Form 3160-3
(June 2015)

OCD – HOBBS
09/19/2018
RECEIVED

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.
NMNM0006531A

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

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

8. Lease Name and Well No.
LEA UNIT
200H [302802]

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

9. API Well No.
30-025-45212

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
303 West Wall St., Ste 1800 Midland TX 79701	(432)689-5287	LEA / UPPER WOLFCAMP [98247]

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWNE / 140 FNL / 1740 FEL / LAT 32.5945004 / LONG -103.5279787
At proposed prod. zone SWNE / 2310 FNL / 2210 FEL / LAT 32.5740291 / LONG -103.5295047

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

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
26 miles	LEA	NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
140 feet	280	2559.68

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
50 feet	11800 feet / 19073 feet	FED: NMB001015

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3665 feet	08/27/2018	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)	Shane Clark / Ph: (405)286-9326	06/22/2018
Title: Permitting Specialist		
Approved by *(Signature)* (Electronic Submission)	Name *(Printed/Typed)* Cody Layton / Ph: (575)234-5959	Date 09/18/2018
Title: Assistant Field Manager Lands & Minerals	Office: 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 09/19/2018

APPROVED WITH CONDITIONS

KZ 09/19/2018

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 09/18/2018

AFMSS

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

Operator Certification Data Report

09/18/2018

Operator Certification

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

NAME: Shane Clark **Signed on:** 06/22/2018

Title: Permitting Specialist

Street Address: 1219 Classen Drive

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

Phone: (405)286-9326

Email address: sclark@rsenergysolutions.com

Field Representative

Representative Name:

Street Address:

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

Phone:

Email address:

APD ID: 10400031426 **Submission Date:** 06/22/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400031426 **Tie to previous NOS?** **Submission Date:** 06/22/2018

BLM Office: CARLSBAD **User:** Shane Clark **Title:** Permitting Specialist

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

Lease number: NMNM0006531A **Lease Acres:** 280

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

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

Agreement number:

Agreement name:

Keep application confidential? YES

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

Operator letter of designation: Authorization_Letter_for_Reagan_Smith_Lea_200H_20180619130758.pdf

Operator Info

Operator Organization Name: LEGACY RESERVES OPERATING LP

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

Operator PO Box:

Operator City: Midland **State:** TX

Operator Phone: (432)689-5287

Operator Internet Address:

Section 2 - Well Information

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

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

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

Well Name: LEA UNIT **Well Number:** 200H **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:** 200H

Describe other minerals:

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** LEA UNIT 100H **Number:** 7

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

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 26 Miles **Distance to nearest well:** 50 FT **Distance to lease line:** 140 FT

Reservoir well spacing assigned acres Measurement: 2559.68 Acres

Well plat: Lea_Unit_200H_Signed_C102_04_10_18_20180619141410.pdf

Well work start Date: 08/27/2018 **Duration:** 45 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	140	FNL	1740	FEL	20S	34E	11	Aliquot NWNE	32.5945004	-103.5279787	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 000653 1A	3665	0	0
KOP Leg #1	144	FNL	2200	FEL	20S	34E	11	Aliquot NWNE	32.59451	-103.5295	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 000653 1A	-7659	11350	11324
PPP Leg #1	336	FNL	2201	FEL	20S	34E	11	Aliquot NWNE	32.593983	-103.5295	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 000653 1A	-8135	12099	11800

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

	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	FNL	2200	FEL	20S	34E	14	Aliquot NWNE	32.580379	-103.529501	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0053434	-8135	16760	11800
EXIT Leg #1	2310	FNL	2210	FEL	20S	34E	14	Aliquot SWNE	32.574029	-103.529504	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0080262	-8135	19073	11800
BHL Leg #1	2310	FNL	2210	FEL	20S	34E	14	Aliquot SWNE	32.574029	-103.529504	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0080262	-8135	19073	11800

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

March 20, 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 200H
11-20S-34E NMPM
Lea County, NM

To whom it may concern:

Legacy Reserves Operating, L.P. has contracted with Reagan Smith Energy Solutions, Inc. to assist in regulatory compliance associated with the Lea Unit 200H. 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 200H. 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.

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

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

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

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Frances Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name

Property Code	Property Name	Well Number
	LEA UNIT	200H
OGRID No.	**Operator Name**	**Elevation**
	LEGACY RESERVES OPERATING LP	3665'

Surface Location

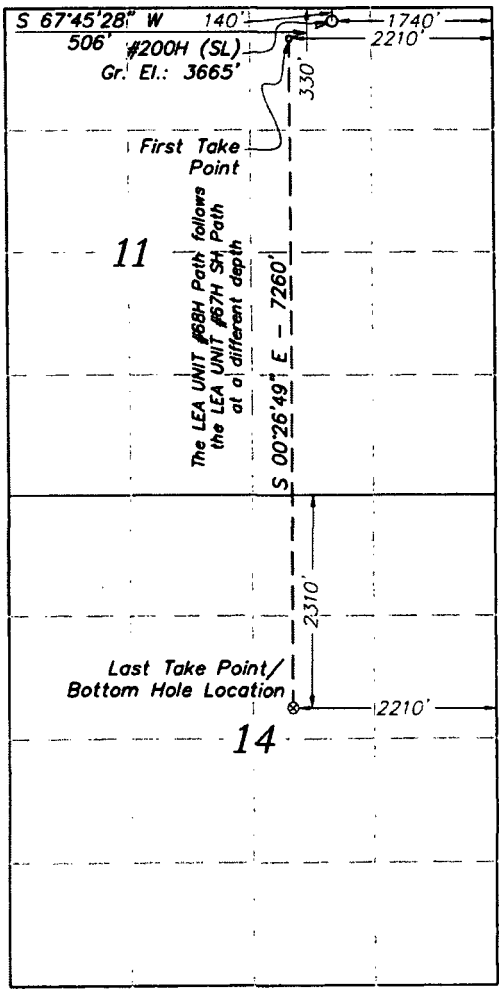
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	11	20 S	34 E		140	NORTH	1740	EAST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	14	20 S	34 E		2310	NORTH	2210	EAST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.

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



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.

SURFACE LOCATION
(NAD83)
Plane Coordinate
X = 789,367.0
Y = 580,949.0
Geodetic (D.D.)
32.59450037° N
103.52797866° W

FIRST TAKE POINT
(NAD83)
Plane Coordinate
X = 788,898.5
Y = 580,757.4
Geodetic (D.D.)
32.59398343° N
103.52950471° W

BOTTOM HOLE LOCATION & LAST TAKE POINT
(NAD83)
Plane Coordinate
X = 788,955.1
Y = 573,497.7
Geodetic (D.D.)
32.57402905° N
103.52949891° W

Scale
1" = 2000'

OPERATOR CERTIFICATION

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

Signature **Date**

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

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

December 20, 2017
Date of Survey

Signature & Seal of Professional Surveyor

04-10-18

LINDSAY GYGAX
NEW MEXICO
23263
PROFESSIONAL SURVEYOR

W.O. Num. 2017-0929

Certificate No. Lindsay Gygax 23263

APD ID: 10400031426 **Submission Date:** 06/22/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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	MANZANITA	3665	0	0	DOLOMITE	USEABLE WATER	No
2	RUSTLER	1965	1700	1728		NONE	No
3	YATES	241	3424	3452		NONE	No
4	SEVEN RIVERS	-144	3809	3837		NONE	No
5	QUEEN	-967	4632	4660		NONE	No
6	BELL CANYON	-1923	5588	5616		NONE	No
7	CHERRY CANYON	-2806	6471	6499		NONE	No
8	BRUSHY CANYON	-3442	7107	7135		NONE	No
9	BONE SPRING	-4526	8191	8219		NATURAL GAS,OIL	No
10	UPPER AVALON SHALE	-5117	8782	8810		NATURAL GAS,OIL	No
11	BONE SPRING 1ST	-5839	9504	9532		NATURAL GAS,OIL	No
12	BONE SPRING 2ND	-6376	10041	10069		NATURAL GAS,OIL	No
13	BONE SPRING 3RD	-7034	10699	10727		NATURAL GAS,OIL	No
14	WOLFCAMP	-7344	11009	11085		NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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 is requested to use a 5M annular on the 10M BOP. A variance to the requirement for a rigid steel line connecting to the choke manifold is requested. Specifications for the flex hose are provided with BOP schematic in exhibit section.

Testing Procedure: 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_20180813105918.pdf

BOP Diagram Attachment:

McVay_2_BOP_Diagram_20180813105932.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	1794	-3665		1800	J-55	54.5	BUTT	1.42	3.5	DRY	4.3	DRY	4.3
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	5600	0	5561	-10136	-11696	5600	HCL-80	40	BUTT	1.97	1.34	DRY	2.99	DRY	2.99
3	INTERMEDIATE	12.25	7.0	NEW	API	N	0	10700	0	10661			10700	HCP-110	32	BUTT	2.31	1.98	DRY	2.31	DRY	2.31
4	PRODUCTION	8.75	4.5	NEW	API	N	10200	19073	10174	11800	-6137	-15937	8873	P-110	13.5	BUTT	1.51	1.25	DRY	1.63	DRY	1.63

Casing Attachments

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit__200H_Drilling_Program_20180622132909.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit__200H_Drilling_Program_20180622132917.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit__200H_Drilling_Program_20180622132925.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Lea_Unit__200H_Drilling_Program_20180622132934.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 cement	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		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
INTERMEDIATE	Lead		0	5300	820	1.18	15.6	968	15	Class H	0.2% Retarder, 6.3 H2O GPS
INTERMEDIATE	Tail		5300	10700	550	1.62	12.6	891	30	PVL	1.3% Salt, 5% Expanding Cement, 0.5% Fluidloss, 0.3% Retarder, 0.1% Antisettling, 0.4 pps Defoamer, 8.621 H2O GPS
PRODUCTION	Lead		10200	19073	750	1.34	14.2	1005	30	50:50 POZ-Class H	5% Salt, 2% Bentonite, 0.5% Fluidloss, 0.2% Retarder, 0.2% Dispersant, 0.4pps

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
											Defoamer, 6.088 H2O GPS

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: 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
5600	10700	OTHER : Cut brine	9	9.2							
1800	5600	OTHER : Brine	10	10							
0	1800	OTHER : Fresh Water	8.5	9							
10700	11800	OIL-BASED MUD	10.5	11							

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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

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_200H_20180622132552.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Lea_Unit__200H_Planning_Report_Plan_1_20180622132640.pdf

Lea_Unit__200H_Plot_Plan_1_20180622132651.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Flex_Hose_Specs_20180619120636.pdf

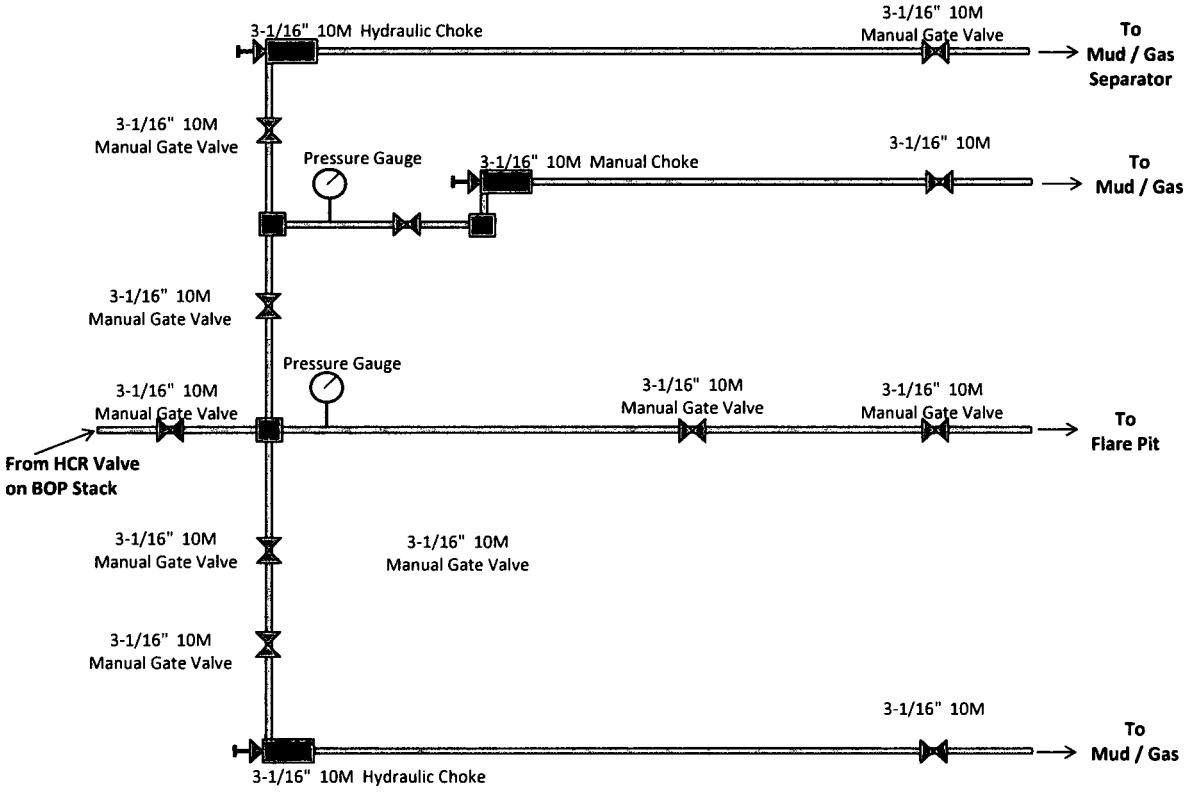
Rig_Schematic_20180619120621.pdf

Lea_Unit_200H_GasCapturePlanFormAPD_20180622132616.pdf

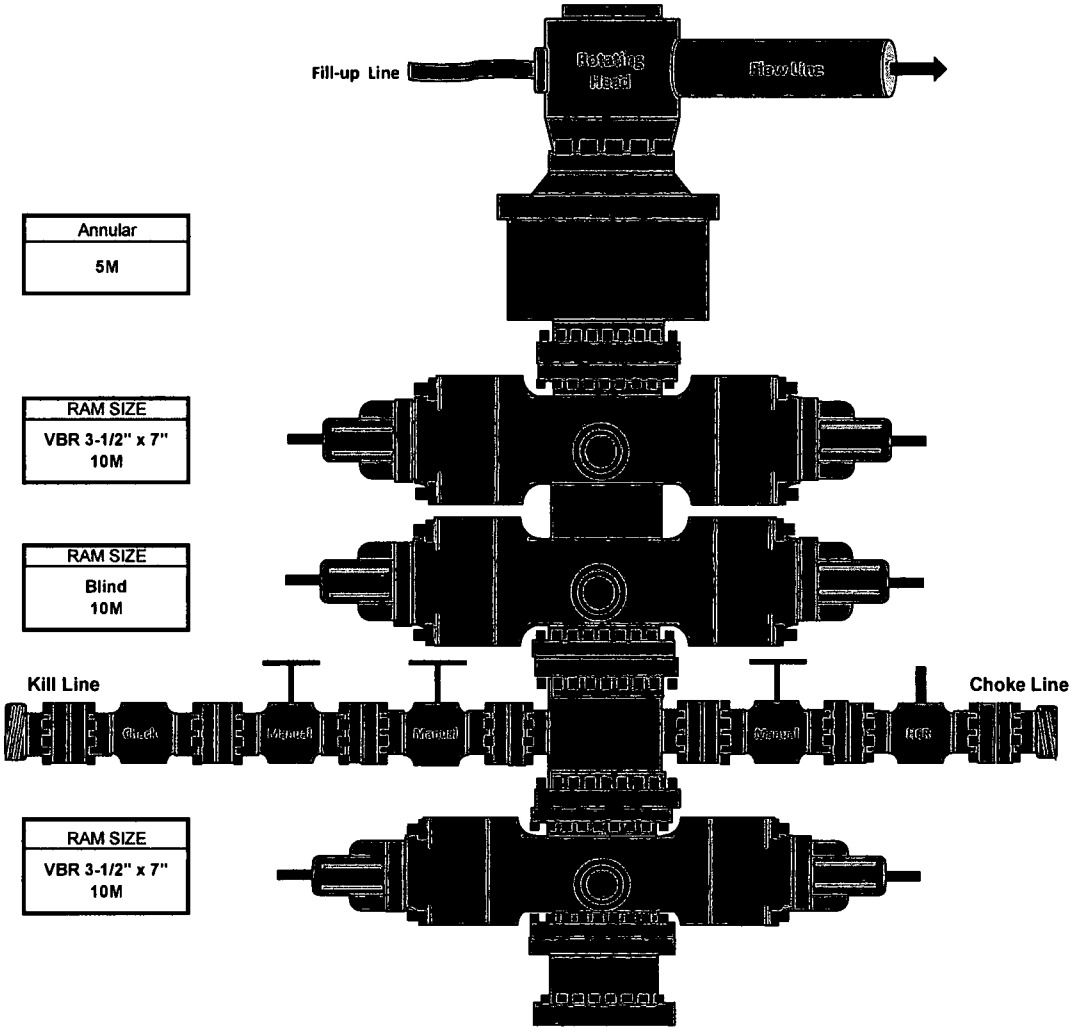
Lea_Unit__200H_AC_Report_Plan_1_20180622132701.pdf

Other Variance attachment:

Choke Manifold (10M)



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



DRILLING PROGRAM

Operator:
LEGACY RESERVES OPERATING LP

Project Name:
LEA UNIT 200H

Project Location:
Lea County, New Mexico

Prepared By:
Matt Dickson
Drilling Engineer

Submitted To:
Bureau of Land Management
Carlsbad Field Office

Please address inquiries, questions, scheduling of meetings and deficiency statements, if any, to Scott St. John and/or Monica Smith Griffin at the address shown below:

Reagan Smith Energy Solutions, Inc.
1219 Classen Drive
Oklahoma City, OK 73103
405-286-9326

sstjohn@rsenergysolutions.com msmith@rsenergysolutions.com

1.0 Drilling Program

1.1 Estimated Formation Tops

FORMATION	*TVD @ Surface Loc*	*TVD @ KB*	*TVD @ TD*
Rustler	1,700'	1,728'	1,728'
Yates	3,424'	3,452'	3,452'
Seven Rivers	3,809'	3,837'	3,837'
Queen	4,632'	4,660'	4,660'
Bell Canyon	5,588'	5,616'	5,616'
Cherry Canyon	6,471'	6,499'	6,499'
Brushy Canyon	7,107'	7,135'	7,135'
Bone Spring	8,191'	8,219'	8,219'
Avalon Shale	8,782'	8,810'	8,810'
1st BS	9,504'	9,532'	9,532'
2nd BS	10,041'	10,069'	10,069'
3rd BS	10,699'	10,727'	10,727'
Wolfcamp	11,009'	11,037'	11,037'
Upper Wolfcamp	11,212'	11,240'	11,240'
Lower Wolfcamp	11,678'	11,698	11,800

Target Formation and Total Depth:

The total depth of the proposed well is approximately 19,100' MD located in the Upper Wolfcamp.

According to New Mexico EMNRD 19.15.15.9 NMAC a well shall be located no closer than 330' feet to a boundary of the unit.

1.2 Estimated Depths of Anticipated Fresh Water, Oil, and Gas

Substance	**Depth**
Fresh Water	0' to 250'
Base of Treatable Water	125'
Hydrocarbons	8,191' to TD

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	19,100'	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	19,073	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:

Surface Casing String	
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):

Intermediate Casing String	
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):

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	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:

Intermediate Casing String	
LEAD	
Top of MD	0
Bottom of MD	5300
Cement Type	Class H
Additives	0.2% Retarder, 6.3 H2O GPS
# of SKS	820
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	968
Excess (%)	15%
TAIL	
Top of MD	5300
Bottom of MD	10,700
Cement Type	PVL
Additives	1.3% Salt, 5% Expanding Cement, 0.5% Fluidloss, 0.3% Retarder, 0.1% Antisettling, 0.4 pps Defoamer, 8.621 H2O

	GPS
# of SKS	550
Yield (ft3/sk)	1.62
Density (lbs/gal)	12.6
Volume (ft3)	891
Excess (%)	30%

4-1/2" Production Liner:

Production Casing String	
TAIL	
Top of MD	10,200
Bottom of MD	19,073
Cement Type	50:50 POZ-Class H
Additives	5% Salt, 2% Bentonite, 0.5% Fluidloss, 0.2% Retarder, 0.2% Dispersant, 0.4pps Defoamer, 6.088 H2O GPS
# of SKS	750
Yield (ft3/sk)	1.34
Density (lbs/gal)	14.2
Volume (ft3)	1005
Excess (%)	30%

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	3.5	1.42	4.3
Interm.	5,600	10	2,420	6,870	5,740	1,122,000	1,086,000	1.34	1.97	2.99
Interm. Liner	10,700	9.0	4,730	12,450	11,890	1,053,000	1,025,000	1.98	2.31	2.31
Prod.	11,800	11.5	5,880	12,420	10,690	443,000	422,000	1.25	1.51	1.63

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 +/- 19,100'; 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.

DRILLING PROGRAM

Operator:
LEGACY RESERVES OPERATING LP

Project Name:
LEA UNIT 200H

Project Location:
Lea County, New Mexico

Prepared By:
Matt Dickson
Drilling Engineer

Submitted To:
Bureau of Land Management
Carlsbad Field Office

Please address inquiries, questions, scheduling of meetings and deficiency statements, if any, to Scott St. John and/or Monica Smith Griffin at the address shown below:

Reagan Smith Energy Solutions, Inc.
1219 Classen Drive
Oklahoma City, OK 73103
405-286-9326

sstjohn@rsenergysolutions.com msmith@rsenergysolutions.com

1.0 Drilling Program

1.1 Estimated Formation Tops

FORMATION	*TVD @ Surface Loc*	*TVD @ KB*	*TVD @ TD*
Rustler	1,700'	1,728'	1,728'
Yates	3,424'	3,452'	3,452'
Seven Rivers	3,809'	3,837'	3,837'
Queen	4,632'	4,660'	4,660'
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Hydrocarbons	8,191' to TD

1.2.2 State Water Protection Compliance

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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	19,100'	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	19,073	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:

Surface Casing String	
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):

Intermediate Casing String	
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
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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):

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	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:

Intermediate Casing String	
LEAD	
Top of MD	0
Bottom of MD	5300
Cement Type	Class H
Additives	0.2% Retarder, 6.3 H2O GPS
# of SKS	820
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	968
Excess (%)	15%
TAIL	
Top of MD	5300
Bottom of MD	10,700
Cement Type	PVL
Additives	1.3% Salt, 5% Expanding Cement, 0.5% Fluidloss, 0.3% Retarder, 0.1% Antisettling, 0.4 pps Defoamer, 8.621 H2O

	GPS
# of SKS	550
Yield (ft3/sk)	1.62
Density (lbs/gal)	12.6
Volume (ft3)	891
Excess (%)	30%

4-1/2" Production Liner:

Production Casing String	
TAIL	
Top of MD	10,200
Bottom of MD	19,073
Cement Type	50:50 POZ-Class H
Additives	5% Salt, 2% Bentonite, 0.5% Fluidloss, 0.2% Retarder, 0.2% Dispersant, 0.4pps Defoamer, 6.088 H2O GPS
# of SKS	750
Yield (ft3/sk)	1.34
Density (lbs/gal)	14.2
Volume (ft3)	1005
Excess (%)	30%

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	3.5	1.42	4.3
Interm.	5,600	10	2,420	6,870	5,740	1,122,000	1,086,000	1.34	1.97	2.99
Interm. Liner	10,700	9.0	4,730	12,450	11,890	1,053,000	1,025,000	1.98	2.31	2.31
Prod.	11,800	11.5	5,880	12,420	10,690	443,000	422,000	1.25	1.51	1.63

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 +/- 19,100'; 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.

DRILLING PROGRAM

Operator:
LEGACY RESERVES OPERATING LP

Project Name:
LEA UNIT 200H

Project Location:
Lea County, New Mexico

Prepared By:
Matt Dickson
Drilling Engineer

Submitted To:
Bureau of Land Management
Carlsbad Field Office

Please address inquiries, questions, scheduling of meetings and deficiency statements, if any, to Scott St. John and/or Monica Smith Griffin at the address shown below:

Reagan Smith Energy Solutions, Inc.
1219 Classen Drive
Oklahoma City, OK 73103
405-286-9326

sstjohn@rsenergysolutions.com msmith@rsenergysolutions.com

1.0 Drilling Program

1.1 Estimated Formation Tops

FORMATION	*TVD @ Surface Loc*	*TVD @ KB*	*TVD @ TD*
Rustler	1,700'	1,728'	1,728'
Yates	3,424'	3,452'	3,452'
Seven Rivers	3,809'	3,837'	3,837'
Queen	4,632'	4,660'	4,660'
Bell Canyon	5,588'	5,616'	5,616'
Cherry Canyon	6,471'	6,499'	6,499'
Brushy Canyon	7,107'	7,135'	7,135'
Bone Spring	8,191'	8,219'	8,219'
Avalon Shale	8,782'	8,810'	8,810'
1st BS	9,504'	9,532'	9,532'
2nd BS	10,041'	10,069'	10,069'
3rd BS	10,699'	10,727'	10,727'
Wolfcamp	11,009'	11,037'	11,037'
Upper Wolfcamp	11,212'	11,240'	11,240'
Lower Wolfcamp	11,678'	11,698	11,800

Target Formation and Total Depth:

The total depth of the proposed well is approximately 19,100' MD located in the Upper Wolfcamp.

According to New Mexico EMNRD 19.15.15.9 NMAC a well shall be located no closer than 330' feet to a boundary of the unit.

1.2 Estimated Depths of Anticipated Fresh Water, Oil, and Gas

Substance	**Depth**
Fresh Water	0' to 250'
Base of Treatable Water	125'
Hydrocarbons	8,191' to TD

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	19,100'	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	19,073	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:

Surface Casing String	
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):

Intermediate Casing String	
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):

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	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:

Intermediate Casing String	
LEAD	
Top of MD	0
Bottom of MD	5300
Cement Type	Class H
Additives	0.2% Retarder, 6.3 H2O GPS
# of SKS	820
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	968
Excess (%)	15%
TAIL	
Top of MD	5300
Bottom of MD	10,700
Cement Type	PVL
Additives	1.3% Salt, 5% Expanding Cement, 0.5% Fluidloss, 0.3% Retarder, 0.1% Antisettling, 0.4 pps Defoamer, 8.621 H2O

	GPS
# of SKS	550
Yield (ft3/sk)	1.62
Density (lbs/gal)	12.6
Volume (ft3)	891
Excess (%)	30%

4-1/2" Production Liner:

Production Casing String	
TAIL	
Top of MD	10,200
Bottom of MD	19,073
Cement Type	50:50 POZ-Class H
Additives	5% Salt, 2% Bentonite, 0.5% Fluidloss, 0.2% Retarder, 0.2% Dispersant, 0.4pps Defoamer, 6.088 H2O GPS
# of SKS	750
Yield (ft3/sk)	1.34
Density (lbs/gal)	14.2
Volume (ft3)	1005
Excess (%)	30%

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	3.5	1.42	4.3
Interm.	5,600	10	2,420	6,870	5,740	1,122,000	1,086,000	1.34	1.97	2.99
Interm. Liner	10,700	9.0	4,730	12,450	11,890	1,053,000	1,025,000	1.98	2.31	2.31
Prod.	11,800	11.5	5,880	12,420	10,690	443,000	422,000	1.25	1.51	1.63

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 +/- 19,100'; 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.

DRILLING PROGRAM

Operator:
LEGACY RESERVES OPERATING LP

Project Name:
LEA UNIT 200H

Project Location:
Lea County, New Mexico

Prepared By:
Matt Dickson
Drilling Engineer

Submitted To:
Bureau of Land Management
Carlsbad Field Office

Please address inquiries, questions, scheduling of meetings and deficiency statements, if any, to Scott St. John and/or Monica Smith Griffin at the address shown below:

Reagan Smith Energy Solutions, Inc.
1219 Classen Drive
Oklahoma City, OK 73103
405-286-9326

sstjohn@rsenergysolutions.com msmith@rsenergysolutions.com

1.0 Drilling Program

1.1 Estimated Formation Tops

FORMATION	*TVD @ Surface Loc*	*TVD @ KB*	*TVD @ TD*
Rustler	1,700'	1,728'	1,728'
Yates	3,424'	3,452'	3,452'
Seven Rivers	3,809'	3,837'	3,837'
Queen	4,632'	4,660'	4,660'
Bell Canyon	5,588'	5,616'	5,616'
Cherry Canyon	6,471'	6,499'	6,499'
Brushy Canyon	7,107'	7,135'	7,135'
Bone Spring	8,191'	8,219'	8,219'
Avalon Shale	8,782'	8,810'	8,810'
1st BS	9,504'	9,532'	9,532'
2nd BS	10,041'	10,069'	10,069'
3rd BS	10,699'	10,727'	10,727'
Wolfcamp	11,009'	11,037'	11,037'
Upper Wolfcamp	11,212'	11,240'	11,240'
Lower Wolfcamp	11,678'	11,698	11,800

Target Formation and Total Depth:

The total depth of the proposed well is approximately 19,100' MD located in the Upper Wolfcamp.

According to New Mexico EMNRD 19.15.15.9 NMAC a well shall be located no closer than 330' feet to a boundary of the unit.

1.2 Estimated Depths of Anticipated Fresh Water, Oil, and Gas

Substance	**Depth**
Fresh Water	0' to 250'
Base of Treatable Water	125'
Hydrocarbons	8,191' to TD

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	19,100'	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	19,073	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:

Surface Casing String	
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):

Intermediate Casing String	
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):

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	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:

Intermediate Casing String	
LEAD	
Top of MD	0
Bottom of MD	5300
Cement Type	Class H
Additives	0.2% Retarder, 6.3 H2O GPS
# of SKS	820
Yield (ft3/sk)	1.18
Density (lbs/gal)	15.6
Volume (ft3)	968
Excess (%)	15%
TAIL	
Top of MD	5300
Bottom of MD	10,700
Cement Type	PVL
Additives	1.3% Salt, 5% Expanding Cement, 0.5% Fluidloss, 0.3% Retarder, 0.1% Antisettling, 0.4 pps Defoamer, 8.621 H2O

	GPS
# of SKS	550
Yield (ft3/sk)	1.62
Density (lbs/gal)	12.6
Volume (ft3)	891
Excess (%)	30%

4-1/2" Production Liner:

Production Casing String	
TAIL	
Top of MD	10,200
Bottom of MD	19,073
Cement Type	50:50 POZ-Class H
Additives	5% Salt, 2% Bentonite, 0.5% Fluidloss, 0.2% Retarder, 0.2% Dispersant, 0.4pps Defoamer, 6.088 H2O GPS
# of SKS	750
Yield (ft3/sk)	1.34
Density (lbs/gal)	14.2
Volume (ft3)	1005
Excess (%)	30%

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	3.5	1.42	4.3
Interm.	5,600	10	2,420	6,870	5,740	1,122,000	1,086,000	1.34	1.97	2.99
Interm. Liner	10,700	9.0	4,730	12,450	11,890	1,053,000	1,025,000	1.98	2.31	2.31
Prod.	11,800	11.5	5,880	12,420	10,690	443,000	422,000	1.25	1.51	1.63

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 +/- 19,100'; 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.

APD ID: 10400031426 **Submission Date:** 06/22/2018

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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:

200H_Location_Verification_Map_03_21_18_20180622133016.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:

One_Mile_Radius_Plat_20180622133041.pdf

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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: FEDERAL

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: 32.695213 **Source longitude:** -103.371185

Source datum: NAD83

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

Water source and transportation map:

Lea_Unit_Water_Sources__Lower__20180622134757.pdf
Water_Transportation_Plat_20180622134835.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: CONSTRUCTION MATERIALS: CALICHE WILL BE USED TO CONSTRUCT THISWELL PAD Any construction material that may be required for surfacing of the drill pad will be from a contractor having a permitted source of materials within the general area. No construction materials will be removed from Federal lands without prior approval from the appropriate surface management agency. See attached for source information.
Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

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

Amount of waste: 20000 barrels

Waste disposal frequency : Daily

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

Safe containmant attachment:

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

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

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

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

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

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:** 200H

Section 9 - Well Site Layout

Well Site Layout Diagram:

200H_Well_Pad_Plat_03_21_18_20180622135255.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: No New Surface Disturbance **Multiple Well Pad Name:** LEA UNIT 100H

Multiple Well Pad Number: 7

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

Disturbance Comments: Existing pipeline & lease road will be utilized.

Reconstruction method: Final reclamation to achieve restoration of the original landform and a natural vegetative community. The original landform will be restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.

Topsoil redistribution: Topsoil will be redistributed after the well pad has been returned to original contours, or as close as practical.

Soil treatment: No soil treatment will be needed.

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre: **Proposed seeding season:**

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

Operator Name: LEGACY RESERVES OPERATING LP

Well Name: LEA UNIT **Well Number:** 200H

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: BUREAU OF LAND MANAGEMENT

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:**

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 #54H, Lea Unit #55H, and Lea Unit #56H pad. The Lea Unit 200H is located on this same well pad.

Other SUPO Attachment

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

09/18/2018

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001015

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: