

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**

1a. Type of work: <input type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		5. Lease Serial No.  6. If Indian, Allottee or Tribe Name  7. If Unit or CA Agreement, Name and No.  8. Lease Name and Well No.  <div style="text-align: center; font-weight: bold;">[333734]</div>	
2. Name of Operator  <div style="text-align: center; font-weight: bold;">[240974]</div>		9. API Well No. <b>30-025-50996</b>	
3a. Address		3b. Phone No. (include area code)  10. Field and Pool, or Exploratory <b>[13160]</b>	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface At proposed prod. zone		11. Sec., T. R. M. or Blk. and Survey or Area	
14. Distance in miles and direction from nearest town or post office*		12. County or Parish  13. State	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)		16. No of acres in lease  17. Spacing Unit dedicated to this well	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.		19. Proposed Depth  20. BLM/BIA Bond No. in file	
21. Elevations (Show whether DF, KDB, RT, GL, etc.)		22. Approximate date work will start*  23. Estimated duration	
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)	
Title		Date	
Approved by (Signature)		Name (Printed/Typed)	
Title		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.			

NGMP Rec 01/24/2023

SL

(Continued on page 2)

APPROVED WITH CONDITIONS

Approval Date: 12/14/2022

 KZ  
 01/26/2023

\*(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

<sup>1</sup> API Number <b>30-025-50996</b>	<sup>2</sup> Pool Code <b>13160</b>	<sup>3</sup> Pool Name <b>Corbin, Bone Springs South</b>
<sup>4</sup> Property Code <b>333734</b>	<sup>5</sup> Property Name EMERALD FEDERAL COM	
<sup>7</sup> OGRID No. <b>240974</b>	<sup>8</sup> Operator Name LEGACY RESERVES OPERATING	<sup>6</sup> Well Number 503H
		<sup>9</sup> Elevation 3681.7'

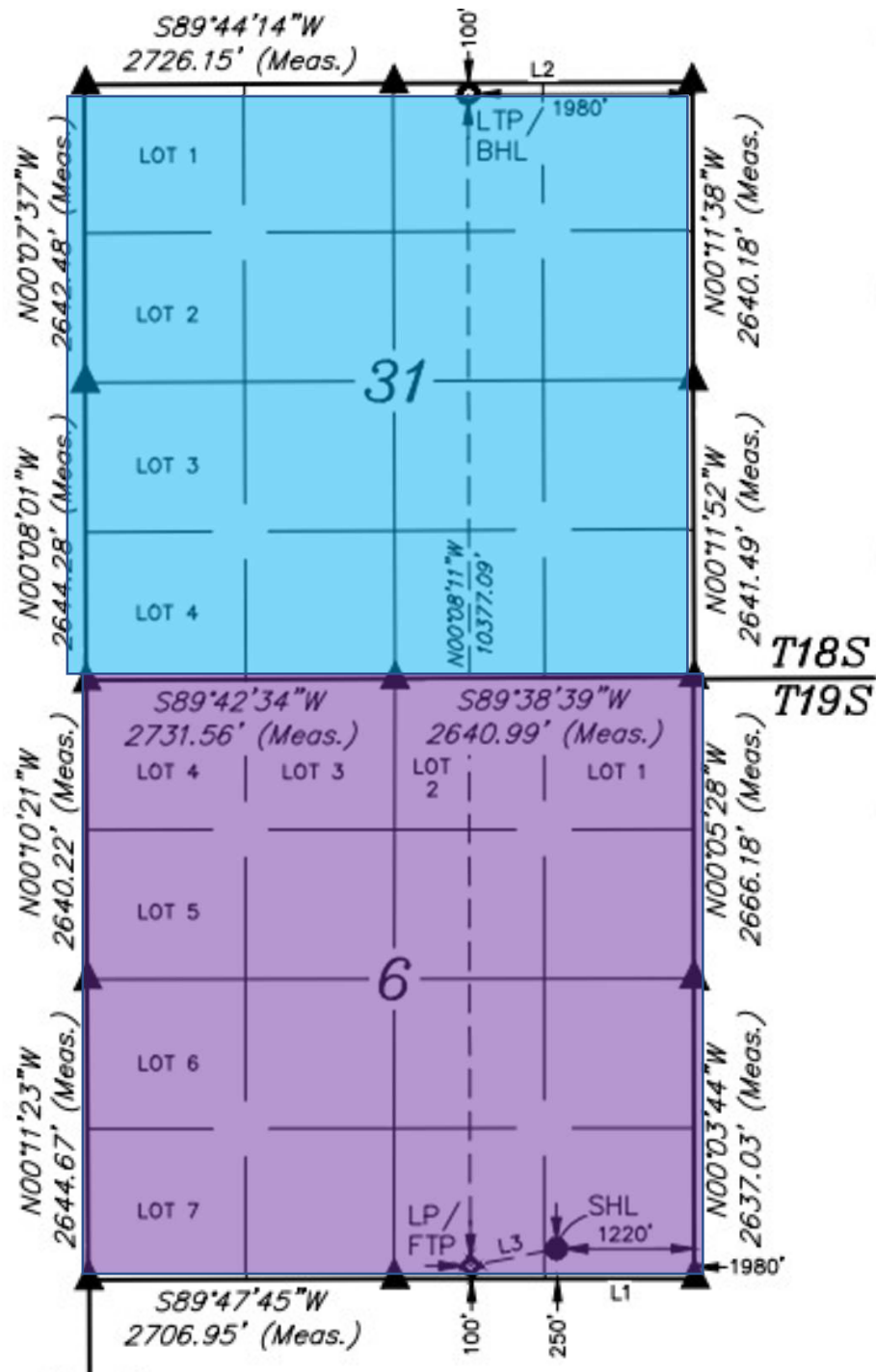
<sup>10</sup> Surface Location									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	6	19S	33E		350	SOUTH	1310	EAST	LEA

<sup>11</sup> Bottom Hole Location If Different From Surface									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	31	18S	33E		100	NORTH	1980	EAST	LEA
<sup>12</sup> Dedicated Acres <b>320</b>		<sup>13</sup> Joint or Infill		<sup>14</sup> Consolidation Code		<sup>15</sup> Order No.			

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.

<p><sup>16</sup></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Distances referenced on plat to section lines are perpendicular.</li> <li>Basis of Bearings is a Transverse Mercator Projection with a Central Meridian of W103°53'00" (NAD 83)</li> </ul> <p>● = SURFACE HOLE LOCATION ◆ = LANDING POINT/FIRST TAKE POINT/LPP ○ = LAST TAKE POINT/ BOTTOM HOLE LOCATION ▲ = SECTION CORNER LOCATED</p>		<p><b>17 OPERATOR CERTIFICATION</b></p> <p>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.</p> <p><i>Kristina Lee</i> 10/20/22 Signature Date</p> <p>Kristina Lee Printed Name</p> <p>klee@legacyreserves.com E-mail Address</p>												
<p><b>NAD 83 (SURFACE HOLE LOCATION)</b> LATITUDE = 32°40'58.98" (32.683050°) LONGITUDE = 103°41'52.89" (103.698025°) <b>NAD 27 (SURFACE HOLE LOCATION)</b> LATITUDE = 32°40'58.54" (32.682929°) LONGITUDE = 103°41'51.09" (103.697526°) <b>STATE PLANE NAD 83 (N.M. EAST)</b> N: 612810.10' E: 736803.18' <b>STATE PLANE NAD 27 (N.M. EAST)</b> N: 612746.74' E: 695623.78'</p> <p><b>NAD 83 (LP/FTP)</b> LATITUDE = 32°40'56.51" (32.682365°) LONGITUDE = 103°42'00.73" (103.700203°) <b>NAD 27 (LP/FTP)</b> LATITUDE = 32°40'56.08" (32.682244°) LONGITUDE = 103°41'58.93" (103.699704°) <b>STATE PLANE NAD 83 (N.M. EAST)</b> N: 612556.73' E: 736134.64' <b>STATE PLANE NAD 27 (N.M. EAST)</b> N: 612493.39' E: 694955.25'</p> <p><b>NAD 83 (LPP #1)</b> LATITUDE = 32°41'47.88" (32.696635°) LONGITUDE = 103°42'00.77" (103.700214°) <b>NAD 27 (LPP #1)</b> LATITUDE = 32°41'47.45" (32.696513°) LONGITUDE = 103°41'58.97" (103.699714°) <b>STATE PLANE NAD 83 (N.M. EAST)</b> N: 617748.25' E: 736100.27' <b>STATE PLANE NAD 27 (N.M. EAST)</b> N: 617684.77' E: 694921.02'</p> <p><b>NAD 83 (LTP/BHL)</b> LATITUDE = 32°42'39.18" (32.710882°) LONGITUDE = 103°42'00.81" (103.700225°) <b>NAD 27 (LTP/BHL)</b> LATITUDE = 32°42'38.74" (32.710761°) LONGITUDE = 103°41'59.01" (103.699725°) <b>STATE PLANE NAD 83 (N.M. EAST)</b> N: 622931.69' E: 736065.94' <b>STATE PLANE NAD 27 (N.M. EAST)</b> N: 622868.07' E: 694886.83'</p>		<p><b>LINE TABLE</b></p> <table border="1"> <thead> <tr> <th>LINE</th><th>DIRECTION</th><th>LENGTH</th></tr> </thead> <tbody> <tr> <td>L1</td><td>S89°57'04"W</td><td>2655.94'</td></tr> <tr> <td>L2</td><td>S69°29'14"W</td><td>715.07'</td></tr> <tr> <td>L3</td><td>S89°43'33"W</td><td>2640.36'</td></tr> </tbody> </table>	LINE	DIRECTION	LENGTH	L1	S89°57'04"W	2655.94'	L2	S69°29'14"W	715.07'	L3	S89°43'33"W	2640.36'
LINE	DIRECTION	LENGTH												
L1	S89°57'04"W	2655.94'												
L2	S69°29'14"W	715.07'												
L3	S89°43'33"W	2640.36'												
<p><b>18 SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>January 04, 2022</p> <p>Date of Survey Signature and Seal of Professional Surveyor:</p>		<p>PAUL BUCHELE NEW MEXICO 23782 09-28-22 PROFESSIONAL SURVEYOR</p> <p>Certificate Number:</p>												

# Emerald Federal Com Lease Plat



NMLC0069276

NMNM0077002

State of New Mexico  
Energy, Minerals and Natural Resources Department

Submit Electronically  
Via E-permitting

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

## NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

### Section 1 – Plan Description

Effective May 25, 2021

**I. Operator:** Legacy Reserves Operating LP **OGRID:** 240974 **Date:** 4/7/2022

**II. Type:** ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: \_\_\_\_\_

**III. Well(s):** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Emerald Fed Com 503H	N/A	M 6 19S 33E	350 FSL 1250 FWL	500	1000	600
<del>30-025-50996</del>						

**IV. Central Delivery Point Name:** Emerald Fed Com CTB [See 19.15.27.9(D)(1) NMAC]

**V. Anticipated Schedule:** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Emerald Fed Com 503H	N/A	11/3/2024	11/19/2024	12/30/2024	1/29/2025	2/1/2025
<del>30-025-50996</del>						

**VI. Separation Equipment:** ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

**VII. Operational Practices:** ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

**VIII. Best Management Practices:** ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

**Section 2 – Enhanced Plan****EFFECTIVE APRIL 1, 2022**

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☒ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

**IX. Anticipated Natural Gas Production:**

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

**X. Natural Gas Gathering System (NGGS):**

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

**XI. Map.** ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

**XII. Line Capacity.** The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

**XIII. Line Pressure.** Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

**XIV. Confidentiality:** ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

### **Section 3 - Certifications**

**Effective May 25, 2021**

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

***If Operator checks this box, Operator will select one of the following:***

**Well Shut-In.** ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

**Venting and Flaring Plan.** ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

### **Section 4 - Notices**

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature: <i>Melanie Reyes</i>
Printed Name: Melanie Reyes
Title: Regulatory
E-mail Address: mreyes@legacyreserves.com
Date: 4/7/2022
Phone: 432-221-6358
<b>OIL CONSERVATION DIVISION</b> <b>(Only applicable when submitted as a standalone form)</b>
Approved By:
Title:
Approval Date:
Conditions of Approval:



## **Legacy Reserves Operating LP Natural Gas Management Plan Attachment**

### **VI. Separation Equipment**

How Operator will size separation equipment to optimize gas capture:

All Legacy Reserves production facility equipment will be sized per industry standards (API 12J) with adequate retention time to effectively separate all phases of production. Each project will take into consideration the number of wells and type curves for each formation pool to ensure adequate facility capacity. Design considerations will also include review of all piping, tanks, VRU's and associated equipment to ensure optimized gas capture minimized risk of release.

### **VII. Operational Practices**

Actions Operator will take to comply with the requirements below:

#### **B. Drilling Operations**

- During drilling, flare stacks will be located a minimum of 100 feet from the nearest surface hole location. All gas is captured or combusted. If an emergency or malfunction occurs, gas will be flared or vented for public health, safety, and the environment and be properly reported to the NMOCD pursuant to 19.15.27.8.G.
- Measure or estimate the volume of natural gas that is vented, flared or beneficially used during drilling, completion and production operations, regardless of the reason or authorization for such venting or flaring.

#### **C. Completion Operations**

- During completion operations, operator does not produce oil or gas but maintains adequate well control through completion operations.
- Individual well test separators will be set to properly separate gas and liquids. A temporary test separator will be utilized initially to process volumes. In addition, separators will be tied into flow back tanks which will be tied into the gas processing equipment for sales down a pipeline.

#### **D. Venting and Flaring during Production Operations**

- During each phase of well life (drilling, completion and production) of a Legacy Reserves well, Legacy personnel will follow all necessary procedures to ensure both the operation and the equipment are within the NMAC 19.15.27.8 Subsection D guidelines.
- During well operations that require unloading of the well to atmospheric pressure, all reasonable actions will be taken to minimize vented gas
- Through the life of the well all flaring shall be measured, and venting events quantified using the data available and industry best practice.



E. Performance Standards for Separation, Storage Tank and Flare Equipment

- All storage tanks and separation equipment are designed to minimize risk of liquid or vapor release and optimize gas capture. This includes automation for automatic gauging and pressure monitoring.
- All flare stacks are equipped with auto ignition devices and/or continuous pilots and are designed to operate at maximum combustion efficiency pursuant NMAC 19.15.27.8 Subsection E. Flares will follow Legacy spacing guidelines to ensure they are a safe distance from combustibles and operations equipment.
- Legacy personnel will conduct routine AVO inspections on a regular basis per NMAC 19.15.27.8 Subsection E guidelines.

F. Measurement of Vented and Flared Natural Gas

- Measurement equipment will be installed to quantify gas flared during drilling, completion and production of the well.
- All measurement devices installed will meet accuracy ratings per AGA and API standards.
- Measurement devices will be installed without manifolds that allow diversion of gas around the metering element, except for the sole purpose of inspection of servicing the measurement device.

**VIII. Best Management Practices**

- Operator will curtail or shut in production, within reasonable limits, during upset conditions to minimize venting and flaring.
- When feasible, Operator will use equipment to capture gas that would otherwise be vented or flared.
- During completions and production operations, Operator will minimize blowdowns to atmosphere.
- When feasible, Operator will use electric or air actuated equipment to reduce bleed emissions.



U.S. Department of the Interior  
BUREAU OF LAND MANAGEMENT

# Drilling Plan Data Report

12/15/2022

APD ID: 10400084370

Submission Date: 04/12/2022

Highlighted data  
reflects the most  
recent changes

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: EMERALD FEDERAL COM

Well Number: 503H

Well Type: OIL WELL

Well Work Type: Drill

[Show Final Text](#)

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical	Measured Depth	Lithologies	Mineral Resources	Producing Formatio
8452645	RUSTLER	3690	1382	1382	LIMESTONE, MARL, SANDSTONE	USEABLE WATER	N
8452647	BASE OF SALT	860	2830	2830	SALT	NONE	N
8452641	YATES	302	3388	3400	DOLOMITE, SANDSTONE	NONE	N
8452640	QUEEN	-526	4216	4300	SANDSTONE	NONE	N
8452642	DELAWARE	-1800	5490	5617	SANDSTONE	NONE	N
8452643	BONE SPRINGS	-3662	7352	7500	LIMESTONE, SANDSTONE	NATURAL GAS, OIL	N
8452644	BONE SPRING 1ST	-5004	8694	8700	LIMESTONE, SANDSTONE	NATURAL GAS, OIL	N
8452648	BONE SPRING 2ND	-6010	9700	10090	LIMESTONE, SANDSTONE	NATURAL GAS, OIL	Y

## Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M

Rating Depth: 11000

**Equipment:** A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

**Requesting Variance?** YES

**Variance request:** Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only. Legacy requests a 5M annular variance for the 10M BOP system. See attached procedure

**Testing Procedure:** BOPs will be tested by an independent service company. The ram preventers, choke manifold, and safety valves will be tested as follows: Prior to drilling out the surface casing, BOPE pressure tests will be 250 psi low and 5000 psi high. Prior to drilling out the intermediate casing, BOPE pressure tests will be 250 psi low and 10,000 psi high. The Annular Preventer will be tested to 250 psi low and 2500 psi high prior to drilling out the surface casing, 250 psi low and 5000 psi high prior to drilling out the production casing. The System may be upgraded to a higher pressure but still tested to the working pressures listed. If the system is upgraded all the components installed will be functional and tested

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: EMERALD FEDERAL COM

Well Number: 503H

Choke Diagram Attachment:

Emerald\_Fed\_Com\_Choke\_Manifold\_20220407193931.pdf

BOP Diagram Attachment:

Emerald\_Fed\_Com\_BOP\_10M\_20220407193941.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	SURFACE	17.5	13.375	NEW	API	N	0	1500	0	1500	3674	2174	1500	J-55	54.5	ST&C	1.42	3.86	DRY	4.3	DRY	4.3
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	6080	0	6070	3690	-2396	6080	J-55	40	LT&C	1.25	1.27	DRY	1.94	DRY	1.94
3	PRODUCTION	8.75	5.5	NEW	API	N	0	19891	0	9700	3690	-6026	19891	P-110	20	BUTT	2.27	1.28	DRY	1.76	DRY	1.76

Casing Attachments

Casing ID: 1

String SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

503H\_casing\_Assumptions\_20221020142733.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: EMERALD FEDERAL COM

Well Number: 503H

## Casing Attachments

Casing ID: 2 String INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

503H\_casing\_Assumptions\_20221020142705.pdf

Casing ID: 3 String PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

503H\_casing\_Assumptions\_20221020142624.pdf

## Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	1500	970	1.72	13.5	1668	100	Class C Cement	CLASS C + BENTONITE
SURFACE	Tail		0	1500	260	1.32	14.8	343	100	Class C Neat	CLASS C
INTERMEDIATE	Lead		0	6080	2115	1.94	12.6	4103	180	CLASS C	35:65 POZ C
INTERMEDIATE	Tail		0	6080	380	1.18	15.6	448	140	CLASS H NEAT	none
PRODUCTION	Lead		0	1989 1	1300	1.62	11.92	2106	80	CLASS H	POZ 50:50

**Operator Name:** LEGACY RESERVES OPERATING LP**Well Name:** EMERALD FEDERAL COM**Well Number:** 503H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	1989 1	2650	1.34	14.2	3551	30	CLASS H	POZ 50:50

### 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:** Sufficient mud materials will be kept on location at all times in order to combat lost circulation or unexpected kicks. An electronic PVT system will be rigged up prior to spudding this well. A volume monitoring system that measures, calculates, and displays readings from the mud system on the rig to alert the crew of impending gas kicks and lost circulation. \*\*In order to effectively run open hole logs and casing, the mud viscosity and fluid loss properties may be adjusted.

**Describe the mud monitoring system utilized:** PVT/Pason/Visual Monitoring

### 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
6100	1989 1	OTHER : Fresh Water / CUT Brine Water	8.8	9.3							
1500	6100	OTHER : Brine water	9.8	10.3							
0	1500	SPUD MUD	8.4	8.6							

**Operator Name:** LEGACY RESERVES OPERATING LP**Well Name:** EMERALD FEDERAL COM**Well Number:** 503H

## Section 6 - Test, Logging, Coring

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

No DST planned

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

MUD LOG/GEOLOGIC LITHOLOGY LOG,GAMMA RAY LOG,DIRECTIONAL SURVEY,

**Coring operation description for the well:**

NA

## Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 4420**Anticipated Surface Pressure:** 2285**Anticipated Bottom Hole Temperature(F):** 170**Anticipated abnormal pressures, temperatures, or potential geologic hazards?** YES**Describe:**

Lost circulation may be encountered in the Delaware mountain group.

**Contingency Plans geohazards description:**

Lost circulation material will be available, as well as additional drilling fluid along with the fluid volume in the drilling rig pit system. Drilling fluid can be mixed on location or mixed in vendor mud plant and trucked to location if needed.

**Contingency Plans geohazards****Hydrogen Sulfide drilling operations plan required?** YES**Hydrogen sulfide drilling operations**

Emerald\_Fed\_Com\_503H\_H2S\_Plan\_20220411141536.pdf

EMERALD\_FEDERAL\_COM\_LAYOUT.UPDATES\_EAST.PAD\_20221020143857.pdf

## Section 8 - Other Information

**Proposed horizontal/directional/multi-lateral plan submission:**

Legacy\_Reserves\_\_\_EMERALD\_FEDERAL\_COM\_503H\_\_\_Lateral\_1r0\_20221020143956.pdf

**Other proposed operations facets description:****Other proposed operations facets attachment:**

Emerald\_Fed\_Com\_Construction\_Material\_20220407194632.pdf

Emerald\_Fed\_Com\_Multibowl\_WH\_20220407194526.pdf

Emerald\_Fed\_Com\_Water\_Transportation\_Map\_20220407194546.pdf

Emerald\_Fed\_Com\_503H\_NGMP\_20220411141740.pdf

Emerald\_Fed\_Com\_503H\_Well\_Control\_Plan\_20220411141900.pdf

**Other Variance attachment:**

**Operator Name:** LEGACY RESERVES OPERATING LP

**Well Name:** EMERALD FEDERAL COM

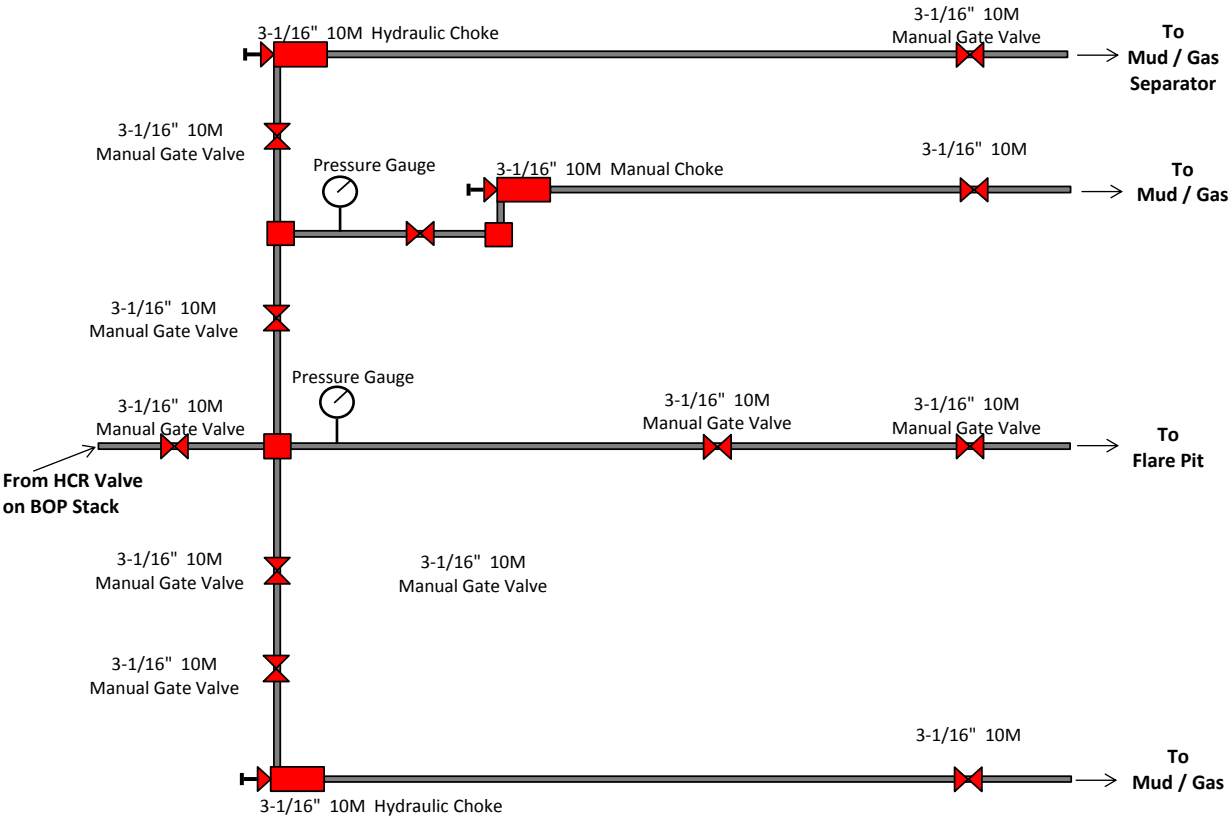
**Well Number:** 503H

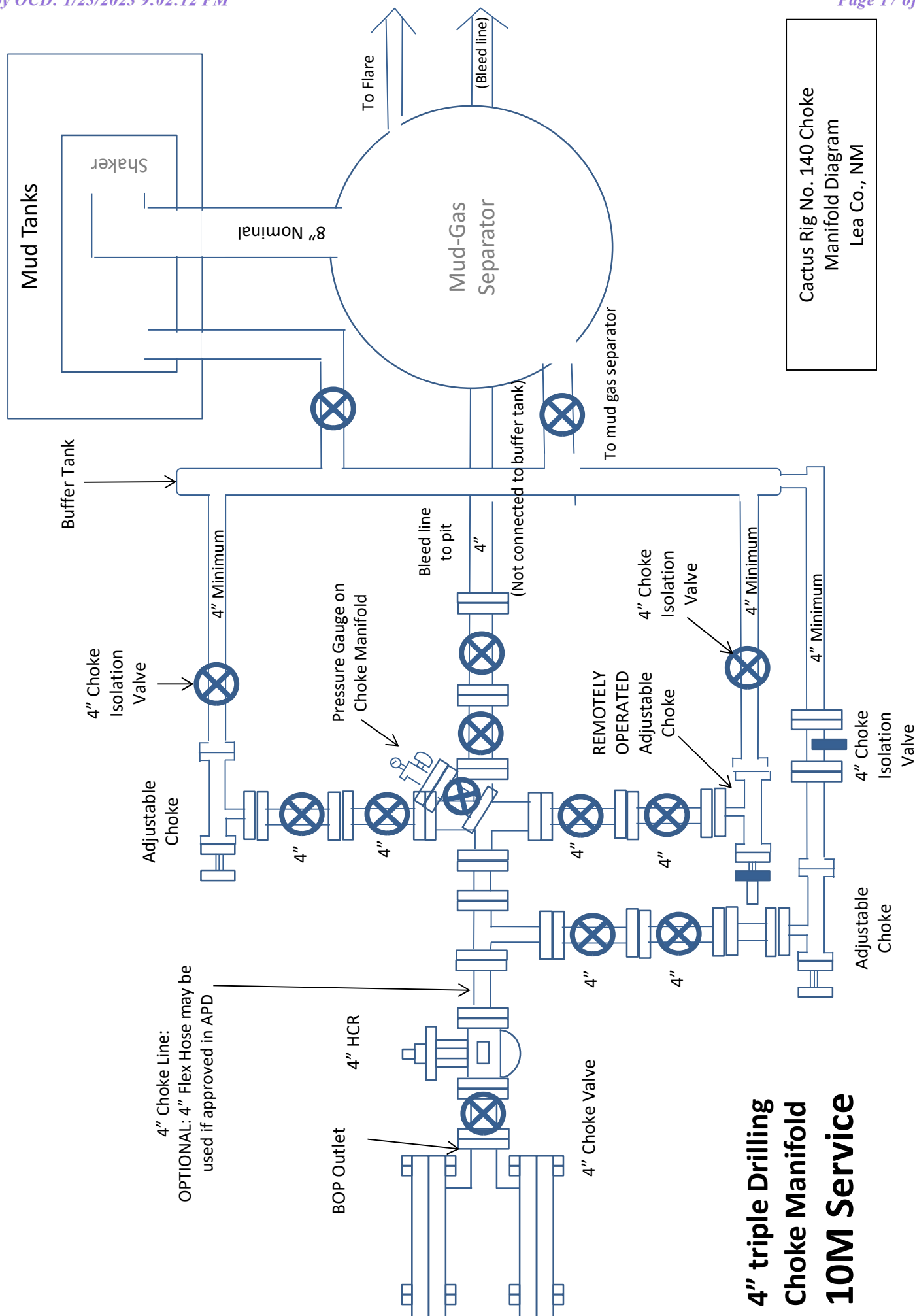
Emerald\_Fed\_Com\_Flex\_Hose\_Test\_20220407194707.pdf

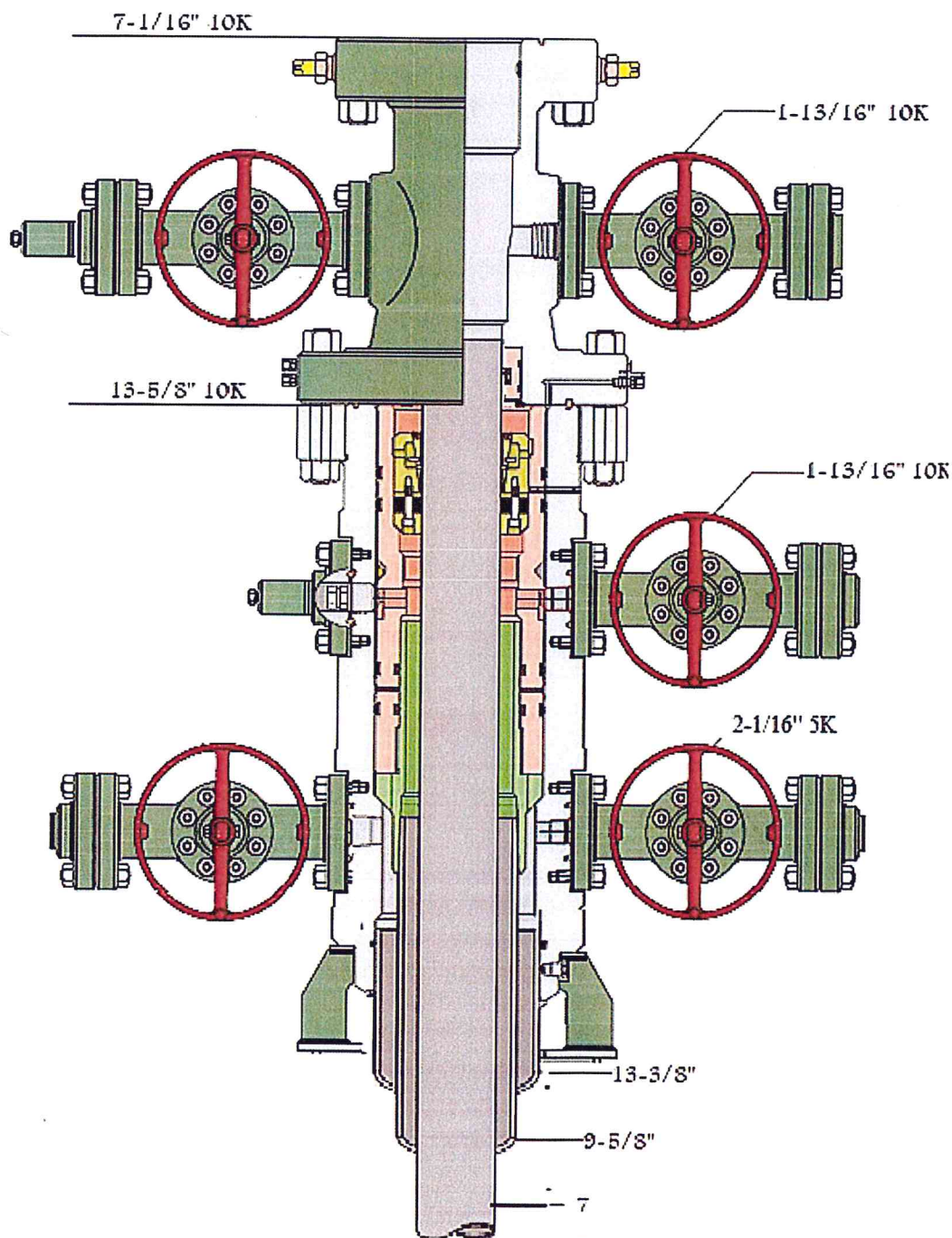
CONFIDENTIAL



Choke Manifold (10M)



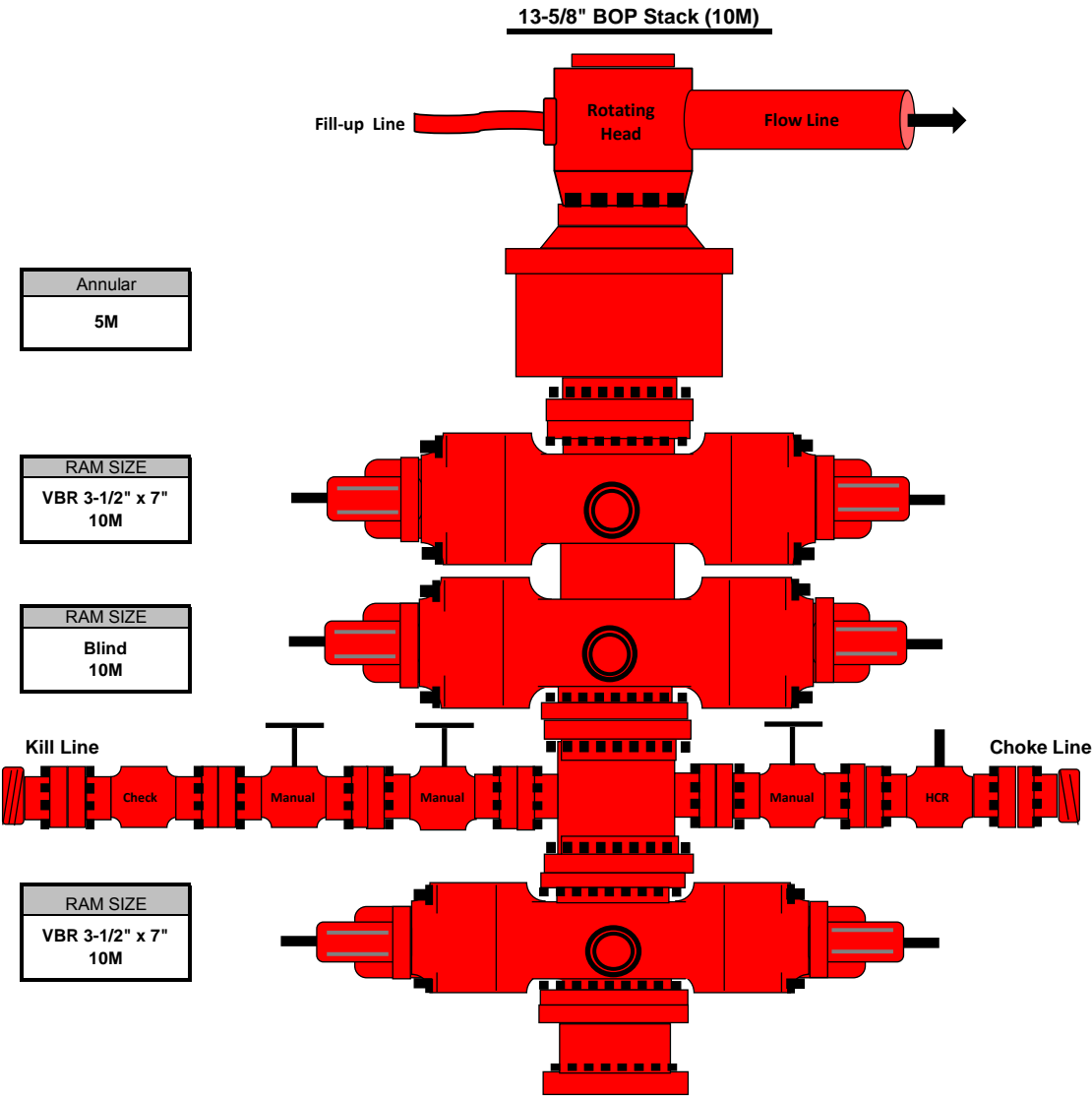




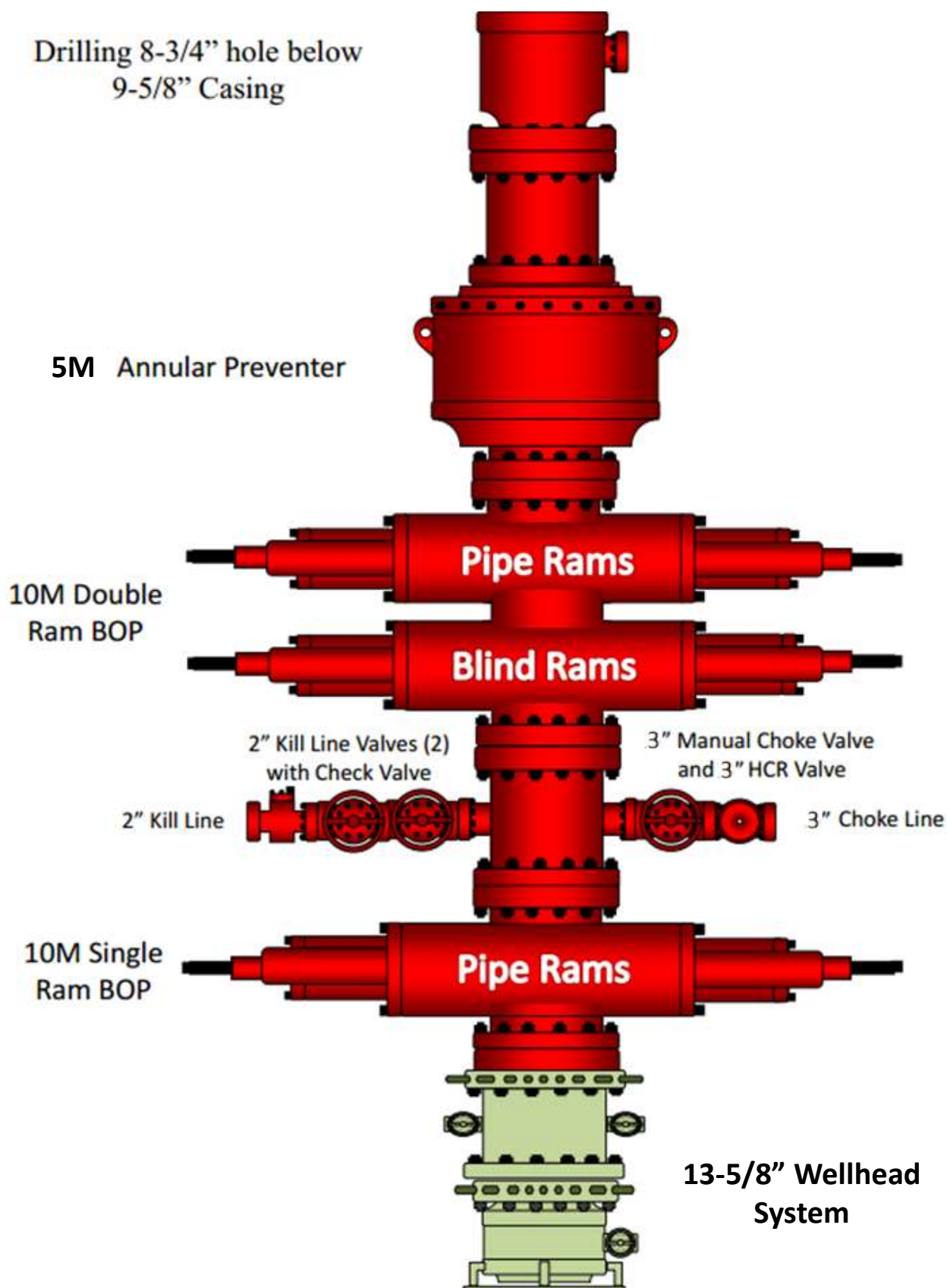
LEGACY RESERVES  
Matt Dickson  
Well: Lea Unit 65h



Rev.	1	Working Product	#	1598854
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## 13-5/8" 10M/5M BOP



**2. Casing Program Emerald 503H**

Hole Size	Casing Top Depth	Casing Set Depth	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17-1/2"	0	1500	1500	13-3/8"	54.50	J-55	STC	1.42	3.86	4.3
12-1/4"	0	6080	6070	9-5/8"	40.00	J-55	LTC	1.25	1.27	1.94
8-3/4"	0	19891	9700	5-1/2"	20.00	P-110	BTC	2.27	1.28	1.76
BLM Minimum Safety Factor								1.125	1.0	1.6 dry 1.8 wet



# **Legacy Reserves Operating LP**

**Lea Co., NM (NAD 27 NME)  
EMERALD FEDERAL COM 503H  
503H**

**Planning**

**Plan: Lateral 1r0**

## **Standard Planning Report**

**12 September, 2022**





# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

<b>Project</b>	Lea Co., NM (NAD 27 NME)		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	New Mexico East 3001		

<b>Site</b>	EMERALD FEDERAL COM 503H		
<b>Site Position:</b>		<b>Northing:</b>	612,746.74 usft
<b>From:</b>	Map	<b>Easting:</b>	695,623.78 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	32.682929°N
		<b>Longitude:</b>	103.697526°W
		<b>Grid Convergence:</b>	0.34 °

<b>Well</b>	503H		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 612,746.74 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 695,623.78 usft
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	<b>Latitude:</b> 32.682929°N
			<b>Longitude:</b> 103.697526°W
			<b>Ground Level:</b>

<b>Wellbore</b>	Planning				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	MVHD	8/31/2022	6.42	60.55	47,900.839

<b>Design</b>	Lateral 1r0			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	359.62

<b>Plan Survey Tool Program</b>	<b>Date</b>	9/9/2022		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	19,891.80	Lateral 1r0 (Planning)	MWD+HRGM
				OWSG MWD + HRGM

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.000	0.000	0.000	0.00	
2,225.59	10.51	249.25	2,222.65	-17.04	-44.96	2.000	2.000	0.000	249.25	
5,617.21	10.51	249.25	5,557.35	-236.31	-623.57	0.000	0.000	0.000	0.00	
6,142.81	0.00	0.00	6,080.00	-253.35	-668.53	2.000	-2.000	0.000	180.00	
9,189.85	0.00	0.00	9,127.04	-253.35	-668.53	0.000	0.000	0.000	0.00	
10,089.85	90.00	359.62	9,700.00	319.59	-672.31	10.000	10.000	-0.042	359.62	
19,891.80	90.00	359.62	9,700.00	10,121.33	-736.95	0.000	0.000	0.000	0.00	PBHL - EMERALD



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.000	0.000	0.000
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.000	0.000	0.000
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.000	0.000	0.000
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.000	0.000	0.000
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.000	0.000	0.000
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.000	0.000	0.000
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.000	0.000	0.000
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.000	0.000	0.000
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.000	0.000	0.000
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.000	0.000	0.000
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.000	0.000	0.000
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.000	0.000	0.000
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.000	0.000	0.000
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.000	0.000	0.000
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.000	0.000	0.000
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.000	0.000	0.000
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.000	0.000	0.000
<b>Build: 2°/100'</b>									
1,800.00	2.00	249.25	1,799.98	-0.62	-1.63	-0.61	2.000	2.000	0.000
1,900.00	4.00	249.25	1,899.84	-2.47	-6.53	-2.43	2.000	2.000	0.000
2,000.00	6.00	249.25	1,999.45	-5.56	-14.68	-5.46	2.000	2.000	0.000
2,100.00	8.00	249.25	2,098.70	-9.88	-26.07	-9.71	2.000	2.000	0.000
2,200.00	10.00	249.25	2,197.47	-15.42	-40.70	-15.15	2.000	2.000	0.000
2,225.59	10.51	249.25	2,222.65	-17.04	-44.96	-16.74	2.000	2.000	0.000
<b>Hold: 10.51° Inc, 249.25° Azm</b>									
2,300.00	10.51	249.25	2,295.81	-21.85	-57.65	-21.47	0.000	0.000	0.000
2,400.00	10.51	249.25	2,394.13	-28.31	-74.71	-27.82	0.000	0.000	0.000
2,500.00	10.51	249.25	2,492.45	-34.78	-91.77	-34.17	0.000	0.000	0.000
2,600.00	10.51	249.25	2,590.77	-41.24	-108.83	-40.52	0.000	0.000	0.000
2,700.00	10.51	249.25	2,689.09	-47.71	-125.89	-46.87	0.000	0.000	0.000
2,800.00	10.51	249.25	2,787.42	-54.17	-142.95	-53.23	0.000	0.000	0.000
2,900.00	10.51	249.25	2,885.74	-60.64	-160.01	-59.58	0.000	0.000	0.000
3,000.00	10.51	249.25	2,984.06	-67.10	-177.07	-65.93	0.000	0.000	0.000
3,100.00	10.51	249.25	3,082.38	-73.57	-194.13	-72.28	0.000	0.000	0.000
3,200.00	10.51	249.25	3,180.70	-80.04	-211.19	-78.63	0.000	0.000	0.000
3,300.00	10.51	249.25	3,279.02	-86.50	-228.25	-84.98	0.000	0.000	0.000
3,400.00	10.51	249.25	3,377.35	-92.97	-245.31	-91.34	0.000	0.000	0.000
3,500.00	10.51	249.25	3,475.67	-99.43	-262.37	-97.69	0.000	0.000	0.000
3,600.00	10.51	249.25	3,573.99	-105.90	-279.43	-104.04	0.000	0.000	0.000
3,700.00	10.51	249.25	3,672.31	-112.36	-296.49	-110.39	0.000	0.000	0.000
3,800.00	10.51	249.25	3,770.63	-118.83	-313.55	-116.74	0.000	0.000	0.000
3,900.00	10.51	249.25	3,868.95	-125.29	-330.61	-123.10	0.000	0.000	0.000
4,000.00	10.51	249.25	3,967.28	-131.76	-347.67	-129.45	0.000	0.000	0.000
4,100.00	10.51	249.25	4,065.60	-138.22	-364.73	-135.80	0.000	0.000	0.000
4,200.00	10.51	249.25	4,163.92	-144.69	-381.79	-142.15	0.000	0.000	0.000
4,300.00	10.51	249.25	4,262.24	-151.15	-398.85	-148.50	0.000	0.000	0.000
4,400.00	10.51	249.25	4,360.56	-157.62	-415.91	-154.86	0.000	0.000	0.000
4,500.00	10.51	249.25	4,458.89	-164.08	-432.97	-161.21	0.000	0.000	0.000
4,600.00	10.51	249.25	4,557.21	-170.55	-450.03	-167.56	0.000	0.000	0.000
4,700.00	10.51	249.25	4,655.53	-177.01	-467.09	-173.91	0.000	0.000	0.000
4,800.00	10.51	249.25	4,753.85	-183.48	-484.15	-180.26	0.000	0.000	0.000
4,900.00	10.51	249.25	4,852.17	-189.94	-501.21	-186.61	0.000	0.000	0.000



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
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<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,000.00	10.51	249.25	4,950.49	-196.41	-518.27	-192.97	0.000	0.000	0.000
5,100.00	10.51	249.25	5,048.82	-202.87	-535.33	-199.32	0.000	0.000	0.000
5,200.00	10.51	249.25	5,147.14	-209.34	-552.39	-205.67	0.000	0.000	0.000
5,300.00	10.51	249.25	5,245.46	-215.80	-569.45	-212.02	0.000	0.000	0.000
5,400.00	10.51	249.25	5,343.78	-222.27	-586.51	-218.37	0.000	0.000	0.000
5,500.00	10.51	249.25	5,442.10	-228.73	-603.57	-224.73	0.000	0.000	0.000
5,600.00	10.51	249.25	5,540.42	-235.20	-620.63	-231.08	0.000	0.000	0.000
5,617.21	10.51	249.25	5,557.35	-236.31	-623.57	-232.17	0.000	0.000	0.000
<b>Drop: 2°/100'</b>									
5,700.00	8.86	249.25	5,638.95	-241.25	-636.59	-237.02	2.000	-2.000	0.000
5,800.00	6.86	249.25	5,738.01	-246.09	-649.37	-241.78	2.000	-2.000	0.000
5,900.00	4.86	249.25	5,837.48	-249.71	-658.91	-245.33	2.000	-2.000	0.000
6,000.00	2.86	249.25	5,937.25	-252.09	-665.20	-247.67	2.000	-2.000	0.000
6,100.00	0.86	249.25	6,037.19	-253.24	-668.23	-248.80	2.000	-2.000	0.000
6,142.81	0.00	0.00	6,080.00	-253.35	-668.53	-248.91	2.000	-2.000	0.000
<b>Hold</b>									
6,200.00	0.00	0.00	6,137.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,300.00	0.00	0.00	6,237.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,400.00	0.00	0.00	6,337.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,500.00	0.00	0.00	6,437.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,600.00	0.00	0.00	6,537.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,700.00	0.00	0.00	6,637.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,800.00	0.00	0.00	6,737.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
6,900.00	0.00	0.00	6,837.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,000.00	0.00	0.00	6,937.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,100.00	0.00	0.00	7,037.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,200.00	0.00	0.00	7,137.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,300.00	0.00	0.00	7,237.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,400.00	0.00	0.00	7,337.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,500.00	0.00	0.00	7,437.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,600.00	0.00	0.00	7,537.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,700.00	0.00	0.00	7,637.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,800.00	0.00	0.00	7,737.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
7,900.00	0.00	0.00	7,837.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,000.00	0.00	0.00	7,937.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,100.00	0.00	0.00	8,037.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,200.00	0.00	0.00	8,137.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,300.00	0.00	0.00	8,237.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,400.00	0.00	0.00	8,337.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,500.00	0.00	0.00	8,437.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,600.00	0.00	0.00	8,537.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,700.00	0.00	0.00	8,637.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,800.00	0.00	0.00	8,737.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
8,900.00	0.00	0.00	8,837.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
9,000.00	0.00	0.00	8,937.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
9,100.00	0.00	0.00	9,037.19	-253.35	-668.53	-248.91	0.000	0.000	0.000
9,189.85	0.00	0.00	9,127.04	-253.35	-668.53	-248.91	0.000	0.000	0.000
<b>KOP: 10°/100' @ 9189.85' MD</b>									
9,200.00	1.02	359.62	9,137.19	-253.26	-668.53	-248.82	10.001	10.001	0.000
9,250.00	6.02	359.62	9,187.08	-250.20	-668.55	-245.76	10.000	10.000	0.000
9,300.00	11.02	359.62	9,236.51	-242.79	-668.60	-238.35	10.000	10.000	0.000
9,350.00	16.02	359.62	9,285.11	-231.11	-668.68	-226.67	10.000	10.000	0.000
9,400.00	21.02	359.62	9,332.51	-215.24	-668.78	-210.80	10.000	10.000	0.000



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,450.00	26.02	359.62	9,378.34	-195.30	-668.91	-190.86	10.000	10.000	0.000
9,500.00	31.02	359.62	9,422.26	-171.44	-669.07	-167.00	10.000	10.000	0.000
9,550.00	36.02	359.62	9,463.94	-143.84	-669.25	-139.40	10.000	10.000	0.000
9,600.00	41.02	359.62	9,503.05	-112.71	-669.46	-108.27	10.000	10.000	0.000
9,650.00	46.02	359.62	9,539.30	-78.30	-669.68	-73.85	10.000	10.000	0.000
9,700.00	51.02	359.62	9,572.41	-40.85	-669.93	-36.41	10.000	10.000	0.000
9,750.00	56.02	359.62	9,602.13	-0.67	-670.20	3.78	10.000	10.000	0.000
9,800.00	61.02	359.62	9,628.23	41.96	-670.48	46.40	10.000	10.000	0.000
9,850.00	66.02	359.62	9,650.52	86.70	-670.77	91.14	10.000	10.000	0.000
9,900.00	71.02	359.62	9,668.83	133.21	-671.08	137.65	10.000	10.000	0.000
9,950.00	76.02	359.62	9,683.01	181.13	-671.40	185.58	10.000	10.000	0.000
10,000.00	81.02	359.62	9,692.97	230.12	-671.72	234.57	10.000	10.000	0.000
10,050.00	86.02	359.62	9,698.61	279.78	-672.05	284.23	10.000	10.000	0.000
10,089.85	90.00	359.62	9,700.00	319.60	-672.31	324.05	9.999	9.999	0.000
Hold: 90.00° Inc, 359.62° Azm									
10,100.00	90.00	359.62	9,700.00	329.75	-672.38	334.20	0.000	0.000	0.000
10,200.00	90.00	359.62	9,700.00	429.74	-673.03	434.20	0.000	0.000	0.000
10,300.00	90.00	359.62	9,700.00	529.74	-673.69	534.20	0.000	0.000	0.000
10,400.00	90.00	359.62	9,700.00	629.74	-674.35	634.20	0.000	0.000	0.000
10,500.00	90.00	359.62	9,700.00	729.74	-675.01	734.20	0.000	0.000	0.000
10,600.00	90.00	359.62	9,700.00	829.74	-675.67	834.20	0.000	0.000	0.000
10,700.00	90.00	359.62	9,700.00	929.73	-676.33	934.20	0.000	0.000	0.000
10,800.00	90.00	359.62	9,700.00	1,029.73	-676.99	1,034.20	0.000	0.000	0.000
10,900.00	90.00	359.62	9,700.00	1,129.73	-677.65	1,134.20	0.000	0.000	0.000
11,000.00	90.00	359.62	9,700.00	1,229.73	-678.31	1,234.20	0.000	0.000	0.000
11,100.00	90.00	359.62	9,700.00	1,329.73	-678.97	1,334.20	0.000	0.000	0.000
11,200.00	90.00	359.62	9,700.00	1,429.72	-679.63	1,434.20	0.000	0.000	0.000
11,300.00	90.00	359.62	9,700.00	1,529.72	-680.29	1,534.20	0.000	0.000	0.000
11,400.00	90.00	359.62	9,700.00	1,629.72	-680.95	1,634.20	0.000	0.000	0.000
11,500.00	90.00	359.62	9,700.00	1,729.72	-681.61	1,734.20	0.000	0.000	0.000
11,600.00	90.00	359.62	9,700.00	1,829.71	-682.27	1,834.20	0.000	0.000	0.000
11,700.00	90.00	359.62	9,700.00	1,929.71	-682.93	1,934.20	0.000	0.000	0.000
11,800.00	90.00	359.62	9,700.00	2,029.71	-683.59	2,034.20	0.000	0.000	0.000
11,900.00	90.00	359.62	9,700.00	2,129.71	-684.25	2,134.20	0.000	0.000	0.000
12,000.00	90.00	359.62	9,700.00	2,229.71	-684.91	2,234.20	0.000	0.000	0.000
12,100.00	90.00	359.62	9,700.00	2,329.70	-685.57	2,334.20	0.000	0.000	0.000
12,200.00	90.00	359.62	9,700.00	2,429.70	-686.22	2,434.20	0.000	0.000	0.000
12,300.00	90.00	359.62	9,700.00	2,529.70	-686.88	2,534.20	0.000	0.000	0.000
12,400.00	90.00	359.62	9,700.00	2,629.70	-687.54	2,634.20	0.000	0.000	0.000
12,500.00	90.00	359.62	9,700.00	2,729.69	-688.20	2,734.20	0.000	0.000	0.000
12,600.00	90.00	359.62	9,700.00	2,829.69	-688.86	2,834.20	0.000	0.000	0.000
12,700.00	90.00	359.62	9,700.00	2,929.69	-689.52	2,934.20	0.000	0.000	0.000
12,800.00	90.00	359.62	9,700.00	3,029.69	-690.18	3,034.20	0.000	0.000	0.000
12,900.00	90.00	359.62	9,700.00	3,129.69	-690.84	3,134.20	0.000	0.000	0.000
13,000.00	90.00	359.62	9,700.00	3,229.68	-691.50	3,234.20	0.000	0.000	0.000
13,100.00	90.00	359.62	9,700.00	3,329.68	-692.16	3,334.20	0.000	0.000	0.000
13,200.00	90.00	359.62	9,700.00	3,429.68	-692.82	3,434.20	0.000	0.000	0.000
13,300.00	90.00	359.62	9,700.00	3,529.68	-693.48	3,534.20	0.000	0.000	0.000
13,400.00	90.00	359.62	9,700.00	3,629.68	-694.14	3,634.20	0.000	0.000	0.000
13,500.00	90.00	359.62	9,700.00	3,729.67	-694.80	3,734.20	0.000	0.000	0.000
13,600.00	90.00	359.62	9,700.00	3,829.67	-695.46	3,834.20	0.000	0.000	0.000
13,700.00	90.00	359.62	9,700.00	3,929.67	-696.12	3,934.20	0.000	0.000	0.000
13,800.00	90.00	359.62	9,700.00	4,029.67	-696.78	4,034.20	0.000	0.000	0.000
13,900.00	90.00	359.62	9,700.00	4,129.66	-697.44	4,134.20	0.000	0.000	0.000



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
14,000.00	90.00	359.62	9,700.00	4,229.66	-698.10	4,234.20	0.000	0.000	0.000
14,100.00	90.00	359.62	9,700.00	4,329.66	-698.75	4,334.20	0.000	0.000	0.000
14,200.00	90.00	359.62	9,700.00	4,429.66	-699.41	4,434.20	0.000	0.000	0.000
14,300.00	90.00	359.62	9,700.00	4,529.66	-700.07	4,534.20	0.000	0.000	0.000
14,400.00	90.00	359.62	9,700.00	4,629.65	-700.73	4,634.20	0.000	0.000	0.000
14,500.00	90.00	359.62	9,700.00	4,729.65	-701.39	4,734.20	0.000	0.000	0.000
14,600.00	90.00	359.62	9,700.00	4,829.65	-702.05	4,834.20	0.000	0.000	0.000
14,700.00	90.00	359.62	9,700.00	4,929.65	-702.71	4,934.20	0.000	0.000	0.000
14,800.00	90.00	359.62	9,700.00	5,029.64	-703.37	5,034.20	0.000	0.000	0.000
14,900.00	90.00	359.62	9,700.00	5,129.64	-704.03	5,134.20	0.000	0.000	0.000
15,000.00	90.00	359.62	9,700.00	5,229.64	-704.69	5,234.20	0.000	0.000	0.000
15,100.00	90.00	359.62	9,700.00	5,329.64	-705.35	5,334.20	0.000	0.000	0.000
15,200.00	90.00	359.62	9,700.00	5,429.64	-706.01	5,434.20	0.000	0.000	0.000
15,300.00	90.00	359.62	9,700.00	5,529.63	-706.67	5,534.20	0.000	0.000	0.000
15,400.00	90.00	359.62	9,700.00	5,629.63	-707.33	5,634.20	0.000	0.000	0.000
15,500.00	90.00	359.62	9,700.00	5,729.63	-707.99	5,734.20	0.000	0.000	0.000
15,600.00	90.00	359.62	9,700.00	5,829.63	-708.65	5,834.20	0.000	0.000	0.000
15,700.00	90.00	359.62	9,700.00	5,929.63	-709.31	5,934.20	0.000	0.000	0.000
15,800.00	90.00	359.62	9,700.00	6,029.62	-709.97	6,034.20	0.000	0.000	0.000
15,900.00	90.00	359.62	9,700.00	6,129.62	-710.63	6,134.20	0.000	0.000	0.000
16,000.00	90.00	359.62	9,700.00	6,229.62	-711.28	6,234.20	0.000	0.000	0.000
16,100.00	90.00	359.62	9,700.00	6,329.62	-711.94	6,334.20	0.000	0.000	0.000
16,200.00	90.00	359.62	9,700.00	6,429.61	-712.60	6,434.20	0.000	0.000	0.000
16,300.00	90.00	359.62	9,700.00	6,529.61	-713.26	6,534.20	0.000	0.000	0.000
16,400.00	90.00	359.62	9,700.00	6,629.61	-713.92	6,634.20	0.000	0.000	0.000
16,500.00	90.00	359.62	9,700.00	6,729.61	-714.58	6,734.20	0.000	0.000	0.000
16,600.00	90.00	359.62	9,700.00	6,829.61	-715.24	6,834.20	0.000	0.000	0.000
16,700.00	90.00	359.62	9,700.00	6,929.60	-715.90	6,934.20	0.000	0.000	0.000
16,800.00	90.00	359.62	9,700.00	7,029.60	-716.56	7,034.20	0.000	0.000	0.000
16,900.00	90.00	359.62	9,700.00	7,129.60	-717.22	7,134.20	0.000	0.000	0.000
17,000.00	90.00	359.62	9,700.00	7,229.60	-717.88	7,234.20	0.000	0.000	0.000
17,100.00	90.00	359.62	9,700.00	7,329.59	-718.54	7,334.20	0.000	0.000	0.000
17,200.00	90.00	359.62	9,700.00	7,429.59	-719.20	7,434.20	0.000	0.000	0.000
17,300.00	90.00	359.62	9,700.00	7,529.59	-719.86	7,534.20	0.000	0.000	0.000
17,400.00	90.00	359.62	9,700.00	7,629.59	-720.52	7,634.20	0.000	0.000	0.000
17,500.00	90.00	359.62	9,700.00	7,729.59	-721.18	7,734.20	0.000	0.000	0.000
17,600.00	90.00	359.62	9,700.00	7,829.58	-721.84	7,834.20	0.000	0.000	0.000
17,700.00	90.00	359.62	9,700.00	7,929.58	-722.50	7,934.20	0.000	0.000	0.000
17,800.00	90.00	359.62	9,700.00	8,029.58	-723.16	8,034.20	0.000	0.000	0.000
17,900.00	90.00	359.62	9,700.00	8,129.58	-723.81	8,134.20	0.000	0.000	0.000
18,000.00	90.00	359.62	9,700.00	8,229.58	-724.47	8,234.20	0.000	0.000	0.000
18,100.00	90.00	359.62	9,700.00	8,329.57	-725.13	8,334.20	0.000	0.000	0.000
18,200.00	90.00	359.62	9,700.00	8,429.57	-725.79	8,434.20	0.000	0.000	0.000
18,300.00	90.00	359.62	9,700.00	8,529.57	-726.45	8,534.20	0.000	0.000	0.000
18,400.00	90.00	359.62	9,700.00	8,629.57	-727.11	8,634.20	0.000	0.000	0.000
18,500.00	90.00	359.62	9,700.00	8,729.56	-727.77	8,734.20	0.000	0.000	0.000
18,600.00	90.00	359.62	9,700.00	8,829.56	-728.43	8,834.20	0.000	0.000	0.000
18,700.00	90.00	359.62	9,700.00	8,929.56	-729.09	8,934.20	0.000	0.000	0.000
18,800.00	90.00	359.62	9,700.00	9,029.56	-729.75	9,034.20	0.000	0.000	0.000
18,900.00	90.00	359.62	9,700.00	9,129.56	-730.41	9,134.20	0.000	0.000	0.000
19,000.00	90.00	359.62	9,700.00	9,229.55	-731.07	9,234.20	0.000	0.000	0.000
19,100.00	90.00	359.62	9,700.00	9,329.55	-731.73	9,334.20	0.000	0.000	0.000
19,200.00	90.00	359.62	9,700.00	9,429.55	-732.39	9,434.20	0.000	0.000	0.000
19,300.00	90.00	359.62	9,700.00	9,529.55	-733.05	9,534.20	0.000	0.000	0.000



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
19,400.00	90.00	359.62	9,700.00	9,629.54	-733.71	9,634.20	0.000	0.000	0.000
19,500.00	90.00	359.62	9,700.00	9,729.54	-734.37	9,734.20	0.000	0.000	0.000
19,600.00	90.00	359.62	9,700.00	9,829.54	-735.03	9,834.20	0.000	0.000	0.000
19,700.00	90.00	359.62	9,700.00	9,929.54	-735.69	9,934.20	0.000	0.000	0.000
19,800.00	90.00	359.62	9,700.00	10,029.54	-736.34	10,034.20	0.000	0.000	0.000
19,891.79	90.00	359.62	9,700.00	10,121.32	-736.95	10,125.99	0.000	0.000	0.000
<b>PBHL</b>									
19,891.80	90.00	359.62	9,700.00	10,121.33	-736.95	10,126.00	0.000	0.000	0.000

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
FTP - EMERALD FEC	0.00	0.00	9,700.00	-253.35	-668.53	612,493.39	694,955.25	32.682244°N	103.699704°W
- plan misses target center by 237.44usft at 9646.00usft MD (9536.51 TVD, -81.16 N, -669.67 E)									
- Point									
PBHL - EMERALD FE	0.00	0.00	9,700.00	10,121.33	-736.95	622,868.07	694,886.83	32.710761°N	103.699725°W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,500.00	1,500.00	Casing	13-3/8	17-1/2	
6,142.81	6,080.00	Casing	9-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,420.00	1,420.00	Rustler				
3,154.53	3,136.00	Base of Salt				
3,304.04	3,283.00	Yates				
4,316.03	4,278.00	Queen				
6,083.80	6,021.00	Delaware				
7,983.81	7,921.00	Bone Spring				
9,213.82	9,151.00	1st Bone Spring Sand				
9,540.25	9,456.00	2nd Bone Spring Carb				



# Aim Directional Services, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db-PR	<b>Local Co-ordinate Reference:</b>	Site EMERALD FEDERAL COM 503H
<b>Company:</b>	Legacy Reserves Operating LP	<b>TVD Reference:</b>	Mean Sea Level (System)
<b>Project:</b>	Lea Co., NM (NAD 27 NME)	<b>MD Reference:</b>	Mean Sea Level (System)
<b>Site:</b>	EMERALD FEDERAL COM 503H	<b>North Reference:</b>	Grid
<b>Well:</b>	503H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Planning		
<b>Design:</b>	Lateral 1r0		

### Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,700.00	1,700.00	0.00	0.00	Build: 2°/100'
2,225.59	2,222.65	-17.04	-44.96	Hold: 10.51° Inc, 249.25° Azm
5,617.21	5,557.35	-236.31	-623.57	Drop: 2°/100'
6,142.81	6,080.00	-253.35	-668.53	Hold
9,189.85	9,127.04	-253.35	-668.53	KOP: 10°/100' @ 9189.85' MD
10,089.85	9,700.00	319.60	-672.31	Hold: 90.00° Inc, 359.62° Azm
19,891.79	9,700.00	10,121.32	-736.95	PBHL



## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>Legacy</b>
<b>LEASE NO.:</b>	<b>NMNM077002</b>
<b>LOCATION:</b>	Section 6, T.19 S., R.33 E., NMPM
<b>COUNTY:</b>	Lea County, New Mexico

<b>WELL NAME &amp; NO.:</b>	Emerald Fed Com 503H
<b>SURFACE HOLE FOOTAGE:</b>	350'/S & 1250'/W
<b>BOTTOM HOLE FOOTAGE:</b>	100'/N & 2310'/W

COA

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input checked="" type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit

### A. HYDROGEN SULFIDE

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Delaware, Atoka and Strawn** formations. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

### B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **1500** feet (a minimum of **25 feet (Lea County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the 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 six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8**

**hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
- d. If cement falls back, remedial cementing will be done prior to drilling out that string.

**Intermediate casing must be kept 1/3<sup>rd</sup> fluid filled to meet BLM minimum collapse requirement.**

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
  - Cement to surface. If cement does not circulate see B.1.a, c-d above.

**Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

**Contingency:**

**Operator is approve to use a DV Tool. Operator shall contact BLM before starting DV Tool operation.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
  - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

**C. PRESSURE CONTROL**

1. **Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).**
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
  - 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 OOGO2.III.A.2.i must be followed.

#### **D. SPECIAL REQUIREMENT (S)**

##### **Communitization Agreement**

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, 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.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

## **GENERAL REQUIREMENTS**

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Eddy County

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)  
689-5981

1. 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
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
  2. 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.
  3. 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 submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. 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 integrity 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 integrity 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 that portion of any 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. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. 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. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
  - e. 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.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the 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 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 not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
  - 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 results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. 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 if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company 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

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

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.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**ZS 070522**



**LEGACY RESERVES OPERATING, L. P.**  
**HYDROGEN SULFIDE (H<sub>2</sub>S) CONTINGENCY PLAN**  
**Emerald Federal Com #503H**  
**Assumed 100 ppm ROE = 3000'**

100 ppm H<sub>2</sub>S concentration shall trigger activation of this plan.

**This is an open drilling site. H<sub>2</sub>S monitoring equipment and emergency response equipment will be rigged up and in use when the company drills out from under surface casing. H<sub>2</sub>S monitors, warning signs, wind indicators and flags will be in use.**

- A. All personnel shall receive proper H<sub>2</sub>S 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 briefing area. 2 units shall be stored in the safety trailer.
    - b. Work/Escapes packs – 4 packs shall be stored on the rig floor with sufficient air hose 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" OSHA approved rope
- d. One 20# class ABC fire extinguisher
- H<sub>2</sub>S detection and monitoring Equipment:

The stationary detector with three sensors will be placed in the upper doghouse, 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 flare 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 drilling site.
  - c. Two wind socks will be placed in strategic locations being visible from all angles.
- Mud Program:  
The mud program has been designated to minimize the volume of H<sub>2</sub>S circulated to surface. The operator will have the necessary mud products to minimize hazards while drilling in H<sub>2</sub>S bearing zones.
- Metallurgy:
  - a. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, shall be suitable for H<sub>2</sub>S service.
  - b. All elastomers used for packing and seals shall be H<sub>2</sub>S trim.
- Communication:  
Communication will be via two way radio in emergency and company vehicles. Cell phones and land lines where available.

### **H<sub>2</sub>S Operations**

Though no H<sub>2</sub>S is anticipated during the drilling operation, this contingency plan will provide for methods to ensure the well is kept under control in the event an H<sub>2</sub>S reading of 100 ppm or more are encountered. Once personnel are safe and the proper protective gear is in place and on personnel, the operator and rig crew essential personnel will ensure the well is under control, suspend drilling operations and shut-in the well (unless pressure build up or other operational situations dictate suspending operations will prevent well control), increase the mud weight and circulate all gas from the hole utilizing the mud/gas separator downstream of the choke, the choke manifold and the emergency flare system located 150' from the well. Bring the mud system into compliance and the H<sub>2</sub>S level below 10 ppm, then notify all emergency officers that drilling ahead is practical and safe.

Proceed with drilling ahead only after all provisions of Onshore Order 6, Section III.C. have been satisfied.

### **Ignition of Gas source**

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO<sub>2</sub>). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever this is an ignition of the gas.

**Characteristics of H<sub>2</sub>S and SO<sub>2</sub>**

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H <sub>2</sub> S	1.189 Air = 1	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO <sub>2</sub>	2.21 Air = 1	2 ppm	N/A	1000 ppm

**Contacting Authorities**

Legacy Reserves Operating's personnel must liaison with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including directions to site. The following call list of essential and potential responders has been prepared for use during a release. Legacy's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER).

**Emergency Assistance Telephone List**

<b><u>PUBLIC SAFETY:</u></b>	<b><u>911 or</u></b>
Lea County Sheriff or Police	(575) 396-3611
Fire Department	(575) 397-9308
Hospital	(575) 492-5000
Ambulance	911
Department of Public Safety	(392) 392-5588
Oil Conservation Division	(575) 748-1823
New Mexico Energy, Minerals & Natural Resources Department	(575) 748-1283
<b><u>LEGACY RESERVES OPERATING LP</u></b>	
Legacy Reserves Operating LP	Office: (432) 689-5200
Drilling Manager: Ron Welch	Office: (432) 689-5200
Drilling Engineer: Ryan Broglie	Office: (432) 689-5200 Cell: (512) 913-0276
Operations Manager: Mark Conrad	Office: (432) 689-5200
<b><u>LEGACY SAFETY</u></b>	<b><u>Hobbs (575) 393-7233</u></b>
EHS Coordinator:	
Field Operations Manager: Randy Williams	Office: (432) 689-5200 Cell: (432) 260-5566

Evacuee Description:

Residents: THERE ARE NO RESIDENTS WITHIN 3000' ROE.



## Emerald Federal Com #503H

### BOPE Preventer Utilization

The table below displays all BHA components, drill pipe, casing, or open hole that could be present during a required shut in and the associated preventer component that would provide a barrier to flow. It is specific to the hole section that requires a 10M system. The mud system being utilized in the hole will always assumed to be the first barrier to flow. The below table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill String Element	OD	Preventer	RWP
4" Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
4.5" Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
4" HWDP Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
4.5" HWDP Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
Drill Collars (including non-magnetic)	4.75- 5.25"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
Production Casing	5.5"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
Production Casing	5"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
Production Casing	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR* Upper Ram 3 1/2" - 5 1/2" VBR*	10M
ALL	0-13 5/8"	Annular	5M
Open Hole		Blind Rams	10M

\*VBR – Variable Bore Ram|

## Page 2- Emerald Federal Com #503H

### **Well Control Procedures**

Proper well control response is highly specific to current well conditions and must be adapted based on environment as needed. The procedures below are given in "common" operating conditions to cover the basic and most necessary operations required during the wellbore construction. These include drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole. In some of the procedures below, there will be a switch of control from the lesser RWP annular to the appropriate 10M RWP ram. The pressure at which this is done is variable based on overall well conditions that must be evaluated situationally. The pressure that control is switched may be equal to or less than the RWP but at no time will the pressure on the annular preventer exceed the RWP of the annular. The annular will be tested to 5,000 psi. This will be the RWP of the annular preventer.

#### ***Shutting In While Drilling***

1. Sound alarm to alert crew
2. Space out drill string
3. Shut down pumps
4. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure
9. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

#### ***Shutting In While Tripping***

1. Sound alarm and alert crew
2. Install open, full open safety valve and close valve
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

#### ***Shutting In While Running Casing***

1. Sound alarm and alert crew
2. Install circulating swedge. Close high pressure, low torque valves.
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold Pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

## Page 3- Emerald Federal Com #503H

### ***Shutting in while out of hole***

1. Sound alarm
2. Shut-in well: close blind rams
3. Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

### ***Shutting in prior to pulling BHA through stack***

1. Prior to pulling last joint of drill pipe thru the stack space out and check flow. If flowing see steps below.
2. Sound alarm and alert crew
3. Install open, full open safety valve and close valve
4. Shut in upper pipe ram and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

### ***Shutting in while BHA is in the stack and ram preventer and combo immediately available***

1. Sound alarm and alert crew
2. Stab Crossover and install open, full open safety valve and close valve
3. Space out drill string with upset just beneath the compatible pipe ram.
4. Shut in upper compatible pipe ram and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

### ***Shutting in while BHA is in the stack and no ram preventer or combo immediately available***

1. Sound alarm and alert crew
2. If possible pick up high enough, to pull string clear and follow "Open Hole" scenario
3. If not possible to pick up high enough:
  1. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve and close valve
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR.
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

**EMERGENCY ASSISTANCE CONTACT LIST**

<b><u>PUBLIC SAFETY:</u></b>	<b><u>911 or</u></b>
Lea County Sheriff or Police	(575) 396-3611
Fire Department	(575) 397-9308
Hospital	(575) 492-5000
Ambulance	911
Department of Public Safety	(392) 392-5588
Oil Conservation Division	(575) 748-1823
New Mexico Energy, Minerals & Natural Resources Department	(575) 748-1283

**LEGACY RESERVES OPERATING LP**

Legacy Reserves Operating LP	Office: (432) 689-5200
Drilling Manager: Ron Welch	Office: (432) 689-5200
Drilling Engineer: Ryan Broglie	Office: (432) 689-5200 Cell: (512) 913-0276
Operations Manager: Mark Conrad	Office: (432) 689-5200

**DRILLING CONTRACTOR – CACTUS DRILLING**

Rig Managers:	
Kevin Whisnet	Cell: (318) 413-0198
Daniel Moore	Cell: (580) 606-7260
Drilling Superintendent: Ryan Stuart	Cell: (580) 641-1870

**LEGACY SAFETY**

EHS Coordinator (Hobbs):	Office: (575) 393-7233
Field Operations Manager:	Office: (432) 689-5200
Randy Williams	Cell: (432) 260-5566



**District I**

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

**District II**

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Phone:(575) 748-1283 Fax:(575) 748-9720

**District III**

1000 Rio Brazos Rd., Aztec, NM 87410  
Phone:(505) 334-6178 Fax:(505) 334-6170

**District IV**

1220 S. St Francis Dr., Santa Fe, NM 87505  
Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 178788

**CONDITIONS**

Operator: LEGACY RESERVES OPERATING, LP 15 Smith Road Midland, TX 79705	OGRID: 240974
	Action Number: 178788
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

**CONDITIONS**

Created By	Condition	Condition Date
pkautz	Will require a File As Drilled C-102 and a Directional Survey with the C-104	1/26/2023
pkautz	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	1/26/2023
pkautz	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	1/26/2023
pkautz	Cement is required to circulate on both surface and intermediate1 strings of casing	1/26/2023