

Submit 1 Copy To Appropriate District Office

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

State of New Mexico
Energy, Minerals and Natural Resources
NM OIL CONSERVATION DIVISION
ARTESIA DISTRICT
OIL CONSERVATION DIVISION
1220 South St. Francis
Santa Fe, NM 87505

Form C-103
Revised July 18, 2013

WELL API NO. 30-015-44757	
5. Indicate Type of Lease STATE ☐ FEE ☒	
6. State Oil & Gas Lease No.	
7. Lease Name or Unit Agreement Name Spud Muffin 31-30	
8. Well Number 738H	
9. OGRID Number 6137	
10. Pool name or Wildcat (98220) PURPLE SAGE; WOLFCAMP	
11. Elevation (Show whether DR, RKB, RT, GR, etc.) 2959.4	

RECEIVED

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well ☐ Gas Well ☒ Other

2. Name of Operator
DEVON ENERGY PRODUCTION COMPANY, LP.

3. Address of Operator
333 WEST SHERIDAN AVENUE, OKC, OK 73102

4. Well Location
Unit Letter P : 335 feet from the South line and 185 feet from the East line
Section 31 Township 23S Range 29E NMPM , County New Mexico

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO: PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐ TEMPORARILY ABANDON ☐ CHANGE PLANS ☐ PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐ DOWNHOLE COMMINGLE ☐ CLOSED-LOOP SYSTEM ☐ OTHER: BWC CHG SHL ☒	SUBSEQUENT REPORT OF: REMEDIAL WORK ☐ ALTERING CASING ☐ COMMENCE DRILLING OPNS. ☐ P AND A ☐ CASING/CEMENT JOB ☐ OTHER: ☐
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13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Devon Energy Production Company, LP Respectfully requests approval to change the Surface Hole per the following:

SURFACE HOLE:

From: Sec. 31, T23S, R29E 335 FSL, 185 FEL

To: Sec. 31, T23S, R29E 335 FSL, 455 FEL

Elevation:

From: 2959.4 to 2960.3

Attachment: New C-102, Drilling Plans, & Directional Survey

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE: Erin Workman TITLE Regulatory Compliance Analyst DATE 10/15/18

Type or print name Erin Workman E-mail address: Erin.workman@dvn.com PHONE: (405)552- 7970

For State Use Only

APPROVED BY: Raymond R. Bodany TITLE Geologist DATE 10-17-18
Conditions of Approval (if any):

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

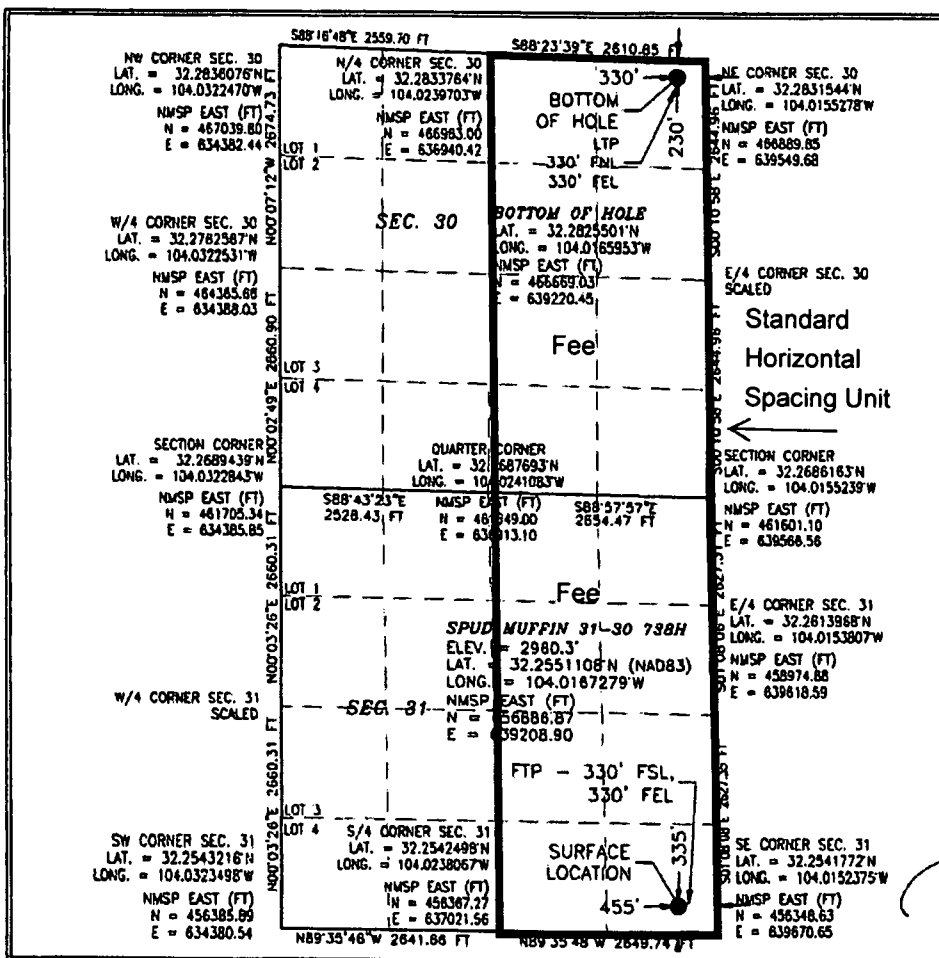
Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office
☒ AMENDED REPORT

¹ API Number 30-015-44757	² Pool Code 98220	³ Pool Name PURPLE SAGE; WOLFCAMP
⁴ Property Code 320827	⁵ Property Name SPUD MUFFIN 31-30	⁶ Well Number 738H
⁷ OGRID No. 6137	⁸ Operator Name DEVON ENERGY PRODUCTION COMPANY, L.P.	⁹ Elevation 2960.3

UL or lot no.	Section	Township	Range	Lot Ida	Feet from the	North/South line	Feet from the	East/West line	County
P	31	23 S	29 E		335	SOUTH	455	EAST	EDDY

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	30	23 S	29 E		230	NORTH	330	EAST	EDDY

¹² Dedicated Acres 640	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. R-14262
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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 horizon 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.

Eric Workman 10/15/18

Printed Name _____

Erin.workman@dvn.com

E-mail Address

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.

AUGUST 29, 2018 JAPAN

Date of Survey: _____

Signature and Seal of Professional Surveyor

Certificate Number: PILIMON F. JARAMILLO, PLS 12797
SURVEY NO. 5954D

RWP 10-17-18

Intent ☒ As Drilled ☐

API #
30-015-44757

Operator Name: DEVON ENERGY PRODUCTION COMPANY, L.P.	Property Name: SPUD MUFFIN 31-30	Well Number 738H
--	--	----------------------------

Kick Off Point (KOP)

UL	Section 30	Township 23S	Range 29E	Lot	Feet 50	From N/S SOUTH	Feet 330	From E/W EAST	County EDDY
Latitude 32.254271					Longitude -104.016327				NAD 83

First Take Point (FTP)

UL P	Section 31	Township 23S	Range 29E	Lot	Feet 330	From N/S SOUTH	Feet 330	From E/W EAST	County EDDY
Latitude 32.2550934					Longitude 104.0163231				NAD 83

Last Take Point (LTP)

UL A	Section 30	Township 23S	Range 29E	Lot	Feet 330	From N/S NORTH	Feet 330	From E/W EAST	County EDDY
Latitude 32.2822751					Longitude 104.0165952				NAD 83

Is this well the defining well for the Horizontal Spacing Unit?

☐ no

Is this well an infill well?

☐ yes

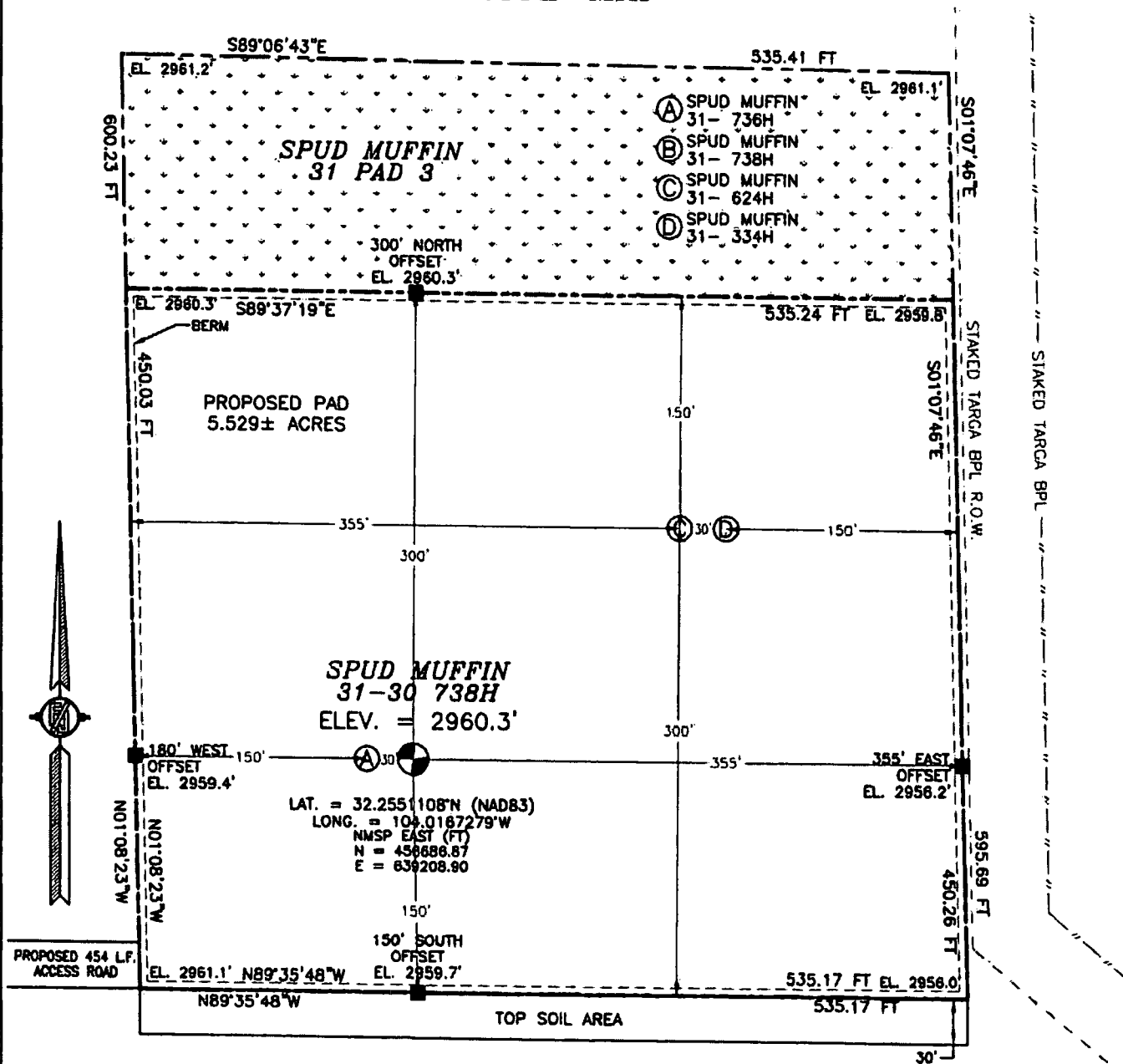
If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #
30-015-45268

Operator Name: Devon Energy Production Company, LP	Property Name: Spud Muffin 31-30	Well Number 624H
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KZ 06/29/2018

**SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP**



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

BEGINNING AT THE JUNCTION OF US 285 AND CR 720, GO EAST ON CR 720 0.8 OF A MILE TO HARROUN ROAD ON THE LEFT. GO NORTH-NORTHEAST ON HARROUN ROAD FOR 3.1 MILES TO A FORK IN THE ROAD. CONTINUE NORTH, LEFT ON SAID HARROUN ROAD 230' TO A LEASE ROAD TO THE LEFT, GO NORTH 0.5 OF A MILE. GO EAST 0.48 OF A MILE TO THE SOUTHWEST PAD OF HARROUN TRUST 31 4H & 5H, THEN FROM SOUTHEAST PAD GO EAST 454' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

**DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H**

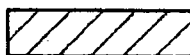
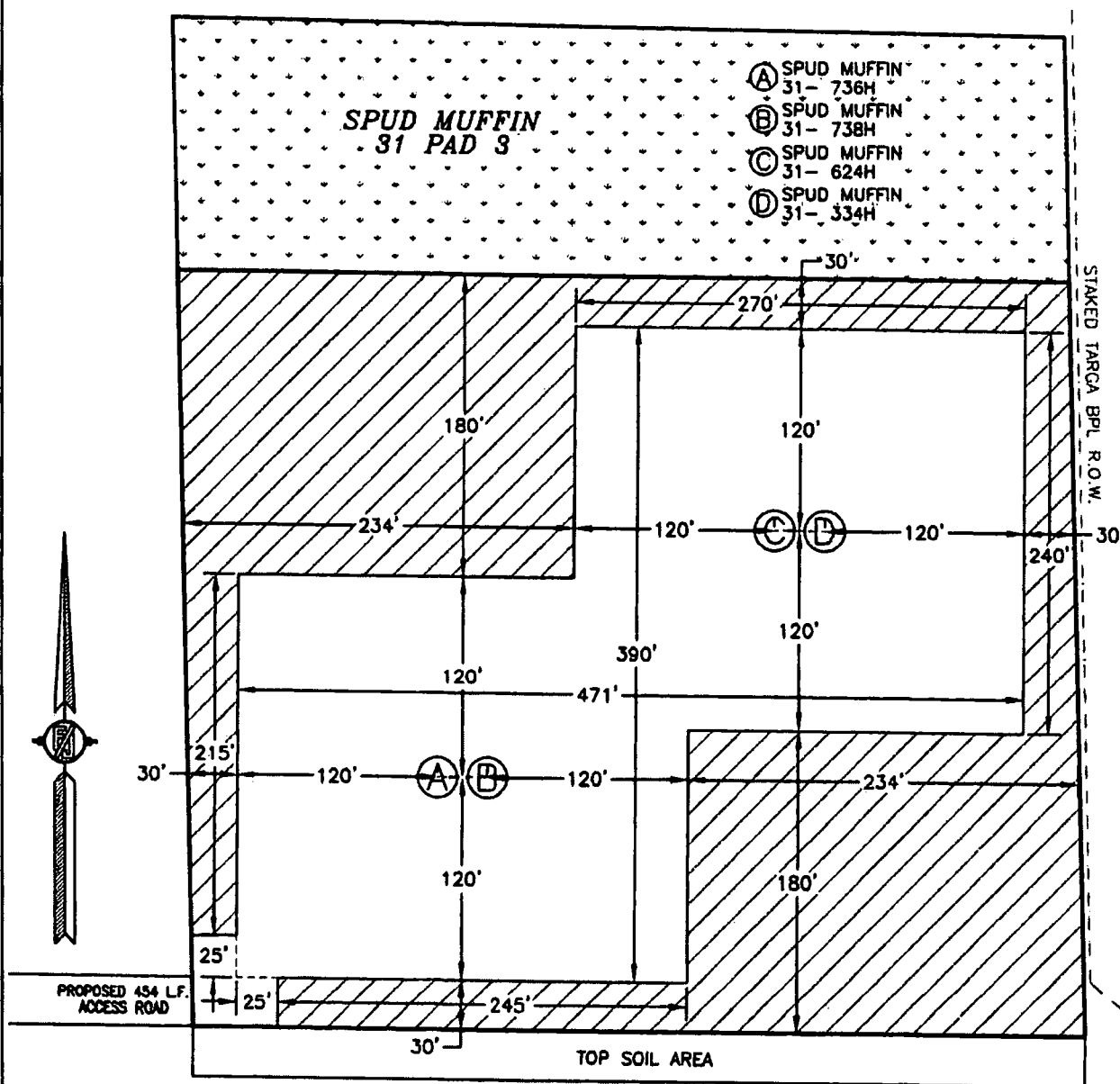
**LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO**

AUGUST 29, 2018

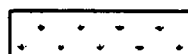
SURVEY NO. 5954D

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

SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
INTERIM SITE BUILD PLAN



DENOTES INTERIM PAD
RECLAMATION AREA



DENOTES GRADING SITE
RECLAMATION AREA

010 50 100 200
SCALE 1" = 100'

2.645± ACRES INTERIM PAD RECLAMATION AREA
1.816± ACRES GRADING SITE RECLAMATION AREA
2.884± ACRES NON-RECLAIMED AREA
7.345± ACRES SPUD MUFFIN 31 PAD 3

DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H
LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AUGUST 29, 2018

SURVEY NO. 5854D

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

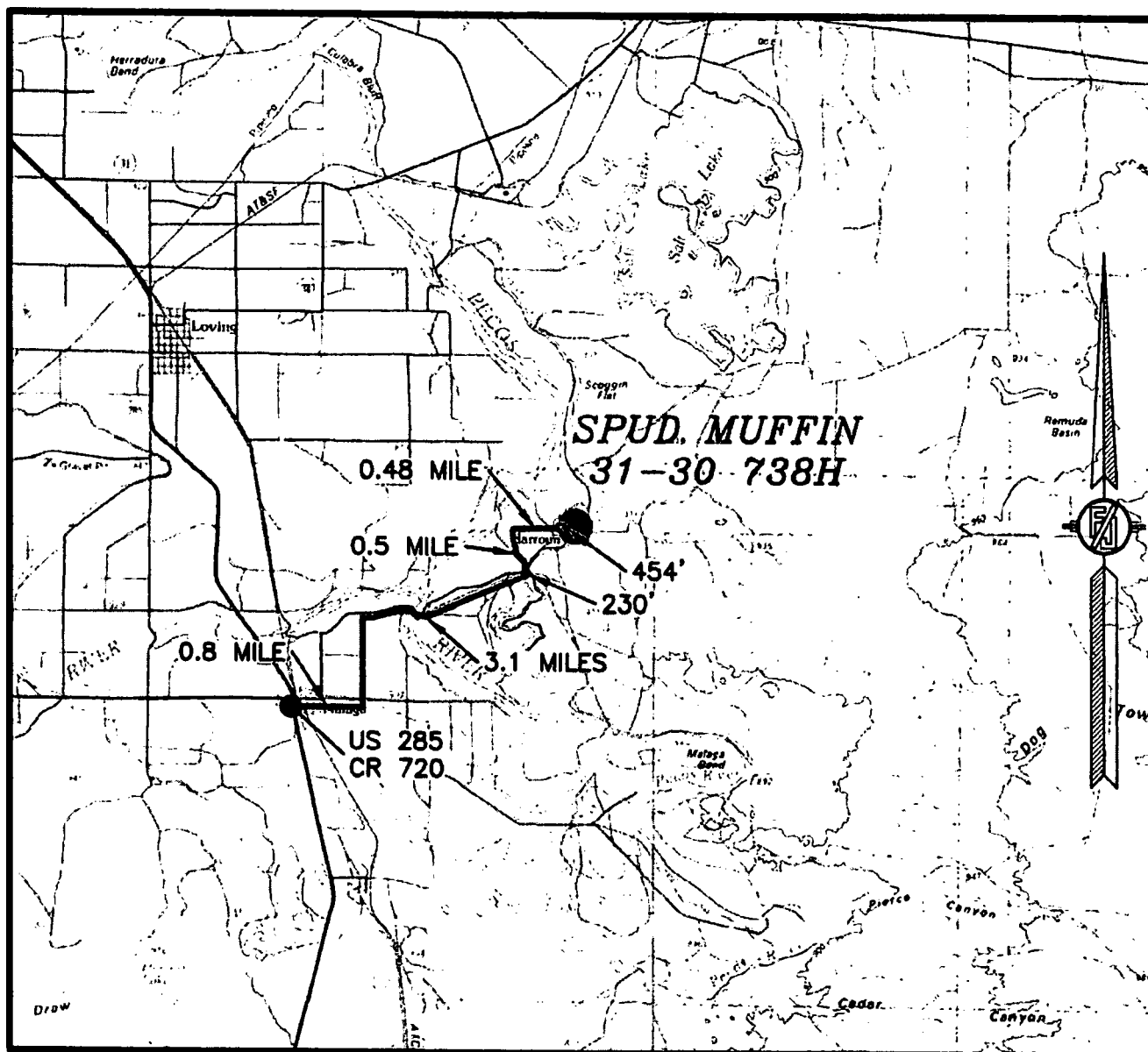
[illegible]

NOT TO SCALE

AUGUST 29, 2018

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 **CARLSBAD, NEW MEXICO** SURVEY NO. 5954D

SECTION 31, TOWNSHIP 23 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

BEGINNING AT THE JUNCTION OF US 285 AND CR 720, GO EAST ON CR 720 0.8 OF A MILE TO HARROUN ROAD ON THE LEFT. GO NORTH-NORTHEAST ON HARROUN ROAD FOR 3.1 MILES TO A FORK IN THE ROAD. CONTINUE NORTH, LEFT ON SAID HARROUN ROAD 230' TO A LEASE ROAD TO THE LEFT, GO NORTH 0.5 OF A MILE. GO EAST 0.48 OF A MILE TO THE SOUTHWEST PAD OF HARROUN TRUST 31 4H & 5H, THEN FROM SOUTHEAST PAD GO EAST 454' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H

LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AUGUST 29, 2018

MADRON SURVEYING, INC.

301 SOUTH CANAL
(575) 234-3341

SURVEY NO. 5954D
CARLSBAD, NEW MEXICO

SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
AERIAL PHOTO



NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
FEB. 2017

DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H

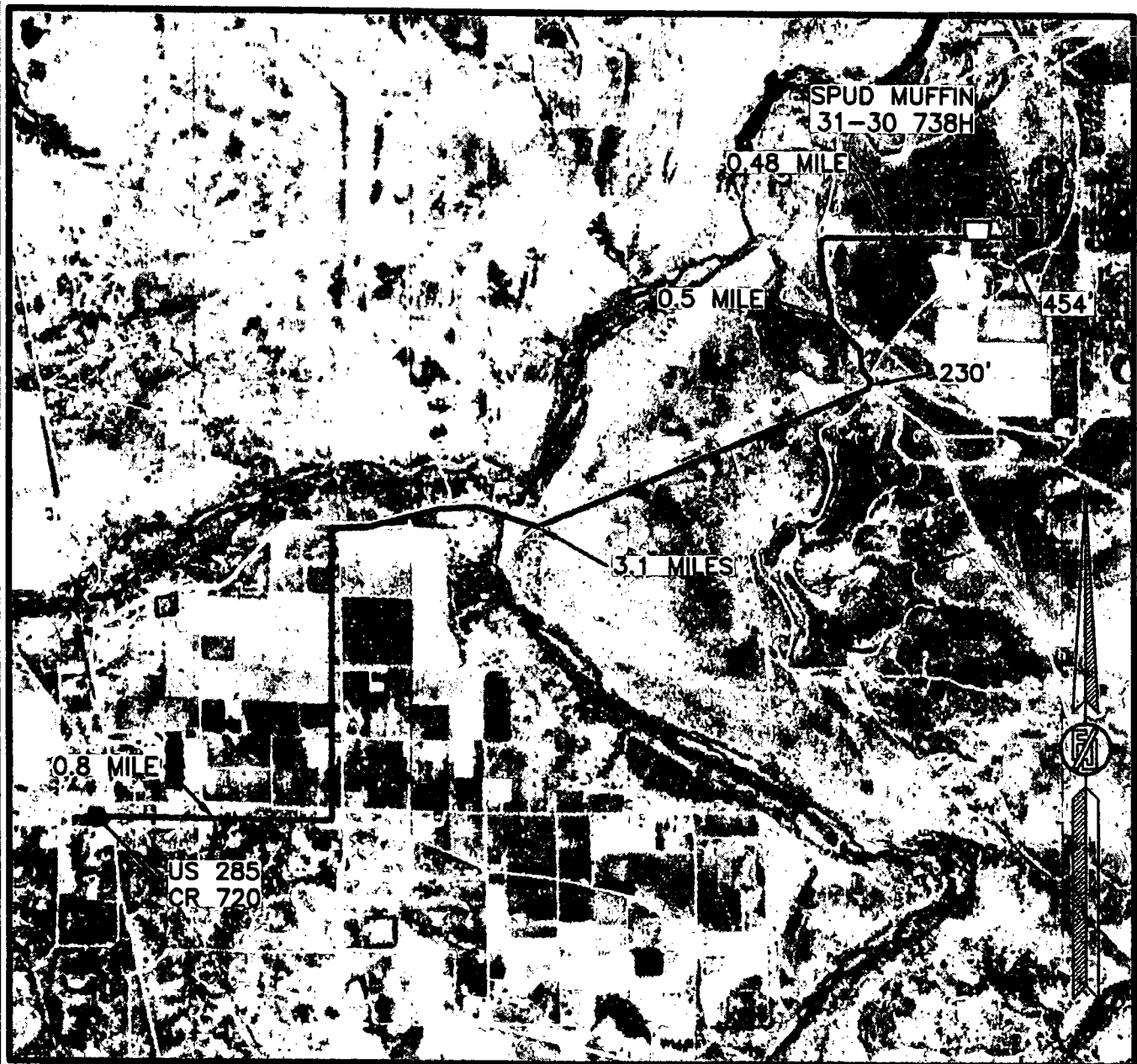
LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AUGUST 29, 2018

SURVEY NO. 5954D

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

SECTION 31, TOWNSHIP 23 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
FEB. 2017

DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H

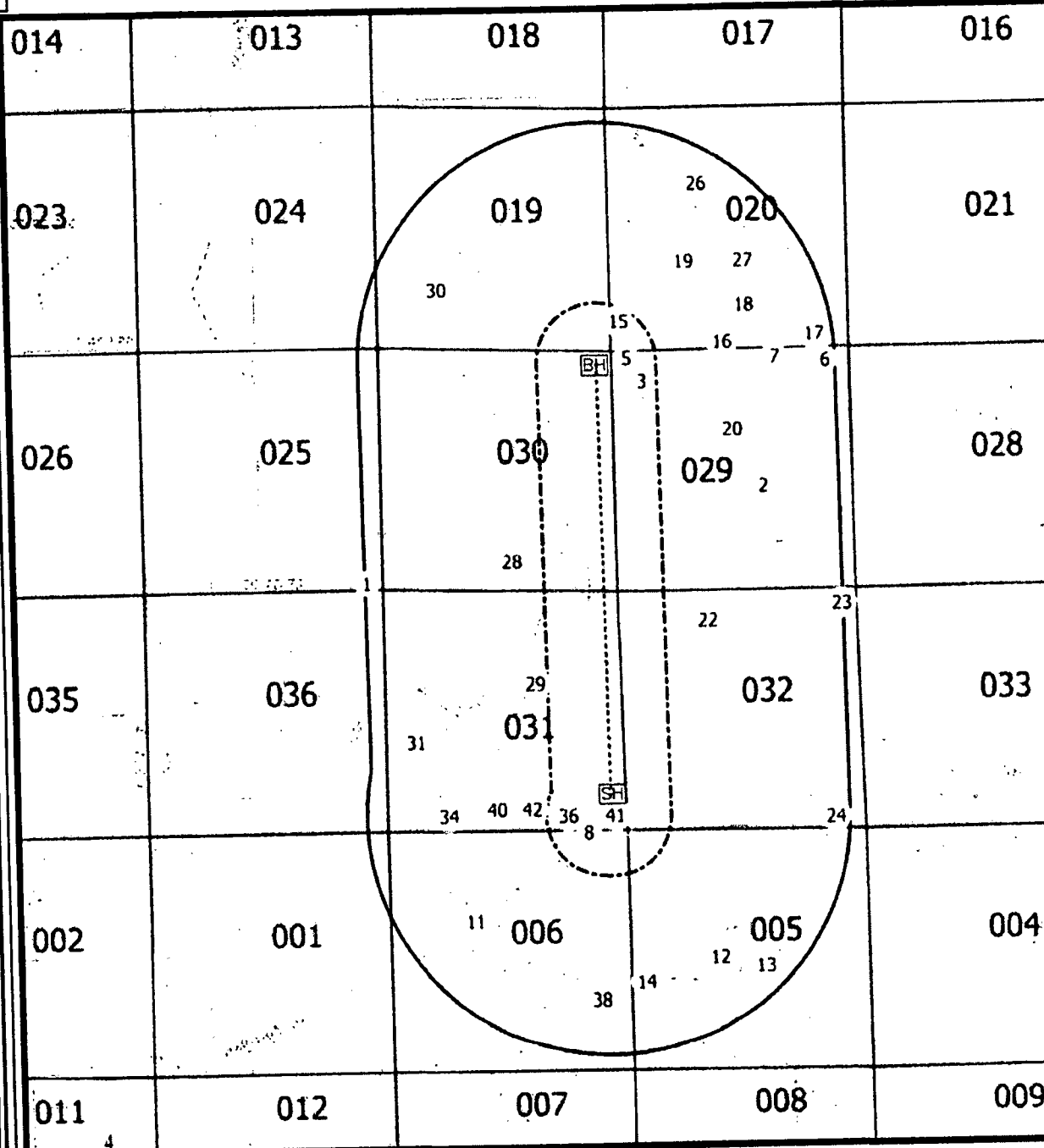
LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AUGUST 29, 2018

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

SURVEY NO. 5954D

1-MILE WELL MAP



WELL DATA FROM NMOC GIS - 8/22/18

SH SURFACE LOCATION

BH BOTTOM OF HOLE

XX WELLS WITHIN 1 MILE

----- WELL PATH

----- 1/4 MILE BOUNDARY

----- 1-MILE BOUNDARY

DEVON ENERGY PRODUCTION COMPANY, L.P.
SPUD MUFFIN 31-30 738H

LOCATED 335 FT. FROM THE SOUTH LINE
AND 455 FT. FROM THE EAST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AUGUST 29, 2018

SURVEY NO. 6954D

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

PLAN VIEW

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

SPUD MUFFIN
31 PAD 3
PROPOSED PAD
EL. = 2960.0'

- Ⓐ SPUD MUFFIN
31- 738H
- Ⓑ SPUD MUFFIN
31- 738H
- Ⓒ SPUD MUFFIN
31- 624H
- Ⓓ SPUD MUFFIN
31- 334H

PAD
CENTER
POINT

STAKED TARGA BPL R.O.W.

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

PROPOSED 454 L.F.
ACCESS ROAD

012 60 120 240
SCALE 1" = 120'

DEVON ENERGY PRODUCTION COMPANY, L.P.
PAD GRADING AND CROSS SECTIONS
FOR SPUD MUFFIN 31-30 738H
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

CUT	FILL	NET
3942 CU. YD	8253 CU. YD	4311 CU. YD (FILL)

EARTHWORK QUANTITIES ARE ESTIMATED

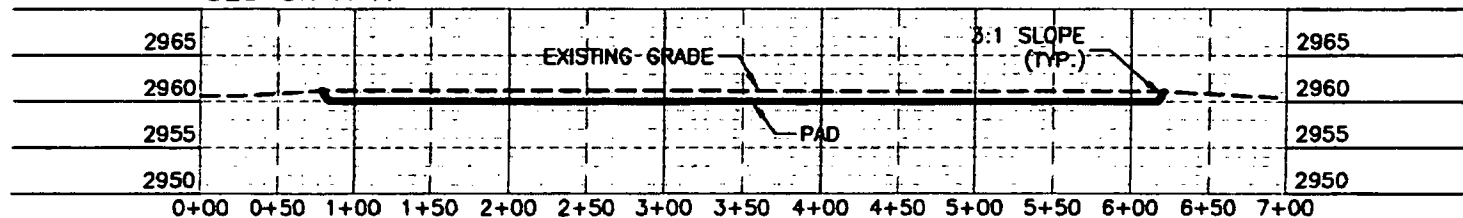
AUGUST 29, 2018

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

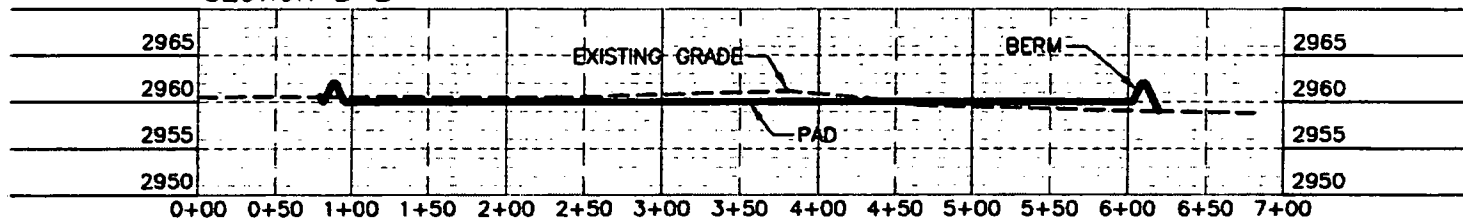
SHEET 1-2
SURVEY NO. 5954D

CROSS-SECTIONS

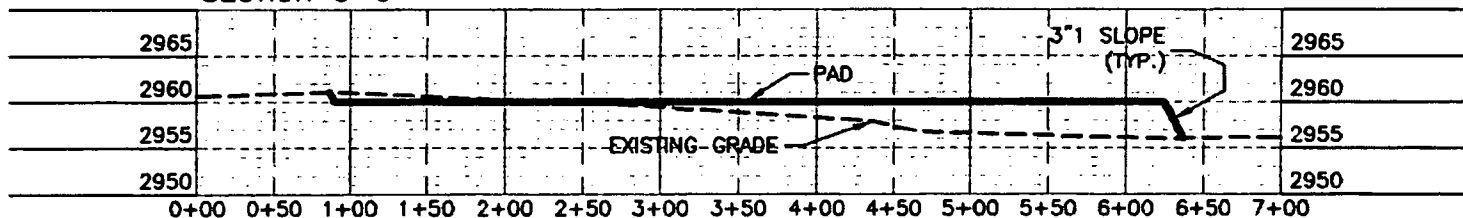
SECTION A-A'



SECTION B-B'



SECTION C-C'



012 60 120 240
SCALE 1" = 120' - 1" = 20' VER

DEVON ENERGY PRODUCTION COMPANY, L.P.
PAD GRADING AND CROSS SECTIONS
FOR SPUD MUFFIN 31-30 738H
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

CUT	FILL	NET
3942 CU. YD	8253 CU. YD	4311 CU. YD (FILL)

EARTHWORK QUANTITIES ARE ESTIMATED

MADRON SURVEYING, INC. 301 SOUTH CANAL (5/15) 234-3341 CARLSBAD, NEW MEXICO

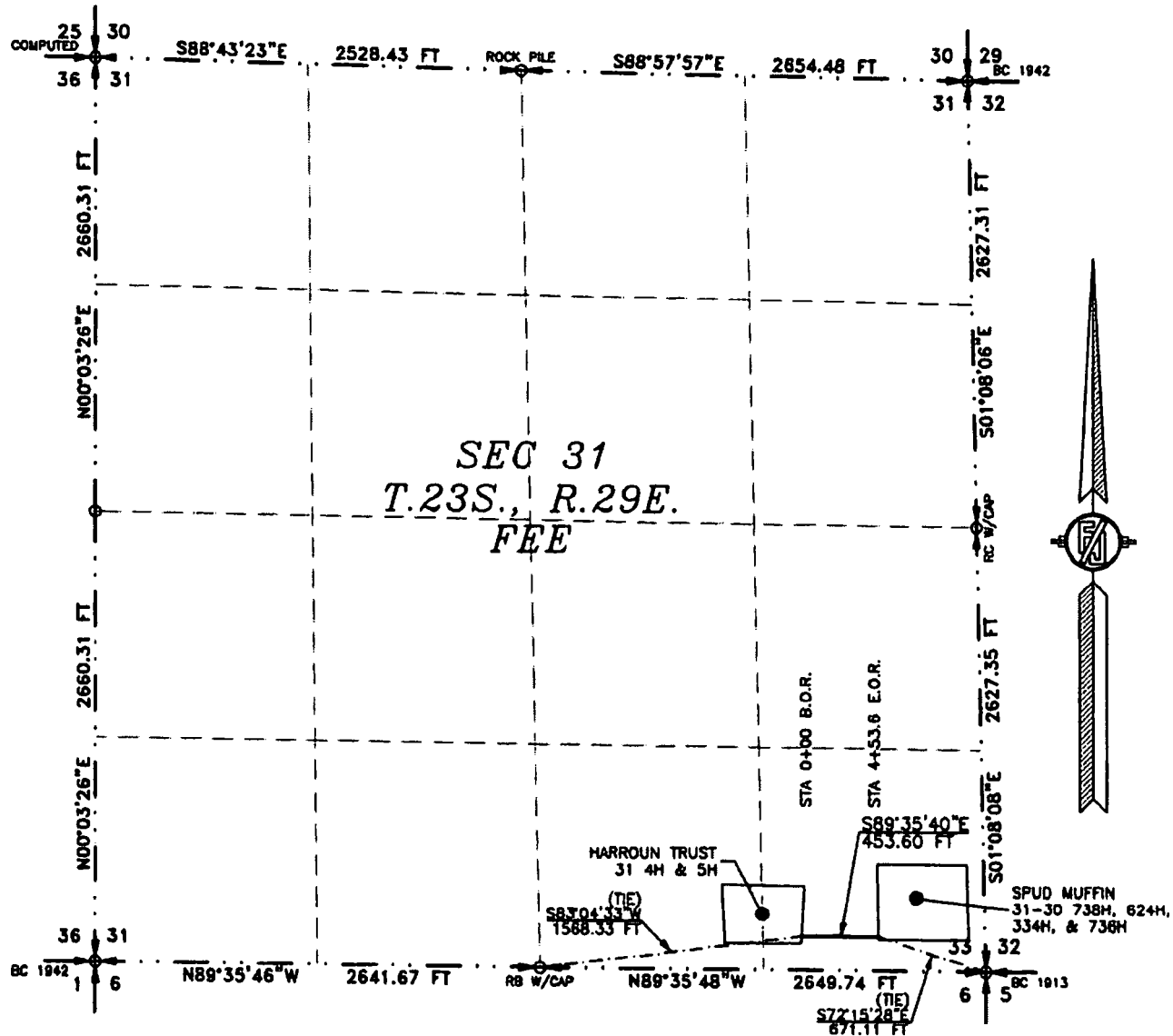
SHEET 2-2
SURVEY NO. 5954D

AUGUST 29, 2018

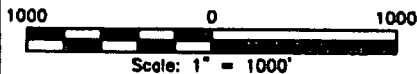
ACCESS ROAD PLAT

ACCESS ROAD FROM HARROUN TRUST 31 4H & 5H WELLPAD
TO SPUD MUFFIN 31-30 738H, 624H, 334H, & 736H

DEVON ENERGY PRODUCTION COMPANY, L.P.
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
AUGUST 29, 2018



SEE NEXT SHEET (2-2) FOR DESCRIPTION



GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES, NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SHEET: 1-2

MADRON SURVEYING, INC. 301 SOUTH CANAL CARLSBAD, NEW MEXICO

SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 29 DAY OF AUGUST 2018

FILMON F. JARAMILLO, S. 12797

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 5945D

ACCESS ROAD PLAT

ACCESS ROAD FROM HARROUN TRUST 31 4H & 6H WELLPAD
TO SPUD MUFFIN 31-30 738H, 624H, 334H, & 736H

DEVON ENERGY PRODUCTION COMPANY, L.P.
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
AUGUST 29, 2018

DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING FEE LAND IN SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., EDDY COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT WITHIN THE SE/4 SE/4 OF SAID SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., WHENCE THE SOUTH QUARTER CORNER OF SAID SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S83°04'33"W, A DISTANCE OF 1568.33 FEET;
THENCE S89°35'40"E A DISTANCE OF 453.60 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE SOUTHEAST CORNER OF SAID SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S72°15'28"E, A DISTANCE OF 671.11 FEET;

SAID STRIP OF LAND BEING 453.60 FEET OR 27.49 RODS IN LENGTH, CONTAINING 0.312 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

SE/4 SE/4 453.60 L.F. 27.49 RODS 0.312 ACRES

SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 31 DAY OF AUGUST 2018

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 5945D

GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SHEET: 2-2

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

Devon Energy, Spud Muffin 31-30 738H

1. Geologic Formations

TVD of target	10931	Pilot hole depth	N/A
MD at TD:	20982	Deepest expected fresh water:	400'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Top Salt	500		
Base of Salt	2700		
Lamar	3106		
Bell Canyon	3157		
Brushy Canyon	5230		
Bone Spring Lime	6812		
1st BSPG Sand	7872		
2nd BSPG Sand	8716		
3rd BSPG Sand	9791		
Wolfcamp	10133		
Wolfcamp XY	10164		
Wolfcamp 100	10268		
Wolfcamp 200	10561		
Wolfcamp 300	10989		

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

Devon Energy, Spud Muffin 31-30 738H

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	400'	13.375"	48	J-55	STC	1.125	1.25	1.6
12.25"	0	2700'	10.75"	40.5	J-55	STC	1.125	1.25	1.6
9.875"	0	10367'	7.625"	29.7	P110	BTC	1.125	1.25	1.6
8.75"	10367'	10,650'	7.625"	29.7	P110	Flushmax III	1.125	1.25	1.6
6.75"	0	20,982'	5.5"	20	P110	Vam SG	1.125	1.25	1.6

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

Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.

A variance is requested to wave the annular clearance guidelines pertaining to casing collars allowing the use of 10-3/4" casing in 12-1/4" hole.

A variance is requested to wave the centralizer requirement for the 7-5/8" flush casing in the 8-3/4" hole and the 5-1/2" SF/Flush casing in the 6-3/4" hole.

Casing Program (Alternate Design I)

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	400'	13.375"	48	J-55	STC	1.125	1.25	1.6
12.25"	0	2700'	10.75"	40.5	J-55	STC	1.125	1.25	1.6
9.875"	0	10650'	8.625"	29.7	P110EC	VAM FJL	1.125	1.25	1.6
7.875"	0	20982'	5.5"	20	P110	Vam SG	1.125	1.25	1.6

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

Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.

A variance is requested to wave the centralizer requirement for the 8-5/8" flush casing in the 9-7/8" hole and the 5-1/2" SF/Flush casing in the 7-7/8" hole.

A variance is requested to wave the annular clearance guidelines pertaining to casing collars allowing the use of 10-3/4" casing in 12-1/4" hole.

8-5/8" Intermediate casing will be kept fluid filled.

Devon Energy, Spud Muffin 31-30 738H

Casing Program (Alternate Design II)

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	400'	13.375"	48	J-55	STC	1.125	1.25	1.6
9.875"	0	10650'	8.625"	29.7	P110EC	VAM FJL	1.125	1.25	1.6
7.875"	0	20982'	5.5"	20	P110	Vam SG	1.125	1.25	1.6

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

Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.

A variance is requested to wave the centralizer requirement for the 8-5/8" flush casing in the 9-7/8" hole and the 5-1/2" SF/Flush casing in the 7-7/8" hole.

8-5/8" Intermediate casing will be kept fluid filled.

	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, Spud Muffin 31-30 738H

3. Cementing Program (Primary Design)

Casing	# Sk	Wt. lb/ gal	H ₂ O gal/sk	Yld ft ³ / sack	Slurry Description
Surface	310	14.8	6.34	1.34	Tail: Class C Cement + 1% Calcium Chloride
Int I	448	12.9	13.5	1.85	Lead: Class H/C + additives
	142	14.8	3.31	1.33	Tail: Class H/C + additives
Int II	804	9	5.31	3.27	Lead: Tuned Light® Cement
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Intermediate II (Bradenhead)	730	14.8	6.32	1.33	Class C Cement + 0.125 lbs/sack Poly-E-Flake
	386	13.2	5.31	1.6	Lead: Class H/C + additives
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Production	800	14.8	6.32	1.33	Class H Cement + 0.125 lbs/sack Poly-E-Flake

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 String	% Excess
Surface	50%
Intermediate	30%
Production	25%

Cementing Program (Alternate Design I)

Casing	# Sk	Wt. lb/ gal	H ₂ O gal/sk	Yld ft ³ / sack	Slurry Description
Surface	310	14.8	6.34	1.34	Tail: Class C Cement + 1% Calcium Chloride
Int I	448	12.9	13.5	1.85	Lead: Class H/C + additives
	142	14.8	3.31	1.33	Tail: Class H/C + additives
Int II	485	9	5.31	3.27	Lead: Tuned Light® Cement
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Intermediate II (Bradenhead)	450	14.8	6.32	1.33	Class C Cement + 0.125 lbs/sack Poly-E-Flake
	386	13.2	5.31	1.6	Tail: Class H/C + additives
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Production	773	14.8	6.32	1.33	Class H Cement + 0.125 lbs/sack Poly-E-Flake

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.

Devon Energy, Spud Muffin 31-30 738H

Casing String	% Excess
Surface	50%
Intermediate	30%
Production	25%

Cementing Program (Alternate Design II)

Casing	# Sks	Wt. lb/ gal	H ₂ O gal/sk	Yld ft ³ / sack	Slurry Description
Surface	310	14.8	6.34	1.34	Tail: Class C Cement + 1% Calcium Chloride
Int	485	9	5.31	3.27	Lead: Tuned Light® Cement
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Intermediate (Bradenhead)	485	14.8	6.32	1.33	Class C Cement + 0.125 lbs/sack Poly-E-Flake
	386	13.2	5.31	1.6	Tail: Class H/C + additives
	108	14.5	3.31	1.6	Tail: Class H/C + additives
Production	773	14.8	6.32	1.33	Class H Cement + 0.125 lbs/sack Poly-E-Flake

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:
Intermediate	13-5/8"	5M	Annular	X	50% of rated working pressure
			Blind Ram	X	5M
			Pipe Ram		
			Double Ram	X	
			Other*		
Production	6-3/4"	5M	Annular (5M)	X	50% of rated working pressure
			Blind Ram	X	5M
			Pipe Ram		
			Double Ram	X	
			Other *		
			Annular		
			Blind Ram		
			Pipe Ram		
			Double Ram		

Devon Energy, Spud Muffin 31-30 738H

			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.
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 5000 (5M) psi. - Wellhead will be installed by wellhead 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 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. - 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 Energy, Spud Muffin 31-30 738H

- Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.

After running surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 5M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 5,000 psi high pressure test. The 5,000 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.

13-5/8" BOP/BOPE system will have been tested to 10M rating prior to drilling out intermediate casing.

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 5,000 psi WP.

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		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	400'	FW Gel	8.6-8.8	28-34	N/C
400'	2700'	Sat Brine/DBE	9.5-10.1	34-40	N/C - 6
2700'	10650'	Cut Brine/DBE	9.0-9.8	32-36	N/C - 6
10650'	TD	OBM	10.5-12.0	45-65	N/C-6

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
---	-----------------------------

Devon Energy, Spud Muffin 31-30 738H

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
X 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	6817psi
Abnormal Temperature	No

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

Hydrogen Sulfide (H ₂ S) monitors will be installed prior to drilling out the surface shoe. If H ₂ S 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	H ₂ S is present
Y	H ₂ S Plan attached

8. Other facets of operation

Is this a walking operation? Potentially

1. In the event the spudder rig is unable to drill the surface holes the drilling rig will batch drill the surface holes and run/cement surface casing; walking the rig to next wells on the pad.
2. The drilling rig will then batch drill the intermediate sections with either OBM or cut brine and run/cement intermediate casing; the wellbore will be isolated with a blind flange and pressure gauge installed for monitoring the well before walking to the next well.
3. The drilling rig will then batch drill the production hole sections on the wells with OBM, run/cement production casing, and install TA caps or tubing heads for completions.

NOTE: During batch operations the drilling rig will be moved from well to well however, it will not be removed from the pad until all wells have production casing run/cemented.

Devon Energy, Spud Muffin 31-30 738H

Will be pre-setting casing? Potentially

1. Spudder rig will move in and drill surface hole.
 - a. Rig will utilize fresh water based mud to drill surface hole to TD. Solids control will be handled entirely on a closed loop basis.
2. After drilling the surface hole section, the spudder rig will run casing and cement following all of the applicable rules and regulations (OnShore Order 2, all COAs and NMOCD regulations).
3. The wellhead will be installed and tested once the surface casing is cut off and the WOC time has been reached.
4. A blind flange with the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with a pressure gauge installed on the wellhead.
5. Spudder rig operations is expected to take 4-5 days per well on a multi well pad.
6. The NMOCD will be contacted and notified 24 hours prior to commencing spudder rig operations.
7. Drilling operations will be performed with the drilling rig. At that time an approved BOP stack will be nipped up and tested on the wellhead before drilling operations commences on each well.
 - a. The NMOCD will be contacted / notified 24 hours before the drilling rig moves back on to the pad with the pre-set surface casing.

Attachments

- ☒ Directional Plan
☐ Other, describe

WCDSC Permian NM

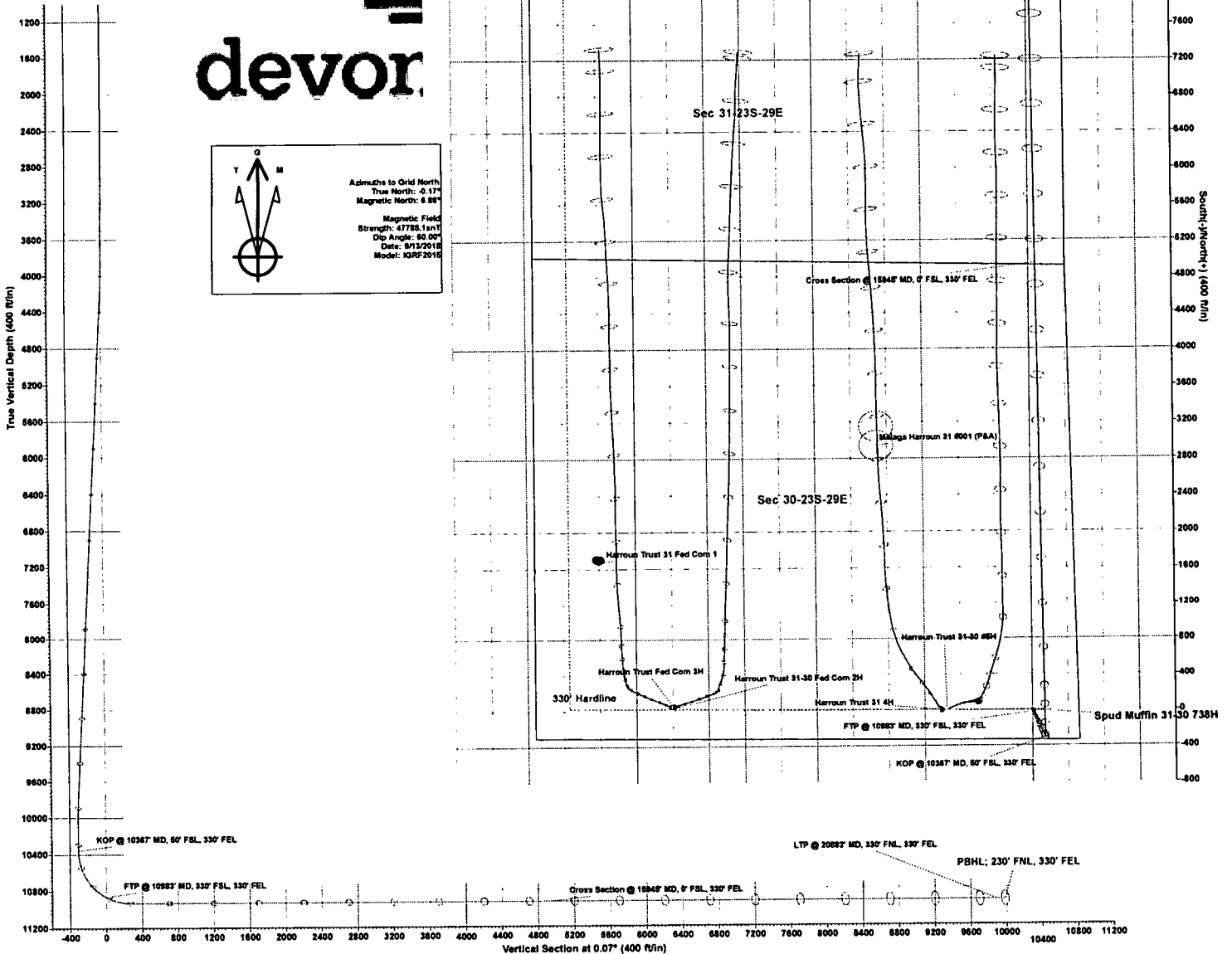
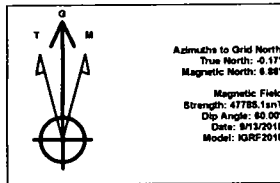
WELL DETAILS: Spud Muffin 31-30 738H

RKB @ 2985.30ft
2960.30
Northing 456888.87 Easting 639208.90 Latitude 32.255111 Longitude -104.016

SECTION DETAILS Permit Plan 2

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4000.00	0.00	0.00	4000.00	0.00	0.00	0.00	0.00	
4261.65	3.27	157.71	4261.51	-6.91	2.83	1.25	-6.91	
9799.24	3.27	157.71	9790.07	-288.24	122.84	0.00	-299.10	
5 10017.28	0.00	0.00	10008.00	-305.00	125.00	1.50	-304.86	KOP @ 10367' MD, 50' FSL, 330' FEL
6 10367.32	0.00	0.00	10358.04	-305.00	125.00	0.00	-304.86	
7 11267.32	90.00	359.37	10931.00	267.82	118.68	10.00	268.06	
8 20982.17	90.00	359.37	10931.00	9982.18	11.55	0.00	9982.19	PBHL: 230' FNL, 330' FEL

devor



WCDSC Permian NM

Eddy County (NAD 83 NM Eastern)

Sec 31-T23S-R29E

Spud Muffin 31-30 738H

Wellbore #1

Plan: Permit Plan 2

Standard Planning Report - Geographic

04 October, 2018

Planning Report - Geographic

Database: EDM r5000.141_Prod US
Company: WCDSC Permian NM
Project: Eddy County (NAD 83 NM Eastern)
Site: Sec 31-T23S-R29E
Well: Spud Muffin 31-30 738H
Wellbore: Wellbore #1
Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
TVD Reference: RKB @ 2985.30ft
MD Reference: RKB @ 2985.30ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy County (NAD 83 NM Eastern)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 31-T23S-R29E			
Site Position:		Northing:	467,039.80 usft	Latitude: 32.283608
From:	Map	Easting:	634,382.44 usft	Longitude: -104.032247
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence: 0.16 "

Well	Spud Muffin 31-30 738H			
Well Position	+N/-S	0.00 ft	Northing:	456,686.87 usft
	+E/-W	0.00 ft	Easting:	639,208.90 usft
Position Uncertainty	0.50 ft	Wellhead Elevation:		Ground Level: 2,960.30 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/13/2018	7.03	60.00	47,785.09086997

Design	Permit Plan 2				
Audit Notes:					
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	0.07	

Plan Survey Tool Program	Date 10/4/2018				
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	20,982.17 Permit Plan 2 (Wellbore #1)	MWD+HDGM OWSG MWD + HDGM		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,261.65	3.27	157.71	4,261.51	-6.91	2.83	1.25	1.25	0.00	157.71	
9,799.24	3.27	157.71	9,790.08	-299.24	122.64	0.00	0.00	0.00	0.00	
10,017.28	0.00	0.00	10,008.00	-305.00	125.00	1.50	-1.50	0.00	180.00	
10,367.32	0.00	0.00	10,358.04	-305.00	125.00	0.00	0.00	0.00	0.00	
11,267.32	90.00	359.37	10,931.00	267.92	118.68	10.00	10.00	0.00	359.37	PBHL2 - Spud Muffin
20,982.17	90.00	359.37	10,931.00	9,982.18	11.55	0.00	0.00	0.00	0.00	PBHL2 - Spud Muffin

Planning Report - Geographic

Database: EDM r5000.141_Prod US
 Company: WCDSC Permian NM
 Project: Eddy County (NAD 83 NM Eastern)
 Site: Sec 31-T23S-R29E
 Well: Spud Muffin 31-30 738H
 Wellbore: Wellbore #1
 Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
 TVD Reference: RKB @ 2985.30ft
 MD Reference: RKB @ 2985.30ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
100.00	0.00	0.00	100.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
200.00	0.00	0.00	200.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
300.00	0.00	0.00	300.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
400.00	0.00	0.00	400.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
500.00	0.00	0.00	500.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
600.00	0.00	0.00	600.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
700.00	0.00	0.00	700.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
800.00	0.00	0.00	800.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
900.00	0.00	0.00	900.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,000.00	0.00	0.00	1,000.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,100.00	0.00	0.00	1,100.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,200.00	0.00	0.00	1,200.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,300.00	0.00	0.00	1,300.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,400.00	0.00	0.00	1,400.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,500.00	0.00	0.00	1,500.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,600.00	0.00	0.00	1,600.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,700.00	0.00	0.00	1,700.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,800.00	0.00	0.00	1,800.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
1,900.00	0.00	0.00	1,900.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,000.00	0.00	0.00	2,000.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,100.00	0.00	0.00	2,100.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,200.00	0.00	0.00	2,200.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,300.00	0.00	0.00	2,300.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,400.00	0.00	0.00	2,400.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,500.00	0.00	0.00	2,500.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,600.00	0.00	0.00	2,600.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,700.00	0.00	0.00	2,700.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,800.00	0.00	0.00	2,800.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
2,900.00	0.00	0.00	2,900.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,000.00	0.00	0.00	3,000.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,100.00	0.00	0.00	3,100.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,200.00	0.00	0.00	3,200.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,300.00	0.00	0.00	3,300.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,400.00	0.00	0.00	3,400.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,500.00	0.00	0.00	3,500.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,600.00	0.00	0.00	3,600.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,700.00	0.00	0.00	3,700.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,800.00	0.00	0.00	3,800.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
3,900.00	0.00	0.00	3,900.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
4,000.00	0.00	0.00	4,000.00	0.00	0.00	456,686.87	639,208.90	32.255111	-104.016728
4,100.00	1.25	157.71	4,099.99	-1.01	0.41	456,685.86	639,209.32	32.255108	-104.016727
4,200.00	2.50	157.71	4,199.94	-4.04	1.65	456,682.83	639,210.56	32.255100	-104.016723
4,261.65	3.27	157.71	4,261.51	-6.91	2.83	456,679.96	639,211.74	32.255092	-104.016719
4,300.00	3.27	157.71	4,299.80	-8.93	3.66	456,677.94	639,212.57	32.255086	-104.016716
4,400.00	3.27	157.71	4,399.63	-14.21	5.82	456,672.66	639,214.73	32.255072	-104.016709
4,500.00	3.27	157.71	4,499.47	-19.49	7.99	456,667.38	639,216.89	32.255057	-104.016703
4,600.00	3.27	157.71	4,599.31	-24.77	10.15	456,662.10	639,219.06	32.255043	-104.016696
4,700.00	3.27	157.71	4,699.14	-30.05	12.32	456,656.82	639,221.22	32.255028	-104.016689
4,800.00	3.27	157.71	4,798.98	-35.33	14.48	456,651.54	639,223.38	32.255014	-104.016682
4,900.00	3.27	157.71	4,898.82	-40.61	16.64	456,646.26	639,225.55	32.254999	-104.016675
5,000.00	3.27	157.71	4,998.66	-45.89	18.81	456,640.98	639,227.71	32.254985	-104.016668
5,100.00	3.27	157.71	5,098.49	-51.17	20.97	456,635.70	639,229.87	32.254970	-104.016661
5,200.00	3.27	157.71	5,198.33	-56.44	23.13	456,630.43	639,232.04	32.254956	-104.016654
5,300.00	3.27	157.71	5,298.17	-61.72	25.30	456,625.15	639,234.20	32.254941	-104.016647

Planning Report - Geographic

Database: EDM r5000.141_Prod US
Company: WCDSC Permian NM
Project: Eddy County (NAD 83 NM Eastern)
Site: Sec 31-T23S-R29E
Well: Spud Muffin 31-30 738H
Wellbore: Wellbore #1
Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
TVD Reference: RKB @ 2985.30ft
MD Reference: RKB @ 2985.30ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,400.00	3.27	157.71	5,398.00	-67.00	27.46	456,619.87	639,236.36	32.254926	-104.016640
5,500.00	3.27	157.71	5,497.84	-72.28	29.62	456,614.59	639,238.53	32.254912	-104.016633
5,600.00	3.27	157.71	5,597.68	-77.56	31.79	456,609.31	639,240.69	32.254897	-104.016626
5,700.00	3.27	157.71	5,697.52	-82.84	33.95	456,604.03	639,242.86	32.254883	-104.016619
5,800.00	3.27	157.71	5,797.35	-88.12	36.11	456,598.75	639,245.02	32.254868	-104.016612
5,900.00	3.27	157.71	5,897.19	-93.40	38.28	456,593.47	639,247.18	32.254854	-104.016605
6,000.00	3.27	157.71	5,997.03	-98.68	40.44	456,588.19	639,249.35	32.254839	-104.016598
6,100.00	3.27	157.71	6,096.86	-103.96	42.61	456,582.91	639,251.51	32.254825	-104.016591
6,200.00	3.27	157.71	6,196.70	-109.24	44.77	456,577.63	639,253.67	32.254810	-104.016584
6,300.00	3.27	157.71	6,296.54	-114.51	46.93	456,572.36	639,255.84	32.254796	-104.016577
6,400.00	3.27	157.71	6,396.38	-119.79	49.10	456,567.08	639,258.00	32.254781	-104.016571
6,500.00	3.27	157.71	6,496.21	-125.07	51.26	456,561.80	639,260.16	32.254767	-104.016564
6,600.00	3.27	157.71	6,596.05	-130.35	53.42	456,556.52	639,262.33	32.254752	-104.016557
6,700.00	3.27	157.71	6,695.89	-135.63	55.59	456,551.24	639,264.49	32.254738	-104.016550
6,800.00	3.27	157.71	6,795.72	-140.91	57.75	456,545.96	639,266.65	32.254723	-104.016543
6,900.00	3.27	157.71	6,895.56	-146.19	59.91	456,540.68	639,268.82	32.254709	-104.016536
7,000.00	3.27	157.71	6,995.40	-151.47	62.08	456,535.40	639,270.98	32.254694	-104.016529
7,100.00	3.27	157.71	7,095.23	-156.75	64.24	456,530.12	639,273.14	32.254679	-104.016522
7,200.00	3.27	157.71	7,195.07	-162.03	66.40	456,524.84	639,275.31	32.254665	-104.016515
7,300.00	3.27	157.71	7,294.91	-167.31	68.57	456,519.56	639,277.47	32.254650	-104.016508
7,400.00	3.27	157.71	7,394.75	-172.58	70.73	456,514.29	639,279.64	32.254636	-104.016501
7,500.00	3.27	157.71	7,494.58	-177.86	72.90	456,509.01	639,281.80	32.254621	-104.016494
7,600.00	3.27	157.71	7,594.42	-183.14	75.06	456,503.73	639,283.96	32.254607	-104.016487
7,700.00	3.27	157.71	7,694.26	-188.42	77.22	456,498.45	639,286.13	32.254592	-104.016480
7,800.00	3.27	157.71	7,794.09	-193.70	79.39	456,493.17	639,288.29	32.254578	-104.016473
7,900.00	3.27	157.71	7,893.93	-198.98	81.55	456,487.89	639,290.45	32.254563	-104.016466
8,000.00	3.27	157.71	7,993.77	-204.26	83.71	456,482.61	639,292.62	32.254549	-104.016459
8,100.00	3.27	157.71	8,093.61	-209.54	85.88	456,477.33	639,294.78	32.254534	-104.016452
8,200.00	3.27	157.71	8,193.44	-214.82	88.04	456,472.05	639,296.94	32.254520	-104.016445
8,300.00	3.27	157.71	8,293.28	-220.10	90.20	456,466.77	639,299.11	32.254505	-104.016438
8,400.00	3.27	157.71	8,393.12	-225.38	92.37	456,461.49	639,301.27	32.254491	-104.016432
8,500.00	3.27	157.71	8,492.95	-230.66	94.53	456,456.22	639,303.43	32.254476	-104.016425
8,600.00	3.27	157.71	8,592.79	-235.93	96.69	456,450.94	639,305.60	32.254462	-104.016418
8,700.00	3.27	157.71	8,692.63	-241.21	98.86	456,445.66	639,307.76	32.254447	-104.016411
8,800.00	3.27	157.71	8,792.47	-246.49	101.02	456,440.38	639,309.93	32.254432	-104.016404
8,900.00	3.27	157.71	8,892.30	-251.77	103.19	456,435.10	639,312.09	32.254418	-104.016397
9,000.00	3.27	157.71	8,992.14	-257.05	105.35	456,429.82	639,314.25	32.254403	-104.016390
9,100.00	3.27	157.71	9,091.98	-262.33	107.51	456,424.54	639,316.42	32.254389	-104.016383
9,200.00	3.27	157.71	9,191.81	-267.61	109.68	456,419.26	639,318.58	32.254374	-104.016376
9,300.00	3.27	157.71	9,291.65	-272.89	111.84	456,413.98	639,320.74	32.254360	-104.016369
9,400.00	3.27	157.71	9,391.49	-278.17	114.00	456,408.70	639,322.91	32.254345	-104.016362
9,500.00	3.27	157.71	9,491.33	-283.45	116.17	456,403.42	639,325.07	32.254331	-104.016355
9,600.00	3.27	157.71	9,591.16	-288.73	118.33	456,398.15	639,327.23	32.254316	-104.016348
9,700.00	3.27	157.71	9,691.00	-294.00	120.49	456,392.87	639,329.40	32.254302	-104.016341
9,799.24	3.27	157.71	9,790.08	-299.24	122.64	456,387.63	639,331.56	32.254287	-104.016334
9,800.00	3.26	157.71	9,790.84	-299.28	122.66	456,387.59	639,331.56	32.254287	-104.016334
9,900.00	1.76	157.71	9,890.74	-303.33	124.32	456,383.54	639,333.22	32.254276	-104.016329
10,000.00	0.26	157.71	9,990.72	-304.96	124.99	456,381.91	639,333.89	32.254272	-104.016327
10,017.28	0.00	0.00	10,008.00	-305.00	125.00	456,381.87	639,333.90	32.254271	-104.016327
10,100.00	0.00	0.00	10,090.72	-305.00	125.00	456,381.87	639,333.90	32.254271	-104.016327
10,200.00	0.00	0.00	10,190.72	-305.00	125.00	456,381.87	639,333.90	32.254271	-104.016327
10,300.00	0.00	0.00	10,290.72	-305.00	125.00	456,381.87	639,333.90	32.254271	-104.016327
10,367.32	0.00	0.00	10,358.04	-305.00	125.00	456,381.87	639,333.90	32.254271	-104.016327

KOP @ 10367' MD, 50' FSL, 330' FEL

Planning Report - Geographic

Database: EDM r5000.141_Prod US
Company: WCDSC Permian NM
Project: Eddy County (NAD 83 NM Eastern)
Site: Sec 31-T23S-R29E
Well: Spud Muffin 31-30 738H
Wellbore: Wellbore #1
Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
TVD Reference: RKB @ 2985.30ft
MD Reference: RKB @ 2985.30ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,400.00	3.27	359.37	10,390.70	-304.07	124.99	456,382.80	639,333.89	32.254274	-104.016327
10,500.00	13.27	359.37	10,489.54	-289.71	124.83	456,397.16	639,333.74	32.254313	-104.016327
10,600.00	23.27	359.37	10,584.38	-258.40	124.49	456,428.47	639,333.39	32.254400	-104.016328
10,700.00	33.27	359.37	10,672.34	-211.11	123.96	456,475.76	639,332.87	32.254530	-104.016329
10,800.00	43.27	359.37	10,750.75	-149.25	123.28	456,537.62	639,332.19	32.254700	-104.016331
10,900.00	53.27	359.37	10,817.23	-74.73	122.46	456,612.14	639,331.36	32.254904	-104.016333
10,982.84	61.55	359.37	10,861.81	-5.00	121.69	456,681.87	639,330.60	32.255096	-104.016335
FTP @ 10983' MD, 330' FSL, 330' FEL									
11,000.00	63.27	359.37	10,869.76	10.21	121.52	456,697.08	639,330.43	32.255138	-104.016335
11,100.00	73.27	359.37	10,906.74	102.98	120.50	456,789.85	639,329.40	32.255393	-104.016337
11,200.00	83.27	359.37	10,927.05	200.76	119.42	456,887.63	639,328.33	32.255662	-104.016340
11,267.32	90.00	359.37	10,931.00	267.92	118.68	456,954.79	639,327.59	32.255846	-104.016342
11,300.00	90.00	359.37	10,931.00	300.60	118.32	456,987.47	639,327.23	32.255936	-104.016343
11,400.00	90.00	359.37	10,931.00	400.59	117.22	457,087.46	639,326.12	32.256211	-104.016345
11,500.00	90.00	359.37	10,931.00	500.59	116.12	457,187.46	639,325.02	32.256486	-104.016348
11,600.00	90.00	359.37	10,931.00	600.58	115.01	457,287.45	639,323.92	32.256761	-104.016350
11,700.00	90.00	359.37	10,931.00	700.58	113.91	457,387.44	639,322.81	32.257036	-104.016353
11,800.00	90.00	359.37	10,931.00	800.57	112.81	457,487.44	639,321.71	32.257311	-104.016356
11,900.00	90.00	359.37	10,931.00	900.56	111.70	457,587.43	639,320.61	32.257585	-104.016358
12,000.00	90.00	359.37	10,931.00	1,000.56	110.60	457,687.43	639,319.51	32.257860	-104.016361
12,100.00	90.00	359.37	10,931.00	1,100.55	109.50	457,787.42	639,318.40	32.258135	-104.016363
12,200.00	90.00	359.37	10,931.00	1,200.55	108.40	457,887.41	639,317.30	32.258410	-104.016366
12,300.00	90.00	359.37	10,931.00	1,300.54	107.29	457,987.41	639,316.20	32.258685	-104.016369
12,400.00	90.00	359.37	10,931.00	1,400.53	106.19	458,087.40	639,315.09	32.258960	-104.016371
12,500.00	90.00	359.37	10,931.00	1,500.53	105.09	458,187.39	639,313.99	32.259235	-104.016374
12,600.00	90.00	359.37	10,931.00	1,600.52	103.99	458,287.39	639,312.89	32.259510	-104.016377
12,700.00	90.00	359.37	10,931.00	1,700.51	102.88	458,387.38	639,311.79	32.259784	-104.016379
12,800.00	90.00	359.37	10,931.00	1,800.51	101.78	458,487.38	639,310.68	32.260059	-104.016382
12,900.00	90.00	359.37	10,931.00	1,900.50	100.68	458,587.37	639,309.58	32.260334	-104.016384
13,000.00	90.00	359.37	10,931.00	2,000.50	99.57	458,687.36	639,308.48	32.260609	-104.016387
13,100.00	90.00	359.37	10,931.00	2,100.49	98.47	458,787.36	639,307.38	32.260884	-104.016390
13,200.00	90.00	359.37	10,931.00	2,200.48	97.37	458,887.35	639,306.27	32.261159	-104.016392
13,300.00	90.00	359.37	10,931.00	2,300.48	96.27	458,987.34	639,305.17	32.261434	-104.016395
13,400.00	90.00	359.37	10,931.00	2,400.47	95.16	459,087.34	639,304.07	32.261709	-104.016397
13,500.00	90.00	359.37	10,931.00	2,500.47	94.06	459,187.33	639,302.96	32.261983	-104.016400
13,600.00	90.00	359.37	10,931.00	2,600.46	92.96	459,287.33	639,301.86	32.262258	-104.016403
13,700.00	90.00	359.37	10,931.00	2,700.45	91.85	459,387.32	639,300.76	32.262533	-104.016405
13,800.00	90.00	359.37	10,931.00	2,800.45	90.75	459,487.31	639,299.66	32.262808	-104.016408
13,900.00	90.00	359.37	10,931.00	2,900.44	89.65	459,587.31	639,298.55	32.263083	-104.016410
14,000.00	90.00	359.37	10,931.00	3,000.44	88.55	459,687.30	639,297.45	32.263358	-104.016413
14,100.00	90.00	359.37	10,931.00	3,100.43	87.44	459,787.29	639,296.35	32.263633	-104.016416
14,200.00	90.00	359.37	10,931.00	3,200.42	86.34	459,887.29	639,295.25	32.263908	-104.016418
14,300.00	90.00	359.37	10,931.00	3,300.42	85.24	459,987.28	639,294.14	32.264182	-104.016421
14,400.00	90.00	359.37	10,931.00	3,400.41	84.14	460,087.28	639,293.04	32.264457	-104.016424
14,500.00	90.00	359.37	10,931.00	3,500.41	83.03	460,187.27	639,291.94	32.264732	-104.016426
14,600.00	90.00	359.37	10,931.00	3,600.40	81.93	460,287.26	639,290.83	32.265007	-104.016429
14,700.00	90.00	359.37	10,931.00	3,700.39	80.83	460,387.26	639,289.73	32.265282	-104.016431
14,800.00	90.00	359.37	10,931.00	3,800.39	79.72	460,487.25	639,288.63	32.265557	-104.016434
14,900.00	90.00	359.37	10,931.00	3,900.38	78.62	460,587.24	639,287.53	32.265832	-104.016437
15,000.00	90.00	359.37	10,931.00	4,000.38	77.52	460,687.24	639,286.42	32.266107	-104.016439
15,100.00	90.00	359.37	10,931.00	4,100.37	76.42	460,787.23	639,285.32	32.266382	-104.016442
15,200.00	90.00	359.37	10,931.00	4,200.36	75.31	460,887.22	639,284.22	32.266656	-104.016444
15,300.00	90.00	359.37	10,931.00	4,300.36	74.21	460,987.22	639,283.11	32.266931	-104.016447
15,400.00	90.00	359.37	10,931.00	4,400.35	73.11	461,087.21	639,282.01	32.267206	-104.016450

Planning Report - Geographic

Database: EDM r5000.141_Prod US
Company: WCDSC Permian NM
Project: Eddy County (NAD 83 NM Eastern)
Site: Sec 31-T23S-R29E
Well: Spud Muffin 31-30 738H
Wellbore: Wellbore #1
Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
TVD Reference: RKB @ 2985.30ft
MD Reference: RKB @ 2985.30ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,500.00	90.00	359.37	10,931.00	4,500.34	72.01	461,187.21	639,280.91	32.267481	-104.016452
15,600.00	90.00	359.37	10,931.00	4,600.34	70.90	461,287.20	639,279.81	32.267756	-104.016455
15,700.00	90.00	359.37	10,931.00	4,700.33	69.80	461,387.19	639,278.70	32.268031	-104.016458
15,800.00	90.00	359.37	10,931.00	4,800.33	68.70	461,487.19	639,277.60	32.268306	-104.016460
15,900.00	90.00	359.37	10,931.00	4,900.32	67.59	461,587.18	639,276.50	32.268581	-104.016463
15,944.68	90.00	359.37	10,931.00	4,945.00	67.10	461,631.86	639,276.01	32.268703	-104.016464
Cross Section @ 15945' MD, 0' FSL, 330' FEL									
16,000.00	90.00	359.37	10,931.00	5,000.31	66.49	461,687.17	639,275.40	32.268855	-104.016465
16,100.00	90.00	359.37	10,931.00	5,100.31	65.39	461,787.17	639,274.29	32.269130	-104.016468
16,200.00	90.00	359.37	10,931.00	5,200.30	64.29	461,887.16	639,273.19	32.269405	-104.016471
16,300.00	90.00	359.37	10,931.00	5,300.30	63.18	461,987.16	639,272.09	32.269680	-104.016473
16,400.00	90.00	359.37	10,931.00	5,400.29	62.08	462,087.15	639,270.98	32.269955	-104.016476
16,500.00	90.00	359.37	10,931.00	5,500.28	60.98	462,187.14	639,269.88	32.270230	-104.016478
16,600.00	90.00	359.37	10,931.00	5,600.28	59.87	462,287.14	639,268.78	32.270505	-104.016481
16,700.00	90.00	359.37	10,931.00	5,700.27	58.77	462,387.13	639,267.68	32.270780	-104.016484
16,800.00	90.00	359.37	10,931.00	5,800.27	57.67	462,487.12	639,266.57	32.271054	-104.016486
16,900.00	90.00	359.37	10,931.00	5,900.26	56.57	462,587.12	639,265.47	32.271329	-104.016489
17,000.00	90.00	359.37	10,931.00	6,000.25	55.46	462,687.11	639,264.37	32.271604	-104.016491
17,100.00	90.00	359.37	10,931.00	6,100.25	54.36	462,787.11	639,263.27	32.271879	-104.016494
17,200.00	90.00	359.37	10,931.00	6,200.24	53.26	462,887.10	639,262.16	32.272154	-104.016497
17,300.00	90.00	359.37	10,931.00	6,300.24	52.16	462,987.09	639,261.06	32.272429	-104.016499
17,400.00	90.00	359.37	10,931.00	6,400.23	51.05	463,087.09	639,259.96	32.272704	-104.016502
17,500.00	90.00	359.37	10,931.00	6,500.22	49.95	463,187.08	639,258.85	32.272979	-104.016505
17,600.00	90.00	359.37	10,931.00	6,600.22	48.85	463,287.07	639,257.75	32.273253	-104.016507
17,700.00	90.00	359.37	10,931.00	6,700.21	47.74	463,387.07	639,256.65	32.273528	-104.016510
17,800.00	90.00	359.37	10,931.00	6,800.20	46.64	463,487.06	639,255.55	32.273803	-104.016512
17,900.00	90.00	359.37	10,931.00	6,900.20	45.54	463,587.06	639,254.44	32.274078	-104.016515
18,000.00	90.00	359.37	10,931.00	7,000.19	44.44	463,687.05	639,253.34	32.274353	-104.016518
18,100.00	90.00	359.37	10,931.00	7,100.19	43.33	463,787.04	639,252.24	32.274628	-104.016520
18,200.00	90.00	359.37	10,931.00	7,200.18	42.23	463,887.04	639,251.13	32.274903	-104.016523
18,300.00	90.00	359.37	10,931.00	7,300.17	41.13	463,987.03	639,250.03	32.275178	-104.016525
18,400.00	90.00	359.37	10,931.00	7,400.17	40.03	464,087.02	639,248.93	32.275452	-104.016528
18,500.00	90.00	359.37	10,931.00	7,500.16	38.92	464,187.02	639,247.83	32.275727	-104.016531
18,600.00	90.00	359.37	10,931.00	7,600.16	37.82	464,287.01	639,246.72	32.276002	-104.016533
18,700.00	90.00	359.37	10,931.00	7,700.15	36.72	464,387.01	639,245.62	32.276277	-104.016536
18,800.00	90.00	359.37	10,931.00	7,800.14	35.61	464,487.00	639,244.52	32.276552	-104.016538
18,900.00	90.00	359.37	10,931.00	7,900.14	34.51	464,586.99	639,243.42	32.276827	-104.016541
19,000.00	90.00	359.37	10,931.00	8,000.13	33.41	464,686.99	639,242.31	32.277102	-104.016544
19,100.00	90.00	359.37	10,931.00	8,100.13	32.31	464,786.98	639,241.21	32.277377	-104.016546
19,200.00	90.00	359.37	10,931.00	8,200.12	31.20	464,886.97	639,240.11	32.277651	-104.016549
19,300.00	90.00	359.37	10,931.00	8,300.11	30.10	464,986.97	639,239.00	32.277926	-104.016552
19,400.00	90.00	359.37	10,931.00	8,400.11	29.00	465,086.96	639,237.90	32.278201	-104.016554
19,500.00	90.00	359.37	10,931.00	8,500.10	27.89	465,186.95	639,236.80	32.278476	-104.016557
19,600.00	90.00	359.37	10,931.00	8,600.10	26.79	465,286.95	639,235.70	32.278751	-104.016559
19,700.00	90.00	359.37	10,931.00	8,700.09	25.69	465,386.94	639,234.59	32.279026	-104.016562
19,800.00	90.00	359.37	10,931.00	8,800.08	24.59	465,486.94	639,233.49	32.279301	-104.016565
19,900.00	90.00	359.37	10,931.00	8,900.08	23.48	465,586.93	639,232.39	32.279576	-104.016567
20,000.00	90.00	359.37	10,931.00	9,000.07	22.38	465,686.92	639,231.29	32.279850	-104.016570
20,100.00	90.00	359.37	10,931.00	9,100.07	21.28	465,786.92	639,230.18	32.280125	-104.016572
20,200.00	90.00	359.37	10,931.00	9,200.06	20.18	465,886.91	639,229.08	32.280400	-104.016575
20,300.00	90.00	359.37	10,931.00	9,300.05	19.07	465,986.90	639,227.98	32.280675	-104.016578
20,400.00	90.00	359.37	10,931.00	9,400.05	17.97	466,086.90	639,226.87	32.280950	-104.016580
20,500.00	90.00	359.37	10,931.00	9,500.04	16.87	466,186.89	639,225.77	32.281225	-104.016583
20,600.00	90.00	359.37	10,931.00	9,600.03	15.76	466,286.89	639,224.67	32.281500	-104.016586

Planning Report - Geographic

Database: EDM r5000.141_Prod US
Company: WCDSC Permian NM
Project: Eddy County (NAD 83 NM Eastern)
Site: Sec 31-T23S-R29E
Well: Spud Muffin 31-30 738H
Wellbore: Wellbore #1
Design: Permit Plan 2

Local Co-ordinate Reference: Well Spud Muffin 31-30 738H
TVD Reference: RKB @ 2985.30ft
MD Reference: RKB @ 2985.30ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,700.00	90.00	359.37	10,931.00	9,700.03	14.66	466,386.88	639,223.57	32.281775	-104.016588
20,800.00	90.00	359.37	10,931.00	9,800.02	13.56	466,486.87	639,222.46	32.282049	-104.016591
20,882.16	90.00	359.37	10,931.00	9,882.18	12.65	466,569.03	639,221.56	32.282275	-104.016593
LTP @ 20882' MD, 330' FNL, 330' FEL									
20,900.00	90.00	359.37	10,931.00	9,900.02	12.46	466,586.87	639,221.36	32.282324	-104.016593
20,982.16	90.00	359.37	10,931.00	9,982.17	11.55	466,669.02	639,220.45	32.282550	-104.016596
PBHL; 230' FNL, 330' FEL									
20,982.17	90.00	359.37	10,931.00	9,982.18	11.55	466,669.03	639,220.45	32.282550	-104.016596

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL2 - Spud Muffin 31 - plan misses target center by 9982.19ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	9,982.18	11.55	466,669.03	639,220.45	32.282550	-104.016596

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
10,367.32	10,358.04	-305.00	125.00	KOP @ 10367' MD, 50' FSL, 330' FEL
10,982.84	10,861.81	-5.00	121.69	FTP @ 10983' MD, 330' FSL, 330' FEL
15,944.68	10,931.00	4,945.00	67.10	Cross Section @ 15945' MD, 0' FSL, 330' FEL
20,882.16	10,931.00	9,882.18	12.65	LTP @ 20882' MD, 330' FNL, 330' FEL
20,982.16	10,931.00	9,982.17	11.55	PBHL; 230' FNL, 330' FEL