

District I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720  
District II  
811 S. First St., Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

NM OIL CONSERVATION DIVISION

ARTESIA DISTRICT  
SEP 21 2017

Form C-102

Issued August 1, 2011

Submit one copy to appropriate

District Office

AMENDED REPORT

RECEIVED

WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number <b>30-015-44097</b>	<sup>2</sup> Pool Code <b>98199</b>	<sup>3</sup> Pool Name <b>PARKWAY; BONE SPRING, WEST</b>
<sup>4</sup> Property Code <b>317514</b>	<sup>5</sup> Property Name <b>EMERALD PWU 20-22</b>	<sup>6</sup> Well Number <b>12H</b>
<sup>7</sup> OGRID No. <b>6137</b>	<sup>8</sup> Operator Name <b>DEVON ENERGY PRODUCTION COMPANY, L.P.</b>	<sup>9</sup> Elevation <b>3313.8</b>

<sup>10</sup> Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>M</b>	<b>20</b>	<b>19 S</b>	<b>29 E</b>		<b>15</b>	<b>SOUTH</b>	<b>265</b>	<b>WEST</b>	<b>EDDY</b>

<sup>11</sup> Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>N</b>	<b>22</b>	<b>19 S</b>	<b>29 E</b>		<b>425</b>	<b>SOUTH</b>	<b>2425</b>	<b>WEST</b>	<b>EDDY</b>

<sup>12</sup> Dedicated Acres <b>960</b>	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No. <b>R-14188</b>
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

<p><b>" OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or undivided mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Erin Workman</i> 09/21/2017</p> <p>Signature _____ Date _____</p> <p><b>Erin Workman</b></p> <p>Printed Name _____</p> <p><b>Erin.workman@dvn.com</b></p> <p>E-mail Address _____</p>	<p><b>18 SURVEYOR CERTIFICATION</b></p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>SEPTEMBER 21 2017</p> <p>Date of Survey _____</p> <p>Signature and Seal of Professional Surveyor: <i>Filimon F. Jaramillo</i></p> <p>Certificate Number: <b>FILIMON F. JARAMILLO, PLS 12797</b></p> <p>SURVEY NO. 5145D</p>
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**Project Area**

**Producing Area 330'**

**From Exterior**

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83) BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD83.

SECTION CORNER  
LAT. = 32.6536028°N  
LONG. = 104.0883657°W  
NWSP EAST (FT)  
N = 601599.76  
E = 611427.11

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LONG. = 104.0970017°W  
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LONG. = 104.0711884°W  
NWSP EAST (FT)  
N = 601586.25  
E = 622018.36

NE CORNER SEC. 22  
LAT. = 32.6534311°N  
LONG. = 104.0540526°W  
NWSP EAST (FT)  
N = 601582.23  
E = 627291.75

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LONG. = 104.0711884°W  
NWSP EAST (FT)  
N = 601586.25  
E = 622018.36

NE CORNER SEC. 22  
LAT. = 32.6534311°N  
LONG. = 104.0540526°W  
NWSP EAST (FT)  
N = 601582.23  
E = 627291.75

N/4 CORNER SEC. 21  
LAT. = 32.653536°N  
LONG. = 104.0797751°W  
NWSP EAST (FT)  
N = 601586.93  
E = 619375.01

N/4 CORNER SEC. 22  
LAT. = 32.6534953°N  
LONG. = 104.0626278°W  
NWSP EAST (FT)  
N = 601575.11  
E = 624652.56

SECTION CORNER  
LAT. = 32.6536028°N  
LONG. = 104.0883657°W  
NWSP EAST (FT)  
N = 601599.76  
E = 611427.11

N/4 CORNER SEC. 20  
LAT. = 32.6536028°N  
LONG. = 104.0970017°W  
NWSP EAST (FT)  
N = 601599.76  
E = 611427.11

NE CORNER SEC. 21  
LAT. = 32.6535396°N  
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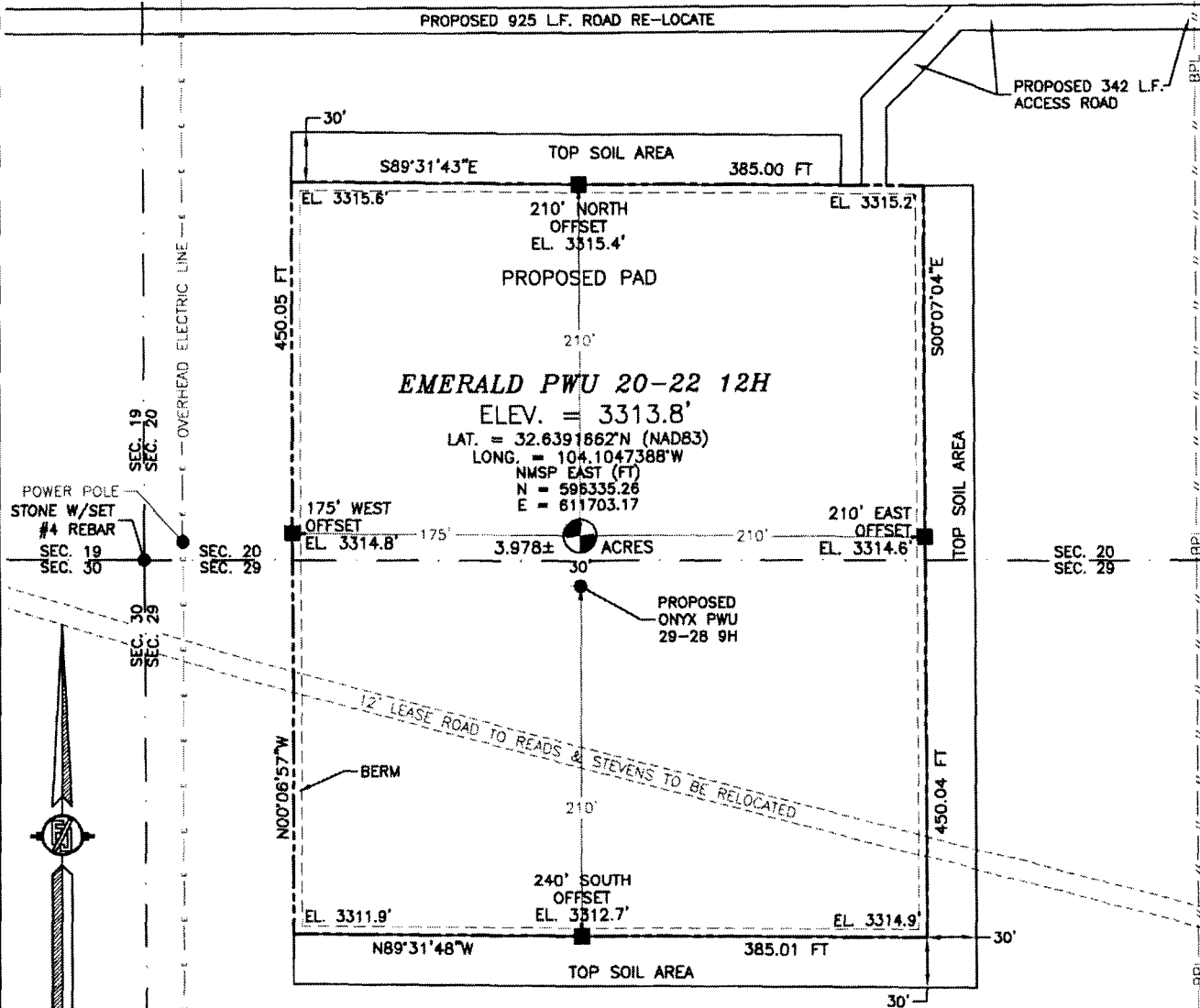
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N/4 CORNER SEC. 21  
LAT. = 32.653536°N  
LONG. = 104.0797751°W  
NWSP EAST (FT)  
N = 601586.93  
E =

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
SITE MAP

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.



010 50 100 200  
SCALE 1" = 100'

DIRECTIONS TO LOCATION  
FROM CR. 235 (CURRY COMB) AND CR. 258 (MILLMAN) GO  
EAST-SOUTHEAST ON CR. 235 4.4 MILES, TURN RIGHT ON CALICHE  
ROAD GO SOUTH 1/2 MILES TO STAKED ROAD ON RIGHT, FOLLOW  
FLAGS WEST ABOUT 342 FT. TO NORTHEAST CORNER OF PROPOSED  
PAD.

DEVON ENERGY PRODUCTION COMPANY, L.P.  
EMERALD PWU 20-22 12H  
LOCATED 15 FT. FROM THE SOUTH LINE  
AND 265 FT. FROM THE WEST LINE OF  
SECTION 20, TOWNSHIP 19 SOUTH,  
RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

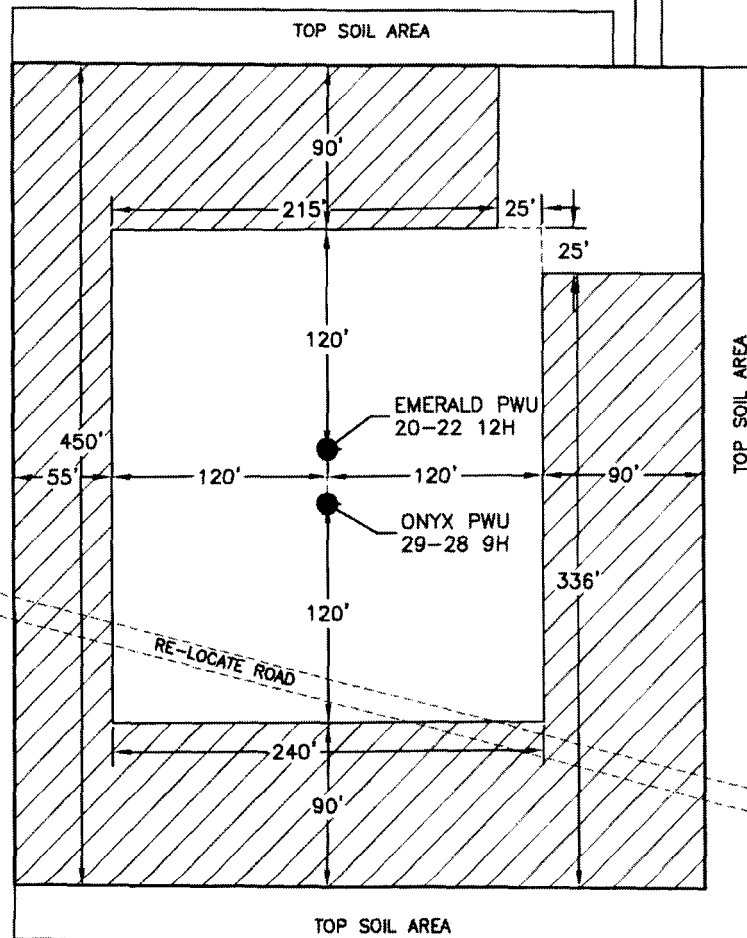
SURVEY NO. 5145D

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

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
INTERIM SITE RECLAMATION

PROPOSED 925 L.F. ROAD RE-LOCATE

PROPOSED 342 L.F.  
ACCESS ROAD



 DENOTES  
RECLAMATION AREA  
2.206± ACRES RECLAMATION AREA



010 50 100 200  
SCALE 1" = 100'

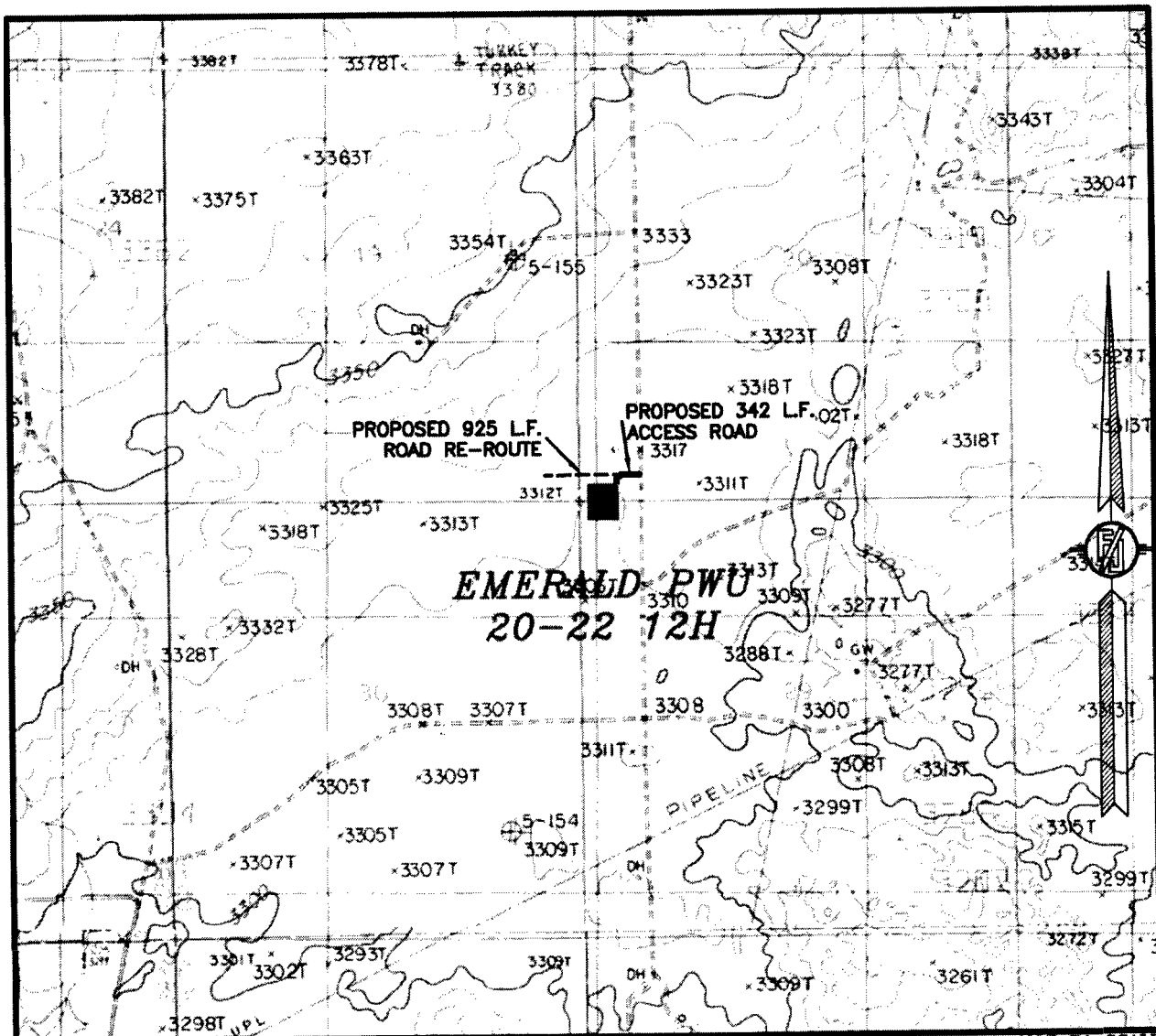
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EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

SURVEY NO. 5145D

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

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
LOCATION VERIFICATION MAP



USGS QUAD MAP:  
ILLINOIS CAMP NE

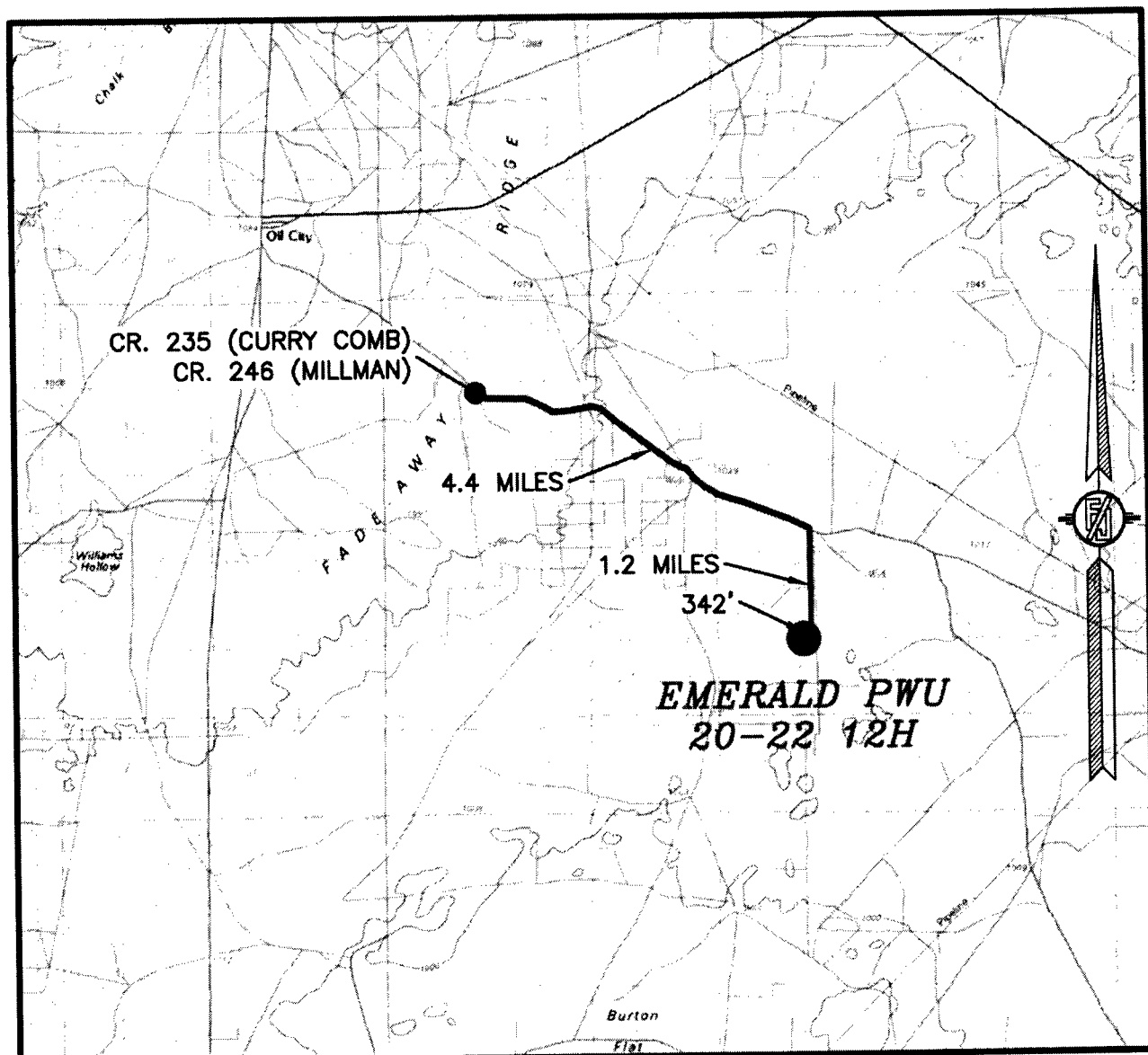
NOT TO SCALE

DEVON ENERGY PRODUCTION COMPANY, L.P.  
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AND 265 FT. FROM THE WEST LINE OF  
SECTION 20, TOWNSHIP 19 SOUTH,  
RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

MADRON SURVEYING, INC. 301 SOUTH CANAL CARLSBAD, NEW MEXICO  
(575) 234-3341 SURVEY NO. 5145D

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
VICINITY MAP



DISTANCES IN MILES

NOT TO SCALE

**DIRECTIONS TO LOCATION**  
FROM CR. 235 (CURRY COMB) AND CR. 256 (MILLMAN) GO EAST-SOUTHEAST ON CR. 235 4.4 MILES, TURN RIGHT ON CALICHE ROAD GO SOUTH 1.2 MILES TO STAKED ROAD ON RIGHT, FOLLOW FLAGS WEST ABOUT 342 FT. TO NORTHEAST CORNER OF PROPOSED PAD.

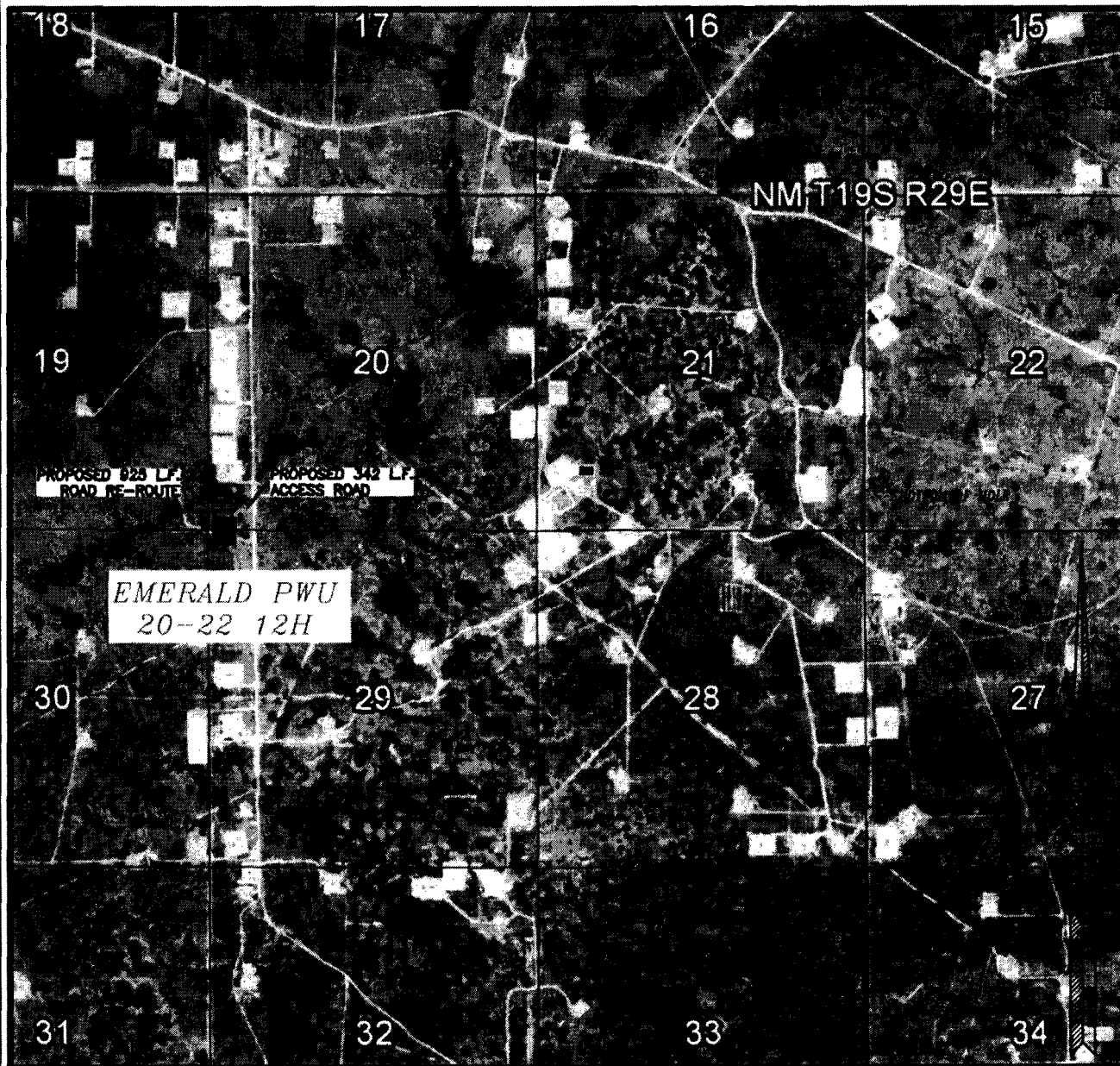
**DEVON ENERGY PRODUCTION COMPANY, L.P.**  
**EMERALD PWU 20-22 12H**  
LOCATED 15 FT. FROM THE SOUTH LINE  
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SECTION 20, TOWNSHIP 19 SOUTH,  
RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

MADRON SURVEYING, INC. 301 SOUTH CANAL CARLSBAD, NEW MEXICO  
(575) 234-3341 SURVEY NO. 5145D

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

## AERIAL PHOTO



NOT TO SCALE  
AERIAL PHOTO:  
GOOGLE EARTH  
MAR. 2016

DEVON ENERGY PRODUCTION COMPANY, L.P.  
**EMERALD PWU 20-22 12H**  
LOCATED 15 FT. FROM THE SOUTH LINE  
AND 265 FT. FROM THE WEST LINE OF  
SECTION 20, TOWNSHIP 19 SOUTH,  
RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

SURVEY NO. 5145D

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

SECTION 20, TOWNSHIP 19 SOUTH, RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
AERIAL ACCESS ROUTE MAP



NOT TO SCALE  
AERIAL PHOTO:  
GOOGLE EARTH  
MAR. 2016

DEVON ENERGY PRODUCTION COMPANY, L.P.  
EMERALD PWU 20-22 12H  
LOCATED 15 FT. FROM THE SOUTH LINE  
AND 265 FT. FROM THE WEST LINE OF  
SECTION 20, TOWNSHIP 19 SOUTH,  
RANGE 29 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

SEPTEMBER 21, 2017

SURVEY NO. 5145D

MADRON SURVEYING, INC. 301 SOUTH CANAL  
(575) 234-3341

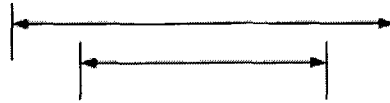
CARLSBAD, NEW MEXICO

**Well Completion Diagram**

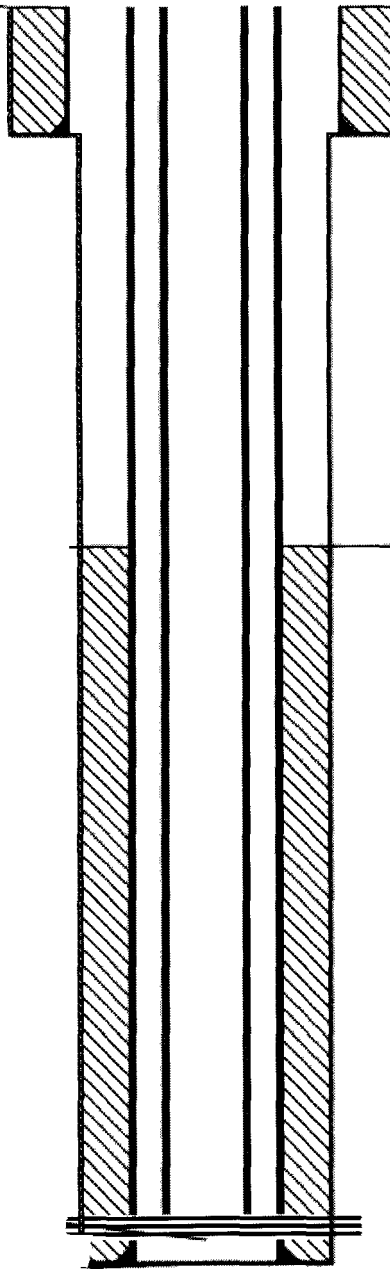
<b>Owner:</b>		<b>API Well No.:</b> (	LP	<b>Well Name:</b>	
<b>County:</b>		<b>Field:</b>		<b>Pool:</b>	
<b>Coordinates: X</b>	659 FEL	<b>; Y</b>		<b>Sec:</b> 24	<b>Twp:</b> 3N <b>Rng:</b> 68W

Note: Changes to the drawing do not effect the database

Bore Diameters (in.)



Cement Top: 0' mthd U





## Devon Energy, Emerald 20-22 12H

### 1. Geologic Formations

TVD of target	9,042'	Pilot hole depth	N/A
MD at TD:	21,633'	Deepest expected fresh water:	

### Basin

Formation	Depth (ft)	Thickness (ft)	Remarks
Top of Salt	439		
Base of Salt	900		
Delaware	2920		
Bone Spring	4520		
1BSSS	6752		
2BSLM	6891		
2BSSS	7486		
3BSLM	7842		
3BSSS	8609		
G Sand Target	8931		
WFMP	9006		

\*H2S, water flows, loss of circulation, abnormal pressures, etc.

## Devon Energy, Emerald 20-22 12H

### 2. Casing Program

Casing Program						
24"	0	200'	13.375"	48	H-40	STC
12.25"	0	3,409'	9.625"	36	J-55	LTC
8.75"	0	21,633'	5.5"	17	P-110	BTC
BLM Minimum Safety Factor				Collapse: 1.125	Burst: 1.00	Tension: 1.6 Dry 1.8 Wet

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Must have table for contingency casing

Contingency Casing	
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 <sup>nd</sup> string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

## Devon Energy, Emerald 20-22 12H

### 3. Cementing Program

Casing Size	Length (ft)	Volume (bbl)	Weight (lb)	Volume (cu ft)	Time (hr mn)	Cement Type
13-3/8" Surface						
9-5/8" Inter.						
5-1/2" Prod	689	11	17.88	2.90	19 hr 3 mn	NeoCem
	2840	13.2	7.46	1.47	9 hr 6 mn	NeoCem

If a DV tool is used, depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing Size	Length (ft)	Volume (bbl)
5-1/2" Production Casing	2450'	10%

**4. Pressure Control Equipment**

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
---	--

BOP Designation	Size	Area	Type	Pressure
12-1/4"	13-5/8"	3M	Annular	x
			Blind Ram	
			Pipe Ram	
			Double Ram	x
			Other*	
8-3/4"	13-5/8"	3M	Annular	x
			Blind Ram	
			Pipe Ram	
			Double Ram	x
			Other*	
			Annular	
			Blind Ram	
			Pipe Ram	
			Double Ram	
			Other*	

\*Specify if additional ram is utilized.

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
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## Devon Energy, Emerald 20-22 12H

Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
Y	Are anchors required by manufacturer?
Y	<p>A multibowl wellhead may be used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.</p> <p>Devon proposes using a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 3000 (3M) psi.</p> <ul style="list-style-type: none"> <li>Wellhead will be installed by wellhead representatives.</li> <li>If the welding is performed by a third party, the wellhead representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal.</li> <li>Wellhead representative will install the test plug for the initial BOP test.</li> <li>Wellhead company will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the pack-off, the pack-off and the lower flange will be tested to 3M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time.</li> <li>If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted.</li> <li>Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating.</li> <li>Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.</li> </ul> <p>After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.</p> <p>After running the 9-5/8' intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 3M will already be installed on the wellhead.</p> <p>The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.</p>

## Devon Energy, Emerald 20-22 12H

	Devon's proposed wellhead manufactures will be FMC Technologies, Cactus Wellhead, or Cameron.
	Devon requests a variance to use a flexible line with flanged ends between the BOP and the choke manifold (choke line). The line will be kept as straight as possible with minimal turns.

### 5. Mud Program

Mud Weight	Mud Type	Mud Volume	Mud Weight	Mud Type	Mud Volume
9,340'	TD	Cut Brine	8.7 – 9.0	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

### 6. Logging and Testing Procedures

Logging	Testing
x	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Additional Logs		Additional Tests
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
X	CBL	Production casing
	Mud log	Intermediate shoe to TD
	PEX	

## Devon Energy, Emerald 20-22 12H

### 7. Drilling Conditions

Condition	Specify the condition and value?
BH Pressure at deepest TVD	4231 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe. Lost circulation material/sweeps/mud scavengers.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

N	H2S is present
Y	H2S Plan attached

### 8. Other facets of operation

Is this a walking operation? No

Will be pre-setting casing? Yes

Attachments

☒ Directional Plan

☐ Other, describe

## Devon Energy, Emerald 20-22 12H

### 1. Geologic Formations

TVD of target	9,042'	Pilot hole depth	N/A
MD at TD:	21,633'	Deepest expected fresh water:	

### Basin

Formation	Depth (ft)	Thickness (ft)	Notes
Top of Salt	439		
Base of Salt	900		
Delaware	2920		
Bone Spring	4520		
1BSSS	6752		
2BSLM	6891		
2BSSS	7486		
3BSLM	7842		
3BSSS	8609		
G Sand Target	8931		
WFMP	9006		

\*H2S, water flows, loss of circulation, abnormal pressures, etc.



## Devon Energy, Emerald 20-22 12H

### 2. Casing Program

24"	0	200'	13.375"	48	H-40	STC
12.25"	0	3,409'	9.625"	36	J-55	LTC
8.75"	0	21,633'	5.5"	17	P-110	BTC
BLM Minimum Safety Factor				Collapse: 1.125	Burst: 1.00	Tension: 1.6 Dry 1.8 Wet

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Must have table for contingency casing

Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
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(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

## Devon Energy, Emerald 20-22 12H

### 3. Cementing Program

Cementing Location	Cement Volume (bbl)	Cement Weight (lb)	Cement Density (lb/bbl)	Cement Grade	Cementing Depth (ft)	Cementing Method
13-3/8" Surface						
9-5/8" Inter.						
5-1/2" Prod	689	11	17.88	2.90	19 hr 3 mn	NeoCem
	2840	13.2	7.46	1.47	9 hr 6 mn	NeoCem

If a DV tool is used, depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Cementing Location	Cementing Depth (ft)	Cementing Method
5-1/2" Production Casing	2450'	10%

#### 4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
---	--

Wellbore Casing Size		Wellbore Casing Depth	Wellbore Casing Type	Wellbore Casing Pressure	Wellbore Casing Test Pressure
12-1/4"	13-5/8"	3M	Annular	x	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		
			Annular		
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		

\*Specify if additional ram is utilized.

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Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
Y	Are anchors required by manufacturer?
Y	<p>A multibowl wellhead may be used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.</p> <p>Devon proposes using a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 3000 (3M) psi.</p> <ul style="list-style-type: none"> <li>• Wellhead will be installed by wellhead representatives.</li> <li>• If the welding is performed by a third party, the wellhead representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal.</li> <li>• Wellhead representative will install the test plug for the initial BOP test.</li> <li>• Wellhead company will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the pack-off, the pack-off and the lower flange will be tested to 3M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time.</li> <li>• If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted.</li> <li>• Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating.</li> <li>• Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.</li> </ul> <p>After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.</p> <p>After running the 9-5/8" intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 3M will already be installed on the wellhead.</p> <p>The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.</p>

## Devon Energy, Emerald 20-22 12H

	Devon's proposed wellhead manufactures will be FMC Technologies, Cactus Wellhead, or Cameron.
	Devon requests a variance to use a flexible line with flanged ends between the BOP and the choke manifold (choke line). The line will be kept as straight as possible with minimal turns.

### 5. Mud Program

Depth	Fluid	Weight	Viscosity	Water Loss
9,340'	TD	Cut Brine	8.7 – 9.0	28-34
				N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

### 6. Logging and Testing Procedures

Logging	Logging and Testing
x	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Logging		Logging and Testing
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
X	CBL	Production casing
	Mud log	Intermediate shoe to TD
	PEX	

## Devon Energy, Emerald 20-22 12H

### 7. Drilling Conditions

Formation	
BH Pressure at deepest TVD	4231 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe. Lost circulation material/sweeps/mud scavengers.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H2S is present
Y	H2S Plan attached

### 8. Other facets of operation

Is this a walking operation? No

Will be pre-setting casing? Yes

Attachments

☒ Directional Plan

☐ Other, describe

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devon

## Emerald 20-22 12H - Re-Entry

County Eddy

Rig Cactus 167

API

WBS

Top of Salt	439	461
Base of Salt	900	2020
Delaware	2920	1600
Bone Spring	4520	2232
1BSSS	6752	139
2BLSM	6891	595
2BSSS	7486	356
3BLSM	7842	767
3BSSS	8609	322
G Sand Target	8931	75
WFMP	9006	

Hole: 20  
MD: 200

Hole: 12.25  
MD: 3,409

## Casing Program:

Section	Size	Weight	Grade	Conn	Top	Shoe (APD)	Shoe (Plan)
Surface	13 3/8	54.5	J-55	BTC	0	200	200
Intermediate	9 5/8	36	J-55	LTC	0	3,450	3,409
Production	5 1/2	17	P110RY	CDC HTQ	0	21,714	21,657

## Casing Mechanical Specifications:

Size	Collapse	Burst	Jt Yield	Min	Opt	Max	ID	Drift
13 3/8	1130	2740	853		13380		12.615	12.459
9 5/8	2020	3520		2718	3624	4530	8.921	8.765
5 1/2	7460	10640	568	10000	12500	14000	4.892	4.767

## Cementing Program:

Section	Slurry	Top	Sacks	Gauge Vol (BBL)	Excess Vol (BBL)	Tot Vol w/ Excess (BBL)	Density (PPG)	Excess
Surface	Tail	Surf						
Inter	Lead	Surf						
	Tail	2409.0						
Prod	Lead	9092.7	19711.0	397	9092.7	9208.3	10.5	0%
	Tail	18823.0	550.2	115.6	115.6		14.5	0%

\*Cement volumes are rough estimates. Use volumes provided in cement proposals

## Production Lateral

Cut Brine

8.4 - 9.0 PPG

35 FV

15 API FL

KOP:  
MD 8,363  
TVD 8,341

Top of Lead in Annulus  
MD 9,093

Top of Tail in Annulus  
MD 18,823

TD:  
MD 21,657  
TVD 9,058

LP:  
MD 9,449  
TVD 8,959

Hole Size (Int CSG - LP): 8.5

Top of Tail in Casing  
MD 10,407

Hole Size (LP - TD): 8.5

**Emerald PWU 20-22 12H**  
**30-015-44097**

**NM OIL CONSERVATION**  
ARTESIA DISTRICT  
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**Remediation plan:**

- 9/22 – Skid rig from Onyx PWU 29-28 9H to Emerald PWU 20-22 12H
- Cut casing at base of curve
- Pull 5.5" casing out of the hole
- Conduct open hole sidetrack at base of curve
- Re-drill lateral
- Run 5.5" 17 PPF P-110 CDC HTQ production casing
- Cement production casing



# NM OIL CONSERVATION

ARTESIA DISTRICT

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## Devon Energy

Project: Eddy County, NM (NAD-83)  
Site: Emerald PWU 20-22  
Well: 12H  
Wellbore: ST01  
Design: Plan #1

3313.8' GE + 23.5' KB @ 3337.30usft  
Ground Level: 3313.80



Azimuths to Grid North  
True North: -0.12°  
Magnetic North: 7.29°

Magnetic Field  
Strength: 48176.8nT  
Dip Angle: 60.50°  
Date: 9/8/2017  
Model: HDGM

PROJECT DETAILS: Eddy County, NM (NAD-83)

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone

Datum: 3313.8' GE + 23.5' KB @ 3337.30usft

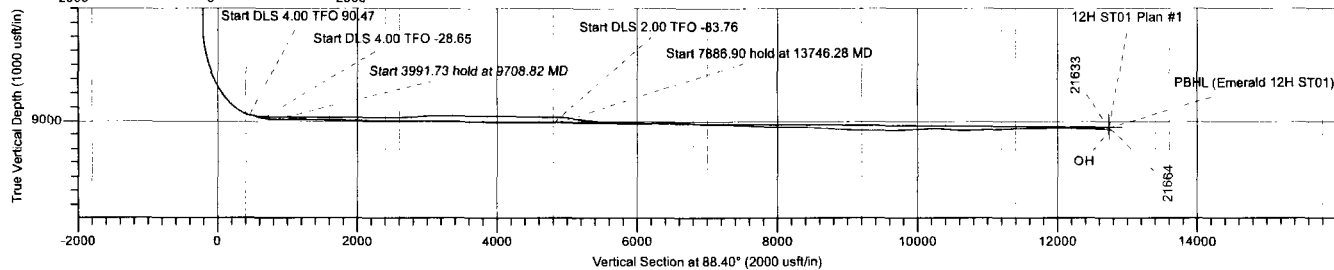
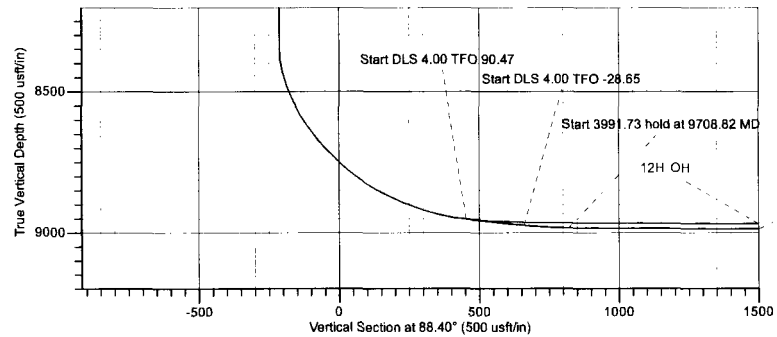
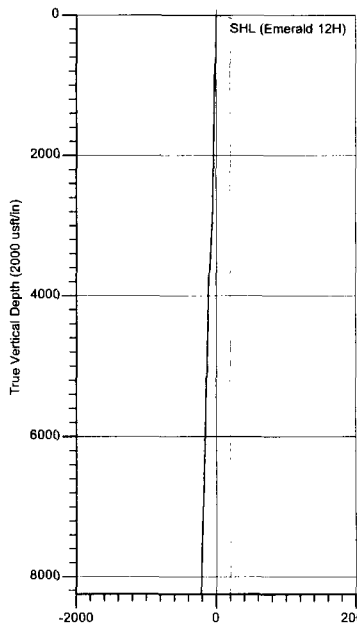


### SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
9340.00	83.97	85.66	8951.69	424.44	441.84	0.00	0.00	453.50
9547.24	83.97	94.00	8973.49	425.04	847.75	4.00	90.47	859.35
9708.82	89.65	90.91	8982.48	418.15	808.85	4.00	-28.65	820.19
13700.55	89.65	90.91	9007.00	355.00	4800.00	0.00	0.00	4808.03
13746.28	89.75	90.00	9007.24	354.64	4845.72	2.00	-83.76	4853.73
21633.18	89.75	90.00	9042.00	355.00	12732.55	0.00	0.00	12737.50

### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
PBHL (Emerald 12H ST01)	9042.00	355.00	12732.55	32° 38' 24.215 N	104° 3' 48.141 W
SHL (Emerald 12H)	0.00	0.00	0.00	32° 38' 20.998 N	104° 6' 17.060 W



LEAM DRILLING SYSTEMS LLC  
2010 East Davis, Conroe, Texas 77301  
Phone: 936/756-7577, Fax: 936/756-7595

Plan: Plan #1 (12H/ST01)  
Emerald PWU 20-22  
Created By: Dustin Ault  
Date: 11-23, September 08 2017  
Approved: \_\_\_\_\_  
Date: \_\_\_\_\_

## Devon Energy

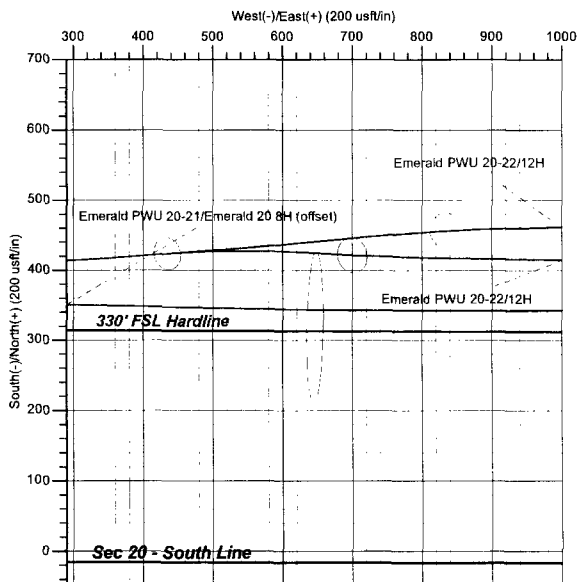
Project: Eddy County, NM (NAD-83)  
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Azimuths to Grid North  
True North: -0.12°  
Magnetic North: 7.29°

Magnetic Field  
Strength: 48176.8 nT  
Dip Angle: 60.50°  
Date: 9/8/2017  
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Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone

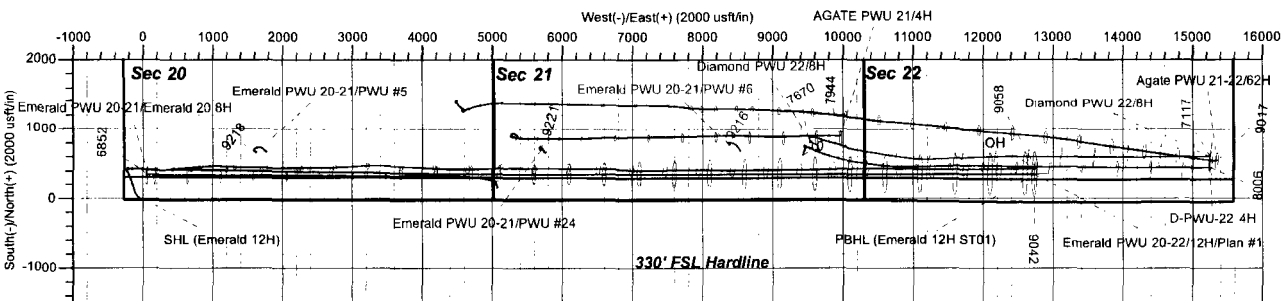


### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL (Emerald 12H)	0.00	0.00	0.00	596335.26	611703.17	32° 38' 20.998 N	104° 6' 17.060 W
PBHL (Emerald 12H ST01)	9042.00	355.00	12732.55	596890.26	624435.72	32° 38' 24.215 N	104° 3' 48.141 W

### SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
9340.00	83.97	85.66	8951.69	424.44	441.84	0.00	0.00	453.50
9547.24	83.97	94.00	8973.49	425.04	647.75	4.00	90.47	659.35
9708.82	89.65	90.91	8982.48	418.15	808.85	4.00	-28.65	820.19
13700.55	89.65	90.91	9007.00	355.00	4800.00	0.00	0.00	4808.03
13746.28	89.75	90.00	9007.24	354.64	4845.72	2.00	-83.78	4853.73
21633.18	89.75	90.00	9042.00	355.00	12732.55	0.00	0.00	12737.50



LEAM DRILLING SYSTEMS LLC  
2010 East Davis, Conroe, Texas 77301  
Phone: 936/756-7577, Fax 936/756-7595

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Date: \_\_\_\_\_