

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 Bruzos 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

ARTESIA DISTRICT

Form C-102

Revised August 1, 2011

AUG 28 2015 submit one copy to appropriate

District Office

RECEIVED

☐ AMENDED REPORT

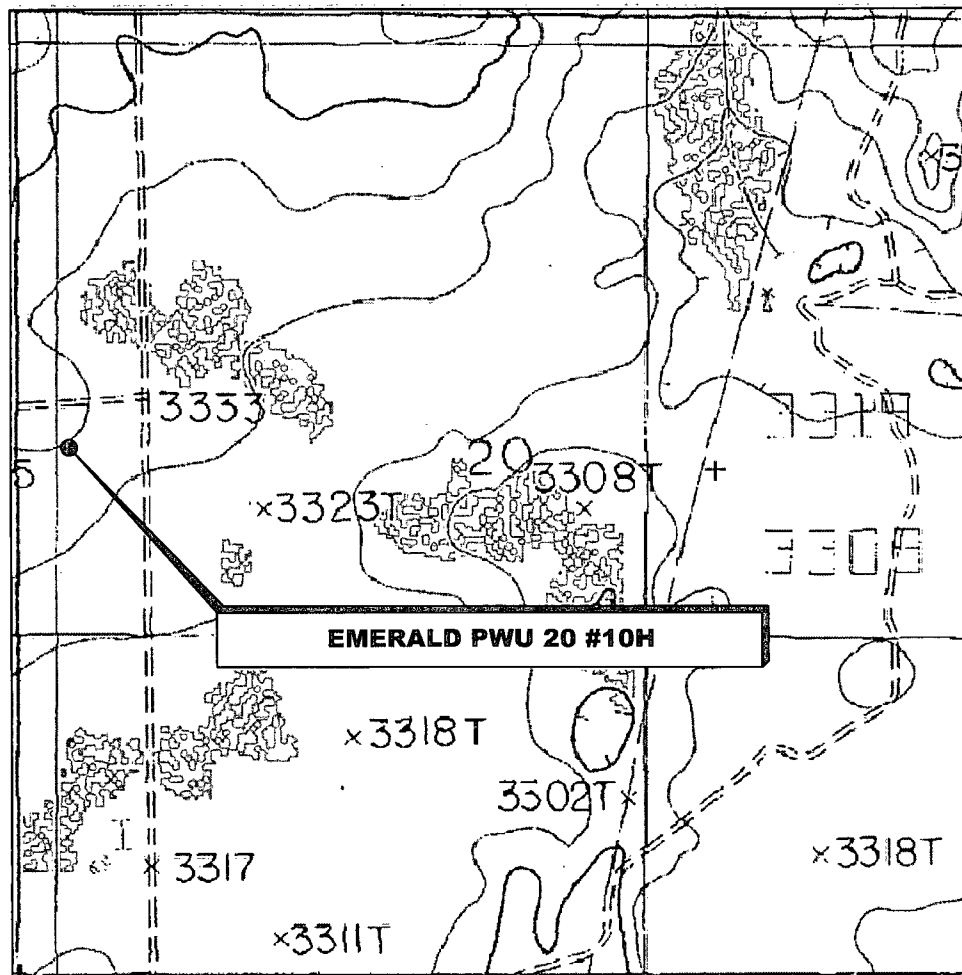
WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-43322		² Pool Code 55510		³ Pool Name Scanlon Draw; Bone Spring	
⁴ Property Code 38436		⁵ Property Name EMERALD PWU 20			⁶ Well Number 10H
⁷ GRID NO. 6137		⁸ Operator Name DEVON ENERGY PRODUCTION CO., L.P.			⁹ Elevation 3339'
¹⁰ Surface Location					
UL or lot no. E	Section 20	Township 19S	Range 29E	Lot Idn	Feet from the 2394
				North/South line NORTH	Feet From the 283
				East/West line WEST	County EDDY
¹¹ Bottom Hole Location If Different From Surface					
UL or lot no. H	Section 20	Township 19S	Range 29E	Lot Idn	Feet from the 2270
				North/South line NORTH	Feet from the 270
				East/West line EAST	County EDDY
¹² Dedicated Acres 160.00		¹³ Joint or Infill		¹⁴ Consolidation Code	
				¹⁵ Order No.	

No allowable will be assigned to this completion until all interest have been consolidated or a non-standard unit has been approved by the division.

¹⁶ C S 89°50'39" E 2646.55' D N 89°57'12" E 2658.56' E		¹⁷ 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 <u>Linda Good</u> Date <u>8/21/2015</u> Printed Name <u>Linda Good</u> E-mail Address <u>linda.good@dmn.com</u>
GEODETIC DATA NAD 83 GRID - NM EAST SURFACE LOCATION N 599206.7 - E 611715.5 LAT: 32.64705887° N LONG: 104.10467866° W BOTTOM HOLE N 599325.2 - E 616458.4 LAT: 32.64735552° N LONG: 104.08926849° W S. L. N 88°34'09" E (GRID) 4745.50' (HORIZ.) B. H.		
CORNER DATA NAD 83 GRID - NM EAST A: FOUND LIMESTONE ROCK N 596321.1 - E 611438.5 B: FOUND LIMESTONE ROCK 12"x4"x4.5" N 598960.3 - E 611433.1 C: FOUND 1/2" REBAR N 601599.9 - E 611427.2 D: FOUND 1/2" REBAR N 601592.7 - E 614073.1 E: FOUND 1/2" REBAR N 601594.9 - E 616731.0 F: FOUND LIMESTONE ROCK 11"x4.5"x6.5" N 598952.1 - E 616727.9 G: FOUND RAILROAD SPIKE N 596311.3 - E 616734.9 H: FOUND LIMESTONE ROCK 7"x8"x3" N 596312.9 - E 614091.7		
2640.26' 2394' N 00°07'47" W 2643.41' 2270' 270' 283' 20 2639.80' N 00°07'01" W 2639.80' N 89°49'21" W 2653.86' N 89°57'58" W 2643.78'		
¹⁸ 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. 7-23-2015 Date of Survey Signature and Seal of Professional Surveyor 20451 Certificate Number		

LOCATION VERIFICATION MAP



**SECTION 20, TWP. 19 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY CO., NEW MEXICO**

OPERATOR: Devon Energy Production
Company, L. P.

LEASE: Emerald PWU 20

WELL NO.: 10H

ELEVATION: 3339'

LOCATION: 2394' FNL & 283' FWL

CONTOUR INTERVAL: 10'

USGS TOPO. SOURCE MAP:

Ironhouse Well, NM (P. E. 1984)

Firm No.: TX 10193838 NM 4655451

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NO.	REVISION	DATE
JOB NO.:	LS1507378	
DWG. NO.:	1507378LVM	

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1"=1000'

DATE: 7-27-2015

SURVEYED BY: BK

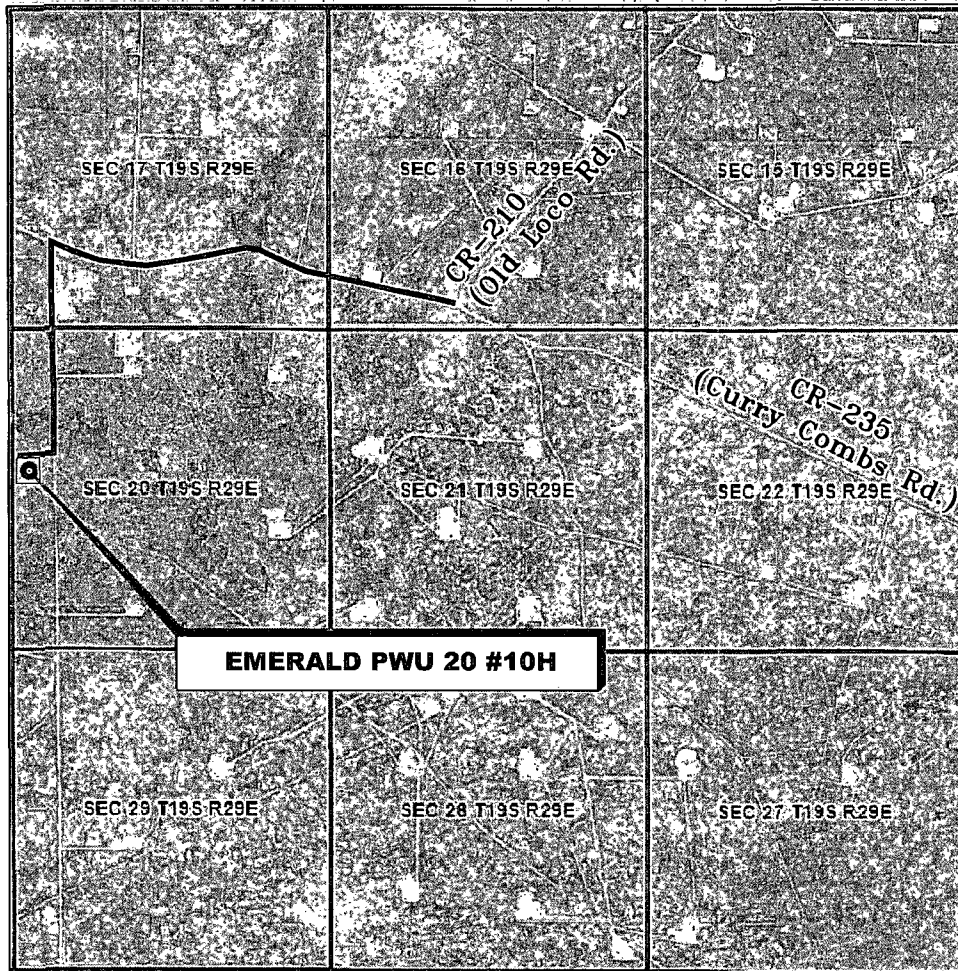
DRAWN BY: CMJ

APPROVED BY: REB

SHEET : 1 OF 5

VICINITY MAP

NOT TO SCALE



*SECTION 20, TWP. 19 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY CO., NEW MEXICO*

OPERATOR: Devon Energy Production
Company, L. P.

LOCATION: 2394' FNL & 283' FWL
ELEVATION: 3339'

LEASE: Emerald PWU 20
WELL NO.: 10H

Firm No.: TX 10193838, NM 4655451

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NO.	REVISION	DATE
JOB NO.: LS1507378		
DWG. NO.: 1507378VM		

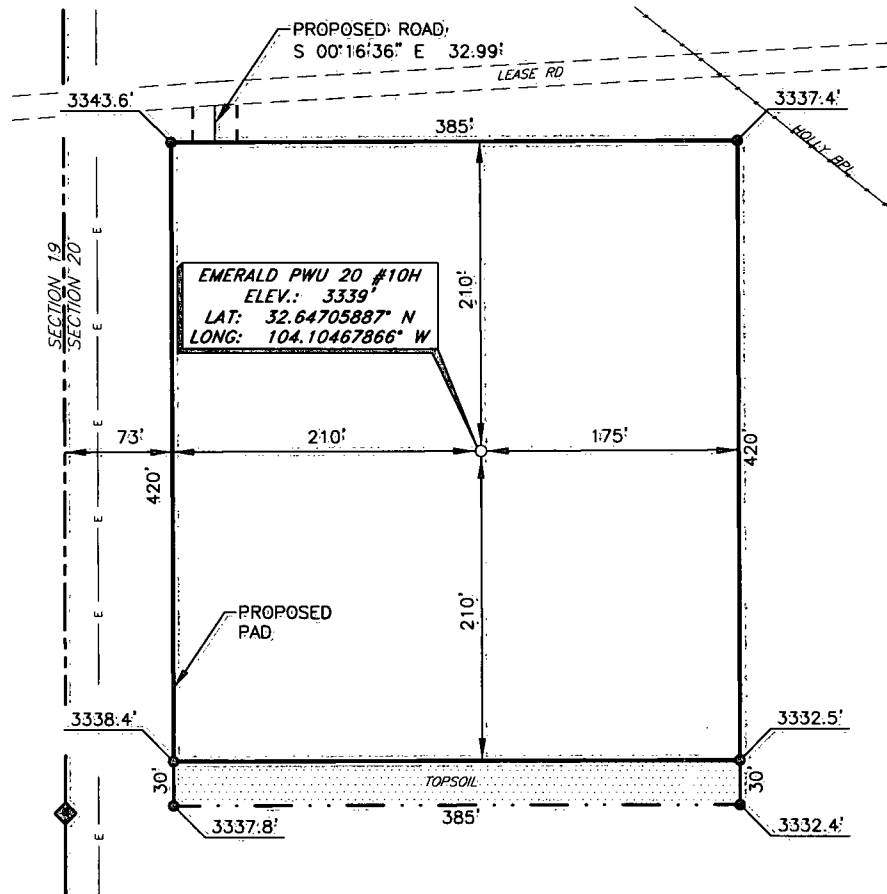
RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: NTS
DATE: 7-27-2015
SURVEYED BY: BK
DRAWN BY: RMH
APPROVED BY: REB
SHEET : 2 OF 5

DEVON ENERGY PRODUCTION CO., LP.

EMERALD PWU 20 #10H
 (2394' FNL & 283' FWL)
 SECTION 20, T19S, R29E,
 N. M. P. M., EDDY COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION:

From the intersection of CR-235 (Curry Combs Rd.) and CR-210 (Old Loco Rd.)
 Go West on CR-235 approx. 1.3 miles to a lease road on the left;
 Turn left and go South approx. 0.7 miles to a lease road on the right;
 Turn right and go West approx. 0.1 miles to a proposed road on the left;
 Turn left and go South approx. 75 feet;
 Location is on the left.

SCALE: 1" = 100'
 0' 50' 100'

BEARINGS ARE
 NAD 27 GRID - NM EAST
 DISTANCES ARE GROUND

Firm No.: TX-10193838 NM-4655451

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NO.	REVISION	DATE
JOB NO.:	LS1507378	
DWG. NO.:	1507378PAD	

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'
DATE: 7-27-2015
SURVEYED BY: BK
DRAWN BY: CMJ
APPROVED BY: REB
SHEET : 3 OF 5

(N 89°46' W - GLO - 5277.36')
 S 89°50'39" E 2646.55' FND 1/2" REBAR
 N 89°57'12" E 2658.56' FND 1/2" REBAR
 S 02°52'01" E 2,154.04' (TIE)
 S 49°19'18" W 3,331.25' (TIE)
 SEE DETAIL A
 EXISTING LEASE ROAD
 EMERALD PWU 20 #10
 FND LIMESTONE ROCK 12"x4"x4.5"
 FND LIMESTONE ROCK 12"x4.5"x6.5"
 FND LIMESTONE ROCK 7"x8"x3"
 FND RR SPIKE
 STATE OF NEW MEXICO
 20
 S. LINE OF EXISTING LEASE ROAD
 N. CORNER OF EMERALD PWU 20 #10H
 0+00.00
 0+32.99
 DETAIL A
 NOT TO SCALE
 EXISTING LEASE ROAD
 30' EASEMENT
 15' TO PIPELINE
 EMERALD PWU 20 #10
 30'
 32.99'
 N 00°03' W - GLO - 5280.00'
 N 00°07'42" W 2640.26'
 N 00°07'01" W 2638.80'
 N 89°49'21" W 2653.86'
 N 89°57'58" W 2643.78'
 S 00°04'01" W 2643.41'
 S 00°02' W - GLO - 5280.00'
 S 00°05'05" E 2641.42'

LINE TABLE		
LINE	BEARING	LENGTH
L1	S 00°16'36" E	32.99'

SCALE: 1" = 1000'

0' 500' 1000'

BEARINGS ARE NAD 83
NM EAST & DISTANCES ARE
HORIZ. GROUND.

() RECORD DATA - GLO
FOUND MONUMENT
AS NOTED
PROPOSED EASEMENT

I, Richard E Brooks, a New Mexico Professional Surveyor, do hereby certify that the plat shown hereon accurately depicts the conditions on the ground at the time of the survey; that all work was done under my direct supervision and meets the State of New Mexico minimum standards for land surveying to the best of my knowledge.

Richard E Brooks

NM PS 20451



Firm No.: TX 10193838 NM 4655451

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NO.	REVISION	DATE
JOB NO.: LS1507378		
DWG. NO.: 1507378RD1		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
DATE: 7-27-15
SURVEYED BY: BK
DRAWN BY: PDJ
APPROVED BY: REB
SHEET : 4 OF 5

DEVON ENERGY PRODUCTION COMPANY, L. P.
PROPOSED LEASE ROAD
FROM AN EXISTING LEASE ROAD
TO EMERALD PWU 20 #10H
SECTION 20, T19S, R29E, NMPM,
EDDY CO., NEW MEXICO

DESCRIPTION

A strip of land 30 feet in width, being 32.99 feet or 2.000 rods in length lying within the Northwest Quarter of Section 20, Township 19 South, Range 29 East, N:M:P.M., Eddy County, State of New Mexico, being 15 feet on each side of the centerline described herein; with the sidelines being shortened or extended to intersect the South Line of an existing lease road and North Line of the Emerald PWU 20 #10H; across State of New Mexico land and being more particularly described as follows:

Beginning at a point on the South Line of an existing lease road which bears S 02°52'01" W; a distance of 2,154.04 feet from the Northwest Corner of Section 20; a 1/2" Rebar;

Thence S 00°16'36" E, a distance of 32.99 feet to the intersect with the North Line of the Emerald PWU 20 #10H; and the Point of Terminus which bears S 49°19'18" W; a distance of 3,331.25 feet from the North Quarter Corner of Section 20, a 1/2" Rebar.

Said strip of land contains 0.023 acres, more or less, and is allocated by Quarter-Quarter (forties) as follows:

SW 1/4 NW 1/4 2.000 Rods 0.023 Acres+-

Firm No.: TX 10193838 NM 4655451

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			SCALE: NA
			DATE: 7-24-2015
			SURVEYED BY: BC/CG
			DRAWN BY: PDJ
NO.	REVISION	DATE	APPROVED BY: REB
JOB NO.: LS1507378			SHEET : 5 OF 5
DWG. NO.: 1507378LEG			

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

Devon Energy, Emerald PWU 20 10H

1. Geologic Formations

TVD of target	8,964'	Pilot hole depth	N/A
MD at TD:	13,508'	Deepest expected fresh water:	

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Rustler	150	Barren	
Salado	330	Barren	
Base of Salt	845	Barren	
Yates	1075	Barren	
Seven Rivers	1505	Barren	
Queen	1854	Barren	
Grayburg	2100	Barren	
San Andres	2580	Oil	
Delaware	3360	Oil	
Bone Spring	4130	Oil	
1ST BSPG SAND	6840	Oil	
2nd BSPG LIME	6955	Oil	
2ND BSPG SAND	7730	Oil	
3RD BSPG LIME	7960	Oil	
3RD BSPG SAND	8580	Oil	
3RD BSPG G SAND	8905	Oil	
WOLFCAMP	8990	Oil	

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

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	300'	13.375"	48	H-40	STC	5.27	12.32	22.36
12.25"	0	3,200'	9.625"	40	J-55	LTC	1.21	2.12	3.93
8.75"	0	13,508'	5.5"	17	P-110	BTC	1.93	2.74	2.38
BLM Minimum Safety Factor							1.125	1.00	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

	Y or N
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 rd 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 nd 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 PWU 20 10H

3. Cementing Program

String	Number of sx	Weight lbs/gal	Water Volume g/sx	Yield cf/sx	Stage; Lead/Tail	Slurry Description
Surface	305	14.8	6.34	1.35	Tail	Premium Plus C Cement + 0.005 lbs/sack Static Free + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 0.005 gps FP-6L + 56.3% Fresh Water
Intermediate	610	12.8	8.01	1.66	Lead	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.25 lbs/sack Cello Flake + 5 lbs/sack LCM-1 + 0.25% bwoc FL- 52 + 0.005 gps FP-6L + 1.5% bwoc Sodium Metasilicate + 0.2% bwoc R-3 + 81.5% Fresh Water
	350	13.8	6.40	1.38	Tail	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.25 lbs/sack Cello Flake + 0.005 gps FP-6L + 0.25% bwoc Sodium Metasilicate + 0.5% bwoc BA-10A + 4% bwoc MPA-5 + 65.1% Fresh Water
Intermediate	145	12.8	8.01	1.66	1 st Lead	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.2% bwoc R-3 + 0.25 lbs/sack Cello Flake + 5 lbs/sack LCM-1 + 0.25% bwoc FL- 52 + 0.005 gps FP-6L + 1.5% bwoc Sodium Metasilicate + 81.5% Fresh Water
	250	13.8	6.40	1.38	1 st Tail	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.25 lbs/sack Cello Flake + 0.005 gps FP-6L + 0.1% bwoc Sodium Metasilicate + 0.5% bwoc BA-10A + 4% bwoc MPA-5 + 65.1% Fresh Water
	DVT @ 2000'					
	425	12.8	8.01	1.66	2 nd Lead	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.2% bwoc R-3 + 0.25 lbs/sack Cello Flake + 5 lbs/sack LCM-1 + 0.25% bwoc FL- 52 + 0.005 gps FP-6L + 1.5% bwoc Sodium Metasilicate + 81.5% Fresh Water
	150	13.8	6.41	1.38	2 nd Tail	(60:40) Poz (Fly Ash):Premium Plus C Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.25 lbs/sack Cello Flake + 0.005 gps FP-6L + 0.5% bwoc Sodium Metasilicate + 0.5% bwoc BA-10A + 4% bwoc MPA-5 + 65.2% Fresh Water
Production	365	11.8	13.15	2.3	1 st Lead	(50:50) Poz (Fly Ash):Premium Plus H Cement + 0.005 lbs/sack Static Free + 0.5% bwoc FL-52 + 0.3% bwoc ASA-

Devon Energy, Emerald PWU 20 10H

(5 ½")						301 + 0.005 gps FP-6L + 10% bwoc Bentonite + 0.35% bwoc R-21 + 130.6% Fresh Water
	440	12.5	11.00	2.01	2 nd Lead	(35:65) Poz (Fly Ash):Premium Plus H Cement + 0.005 lbs/sack Static Free + 3% bwow Sodium Chloride + 0.2% bwoc R-3 + 0.125 lbs/sack Cello Flake + 0.7% bwoc FL-52 + 0.3% bwoc ASA- 301 + 0.005 gps FP-6L + 6% bwoc Bentonite + 105.5% Fresh Water
	1415	14.2	5.76	1.28	Tail	(50:50) Poz (Fly Ash):Premium Plus H Cement + 0.005 lbs/sack Static Free + 5% bwow Sodium Chloride + 0.3% bwoc CD-32 + 0.5% bwoc FL-25 + 0.4% bwoc FL-52 + 0.005 gps FP-6L + 0.5% bwoc Sodium Metasilicate + 57.2% Fresh Water
Production 2 Stage (5 ½")	720	12.5	11.01	2.01	1 st Lead	(35:65) Poz (Fly Ash):Premium Plus H Cement + 0.005 gps FP-6L + 3% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.3% bwoc ASA-301 + 6% bwoc Bentonite + 0.7% bwoc FL- 52A + 0.005 lbs/sack Static Free + 105.5% Fresh Water
	1415	14.2	5.76=5	1.28	1 st Tail	(50:50) Poz (Fly Ash):Premium Plus H Cement + 5% bwow Sodium Chloride + 0.3% bwoc CD-32 + 0.5% bwoc FL-25 + 0.3% bwoc Sodium Metasilicate + 0.5% bwoc FL-52A + 0.005 gps FP- 6L + 0.005% bwoc Static Free + 57.1% Fresh Water
	DVT @ 3250'					
	210	13.8	6.4	1.37	2 nd Tail	(60:40) Poz (Fly Ash):Premium Plus C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.5% bwoc BA-10A + 4% bwoc MPA-5 + 0.005 lbs/sack Static Free + 0.005 gps FP-6L + 65.1% Fresh Water

DV tool 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 String	TOC	% Excess
13-3/8" Surface	0'	100%
9-5/8" Intermediate	0'	75%
5-1/2" Production Casing Single Stage Option	2200'	25%
5-1/2" Production Casing Two Stage Option	1 st Stage = 3250ft / 2 nd Stage = 2200'	25%

4. Pressure Control Equipment

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

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
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% of working pressure
			Blind Ram		3M
			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.
---	---

Devon Energy, Emerald PWU 20 10H

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	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. 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. - Wellhead will be installed by wellhead vendor representatives. - 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. - Wellhead representative will install the test plug for the initial BOP test. - Wellhead 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 5M, 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. - 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. - Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating. - Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2. 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. 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. 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.

Devon Energy, Emerald PWU 20 10H

	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
	See attached schematic.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	300'	FW Gel	8.6-8.8	28-34	N/C
300'	3,200'	Saturated Brine	10.0-10.2	28-34	N/C
3,200'	13,508'	Cut Brine	8.5-9.3	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, Coring 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

Additional logs planned		Interval
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
	CBL	Production casing
X	Mud log	Intermediate shoe to TD
	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	3,881 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? Yes.

Will be pre-setting casing? No.

Attachments

☒ Directional Plan

☐ Other, describe



Emerald PWU 20 10H
Eddy Co, NM

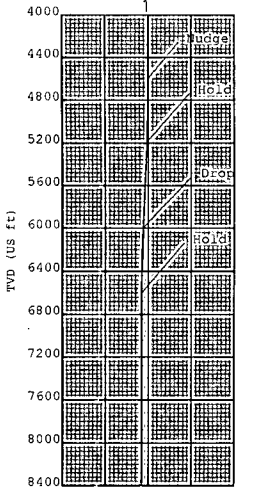


Plan Data for Emerald PWU 20 10H

Plan Point Information:									
Dogleg Severity Unit: °/100.00ft					Position offsets from Slot centre				
MD	Inc	Az	TVD	+N/-S	+E/-W	Northing	Easting	VSec	DLS
(USft)	(°)	(°)	(USft)	(USft)	(USft)	(USft)	(USft)	(USft)	(DLSU)
0.00	0.00	0.00	-0.00	0.00	0.00	599206.70	611715.50	0.00	0.00
4600.00	0.00	0.00	4600.00	0.00	0.00	599206.70	611715.50	0.00	0.00
5200.00	6.00	335.00	5198.90	28.45	-13.26	599235.15	611702.24	-13.29	1.00
6005.00	6.00	335.00	5999.49	104.71	-48.83	599311.41	611666.67	-48.92	0.00
6605.00	0.00	0.00	6598.40	133.15	-62.09	599339.85	611653.41	-62.21	1.00
8393.50	0.00	0.00	8386.90	133.15	-62.09	599339.85	611653.41	-62.21	0.00
9292.94	89.94	90.05	8959.86	132.64	510.30	599339.34	612225.80	510.19	10.00
13508.93	89.94	90.05	8964.00	128.87	4726.29	599335.57	616441.79	4726.18	0.00



KB:3364
GL:3339



Plan Data for Emerald PWU 20 10H

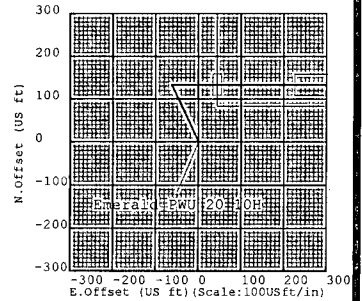
Well: Emerald PWU 20 10H
Type: Main-Well
File Number:
Plan Folder: P1 Plan: P1.V2
Vertical Section: Position offset of origin from Slot centre:
+N/-S: 0.00USft Azimuth: 90.05°
+E/-W: 0.00USft
Magnetic Parameters:
Model: Field Strength: Declination: Dip: Date:
BGGM 48399(nT) 7.53° 60.42° 2015-10-30

Plan Data for Emerald PWU 20 10H

Target Set Information:
Name: Emerald PWU 20 10H
Position offsets from Slot centre
Name TVD Elevation +N/-S +E/-W Northing Easting
(USft) (USft) (USft) (USft) (USft) (USft)
LP Tgt 8959.00 -5595.00 133.26 45.10 599339.96 611760.60
PBHL 10H 8964.00 -5600.00 128.87 4726.29 599335.57 616441.79

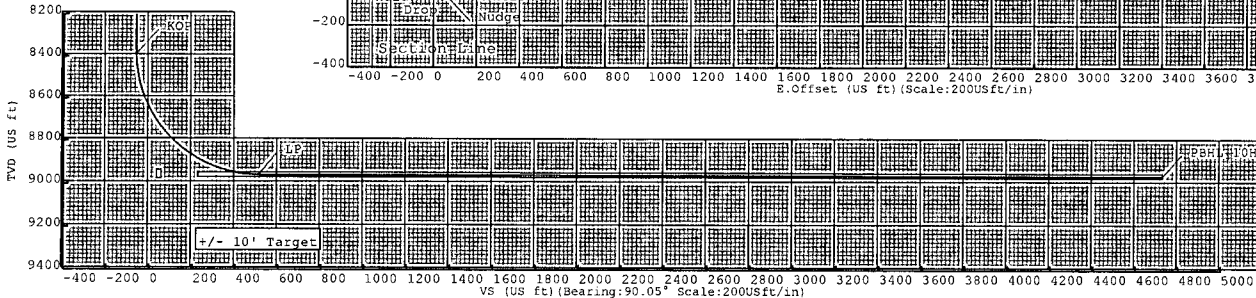
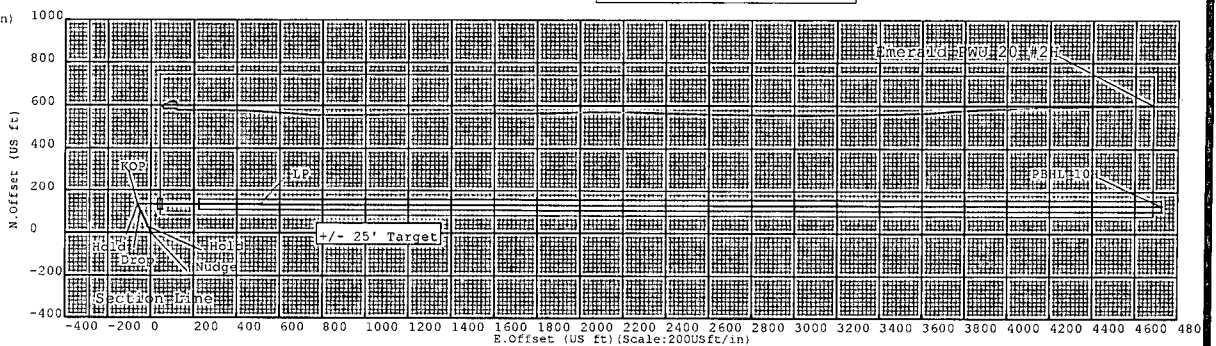
Plan Data for Emerald PWU 20 10H

Slot: Emerald PWU 20 10H
Position:
Offset is from Site centre
+N/-S: 0.00USft Northing: 599206.70USft Latitude: 32.647059°
+E/-W: 0.00USft Easting: 611715.50USft Longitude: -104.104679°
Elevation Above VRD: 3339.00USft



Emerald PWU 20 10H
Emerald PWU 20 #2H

VS (US ft) (Bearing:90.05° Scale:400USft/in)



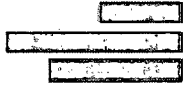
5D Plan Report

NM OIL CONSERVATION

ARTESIA DISTRICT

AUG 28 2015

RECEIVED


devon**5D Plan Report**

Devon Energy**Field Name:** *Eddy Co, NM (Nad 83 NME)***Site Name:** *Emerald PWU 20 10H***Well Name:** *Emerald PWU 20 10H***Plan:** *P1:V2*

19 August 2015

**Weatherford®**



Emerald PWU 20 10H

Field Name: Eddy Co, NM (Nad 83 NME)	Map Units: US ft Company Name: Devon Energy Vertical Reference Datum (VRD): Mean Sea Level Projected Coordinate System: NAD83 / New Mexico East (ftUS) Comment:	
Site: Emerald PWU 20 10H	Units: US ft North Reference: Grid Convergence Angle: 0.12 Position: Northings: 599206.70US ft Easting: 611715.50US ft Latitude: 32° 38' 49.41" Longitude: -104° 6' 16.84" Elevation above MSL: 3339.00 US ft Comment:	
Slot: Emerald PWU 20 10H	Position (Relative to Site Centre) +N/-S: 0.00US ft Northings: 599206.70US ft Latitude: 32°38'49.41" +E/-W: 0.00US ft Easting: 611715.50US ft Longitude: -104°6'16.84" Slot TVD Reference: Ground Elevation Elevation above MSL: 3339.00US ft Comment:	
Well: Emerald PWU 20 10H	Type: Main well UWI: Plan: P1:V2 File Number: Comment: Closure Distance: 4728.05US ft Closure Azimuth: 88.44° Vertical Section: Position of Origin (Relative to Slot centre) +N/-S: 0.00US ft +E/-W: 0.00US ft Az: 90.05° Magnetic Parameters: Model: BGGM Field Strength: 48399.0nT Declination: 7.53° Dip: 60.42° Date: 30/Oct/2015	

Drill floor: Plan: P1:V2		
Rig Height (Kelly Bushing): 25.00US ft	Elevation above MSL: 3364.00US ft	Inclination: 0.00° Azimuth: 0.00°

Target set: Emerald PWU 20 10H Comment:							
Target Name:	Shape:	TVD (US ft)	N. Offset (US ft)	E. Offset (US ft)	Northings (US ft)	Easting (US ft)	Comment:
LP Tgt	Cuboid	8959.00	133.26	45.10	599339.96	611760.60	
PBHL 10H	Cuboid	8964.00	128.87	4726.29	599335.57	616441.79	

Wellpath created using minimum curvature.

Life Points:					
MD: 0.00USFt	Inclination: 0.00°	Azimuth: 0.00°	TVD: 0.00USFt	North Offset: 0.00USFt	East Offset: 0.00USFt

5D Plan Report

Salient Points: (Relative to Slot centre) (TVD relative to Kelly Bushing)											
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	VS (US ft)	DLS (°/100US ft)	B.Rate (°/100US ft)	T.Rate (°/100US ft)	T.Face (°)	Comment
0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	
4600.00	0.00	0.00	4600.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	Nudge
5200.00	6.00	335.00	5198.90	28.45	-13.26	-13.29	1.00	1.00	0.00	335.00	Hold
6005.00	6.00	335.00	5999.49	104.71	-48.83	-48.92	0.00	0.00	0.00	0.00	Drop
6605.00	0.00	0.00	6598.40	133.15	-62.09	-62.21	1.00	-1.00	0.00	180.00	Hold
8393.50	0.00	0.00	8386.90	133.15	-62.09	-62.21	0.00	0.00	0.00	0.00	KOP
9292.94	89.94	90.05	8959.86	132.64	510.30	510.19	10.00	10.00	0.00	90.05	LP
13508.93	89.94	90.05	8964.00	128.87	4726.29	4726.18	0.00	0.00	0.00	0.00	PBHL 10H

Interpolated Points: (Relative to Slot centre) (TVD relative to Kelly Bushing)											
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	VS (US ft)	DLS (°/100US ft)	Northing (US ft)	Easting (US ft)		Comment
0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
100.00	0.00	0.00	100.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
200.00	0.00	0.00	200.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
300.00	0.00	0.00	300.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
400.00	0.00	0.00	400.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
500.00	0.00	0.00	500.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
600.00	0.00	0.00	600.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
700.00	0.00	0.00	700.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
800.00	0.00	0.00	800.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
900.00	0.00	0.00	900.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1000.00	0.00	0.00	1000.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1100.00	0.00	0.00	1100.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1200.00	0.00	0.00	1200.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1300.00	0.00	0.00	1300.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1400.00	0.00	0.00	1400.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1500.00	0.00	0.00	1500.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1600.00	0.00	0.00	1600.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1700.00	0.00	0.00	1700.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1800.00	0.00	0.00	1800.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
1900.00	0.00	0.00	1900.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2000.00	0.00	0.00	2000.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2100.00	0.00	0.00	2100.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2200.00	0.00	0.00	2200.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2300.00	0.00	0.00	2300.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2400.00	0.00	0.00	2400.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2500.00	0.00	0.00	2500.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2600.00	0.00	0.00	2600.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2700.00	0.00	0.00	2700.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2800.00	0.00	0.00	2800.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
2900.00	0.00	0.00	2900.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3000.00	0.00	0.00	3000.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3100.00	0.00	0.00	3100.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3200.00	0.00	0.00	3200.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3300.00	0.00	0.00	3300.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3400.00	0.00	0.00	3400.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3500.00	0.00	0.00	3500.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3600.00	0.00	0.00	3600.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3700.00	0.00	0.00	3700.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3800.00	0.00	0.00	3800.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
3900.00	0.00	0.00	3900.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4000.00	0.00	0.00	4000.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4100.00	0.00	0.00	4100.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4200.00	0.00	0.00	4200.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4300.00	0.00	0.00	4300.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4400.00	0.00	0.00	4400.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4500.00	0.00	0.00	4500.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		
4600.00	0.00	0.00	4600.00	0.00	0.00	-0.00	0.00	599206.70	611715.50		Nudge

SD Plan Report

Interpolated Points (Relative to Slot centre) (TVD relative to Kelly Bushing)										
MD (US ft)	Incl (°)	Az (°)	TVD (US ft)	N. Offset (US ft)	E. Offset (US ft)	VS (US ft)	DLS (%/100US ft)	Northing (US ft)	Easting (US ft)	Comment
4700.00	1.00	335.00	4699.99	0.79	-0.37	-0.37	1.00	599207.49	611715.13	
4800.00	2.00	335.00	4799.96	3.16	-1.48	-1.48	1.00	599209.86	611714.02	
4900.00	3.00	335.00	4899.86	7.12	-3.32	-3.32	1.00	599213.82	611712.18	
5000.00	4.00	335.00	4999.68	12.65	-5.90	-5.91	1.00	599219.35	611709.60	
5100.00	5.00	335.00	5099.37	19.76	-9.21	-9.23	1.00	599226.46	611706.29	
5200.00	6.00	335.00	5198.90	28.45	-13.26	-13.29	1.00	599235.15	611702.24	Hold
5300.00	6.00	335.00	5298.36	37.92	-17.68	-17.72	0.00	599244.62	611697.82	
5400.00	6.00	335.00	5397.81	47.39	-22.10	-22.14	0.00	599254.09	611693.40	
5500.00	6.00	335.00	5497.26	56.87	-26.52	-26.57	0.00	599263.57	611688.98	
5600.00	6.00	335.00	5596.71	66.34	-30.94	-30.99	0.00	599273.04	611684.56	
5700.00	6.00	335.00	5696.16	75.81	-35.35	-35.42	0.00	599282.51	611680.15	
5800.00	6.00	335.00	5795.62	85.29	-39.77	-39.84	0.00	599291.99	611675.73	
5900.00	6.00	335.00	5895.07	94.76	-44.19	-44.27	0.00	599301.46	611671.31	
6000.00	6.00	335.00	5994.52	104.23	-48.61	-48.70	0.00	599310.93	611666.89	
6005.00	6.00	335.00	5999.49	104.71	-48.83	-48.92	0.00	599311.41	611666.67	Drop
6100.00	5.05	335.00	6094.05	113.00	-52.69	-52.79	1.00	599319.70	611662.81	
6200.00	4.05	335.00	6193.74	120.19	-56.04	-56.15	1.00	599326.89	611659.46	
6300.00	3.05	335.00	6293.54	125.80	-58.66	-58.77	1.00	599332.50	611656.84	
6400.00	2.05	335.00	6393.44	129.83	-60.54	-60.65	1.00	599336.53	611654.96	
6500.00	1.05	335.00	6493.40	132.28	-61.68	-61.80	1.00	599338.98	611653.82	
6600.00	0.05	335.00	6593.40	133.15	-62.09	-62.21	1.00	599339.85	611653.41	
6605.00	0.00	0.00	6598.40	133.15	-62.09	-62.21	1.00	599339.85	611653.41	Hold
6700.00	0.00	0.00	6693.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
6800.00	0.00	0.00	6793.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
6900.00	0.00	0.00	6893.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7000.00	0.00	0.00	6993.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7100.00	0.00	0.00	7093.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7200.00	0.00	0.00	7193.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7300.00	0.00	0.00	7293.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7400.00	0.00	0.00	7393.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7500.00	0.00	0.00	7493.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7600.00	0.00	0.00	7593.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7700.00	0.00	0.00	7693.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7800.00	0.00	0.00	7793.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
7900.00	0.00	0.00	7893.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
8000.00	0.00	0.00	7993.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
8100.00	0.00	0.00	8093.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
8200.00	0.00	0.00	8193.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
8300.00	0.00	0.00	8293.40	133.15	-62.09	-62.21	0.00	599339.85	611653.41	
8393.50	0.00	0.00	8386.90	133.15	-62.09	-62.21	0.00	599339.85	611653.41	KOP
8400.00	0.65	90.05	8393.40	133.15	-62.05	-62.17	10.00	599339.85	611653.45	
8500.00	10.65	90.05	8492.79	133.15	-52.22	-52.34	10.00	599339.85	611663.28	
8600.00	20.65	90.05	8588.96	133.12	-25.28	-25.40	10.00	599339.82	611690.22	
8700.00	30.65	90.05	8678.99	133.08	17.95	17.84	10.00	599339.78	611733.45	
8800.00	40.65	90.05	8760.14	133.03	76.16	76.05	10.00	599339.73	611791.66	
8900.00	50.65	90.05	8829.96	132.97	147.58	147.46	10.00	599339.67	611863.08	
9000.00	60.65	90.05	8886.31	132.89	230.04	229.92	10.00	599339.59	611945.54	
9100.00	70.65	90.05	8927.49	132.81	321.02	320.91	10.00	599339.51	612036.52	
9200.00	80.65	90.05	8952.24	132.73	417.78	417.67	10.00	599339.43	612133.28	
9292.94	89.94	90.05	8959.86	132.64	510.30	510.19	10.00	599339.34	612225.80	LP
9300.00	89.94	90.05	8959.86	132.64	517.37	517.25	0.00	599339.34	612232.87	
9400.00	89.94	90.05	8959.96	132.55	617.37	617.25	0.00	599339.25	612332.87	
9500.00	89.94	90.05	8960.06	132.46	717.37	717.25	0.00	599339.16	612432.87	
9600.00	89.94	90.05	8960.16	132.37	817.37	817.25	0.00	599339.07	612532.87	
9700.00	89.94	90.05	8960.26	132.28	917.37	917.25	0.00	599338.98	612632.87	
9800.00	89.94	90.05	8960.35	132.19	1017.37	1017.25	0.00	599338.89	612732.87	
9900.00	89.94	90.05	8960.45	132.10	1117.37	1117.25	0.00	599338.80	612832.87	
10000.00	89.94	90.05	8960.55	132.01	1217.37	1217.25	0.00	599338.71	612932.87	
10100.00	89.94	90.05	8960.65	131.92	1317.37	1317.25	0.00	599338.62	613032.87	

5D Plan Report

Interpolated Points: (Relative to Slot centre) (TVD relative to Kelly Bushing)										
MD (US ft)	Inc. (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	VS (US ft)	DLS (%/100US ft)	Northing (US ft)	Easting (US ft)	Comment
10200.00	89.94	90.05	8960.75	131.83	1417.37	1417.25	0.00	599338.53	613132.87	
10300.00	89.94	90.05	8960.85	131.74	1517.37	1517.25	0.00	599338.44	613232.87	
10400.00	89.94	90.05	8960.94	131.65	1617.37	1617.25	0.00	599338.35	613332.87	
10500.00	89.94	90.05	8961.04	131.56	1717.37	1717.25	0.00	599338.26	613432.87	
10600.00	89.94	90.05	8961.14	131.47	1817.37	1817.25	0.00	599338.17	613532.87	
10700.00	89.94	90.05	8961.24	131.38	1917.37	1917.25	0.00	599338.08	613632.87	
10800.00	89.94	90.05	8961.34	131.29	2017.37	2017.25	0.00	599337.99	613732.87	
10900.00	89.94	90.05	8961.44	131.20	2117.37	2117.25	0.00	599337.90	613832.87	
11000.00	89.94	90.05	8961.53	131.11	2217.37	2217.25	0.00	599337.81	613932.87	
11100.00	89.94	90.05	8961.63	131.03	2317.36	2317.25	0.00	599337.73	614032.86	
11200.00	89.94	90.05	8961.73	130.94	2417.36	2417.25	0.00	599337.64	614132.86	
11300.00	89.94	90.05	8961.83	130.85	2517.36	2517.25	0.00	599337.55	614232.86	
11400.00	89.94	90.05	8961.93	130.76	2617.36	2617.25	0.00	599337.46	614332.86	
11500.00	89.94	90.05	8962.03	130.67	2717.36	2717.25	0.00	599337.37	614432.86	
11600.00	89.94	90.05	8962.12	130.58	2817.36	2817.25	0.00	599337.28	614532.86	
11700.00	89.94	90.05	8962.22	130.49	2917.36	2917.25	0.00	599337.19	614632.86	
11800.00	89.94	90.05	8962.32	130.40	3017.36	3017.25	0.00	599337.10	614732.86	
11900.00	89.94	90.05	8962.42	130.31	3117.36	3117.25	0.00	599337.01	614832.86	
12000.00	89.94	90.05	8962.52	130.22	3217.36	3217.25	0.00	599336.92	614932.86	
12100.00	89.94	90.05	8962.61	130.13	3317.36	3317.25	0.00	599336.83	615032.86	
12200.00	89.94	90.05	8962.71	130.04	3417.36	3417.25	0.00	599336.74	615132.86	
12300.00	89.94	90.05	8962.81	129.95	3517.36	3517.25	0.00	599336.65	615232.86	
12400.00	89.94	90.05	8962.91	129.86	3617.36	3617.25	0.00	599336.56	615332.86	
12500.00	89.94	90.05	8963.01	129.77	3717.36	3717.25	0.00	599336.47	615432.86	
12600.00	89.94	90.05	8963.11	129.68	3817.36	3817.25	0.00	599336.38	615532.86	
12700.00	89.94	90.05	8963.20	129.59	3917.36	3917.25	0.00	599336.29	615632.86	
12800.00	89.94	90.05	8963.30	129.50	4017.36	4017.25	0.00	599336.20	615732.86	
12900.00	89.94	90.05	8963.40	129.41	4117.36	4117.25	0.00	599336.11	615832.86	
13000.00	89.94	90.05	8963.50	129.33	4217.36	4217.25	0.00	599336.03	615932.86	
13100.00	89.94	90.05	8963.60	129.24	4317.36	4317.25	0.00	599335.94	616032.86	
13200.00	89.94	90.05	8963.70	129.15	4417.36	4417.25	0.00	599335.85	616132.86	
13300.00	89.94	90.05	8963.79	129.06	4517.36	4517.25	0.00	599335.76	616232.86	
13400.00	89.94	90.05	8963.89	128.97	4617.36	4617.25	0.00	599335.67	616332.86	
13500.00	89.94	90.05	8963.99	128.88	4717.36	4717.25	0.00	599335.58	616432.86	
13508.93	89.94	90.05	8964.00	128.87	4726.29	4726.18	0.00	599335.57	616441.79	PBHL 10H

5D Anti-Collision Report

NM OIL CONSERVATION

ARTESIA DISTRICT

AUG 28 2015

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**5D Anti-Collision Report**

Devon Energy**Field Name:** *Eddy Co, NM (Nad 83 NME)***Site Name:** *Emerald PWU 20 10H***Well Name:** *Emerald PWU 20 10H*

19 August 2015





Emerald PWU 20 10H

Field Names Eddy Co, NM (Nad 83 NME)	Map Units: US ft		Company Name: Devon Energy	
	Vertical Reference Datum (VRD): Mean Sea Level			
	Projected Coordinate System: NAD83 / New Mexico East (ftUS)			
	Comment:			
Site: Emerald PWU 20 10H	Units: US ft	North Reference: Grid	Convergence Angle: 0.12	
	Position:	Northing: 599206.70US ft	Latitude: 32° 38' 49.41"	
		Easting: 611715.50US ft	Longitude: -104° 6' 16.84"	
	Elevation above MSL: 3339.00 US ft			
	Comment:			
Slot: Emerald PWU 20 10H	Position (Relative to Site Centre)			
	+N/-S: 0.00US ft	Northing: 599206.70US ft	Latitude: 32°38'49.41"	
	+E/-W: 0.00US ft	Easting: 611715.50US ft	Longitude: -104°6'16.84"	
	Slot TVD Reference: Ground Elevation			
	Elevation above MSL: 3339.00US ft			
	Comment:			
Well: Emerald PWU 20 10H	Type: Main well	UWI:	Plan: Working Plan	
	File Number:	Comment:		
	Closure Distance: 4728.05US ft	Closure Azimuth: 88.44°		
	Vertical Section: Position of Origin (Relative to Slot centre)			
	+N/-S: 0.00US ft	+E/-W: 0.00US ft	Az: 90.05°	
	Magnetic Parameters:			
	Model: BGGM	Field Strength: 48399.0nT	Declination: 7.53°	Dip: 60.42° Date: 30/Oct/2015

Drill floor Plan: Working Plan			
Rig Height (Kelly Bushing): 25.00us ft	Elevation above MSL: 3364.00us ft	Inclination: 0.00°	Azimuth: 0.00°

Collision / Uncertainty Analysis				
Primary Well	Start MD (USFt)	End MD (USFt)	Collision Risk Interval	No. of Std. Deviations in Error Computation
Emerald PWU 20 10H (p)	0.00	13508.93	100.00	2

Secondary Well Names:
Longboard PWD 20 1H Lat OH (s)
Longboard PWU 20 1H RE Lat (s)
Emerald PWU 20 #2H (s)

Anti-Collision Report Terminology
S.Minor, S.Major: Radii of the ellipse of uncertainty at the current location as seen in the along hole direction.
PHI: Angle between high-side vector and semi-minor axis
TVD Spread: Total TVD range of the ellipsoid of uncertainty at the current location.
ES: Distance between the extremities of the primary and secondary uncertainty ellipsoids in the direction Cr-Cr.
T.Face to Sec: Angle between the Hi-Side vector of the primary well at the current location and line of closest approach between the two wells.

5D Anti-Collision Report

AG Filter Info: the following filter has been applied: Separation Factor.

Separation factors calculated using Pedal Curve (Independent Uncertainty). Surface Uncertainty (S.U.) Not Applied. Wellpath created using minimum curvature.

Anti-Collision Summary (TVD relative to Kelly Bushing)

Secondary Well Name	Pri MD (US ft)	TVD (US ft)	Sec MD (US ft)	ES (US ft)	CC (US ft)	SF	Risk
Longboard PWU 20 1H RE Lat (s)	13508.93	8964.00	13492.00	348.40	602.43	2.37	
Longboard PWD 20 1H Lat OH (s)	13116.99	8963.61	13748.00	674.43	855.07	4.73	
Emerald PWU 20 #2H (s)	13508.93	8964.00	12091.00	1072.49	1189.39	10.17	

Primary Well: Emerald PWU 20 1H (s) (TVD relative to Kelly Bushing) (All Azimuth Relative to GRID NORTH)

MD (US ft)	TVD (US ft)	T.Face to Sec (°)	S.Major (US ft)	S.Minor (US ft)	TVD Spread (US ft)	Secondary Well Name	ES (US ft)	CC (US ft)	SF	Risk
10900.00	8961.44	279.93	60.73	19.70	39.40	Longboard PWU 20 1H RE Lat (s)	460.78	582.54	4.78	
11000.00	8961.53	280.36	63.34	20.27	40.54	Longboard PWU 20 1H RE Lat (s)	454.13	581.08	4.58	
11100.00	8961.63	280.80	65.96	20.85	41.70	Longboard PWU 20 1H RE Lat (s)	447.54	579.27	4.40	
11200.00	8961.73	281.35	68.60	21.44	42.88	Longboard PWU 20 1H RE Lat (s)	441.65	578.49	4.23	
11300.00	8961.83	281.84	71.24	22.04	44.08	Longboard PWU 20 1H RE Lat (s)	434.31	576.27	4.06	
11400.00	8961.93	282.12	73.89	22.64	45.30	Longboard PWU 20 1H RE Lat (s)	426.95	573.90	3.91	
11500.00	8962.03	282.30	76.55	23.26	46.52	Longboard PWU 20 1H RE Lat (s)	420.84	572.65	3.77	
11600.00	8962.12	282.68	79.22	23.88	47.77	Longboard PWU 20 1H RE Lat (s)	416.26	572.84	3.66	
11700.00	8962.22	283.15	81.89	24.51	49.02	Longboard PWU 20 1H RE Lat (s)	412.99	574.26	3.56	
11800.00	8962.32	283.57	84.57	25.14	50.28	Longboard PWU 20 1H RE Lat (s)	410.62	576.67	3.47	
11900.00	8962.42	284.13	87.25	25.78	51.56	Longboard PWU 20 1H RE Lat (s)	409.41	579.99	3.40	
12000.00	8962.52	284.85	89.94	26.42	52.85	Longboard PWU 20 1H RE Lat (s)	409.66	584.54	3.34	
12100.00	8962.61	285.59	92.63	27.07	54.14	Longboard PWU 20 1H RE Lat (s)	410.30	589.77	3.29	
12200.00	8962.71	286.28	95.32	27.72	55.45	Longboard PWU 20 1H RE Lat (s)	409.32	593.85	3.22	
12300.00	8962.81	286.81	98.02	28.37	56.76	Longboard PWU 20 1H RE Lat (s)	407.44	596.87	3.15	
12400.00	8962.91	287.21	100.72	29.03	58.08	Longboard PWU 20 1H RE Lat (s)	404.74	598.79	3.09	
12500.00	8963.01	287.51	103.43	29.70	59.40	Longboard PWU 20 1H RE Lat (s)	407.23	604.66	3.06	
12600.00	8963.11	287.79	106.13	30.36	60.74	Longboard PWU 20 1H RE Lat (s)	405.51	609.47	2.99	
12700.00	8963.20	287.55	108.84	31.03	62.07	Longboard PWU 20 1H RE Lat (s)	401.14	611.00	2.91	

5D Anti-Collision Report

Primary Well: Emerald PWU 20 10H (p) (TVD relative to Kelly Bushing) (All Azimuth Relative to GRID NORTH)										
MD (US ft)	TVD (US ft)	T.Face to Sec (°)	S.Major (US ft)	S.Minor (US ft)	TVD Spread (US ft)	Secondary Well Name	ES (US ft)	CC (US ft)	SF	Risk
12800.00	8963.30	287.17	111.56	31.70	63.42	Longboard PWU 20 1H RE Lat (s)	393.74	609.62	2.82	
12900.00	8963.40	227.30	114.27	32.38	64.77	Longboard PWD 20 1H Lat OH (s)	684.87	860.49	4.90	
12900.00	8963.40	286.82	114.27	32.38	64.77	Longboard PWU 20 1H RE Lat (s)	386.23	607.46	2.75	
13000.00	8963.50	226.81	116.99	33.06	66.12	Longboard PWD 20 1H Lat OH (s)	677.97	856.16	4.80	
13000.00	8963.50	286.58	116.99	33.06	66.12	Longboard PWU 20 1H RE Lat (s)	380.34	606.92	2.68	
13100.00	8963.60	226.48	119.70	33.74	67.48	Longboard PWD 20 1H Lat OH (s)	674.07	854.53	4.74	
13100.00	8963.60	286.50	119.70	33.74	67.48	Longboard PWU 20 1H RE Lat (s)	376.62	607.91	2.63	
13200.00	8963.70	226.48	122.42	34.42	68.85	Longboard PWD 20 1H Lat OH (s)	681.99	862.54	4.78	
13200.00	8963.70	286.49	122.42	34.42	68.85	Longboard PWU 20 1H RE Lat (s)	374.19	610.85	2.58	
13300.00	8963.79	226.48	125.14	35.10	70.21	Longboard PWD 20 1H Lat OH (s)	703.55	881.89	4.94	
13300.00	8963.79	286.54	125.14	35.10	70.21	Longboard PWU 20 1H RE Lat (s)	367.72	610.38	2.52	
13400.00	8963.89	286.38	127.87	35.79	71.58	Longboard PWU 20 1H RE Lat (s)	359.08	607.30	2.45	
13500.00	8963.99	286.22	130.59	36.48	72.96	Longboard PWU 20 1H RE Lat (s)	349.06	602.77	2.38	
13508.93	8964.00	286.22	130.83	36.54	73.08	Longboard PWU 20 1H RE Lat (s)	348.40	602.43	2.37	

Secondary Well: Longboard PWD 20 1H Lat OH (s) (TVD relative to Kelly Bushing) (All Azimuth Relative to GRID NORTH)										
Pri MD (US ft)	TVD (US ft)	Sec MD (US ft)	T.Face to Sec (°)	S.Major (US ft)	S.Minor (US ft)	TVD Spread (US ft)	ES (US ft)	CC (US ft)	SF	Risk
12900.00	9546.19	13612.33	227.30	117.29	33.65	67.41	684.87	860.49	4.90	
13000.00	9549.23	13693.62	226.81	119.66	34.18	68.50	677.97	856.16	4.80	
13100.00	9551.84	13748.00	226.48	121.18	34.53	69.23	674.07	854.53	4.74	
13200.00	9551.84	13748.00	226.48	121.18	34.53	69.23	681.99	862.54	4.78	
13300.00	9551.84	13748.00	226.48	121.18	34.53	69.23	703.55	881.89	4.94	

Secondary Well: Longboard PWU 20 1H RE Lat (s) (TVD relative to Kelly Bushing) (All Azimuth Relative to GRID NORTH)										
Pri MD (US ft)	TVD (US ft)	Sec MD (US ft)	T.Face to Sec (°)	S.Major (US ft)	S.Minor (US ft)	TVD Spread (US ft)	ES (US ft)	CC (US ft)	SF	Risk
10900.00	8860.99	10868.49	279.93	62.30	19.81	39.49	460.78	582.54	4.78	
11000.00	8857.03	10974.61	280.36	65.14	20.46	40.73	454.13	581.08	4.58	
11100.00	8853.07	11066.31	280.80	67.55	21.03	41.82	447.54	579.27	4.40	
11200.00	8847.88	11171.67	281.35	70.38	21.64	43.09	441.65	578.49	4.23	
11300.00	8843.60	11277.32	281.84	73.22	22.27	44.37	434.31	576.27	4.06	
11400.00	8841.48	11374.18	282.12	75.80	22.80	45.57	426.95	573.90	3.91	
11500.00	8840.05	11464.63	282.30	78.19	23.41	46.71	420.84	572.65	3.77	
11600.00	8836.34	11557.71	282.68	80.67	24.05	47.88	416.26	572.84	3.66	
11700.00	8831.63	11650.79	283.15	83.10	24.62	49.06	412.99	574.26	3.56	
11800.00	8827.04	11746.67	283.57	85.65	25.24	50.28	410.62	576.67	3.47	
11900.00	8820.89	11840.02	284.13	88.13	25.88	51.48	409.41	579.99	3.40	
12000.00	8812.84	11932.82	284.85	90.56	26.48	52.67	409.66	584.54	3.34	
12100.00	8804.34	12033.17	285.59	93.24	27.12	53.97	410.30	589.77	3.29	
12200.00	8796.27	12144.72	286.28	96.34	27.83	55.43	409.32	593.85	3.22	
12300.00	8790.29	12249.47	286.81	99.19	28.50	56.81	407.44	596.87	3.15	

5D Anti-Collision Report

Secondary Well: Longboard PWU 2014 RE Lat(s) (TVD relative to Kelly Bushing) (All Azimuth Relative to GRID NORTH)										
Pr MD (US ft)	TVD (US ft)	Sec MD (US ft)	T.Face to Sec (°)	S.Major (US ft)	S.Minor (US ft)	TVD Spread (US ft)	ES (US ft)	CC (US ft)	SF	Risk
12400.00	8785.86	12344.99	287.21	101.74	29.13	58.08	404.74	598.79	3.09	
12500.00	8781.71	12413.76	287.51	103.21	29.61	58.99	407.23	604.66	3.06	
12600.00	8776.99	12548.45	287.79	107.18	30.41	60.80	405.51	609.47	2.99	
12700.00	8778.92	12663.86	287.55	110.40	31.11	62.36	401.14	611.00	2.91	
12800.00	8783.45	12782.35	287.17	113.71	31.85	63.97	393.74	609.62	2.82	
12900.00	8787.63	12871.54	286.82	116.09	32.50	65.19	386.23	607.46	2.75	
13000.00	8790.35	12966.30	286.58	118.66	33.21	66.49	380.34	606.92	2.68	
13100.00	8790.97	13049.26	286.50	120.79	33.81	67.63	376.62	607.91	2.63	
13200.00	8790.33	13152.95	286.49	123.68	34.55	69.05	374.19	610.85	2.58	
13300.00	8790.07	13281.57	286.54	127.31	35.38	70.83	367.72	610.38	2.52	
13400.00	8792.75	13388.60	286.38	130.24	36.09	72.31	359.08	607.30	2.45	
13500.00	8795.79	13492.00	286.22	133.06	36.81	73.75	349.06	602.77	2.38	
13508.93	8795.79	13492.00	286.22	133.06	36.81	73.75	348.40	602.43	2.37	

**Weatherford**

Weatherford Drilling Services

GeoDec4 v2.1.0.0

Report Date: August 18, 2015
Job Number: _____
Customer: Devon Energy
Well Name: Emerald PWU 20 10H
API Number: _____
Rig Name: _____
Location: Eddy Co, NM Nad83 NME
Block: _____
Engineer: _____

NAD83 / New Mexico East (ftUS)	NAD83 (1986)
Projected Coordinate System	Geodetic Coordinate System
Datum: North American Datum 1983 (1986)	Datum: North American Datum 1983 (1986)
Ellipsoid: GRS 1980	Ellipsoid: GRS 1980
EPSG: 2257	EPSG: 4269
North: 599206.7 US Survey Foot	Latitude: 32.647059 Degree
East: 611715.5 US Survey Foot	Longitude: -104.104679 Degree
Convergence: 0.12°	
Declination: 7.53°	
Total Correction: 7.41°	
Datum Transformation: none	

Geodetic Location WGS84

MSL Elevation = 0 m
Latitude = 32° 38' 49.41" N
Longitude = 104° 06' 16.84" W

Magnetic Declination = 7.53 deg	[True North Offset]
Local Gravity = .9988 g	Checksum = 6581
Local Field Strength = 48399 nT	Magnetic Vector X = 23688 nT
Magnetic Dip = 60.42 deg	Magnetic Vector Y = 3131 nT
Magnetic Model = bggm2015.dat	Magnetic Vector Z = 42090 nT
Run Date = October 30, 2015	Magnetic Vector H = 23894 nT

Signed: _____ Date: _____

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