Form 3160-3
(March 2012)

OCD - HOBBS
09/04/2018
RECEIVED

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. NMNM0001747

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No. LEA UNIT 66H [302802]

2. Name of Operator LEGACY RESERVES OPERATING LP [240974]

9. API Well No. 30-025-45154

3a. Address 303 West Wall St., Ste 1800 Midland TX 7970

3b. Phone No. *(include area code)* (432)689-5287

10. Field and Pool, or Exploratory LEA / BONE SPRING (OIL) [37570]

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

At surface NWSE / 2270 FSL / 1380 FEL / LAT 32.5576023 / LONG -103.5096494

At proposed prod. zone NWNE / 330 FNL / 1700 FEL / LAT 32.5794581 / LONG -103.5106832

11. Sec., T. R. M. or Blk. and Survey or Area SEC 24 / T20S / R34E / NMP

14. Distance in miles and direction from nearest town or post office* 26 miles

12. County or Parish LEA

13. State NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 1380 feet

16. No. of acres in lease 360

17. Spacing Unit dedicated to this well 240

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 50 feet

19. Proposed Depth 10932 feet / 18300 feet

20. BLM/BIA Bond No. on file FED: NMB001015

21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3676 feet

22. Approximate date work will start* 06/20/2018

23. Estimated duration 45 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Blayne Housh / Ph: (405)286-9326	03/27/2018

Title: Permitting Specialist

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	07/11/2018

Title	Office
Assistant Field Manager Lands & Minerals	CARLSBAD

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

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

(Continued on page 2)

*(Instructions on page 2)

GCP received 09/04/2018

APPROVED WITH CONDITIONS

09/04/2018

Approval Date: 07/11/2018

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.
AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160
PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.
ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.
EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Approval Date: 07/11/2018

Additional Operator Remarks

Location of Well

1. SHL: NWSE / 2270 FSL / 1380 FEL / TWSP: 20S / RANGE: 34E / SECTION: 24 / LAT: 32.5576023 / LONG: -103.5096494 (TVD: 0 feet, MD: 0 feet)
   PPP: SWNE / 2640 FNL / 1627 FEL / TWSP: 20S / RANGE: 33E / SECTION: 13 / LAT: 32.573142 / LONG: -103.510387 (TVD: 10952 feet, MD: 16200 feet)
   PPP: SWSE / 0 FSL / 1520 FEL / TWSP: 20S / RANGE: 33E / SECTION: 13 / LAT: 32.565886 / LONG: -103.510047 (TVD: 10978 feet, MD: 13500 feet)
   PPP: SWNE / 2310 FNL / 1410 FEL / TWSP: 20S / RANGE: 34E / SECTION: 24 / LAT: 32.5595164 / LONG: -103.5097444 (TVD: 10995 feet, MD: 11225 feet)
   BHL: NWNE / 330 FNL / 1700 FEL / TWSP: 20S / RANGE: 34E / SECTION: 13 / LAT: 32.5794581 / LONG: -103.5106832 (TVD: 10932 feet, MD: 18300 feet)

BLM Point of Contact

Name: Katrina Ponder
Title: Geologist
Phone: 5752345969
Email: kponder@blm.gov

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

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

Operator Certification Data Report

08/06/2018

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Blayne Housh **Signed on:** 03/26/2018

Title: Permitting Specialist

Street Address: 1219 Classen Drive

City: Oklahoma City **State:** OK **Zip:** 73103

Phone: (405)286-9326

Email address: bhoush@rsenergysolutions.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

Email address:

AFMSS

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

Application Data Report

08/06/2018

APD ID: 10400028589 **Submission Date:** 03/27/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

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

30-025-45154

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400028589 **Tie to previous NOS?** **Submission Date:** 03/27/2018

BLM Office: CARLSBAD **User:** Blayne Housh **Title:** Permitting Specialist

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM0001747 **Lease Acres:** 360

Surface access agreement in place? **Allotted?** **Reservation:**

Agreement in place? NO **Federal or Indian agreement:**

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? YES **APD Operator:** LEGACY RESERVES OPERATING LP

Operator letter of designation: Authorization_Letter_for_Reagan_Smith_Lea_66H_20180320080134.pdf

Operator Info

Operator Organization Name: LEGACY RESERVES OPERATING LP

Operator Address: 303 West Wall St., Ste 1800 **Zip:** 79701

Operator PO Box:

Operator City: Midland **State:** TX

Operator Phone: (432)689-5287

Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? EXISTING **Mater Development Plan name:** Lea Unit Master Dev Plan

Well in Master SUPO? NO **Master SUPO name:**

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: LEA UNIT **Well Number:** 66H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** LEA **Pool Name:** BONE SPRING (OIL)

Is the proposed well in an area containing other mineral resources? POTASH

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** YES **New surface disturbance?** Y

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** LEA UNIT **Number:** 42H

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 26 Miles **Distance to nearest well:** 50 FT **Distance to lease line:** 1380 FT

Reservoir well spacing assigned acres Measurement: 240 Acres

Well plat: 66H_Location_Map_20180320080439.pdf

66H_Well_Pad_Plat_03_12_18_20180320080450.pdf

Lea_Unit_66H_Signed_03_12_18_20180320080516.pdf

Well work start Date: 06/20/2018 **Duration:** 45 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	2270	FSL	1380	FEL	20S	34E	24	Aliquot NWSE	32.5576023	-103.5096494	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 020979	3676	0	0
KOP Leg #1	2567	FSL	1412	FEL	20S	34E	24	Aliquot NWSE	32.55843	-103.509697	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 020979	-6853	10550	10529

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	2310	FNL	1410	FEL	20S	34E	24	Aliquot SWNE	32.5595164	-103.5097444	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0001747	-7319	11225	10995
PPP Leg #1	0	FSL	1520	FEL	20S	33E	13	Aliquot SWSE	32.565886	-103.510047	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0003085	-7302	13500	10978
PPP Leg #1	2640	FNL	1627	FEL	20S	33E	13	Aliquot SWNE	32.573142	-103.510387	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0053434	-7276	16200	10952
EXIT Leg #1	330	FNL	1700	FEL	20S	34E	13	Aliquot NWNE	32.5794581	-103.5106832	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0053434	-7256	18300	10932
BHL Leg #1	330	FNL	1700	FEL	20S	34E	13	Aliquot NWNE	32.5794581	-103.5106832	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0053434	-7256	18300	10932

LEGACY
RESERVES
303 W. Wall, Suite 1800 - Midland, Texas 79701
(432) 689-5200

March 12, 2018

Bureau of Land Management
Division of Oil and Gas
620 E. Greene Street
Carlsbad, NM 88220-6292
Attn: Land Law Examiner

Re: Legacy Reserves Operating, L.P.
Designation of Agent
Lea Unit 66H
24-20S-34E NMPM
Lea County, NM

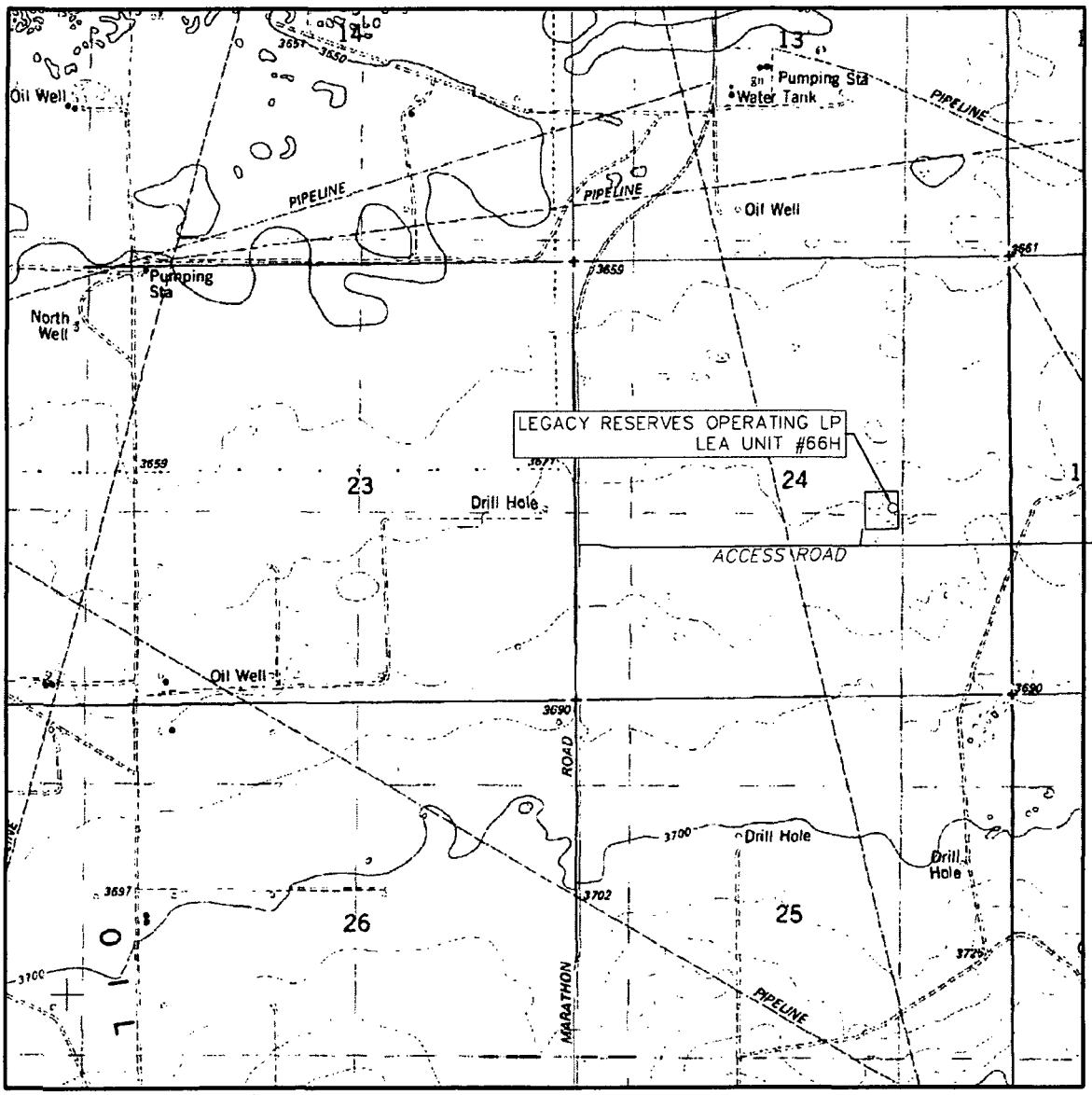
To whom it may concern:

Legacy Reserves Operating, L.P. has contracted with Reagan Smith Energy Solutions, Inc. to assist in regulatory compliance associated with the Lea Unit 66H. Reagan Smith Energy Solutions, Inc. has the authority to act as Legacy Reserves Operating, L.P.'s agent to maintain regulatory compliance for the Lea Unit 66H. This includes the submittal of an APD, Communitization Agreement, Designations of Operator, Sundry Notices, and any other regulatory documents on behalf of Legacy Reserves Operating, L.P. in order to maintain regulatory compliance with the Bureau of Land Management in regard to the above referenced project.

Sincerely,

Matthew Dickson
Legacy Reserves Operating, L.P.

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
LEA – 10'

SEC. 24 TWP. 20-S RGE. 34-E

SURVEY N.M.P.M.

COUNTY LEA

DESCRIPTION 2270' FSL & 1380' FEL

ELEVATION 3676'

OPERATOR LEGACY RESERVES OPERATING LP

LEASE LEA UNIT

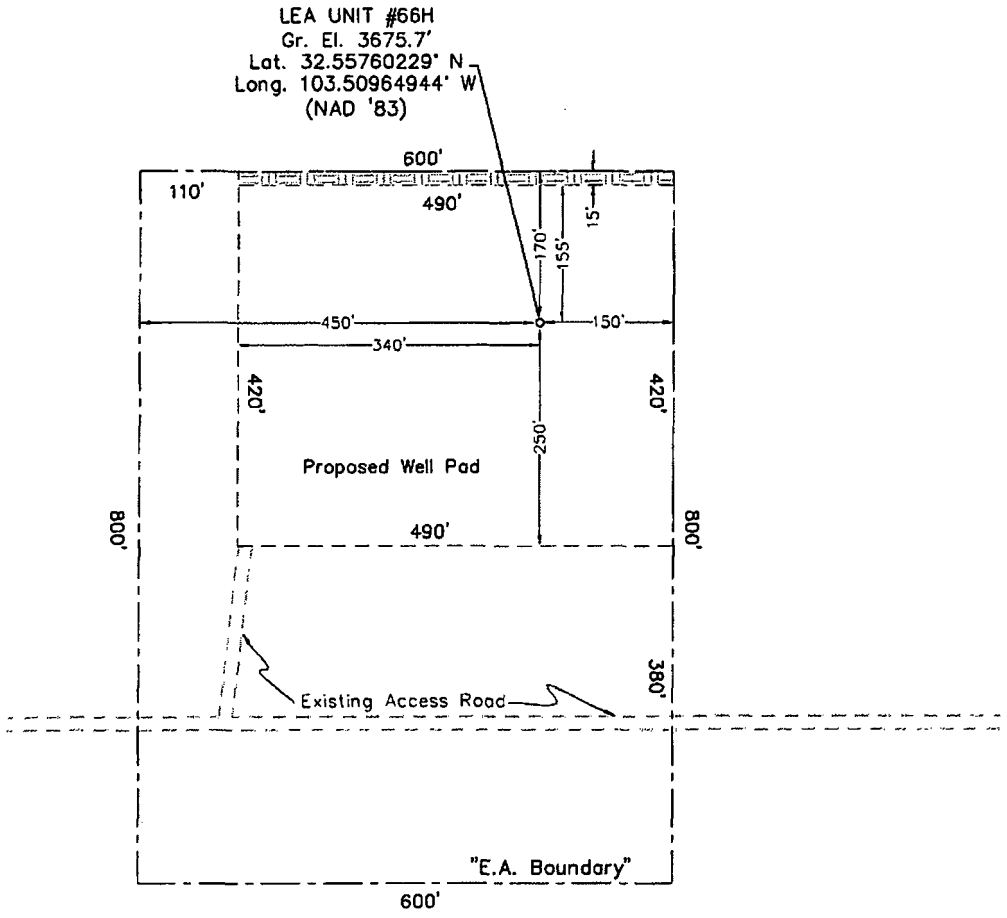
U.S.G.S. TOPOGRAPHIC MAP
LEA

WEST COMPANY
Land Surveyors ■ Civil Engineers

SURVEYORS - ENGINEERS - PLANNERS
FIRM REGISTRATION NUMBER: 100682-00
110 W. LOUISIANA AVE., SUITE 110
MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

SECTION 24, TOWNSHIP 20 SOUTH, RANGE 34 EAST, N.M.P.M.
LEA COUNTY NEW MEXICO

2017-0929 B2



— Denotes 15' Topsoil Stockpile

200 0 200 400

Graphic Scale in Feet

DRIVING DIRECTIONS

FROM THE INTERSECTION OF STATE HIGHWAY 18 AND U.S. HIGHWAY 62-180 IN HOBBS, NEW MEXICO, GO WEST AND SOUTHWEST ON U.S. HIGHWAY 62-180 23.6 MILES TO MARATHON ROAD / CO. RD. 27-A ON SOUTH (LEFT) SIDE OF THE HIGHWAY. THEN GO SOUTH 5.6 MILES TO A LEASE ROAD ON THE EAST (LEFT) SIDE OF THE ROAD, THEN GO EAST ON LEASE ROAD 0.7 MILE TO A POINT APPROXIMATELY 400 FEET SOUTH OF THE PROPOSED LOCATION.

LEGACY RESERVES OPERATING LP

LEA UNIT #66H

Located 2,270' FSL & 1,380' FEL, Section 24
Township 20 South, Range 34 East, N.M.P.M.
Lea County, New Mexico

Drawn By: SC	Issued: March 12, 2018
Scale: 1" = 200'	Field Book:
Revision Date:	Quadrangle: Lea
W.O. No: 2017-0929	Dwg. No.: 2017-0929

WEST COMPANY
Land Surveyors ■ Civil Engineers

SURVEYORS - ENGINEERS - PLANNERS
110 W. LOUISIANA AVE., SUITE 110
MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

AFMSS

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

Drilling Plan Data Report

08/06/2018

APD ID: 10400028589 **Submission Date:** 03/27/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

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

OCD - HOBBS
09/04/2018
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Highlighted data reflects the most recent changes

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Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	MANZANITA	3663	0	0		USEABLE WATER	No
2	RUSTLER	1982	1680	1680		NONE	No
3	TOP SALT	1942	1720	1720	SALT	NONE	No
4	BOTTOM SALT	513	3150	3150	SALT	NONE	No
5	CAPITAN REEF	513	3150	3150		NONE	No
6	SAN ANDRES	-1047	4710	4710		NONE	No
7	DELAWARE SAND	-2003	5666	5666	SANDSTONE	NATURAL GAS,OIL	No
8	BONE SPRING LIME	-4542	8205	8205	LIMESTONE	NATURAL GAS,OIL	No
9	AVALON SAND	-5097	8760	8760	SANDSTONE	NATURAL GAS,OIL	No
10	BONE SPRING 1ST	-5838	9501	9510		NATURAL GAS,OIL	No
11	BONE SPRING 2ND	-6337	10000	10000		NATURAL GAS,OIL	No
12	BONE SPRING 3RD	-7237	10900	10900		NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M **Rating Depth:** 5600

Equipment: A 3M BOP will be used to drill from the surface casing shoe (~1800') to the intermediate casing shoe (~5600'). The BOP will be a 5M system, however the "A" section wellhead will be a 3M wellhead (see attached BOP Diagram).
Requesting Variance? YES

Variance request: A variance to the requirement of a rigid steel line connecting to the choke manifold is requested. Specifications for the flex hose are provided with BOP schematic in exhibit section
Testing Procedure: The BOPs will be tested by an independent service company to 250 psi low and 3000 psi high.

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Choke Diagram Attachment:

McVay_4_Choke_Manifold_Diagram_20180130090426.pdf

BOP Diagram Attachment:

McVay_4_BOP_Schematic_20180130090433.pdf

Cameron_Conventional_3_String_Wellhead_Schematic_20180130090440.pdf

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Pressure Rating (PSI): 5M **Rating Depth:** 11000

Equipment: Legacy Reserves plans to use a 13-5/8" 5000-psi working pressure BOP system consisting of a double ram BOP with one ram being pipe and one ram being blind, a 5000-psi annular type preventer, a 5000-psi choke manifold and 80 gallon accumulator with floor, five remote operating stations and an auxiliary power system. A rotating head will be utilized as needed. A drill string safety valve in the open position will be available on the rig floor. A mud gas separator will be available for use if needed. A 3M BOP will be used to drill from the surface casing shoe (~1800') to the intermediate casing shoe (~5600'). The BOP will be a 5M system, however the "A" section wellhead will be a 3M wellhead (see attached BOP Diagram). The BOP unit will be hydraulically operated. The BOP will be operated at least once per day while drilling and the blind rams will be operated when out of hole during trips. No abnormal pressure or temperature is expected while drilling.
Requesting Variance? YES

Variance request: A variance to the requirement of a rigid steel line connecting to the choke manifold is requested. Specifications for the flex hose are provided with BOP schematic in exhibit section
Testing Procedure: The BOPs will be tested by an independent service company to 250 psi low and 5000 psi high.

Choke Diagram Attachment:

McVay_4_Choke_Manifold_Diagram_20180130090129.pdf

BOP Diagram Attachment:

McVay_4_BOP_Schematic_20180130090143.pdf

Flex_Hose_Specs_20180130090135.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	1800	0	1800	3689	1889	1800	J-55	54.5	STC	1.42	3.86	DRY	2.59	DRY	2.59
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	3901	0	3901	3689	-212	3901	J-55	40	LTC	1.25	1.41	DRY	1.6	DRY	1.6
3	INTERMEDIATE	12.25	9.625	NEW	API	N	3901	5600	3901	5600	-212	-1911	1699	HCK-55	40	LTC	1.45	1.27	DRY	4.23	DRY	4.23

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

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
4	PRODUCTION	8.75	5.5	NEW	API	N	0	17643	0	9800	3689	-13954	17643	P-110	20	OTHER - BTC	2.17	1.26	DRY	1.6	DRY	1.6

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_66H_Casing_Design_20180321124121.pdf

Lea_Unit_66H_Drilling_Plan_20180322081630.pdf

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_66H_Casing_Design_20180321124138.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Casing Attachments

Casing ID: 3 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_66H_Casing_Design_20180321124331.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_66H_Casing_Design_20180321124344.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	1523	1100	1.93	13.5	2123	75	Class C cement	4% bwoc bentonite II + 2% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.005% bwoc Static Free + 0.005 gps FP-6L
SURFACE	Tail		1523	1800	200	1.34	14.8	268	75	Class C cement	1.5% bwoc Calcium Chloride + 0.005 lbs/sack Static Free + 0.005 gps FP-6L

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		0	3352	1600	2.38	11.9	3808	80	Poz (fly ash) Class H cement	10% bwoc bentonite II + 5% bwow sodium chloride + 5 pps LCM-1 + 0.005 lbs/sk Static Free + 0.005 gps FP-6L
PRODUCTION	Tail			17643	1700	1.62	13.2	2754	20	Class H	CSE-2 + 4% bwow sodium chloride + 3 pps LCM- 1 + 0.6% bwoc FL-25 + 0.005 gps FP-6L + 0.005% bwoc Static Free
INTERMEDIATE	Lead		0	4900	1400	2.13	12.5	2982	80	Poz (fly ash) Class C cement	4% bwoc bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL- 52 + 5 lbs/sack LCM-1 +0.125 lbs/sk cello flake+ 0.005 lbs/sk defoamer + 0.005 gpsFP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride
INTERMEDIATE	Tail		4900	5600	200	1.33	14.8	266	80	Class C cement	none
INTERMEDIATE	Lead		0	4900	1400	2.13	12.5	2982	80	Paz (fly ash) Class C	4% bwoc bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL- 52 + 5 lbs/sack LCM-1 +0.125 lbs/sk cello flake + 0.005 lbs/sk defoamer + 0.005 gpsFP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride
INTERMEDIATE	Tail		4900	5600	200	1.33	14.8	266	80	Class C cement	none

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

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. Mud logging program: 2 man unit from approximately after setting intermediate casing. No open hole logs, DSTs, or cores are planned.
Describe the mud monitoring system utilized: A Pason 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 rig crew of impending gas kicks and lost circulation. In order to effectively run casing, the mud viscosity and fluid loss properties may be adjusted.

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
5600	9800	OTHER : Fresh water/brine	8.4	8.6							
1800	5600	OTHER : Brine water	9.8	10							
0	1800	SPUD MUD	8.4	8.9							
9800	17643	OTHER : Fresh water/brine	8.9	9.1							

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Section 6 - Test, Logging, Coring

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

Mud logging program: 2 man unit from approximately after setting intermediate casing.

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

MUDLOG

Coring operation description for the well:

No coring No open hole logs, DST's or cores are planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4620 **Anticipated Surface Pressure:** 2204.4

Anticipated Bottom Hole Temperature(F): 162

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:

Lea_Unit__66H_H2S_Briefing_Areas_and_Alarm_Locations_V_Door_East_20180322081740.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Lea_Unit__66H_Planning_Report_Plan_1_20180321125021.pdf

Lea_Unit__66H_AC_Report_Plan_1_20180321125036.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Lea_Unit_66H_Drilling_Plan_20180321125217.pdf

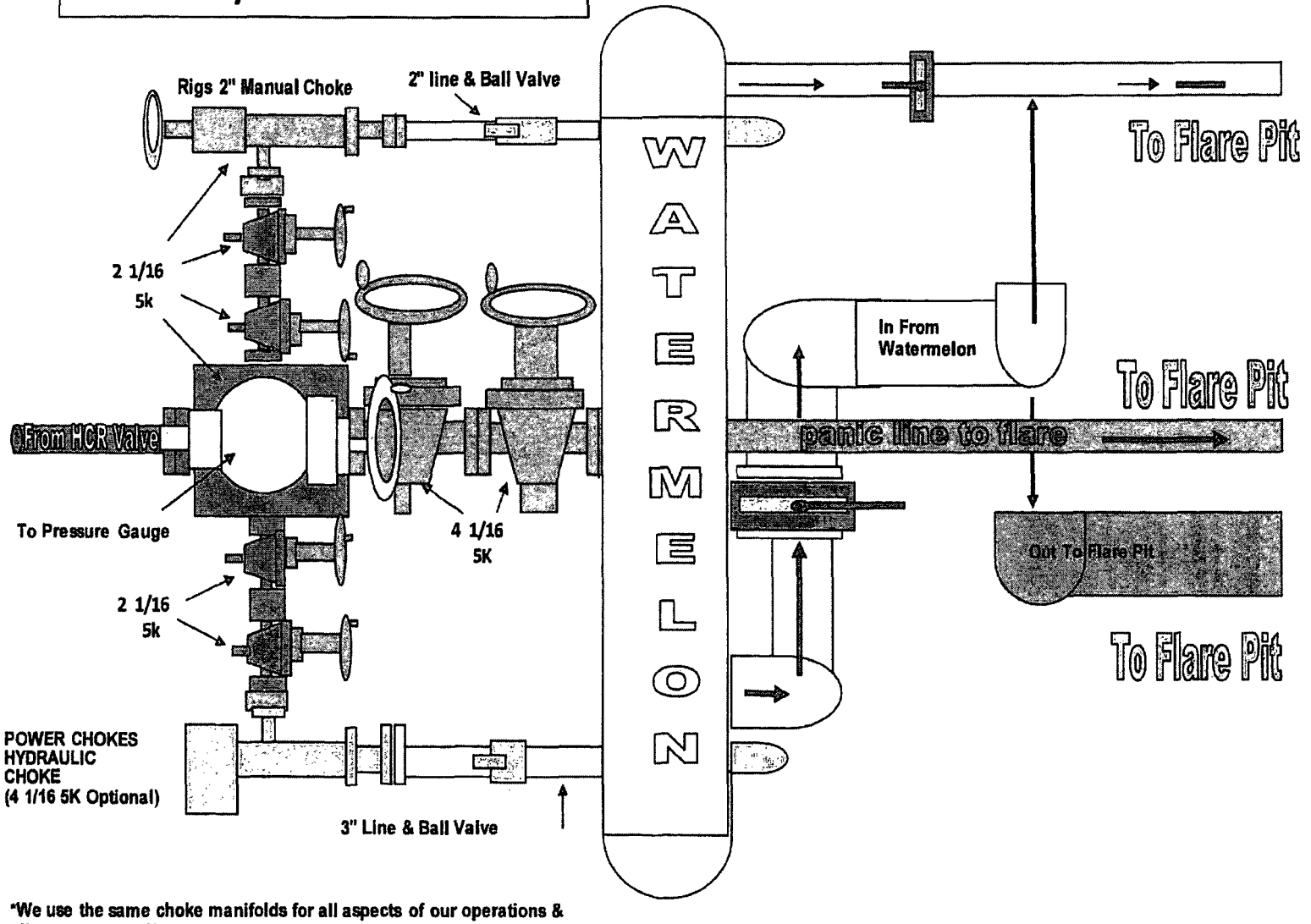
H2S_Contingency_Plan_Legacy_Lea_Unit__66H_20180613150756.pdf

GasCapturePlanFormFinal_000_20180613150811.pdf

Other Variance attachment:

Flex_Hose_Specs_20180321125142.pdf

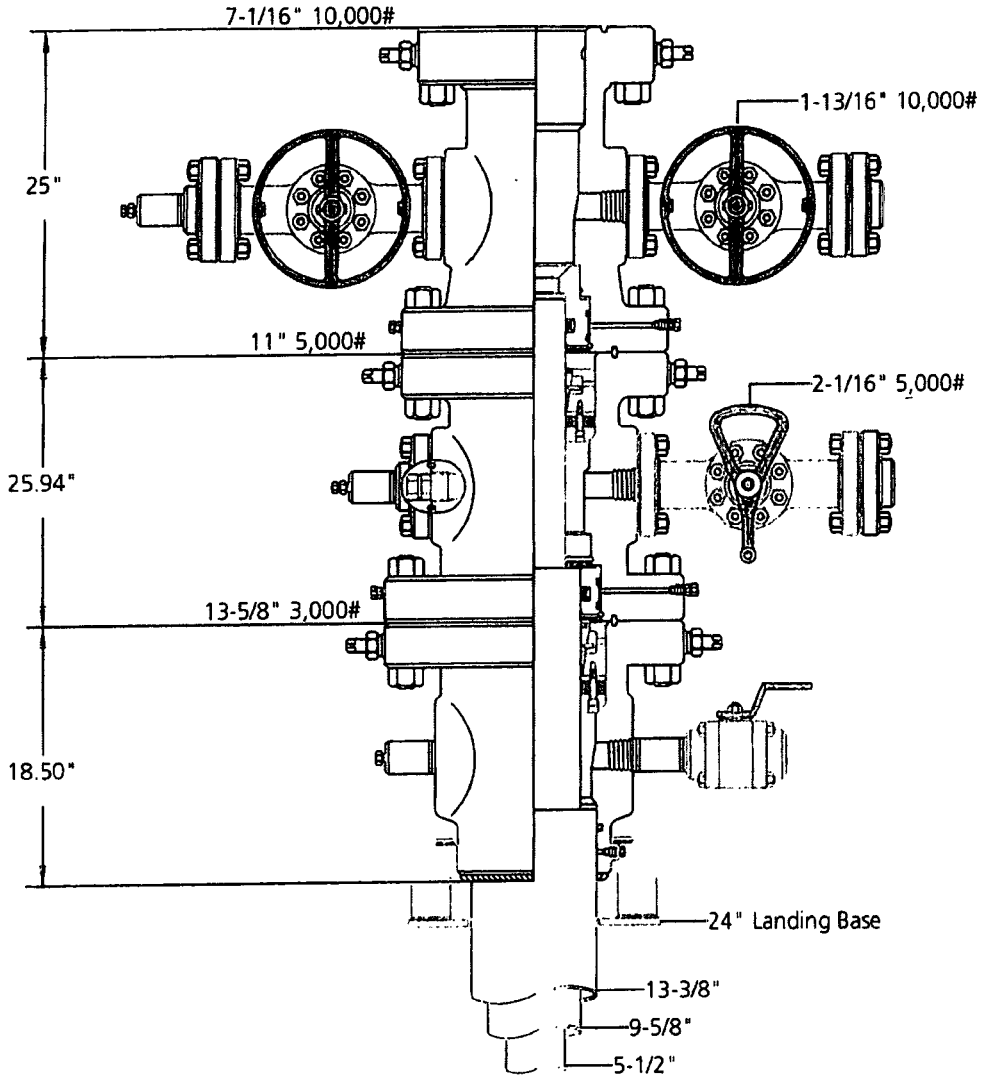
McVay 4 Choke Manifold



*We use the same choke manifolds for all aspects of our operations & all are rated to 10K;

* All connections downstream from BOP thru chokes Are Flanged, All connections downstream from chokes are Flanged .

Note: Dimensional information reflected on this drawing are estimated measurements only.



Legacy Reserves
Conventional 3- String

CAMERON

Name	Jeanette	Date	7-15-15	Working Pressure	#	1274616

Surface Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
13.375"	*J-55*	*54.5*	*1130 psi*	*2730 psi*	*514 kips*	*STC*	*1800'*	*98,100 lbs*	*8.5 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Complete internal evacuation of the casing, utilizing a collapse force equivalent to the mud gradient (0.44 psi/ft) in which the casing will be ran.
- Cementing operations in which, utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal force equivalent to the fresh water displacement fluid (0.433 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Complete Evacuation:
1,130psi / [(0.44psi/ft)(1,800')] = **1.42**

Cementing Operations:
1,130psi / [(0.77psi/ft – 0.433psi/ft)(1800')] = **1.86**

Burst: $DF_B = 1.25$

Base Assumption

- Casing pressure test as per Onshore Oil and Gas Order No. 2 (0.22 psi/ft or 1500 psi), utilizing an external force equivalent to the mud gradient (0.44 psi/ft) in which the casing will be ran.

Burst Calculations: Internal Yield Rating / Internal Force

Casing Pressure Test:
2,730psi / [(1500psi)-(0.44 psi/ft)(1,800')] = **3.86**

Tensile: $DF_T = 1.6$

Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight and not considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
514 kips / (100,000 lbs. + 98,100 lbs.) = **2.59**

Intermediate Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
9.625"	*J-55*	*40*	*2570 psi*	*3950 psi*	*520 kips*	*LTC*	*4000'*	*160,000 lb*	*10.0 ppg*
9.625"	*HCK-55*	*40*	*4230 psi*	*3950 psi*	*694 kips*	*LTC*	*1600'*	*64,000 lb*	*10.0 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Complete internal evacuation of the casing, utilizing a collapse force equivalent to the mud gradient (0.52 psi/ft) in which the casing will be ran.
- Cementing operations in which, utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal back-up force equivalent to the fresh water displacement fluid (0.433 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Complete Evacuation:
J-55: 2570psi / [(0.52psi/ft)(4,000')] = **1.25**
HCK-55: 4230psi / [(0.52psi/ft)(5,600')] = **1.45**

Cementing Operations:
J-55: 2570psi / [(0.77psi/ft – 0.433psi/ft)(4000')] = **1.91**
HCK-55: 4230psi / [(0.77psi/ft – 0.433psi/ft)(5600')] = **2.24**

Burst: $DF_B = 1.25$

Base Assumption

- Casing pressure test as per Onshore Oil and Gas Order No. 2 (0.22 psi/ft or 1500 psi), utilizing an internal force equivalent to the displacement fluid of 8.6 ppg and external force equivalent to 8.4 ppg.
- Gas kick at the casing shoe, in which a 0.7 psi/ft shoe test is assumed, and 0.2 psi/ft gas gradient is assumed.

Burst Calculations: Internal Yield Rating / Burst Force

Casing Pressure Test:
J-55: 3950psi / [(1500psi +1789 psi) - (1747psi)] = **2.56**
HCK-55: 3950psi / [(1500psi +2504 psi) - (2446psi)] = **2.54**

Gas Kick:
J-55: 3950psi / [(0.7psi/ft)(5600')-(0.2psi/ft)(5600')] = **1.41**
HCK-55: 3950psi / [(0.7psi/ft)(5600')-(0.2psi/ft)(4000')] = **1.27**

Tensile: $DF_T = 1.6$

Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight of the string and not considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
J-55: 520 kips / (100,000 lbs. + 224,00 lbs.) = **1.6**
HCK-55: 694 kips / (100,000 lbs. + 64,100 lbs.) = **4.23**

Production Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
5.5"	*P-110*	*20*	*11080 psi*	*12360 psi*	*641 kips*	*BTC*	*18,300'*	*366,000 lb*	*9.1 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Cementing operations in which utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal back-up force equivalent to the fresh water displacement fluid (0.433 psi/ft).
- Production operations in which the pipe is completely evacuated with an external force equivalent to the pore pressure gradient (0.52 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Cementing Operations:
11,080psi / [(0.66psi/ft-0.433 psi/ft)(10,500'TVD)] = **3.13**

Production Operations:
11080psi / (10,500' TVD)(0.52psi/ft) = **2.03**

Burst: $DF_B = 1.25$

Base Assumption

- Frac pressure utilizing an internal force of 9500 psi along with a frac fluid gradient equivalent to 0.468 psi/ft and an external force equal to the minimum fluid gradient (0.433 psi/ft) in which the casing will be ran.
- Production operations in which the casing is completely filled with a gas equivalent gradient of 0.2 psi/ft and an external force equivalent to pore pressure of 0.5 psi/ft.

Burst Calculations: Internal Yield Rating / Burst Force

Frac Pressure:
12,360psi / [(9500 psi)+ (0.468 – 0.433psi/ft)(10,500'TVD)] = **1.28**

Production Operations:
12,360psi / [(0.5 psi/ft – 0.2 psi/ft)(10,500'TVD)] = **3.92**

Tensile: $DF_T = 1.6$

Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight of the string and considering the effects of buoyancy (factor =0.86).

Tensile Calculations: Joint Strength / Axial Load

Overpull:
641,000 lbs /[(100,000 lbs.) + (366,000 lbs.)(0.86)] = **1.6**

DRILLING PLAN

LEA UNIT 63H

LEGACY RESERVES OPERATING LP

SHL: Unit K, Section 19

BHL: Unit C, Section 18

T20S-R35E, Lea County, New Mexico

To satisfy requirements of Onshore Oil and Gas Order No. 1, Legacy Reserves Operating LP submits the following for your consideration:

1. ***Location:*** SHL: 2270' FSL & 2610' FWL, Sec.19, T20S-R35E (First Take: 2310 FNL & 1750 FWL)
   BHL: 330' FNL & 1750' FWL, Sec. 18, T20S-R35E (Last Take)

2. ***Elevations:*** 3,689' GL

3. ***Geological Name of Surface Formation:*** Quaternary alluvium deposits

4. ***Drilling Tools and Associated Equipment:*** Rotary drilling rig using fluid as a means for removal of solid cuttings from the well.

5. ***Proposed Drilling Depth:*** 18,314' MD 10,500' TVD

6. ***Estimated Tops of Geological Markers:***

Rustler	1,680'	Delaware	5,666'
Top Salt	1,720'	Bone Spring Lime	8,205'
Bottom Salt	3,150'	Avalon	8,760'
Top of Capitan Reef	3,150'	1st. Bone Spring	9,501'
Capitan Reef Bottom	4,710'	2nd. Bone Spring	10,034'
San Andres	4,710'		

7. ***Possible mineral bearing formations:***
   Primary: Bone Spring (oil); Secondary: Delaware (oil), Avalon (oil), fresh water (~125')

8. ***Proposed Mud System:***

Depth	Mud Wt.	Visc	Fluid Loss	Type Mud
0' to 1800'	8.4-8.9	30-32	NC	Fresh water gel spud mud
1800' to 5600'	9.8-10	28-29	NC	Brine water
5600' to 10,500'	8.4-8.6	28-29	NC	Fresh water/brine, use hi-viscosity Weeps to clean hole
10,500' to 18,314'	8.9-9.1	28-29	18-20	Fresh water/brine

Sufficient mud materials will be kept on location at all times in order to combat lost circulation or unexpected kicks. A Pason 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 rig 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.

9. ***Proposed Drilling Plan:***

Set surface and intermediate casing and cement to surface. Drill 8-3/4" to ~10,500', Kick off and drill 8-3/4" hole to TD of ~18,314'. Set 5-1/2" casing from surface to TD (~ 18,314'). Cement 5-1/2" production casing back to surface.

10. ***Casing Information:***

String	Hole size	Depth	Casing OD	Collar	Weight	Grade
Surface	17-1/2"	1800' MD	New 13-3/8"	STC	54.5#	J-55
Intermediate	12-1/4"	3901' MD	New 9-5/8"	LTC	40#	J-55
Intermediate	12-1/4"	5600' MD	New 9-5/8"	LTC	40#	HCK-55
Production	8-3/4"	18,314' MD	New 5-1/2"	BTC	20#	P-110

13-3/8", J-55:		9-5/8", J-55	
Collapse Factor:	1.42	Collapse Factor:	1.25
Burst Factor:	3.86	Burst Factor:	1.41
Tension Factor:	2.59	Tension Factor:	1.6

9-5/8", HCK-55		5-1/2", P-110	
Collapse Factor:	1.45	Collapse Factor:	2.03
Burst Factor:	1.27	Burst Factor:	1.28
Tension Factor:	4.23	Tension Factor:	1.6

11. ***Cementing Information:***

Surface Casing (75% excess on lead & 75% excess on tail to design for cement top at surface):

Lead: 1100 sxs class C cement + 4% bwoc bentonite II + 2% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.005% bwoc Static Free + 0.005 gps FP-6L (13.50 ppg, 1.93 cfps, 9.71 gps wtr).

Tail: 200 sxs class C cement + 1.5% bwoc Calcium Chloride + 0.005 lbs/sack Static Free + 0.005 gps FP-6L (14.80 ppg, 1.34 cfps, 6.35 gps wtr).

Intermediate Casing

In the event that circulation is lost (> 50%) while drilling the 12-1/4" intermediate hole in the Capitan Reef at +/-4000', we will plan to install a DV tool and external casing packer within 200' of the top depth where lost circulation occurred and will pump a two-stage cement job with the potential to add an additional DV tool for a three-stage cement job. If there is no lost circulation a single stage cementing procedure will be followed. Legacy plans to cement to surface regardless of whether a single stage, 2-stage or 3-stage procedure is implemented.

No DV tool ***(80% excess on lead & 80% excess on tail to design for cement top at surface)***

Lead: 1400 sx (35:65) poz (fly ash) class C cement+ 4% bwoc bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL- 52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk cello flake+ 0.005 lbs/sk defoamer + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 *ppg*, 1.33 cfps, 6.35 *gps* wtr)

With (1) DV Tool ***(100% excess on lead & 100% excess on tail to design for cement top at surface)***

Assuming DV tool set at 3950' but if the setting depth changes, cement volumes will be adjusted proportionately.

Stage 1

Lead: 400 sx (35:65) paz (fly ash) class C cement+ 4% bwoc Bentonite II+ 5% bwoc MPA-5 + 0,25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk cello flake+ 0.005 lbs/sk defoamer + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 ppg, 1.33 cfps, 6.35 gps wtr)

Stage 2

Lead: 1100 sx (35:65) paz (fly ash) class C cement+ 4% bwoc bentonite II + 5% bwoc MPA-5 + 0,25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk Cello Flake+ 0.005 lbs/sk Static Free+ 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 ppg, 1.33 cfps, 6.35 gps wtr)

With (2) DV Tools ***(100% excess on lead & 100% excess on tail to design for cement top at surface)***

Assuming one DV tool set at 3950' and one DV tool set at 1800' but if the setting depths change, cement volumes will be adjusted proportionately.

Stage 1

Lead: 400 sx (35:65) paz (fly ash) class C cement+ 4% bwoc Bentonite II+ 5% bwoc MPA-5 + 0,25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk cello flake+ 0.005 lbs/sk defoamer + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 ppg, 1.33 cfps, 6.35 gps wtr)

Stage 2

Lead: 600 sx (35:65) paz (fly ash) class C cement+ 4% bwoc bentonite II + 5% bwoc MPA-5 + 0,25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk Cello Flake+ 0.005 lbs/sk Static Free+ 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 ppg, 1.33 cfps, 6.35 gps wtr)

Stage 3

Lead: 600 sx (35:65) paz (fly ash) class C cement+ 4% bwoc bentonite II + 5% bwoc MPA-5 + 0,25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sk Cello Flake+ 0.005 lbs/sk Static Free+ 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride (12.5 ppg, 2.13 cfps, 8.81 gps wtr)

Tail: 200 sx class C cement (14.80 ppg, 1.33 cfps, 6.35 gps wtr)

Production Casing (80% excess on lead & 20% excess on tail to design for cement top at surface):

Lead: 1600 sxs (50:50) poz (fly ash) class H cement + 10% bwoc bentonite II + 5% bwow sodium chloride + 5 pps LCM-1 + 0.005 lbs/sk Static Free + 0.005 gps FP-6L (11.90 ppg, 2.38 cf/sx, 13.22 gps wtr).

Tail: 1700 sxs Class H (15:61:11) poz (fly ash): class H cement: CSE-2 + 4% bwow sodium chloride + 3 pps LCM-1 + 0.6% bwoc FL-25 + 0.005 gps FP-6L + 0.005% bwoc Static Free (13.20 ppg, 1.62 cf/sx, 9.45 gps wtr).

12. ***Pressure Control Eqpt/BOP:***

Legacy Reserves plans to use a 13-5/8" 5000-psi working pressure BOP system consisting of a double ram BOP with one ram being pipe and one ram being blind, a 5000-psi annular type preventer, a 5000-psi choke manifold and 80 gallon accumulator with floor, five remote operating stations and an auxiliary power system. A rotating head will be utilized as needed. A drill string safety valve in the open position will be available on the rig floor. A mud gas separator will be available for use if needed.

A 3M BOP will be used to drill from the surface casing shoe (~1800') to the intermediate casing shoe (~5600'). The BOP will be a 5M system, however the "A" section wellhead will be a 3M wellhead (see attached BOP Diagram).

The BOP unit will be hydraulically operated. The BOP will be operated at least once per day while drilling and the blind rams will be operated when out of hole during trips. No abnormal pressure or temperature is expected while drilling.

The BOPs will be tested by an independent service company to 250 psi low and 5000 psi high.

13. ***Testing, Logging, and Coring Program:***

A. Mud logging program: 2 man unit from approximately after setting intermediate casing.

B. No open hole logs, DST's or cores are planned.

14. ***Potential Hazards***

No abnormal pressures or temperatures are expected during the drilling of this well. If H2S is encountered the operator will comply with provisions of Onshore Order 6. Since there will be an H2S Safety package on location, attached is an "H2S Drilling Operations Plan". Adequate flare lines will be installed on the mud/gas separator so gas may be flared safely. All personnel will be familiar with all aspects of safe operations of equipment being used. Lost circulation may occur and a cement contingency plan is included in this plan along with mud materials to be kept on location at all times in order to combat lost circulation or unexpected kicks. Estimated BHP: 4620 psi, estimated BHT: 162°F.

15. ***Road and Location***

Road and location construction will begin after BLM approval of the APD. Drilling is expected to take 30-35 days and an additional 10 days for the completion.

16. ***Additional Requirements of Project:***

Completion: The targeted Bone Spring pay zone will be perforated and stimulated in multiple stages using acid and hydraulic fracturing treatments. Fresh water used in the drilling and completion of this well will be transferred from off-site via temporary flowlines and stored in frac tanks on the location.

Surface Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
13.375"	*J-55*	*54.5*	*1130 psi*	*2730 psi*	*514 kips*	*STC*	*1800'*	*98,100 lbs*	*8.5 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Complete internal evacuation of the casing, utilizing a collapse force equivalent to the mud gradient (0.44 psi/ft) in which the casing will be ran.
- Cementing operations in which, utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal force equivalent to the fresh water displacement fluid (0.433 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Complete Evacuation:
1,130psi / [(0.44psi/ft)(1,800')] = **1.42**

Cementing Operations:
1,130psi / [(0.77psi/ft – 0.433psi/ft)(1800')] = **1.86**

Burst: $DF_B = 1.25$

Base Assumption

- Casing pressure test as per Onshore Oil and Gas Order No. 2 (0.22 psi/ft or 1500 psi), utilizing an external force equivalent to the mud gradient (0.44 psi/ft) in which the casing will be ran.

Burst Calculations: Internal Yield Rating / Internal Force

Casing Pressure Test:
2,730psi / [(1500psi)-(0.44 psi/ft)(1,800')] = **3.86**

Tensile: $DF_T = 1.6$

Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight and not considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
514 kips / (100,000 lbs. + 98,100 lbs.) = **2.59**

Intermediate Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
9.625"	*J-55*	*40*	*2570 psi*	*3950 psi*	*520 kips*	*LTC*	*4000'*	*160,000 lb*	*10.0 ppg*
9.625"	*HCK-55*	*40*	*4230 psi*	*3950 psi*	*694 kips*	*LTC*	*1600'*	*64,000 lb*	*10.0 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Complete internal evacuation of the casing, utilizing a collapse force equivalent to the mud gradient (0.52 psi/ft) in which the casing will be ran.
- Cementing operations in which, utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal back-up force equivalent to the fresh water displacement fluid (0.433 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Complete Evacuation:
J-55: 2570psi / [(0.52psi/ft)(4,000')] = **1.25**
HCK-55: 4230psi / [(0.52psi/ft)(5,600')] = **1.45**

Cementing Operations:
J-55: 2570psi / [(0.77psi/ft – 0.433psi/ft)(4000')] = **1.91**
HCK-55: 4230psi / [(0.77psi/ft – 0.433psi/ft)(5600')] = **2.24**

Burst: $DF_B = 1.25$

Base Assumption

- Casing pressure test as per Onshore Oil and Gas Order No. 2 (0.22 psi/ft or 1500 psi), utilizing an internal force equivalent to the displacement fluid of 8.6 ppg and external force equivalent to 8.4 ppg.
- Gas kick at the casing shoe, in which a 0.7 psi/ft shoe test is assumed, and 0.2 psi/ft gas gradient is assumed.

Burst Calculations: Internal Yield Rating / Burst Force

Casing Pressure Test:
J-55: 3950psi / [(1500psi +1789 psi) - (1747psi)] = **2.56**
HCK-55: 3950psi / [(1500psi +2504 psi) - (2446psi)] = **2.54**

Gas Kick:
J-55: 3950psi / [(0.7psi/ft)(5600')-(0.2psi/ft)(5600')] = **1.41**
HCK-55: 3950psi / [(0.7psi/ft)(5600')-(0.2psi/ft)(4000')] = **1.27**

Tensile: $DF_T = 1.6$

Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight of the string and not considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
J-55: 520 kips / (100,000 lbs. + 224,00 lbs.) = **1.6**
HCK-55: 694 kips / (100,000 lbs. + 64,100 lbs.) = **4.23**

Production Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
5.5"	*P-110*	*20*	*11080 psi*	*12360 psi*	*641 kips*	*BTC*	*18,300'*	*366,000 lb*	*9.1 ppg*

Collapse: $DF_C = 1.25$

Base Assumptions

- Cementing operations in which utilizes a collapse force equivalent to the gradient of the planned cement slurry (0.77 psi/ft) and an internal back-up force equivalent to the fresh water displacement fluid (0.433 psi/ft).
- Production operations in which the pipe is completely evacuated with an external force equivalent to the pore pressure gradient (0.52 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Cementing Operations:
11,080psi / [(0.66psi/ft-0.433 psi/ft)(10,500'TVD)] = **3.13**

Production Operations:
11080psi / (10,500' TVD)(0.52psi/ft) = **2.03**

Burst: $DF_B = 1.25$

Base Assumption

- Frac pressure utilizing an internal force of 9500 psi along with a frac fluid gradient equivalent to 0.468 psi/ft and an external force equal to the minimum fluid gradient (0.433 psi/ft) in which the casing will be ran.
- Production operations in which the casing is completely filled with a gas equivalent gradient of 0.2 psi/ft and an external force equivalent to pore pressure of 0.5 psi/ft.

Burst Calculations: Internal Yield Rating / Burst Force

Frac Pressure:
12,360psi / [(9500 psi)+ (0.468 – 0.433psi/ft)(10,500'TVD)] = **1.28**

Production Operations:
12,360psi / [(0.5 psi/ft – 0.2 psi/ft)(10,500'TVD)] = **3.92**

Tensile: $DF_T = 1.6$

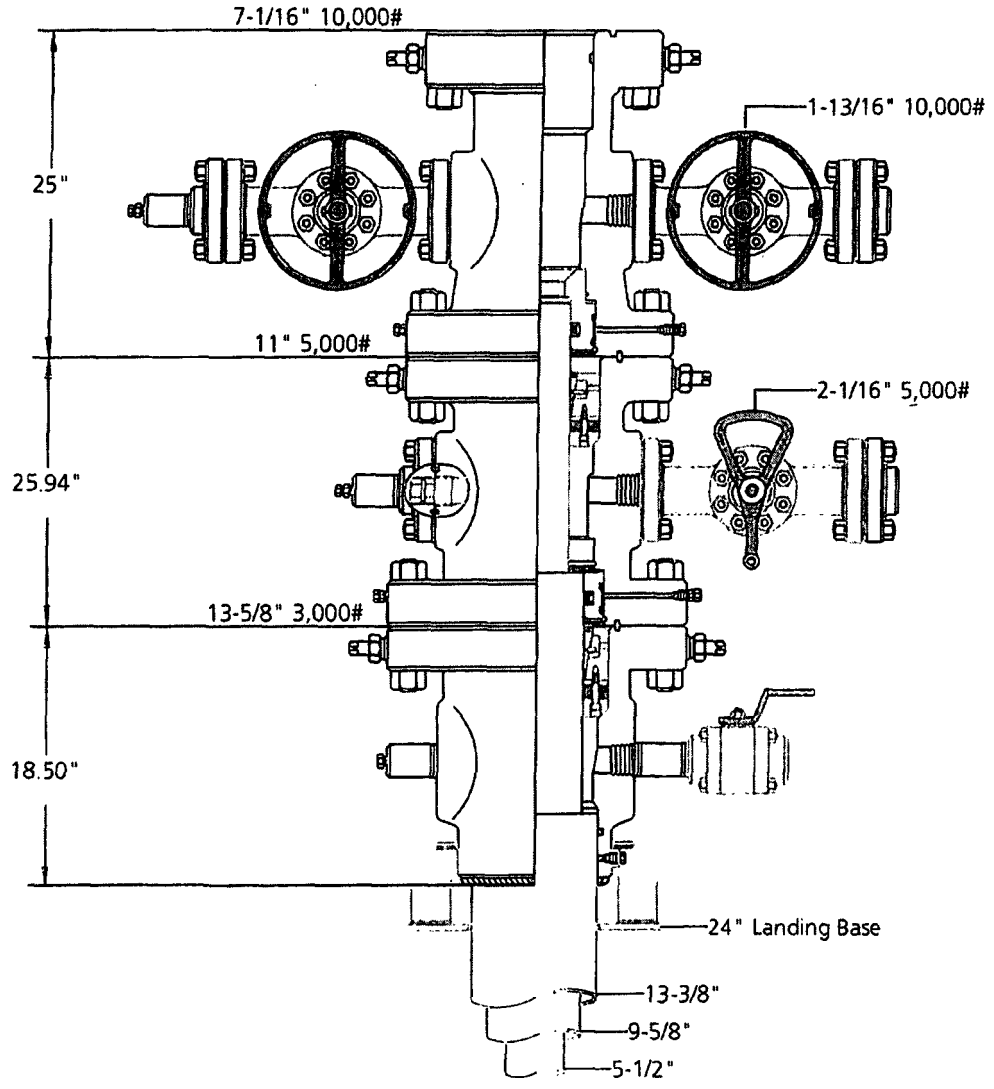
Base Assumption

- A downward force of 100,000 lb. overpull is applied at the base of the casing along with the weight of the string and considering the effects of buoyancy (factor =0.86).

Tensile Calculations: Joint Strength / Axial Load

Overpull:
641,000 lbs /[(100,000 lbs.) + (366,000 lbs.)(0.86)] = **1.6**

Note: Dimensional information reflected on this drawing are estimated measurements only.



Legacy Reserves
Conventional 3- String

CAMERON

Name	Jeanette	Date	7-15-15	Working Pressure	#	1274616

AFMSS

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

SUPO Data Report

08/06/2018

APD ID: 10400028589 **Submission Date:** 03/27/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

66H_Location_Map_20180321125310.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT **Row(s) Exist?** YES

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

66H_Location_Map_20180321125358.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Existing Wells description:

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: In the event the well is found productive, a 4" surface poly flowline (125 psi with oil/gas/water) will be laid along the existing roadway, for 4239.1' to the satellite battery located in the SW/4NW/4 of section 12, T. 20S, R. 34E. All permanent (six months or longer) aboveground structures constructed or intalled on location and not subject to safety requirements will be painted to BLM specifications.

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING, STIMULATION, SURFACE CASING

Water source type: GW WELL

Describe type:

Source latitude:

Source longitude:

Source datum:

Water source permit type: WATER WELL

Source land ownership: PRIVATE

Water source transport method: TRUCKING

Source transportation land ownership: FEDERAL

Water source volume (barrels): 18000

Source volume (acre-feet): 2.3200758

Source volume (gal): 756000

Water source and transportation map:

Water_Transportation_Plat_20180326134210.pdf

Water source comments:

New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: CONSTRUCTION MATERIALS: CALICHE WILL BE USED TO CONSTRUCT THISWELL PAD Any construction material that may be required for surfacing of the drill pad will be from a contractor having a permitted source of materials within the general area. No construction materials will be removed from Federal lands without prior approval from the appropriate surface management agency. See attached for source information.
Construction Materials source location attachment:

Construction_Materials_Source_Plat_20180326134942.pdf

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling fluids (flowback, water, cuttings)

Amount of waste: 20000 barrels

Waste disposal frequency : Daily

Safe containment description: Drilling fluids will be contained in steel mud tanks.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** PRIVATE
Disposal type description:

Disposal location description: NMOCD approved disposal site in Halfway, NM.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? NO

Description of cuttings location

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Rig_4_Schematic_20180123121930.pdf
66H_Well_Pad_Plat_03_12_18_20180321134603.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance **Multiple Well Pad Name:** LEA UNIT

Multiple Well Pad Number: 42H

Recontouring attachment:

Lea_Unit__66H_Surface_Reclamation_20180326135223.pdf

Drainage/Erosion control construction: To mitigate erosion and protect the natural drainage areas, erosion control methods (e.g. cut and fill ratios of 3:1) will be implemented during the construction and production phases of this project. The slopes of the well pad may be reseeded or replanted per agreement with the landowner. Erosion mitigation such as silt fences and hay bales will be located as necessary around the well pad.

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Drainage/Erosion control reclamation: • The original landform will be restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors. • A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community will be established on the site, with a density sufficient to control erosion and invasion by non-native plants and to re-establish wildlife habitat or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation. • Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rills (greater than 3 inches) are not observed. • The site will be free of State- or county-listed noxious weeds, oil field debris and equipment, and contaminated soil. Invasive and non-native weeds are controlled.

Well pad proposed disturbance (acres): 0.48
Road proposed disturbance (acres): 0
Powerline proposed disturbance (acres): 0
Pipeline proposed disturbance (acres): 0
Other proposed disturbance (acres): 0
Total proposed disturbance: 0.48

Well pad interim reclamation (acres): 0
Road interim reclamation (acres): 0
Powerline interim reclamation (acres): 0
Pipeline interim reclamation (acres): 0
Other interim reclamation (acres): 0
Total interim reclamation: 0

Well pad long term disturbance (acres): 0.48
Road long term disturbance (acres): 0
Powerline long term disturbance (acres): 0
Pipeline long term disturbance (acres): 0
Other long term disturbance (acres): 0
Total long term disturbance: 0.48

Disturbance Comments: Pad and road already exist and have been approved as part of APD process for the existing well (Lea Unit 62H).
Reconstruction method: Final reclamation to achieve restoration of the original landform and a natural vegetative community. The original landform will be restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.
Topsoil redistribution: Topsoil will be redistributed after the well pad has been returned to original contours, or as close as practical.
Soil treatment: No soil treatment will be needed.

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Scott **Last Name:** St. John

Phone: (405)286-9326 **Email:** sstjohn@rsenergysolutions.com

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: Weeds will be mowed regularly to prevent them from becoming dominant within the project area

Weed treatment plan attachment:

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Monitoring plan description: The project location will be periodically monitored by Legacy Reserves Operating, LP's staff that are responsible for infrastructure maintenance.
Monitoring plan attachment:

Success standards: Develop sufficient plant and root coverage to maximize erosion and sediment control.

Pit closure description: No pit will be utilized for this project.

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 66H

Fee Owner: Smith & Sons, Inc. **Fee Owner Address:** Box 1046 Eunice, NM 88231

Phone: (575)390-2642 **Email:**

Surface use plan certification: YES

Surface use plan certification document:

PAT_SIMS_SUA___EXECUTED_Redacted_reduced_20180326155505.pdf

Surface access agreement or bond: Agreement

Surface Access Agreement Need description: A Surface Use Agreement has been established

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Section 12 - Other Information

Right of Way needed? NO **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Well will be located on existing pad constructed for the Lea Unit 37H & 42H

Other SUPO Attachment

66H_Pad_Cross_Section_Profile_20180326155828.pdf
Lea_Unit_66H_Electric_Line_Easement_20180326155829.pdf
Lea_Unit_66H_Flowline_Easement_20180326155829.pdf
SUP_for_Lea_Unit__66H_20180327123742.pdf

EXHIBIT "A"
Page 1
S&S Inc.'s Fee Surface

THE SURFACE ESTATE ONLY TO:

Description	Section	Township	Range
All of	24	20S	34E
All of	36	20S	34E
All of	22	20S	35E
All of	25	20S	35E
All of	26	20S	35E
All of	27	20S	35E
All of	28	20S	35E
All of	29	20S	35E
All of	30	20S	35E
All of	31	20S	35E
All of	32	20S	35E
All of	33	20S	35E
All of	34	20S	35E
All of	35	20S	35E
All of	36	20S	35E

and

That portion of the following described Sections lying south and west of that certain "Survey Boundary Fence crossing Ranch Properties in Sections 13 and 24 Township 20 South, Range 34 East, Sections 19, 20, 21, 16, 15, 14, 23 and 24, Township 20 South, Range 35 East and Sections 19 and 20, Township 20 South, Range 36 East, N.M.P.M, Lea County, New Mexico" by John West Surveying Company, Inc., dated March 17, 2000 and recorded in the records of the County Clerk of Lea County, New Mexico on June 15, 2000, as Reception No. 59881, at Survey Book 1, Page 276.

Section 14, Township 20 South, Range 35 East
Being all or parts of: NE/4SW/4, NE/4SE/4, NW/4SE/4SW/4SE/4, SW/4SW/4 and SE/4SW/4

Section 15, Township 20 South, Range 35 East
Being all or parts of: SW/4SW/4, NW/4SW/4, NE/4SW/4, NW/4SE/4, NE/4SE/4, SE/4SW/4SW/4SE/4, and SE/4SE/4

Section 19, Township 20 South, Range 35 East
Being all or part of: NW/4NW/4, NW/4NW/4, NE/4NW/4, NW/4NE/4, NE/4NE/4, SE/4NW/4, SW/4NE/4, S/2N/2 and S/2

Section 20, Township 20 South, Range 35 East
Being all or part of: SW/4NW/4, NW/4NW/4, NE/4NW/4, NW/4NE/4 NE/4NE/4, SE/4NW/4SW/4NE/4, SE/4NE/4 S/2

Section 21, Township 20 South, Range 35 East
Being all or part of: NW/4NW/4, NE/4NW/4, NW/4NE/4, NE/4NE/4 S/2N/2 and S/2

Together with all improvements thereon and all rights appurtenant thereto including, but not limited to, all water rights, both surface and underground, all wind rights, all sand, gravel, caliche, and other property and rights whatsoever owned by the Grantor in connection with the described land. Notwithstanding anything to the rights are hereby reserved to the Grantor subject to reservations, restrictions and easements appearing of record.

Subject to reservations, restrictions and easements appearing of record

THE SURFACE ESTATE ONLY TO:

That portion of the following described Sections lying south and west of that certain "Survey Boundary Fence crossing Ranch Properties in Sections 13 and 24 Township 20 South, Range 34 East, Sections 19, 20, 21, 16, 15, 14, 23 and 24, Township 20 South, Range 35 East and Sections 19 and 20, Township 20 South, Range 36 East, N.M.P.M, Lea County, New Mexico" by John West Surveying Company, Inc., dated March 17, 2000 and recorded in the records of the County Clerk of Lea County, New Mexico on June 15, 2000, as Reception No. 59881, at Survey Book 1, Page 276.

Section 23, Township 20 South, Range 35 East
Being all or parts of: NW/4NE/4, SW/4NE/4, SE/4NE/4, NW/4 and S/2

Section 24, Township 20 South, Range 35 East
Being all or parts of: SW/4NW/4, SE/4NW/4, SW/4NE/4, SE/4NE/4 and S/2

Section 19, Township 20 South, Range 36 East
Being all or parts of: SW/4NW/4, NW/4SW/4, NE/4SW/4, NW/4SE/4, NE/4SE/4 and S/2S/2

Section 20, Township 20 South, Range 36 East
Being all or parts of: NW/4SW/4, NE/4SW/4, NW/4SE/4, NE/4SE/4 and S/2S/2

Together with all improvements thereon and all rights appurtenant thereto including, but not limited to, all water rights, both surface and underground, all wind rights, all sand, gravel, caliche, and other property and rights whatsoever owned by the Grantor in connection with the described land. Notwithstanding anything to the rights are hereby reserved to the Grantor subject to reservations, restrictions and easements appearing of record.

Subject to reservations, restrictions and easements appearing of record

Exhibit A-1

S&S, Inc.'s State Lease Lands

State Agricultural Lease No. GT-2979 covering the following described lands for a total of 2588.27 acres:

Legal	Section-Township-Range	Acres
All	29-20S-36E	640
All	30-20S-36E	638.88
All	31-20S-36E	639.52
All	32-20S-36E	640
Part SE/4SW/4	16-20S-35E	1.58
Part SW/4SE/4	16-20S-35E	9.73
Part SE/4SE/4	16-20S-35E	18.56

Exhibit "B"

Pearl Valley Limited Partnership Land

Surface Estate only to: That portion of the following described lands lying North of the survey line as more fully described in the John W. West Surveying Company survey of the boundary partitioning the Sims Brother Ranch dated February 24, 2000, and filed of record with the County Clerk of Lea County on June 15, 2000, in Book 1, Pages 270 to 285 of the Records of Lea County as Document Nos. 59880 and 59881, which description is incorporated herein by reference as if set out in full herein.

Description	Section	Township	Range N.M.P.M	Approximate Acres
All of	24	20 South	34 East	640
All of	36	20 South	34 East	640
NE/4 & S/2SW/4	23	19 South	35 East	240
NW/4	24	19 South	35 East	160
All of	25	19 South	35 East	640
All of	26	19 South	35 East	640
SW/4SE/4 plus 2 acres out of NW/4SE/4 (being about 70 yds)	27	19 South	35 East	42
N/2N/2, SE/4NW/4, SW/4ne/4, NE/4SW/4, NW/4SE/4 & S/2SE/4	35	19 South	35 East	400
All of	1	20 South	35 East	640
S/2N/2 & S/2	7	20 South	35 East	480
S/2N/2 & S/2	8	20 South	35 East	480
S/2N/2 & S/2	9	20 South	35 East	480
S/2N/2 & S/2	10	20 South	35 East	480
All of	11	20 South	35 East	640
All of	12	20 South	35 East	640
All of	13	20 South	35 East	640
N/2, SE/4, S/2SW/4 & NE/4SW/4	14	20 South	35 East	640
All of	15	20 South	35 East	640
All of	17	20 South	35 East	640
All of	18	20 South	35 East	640
All of	19	20 South	35 East	640
All of	20	20 South	35 East	640
All of	21	20 South	35 East	640
All of	22	20 South	35 East	640
All of	23	20 South	35 East	640

Exhibit "B-1"
Page 1

Pearl Valley Limited Partnership's State Leases

1. **State Agricultural Lease NO. GT-1415 Covering the following described lands for a total of 80 acres:**

LEASE NO: GT1415

E/2SE/4 – Section 22, Township 19 South, Range 35 East – 80 acres

2. **State Agricultural Lease No. GT-1630 covering the following described lands for a total of 680 acres:**

LEASE NO: GT1630

SE/4NE/4 - Section 35, Township 23 North, Range 29 East – 40 acres
All - Section 36, Township 23 North, Range 29 East – 640 acres

3. **State Agricultural Lease No. GM-1773 covering the following described lands for a total of 80 acres:**

LEASE NO: GM1773

SE/4NE/4 - Section 2, Township 23 North, Range 29 East, 40 acres
NW/4SE/4 - Section 11, Township 23 North, Range 29 East, 40 Acres

4. **State Agricultural Lease No. GR-2182 covering the following described lands for a total of 145 acres:**

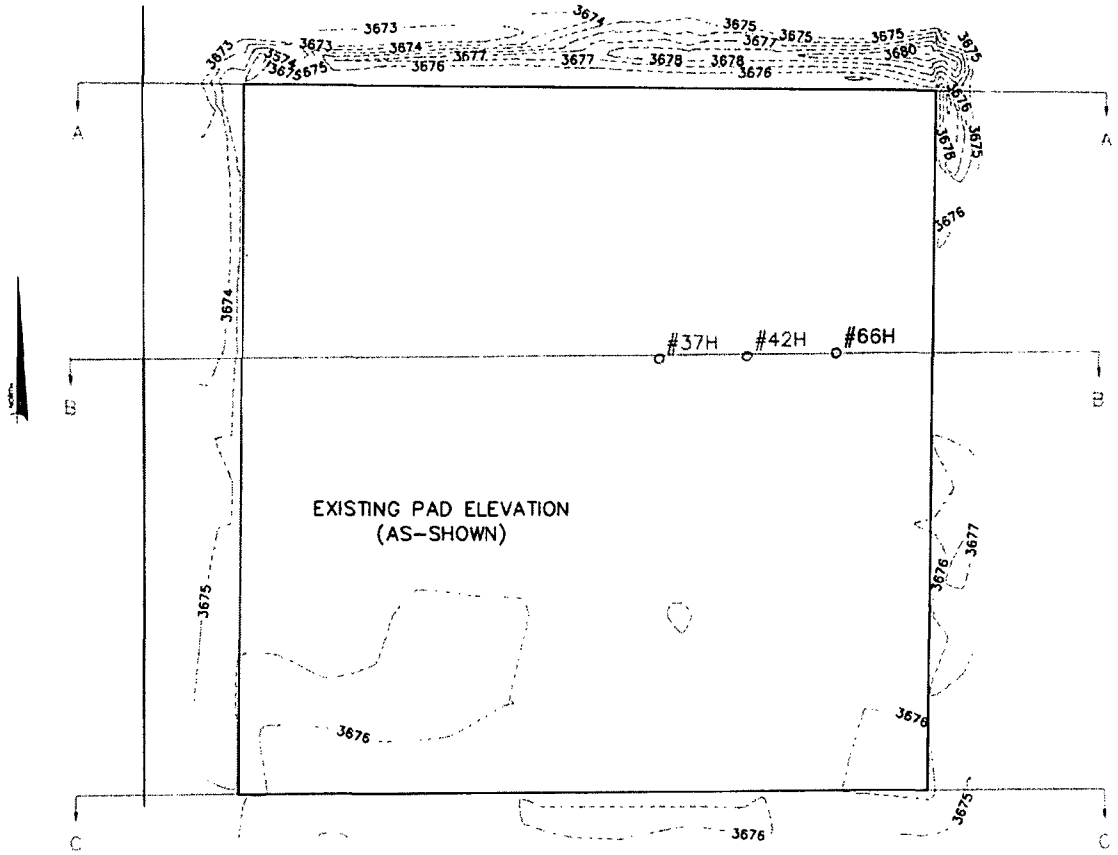
LEASE NO: GR8182

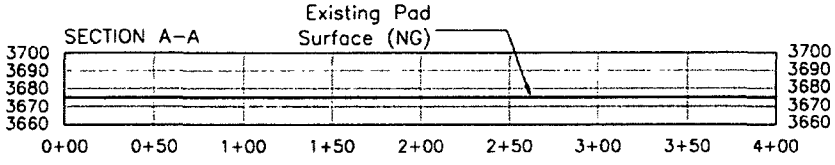
E/2NE & NE/4SE/4 – Section 16, Township 23 North, Rage 29 East, 120 acres
PART OF SE/4SE/4 – Section 16, Township 23 North, Range 29 East, 25 acres

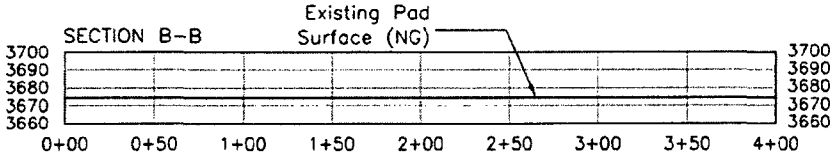
5. **State Agricultural Lease No. GT-2978 covering the following described lands for a total of 4,412.65 acres:**

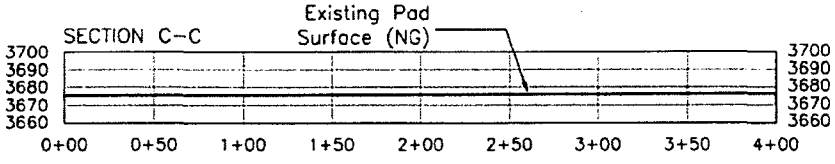
LEASE NO: GT2978

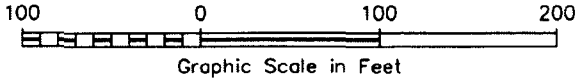
NW/4, N/2S/2 & S/2SE/4, Section 23, Township 19 South, Range 35 East , 400 Acres
ALL, Section 32, Township 19 South, Range 35 East, 640 Acres
ALL, Section 33, Township 19 South, Range 35 East, 640 Acres
W/2NE/4, SE/4NE/4, W/2, SE/4, Section 34, Township 19 South, Range 35 East, 600 Acres
SE/4NE/4, SW/NW/4, W/2SW/4, SE/4SW/4 & NE/4SE/4, Section 35, Township 19 South, Range 35 East, 240 Acres
ALL, Section 36, Township 19 South, Range 35 East, 640 acres
LOT 1-4 – Section 2, Township 20 South, Range 35 East, 162.52 acres
S/2N/2, & S/2 – Section 2, 20 South, Range 35 East, 480 acres
N/2, N/SW/4, SW/4SW/4, PART SE/4SW/4 & N/2SE/4 – Section 16, Township 20 South, Range 35 East, 558.42 acres
PART SW/4SE/4 & PART SE/4SE/4 – Section 16, Township 20 South, Range 35 East, 51.71 acres











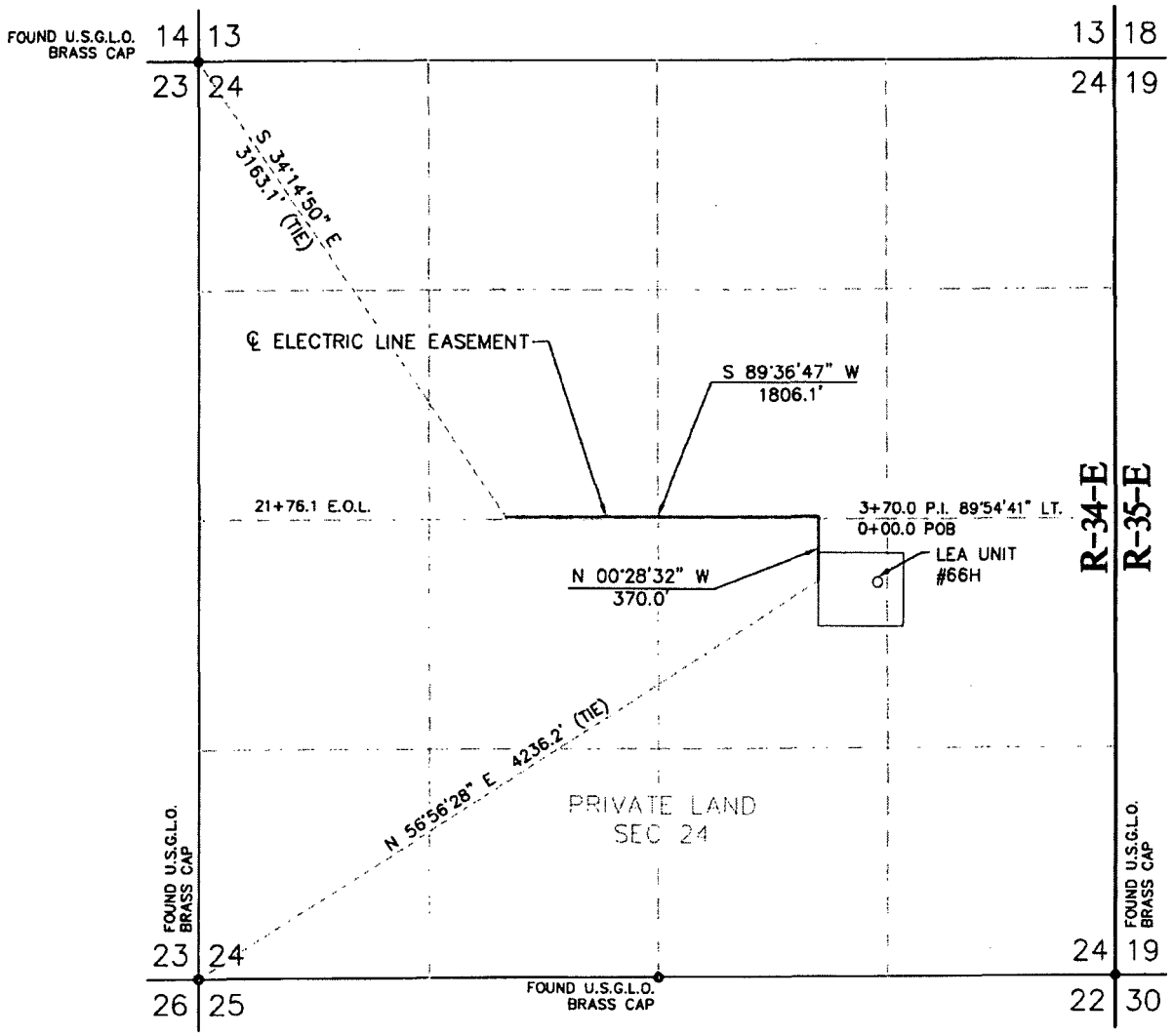
LEGACY RESERVES, LP

LEA UNIT #66H PAD

Located 2270' FSL & 1380' FEL, Section 24, Township 20 South, Range 34 East, N.M.P.M. Lea County, New Mexico

Scale: 1" = 100'	Date: April 25, 2017

SECTION 24, TOWNSHIP 20 SOUTH, RANGE 34 EAST, N.M.P.M.
LEA COUNTY NEW MEXICO



LEGEND

● – DENOTES FOUND MONUMENT (AS DESCRIBED)

—— – DENOTES CENTERLINE ELECTRIC EASEMENT

LEGAL DESCRIPTION

A STRIP OF LAND BEING 50 FEET WIDE, 2,176.1 FEET OR 0.412 MILES IN LENGTH AND BEING 25.0 FEET RIGHT AND 25.0 FEET LEFT OF THE ABOVE PLATTED CENTERLINE.

1000 0 1000 2000

Graphic Scale in Feet

LEGACY RESERVES OPERATING LP

AN ELECTRIC LINE EASEMENT LOCATED ON FEE LAND IN SECTION 24 TOWNSHIP 20 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO

Survey Date: June 25, 2015	Sheet 1 of 1 Sheets
W.O. Number: 2017-0929	Drawn By: SC/LRG
Date: 03-12-2018	Scale: 1" = 1000'

WEST COMPANY
Land Surveyors ▪ Civil Engineers

SURVEYORS - ENGINEERS - PLANNERS
110 W. LOUISIANA AVE., SUITE 110
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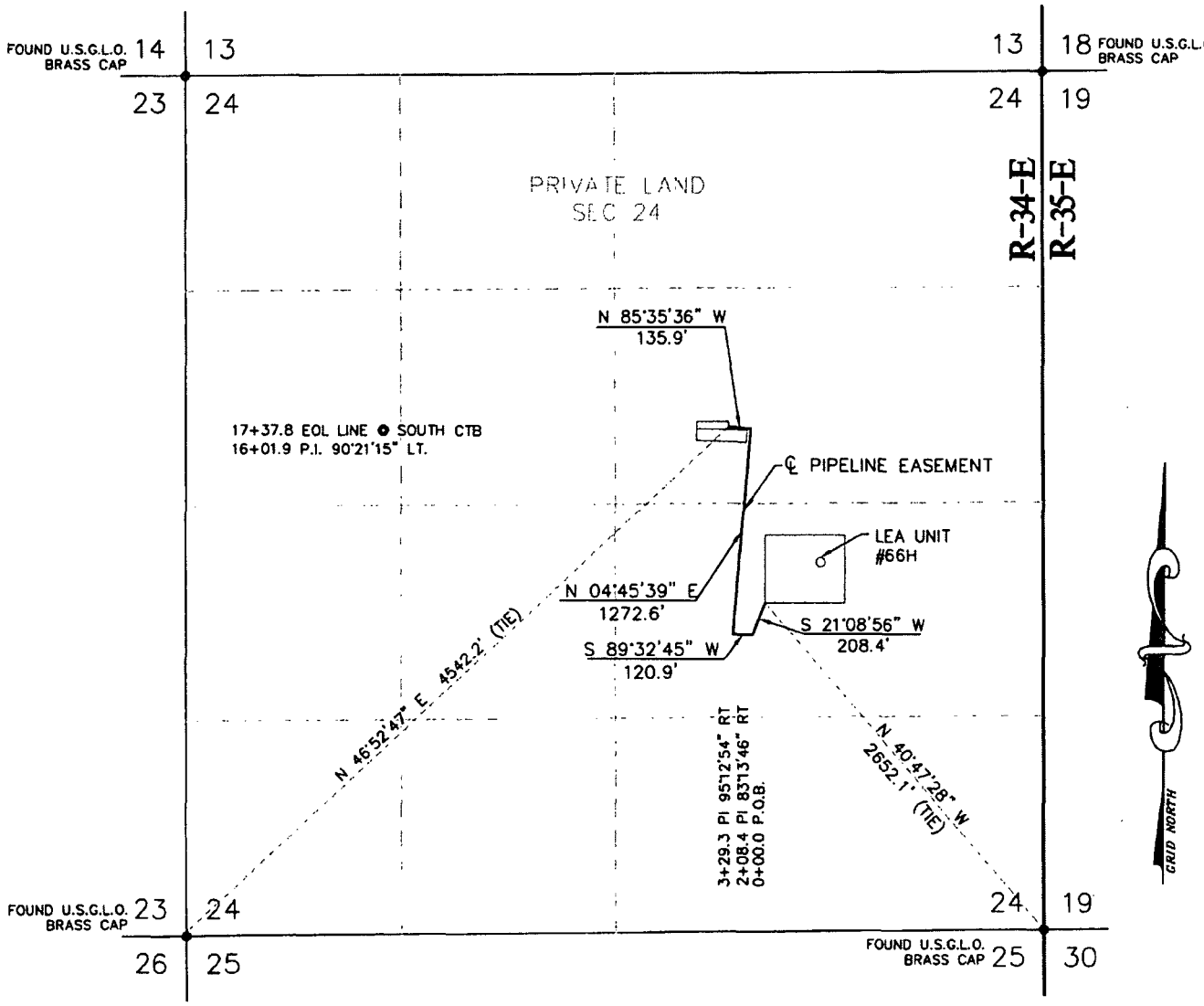
SECTION 24, TOWNSHIP 20 SOUTH, RANGE 34 EAST, N.M.P.M.
LEA COUNTY NEW MEXICO



LEGEND

● – DENOTES FOUND MONUMENT (AS DESCRIBED)

—— – DENOTES PIPE LINE

1000 0 1000 2000

Graphic Scale in Feet

LEGAL DESCRIPTION

A STRIP OF LAND BEING 50 FEET WIDE, 1,737.8 FEET OR 0.329 MILES IN LENGTH AND BEING 25.0 FEET RIGHT AND 25.0 FEET LEFT OF THE ABOVE PLATTED CENTERLINE.

NOTE: The above platted centerline was created using data as provided by client and/or client's representative and has not been staked on the ground or in the field.

LEGACY RESERVES OPERATING LP

A PIPELINE EASEMENT LOCATED ON PRIVATE LAND IN SECTION 24 TOWNSHIP 20 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO

Survey Date: June 25, 2015	Sheet 1 of 1 Sheets
W.O. Number: 2017-0929	Drawn By: SC/LRG
Date: 03-12-2018	Scale: 1" = 1000'

WEST COMPANY
Land Surveyors ▪ Civil Engineers

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SURFACE USE PLAN
Legacy Reserves Operating, L.P.
Lea Unit 66H
SHL: 2270' FSL & 1380' FEL, Section 24, T. 20 S., R. 34 E.
BHL: 330' FNL & 1700' FEL, Section 13, T. 20 S., R. 34 E.
Lea County, New Mexico

This plan is submitted with form 3160-3, Application for Permit to Drill, covering the above described well. The purpose of this plan is to describe the location of the proposed well, the proposed construction activities and operations plan, the magnitude of the surface disturbance involved and the procedures to be followed in rehabilitating the surface after completion of the operations, so that a complete appraisal can be made of the environmental effect associated with the operations.

1. EXISTING ROADS

   A. DIRECTIONS: Go northeast of Carlsbad, NM on Highway 285, for 50 miles. Turn south onto Marathon Road (County Road 27-A) for 5.6 miles. Turn east on lease road for 0.7 miles. The new access road to the north will begin at this point. All existing roads are either paved or a caliche lease road.

   B. See attached plats and maps provided by West Company of Midland Surveys.

   C. The access route from Marathon Road to the well location is depicted on the attached location map. The route highlighted in red is all within private surface and no ROW required.

   D. Existing roads on the access route will be improved and maintained to the standard set forth in Section 2 of this Surface Use Plan of Operations.

2. NEW OR RECONSTRUCTED ACCESS ROADS:

   A. Will be utilizing existing access road, no new road construction will be required.

   B. The maximum width of the driving surface will be 14 feet. The road will be crowned and ditched with a 2% slope from the tip of the crown to the edge of the driving surface. The ditches will be 1 foot deep with 3:1 slopes. The driving surface will be made of 6" rolled and compacted caliche.

Level Ground Section

   C. Surface material will be native caliche. The average grade of the entire road will be approximately 3%.

   D. Fence cuts: No

   E. Cattle guards: No

   F. Turnouts: No

G. Culverts: No

H. Cuts and Fills: Not significant

I. Approximately 6 inches of topsoil (root zone) will be stripped from the proposed access road prior to any further construction activity. The topsoil that was stripped will be spread along the edge of the road and with the ditch. The topsoil will be seeded with the proper seed mix designated by the BLM.

J. The access road will be constructed and maintained as necessary to prevent soil erosion and accommodate all-weather traffic. The road will be crowned and ditched with water turnouts installed as necessary to provide for proper drainage along the access road route.

K. The access road and associated drainage structures will be constructed and maintained in accordance with road guidelines contained in the joint BLM/USFS publication: Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book, Fourth Edition and/or BLM Manual Section 9113 concerning road construction standards on projects subject to federal jurisdiction.

3. LOCATION OF EXISTING WELLS:

See attached Proximity Exhibit Plat showing all wells within a one-mile radius.

4. LOCATION OF EXISTING AND/OR PROPOSED FACILITIES:

A. In the event the well is found productive, a 4" surface poly flowline (125 psi) (oil/gas/water) will be laid along the proposed and existing roadway, for 1722.6', to the satellite battery located in the SW/4NE/4 of section 24, T. 20 S., R. 34 E. **(SEE ATTACHMENT FOR FLOWLINE EASEMENT).**

B. All permanent (on site six months or longer) aboveground structures constructed or installed on location and not subject to safety requirements will be painted to BLM specifications.

C. Containment berms will be constructed completely around production facilities designed to hold fluids. The containment berms will be constructed or compacted subsoil, be sufficiently impervious, hold 1½ times the capacity of the largest tank and away from cut or fill areas.

5. LOCATION AND TYPE OF WATER SUPPLY: **12,000 bbls of fresh water and 8,000 bbls of brine water will be used for this well (SEE ATTACHMENT FOR WATER SOURCE AND LEGALS).**

The well will be drilled using a combination of water mud systems as outlined in the Drilling Program. The water will be obtained from commercial water stations in the area and hauled to the location by transport truck using the existing and proposed roads shown in the attached survey plats. If a commercial water well is nearby, a temporary, surface poly line, will be laid along existing roads or other ROW easements and the water pumped to the well. No water well will be drilled on the location.

6. SOURCE OF CONSTRUCTION MATERIALS: **3,000 YARDS OF CALICHE WILL BE USED TO EXTEND THIS WELL PAD (SEE ATTACHMENT FOR CALICHE PIT SOURCE AND LEGALS).**

   Any construction material that may be required for surfacing of the drill pad and access road will be from a contractor having a permitted source of materials within the general area. No construction materials will be removed from Federal lands without prior approval from the appropriate surface management agency. All roads will be constructed of 6" rolled and compacted caliche.

7. METHODS OF HANDLING WASTE DISPOSAL:

   A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.
   B. Drilling fluids will be contained in steel mud pits.
   C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.
   D. Oil produced during operations will be stored in tanks until sold.
   E. Portable, self-contained chemical toilets will be provided for human waste disposal. Upon completion of operations, or as required, the toilet holding tanks will be pumped and the contents thereof disposed of in an approved sewage disposal facility. All state and local laws and regulations pertaining to disposal of human and solid waste will be complied with. This equipment will be properly maintained during the drilling and completion operations and will be removed when all operations are complete.
   F. All trash, junk, and other waste materials will be contained in trash cages or bins to prevent scattering and will be removed and deposited in an approved sanitary landfill. Immediately after drilling all debris and other waste materials on and around the well location, not contained in the trash cage will be cleaned up and removed from the locations. No potentially adverse materials or substances will be left on the location.

8. ANCILLARY FACILITIES:

   No campsite, airstrip, or other facilities will be built as a result of the operation of this well. No staging areas are needed.

9. WELL SITE LAYOUT:

   A. **Attached Pad Plat** shows the dimensions of the proposed well, which will be 100' east and on the same pad, as the previously approved Lea Unit 37H well.
   B. Extending the existing location to the proposed well pad size will be 490' x 420'. There will be no reserve pit due to the well being drilled utilizing a closed loop mud system. The closed loop system will meet the NMOCD requirements 19.15.17.
   C. The West Company of Midland Surveyor's plat, Form C-102, shows how the wells will be turned to a V-Door East.
   D. A 600' x 800' area has been staked and flagged.
   E. All equipment and vehicles will be confined to the approved disturbed areas of this APD (i.e., access road, well pad, and topsoil storage areas).

10. PLANS FOR SURFACE RECLAMATION:

   A. After concluding the drilling and/or completion operations, if the well is found non-commercial, all the equipment will be removed, the surface material, caliche, will be removed

from the well pad and road and transported to the original caliche pit or used for other roads. The original stock piled top soil will be returned to the pad and contoured, as close as possible, to the original topography. The access road will have the caliche removed and the road ripped, barricaded and seeded as directed by the BLM.

B. If the well is a producer, the portions of the location not essential to production facilities or space required for workover operations, will be reclaimed and seeded as per BLM requirements. **(SEE ATTACHMENT FOR SURFACE RECLAMATION PLAT FOR THIS WELL)**

C. Reclamation Performance Standards

The following reclamation performance standards will be met:

Interim Reclamation – Includes disturbed areas that may be redisturbed during operations and will be redisturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.

- Disturbed areas not needed for active, long-term production operations or vehicle travel will be recontoured, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved) plant community sufficient to minimize visual impacts, provide forage, stabilize soils, and impede the invasion of noxious, invasive, and non-native weeds.

Final Reclamation – Includes disturbed areas where the original landform and a natural vegetative community will be restored and it is anticipated the site will not be redisturbed for future development.

- The original landform will be restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.
- A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community will be established on the site, with a density sufficient to control erosion and invasion by non-native plants and to re-establish wildlife habitat or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation.
- Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rills (greater than 3 inches) are not observed.
- The site will be free of State- or county-listed noxious weeds, oil field debris and equipment, and contaminated soil. Invasive and non-native weeds are controlled.

D. Reclamation Actions

Earthwork for interim and final reclamation will be completed within 6 months of well completion or plugging unless a delay is approved in writing by the BLM authorized officer. The following minimum reclamation actions will be taken to ensure that the reclamation objectives and standards are met. It may be necessary to take additional reclamation actions beyond the minimum in order to achieve the Reclamation Standards.

Reclamation – General

Notification:

- The BLM will be notified at least 3 days prior to commencement of any reclamation operations.

Housekeeping:

- Within 30 days of well completion, the well location and surrounding areas(s) will be cleared of, and maintained free of, all debris, materials, trash, and equipment not required for production.
- No hazardous substances, trash, or litter will be buried or placed in pits.

Topsoil Management:

- Operations will disturb the minimum amount of surface area necessary to conduct safe and efficient operations.
- Topsoil depth is defined as the top layer of soil that contains 80% of the roots. In areas to be heavily disturbed, the topsoil will be stripped and stockpiled around the perimeter of the well location and along the perimeter of the access road to control run-on and run-off, to keep topsoil viable, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled topsoil will include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils.
- Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment or so dry that dust clouds greater than 30 feet tall are created. If such equipment creates ruts in excess of four (4) inches deep, the soil will be deemed too wet.
- No major depressions will be left that would trap water and cause ponding unless the intended purpose is to trap runoff and sediment.

Seeding:

- Seedbed Preparation. Initial seedbed preparation will consist of recontouring to the appropriate interim or final reclamation standard. All compacted areas to be seeded will be ripped to a minimum depth of 18 inches with a minimum furrow spacing of 2 feet, followed by recontouring the surface and then evenly spreading the stockpiled topsoil. Prior to seeding, the seedbed will be scarified to a depth of no less than 4 – 6 inches. If the site is to be broadcast seeded, the surface will be left rough enough to trap seed and snow, control erosion, and increase water infiltration.
- If broadcast seeding is to be used and is delayed, final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.
- Seed Application. Seeding will be conducted no more than two weeks following completion of final seedbed preparation. A certified weed-free seed mix designed by the BLM to meet reclamation standards will be used.
- If the site is harrowed or dragged, seed will be covered by no more than 0.25 inch of soil.

11. SURFACE OWNERSHIP:

A. The surface is owned by Smith & Sons, Inc. (Patrick Sims) and Pearl Valley, L.P.P.O. Box 1046, Eunice, NM 88231. Phone: 575-390-2642. The minerals is owned by the Bureau of Land Management. The surface use agreement was obtained from the private surface owner regarding this proposed project.

12. OTHER INFORMATION:

A. The area surrounding the well site is in a very flat, sandy loam, rolling hills type area. The vegetation consists of Shinnery Oak, Yucca, Mesquite with three-awns and some dropseed species.
B. There is no permanent or live water in the immediate area.
C. There are no dwellings within 2 miles of this location.
D. A class III archaeological survey has been conducted and filed with the Carlsbad Field Office of the Bureau of Land Management.

13. BOND COVERAGE:

Bond Coverage is Nationwide; Bond Number NMB-001014.

OPERATORS REPRESENTATIVE:

The Legacy Reserves Operating L.P. representatives responsible for ensuring compliance of the surface use plan are listed below:

Drilling:

Matt Dickson – Drilling Engineer, Legacy Reserves Operating, L.P.
P.O. Box 10848
Midland, Texas 79702
(432) 689-5204 (Office)
(432) 212-5698 (Cell)

ON-SITE PERFORMED ON 6/16/15 RESULTED IN PROPOSED LOCATION BEING OK WHERE STAKED. IT WAS AGREED TO TURN THE LOCATION TO A V-DOOR EAST. IT WAS ALSO AGREED TO MOVE AND PLACE THE TOP SOIL TO THE NORTH, AND THE INTERIM RECLAMATION WILL BE THE NORTH, EAST, SOUTH AND WEST PORTION OF THIS PAD.

PRESENT AT ON-SITE:
CRAIG SPARKMAN – LEGACY RESERVES OPERATING, L.P.
TRISH BADBEAR – BLM
CASSANDRA BROOKS – BLM
MATT MATHIS – CEHMM
CHRISTOPHER FREEMAN – CEHMM
DOUG BURGER – LEGACY LAND & ENVIRONMENTAL SOLUTIONS
KELLY POINDEXTER – WEST COMPANY OF MIDLAND – SURVEYORS

CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct, and that the work associated with the operations proposed herein will be performed in conformity with the APD package and the terms and conditions under which it is approved. I also certify that I, or Legacy Reserves Operating, L.P., am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U. S. C. 1001 for the filing of false statements. Executed this 19th day of January 2017.

AFMSS

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

PWD Data Report

08/06/2018

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

08/06/2018

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001015

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: