Form 3160-3
(June 2015)

HOBBS OCD

MAY 01 2019

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMLC0065375A

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

7. If Unit or CA Agreement, Name and No.
LEA / NMNM070976X

8. Lease Name and Well No.
LEA UNIT
221H (302802)

2. Name of Operator
LEGACY RESERVES OPERATING LP 240974

9. API Well No.
30-025-45903

3a. Address
303 West Wall St., Ste 1800 Midland TX 79701

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

10. Field and Pool, or Exploratory
~~LEA~~ / UPPER WOLFCAMP (98243)

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWSW / 2200 FSL / 635 FWL / LAT 32.5574154 / LONG -103.5031103
At proposed prod. zone NWNW / 100 FNL / 1000 FWL / LAT 32.5801068 / LONG -103.5019181

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 19 / T20S / R35E / NMP

14. Distance in miles and direction from nearest town or post office*
22 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)
635 feet

16. No of acres in lease
239.77

17. Spacing Unit dedicated to this well
2559.68

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

19. Proposed Depth
11800 feet / 19827 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3678 feet

22. Approximate date work will start*
02/14/2019

23. Estimated duration
45 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Sherry Morrow / Ph: (432)689-5200	11/19/2018

Title
Drilling Tech

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	04/19/2019

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.

GCP Rec 05/01/19

APPROVED WITH CONDITIONS

KK 05/06/19

REQUIRES NSL

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 04/19/2019

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 I: 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 wen, 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 directionany 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.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

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 wen 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 win 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 conects this information to anow 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 Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**LEGACY RESERVES OPERATING LP**
LEASE NO.:	**NMLC0065375A**
WELL NAME & NO.:	**Lea Unit 221H**
SURFACE HOLE FOOTAGE:	**2200'/S & 635'/W**
BOTTOM HOLE FOOTAGE	**100'/N & 1000'/W**
LOCATION:	**Section 19, T.20 S., R.35 E., NMPM**
COUNTY:	**Lea County, New Mexico**

Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	◉ Low	○ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	
Other	☐ 4 String Area	☒ Capitan Reef	☐ WIPP

A. HYDROGEN SULFIDE

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

B. CASING

1. The **13 3/8** inch surface casing shall be set at approximately **1,825** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater (This is to include the lead cement).

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength,

whichever is greater.

d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The **9 5/8** inch intermediate casing shall be set at approximately **5,587** feet and the minimum required fill of cement behind this intermediate casing is:

Option 1:

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef.**

Option 2:

Operator has proposed DV tool at depth of 3900', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

b. Second stage above DV tool:
   - Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef.**

Option 3:

Operator has proposed DV tool at depth of 3900' and 1900', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

b. Second stage above DV tool:

- Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with third stage cement job.

c. Third stage above DV tool:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef.**

❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:

- Switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

- Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.

3. The minimum required fill of cement behind the **7** inch intermediate liner is:

- Cement to top of liner. Operator shall provide method of verification.

Operator will utilize a 7" tie back casing and cement to surface.

4. The minimum required fill of cement behind the **4 1/2** inch production liner is:

- Cement should tie-back at least **100 feet** into previous string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8** inch intermediate casing shoe shall be **10,000 (10M)** psi. **Variance is approved to use a 5M Annular which shall be tested to 5000 psi.**

D. SPECIAL REQUIREMENT(S)

Commercial Well Determination

A commercial well determination will need to be submitted after production has been established for at least six months.

Unit Wells

The well sign for a unit well shall include the unit number in addition to the surface and bottom hole lease numbers. This also applies to participating area numbers. If a participating area has not been established, the operator can use the general unit designation, but will replace the unit number with the participating area number when the sign is replaced.

JJP04082019

GENERAL REQUIREMENTS

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

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

☒ Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)

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

☒ Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575) 393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig
      - Notify the BLM when moving in and removing the Spudder Rig.
      - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

    a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    c. Manufacturer representative shall install the test plug for the initial BOP test.
    d. Operator shall perform the intermediate casing integrity test to 70% of the casing burst. This will test the multi-bowl seals.
    e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

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

    a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the

plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

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

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

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

e. The results of the test shall be reported to the appropriate BLM office.

f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

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

AFMSS

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

Operator Certification Data Report

04/24/2019

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: Sherry Morrow **Signed on:** 11/19/2018

Title: Drilling Tech

Street Address: 303 West Wall St., Ste 1800

City: Midland **State:** TX **Zip:** 79701

Phone: (432)689-5200

Email address: smorrow@legacylp.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

04/24/2019

APD ID: 10400036496 **Submission Date:** 11/19/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400036496 **Tie to previous NOS?** **Submission Date:** 11/19/2018

BLM Office: CARLSBAD **User:** Sherry Morrow **Title:** Drilling Tech

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

Lease number: NMLC0065375A **Lease Acres:** 239.77

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

Agreement in place? YES **Federal or Indian agreement:** FEDERAL

Agreement number: NMNM070976X

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_221H_20181119090451.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? NO **Master Development Plan name:**

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

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

Well Name: LEA UNIT **Well Number:** 221H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** LEA **Pool Name:** UPPER WOLFCAMP

Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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:** 59H, 60H, 61H, 120H, 121H, 220H

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: 22 Miles **Distance to nearest well:** 50 FT **Distance to lease line:** 635 FT

Reservoir well spacing assigned acres Measurement: 2559.68 Acres

Well plat: Agency_Lease_Plat___Lea_Unit_221H_20181119092351.pdf

Lea_Unit_221H_Signed_C102_Plat_20190131085902.pdf

Well work start Date: 02/14/2019 **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	2200	FSL	635	FWL	20S	35E	19	Aliquot NWSW	32.557415	-103.503103	LEA	NEW MEXICO	NEW MEXICO	F	FEE	3678	0	0
KOP Leg #1	2200	FSL	1000	FWL	20S	35E	19	Aliquot NWSW	32.557408	-103.501922	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-7549	11241	11227
PPP Leg #1	2541	FNL	1000	FWL	20S	35E	19	Aliquot SWNW	32.55887	-103.501922	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-8121	12100	11799

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

	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	0	FSL	1000	FWL	20S	35E	18	Aliquot SWSW	32.565855	-103.501921	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0065375A	-8122	14600	11800
PPP Leg #1	2640	FSL	1000	FWL	20S	35E	18	Aliquot SWNW	32.573111	-103.50192	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0066147A	-8122	17300	11800
EXIT Leg #1	100	FNL	1000	FWL	20S	35E	18	Aliquot NWNW	32.580106 8	-103.501918 1	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0065375A	-8122	19827	11800
BHL Leg #1	100	FNL	1000	FWL	20S	35E	18	Aliquot NWNW	32.580106 8	-103.501918 1	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0065375A	-8122	19827	11800

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

August 2, 2018

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

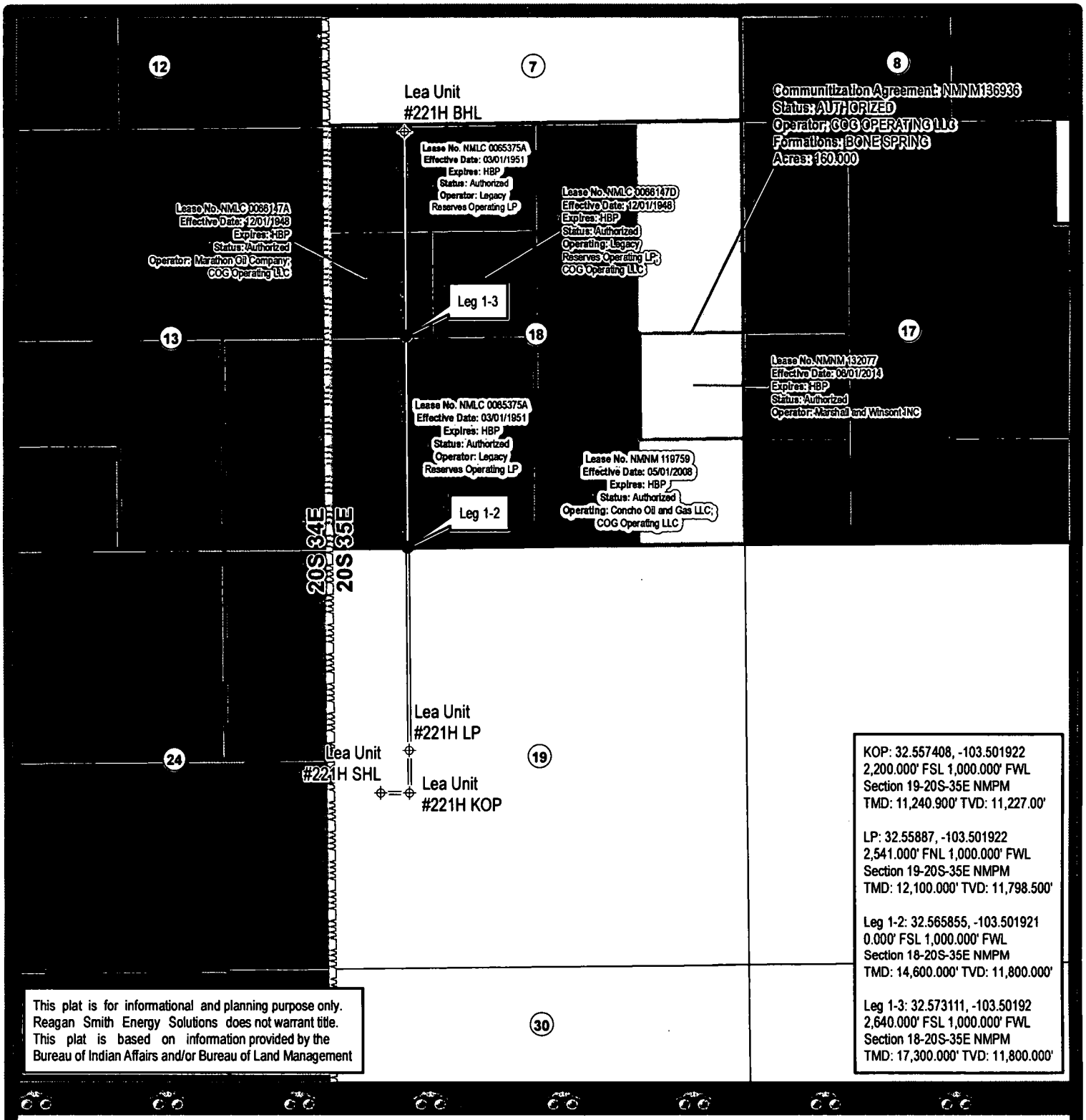
Re: Legacy Reserves Operating, L.P.
Designation of Agent
Lea Unit 221H
19-20S-35E NMPM
Lea County, NM

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 221H. 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 221H. 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.



N
W E
S
1:20,000

Approximately 43mi
East of Carlsbad, NM

Agency Lease Plat

Lea Unit #221H
Legacy Reserves Operating, LP
SHL Section 19 - T20S - R35E NMPM
Producing Sections 18 & 19 - T20S - R35E NMPM
Lea County, New Mexico

Created By: Alex Sherman
Map Created: 11/15/2018
www.landscout.com
info@landscout.com
(405) 600-3350

REAGAN SMITH ENERGY SOLUTIONS, INC.

- Lease Penetration Point
- Lea Unit #221H
- Proposed Well Path
- Communitization Agreements
- Bureau of Land Management

Document Path: S:\PERMITTING\APDs\APD - New Mexico\Lea County\Legacy Reserves, LP\Lea Unit 221H\Plats\GIS\Lea Unit 221H.mxd

AFMSS

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

Drilling Plan Data Report

04/24/2019

APD ID: 10400036496 **Submission Date:** 11/19/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	RUSTLER	3678	1800	1828		USEABLE WATER	No
2	YATES	51	3627	3655		USEABLE WATER	No
3	SEVEN RIVERS	-101	3779	3807		USEABLE WATER	No
4	CAPITAN REEF	-338	4016	4044		NONE	No
5	QUEEN	-694	4372	4400		NONE	No
6	BELL CANYON	-1826	5504	5532		NONE	No
7	CHERRY CANYON	-3016	6694	6722		NONE	No
8	BRUSHY CANYON	-3532	7210	7238		NATURAL GAS,OIL	No
9	BONE SPRING	-4739	8417	8445		NATURAL GAS,OIL	No
10	AVALON SAND	-5240	8918	8946		NATURAL GAS,OIL	No
11	BONE SPRING 1ST	-5929	9607	9635		NATURAL GAS,OIL	No
12	BONE SPRING 2ND	-6601	10279	10307		NATURAL GAS,OIL	No
13	BONE SPRING 3RD	-7079	10757	10785		NATURAL GAS,OIL	No
14	WOLFCAMP	-7588	11266	11294		NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Pressure Rating (PSI): 5M **Rating Depth:** 11800

Equipment: Ten thousand (10M) psi working pressure Blind Rams and Pipe Rams and a five thousand (5M) psi Annular Preventer will be installed on all casing. Three (3) chokes; two (2) hydraulic and one (1) manual, will be used.
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. Also requesting a variance for the requirement of a ten thousand (10M) psi Annular Preventer in which case a five thousand (5M) psi Annular Preventer will be utilized. See attached BOP diagram and the required Well Control Procedure for this variance.
Testing Procedure: A third party testing company will conduct pressure tests and record prior to drilling out below 13-3/8s" casing. The BOP, Choke, Choke Manifold, Top Drive Valves and Floor Safety Valves will be tested to 5000 psi prior to drilling below the 13-3/8s" surface casing shoe and to 100% of full working pressure (10,000 psi) prior to drilling below the 9-5/8s" intermediate casing shoe. The Annular Preventer will be tested to 2500 psi prior to drilling below the 13-3/8s" surface casing shoe and to 100% of working pressure (5,000 psi) prior to drilling below the 9-5/8" intermediate casing shoe. In addition, the BOP equipment will be tested after any repairs to the equipment as well as drilling out below any casing string. Pipe rams, blind rams, and annular preventer will be activated on each trip, and weekly BOP drills will be held with each crew. Floor Safety Valves that are full open and sized to fit Drill Pipe and Collars will be available on the rig floor in the open position when the Kelly is not in use.

Choke Diagram Attachment:

McVay_2_Choke_Manifold_Diagram_20181119102950.pdf

Flex_Hose_Specs_20190131111731.pdf

BOP Diagram Attachment:

McVay_2_BOP_Diagram_20190131111755.pdf

Legacy_Reseves_Inc._Well_Control_Procedure_w_emergency__s_20190131111817.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	1798	3678	1880	1800	J-55	54.5	BUTT	1.42	3.86	DRY	2.59	DRY	2.59
2	OTHER	8.5	7.0	NEW	API	N	0	5300	0	5286	3678	-1608	5300	HCP-110	32	BUTT	2.45	1.26	DRY	2.32	DRY	2.32
3	INTERMEDIATE	12.25	9.625	NEW	API	N	0	5600	0	5587	3678	-1909	5600	HCL-80	47	BUTT	1.97	1.33	DRY	2.99	DRY	2.99
4	LINER	8.5	7.0	NEW	API	N	5300	10700	5300	10686	3678	-7008	5400	HCP-110	32	BUTT	2.25	1.98	DRY	3.76	DRY	3.76
5	PRODUCTION	6	4.5	NEW	API	N	10200	19826	10186	11800	3678	-8122	9626	P-110	13.5	BUTT	1.81	1.25	DRY	1.8	DRY	1.8

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_221H___Surface_Casing_Design_20190131112557.pdf

Casing ID: 2 **String Type:** OTHER - TIE-BACK

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_221H___7_in_Liner_Tie_Back_Casing_Design_20190131114314.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_221H___Intermediate_I_Casing_Design_20190131112816.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Casing Attachments

Casing ID: 4 **String Type:** LINER

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_221H___Intermediate_Lnr_Casing_Design_20190131113252.pdf

Casing ID: 5 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit_221H___Production_Lnr_Casing_Design_20190131113816.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	1600	1300	1.72	13.5	2236	100	Class C	4%Bentonite, 0.4 pps Defoamer, 0.125 pps Cellophane, 9.102 H2O GPS
SURFACE	Tail		1600	1800	200	1.32	14.8	264	60	Class C Neat	6.304 H2O GPS
INTERMEDIATE	Lead	1900	0	1900	700	1.32	14.8	924	30	Class C Neat	6.304 H2O GPS

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
INTERMEDIATE	Lead	3900	0	3500	1200	1.94	12.6	2328	200	35:65 POZ-Class C	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.543 H2O GPS
INTERMEDIATE	Tail		3500	3900	200	1.18	15.6	236	100	Class H	0.3% Fluidloss, 5.216 H2O GPS
INTERMEDIATE	Lead		0	5000	1700	1.94	12.6	3298	180	35:65 POZ-Class C	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.542 H2O GPS
INTERMEDIATE	Tail		5000	5600	350	1.18	15.6	413	140	Class H	0.3% Fluidloss, 5.216 H2O GPS
OTHER	Lead		0	5300	700	1.32	14.8	924	10	Class C	0.2% Retarder, 0.1% Dispersant, 6.3 H2O GPS
LINER	Lead		5300	9200	350	2.47	12.6	865	50	50:50 POZ-Class H	5% Salt, 10% Bentonite, 0.2% Antisettling, 0.2% Retarder, 3pps Kol-Seal, 0.4pps Defoamer, 0.125pps Cellophane
LINER	Tail		9200	10700	200	1.18	15.6	236	30	Class H	0.3% Retarder, 5.214 H2O GPS
PRODUCTION	Lead		10200	19826	650	1.62	12.6	1053	30	PVL	1.3% Salt, 0.5% Fluidloss, 0.5% Retarder, 0.1% Antisettling, 0.4pps Defoamer, 8.626 H2O GPS

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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: If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water. 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.

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
10700	11800	OIL-BASED MUD	11	11							
5600	10700	OTHER : Cut Brine	9.2	9.2							
0	1800	OTHER : Fresh Water	9	9							
1800	5600	OTHER : Brine	10	10							

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Section 6 - Test, Logging, Coring

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

Mud logging, H2S plan, BOP and choke plans all in place for testing, equipment, safety

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

CBL,GR,MWD,MUDLOG

Coring operation description for the well:

No coring planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6750 **Anticipated Surface Pressure:** 4154

Anticipated Bottom Hole Temperature(F): 205

Anticipated abnormal pressures, temperatures, or potential geologic hazards? YES

Describe:

Capitan Reef - Zone of possible lost circulation.

Contingency Plans geoharzards description:

If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

H2S_Contingency_Plan_Briefing_Areas_Alarm_Loc._Legacy_Lea_Unit__221H_20181119111855.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Lea_Unit_221H_Planning_Report_Plan_1_20181119111924.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

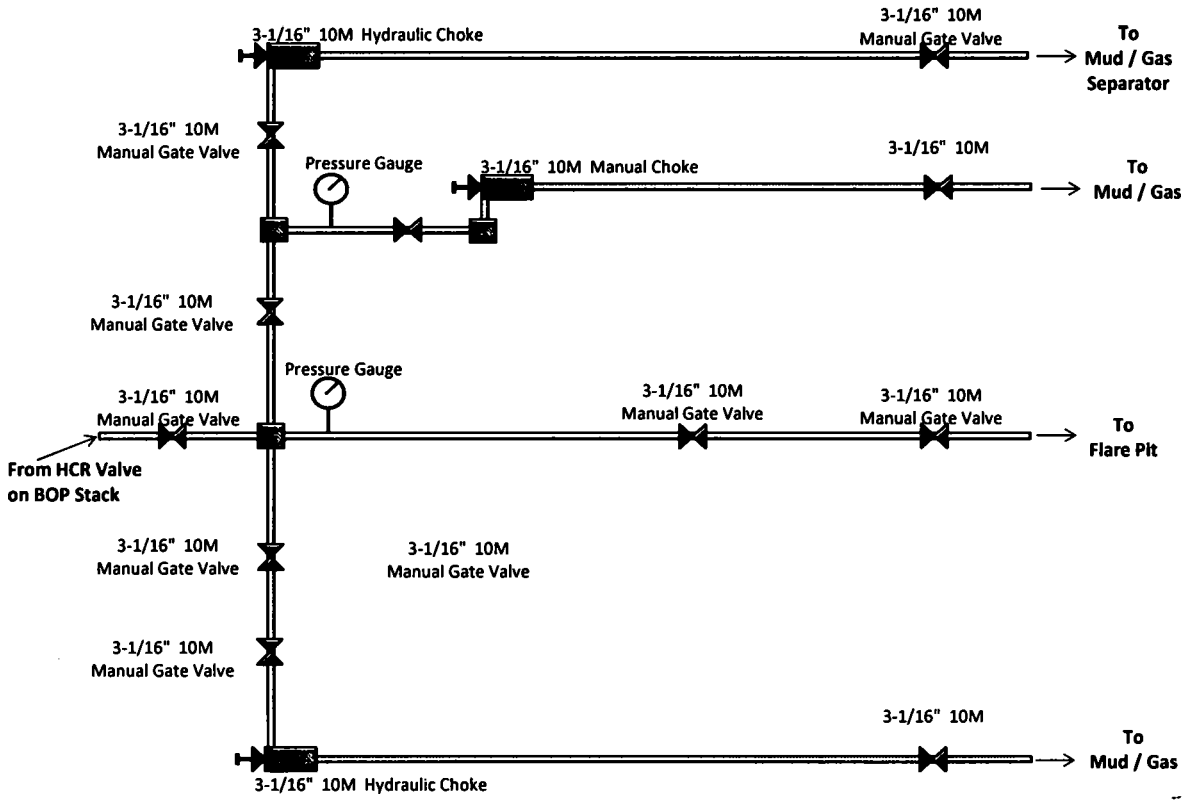
McVay_Rig2_Schematic_20181119111952.pdf
Lea_Unit_221H_GasCapturePlanFormAPD_20181119112021.pdf
Lea_Unit_221H_AC_Report_Plan_1_20181119112049.pdf
Lea_Unit_221H_Plot_Plan_1_20181119112116.pdf
Lea_Unit__221H_Drilling_Program_20190131123230.pdf
Lea_Unit_221H_Well_Plan__WBD__20190131123244.pdf

Other Variance attachment:

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Choke Manifold (10M)



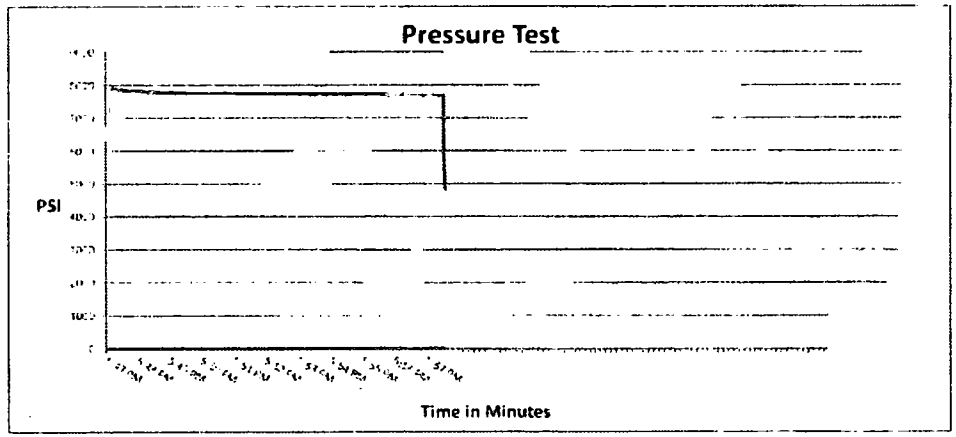
Midwest Hose & Specialty, Inc.

Internal Hydrostatic Test Graph

February 19 2017

Customer: Hobbs Pick Ticket #: 384842

Hose Specifications		Verification	
Hose Type	Length	Type of Fitting	Coupling Method
D	20'	4 1/2 1502	Swage
I.D.	O.D.	Die Size	Final O.D.
2"	5.07"	3.62"	5.55"
Working Pressure	Burst Pressure	Hose Serial #	Hose Assembly Serial #
5000 PSI	[illegible]	13928	384842



Test Pressure	Time Held at Test Pressure	Actual Burst Pressure	Peak Pressure
7500 PSI	30 1/4 Minutes		7538 PSI

Comments: [illegible]

Tested By: Richard Davis

Approved By: [illegible]

Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	**HOBBS**	*Hose Assembly Type*	**Rotary/Vibrator**
MWH Sales Representative	**CHARLES ASH**	*Certification*	**API 7K/FSL LEVEL2**
Date Assembled	**2/19/2017**	*Hose Grade*	**D**
Location Assembled	**OKC**	*Hose Working Pressure*	**5000**
Sales Order #	**318810**	*Hose Lot # and Date Code*	**10958-08/13**
Customer Purchase Order #	**356945**	*Hose I.D. (inches)*	**3.5"**
Assembly Serial # (Pick Ticket #)	**384842**	*Hose O.D. (inches)*	**5.45"**
Hose Assembly Length	**20FT**	*Armor (yes/no)*	NO
Fittings			
End A		**End B**	
Stem (Part and Revision #)	**R3.5X64WB**	*Stem (Part and Revision #)*	**R3.5X64WB**
Stem (Heat #)	**13105653**	*Stem (Heat #)*	**13105653**
Ferrule (Part and Revision #)	**RF3.5X5330**	*Ferrule (Part and Revision #)*	**RF3.5X5330**
Ferrule (Heat #)	**34038185**	*Ferrule (Heat #)*	**3403818**
Connection . Flange Hammer Union Part	**4-1/16 5K**	*Connection (Part #)*	**4-1/16 5K**
Connection (Heat #)		*Connection (Heat #)*	
Nut (Part #)		*Nut (Part #)*	
Nut (Heat #)		*Nut (Heat #)*	
Dies Used	**5.62"**	*Dies Used*	**5.53"**
Hydrostatic Test Requirements			
Test Pressure (psi)	**7,500**	***Hose assembly was tested with ambient water temperature.***	
Test Pressure Hold Time (minutes)	**10 1/2**		

Date Tested	*Tested By*	*Approved By*
2/19/2017	Richard Dix	

Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **HOBBS**	*Customer P.O.#* **356945**
Sales Order # **318810**	*Date Assembled:* **2/19/2017**

Specifications

Hose Assembly Type:	**Rotary/Vibrator**	*Rig #*	
Assembly Serial #	**384842**	*Hose Lot # and Date Code*	**10958-08/13**
Hose Working Pressure (psi)	**5000**	*Test Pressure (psi)*	**7500**
Hose Assembly Description:	**TRH56D-64SKH-64SKH-20.00' FT**		

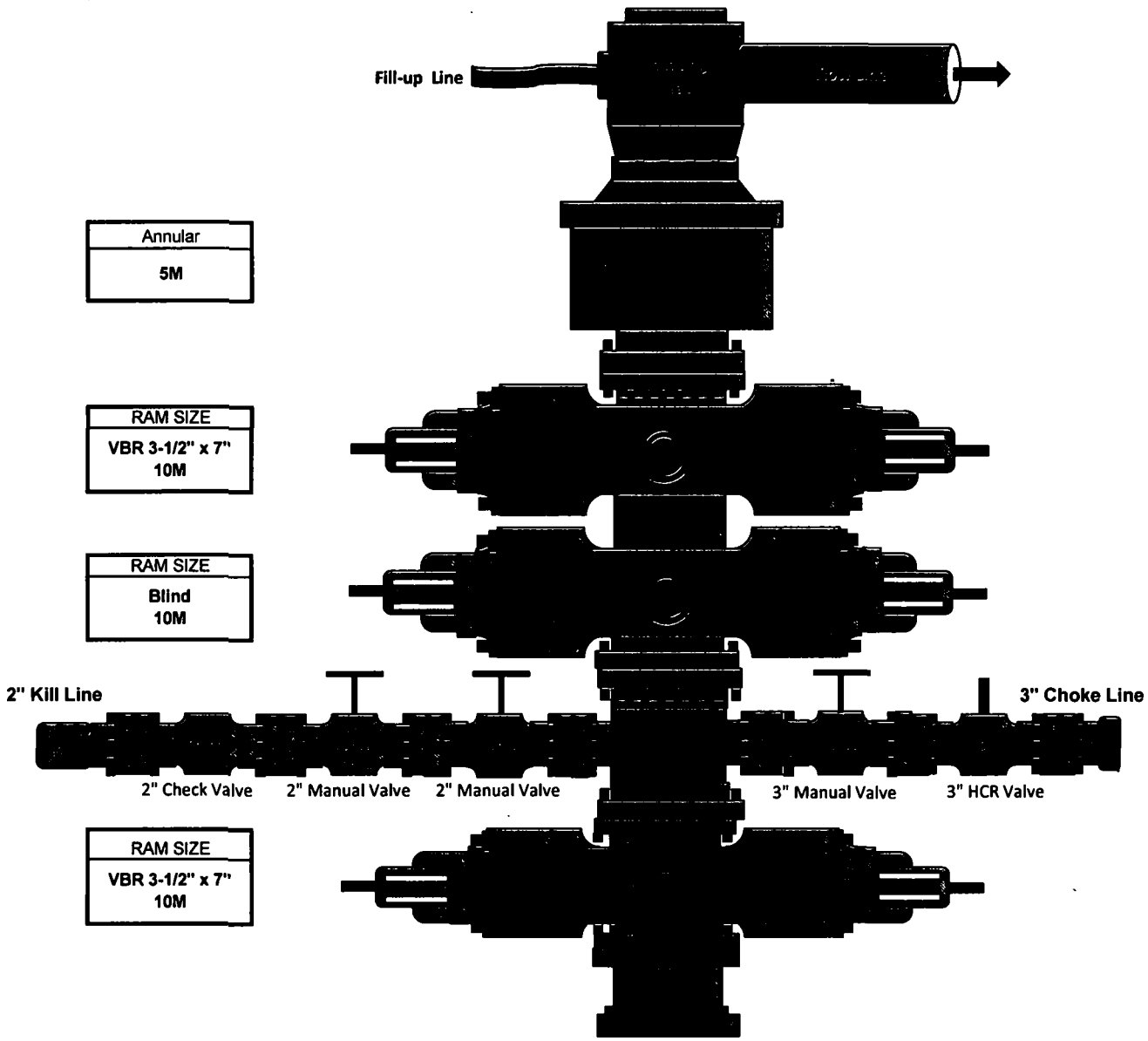
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

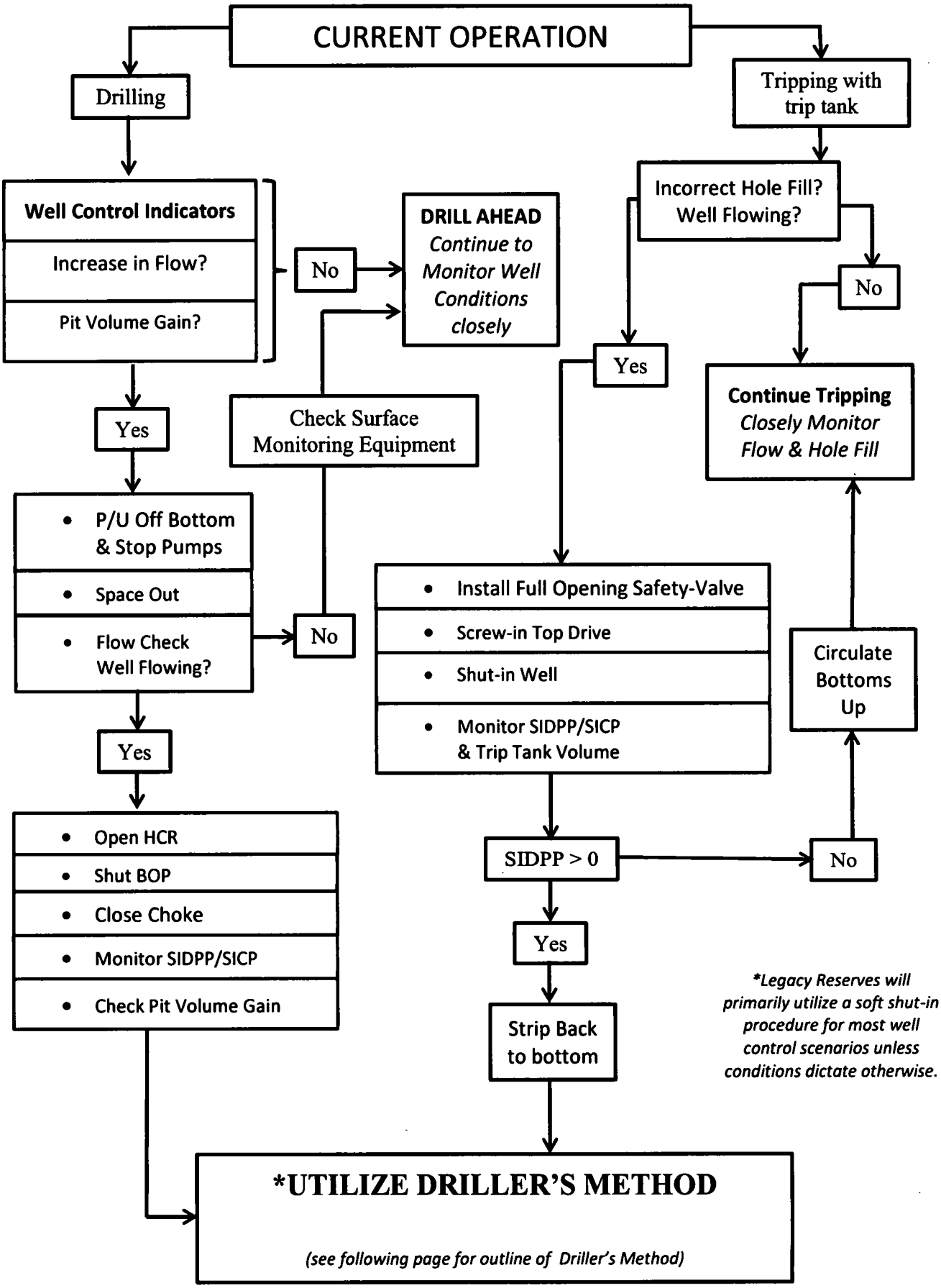
Comments:

Approved By	*Date*
	2/20/2017

13-5/8" BOP Stack (10M)



WELL CONTROL PROCEDURE



WELL CONTROL PROCEDURE

DRILLER'S METHOD

In order to kill the well without raising the mud weight the drill string must be run back to bottom. The kill procedure will begin on the assumption that the drill string has been returned to bottom.

1. Allow the SICP to stabilize, if it has not done so.

2. Bring the well on choke:
   a. Observe the SICP.
   b. Open the choke and slowly bring the pump up to kill rate.
   c. While bringing the pump up to kill rate, adjust the choke to maintain a constant casing pressure.
   d. After the pump is at the kill rate, adjust the choke to maintain a constant circulating drill pipe pressure.

4. Continue to circulate, holding the pump speed and drill pipe pressure constant.

5. Circulate until a constant return of OWM is at the surface.

6. Shut-off Pumps and check for flow:
   a. As the pump speed is reduced, gradually close the choke while adding no pressure to the casing gauge.
   b. Stop the pump and check for flow.
      - If the well is flowing, bring the well back on choke and continue to circulate. Utilize the concurrent method in order to pump kill weight mud and circulate out the influx.
      - If the well is no longer flowing proceed to the next steps.

7. Clear the rig floor and open the BOP.

8. Circulate bottoms up and condition the mud as required.

9. Inspect all pressure control equipment and make needed repairs.

10. Resume drilling or tripping operations and closely monitor well conditions.

SUPERVISION OF THE WELL CONTROL OPERATION

Every rig should have an established and well-practiced procedure to kill a well. Each individual should be well-versed in the specific duties to be performed and their relevance to the success of the operation.

Operator's/Representative

The ultimate success of the kill operation lies with the Operation's Representative. He should be certified and able to perform any calculations deemed necessary and be well versed in the kill procedure that will be used.

Toolpusher

The responsibility of the Toolpusher is to direct the drill crew members in their assigned duties. He should be able to perform any and all pertinent calculations and possess knowledge of the well control process equal to that of the Operator's Representative (OR).

Driller

The Driller should remain on the rig floor to operate the mud pumps when the need arises. He may also be called upon to "work-the-pipe" if there is a possibility of differentially sticking the drill string. He should also remain in constant communication with the mud pits.

Derrickman

The job of the Derrickman is to monitor the pits and direct the floorhands in weighting up the mud to the required density. His duties should also include operating and monitoring the degassing equipment. The derrickman should also make periodic visual inspections of the BOP stack and choke manifold.

Floorhand

After the well has been shut-in, the Floorhand should perform duties as directed by the driller. The floorhands should also be available to perform mud-mixing duties as directed by the derrickman. The floorhand may also be called on to relay information if there is no remote communication system on the rig.

Mud Engineer

The Mud Engineer should monitor the pits for mud property changes, periodically making checks of the mud density, and assisting the Operator's Representative and the Toolpusher in all needed calculations. He is also responsible for notifying the Operator's Representative of any additional mud-related changes that may occur.

Emergency Assistance Telephone List

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

LEGACY RESERVES OPERATING LP	
Legacy Reserves Operating LP	Office: (432) 689-5200
Drilling Manager: Dan Breeding	Office: (432) 689-5200 Cell: (432) 853-1680
Drilling Engineer: Matt Dickson	Office: (432) 689-5200 Cell: (432) 212-5698
Operations Manager: Gregg Skelton	Office: (432) 689-5200
Legacy Company Representative:	Cell: (432) 631-8469

DRILLING CONTRACTOR-McVAY	
Rig Manager: Bobby Whinery	Cell: (575) 408-2538
Drilling Contractor Manager: Mike McVay	Office: (575) 397-3311 Cell: (575) 631-5382

LEGACY SAFETY	***Hobbs (575) 393-7233***
EHS Coordinator: Field Operations Manager: Randy Williams	Office: (432) 689-5200 Cell: (432) 260-5566
Field Safety Technician: Randy Turner	Office: (432) 689-5200 Cell: (432) 536-6473

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*	*BTC*	*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 without considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:

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

Intermediate I Casing

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
9.625"	*HCL-80*	*47*	*5740 psi*	*6870 psi*	*1086 kips*	*BTC*	*5600'*	*263,200 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:

5,740psi / [(0.52psi/ft)(5,600')] = **1.97**

Cementing Operations:

5,740 psi / [(0.77psi/ft – 0.433psi/ft)(5600')] = **3.04**

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 7" liner shoe, in which a 0.7 psi/ft shoe test is assumed, and 0.22 psi/ft gas gradient is assumed.

Burst Calculations: Internal Yield Rating / Burst Force

Casing Pressure Test:

6,870 psi / [(1500psi +2504 psi) - (2446psi)] = **4.41**

Gas Kick at 7" liner shoe:

6,870 psi / [(0.7psi/ft-0.22psi/ft)(10,700')] = **1.33**

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 without considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:

1086 kips / (100,000 lbs. + 263,200 lbs.) = **2.99**

Intermediate Liner

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
7"	*P-110HC*	*32*	*11890 psi*	*12450 psi*	*1025 kips*	*BTC*	*5,400'*	*172,800 lb*	*9.2 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:

11,890psi / [(0.494psi/ft)(10,700')] = **2.25**

Cementing Operations:

11,890 psi / [(0.77psi/ft – 0.433psi/ft)(10,700')] = **3.3**

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, with complete evacuation of the casing annular.
- Gas kick at the 7" liner shoe, in which a 0.7 psi/ft shoe test is assumed, and 0.22 psi/ft gas gradient is assumed, along with complete evacuation of the casing annular.

Burst Calculations: Internal Yield Rating / Burst Force

Casing Pressure Test:

12,450 psi / (1500psi) + [(0.45)(5600')]= **3.1**

Gas Kick at 7" liner shoe:

12,450 psi / [(0.7psi/ft)(10,700')-(0.22psi/ft)(5600')] = **1.98**

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 without considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:

1025 kips / (100,000 lbs. + 172,800 lbs.) = **3.76**

Production Liner

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
4.5"	*P-110*	*13.5*	*10690 psi*	*12420 psi*	*422 kips*	*BTC*	*10,000'*	*135,000 lb*	*11.5 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 (0.5 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Cementing Operations:
10,690psi / [(0.77 psi/ft-0.433 psi/ft)(11,800'TVD)] = **2.69**

Production Operations:
10,690psi / (11,800' TVD)(0.5 psi/ft) = **1.81**

Burst: $DF_B = 1.25$

Base Assumption

- Frac pressure utilizing a surface pressure of 9500 psi along with a frac fluid gradient equivalent to 0.47 psi/ft and an external force equal to the minimum fluid gradient (0.433 psi/ft) in which the casing will be cemented.
- Production operations in which the casing is completely filled with a gas equivalent gradient of 0.22 psi/ft and an external force equivalent to pore pressure of 0.5 psi/ft.

Burst Calculations: Internal Yield Rating / Burst Force

Frac Pressure:
12,420psi / [(9500 psi)+ (0.47 – 0.433psi/ft)(11,800'TVD)] = **1.25**

Production Operations:
12,420psi / [(0.5 psi/ft – 0.22 psi/ft)(11,800'TVD)] = **3.76**

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 without considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
422,000 lbs /[(100,000 lbs.) + (135,000 lbs.)] = **1.8**

7" Liner Tie-Back

Size	Grade	#/ft	Collapse	Burst (Internal Yield)	Tensile	Coupling	Length	Dry Weight	Mud Weight
7"	*P-110HC*	*32*	*11890 psi*	*12450 psi*	*1025 kips*	*BTC*	*10,700'*	*342,400 lb*	*9.5 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 pipe completely evacuated.
- Production operations in which the pipe is completely evacuated with an external force equivalent to the pore pressure gradient (0.5 psi/ft).

Collapse Calculations: Collapse Rating / Collapse Force

Cementing Operations:
11,890 psi / [(0.77 psi/ft)(5,300'TVD)] = **2.92**

Production Operations:
11,890psi / (9,700' TVD)(0.5 psi/ft) = **2.45**

Burst: $DF_B = 1.25$

Base Assumption

- Frac pressure utilizing a surface pressure of 9500 psi along with a frac fluid gradient equivalent to 0.47 psi/ft and an external force equal to the minimum fluid gradient (0.433 psi/ft) in which the casing will be cemented.
- Production operations in which the casing is completely filled with a gas equivalent gradient of 0.22 psi/ft and an external force equivalent to pore pressure of 0.5 psi/ft, with top of production liner at 9700'

Burst Calculations: Internal Yield Rating / Burst Force

Frac Pressure:
12,450psi / [(9500 psi)+ (0.47 – 0.433psi/ft)(10,200'TVD)] = **1.26**

Production Operations:
12,450psi / [(0.5 psi/ft – 0.22 psi/ft)(10,200'TVD)] = **4.58**

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 without considering the effects of buoyancy.

Tensile Calculations: Joint Strength / Axial Load

Overpull:
1025 kips / (100,000 lbs. + 342,400 lbs.) = **2.32**

LEGACY RESERVES OPERATING, L. P.
HYDROGEN SULFIDE (H2S) CONTINGENCY PLAN
LEA UNIT 221H
Assumed 100 ppm ROE = 3000'

100 ppm H2S concentration shall trigger activation of this plan.

This is an open drilling site. H_2S monitoring equipment and emergency response equipment will be rigged up and in use when the company drills out from under surface casing. H_2S monitors, warning signs, wind indicators and flags will be in use.

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

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

C. Required Emergency Equipment:

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

- Protective Equipment for essential personnel.
  Breathing apparatus:
  a. Rescue Packs (SCBA) – 1 unit shall be placed at each briefing area. 2 units shall be stored in the safety trailer.
  b. Work/Escape packs – 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
  c. Emergency Escape Packs – 4 packs shall be stored in the doghouse for emergency evacuation.

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

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

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

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

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

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

H_2S Operations

Though no H_2S is anticipated during the drilling operation, this contingency plan will provide for methods to ensure the well is kept under control in the event an H_2S reading of 100 ppm or more are encountered. Once personnel are safe and the proper protective gear is in place and on personnel, the operator and rig crew essential personnel will ensure the well is under control, suspend drilling operations and shut-in the well (unless pressure build up or other operational situations dictate suspending operations will prevent well control), increase the mud weight and circulate all gas from the hole utilizing the mud/gas separator downstream of the choke, the choke manifold and the emergency flare system located 150' from the well. Bring the mud system into compliance and the H_2S level below 10 ppm, then notify all emergency officers that drilling ahead is practical and safe.

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

Ignition of Gas source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO_2). Intentional ignition must be coordinated with the

NMOCD and local officials. Additionally the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever this is an ignition of the gas.

Characteristics of H_2S and SO_2

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H_2S	1.189 Air = I	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO_2	2.21 Air = I	2 ppm	N/A	1000 ppm

Contacting Authorities

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

Emergency Assistance Telephone List

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

LEGACY RESERVES OPERATING LP	
Legacy Reserves Operating LP	**Office: (432) 689-5200**
Drilling Manager: **Daniel Breeding**	**Office: (432) 689-5200** **Cell: (432) 853-1680**
Drilling Engineer: **Matthew Dickson**	**Office: (432) 689-5200** **Cell: (432) 212-5698**
Operations Manager: **Gregg Skelton**	**Office: (432) 689-5200**

Legacy Company Representative:	**Cell: (432) 631-8469**

DRILLING CONTRACTOR-McVAY

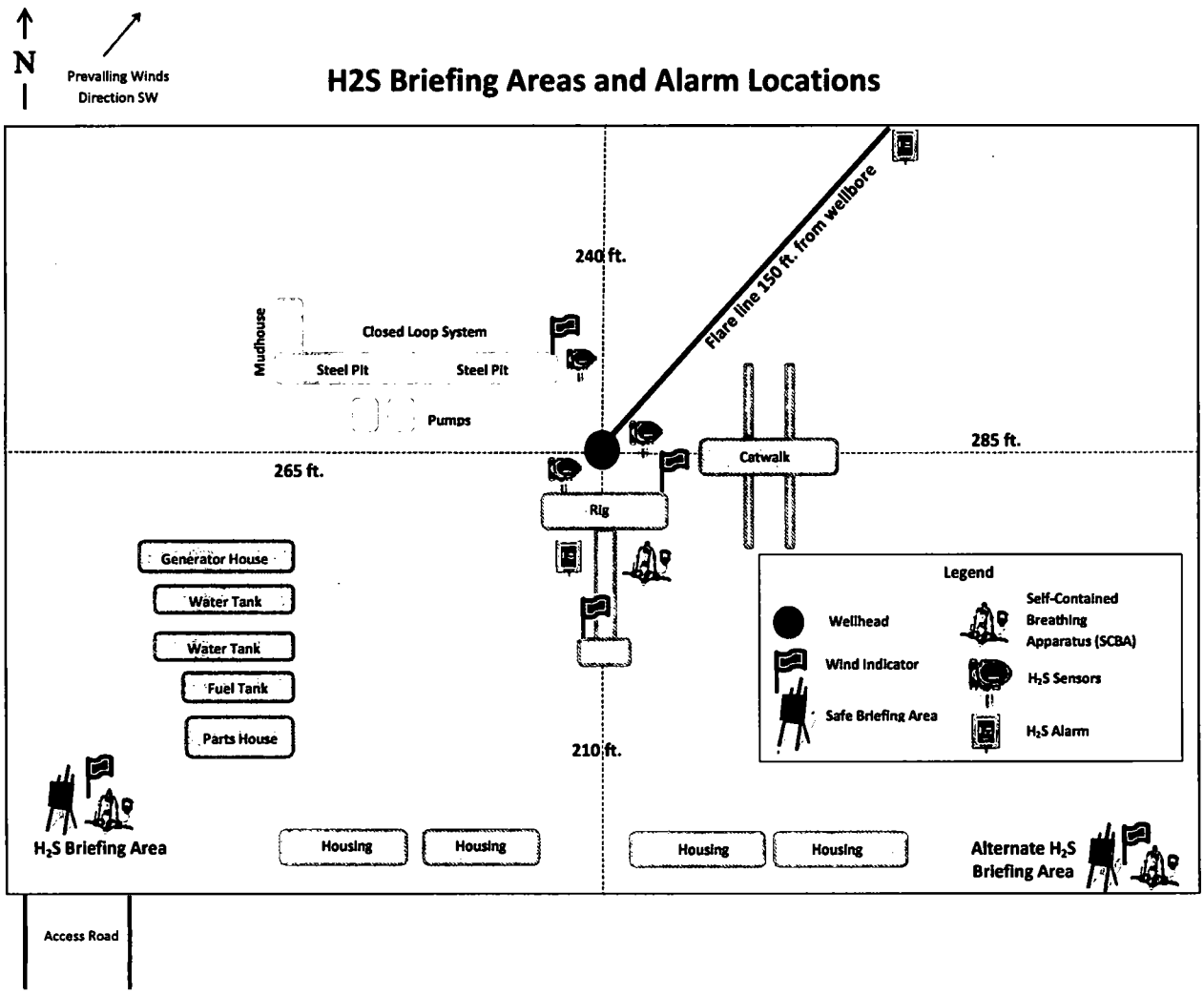
Tool Pusher:	
Olin Vaught	**Cell: (575) 631-7799**
Drilling Manager:	**Office: (575) 397-3311**
Michael McVay	**Cell: (575) 602-1839**

LEGACY SAFETY ***Hobbs (575) 393-7233***

EHS Coordinator:	
Field Operations Manager:	**Office: (432) 689-5200**
Randy Williams	**Cell: (432) 260-5566**
Field Safety Technician:	**Office: (432) 689-5200**
Randy Turner	**Cell: (432) 536-6473**

Evacuee Description:
Residents: THERE ARE NO RESIDENTS WITHIN 3000' ROE.

H2S Briefing Areas and Alarm Locations



MOTIVE
DRILLING TECHNOLOGIES

Legacy Reserves

Lea County, NM (NAD83)
Lea
Lea Unit #221H

Original Wellbore

Plan: Plan 1

Standard Planning Report

25 October, 2018

LEGACY
RESERVES

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

Project	Lea County, NM (NAD83)		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Lea				
Site Position:		**Northing:**	567,587.00 usft	**Latitude:**	32° 33' 27.391 N
From:	Map	**Easting:**	797,256.10 usft	**Longitude:**	103° 30' 9.733 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.45 °

Well	Lea Unit #221H					
Well Position	**+N/-S**	-71.2 usft	**Northing:**	567,515.80 usft	**Latitude:**	32° 33' 26.696 N
	+E/-W	-124.7 usft	**Easting:**	797,131.40 usft	**Longitude:**	103° 30' 11.197 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	3,696.0 usft	**Ground Level:**	3,678.0 usft

Wellbore	Original Wellbore				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	10/11/2018	6.80	60.36	48,005.12699277

Design	Plan 1				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	2.10	

Plan Survey Tool Program **Date** 10/25/2018

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	19,826.0	Plan 1 (Original Wellbore)	MWD	
				MWD - Standard	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,296.6	4.45	90.00	1,296.4	0.0	11.5	1.50	1.50	0.00	90.00	
5,717.3	4.45	90.00	5,703.6	0.0	354.5	0.00	0.00	0.00	0.00	
6,013.9	0.00	0.00	6,000.0	0.0	366.0	1.50	-1.50	0.00	180.00	
11,240.9	0.00	0.00	11,227.0	0.0	366.0	0.00	0.00	0.00	0.00	
12,140.9	90.00	359.56	11,800.0	572.9	361.6	10.00	10.00	0.00	359.56	
19,826.5	90.00	359.56	11,800.0	8,258.3	302.8	0.00	0.00	0.00	0.00	BHL-Lea Unit 221H

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	1.50	90.00	1,100.0	0.0	1.3	0.0	1.50	1.50	0.00
1,200.0	3.00	90.00	1,199.9	0.0	5.2	0.2	1.50	1.50	0.00
1,296.6	4.45	90.00	1,296.4	0.0	11.5	0.4	1.50	1.50	0.00
1,300.0	4.45	90.00	1,299.7	0.0	11.8	0.4	0.00	0.00	0.00
1,400.0	4.45	90.00	1,399.4	0.0	19.5	0.7	0.00	0.00	0.00
1,500.0	4.45	90.00	1,499.1	0.0	27.3	1.0	0.00	0.00	0.00
1,600.0	4.45	90.00	1,598.8	0.0	35.0	1.3	0.00	0.00	0.00
1,700.0	4.45	90.00	1,698.5	0.0	42.8	1.6	0.00	0.00	0.00
1,800.0	4.45	90.00	1,798.2	0.0	50.6	1.9	0.00	0.00	0.00
1,900.0	4.45	90.00	1,897.9	0.0	58.3	2.1	0.00	0.00	0.00
2,000.0	4.45	90.00	1,997.6	0.0	66.1	2.4	0.00	0.00	0.00
2,100.0	4.45	90.00	2,097.3	0.0	73.8	2.7	0.00	0.00	0.00
2,200.0	4.45	90.00	2,197.0	0.0	81.6	3.0	0.00	0.00	0.00
2,300.0	4.45	90.00	2,296.7	0.0	89.4	3.3	0.00	0.00	0.00
2,400.0	4.45	90.00	2,396.4	0.0	97.1	3.6	0.00	0.00	0.00
2,500.0	4.45	90.00	2,496.1	0.0	104.9	3.8	0.00	0.00	0.00
2,600.0	4.45	90.00	2,595.8	0.0	112.6	4.1	0.00	0.00	0.00
2,700.0	4.45	90.00	2,695.5	0.0	120.4	4.4	0.00	0.00	0.00
2,800.0	4.45	90.00	2,795.2	0.0	128.2	4.7	0.00	0.00	0.00
2,900.0	4.45	90.00	2,894.9	0.0	135.9	5.0	0.00	0.00	0.00
3,000.0	4.45	90.00	2,994.6	0.0	143.7	5.3	0.00	0.00	0.00
3,100.0	4.45	90.00	3,094.3	0.0	151.4	5.5	0.00	0.00	0.00
3,200.0	4.45	90.00	3,194.0	0.0	159.2	5.8	0.00	0.00	0.00
3,300.0	4.45	90.00	3,293.7	0.0	166.9	6.1	0.00	0.00	0.00
3,400.0	4.45	90.00	3,393.4	0.0	174.7	6.4	0.00	0.00	0.00
3,500.0	4.45	90.00	3,493.1	0.0	182.5	6.7	0.00	0.00	0.00
3,600.0	4.45	90.00	3,592.8	0.0	190.2	7.0	0.00	0.00	0.00
3,700.0	4.45	90.00	3,692.5	0.0	198.0	7.3	0.00	0.00	0.00
3,800.0	4.45	90.00	3,792.2	0.0	205.7	7.5	0.00	0.00	0.00
3,900.0	4.45	90.00	3,891.9	0.0	213.5	7.8	0.00	0.00	0.00
4,000.0	4.45	90.00	3,991.6	0.0	221.3	8.1	0.00	0.00	0.00
4,100.0	4.45	90.00	4,091.3	0.0	229.0	8.4	0.00	0.00	0.00
4,200.0	4.45	90.00	4,191.0	0.0	236.8	8.7	0.00	0.00	0.00
4,300.0	4.45	90.00	4,290.6	0.0	244.5	9.0	0.00	0.00	0.00
4,400.0	4.45	90.00	4,390.3	0.0	252.3	9.2	0.00	0.00	0.00
4,500.0	4.45	90.00	4,490.0	0.0	260.0	9.5	0.00	0.00	0.00
4,600.0	4.45	90.00	4,589.7	0.0	267.8	9.8	0.00	0.00	0.00
4,700.0	4.45	90.00	4,689.4	0.0	275.6	10.1	0.00	0.00	0.00
4,800.0	4.45	90.00	4,789.1	0.0	283.3	10.4	0.00	0.00	0.00
4,900.0	4.45	90.00	4,888.8	0.0	291.1	10.7	0.00	0.00	0.00
5,000.0	4.45	90.00	4,988.5	0.0	298.8	10.9	0.00	0.00	0.00
5,100.0	4.45	90.00	5,088.2	0.0	306.6	11.2	0.00	0.00	0.00
5,200.0	4.45	90.00	5,187.9	0.0	314.4	11.5	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,300.0	4.45	90.00	5,287.6	0.0	322.1	11.8	0.00	0.00	0.00
5,400.0	4.45	90.00	5,387.3	0.0	329.9	12.1	0.00	0.00	0.00
5,500.0	4.45	90.00	5,487.0	0.0	337.6	12.4	0.00	0.00	0.00
5,600.0	4.45	90.00	5,586.7	0.0	345.4	12.7	0.00	0.00	0.00
5,700.0	4.45	90.00	5,686.4	0.0	353.1	12.9	0.00	0.00	0.00
5,717.3	4.45	90.00	5,703.6	0.0	354.5	13.0	0.00	0.00	0.00
5,800.0	3.21	90.00	5,786.2	0.0	360.0	13.2	1.50	-1.50	0.00
5,900.0	1.71	90.00	5,886.1	0.0	364.3	13.3	1.50	-1.50	0.00
6,000.0	0.21	90.00	5,986.1	0.0	366.0	13.4	1.50	-1.50	0.00
6,013.9	0.00	0.00	6,000.0	0.0	366.0	13.4	1.50	-1.50	0.00
6,100.0	0.00	0.00	6,086.1	0.0	366.0	13.4	0.00	0.00	0.00
6,200.0	0.00	0.00	6,186.1	0.0	366.0	13.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,286.1	0.0	366.0	13.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,386.1	0.0	366.0	13.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,486.1	0.0	366.0	13.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,586.1	0.0	366.0	13.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,686.1	0.0	366.0	13.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,786.1	0.0	366.0	13.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,886.1	0.0	366.0	13.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,986.1	0.0	366.0	13.4	0.00	0.00	0.00
7,100.0	0.00	0.00	7,086.1	0.0	366.0	13.4	0.00	0.00	0.00
7,200.0	0.00	0.00	7,186.1	0.0	366.0	13.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,286.1	0.0	366.0	13.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,386.1	0.0	366.0	13.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,486.1	0.0	366.0	13.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,586.1	0.0	366.0	13.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,686.1	0.0	366.0	13.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,786.1	0.0	366.0	13.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,886.1	0.0	366.0	13.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,986.1	0.0	366.0	13.4	0.00	0.00	0.00
8,100.0	0.00	0.00	8,086.1	0.0	366.0	13.4	0.00	0.00	0.00
8,200.0	0.00	0.00	8,186.1	0.0	366.0	13.4	0.00	0.00	0.00
8,300.0	0.00	0.00	8,286.1	0.0	366.0	13.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,386.1	0.0	366.0	13.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,486.1	0.0	366.0	13.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,586.1	0.0	366.0	13.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,686.1	0.0	366.0	13.4	0.00	0.00	0.00
8,800.0	0.00	0.00	8,786.1	0.0	366.0	13.4	0.00	0.00	0.00
8,900.0	0.00	0.00	8,886.1	0.0	366.0	13.4	0.00	0.00	0.00
9,000.0	0.00	0.00	8,986.1	0.0	366.0	13.4	0.00	0.00	0.00
9,100.0	0.00	0.00	9,086.1	0.0	366.0	13.4	0.00	0.00	0.00
9,200.0	0.00	0.00	9,186.1	0.0	366.0	13.4	0.00	0.00	0.00
9,300.0	0.00	0.00	9,286.1	0.0	366.0	13.4	0.00	0.00	0.00
9,400.0	0.00	0.00	9,386.1	0.0	366.0	13.4	0.00	0.00	0.00
9,500.0	0.00	0.00	9,486.1	0.0	366.0	13.4	0.00	0.00	0.00
9,600.0	0.00	0.00	9,586.1	0.0	366.0	13.4	0.00	0.00	0.00
9,700.0	0.00	0.00	9,686.1	0.0	366.0	13.4	0.00	0.00	0.00
9,800.0	0.00	0.00	9,786.1	0.0	366.0	13.4	0.00	0.00	0.00
9,900.0	0.00	0.00	9,886.1	0.0	366.0	13.4	0.00	0.00	0.00
10,000.0	0.00	0.00	9,986.1	0.0	366.0	13.4	0.00	0.00	0.00
10,100.0	0.00	0.00	10,086.1	0.0	366.0	13.4	0.00	0.00	0.00
10,200.0	0.00	0.00	10,186.1	0.0	366.0	13.4	0.00	0.00	0.00
10,300.0	0.00	0.00	10,286.1	0.0	366.0	13.4	0.00	0.00	0.00
10,400.0	0.00	0.00	10,386.1	0.0	366.0	13.4	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,500.0	0.00	0.00	10,486.1	0.0	366.0	13.4	0.00	0.00	0.00
10,600.0	0.00	0.00	10,586.1	0.0	366.0	13.4	0.00	0.00	0.00
10,700.0	0.00	0.00	10,686.1	0.0	366.0	13.4	0.00	0.00	0.00
10,800.0	0.00	0.00	10,786.1	0.0	366.0	13.4	0.00	0.00	0.00
10,900.0	0.00	0.00	10,886.1	0.0	366.0	13.4	0.00	0.00	0.00
11,000.0	0.00	0.00	10,986.1	0.0	366.0	13.4	0.00	0.00	0.00
11,100.0	0.00	0.00	11,086.1	0.0	366.0	13.4	0.00	0.00	0.00
11,200.0	0.00	0.00	11,186.1	0.0	366.0	13.4	0.00	0.00	0.00
11,240.9	0.00	0.00	11,227.0	0.0	366.0	13.4	0.00	0.00	0.00
11,250.0	0.91	359.56	11,236.1	0.1	366.0	13.5	10.00	10.00	0.00
11,300.0	5.91	359.56	11,286.0	3.0	366.0	16.4	10.00	10.00	0.00
11,350.0	10.91	359.56	11,335.4	10.3	365.9	23.7	10.00	10.00	0.00
11,400.0	15.91	359.56	11,384.0	21.9	365.8	35.3	10.00	10.00	0.00
11,450.0	20.91	359.56	11,431.5	37.7	365.7	51.1	10.00	10.00	0.00
11,500.0	25.91	359.56	11,477.3	57.6	365.6	70.9	10.00	10.00	0.00
11,550.0	30.91	359.56	11,521.3	81.4	365.4	94.7	10.00	10.00	0.00
11,600.0	35.91	359.56	11,563.0	108.9	365.2	122.2	10.00	10.00	0.00
11,650.0	40.91	359.56	11,602.2	139.9	364.9	153.2	10.00	10.00	0.00
11,700.0	45.91	359.56	11,638.5	174.3	364.7	187.5	10.00	10.00	0.00
11,750.0	50.91	359.56	11,671.7	211.6	364.4	224.9	10.00	10.00	0.00
11,800.0	55.91	359.56	11,701.5	251.8	364.1	264.9	10.00	10.00	0.00
11,850.0	60.91	359.56	11,727.7	294.4	363.7	307.5	10.00	10.00	0.00
11,900.0	65.91	359.56	11,750.1	339.0	363.4	352.1	10.00	10.00	0.00
11,950.0	70.91	359.56	11,768.5	385.5	363.0	398.6	10.00	10.00	0.00
12,000.0	75.91	359.56	11,782.7	433.4	362.7	446.4	10.00	10.00	0.00
12,050.0	80.91	359.56	11,792.8	482.4	362.3	495.3	10.00	10.00	0.00
12,100.0	85.91	359.56	11,798.5	532.0	361.9	544.9	10.00	10.00	0.00
12,140.9	90.00	359.56	11,800.0	572.9	361.6	585.8	10.00	10.00	0.00
12,200.0	90.00	359.56	11,800.0	632.0	361.1	644.8	0.00	0.00	0.00
12,300.0	90.00	359.56	11,800.0	732.0	360.4	744.7	0.00	0.00	0.00
12,400.0	90.00	359.56	11,800.0	832.0	359.6	844.6	0.00	0.00	0.00
12,500.0	90.00	359.56	11,800.0	932.0	358.8	944.5	0.00	0.00	0.00
12,600.0	90.00	359.56	11,800.0	1,032.0	358.1	1,044.4	0.00	0.00	0.00
12,700.0	90.00	359.56	11,800.0	1,132.0	357.3	1,144.3	0.00	0.00	0.00
12,800.0	90.00	359.56	11,800.0	1,232.0	356.5	1,244.2	0.00	0.00	0.00
12,900.0	90.00	359.56	11,800.0	1,332.0	355.8	1,344.1	0.00	0.00	0.00
13,000.0	90.00	359.56	11,800.0	1,432.0	355.0	1,444.0	0.00	0.00	0.00
13,100.0	90.00	359.56	11,800.0	1,532.0	354.2	1,543.9	0.00	0.00	0.00
13,200.0	90.00	359.56	11,800.0	1,632.0	353.5	1,643.8	0.00	0.00	0.00
13,300.0	90.00	359.56	11,800.0	1,732.0	352.7	1,743.7	0.00	0.00	0.00
13,400.0	90.00	359.56	11,800.0	1,832.0	351.9	1,843.6	0.00	0.00	0.00
13,500.0	90.00	359.56	11,800.0	1,932.0	351.2	1,943.5	0.00	0.00	0.00
13,600.0	90.00	359.56	11,800.0	2,032.0	350.4	2,043.4	0.00	0.00	0.00
13,700.0	90.00	359.56	11,800.0	2,132.0	349.6	2,143.3	0.00	0.00	0.00
13,800.0	90.00	359.56	11,800.0	2,232.0	348.9	2,243.2	0.00	0.00	0.00
13,900.0	90.00	359.56	11,800.0	2,332.0	348.1	2,343.1	0.00	0.00	0.00
14,000.0	90.00	359.56	11,800.0	2,431.9	347.3	2,443.0	0.00	0.00	0.00
14,100.0	90.00	359.56	11,800.0	2,531.9	346.6	2,542.9	0.00	0.00	0.00
14,200.0	90.00	359.56	11,800.0	2,631.9	345.8	2,642.8	0.00	0.00	0.00
14,300.0	90.00	359.56	11,800.0	2,731.9	345.0	2,742.7	0.00	0.00	0.00
14,400.0	90.00	359.56	11,800.0	2,831.9	344.3	2,842.6	0.00	0.00	0.00
14,500.0	90.00	359.56	11,800.0	2,931.9	343.5	2,942.5	0.00	0.00	0.00
14,600.0	90.00	359.56	11,800.0	3,031.9	342.7	3,042.5	0.00	0.00	0.00
14,700.0	90.00	359.56	11,800.0	3,131.9	341.9	3,142.4	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,800.0	90.00	359.56	11,800.0	3,231.9	341.2	3,242.3	0.00	0.00	0.00
14,900.0	90.00	359.56	11,800.0	3,331.9	340.4	3,342.2	0.00	0.00	0.00
15,000.0	90.00	359.56	11,800.0	3,431.9	339.6	3,442.1	0.00	0.00	0.00
15,100.0	90.00	359.56	11,800.0	3,531.9	338.9	3,542.0	0.00	0.00	0.00
15,200.0	90.00	359.56	11,800.0	3,631.9	338.1	3,641.9	0.00	0.00	0.00
15,300.0	90.00	359.56	11,800.0	3,731.9	337.3	3,741.8	0.00	0.00	0.00
15,400.0	90.00	359.56	11,800.0	3,831.9	336.6	3,841.7	0.00	0.00	0.00
15,500.0	90.00	359.56	11,800.0	3,931.9	335.8	3,941.6	0.00	0.00	0.00
15,600.0	90.00	359.56	11,800.0	4,031.9	335.0	4,041.5	0.00	0.00	0.00
15,700.0	90.00	359.56	11,800.0	4,131.9	334.3	4,141.4	0.00	0.00	0.00
15,800.0	90.00	359.56	11,800.0	4,231.9	333.5	4,241.3	0.00	0.00	0.00
15,900.0	90.00	359.56	11,800.0	4,331.9	332.7	4,341.2	0.00	0.00	0.00
16,000.0	90.00	359.56	11,800.0	4,431.9	332.0	4,441.1	0.00	0.00	0.00
16,100.0	90.00	359.56	11,800.0	4,531.9	331.2	4,541.0	0.00	0.00	0.00
16,200.0	90.00	359.56	11,800.0	4,631.9	330.4	4,640.9	0.00	0.00	0.00
16,300.0	90.00	359.56	11,800.0	4,731.9	329.7	4,740.8	0.00	0.00	0.00
16,400.0	90.00	359.56	11,800.0	4,831.9	328.9	4,840.7	0.00	0.00	0.00
16,500.0	90.00	359.56	11,800.0	4,931.9	328.1	4,940.6	0.00	0.00	0.00
16,600.0	90.00	359.56	11,800.0	5,031.9	327.4	5,040.5	0.00	0.00	0.00
16,700.0	90.00	359.56	11,800.0	5,131.9	326.6	5,140.4	0.00	0.00	0.00
16,800.0	90.00	359.56	11,800.0	5,231.9	325.8	5,240.3	0.00	0.00	0.00
16,900.0	90.00	359.56	11,800.0	5,331.9	325.1	5,340.2	0.00	0.00	0.00
17,000.0	90.00	359.56	11,800.0	5,431.9	324.3	5,440.1	0.00	0.00	0.00
17,100.0	90.00	359.56	11,800.0	5,531.9	323.5	5,540.0	0.00	0.00	0.00
17,200.0	90.00	359.56	11,800.0	5,631.9	322.7	5,639.9	0.00	0.00	0.00
17,300.0	90.00	359.56	11,800.0	5,731.9	322.0	5,739.8	0.00	0.00	0.00
17,400.0	90.00	359.56	11,800.0	5,831.8	321.2	5,839.7	0.00	0.00	0.00
17,500.0	90.00	359.56	11,800.0	5,931.8	320.4	5,939.6	0.00	0.00	0.00
17,600.0	90.00	359.56	11,800.0	6,031.8	319.7	6,039.5	0.00	0.00	0.00
17,700.0	90.00	359.56	11,800.0	6,131.8	318.9	6,139.4	0.00	0.00	0.00
17,800.0	90.00	359.56	11,800.0	6,231.8	318.1	6,239.3	0.00	0.00	0.00
17,900.0	90.00	359.56	11,800.0	6,331.8	317.4	6,339.2	0.00	0.00	0.00
18,000.0	90.00	359.56	11,800.0	6,431.8	316.6	6,439.1	0.00	0.00	0.00
18,100.0	90.00	359.56	11,800.0	6,531.8	315.8	6,539.0	0.00	0.00	0.00
18,200.0	90.00	359.56	11,800.0	6,631.8	315.1	6,638.9	0.00	0.00	0.00
18,300.0	90.00	359.56	11,800.0	6,731.8	314.3	6,738.8	0.00	0.00	0.00
18,400.0	90.00	359.56	11,800.0	6,831.8	313.5	6,838.7	0.00	0.00	0.00
18,500.0	90.00	359.56	11,800.0	6,931.8	312.8	6,938.6	0.00	0.00	0.00
18,600.0	90.00	359.56	11,800.0	7,031.8	312.0	7,038.5	0.00	0.00	0.00
18,700.0	90.00	359.56	11,800.0	7,131.8	311.2	7,138.4	0.00	0.00	0.00
18,800.0	90.00	359.56	11,800.0	7,231.8	310.5	7,238.3	0.00	0.00	0.00
18,900.0	90.00	359.56	11,800.0	7,331.8	309.7	7,338.2	0.00	0.00	0.00
19,000.0	90.00	359.56	11,800.0	7,431.8	308.9	7,438.1	0.00	0.00	0.00
19,100.0	90.00	359.56	11,800.0	7,531.8	308.2	7,538.0	0.00	0.00	0.00
19,200.0	90.00	359.56	11,800.0	7,631.8	307.4	7,637.9	0.00	0.00	0.00
19,300.0	90.00	359.56	11,800.0	7,731.8	306.6	7,737.8	0.00	0.00	0.00
19,400.0	90.00	359.56	11,800.0	7,831.8	305.9	7,837.7	0.00	0.00	0.00
19,500.0	90.00	359.56	11,800.0	7,931.8	305.1	7,937.6	0.00	0.00	0.00
19,600.0	90.00	359.56	11,800.0	8,031.8	304.3	8,037.5	0.00	0.00	0.00
19,700.0	90.00	359.56	11,800.0	8,131.8	303.6	8,137.4	0.00	0.00	0.00
19,800.0	90.00	359.56	11,800.0	8,231.8	302.8	8,237.3	0.00	0.00	0.00
19,826.5	90.00	359.56	11,800.0	8,258.3	302.8	8,263.8	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Company:	Legacy Reserves	**TVD Reference:**	RKB @ 3696.0usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	RKB @ 3696.0usft
Site:	Lea	**North Reference:**	Grid
Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Wellbore		
Design:	Plan 1		

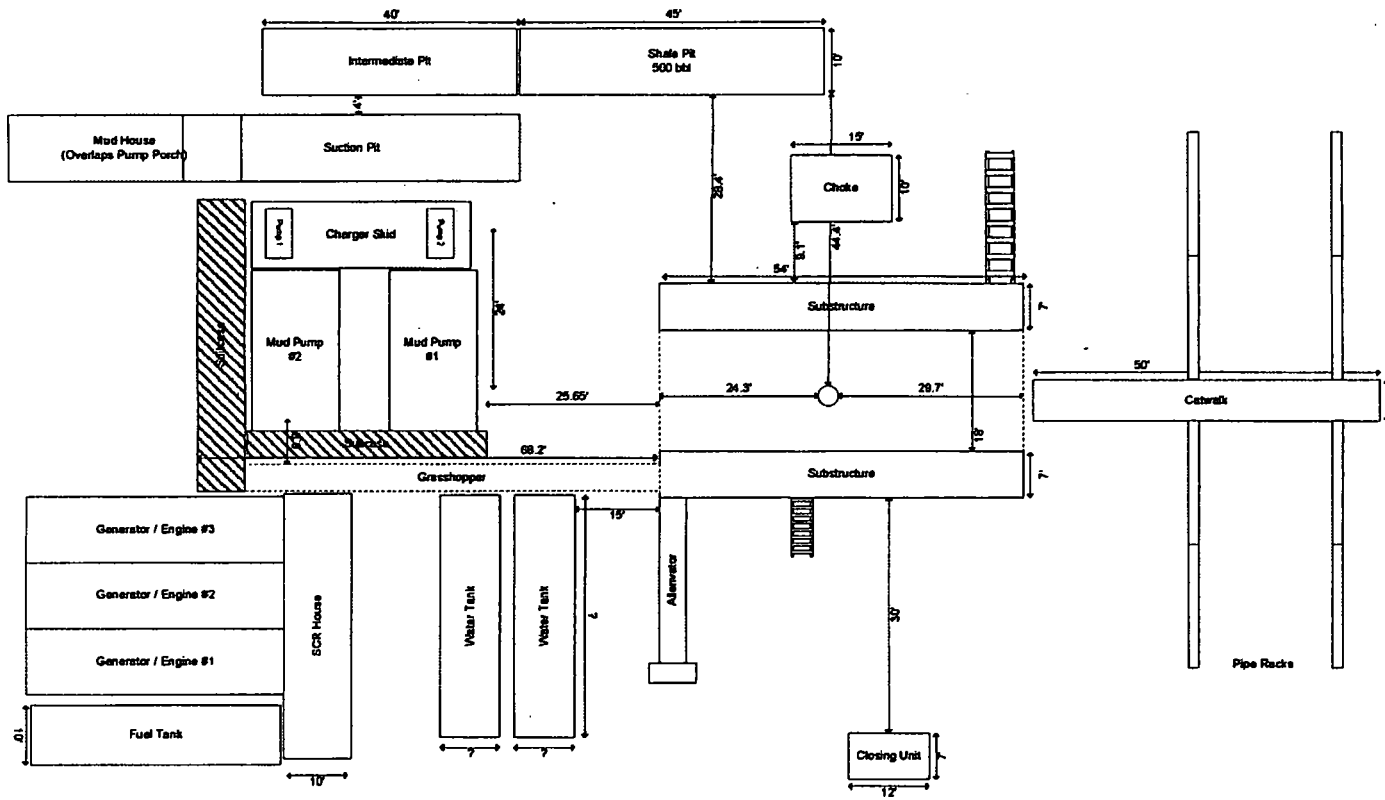
Design Targets

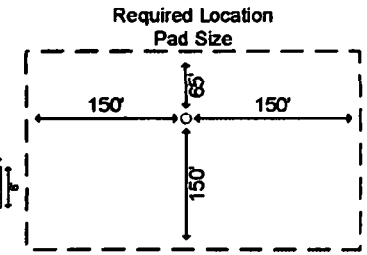
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHL-Lea Unit 221H - plan hits target center - Point	0.00	0.00	11,800.0	8,258.3	302.8	575,774.10	797,434.20	32° 34' 48.384 N	103° 30' 6.905 W
FTP-Lea Unit 221H - plan misses target center by 0.9usft at 12109.1usft MD (11799.1 TVD, 541.1 N, 361.8 E) - Point	0.00	0.00	11,800.0	541.1	361.7	568,056.90	797,493.10	32° 33' 32.022 N	103° 30' 6.922 W

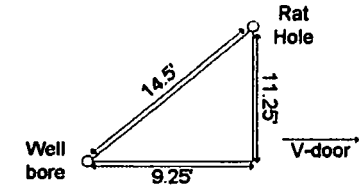
MCVAY RIG #2

General Layout

Scale: 1 inch = 30 feet







MOTIVE
DRILLING TECHNOLOGIES

Legacy Reserves

Lea County, NM (NAD83)
Lea
Lea Unit #221H

Original Wellbore
Plan 1

Anticollision Summary Report

25 October, 2018

LEGACY
RESERVES

MOTIVE
DRILLING TECHNOLOGIES

Motive Drilling Technologies
Anticollision Summary Report

LEGACY RESERVES

Company:	Legacy Reserves	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	RKB @ 3696.0usft
Reference Site:	Lea	**MD Reference:**	RKB @ 3696.0usft
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Wellbore	**Database:**	EDM 5000.1 Single User Db
Reference Design:	Plan 1	**Offset TVD Reference:**	Reference Datum

Reference	Plan 1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 100.0usft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum centre distance of 30,000.0usft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 10/25/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	19,826.0	Plan 1 (Original Wellbore)	MWD	MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Lea						
Lea Unit #120H - Original Wellbore - Plan 1	916.7	916.7	100.0	93.9	16.263	CC
Lea Unit #120H - Original Wellbore - Plan 1	1,000.0	1,000.0	100.0	93.3	14.823	ES
Lea Unit #120H - Original Wellbore - Plan 1	19,826.5	18,803.9	820.0	592.0	3.596	SF
Lea Unit #121H - Original Wellbore - Plan 1	416.7	416.7	50.0	47.4	19.499	CC
Lea Unit #121H - Original Wellbore - Plan 1	600.0	599.3	50.7	46.8	13.077	ES
Lea Unit #121H - Original Wellbore - Plan 1	19,826.5	18,813.0	500.0	366.7	3.751	SF
Lea Unit #122H - Original Wellbore - Plan 1	12,684.3	11,702.0	814.8	739.3	10.802	CC
Lea Unit #122H - Original Wellbore - Plan 1	19,826.5	18,847.6	815.3	588.2	3.591	ES, SF
Lea Unit #123H - Original Wellbore - Plan 1	19,826.5	18,805.1	1,383.5	1,115.4	5.161	CC, ES, SF
Lea Unit #220H - Original Wellbore - Plan 1	1,000.0	1,000.0	50.0	43.3	7.412	CC, ES
Lea Unit #220H - Original Wellbore - Plan 1	19,826.5	19,807.3	649.9	363.5	2.269	SF
Lea Unit #222H - Original Wellbore - Plan 1	19,826.5	19,855.3	644.0	357.4	2.247	CC, ES, SF
Lea Unit #223H - Original Wellbore - Plan 1	11,240.9	11,236.0	1,289.0	1,209.9	16.287	CC
Lea Unit #223H - Original Wellbore - Plan 1	19,826.5	19,821.0	1,290.0	1,003.3	4.500	ES, SF
Lea Unit #59H - Original Wellbore - Original Wellbore	0.0	0.0	74.0			
Lea Unit #59H - Original Wellbore - Original Wellbore	1,400.0	1,397.1	75.2	65.9	8.034	ES
Lea Unit #59H - Original Wellbore - Original Wellbore	19,600.0	18,793.2	1,071.8	868.2	5.264	SF
Lea Unit #60H - Original Wellbore - Original Wellbore	2,052.8	2,049.2	75.1	61.2	5.384	CC
Lea Unit #60H - Original Wellbore - Original Wellbore	2,100.0	2,096.3	75.2	60.9	5.263	ES
Lea Unit #60H - Original Wellbore - Original Wellbore	6,100.0	6,088.4	148.3	105.7	3.484	SF
Lea Unit #61H - Original Wellbore - Original Wellbore	2,129.1	2,122.4	85.4	70.7	5.831	CC, ES
Lea Unit #61H - Original Wellbore - Original Wellbore	2,400.0	2,390.8	91.9	75.4	5.543	SF
Lea Unit #62H - Original Wellbore - Original Wellbore	17,927.8	17,616.2	1,147.2	944.0	5.646	CC
Lea Unit #62H - Original Wellbore - Original Wellbore	19,248.0	18,938.0	1,151.9	916.6	4.897	ES
Lea Unit #62H - Original Wellbore - Original Wellbore	19,300.0	18,938.0	1,153.0	917.4	4.893	SF
Lea Unit #63H - Original Wellbore - Original Wellbore	19,593.5	18,480.0	1,424.9	1,257.2	8.495	CC
Lea Unit #63H - Original Wellbore - Original Wellbore	19,600.0	18,480.0	1,424.9	1,257.1	8.492	ES
Lea Unit #63H - Original Wellbore - Original Wellbore	19,700.0	18,480.0	1,428.9	1,260.5	8.488	SF

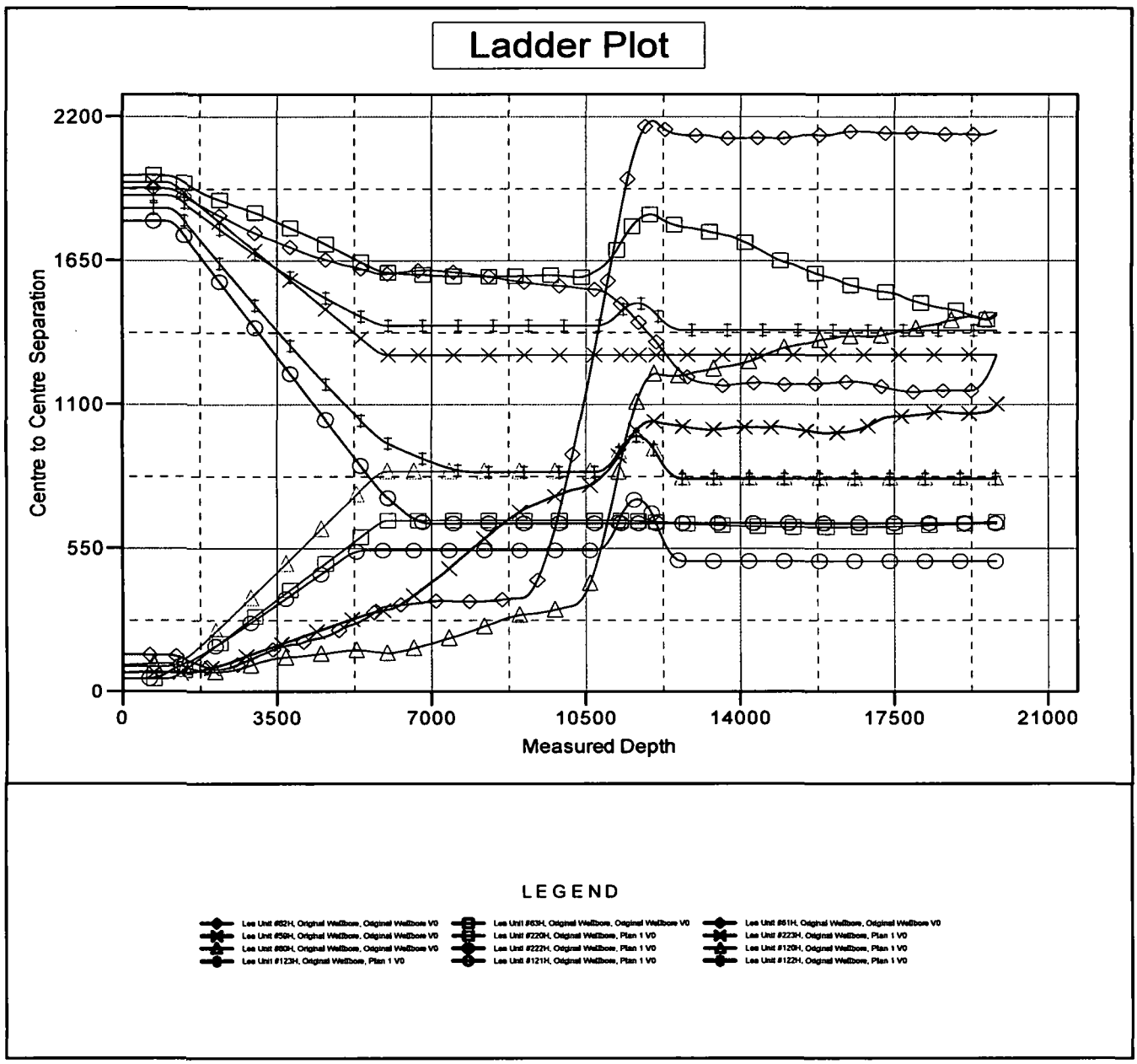
MOTIVE
DRILLING TECHNOLOGIES

Motive Drilling Technologies
Anticollision Summary Report

LEGACY RESERVES

Company:	Legacy Reserves	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	RKB @ 3696.0usft
Reference Site:	Lea	**MD Reference:**	RKB @ 3696.0usft
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Wellbore	**Database:**	EDM 5000.1 Single User Db
Reference Design:	Plan 1	**Offset TVD Reference:**	Reference Datum

Reference Depths are relative to RKB @ 3696.0usft	Coordinates are relative to: Lea Unit #221H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.45°



MOTIVE
DRILLING TECHNOLOGIES

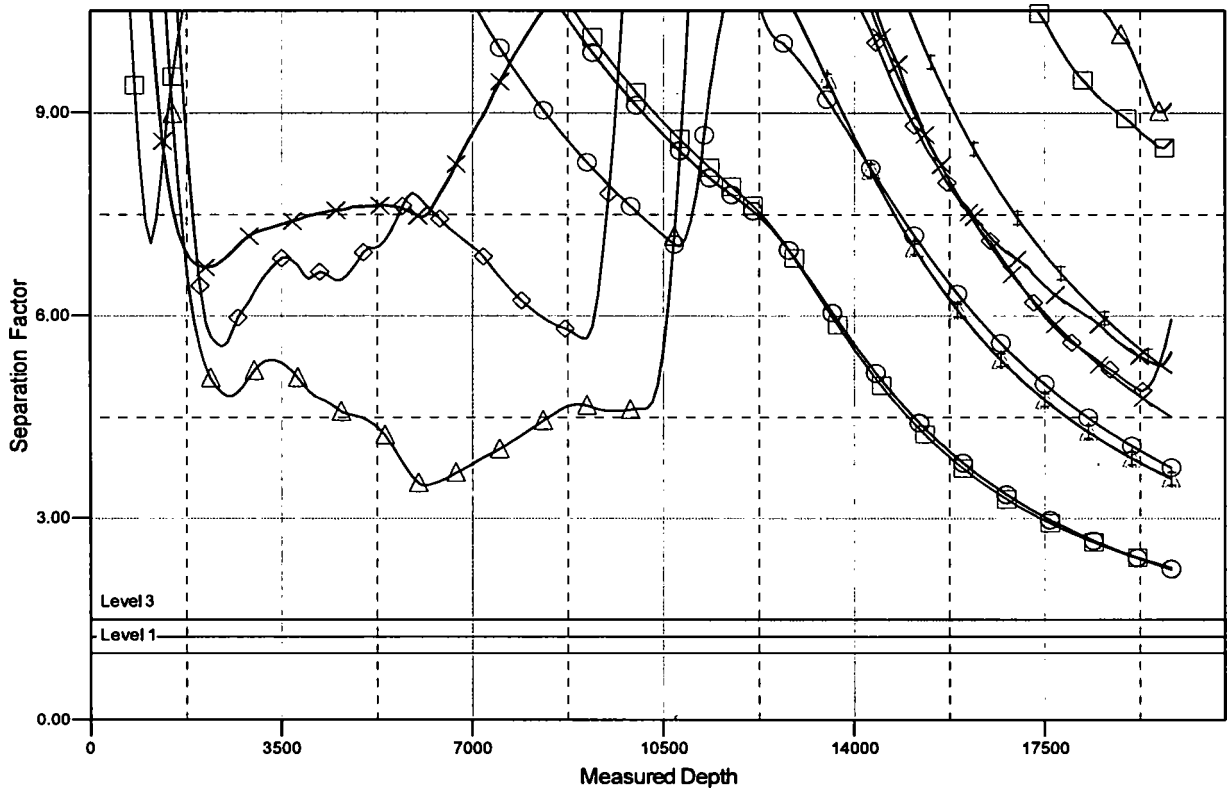
Motive Drilling Technologies
Anticollision Summary Report

LEGACY RESERVES

Company:	Legacy Reserves	**Local Co-ordinate Reference:**	Well Lea Unit #221H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	RKB @ 3696.0usft
Reference Site:	Lea	**MD Reference:**	RKB @ 3696.0usft
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Lea Unit #221H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Wellbore	**Database:**	EDM 5000.1 Single User Db
Reference Design:	Plan 1	**Offset TVD Reference:**	Reference Datum

Reference Depths are relative to RKB @ 3696.0usft	Coordinates are relative to: Lea Unit #221H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.45°

Separation Factor Plot



LEGEND

Lea Unit #621H, Original Wellbore, Original Wellbore V0
Lea Unit #56H, Original Wellbore, Original Wellbore V0
Lea Unit #60H, Original Wellbore, Original Wellbore V0
Lea Unit #123H, Original Wellbore, Plan 1 V0
Lea Unit #63H, Original Wellbore, Original Wellbore V0
Lea Unit #220H, Original Wellbore, Plan 1 V0
Lea Unit #222H, Original Wellbore, Plan 1 V0
Lea Unit #121H, Original Wellbore, Plan 1 V0
Lea Unit #61H, Original Wellbore, Original Wellbore V0
Lea Unit #223H, Original Wellbore, Plan 1 V0
Lea Unit #120H, Original Wellbore, Plan 1 V0
Lea Unit #122H, Original Wellbore, Plan 1 V0

LEGACY RESERVES

WELL DETAILS: Lea Unit #221H

RKB @ 3696.00ft Ground Level: 3678.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	567515.800	797131.400	32.557416°N	-103.503110

MOTIVE DRILLING TECHNOLOGIES

Project:	Lea County, NM
Site:	Lea
Well:	Lea Unit #221H
Geodetic Datum:	NAD 1983
Design:	Plan 1

T G M

Azimuths to Grid North
True North: -0.45°
Magnetic North: 6.36°

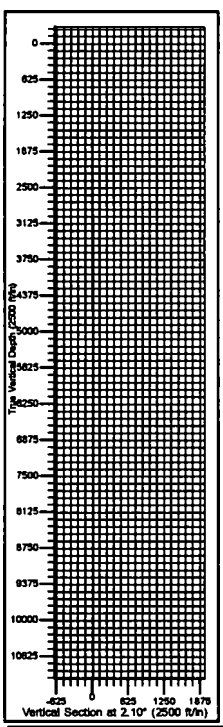
Magnetic Field
Strength: 48005.1nT
Dip Angle: 60.36°
Date: 10/11/2018
Model: IGRF2015

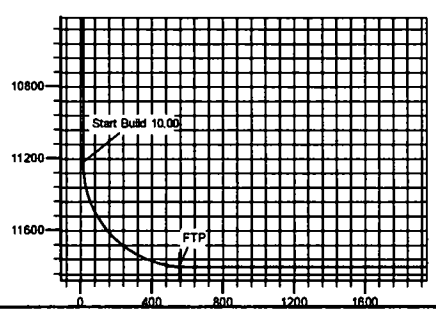
DESIGN TARGET DETAILS

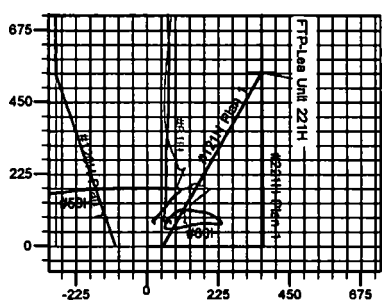
Name	TVD	+N/-S	+E/-W	Northing	Easting
BHL	11800.00	8258.32	302.80	575774.100	797434.200
FTP	11800.00	541.10	361.70	568056.900	797493.100

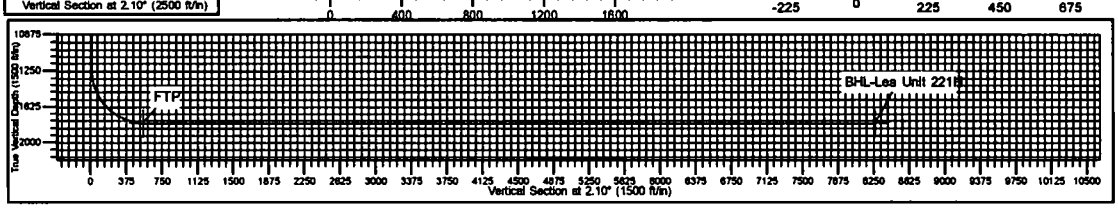
SECTION DETAILS

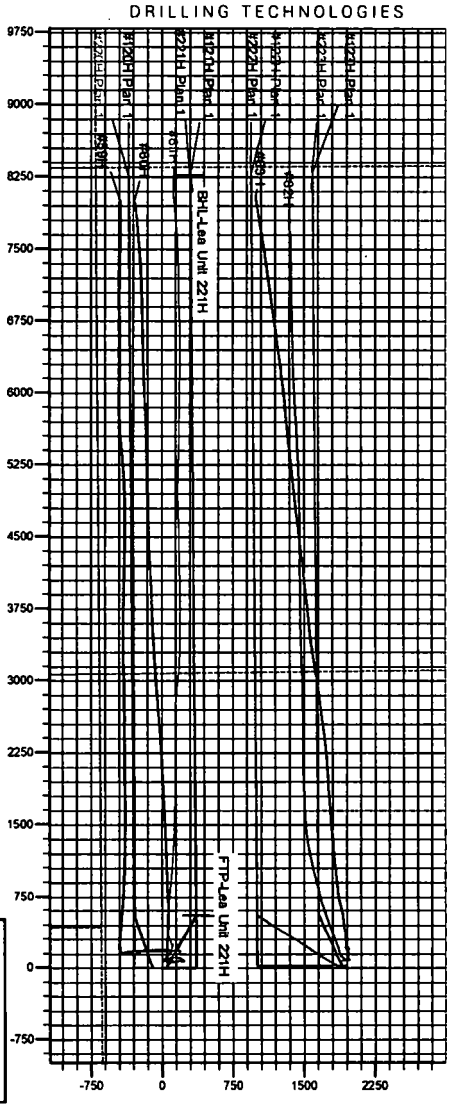
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	0.00	
3	1296.65	4.45	90.00	1296.35	0.00	11.51	1.50	90.00	0.42	
4	5717.27	4.45	90.00	5703.65	0.00	354.49	0.00	0.00	12.99	
5	6013.92	0.00	0.00	6000.00	0.00	366.00	1.50	180.00	13.41	
6	11240.96	0.00	0.00	11227.04	0.00	366.00	0.00	0.00	13.41	
7	12140.96	90.00	359.56	11800.00	572.94	361.60	10.00	359.56	585.81	
8	19826.56	90.00	359.56	11800.00	8258.32	302.80	0.00	0.00	8263.87	BHL-Lea Unit 221H











1.2.2 State Water Protection Compliance

Bureau of Land Management requires surface casing to be set at a minimum of 25' into the Rustler Anhydrite and above the salt section. Operator proposes to set the surface casing at a depth of 1800' (measured from the surface) and use 13-3/8" casing.

Special Capitan Reef requirements
If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

1.3 Pressure Control Equipment

Ten thousand (10M) psi working pressure Blind Rams and Pipe Rams and a five thousand (5M) psi Annular Preventer will be installed on all casing. Three (3) chokes; two (2) hydraulic and one (1) manual, will be used.

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.

A third party testing company will conduct pressure tests and record prior to drilling out below 13-3/8s" casing. The BOP, Choke, Choke Manifold, Top Drive Valves and Floor Safety Valves will be tested to 5000 psi prior to drilling below the 13-3/8s" surface casing shoe and to 100% of full working pressure (10,000 psi) prior to drilling below the 9-5/8s" intermediate casing shoe. The Annular Preventer will be tested to 2500 psi prior to drilling below the 13-3/8s" surface casing shoe and to 100% of working pressure (5,000 psi) prior to drilling below the 9-5/8" intermediate casing shoe.

In addition, the BOP equipment will be tested after any repairs to the equipment as well as drilling out below any casing string. Pipe rams, blind rams, and annular preventer will be activated on each trip, and weekly BOP drills will be held with each crew.

Floor Safety Valves that are full open and sized to fit Drill Pipe and Collars will be available on the rig floor in the open position when the Kelly is not in use.

1.4 Proposed Casing and Cementing Program

1.4.1 Proposed Casing Program

Interval	Depth	Size	Weight/ft	Grade	Thread	Condition	Hole size	Wash out factor	Cement Yield
Conductor	120'	20"	94.00#	H-40		New	26"		Grout
Surface	1,800'	13-3/8"	54.50#	J-55	BTC	New	17-1/2"	100	1.72/1.32 cu. Ft/sk
Intermediate	5,600'	9-5/8"	47#	HCL-80	BTC	New	12-1/4"	150	1.94/1.18 cu. Ft/sk
Intermediate Liner	10,700'	7"	32.00#	P-110HC	BTC	New	8-1/2"	30	1.62 cu. Ft/sk
Production	19,826'	4-1/2"	13.5#	P-110	BTC	New	6"	30	1.34 cu. Ft/sk

Conductor: 20", H-40# line pipe to a depth of 120'.
Wall thickness of 0.250".

Surface Casing:

Top	Bottom	Size	Weight/ Ft	Grade	Thread	Collapse psi	Internal Yld psi	Body Yld Strength	Joint Strength
Surface	1,800'	13-3/8"	54.50	J-55	BTC	1130	2730	853,000	909,000

Intermediate Casing:

Top	Bottom	Size	Weight/Ft	Grade	Thread	Collapse psi	Internal Yld psi	Body Yld Strength	Joint Strength
Surface	5,600'	9-5/8"	47#	HCL-80	BTC	5,740	6,870	1,086,000	1,122,000

Intermediate Liner:

Top	Bottom	Size	Weight/Ft	Grade	Thread	Collapse psi	Internal Yld psi	Body Yld Strength	Joint Strength
Surface	10,700'	7"	32#	P-110HC	BTC	11,890	12,450	1,025,000	1,053,000

Production Casing:

Top	Bottom	Size	Weight/Ft	Grade	Thread	Collapse psi	Internal Yld psi	Body Yld Strength	Joint Strength
10,200	19,826'	4-1/2"	13.5#	P-110	BTC	10,690	12,420	422,000	443,000

1.4.2 Proposed Cement Program

Conductor: Grout to Surface (est. 8 cu. yds on backside)

13-3/8" Surface:

LEAD	
Top of MD	0
Bottom of MD	1600
Cement Type	Class C
Additives	4%Bentonite, 0.4 pps Defoamer, 0.125 pps Cellophane, 9.102 H2O GPS
# of SKS	1300
Yield (ft3/sk)	1.72
Density (lbs/gal)	13.5
Volume (ft3)	2236
Excess (%)	100%
TAIL	
Top of MD	1600
Bottom of MD	1800
Cement Type	Class C Neat
Additives	6.304 H2O GPS
# of SKS	200
Yield (ft3/sk)	1.32
Density (lbs/gal)	14.8
Volume (ft3)	264
Excess (%)	60%

9-5/8" Intermediate (No DV Tool):

LEAD	
Top of MD	0
Bottom of MD	5000
Cement Type	35:65 POZ-Class C
Additives	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.542 H2O GPS
# of SKS	1700
Yield (ft3/sk)	1.94
Density (lbs/gal)	12.6

Volume (ft3)	3298
Excess (%)	180%
TAIL	
Top of MD	5000
Bottom of MD	5600
Cement Type	Class H
Additives	0.3% Fluidloss, 5.216 H2O GPS
# of SKS	350
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	413
Excess (%)	140%

9-5/8" Intermediate (With 1 DV Tool):

Intermediate Casing String	
***Stage 1**	
LEAD	
Top of MD	0
Bottom of MD	5000
Cement Type	35:65 POZ-Class C
Additives	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.542 H2O GPS
# of SKS	1700
Yield (ft3/sk)	1.94
Density (lbs/gal)	12.6
Volume (ft3)	3298
Excess (%)	180%
TAIL	
Top of MD	500
Bottom of MD	5600
Cement Type	Class H
Additives	0.3% Fluidloss, 5.216 H2O GPS
# of SKS	350
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	413
Excess (%)	140%
***Stage 2**	
Stage Tool Depth	+/- 3900'
LEAD	
Top of MD	0

Bottom of MD	3500
Cement Type	35:65 POZ-Class C
Additives	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.543 H2O GPS
# of SKS	1200
Yield (ft3/sk)	1.94
Density (lbs/gal)	12.6
Volume (ft3)	2328
Excess (%)	200%
TAIL	
Top of MD	3500
Bottom of MD	3900
Cement Type	Class H
Additives	0.3% Fluidloss, 5.216 H2O GPS
# of SKS	200
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	236
Excess (%)	100%

9-5/8" Intermediate (With 2 DV Tools):

***Stage 1**	
LEAD	
Top of MD	0
Bottom of MD	5000
Cement Type	35:65 POZ-Class C
Additives	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.542 H2O GPS
# of SKS	1700
Yield (ft3/sk)	1.94
Density (lbs/gal)	12.6
Volume (ft3)	3298
Excess (%)	180%
TAIL	
Top of MD	5000
Bottom of MD	5600
Cement Type	Class H
Additives	0.3% Fluidloss, 5.216 H2O GPS
# of SKS	350

Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	413
Excess (%)	140%
***Stage 2**	
Stage Tool Depth	+/- 3900'
LEAD	
Top of MD	0
Bottom of MD	3500
Cement Type	35:65 POZ-Class C
Additives	6% Bentonite, 0.5% Fluidloss, 0.15% Retarder, 0.4pps Defoamer, 10.543 H2O GPS
# of SKS	1200
Yield (ft3/sk)	1.94
Density (lbs/gal)	12.6
Volume (ft3)	2328
Excess (%)	200%
TAIL	
Top of MD	3500
Bottom of MD	3900
Cement Type	Class H
Additives	0.3% Fluidloss, 5.216 H2O GPS
# of SKS	200
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	236
Excess (%)	100%
***Stage 3**	
Stage Tool Depth	+/- 1900'
TAIL	
Top of MD	0
Bottom of MD	1900
Cement Type	Class C Neat
Additives	6.304 H2O GPS
# of SKS	700
Yield (ft3/sk)	1.32
Density (lbs/gal)	14.8
Volume (ft3)	924
Excess (%)	30%

7" Intermediate Liner:

LEAD	
Top of MD	5300
Bottom of MD	9200
Cement Type	50:50 POZ-Class H
Additives	5% Salt, 10% Bentonite, 0.2% Antisettling, 0.2% Retarder, 3pps Kol-Seal, 0.4pps Defoamer, 0.125pps Cellophane
# of SKS	350
Yield (ft3/sk)	2.47
Density (lbs/gal)	12.6
Volume (ft3)	865
Excess (%)	50%
TAIL	
Top of MD	9200
Bottom of MD	10,700
Cement Type	Class H
Additives	0.3% Retarder, 5.214 H2O GPS
# of SKS	200
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	236
Excess (%)	30%

4-1/2" Production Liner:

TAIL	
Top of MD	10,200
Bottom of MD	19,826
Cement Type	PVL
Additives	1.3% Salt, 0.5% Fluidloss, 0.5% Retarder, 0.1% Antisettling, 0.4pps Defoamer, 8.626 H2O GPS
# of SKS	650
Yield (ft3/sk)	1.62
Density (lbs/gal)	12.6
Volume (ft3)	1053
Excess (%)	30%

7" Intermediate Tie-Back:

TAIL	
Top of MD	0
Bottom of MD	5300
Cement Type	Class C
Additives	0.2% Retarder, 0.1% Dispersant, 6.3 H2O GPS
# of SKS	700
Yield (ft3/sk)	1.32
Density (lbs/gal)	14.8
Volume (ft3)	924
Excess (%)	10%

Cement volumes are based on bringing cement to surface on all strings and TOC to ~10,200' (top of liner) on production.

Operator reserves the right to change cement designs as hole conditions may warrant.

1.5 Proposed Mud Program

Top TVD	Bottom TVD	Type	Max Mud Weight for Hole Control Design	Viscosity (sec/qt)
SURFACE	1,800	Fresh Water	9.0	28-38
1800	5,600	Brine	10.0	28-30
5,600	10,700	Cut Brine	9.2	28-30
10,700	TD	OBM	11.0	55-65

The operator must include the minimum design criteria, including casing loading assumptions and corresponding safety factors for burst, collapse, and tensions (body yield, and joint strength).

1.6 Casing Design

1.6.1 Drilling Design Analysis

Interval	Max TVD (ft)	Anticipated Mud Weight (ppg)	Estimated Max Pore Pressure (psi)	Internal Yield Strength (psi)	Collapse Strength (psi)	Joint Strength (lbs)	Body Strength (lbs)	Burst Safety Factor (Min 1.25)	Collpase Safety Factor (Min 1.25)	Tensile Safety Factor (Min 1.6)
Surface	1,800	8.5	780	2,730	1,130	909,000	853,000	3.86	1.42	2.59
Interm.	5,600	10	2,420	6,870	5,740	1,122,000	1,086,000	1.33	1.97	2.99
Tie-Back	10,700	9.0	4,730	12,450	11,890	1,053,000	1,025,000	1.26	2.25	2.32
Prod.	11,800	11.5	6,750	12,420	10,690	443,000	422,000	1.25	1.81	1.8

Surface Casing Design Notes:

- **Burst Design Assumptions: Calculations assume complete evacuation behind pipe.**
- **Collapse Design Assumptions: Calculations assume complete evacuation inside pipe.**
- **Tension Design Assumptions: Calculations include 100,000 lb. max over-pull and do not consider the effects of buoyancy, with string held in tension.**

Intermediate Casing Design Notes:

- **Burst Design Assumptions: Calculations assume a .7psi/ft shoe test, and 0.22 psi/ft gas gradient.**
- **Collapse Design Assumptions: Calculations assume complete evacuation inside pipe.**
- **Tension Design Assumptions: Calculations include 100,000 lb. max over-pull and do not consider the effects of buoyancy, with string held in tension.**

Intermediate Liner w/ Tie-Back Design Notes:

- **Burst Design Assumptions: Calculations assume a .7psi/ft shoe test, and 0.22 psi/ft gas gradient.**
- **Collapse Design Assumptions: Calculations assume complete evacuation inside pipe.**
- **Tension Design Assumptions: Calculations include 100,000 lb. max over-pull and do not consider the effects of buoyancy, with string held in tension.**

Production Design Notes:

- **Burst Design Assumptions: Calculations assume surface frac pressure of 9500 psi along with a fluid gradient of 0.49psi/ft, with an external force equivalent to 0.44 psi/ft.**
- **Collapse Design Assumptions: Calculations assume complete evacuation inside pipe.**

- **Tension Design Assumptions: Calculations include 100,000 lb. max over-pull and do not consider the effects of buoyancy, with string held in tension.**

*Notes:

1) Collapse DSF: If < 1.125 calculations are required.
2) Burst DSF: If < 1.0 calculations are required.
3) Body Tensile DSF: If < 1.6 (dry) or < 1.8 (buoyant) calculations are required.
4) Joint Tensile DSF: If < 1.6 (dry) or < 1.8 (buoyant) calculations are required.
5) Will an offset pressure variance request be requested to meet safety factors? Max. 0.22 psi/ft. Please indicate offset pressure variance requested.

Mud weight increases at shoe depths are for pressure control. Mud weight increases in the curve and lateral sections of the hole are for hole stability, not pressure control. Mud weight assumptions for casing load designs exceed anticipated maximum mud weight for balanced drilling in all hole sections. Expected mud weights in the Lower Wolfcamp Horizontal will be 0.5 to 1.0 ppg greater than formation pressure (i.e. overbalanced drilling.)

The Mud System will run as a closed loop system with PVT monitoring. All drill cuttings and liquid mud will be hauled to an approved NMOCD site for disposal or soil farm upon receiving appropriate approval.

1.7 Completion Program and Casing Design

Hydraulic fracturing will occur through the production casing. The burst design calculation assumes TOC at surface and therefore, the backside of the production casing is not evacuated. The maximum pumping pressure is 10,000 psi with a maximum proppant fluid weight of 9.5 ppg. The design safety factor for burst is 1.25.

Upon request, operator will provide proof of cement bonding by bond log. Operator is responsible for log interpretation and certification prior to frac treatment.

Upon request, operator will provide estimated fracture lengths, flowback storage, volumes of fluids and amount of sand to be used, and number of stages of frac procedure. Furthermore, a report of the annulus pressures before and after each stage of treatment may be requested by the BLM. The report may include chemical additives

(other than proprietary), dissolved solids in frac fluid, and depth of perforations.

1.8 Evaluation Program

Required Testing, Logging, and Coring procedures noted below:

- Mud Logging/Gamma Ray/MWD.
- Cased hole CBL on production casing.

1.9 Downhole Conditions

Zones of possible lost circulation:	Capitan Reef
Zones of possible abnormal pressure:	Lower Wolfcamp
Maximum bottom hole temperature:	205° F
Maximum bottom hole pressure:	6,750 psi or less.

1.10 Overview of Drilling Procedure

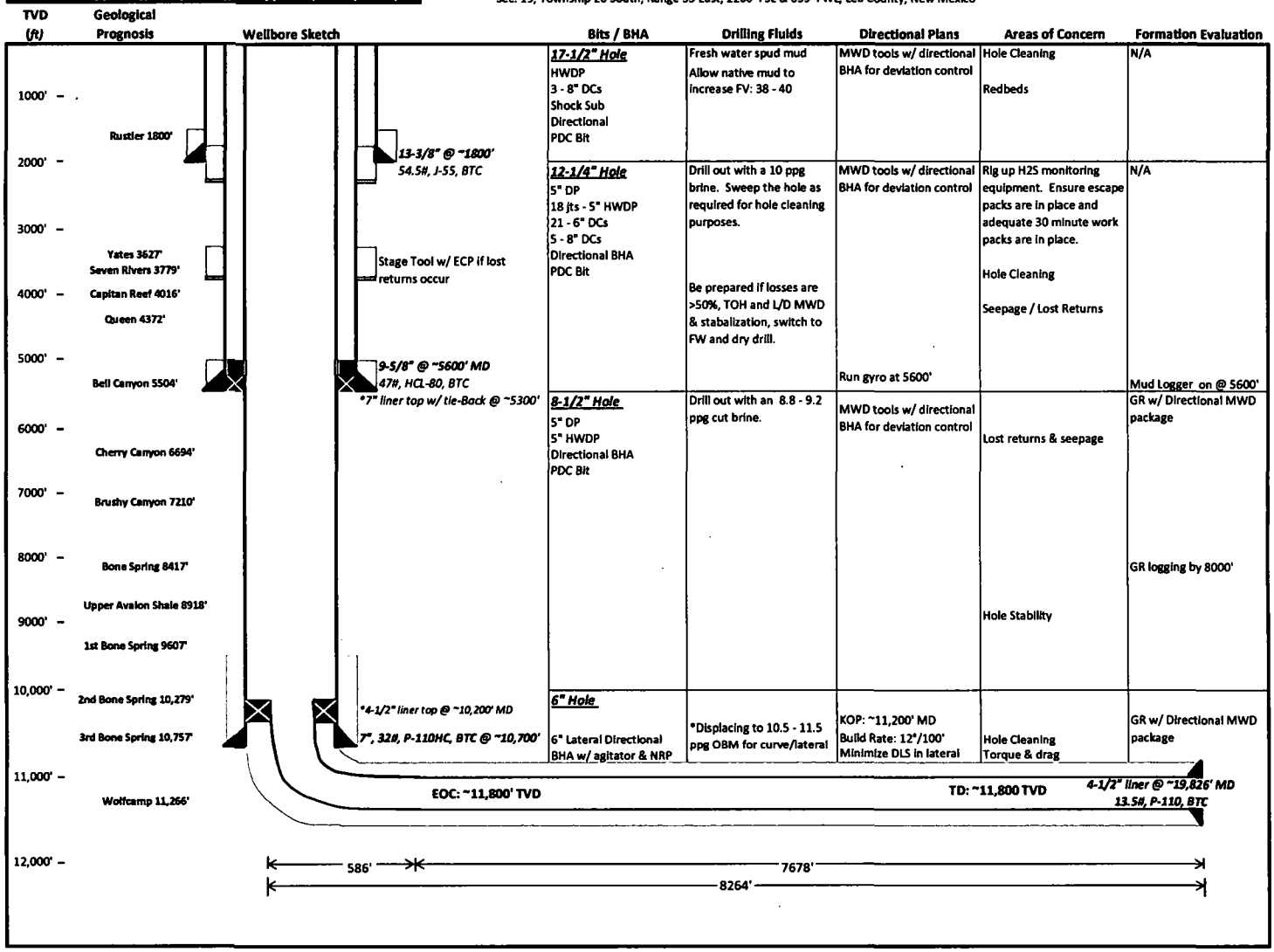
- Drill 17.5" surface hole to 1,800'; run 13.375" casing to 1,800' and cement to surface; install 10M stack, set isolation plug and test BOPE and casing independently to regulatory requirements.
- Drill 12.25" intermediate hole to 5,600', run 9.625" casing and cement; set isolation plug and test BOPE and casing independently to regulatory requirements.
- Drill 8-1/2" intermediate hole to approximately 10,700' and run 7" liner with a tie-back sleeve, and cement to top of liner set at +/- 5,300'.
- Drill 6" production hole to +/-19,826'; run 4.5" liner from TD to +/- 10,200' and cement per cement program and test.
- Run 7" tie-back string from +/- 5300' to surface and cement per cement program, circulate cement to surface.

1.11 Overview of Completion for Equipment Sizing

- A Sundry Notice will be submitted with the proposed completion procedure prior to the job.

Lea Unit #221H (Lower Wolfcamp)

Sec. 19, Township 20 South, Range 35 East, 2200' FSL & 635' FWL, Lea County, New Mexico



Bits / BHA	Drilling Fluids	Directional Plans	Areas of Concern	Formation Evaluation
17-1/2" Hole HWDP 3 - 8" DCs Shock Sub Directional PDC Bit	Fresh water spud mud Allow native mud to increase FV: 38 - 40	MWD tools w/ directional BHA for deviation control	Hole Cleaning Redbeds	N/A
12-1/4" Hole 5" DP 18 jts - 5" HWDP 21 - 6" DCs 5 - 8" DCs Directional BHA PDC Bit	Drill out with a 10 ppg brine. Sweep the hole as required for hole cleaning purposes. Be prepared if losses are >50%, TOH and L/D MWD & stabalization, switch to FW and dry drill.	MWD tools w/ directional BHA for deviation control Run gyro at 5600'	Rig up H2S monitoring equipment. Ensure escape packs are in place and adequate 30 minute work packs are in place. Hole Cleaning Seepage / Lost Returns	N/A Mud Logger on @ 5600'
8-1/2" Hole 5" DP 5" HWDP Directional BHA PDC Bit	Drill out with an 8.8 - 9.2 ppg cut brine.	MWD tools w/ directional BHA for deviation control	Lost returns & seepage Hole Stability	GR w/ Directional MWD package GR logging by 8000'
6" Hole 6" Lateral Directional BHA w/ agitator & NRP	*Displacing to 10.5 - 11.5 ppg OBM for curve/lateral	KOP: ~11,200' MD Build Rate: 12°/100' Minimize DLS in lateral	Hole Cleaning Torque & drag	GR w/ Directional MWD package

APD ID: 10400036496 **Submission Date:** 11/19/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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:

Lea_Unit_221H_Pad_Plat_09_12_18_20181119112218.pdf
Lea_Unit_221H_Location_Map_09_12_18_20181119112230.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:

Lea_Unit_221H_Proximity_Exhibit_09_12_18_20181119112303.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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: Existing production facilities will be utilized.

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: STATE

Water source volume (barrels): 10000

Source volume (acre-feet): 1.288931

Source volume (gal): 420000

Water source use type: STIMULATION

Water source type: RAW PRODUCED

Describe type:

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: TRUCKING

Source transportation land ownership: STATE

Water source volume (barrels): 3000

Source volume (acre-feet): 0.3866793

Source volume (gal): 126000

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Water source and transportation map:

Water_Transportation_Plat___Lea_Unit_221H_20181119112547.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:**

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: To rock the 50' pad extension to the west material will be used from Pat Sims Caliche Pit located in the SW/4 Section 24-20S-35E.

Construction Materials source location attachment:

Construction_Materials_Plat___Lea_Unit_221H_20181119112627.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:

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site in Halfway, NM.

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:

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Section 9 - Well Site Layout

Well Site Layout Diagram:

McVay_Rig2_Schematic_20181119112945.pdf

Comments:

Section 10 - Plans for Surface Reclamation

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

Multiple Well Pad Number: 59H, 60H, 61H, 120H, 121H, 220H

Recontouring attachment:

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.

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): 0.52	**Well pad interim reclamation (acres):** 0	**Well pad long term disturbance (acres):** 0.52
Road proposed disturbance (acres): 0	**Road interim reclamation (acres):** 0	**Road long term disturbance (acres):** 0
Powerline proposed disturbance (acres): 0	**Powerline interim reclamation (acres):** 0	**Powerline long term disturbance (acres):** 0
Pipeline proposed disturbance (acres): 0	**Pipeline interim reclamation (acres):** 0	**Pipeline long term disturbance (acres):** 0
Other proposed disturbance (acres): 0	**Other interim reclamation (acres):** 0	**Other long term disturbance (acres):** 0
Total proposed disturbance: 0.52	**Total interim reclamation:** 0	**Total long term disturbance:** 0.52

Disturbance Comments: Existing pipeline and lease road will be utilized. A 50' extension will be implemented along the western edge of the existing pad.

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: The well pad extension will be a 50' extension along the western edge of the existing pad site. vegetation disturbed will be limited to Shinnery oak (Quercus havardii).

Existing Vegetation at the well pad attachment:

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

Existing Vegetation Community at the road: Existing lease road, no vegetation will be affected.

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Existing pipeline, no vegetation will be affected.

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: No surface disturbance other than described herein is expected.

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

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

Seed Type	Pounds/Acre

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 221H

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:

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:** 221H

Fee Owner: Pat Sims **Fee Owner Address:** P.O. Box 1046 Eunice, NM 88231

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

Surface use plan certification: YES

Surface use plan certification document:

Lea_Unit__221H_SUA_20181119113731.pdf

Surface access agreement or bond: Agreement

Surface Access Agreement Need description: See attached Surface Use Agreement.

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:

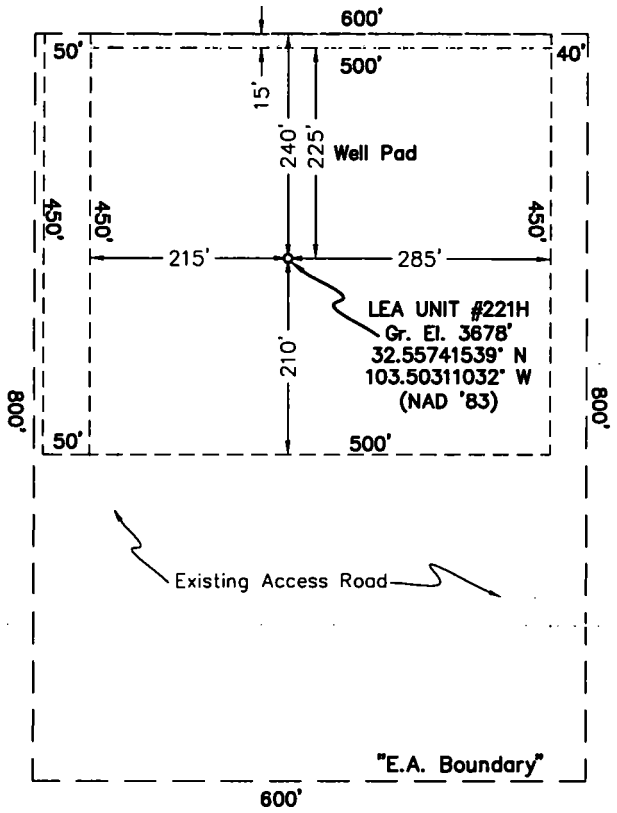
Use a previously conducted onsite? YES

Previous Onsite information: An onsite was previously conducted for the existing Lea Unit #59H, Lea Unit 60H, and Lea Unit 61H pad. The Lea Unit #121H is located on this same well pad.

Other SUPO Attachment

SECTION 19, TOWNSHIP 20 SOUTH, RANGE 35 EAST, N.M.P.M.

LEA COUNTY NEW MEXICO



— 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 5.4 MILES TO A LEASE ROAD ON THE EAST (LEFT) SIDE OF THE ROAD, THEN GO EAST ON LEASE ROAD 1.1 MILES TO A POINT APPROXIMATELY 500 FEET SOUTH OF THE PROPOSED LOCATION.

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

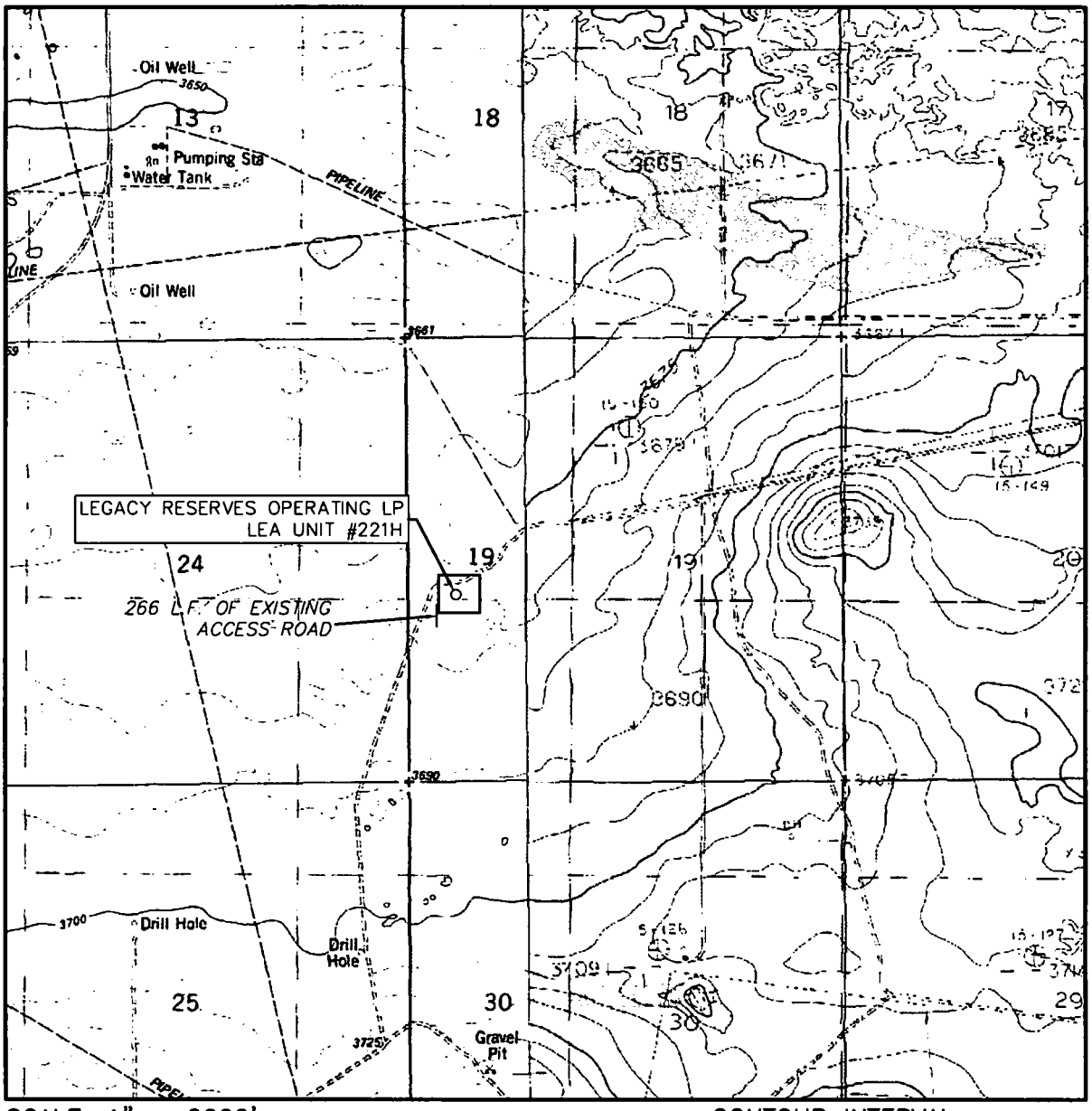
LEGACY RESERVES OPERATING LP

LEA UNIT #221H

Located 2,200' FSL & 635' FWL, Section 19
Township 20 South, Range 35 East, N.M.P.M.
Lea County, New Mexico

Drawn By: SC	Date: September 12, 2018
Scale: 1" = 200'	Field Book: 599 / 52–54
Revision Date: 9–17–2015	Quadrangle: Lea
W.O. No: J:\2018\2018–0264\2018–0264 LEA UNIT WELLS.DWG	

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
LEA – 10'

SEC. 19 TWP. 20–S RGE. 35–E

SURVEY N.M.P.M.

COUNTY LEA

DESCRIPTION 2,200' FSL & 635' FWL

ELEVATION 3678'

OPERATOR LEGACY RESERVES OPERATING LP

LEASE LEA UNIT

U.S.G.S. TOPOGRAPHIC MAP
LEA & MONUMENT SW

WEST COMPANY
Land Surveyors ▪ Civil Engineers

SURVEYORS - ENGINEERS - PLANNERS
FIRM REGISTRATION NUMBER: 100682-00
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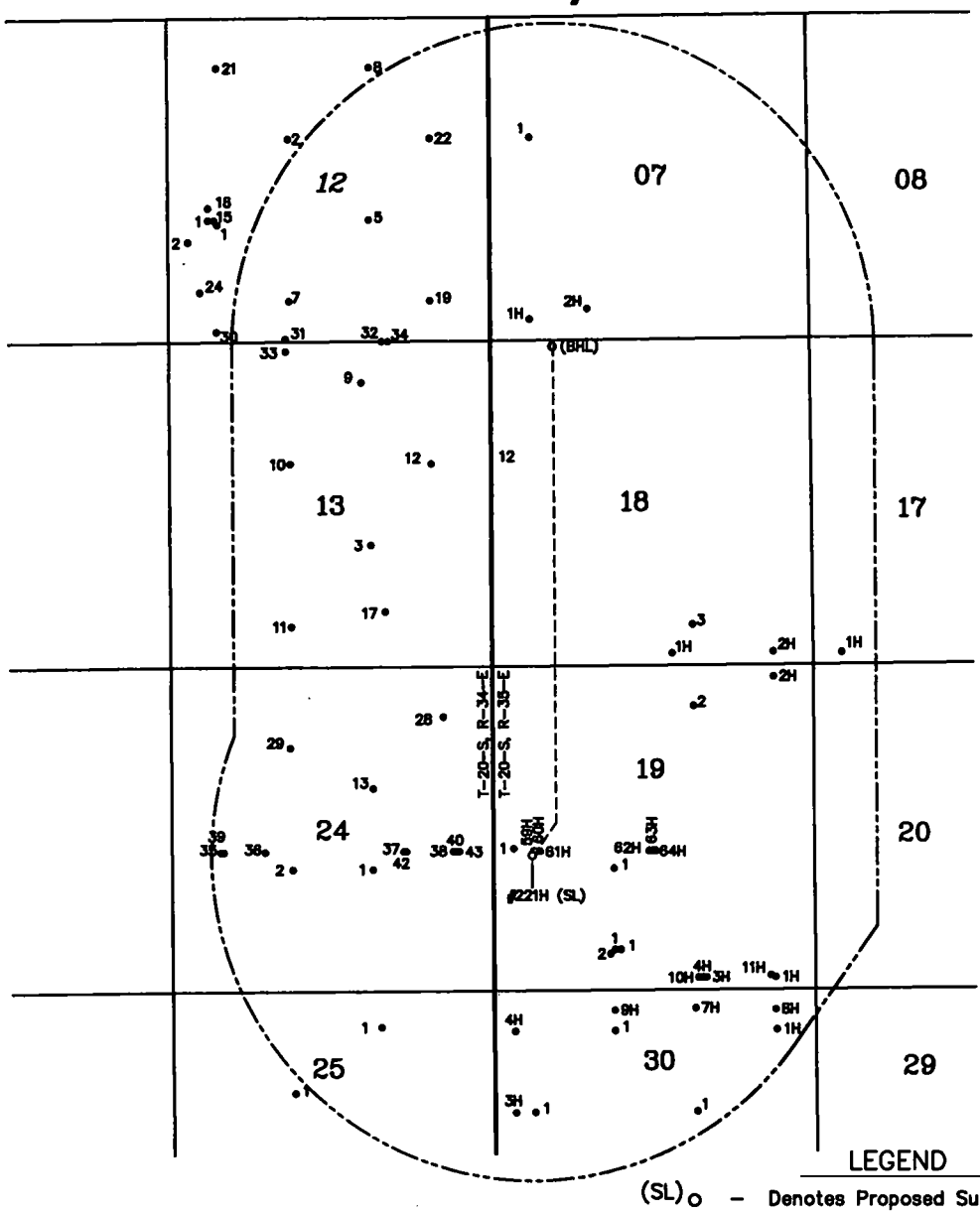
"Well Proximity Exhibit"



LEGEND

(SL) ○ – Denotes Proposed Surface Well Location

(BHL) ⊗ – Denotes Proposed Bottom Hole Location

● – Denotes Active Well Location

------- – Denotes Wellbore Path

—·—·— – Denotes 1 Mile Buffer

Scale
1" = 3000'

NOTE:

1) Plane Coordinates shown hereon are Transverse Mercator Grid and Conform to the "New Mexico Coordinate System", New Mexico East Zone, North American Datum of 1983. Distances shown hereon are mean horizontal surface values.

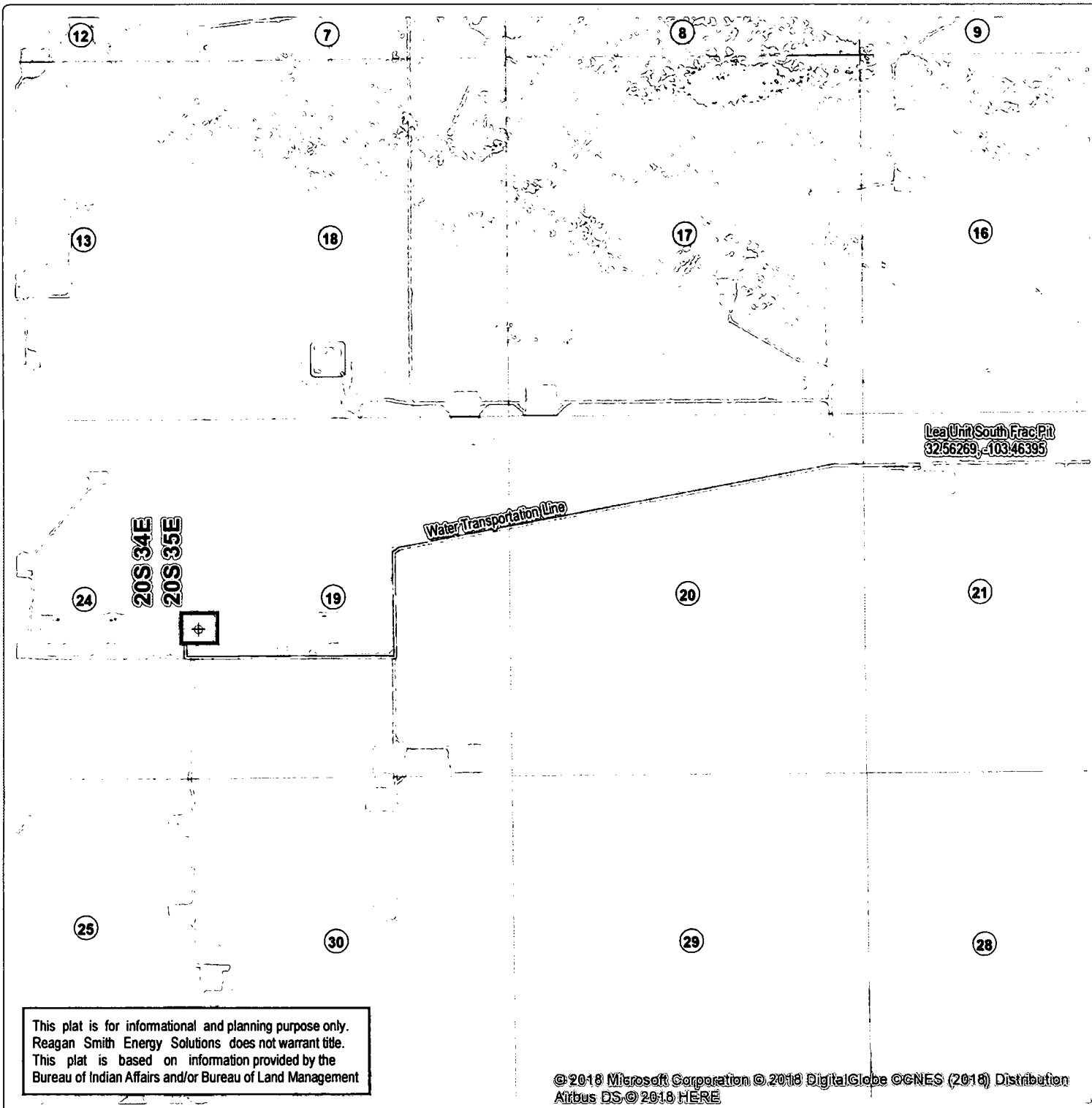
2) This Plat only shows wells within a 1 mile Diameter from the centerline of the wellbore according to the NM OCD Oil and Gas Map.

LEGACY RESERVES OPERATING LP

LEA UNIT #221H

Surface Location:
Section 19, T-20-S, R-35-E,
Bottom Hole Location:
Section 18, T-20-S, R-35-E,
all in N.M.P.M., Lea County, New Mexico

Drawn By: SC	Date: September 12, 2018
Scale: 1" = 200'	Field Book: 599 / 52-54
Revision Date:	Quadrangle:Lea & Monument SW
W.O. No: J:\2018\2018-0264\2018-0264 LEA UNIT WELLS.DWG	



This plat is for informational and planning purpose only. Reagan Smith Energy Solutions does not warrant title. This plat is based on information provided by the Bureau of Indian Affairs and/or Bureau of Land Management

N
W E
S

1:24,000

Approximately 43mi
East of Carlsbad, NM

Water Tranpsortation Plat

Lea Unit #221H
Legacy Reserves Operating, LP
SHL Section 19 - T20S - R35E NMPM
Producing Sections 18 & 19 - T20S - R35E NMPM
Lea County, New Mexico

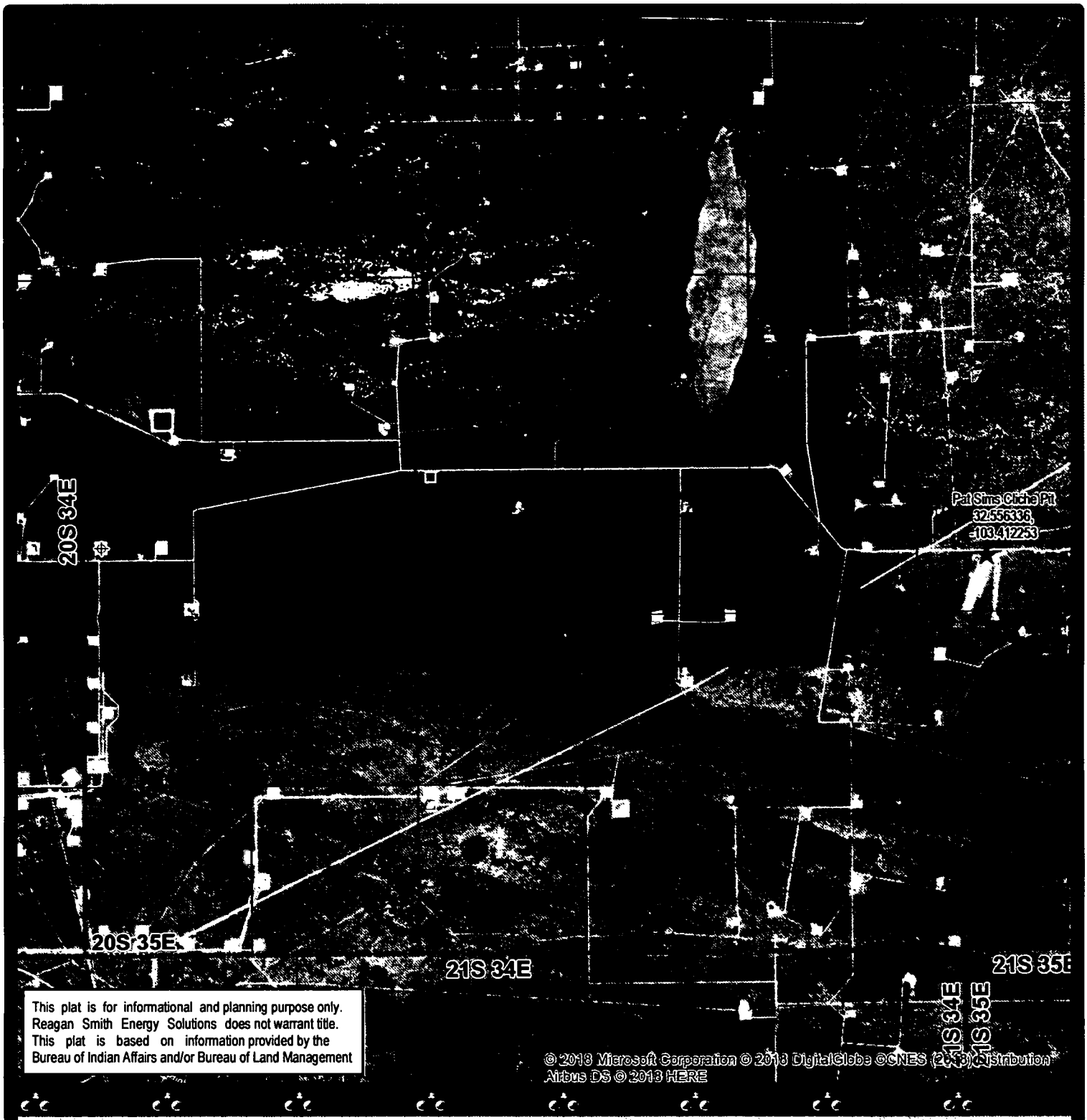
Created By: Alex Sherman
Map Created: 11/15/2018
www.landscout.com
info@landscout.com
(405) 600-3350

Land Scout

REAGAN SMITH ENERGY SOLUTIONS, INC.

⌖ Lea Unit #221H ○ Water Diversion Point
▭ Proposed Well Pad ═ Water Transportation Line

Document Path: S:\PERMITTING\APDs\APD - New Mexico\Lea County\Legacy Reserves, LP\Lea Unit 221H\Plats\GIS\Lea Unit 221H.mxd



N
W E
S

1:60,000

Approximately 43mi
East of Carlsbad, NM

Construction Materials Plat

Lea Unit #221H
Legacy Reserves Operating, LP
SHL Section 19 - T20S - R35E NMPM
Producing Sections 18 & 19 - T20S - R35E NMPM
Lea County, New Mexico

Created By: Alex Sherman
Map Created: 11/15/2018
www.landscout.com
info@landscout.com
(405) 600-3360

REAGAN SMITH ENERGY SOLUTIONS, INC.

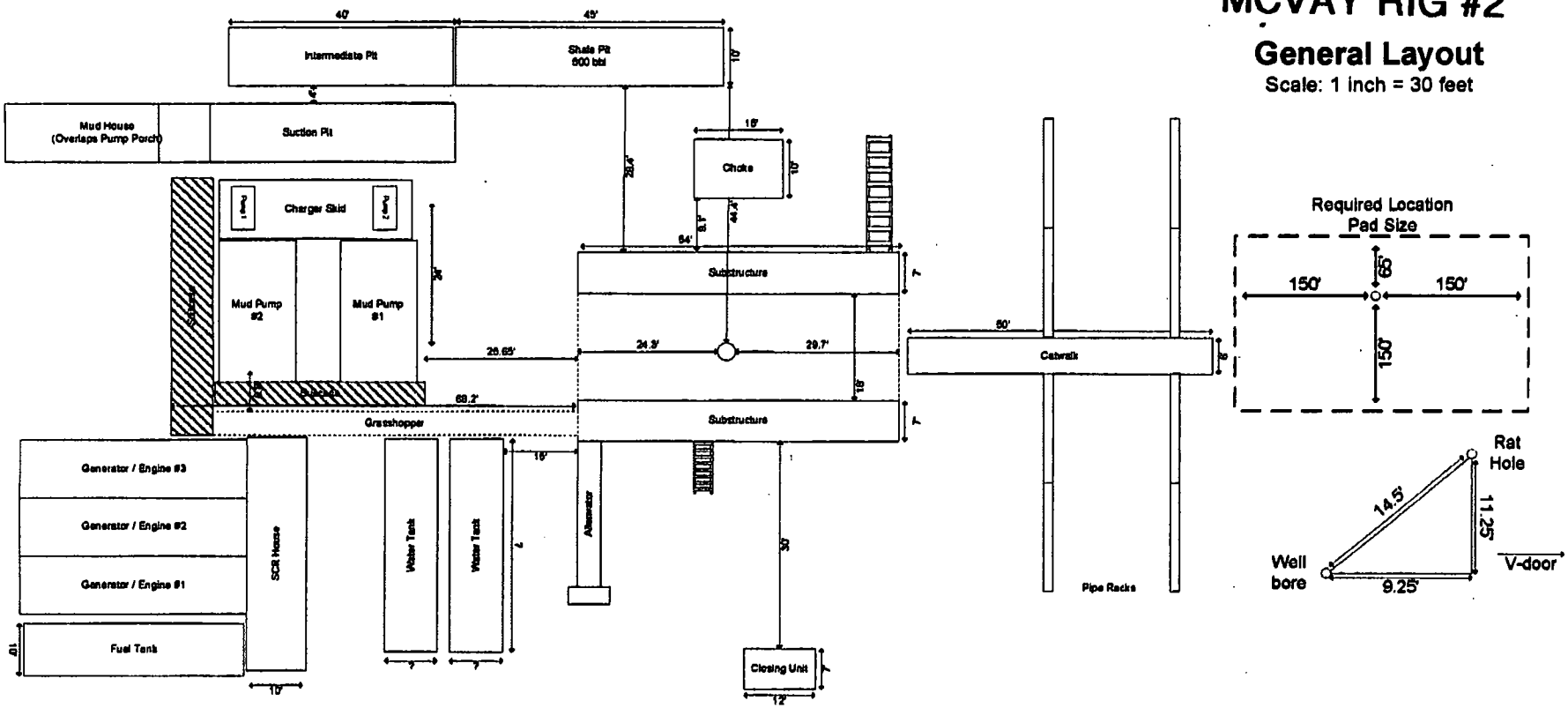
⌖ Lea Unit #221H
★ Construction Materials Sources

Document Path: S:\PERMITTING\APDs\APD - New Mexico\Lea County\Legacy Reserves, LP\Lea Unit 221H\Plats\GIS\Lea Unit 221H.mxd

MCVAY RIG #2

General Layout

Scale: 1 inch = 30 feet



LEGACY
RESERVES

September 28, 2018

RE: Legacy Reserves – Lea Unit #221H
Surface Agreement with S&S Inc. and Pearl Valley Limited Partnership

To whom it may concern:

This letter is to inform you that as of July 15th, 2015 Legacy Reserves Operating LP has secured a Ranch Wide Surface Use Agreement with Pat Sims, on behalf of S&S Inc. and Pearl Valley Limited Partnership for the purposes of building well pad locations and other necessary oil and gas operations on land owned by S&S and Pearl Valley.

The agreement will cover all of Section 24-20S-34E, and all of Section 19-20S-35E, among other lands held by Mr. Sims' two entities. If there are any questions for Pat Sims, he can be reached by phone or mail by using the following information:

- Phone – (575) 390-2642
- Address – PO Box 1046
  Eunice, NM 88231

If you have any questions in regards to the Surface Use Agreement with S&S Inc. and Pearl Valley Limited Partnership please call Clay Roberts, Landman, at Legacy Reserves. He can be reached at 432-689-5206

Sincerely,

Clay Roberts
Landman

303 W. Wall, Suite 1800 ■ Midland, Texas 79701 ■ P.O. Box 10848 ■ Midland, Texas 79702
OFFICE 432-689-5200 ■ FAX 432-684-3774

AFMSS

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

PWD Data Report
04/24/2019

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:

Additional bond information attachment:

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 mineral owner:

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

04/24/2019

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: