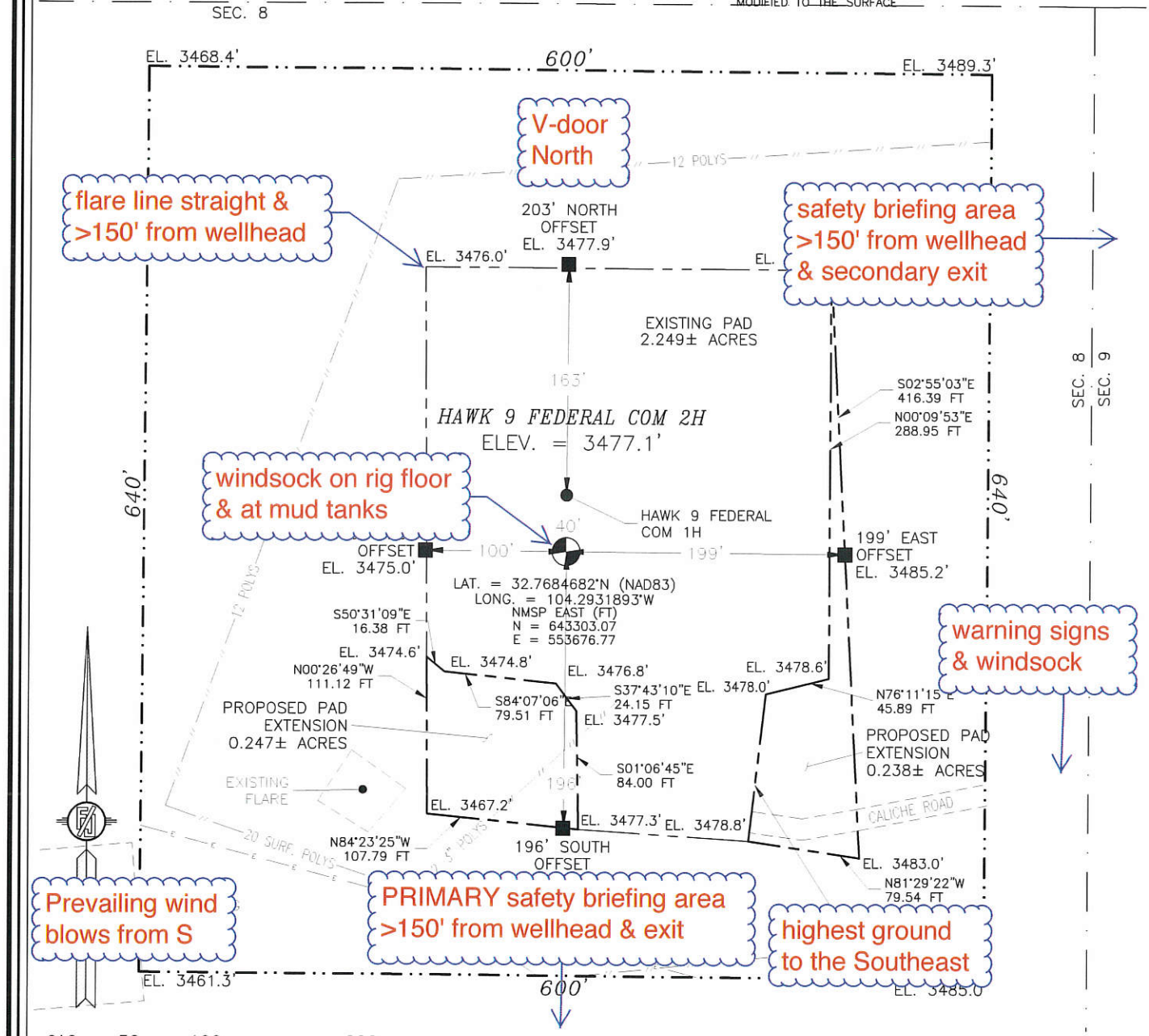
Agency Call List		
City	Agency or Office	Telephone Number
Artesia	Ambulance	911
Artesia	State Police	575-746-2703
Artesia	Sheriff's Office	575-746-9888
Artesia	City Police	575-746-2703
Artesia	Fire Department	575-746-2701
Artesia	Local Emergency Planning Committee	575-746-2122
Artesia	New Mexico OCD District II	575-748-1283
Carlsbad	Ambulance	911
Carlsbad	State Police	575-885-3137
Carlsbad	Sheriff's Office	575-887-7551
Carlsbad	City Police	575-885-2111
Carlsbad	Fire Department	575-885-2111
Carlsbad	Local Emergency Planning Committee	575-887-3798
Carlsbad	US DOI Bureau of Land Management	575-887-6544
State Wide	New Mexico Emergency Response Commission ("NMERC")	505-476-9600
State Wide	NMERC 24 hour Number	505-827-9126
State Wide	New Mexico State Emergency Operations Center	505-476-9635
National	National Emergency Response Center (Washington, D.C.)	800-424-8802

H2S CONTINGENCY DRILLING PLAN EMERGENCY CONTACTS

Emergency Services				
Name	**Service**	**Location**	**Telephone Number**	**Alternate Number**
Boots & Coots International Well Control	Well Control	Houston / Odessa	1-800-256-9688	281-931-8884
Cudd Pressure Control	Well Control & Pumping	Odessa	915-699-0139	915-563-3356
Baker Hughes Inc.	Pumping Service	Artesia, Hobbs and Odessa	575-746-2757	SAME
Total Safety	Safety Equipment and Personnel	Artesia	575-746-2847	SAME
Cutter Oilfield Services	Drilling Systems Equipment	Midland	432-488-6707	SAME
Assurance Fire & Safety	Safety Equipment and Personnel	Artesia	575-396-9702	575-441-2224
Flight for Life	Emergency Helicopter Evacuation	Lubbock	806-743-9911	SAME
Aerocare	Emergency Helicopter Evacuation	Lubbock	806-747-8923	SAME
Med Flight Air Ambulance	Emergency Helicopter Evacuation	Albuquerque	505-842-4433	SAME
Artesia General Hospital	Emergency Medical Care	Artesia	575-748-3333	702 North 13 Street

SECTION 8, TOWNSHIP 18 SOUTH, RANGE 27 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM CR 201 (CHALK BLUFF) AND CR 227 (LITTLE DIAMOND) GO SOUTHEAST ON CR 227 855', THEN EAST 365', TURN RIGHT ON CALICHE ROAD AND GO SOUTHEAST 0.1 OF A MILE, TURN RIGHT AND GO SOUTH–SOUTHWEST 0.15 OF A MILE, BEND LEFT AND GO SOUTH 350', TURN RIGHT AND GO SOUTHWEST 390' TO SOUTHEAST OF EXISTING PAD CORNER FOR THIS LOCATION.

I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I WAS DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

12797 6/12/19

FILIMON F. JARAMILLO, PLS 12797 DATE

LIME ROCK RESOURCES II–A, L.P.

HAWK 9 FEDERAL COM 2H

LOCATED 387 FT. FROM THE NORTH LINE AND 373 FT. FROM THE EAST LINE OF SECTION 8, TOWNSHIP 18 SOUTH, RANGE 27 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO

JUNE 12, 2019

SURVEY NO. 7035

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

Lime Rock Resources

Hawk 9 Federal Com
H2S Contingency Plan:
Radius Map

Section 8, Township 18S, Range 27E
Eddy County, New Mexico

Proposed SHL

1:27,000

0 0.25 0.5 1

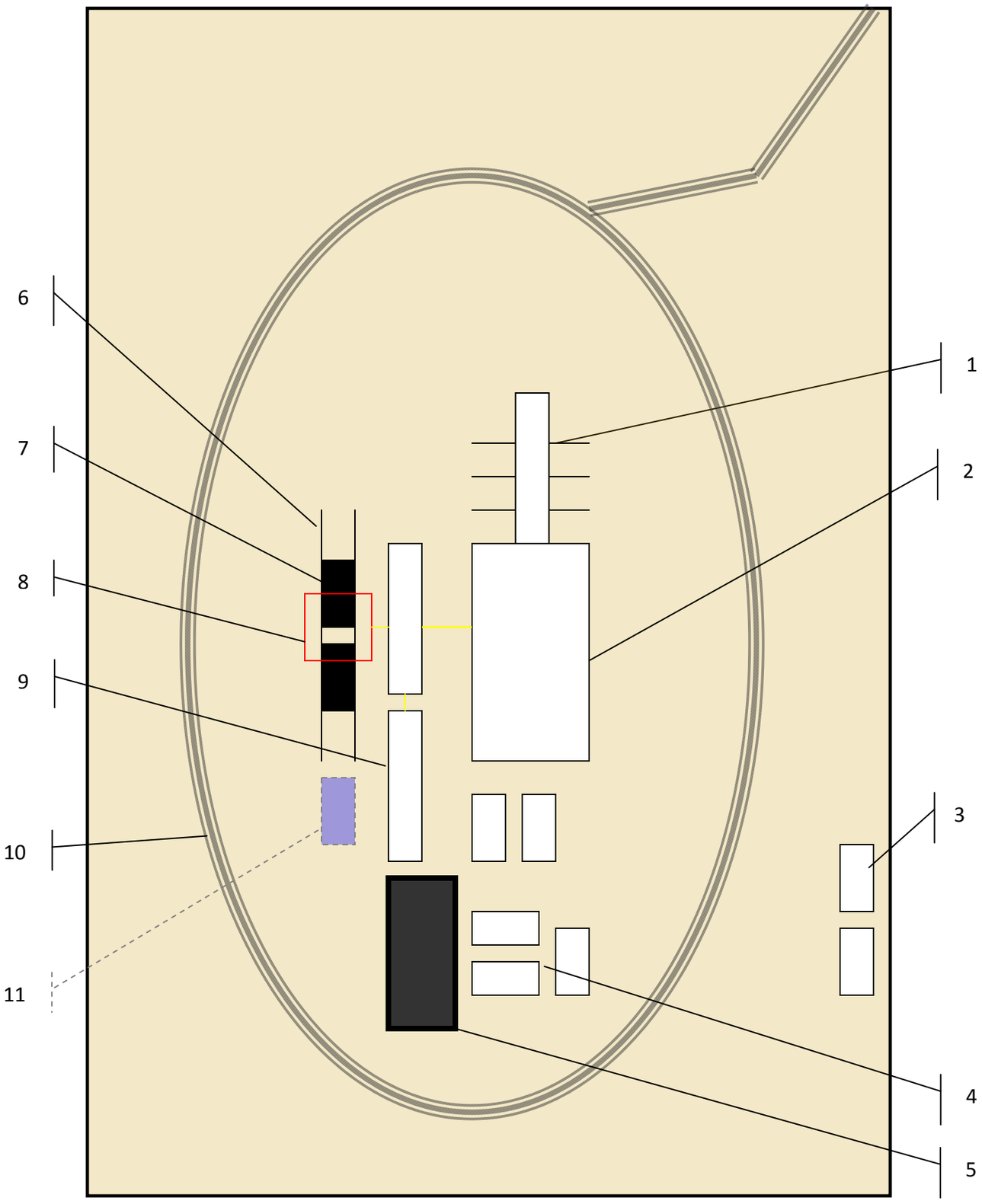
Miles

N

NAD 1983 New Mexico State Plane East
FIPS 3001 Feet

PERMITS WEST, Inc.

Prepared by Permits West, Inc., September 23, 2019
for Lime Rock Resources



Schematic Closed Loop Drilling Rig*

1. **Pipe Rack**
2. **Drill Rig**
3. **House Trailers/ Offices**
4. **Generator/Fuel/Storage**
5. **Overflow-Frac Tank**
6. **Skids**
7. **Roll Offs**
8. **Hopper or Centrifuge**
9. **Mud Tanks**
10. **Loop Drive**
11. **Generator (only for use with centrifuge)**

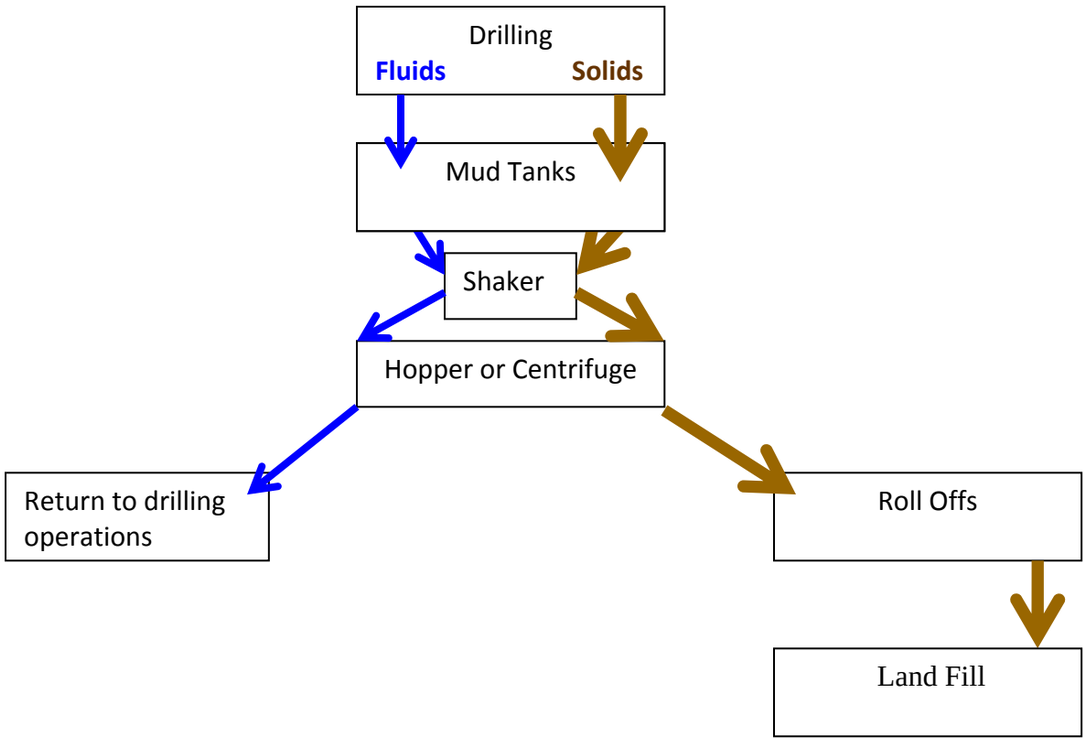
***Not drawn to scale: Closed loop system requires at least 30 feet beyond mud tanks. Ideally 60 feet would be available**

Above: Centrifugal Closed Loop System

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

Closed Loop Drilling System: Mud tanks to right (1)
Hopper in air to settle out solids (2)
Water return pipe (3)
Shaker between hopper and mud tanks (4)
Roll offs on skids (5)

Flow Chart for Drilling Fluids and Solids



Photos Courtesy of Gandy Corporation Oil Field Service