

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
SUNDRY NOTICES AND REPORTS ON WELLS

OCD-ARTESIA

FORM APPROVED  
OMB NO. 1004-0135  
EXPIRES: March 31, 2007

Do not use this form for proposals to drill or to re-enter an  
abandoned well. Use Form 3160-3 (APD) for such proposals

SUBMIT IN TRIPLICATE

1a Type of Well ☒ Oil Well ☐ Gas Well ☐ Other

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

3. Address and Telephone No.  
20 N. Broadway, Oklahoma City, Ok 73102-8260 405-235-3611

4. Location of Well (Report location clearly and in accordance with Federal requirements)\*  
660' FSL 660' FWL M SEC 25 T24S R31E

BHL: 330 FNL & 660 FWL D SEC 25 T24S R31E

RECEIVED

FEB 19 2010

NMOCD ARTESIA

5. Lease Serial No.

NMNM-0121121

6. If Indian, Allottee or Tribe Name

7. Unit or CA Agreement Name and No.

8 Well Name and No.

Cotton Draw Unit 110

9. API Well No.

30-015-36406

10. Field and Pool, or Exploratory

Paduca; Delaware ✓

11. County or Parish State

Eddy NM

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

☒ Notice of Intent

☐ Subsequent Report

☐ Final Abandonment Notice

☐ Acidize

☐ Alter Casing

☐ Casing Repair

☒ Change Plans

☐ Convert to Injection

☐ Deepen

☐ Fracture Treat

☐ New Construction

☐ Plug and Abandon

☐ Plug Back

☐ Production (Start/Resume)

☐ Reclamation

☐ Recomplete

☐ Temporarily Abandon

☐ Water Disposal

☐ Water Shut-Off

☐ Well Integrity

☒ Other Horizontal

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work and approximate duration thereof. If the proposal deepens directionally or recompletes horizontally, give subsurface location and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirement, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection)

*Devon Energy Production Company L. P. respectfully requests permission to deviate from the original APD which was a vertical well to change to a horizontal well. The C-102, Casing Program, Design Factors, Mud Program, Cementing Procedures and a Directional Survey are attached reflecting changes.*

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct

Signed Judy A. Barnett

Name Judy A. Barnett X8699  
Title Regulatory Analyst

(This space for Federal or State Office use)

Approved by \_\_\_\_\_ Title \_\_\_\_\_  
Conditions of approval, if any.

APPROVED

Date 2/10/2010

FEB 18 2010

Date /s/ Chris Walls

BUREAU OF LAND MANAGEMENT  
CARLSBAD FIELD OFFICE

This is U.S.C. Section 1001; makes it a crime for any person knowingly and willfully to make any department or agency of the United States any false, fictitious or fraudulent statement or representation to any matter within its jurisdiction.

\*See Instruction on Reverse Side

MR2

DISTRICT I  
1825 N. French Dr., Hobbs, NM 88240

DISTRICT II  
1301 W. Grand Avenue, Artesia, NM 88210

DISTRICT III  
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV  
1820 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy, Minerals and Natural Resources Department

Form C-102  
Revised October 12, 2005

Submit to Appropriate District Office  
State Lease - 4 Copies  
Fee Lease - 3 Copies

OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, New Mexico 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code 49460	Pool Name Paduca	DELAWARE
Property Code	Property Name COTTON DRAW UNIT		Well Number 110H
OGRID No. 6137	Operator Name DEVON ENERGY PRODUCTION COMPANY LP		Elevation 3509'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	25	24 S	31 E		660	SOUTH	660	WEST	EDDY

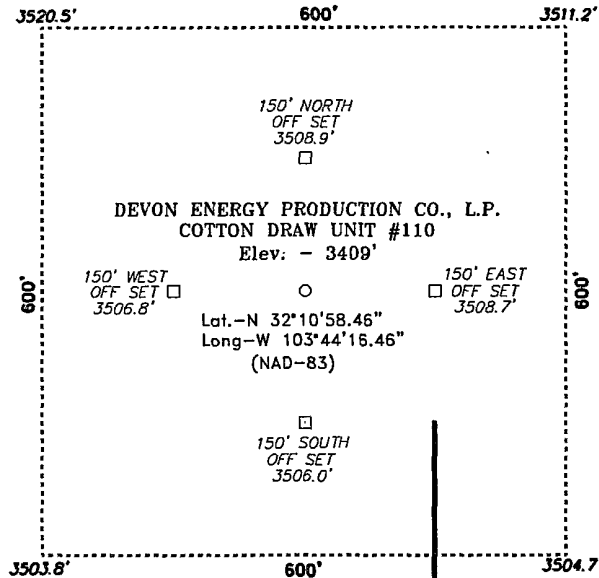
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	25	24 S	31 E		330	NORTH	660	WEST	EDDY
Dedicated Acres 160	Joint or Infill	Consolidation Code	Order No.						

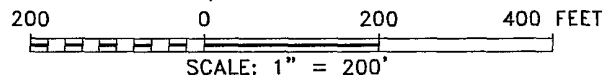
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature: <i>Judy A. Barnett</i> Date: 2/10/10</p> <p>Printed Name: Judy A. Barnett Regulatory Analyst</p>
	<p><b>SURVEYOR CERTIFICATION</b></p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>FEBRUARY 7, 2008</p> <p>Date Surveyed: _____</p> <p>Signature &amp; Seal of Professional Surveyor: <i>GARY L. JONES</i></p> <p>W.O. 10066</p> <p>Certificate No. Gary L. Jones 7977</p> <p>BASIN SURVEYS</p>

**SECTION 25, TOWNSHIP 24 SOUTH, RANGE 31 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.**



COTTON DRAW #90



**Directions to Location:**

FROM MILE MARKER 19 OF STATE HWY 128, GO EAST 0.3 MILES TO CO. RD. 786, ON CO. RD. 786 GO SOUTH FOR 4.6 MILES TO CO. RD. 791, ON CO. RD. 791 GO SOUTH BY SOUTHEAST FOR 3.1 MILES TO LEASE ROAD, ON LEASE ROAD GO EAST 1.9 MILES TO COTTON DRAW WELL IN SECTION 11, THENCE NORTH 0.7 MILES, THENCE WEST 0.3 MILES, THENCE NORTH 0.3 MILES, THENCE EAST 0.7 MILES, THENCE 0.8 MILES NORTH THENCE WEST TO PROPOSED LEASE ROAD.

**BASIN SURVEYS** P.O. BOX 1786-HOBBS, NEW MEXICO

W.O. Number: 19064 Drawn By: **J. M. SMALL**

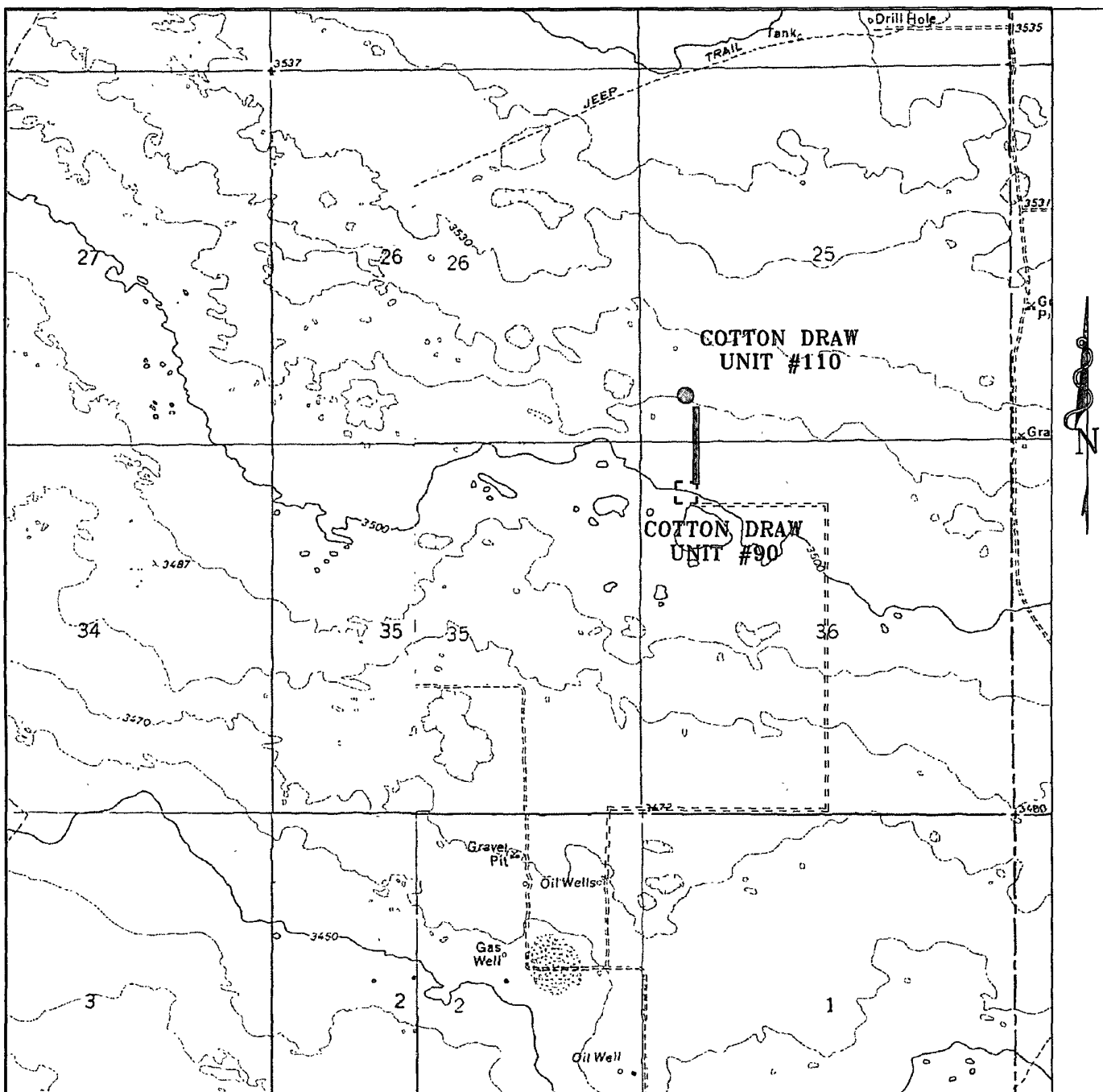
Date: 02-12-2008 Disk: 19064W JMS

**DEVON ENERGY PROD. CO., L.P.**

REF: COTTON DRAW UNIT #110 / WELL PAD TOPO

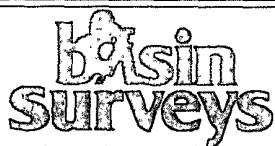
THE COTTON DRAW UNIT #110 LOCATED 660' FROM THE SOUTH LINE AND 660' FROM THE WEST LINE OF SECTION 25, TOWNSHIP 24 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

Survey Date: 02-07-2008 Sheet 1 of 1 Sheets



### COTTON DRAW UNIT #110

Located at 660' FSL AND 660' FWL  
 Section 25, Township 24 South, Range 31 East,  
 N.M.P.M., Eddy County, New Mexico.



focused on excellence  
 in the oilfield

P.O. Box 1785  
 1120 N. West County Rd.  
 Hobbs, New Mexico 88241  
 (505) 393-7316 - Office  
 (505) 392-3074 - Fax  
[basinsurveys.com](http://basinsurveys.com)

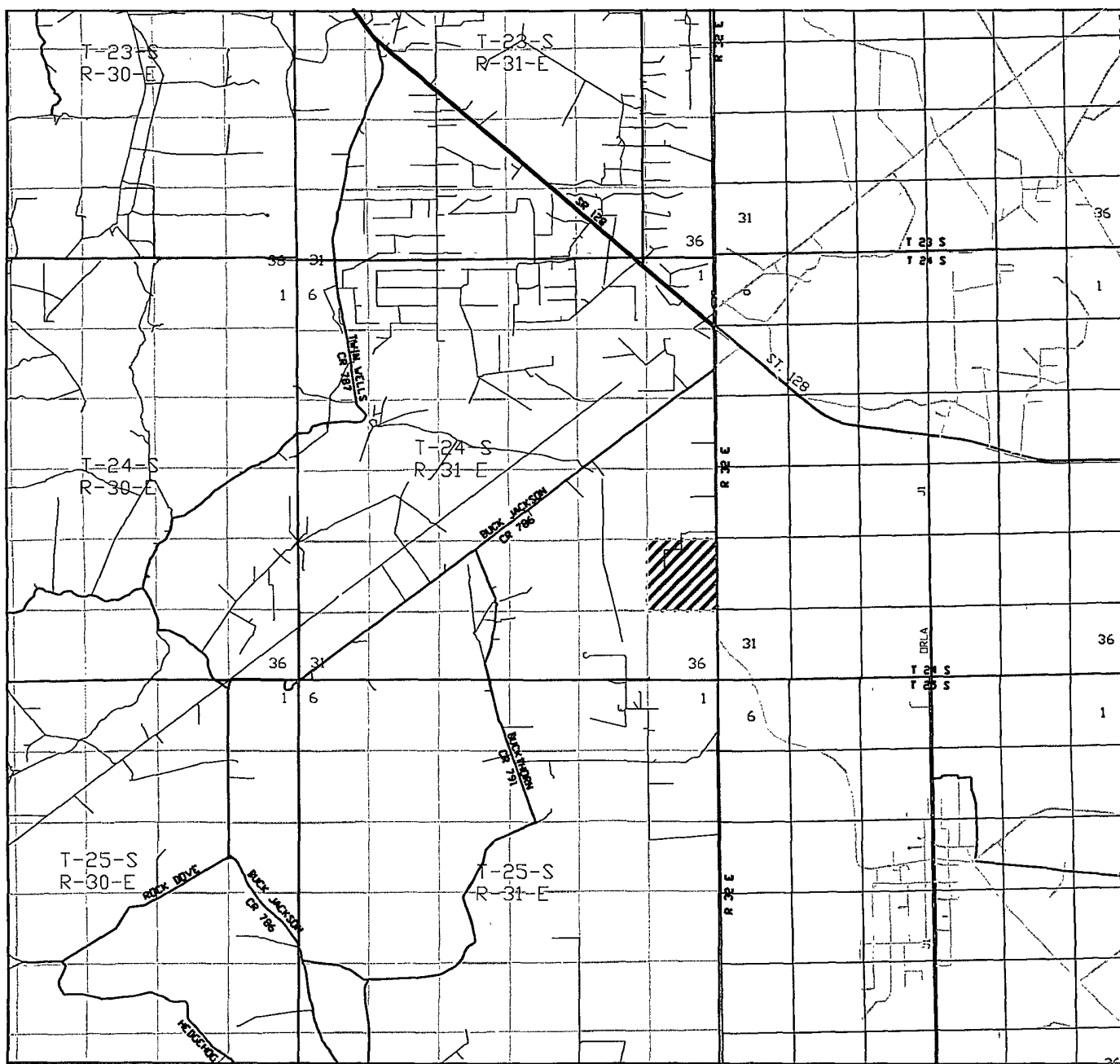
W.O. Number: JMS 19064T

Survey Date: 02-07-2008

Scale: 1" = 2000'

Date: 02-12-2008

DEVON ENERGY  
 PROD. CO., L.P.



# COTTON DRAW UNIT #110

Located at 660' FSL AND 660' FWL  
 Section 25, Township 24 South, Range 31 East,  
 N.M.P.M., Eddy County, New Mexico.



P.O. Box 1786  
 1120 N. West County Rd.  
 Hobbs, New Mexico 88241  
 (505) 393-7316 - Office  
 (505) 392-3074 - Fax  
 basinsurveys.com

W.O. Number: JMS 19064TR  
 Survey Date: 02-07-2008  
 Scale: 1" = 2 MILES  
 Date: 02-12-2008

DEVON ENERGY  
 PROD. CO., L.P.

## COTTON DRAW UNIT 110H - SUNDRY

### Casing Program

<u>Hole Size</u>	<u>Hole Interval</u>	<u>OD Csg</u>	<u>Casing Interval</u>	<u>Weight</u>	<u>Collar</u>	<u>Grade</u>
17-1/2"	0 – 900	13-3/8"	0 – 900	48#	STC	H-40
12-1/4"	900 – 3,000	9-5/8"	0 – 3,000	36#	LTC	J-55
12-1/4"	3,000 – 4,350	9-5/8"	3,000 – 4,350	40#	LTC	J-55
8-1/2"	4,350 – 7,650	5-1/2"	0 – 7,650	17#	LTC	N-80
8-1/2"	7,650 – 12,350	5-1/2"	7,650 – 12,350	17#	BTC	N-80

### Design Factors:

<u>Casing Size</u>	<u>Collapse Design Factor</u>	<u>Burst Design Factor</u>	<u>Tension Design Factor</u>
13-3/8"	1.83	4.11	7.45
9-5/8" 36# J-55 LTC	1.29	2.26	2.80
9-5/8" 40# J-55 LTC	1.14	1.75	9.63
5-1/2" 17# N-80 LTC	1.75	2.16	1.66
5-1/2" 17# N-80 BTC	1.62	1.99	5.58

### Mud Program:

<u>Depth</u>	<u>Mud Wt.</u>	<u>Visc.</u>	<u>Fluid Loss</u>	<u>Type System</u>
0 – 900	8.4 – 9.0	30 – 34	N/C	FW
900 – 4,350	9.8 – 10.0	28 – 32	N/C	Brine
4,350 – 12,350	8.6 – 9.0	28 – 32	NC -12	FW

### Pressure Control Equipment:

The BOP system used to drill the intermediate hole will consist of a 13-5/8" 5M Double Ram and Annular preventer. The BOP system will be tested as per BLM Onshore Oil and Gas Order No. 2 as a 3M system prior to drilling out the surface casing shoe.

The BOP system used to drill the production hole will consist of a 13-5/8" 5M Double Ram and Annular preventer. The BOP system will be tested as per BLM Onshore Oil and Gas Order No. 2 as a 5M system prior to drilling out the intermediate casing shoe.

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.

## Cementing Program

### 13-3/8" Surface

**Lead:** 615 sacks Class C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 4% bwoc Bentonite + 81.4% Fresh Water, 13.5 ppg, **Yield:** 1.75 cf/sk **TOC @ surface.**

**Tail:** 250 sacks Class C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 56.3% Fresh Water, 14.8 ppg **Yield:** 1.35 cf/sk

### 9-5/8" Intermediate

**Lead:** 1,190 sacks (35:65) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 107.8% Fresh Water, 12.5 ppg **Yield:** 2.04 cf/sk **TOC @ surface**

**Tail:** 300 sacks 60:40 Poz + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.4% bwoc Sodium Metasilicate + 4% bwoc MPA-5 + 64.7% Water, 13.8 ppg **Yield:** 1.38 cf/sk.

### 5-1/2" Production

#### 1<sup>st</sup> Stage

**Lead:** 1,250 sacks (50:50) Poz (Fly Ash):Class H Cement + 5% bwow Sodium Chloride + 0.3% bwoc CD-32 + 0.5% bwoc FL-25 + 2% bwoc Bentonite + 0.6% bwoc Sodium Metasilicate + 0.5% bwoc FL-52A + 58 3% Fresh Water, 14.2 ppg **Yield:** 1.31 cf/sk

**DV TOOL at ~7,600 ft**

#### 2<sup>nd</sup> Stage

**Lead:** 570 sacks (35:65) Poz (Fly Ash):Class C Cement + 1% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 103.2% Fresh Water, 12.5 ppg **Yield:** 1.96 cf/sk **TOC @ 3,850'**

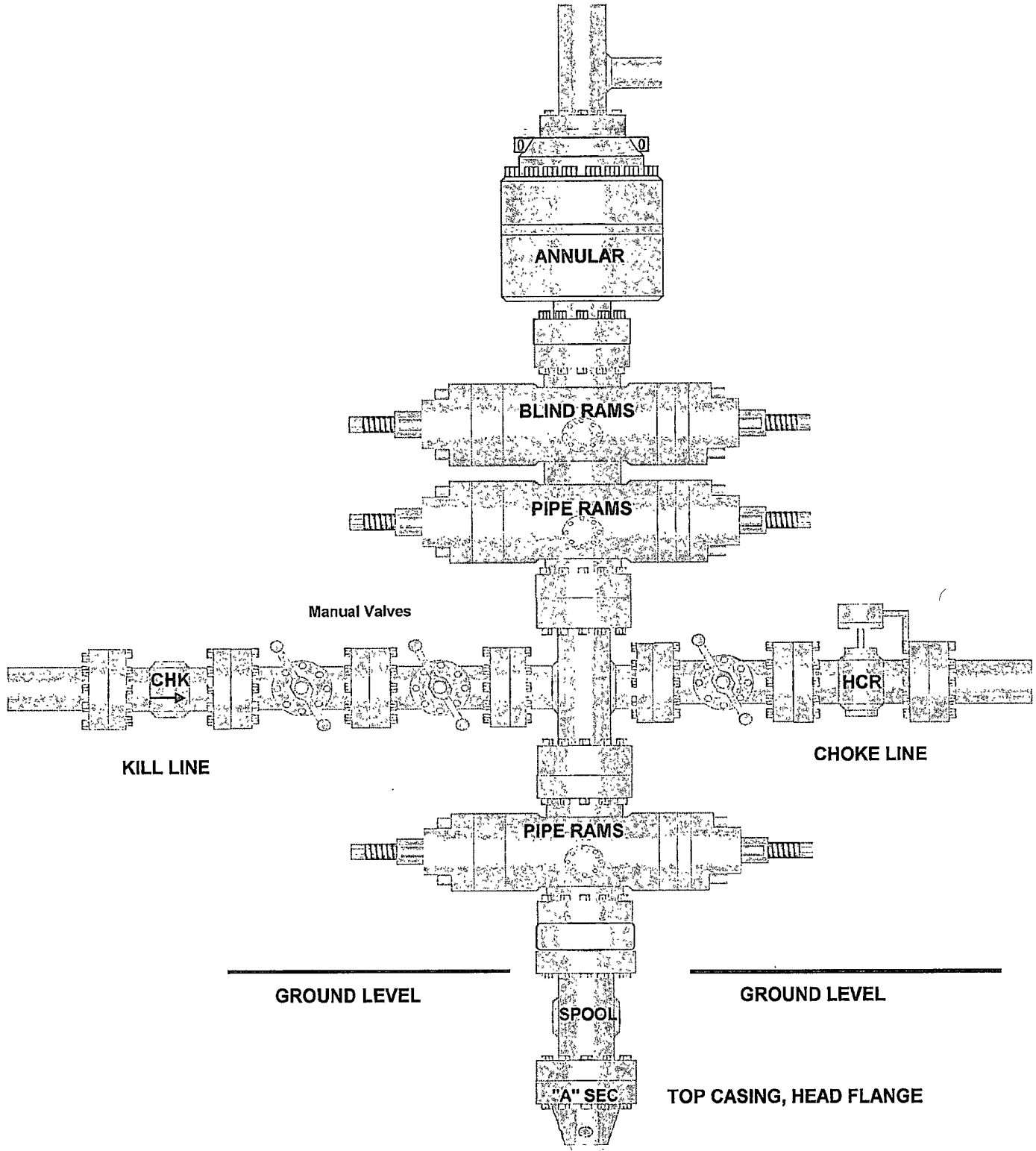
**Tail:** 375 sacks (60:40) Poz (Fly Ash):Class C Cement + 1% bwow Sodium Chloride + 0.2% bwoc R-3 + 0.125 lbs/sack Cello Flake + 0.5% bwoc BA-10A + 4% bwoc MPA-5 + 63.2% Fresh Water, 13.8 ppg **Yield:** 1.34cf/sk

#### TOC for All Strings:

Surface:	0'
Intermediate:	0'
Production:	3,850'

ACTUAL CEMENT VOLUMES WILL BE ADJUSTED BASED ON FLUID CALIPER AND OPENHOLE LOG CALIPER DATA.

# 13-5/8" x 5,000 psi BOP Stack







Proposal No: 215855731A

**Devon Energy Corp**  
**Cotton Draw Unit #110H**

Sec. 25-24S-31E  
Eddy County, New Mexico  
February 10, 2010

### **Well Recommendation**

**Prepared for:**

Mark Cooper  
Drilling Engineer  
Oklahoma City, Oklahoma  
Bus Phone: (405) 228-8264

**Prepared by:**

John Parks  
Region Technical Rep.  
Oklahoma City, Oklahoma  
Bus Phone: (405) 228-4302



**Service Point:**

Artesia  
Bus Phone: (505) 746-3140  
Fax: (505) 746-2293

**Service Representatives:**

Larry Johnson  
Senior Sales Rep  
Artesia, New Mexico

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Surface Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

### JOB AT A GLANCE

Depth (TVD)	900 ft
Depth (MD)	900 ft
Hole Size	17.5 in
Casing Size/Weight :	13 3/8 in, 48 lbs/ft
Pump Via	13 3/8" O.D. (12.715" I.D) 48 #
Total Mix Water Required	7,227 gals
<b>Spacer</b>	
Fresh Water	10 bbls
Density	8.3 ppg
<b>Lead Slurry</b>	
Class C + Additives	615 sacks
Density	13.5 ppg
Yield	1.75 cf/sack
<b>Tail Slurry</b>	
Class C	250 sacks
Density	14.8 ppg
Yield	1.35 cf/sack
<b>Displacement</b>	
Mud	135 bbls
Density	9.0 ppg

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Surface Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## WELL DATA

### ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
17.500 HOLE	900	900

### SUSPENDED PIPES

DIAMETER (in)		WEIGHT (lbs/ft)	DEPTH(ft)	
O.D.	I.D.		MEASURED	TRUE VERTICAL
13.375	12.715	48	900	900

Float Collar set @ 860 ft  
 Mud Density 9.00 ppg  
 Est. Static Temp. 80 ° F  
 Est. Circ. Temp. 80 ° F

### VOLUME CALCULATIONS

703 ft x 0.6946 cf/ft with 120 % excess = 1074.3 cf  
 197 ft x 0.6946 cf/ft with 120 % excess = 301.1 cf  
 40 ft x 0.8818 cf/ft with 0 % excess = 35.3 cf (inside pipe)  
**TOTAL SLURRY VOLUME = 1410.7 cf**  
 = 251 bbls

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Surface Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## FLUID SPECIFICATIONS

Spacer 10.0 bbls Fresh Water @ 8.34 ppg

<u>FLUID</u>	<u>VOLUME CU-FT</u>	<u>VOLUME FACTOR</u>	<u>AMOUNT AND TYPE OF CEMENT</u>
Lead Slurry	1074	/ 1.75	= 615 sacks Class C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 4% bwoc Bentonite + 81.4% Fresh Water
Tail Slurry	336	/ 1.35	= 250 sacks Class C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 56.3% Fresh Water

Displacement 135.1 bbls Mud @ 9 ppg

## **CEMENT PROPERTIES**

	<b>SLURRY NO. 1</b>	<b>SLURRY NO. 2</b>
Slurry Weight (ppg)	13.50	14.80
Slurry Yield (cf/sack)	1.75	1.35
Amount of Mix Water (gps)	9.17	6.35
Estimated Pumping Time - 70 BC (HH:MM)	3:30	2:30
<b>COMPRESSIVE STRENGTH</b>		
8 hrs @ 80 ° F (psi)		500
12 hrs @ 80 ° F (psi)	400	1475
15 hrs @ 80 ° F (psi)	500	
24 hrs @ 80 ° F (psi)	700	2050

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Intermediate Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## **JOB AT A GLANCE**

<b>Depth (TVD)</b>	4,350 ft
<b>Depth (MD)</b>	4,350 ft
<b>Hole Size</b>	12.25 in
<b>Casing Size/Weight :</b>	9 5/8 in, 36 lbs/ft 9 5/8 in, 40 lbs/ft
<b>Pump Via</b>	9 5/8" O.D. (8.921" I.D) 36 # 9 5/8" O.D. (8.835" I.D) 40 #
<b>Total Mix Water Required</b>	15,307 gals
<b>Spacer</b>	
<b>Fresh Water</b>	10 bbls
<b>Density</b>	8.3 ppg
<b>Lead Slurry</b>	
<b>35:65:6 Poz:Class C</b>	1,190 sacks
<b>Density</b>	12.5 ppg
<b>Yield</b>	2.04 cf/sack
<b>Tail Slurry</b>	
<b>60:40 Poz:Class C (MPA)</b>	300 sacks
<b>Density</b>	13.8 ppg
<b>Yield</b>	1.38 cf/sack
<b>Displacement</b>	
<b>Mud</b>	331 bbls
<b>Density</b>	9.0 ppg

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Intermediate Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## WELL DATA

### ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
12.715 CASING	900	900
12.250 HOLE	4,350	4,350

### SUSPENDED PIPES

DIAMETER (in)		WEIGHT (lbs/ft)	DEPTH(ft)	
O.D.	I.D.		MEASURED	TRUE VERTICAL
9.625	8.921	36	3,000	3,000
9.625	8.835	40	4,350	4,350

Float Collar set @ 4,310 ft  
 Mud Density 9.00 ppg  
 Est. Static Temp. 113 ° F  
 Est. Circ. Temp. 100 ° F

### VOLUME CALCULATIONS

900 ft	x	0.3765 cf/ft	with	0 % excess	=	338.9 cf
2,100 ft	x	0.3132 cf/ft	with	130 % excess	=	1512.7 cf
800 ft	x	0.3132 cf/ft	with	130 % excess	=	576.5 cf
550 ft	x	0.3132 cf/ft	with	130 % excess	=	396.0 cf
40 ft	x	0.4257 cf/ft	with	0 % excess	=	17.0 cf (inside pipe)
<b>TOTAL SLURRY VOLUME</b>					=	2841.0 cf
					=	506 bbls

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Intermediate Casing  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## FLUID SPECIFICATIONS

Spacer 10.0 bbls Fresh Water @ 8.34 ppg

<u>FLUID</u>	<u>VOLUME CU-FT</u>	<u>VOLUME FACTOR</u>	<u>AMOUNT AND TYPE OF CEMENT</u>
Lead Slurry	2428	/ 2.04	= 1190 sacks (35:65) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.25% bwoc FL-52A + 107.7% Fresh Water
Tail Slurry	413	/ 1.38	= 300 sacks (60:40) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.4% bwoc Sodium Metasilicate + 4% bwoc MPA-5 + 65.5% Fresh Water

Displacement 331.3 bbls Mud @ 9 ppg

## **CEMENT PROPERTIES**

	<b>SLURRY NO. 1</b>	<b>SLURRY NO. 2</b>
Slurry Weight (ppg)	12.50	13.80
Slurry Yield (cf/sack)	2.04	1.38
Amount of Mix Water (gps)	11.24	6.44
Estimated Pumping Time - 70 BC (HH:MM)	4:25	2:45
<b>COMPRESSIVE STRENGTH</b>		
7 hrs @ 107 ° F (psi)		500
12 hrs @ 107 ° F (psi)	325	1342
17.3 hrs @ 107 ° F (psi)	500	
24 hrs @ 107 ° F (psi)	637	2076

ACTUAL CEMENT VOLUME MAY VARY BASED ON FLUID CALIPER.

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Long String  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## **JOB AT A GLANCE**

Depth (TVD)	8,305 ft
Depth (MD)	12,350 ft
Hole Size	8.5 in
Casing Size/Weight :	5 1/2 in, 17 lbs/ft
Pump Via	5 1/2" O.D. (4.892" I.D) 17 #
Total Mix Water Required	15,809 gals
Stage No: 1	Float Collar set @ 12,310 ft
<b>Spacer</b>	
Fresh Water	10 bbls
Density	8.3 ppg
<b>Spacer</b>	
Mud Clean II	1,500 gals
Density	8.5 ppg
<b>Spacer</b>	
Fresh Water	10 bbls
Density	8.3 ppg
<b>Cement Slurry</b>	
50:50 Poz:Class H	1,250 sacks
Density	14.2 ppg
Yield	1.31 cf/sack
<b>Displacement</b>	
Displacement Fluid	286 bbls



**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Long String  
**Date:** February 10, 2010



**Proposal No:** 215855731A

**JOB AT A GLANCE (Continued)**

**Stage No: 2**                                      **Stage Collar set @**      7,600 ft

**Spacer**

**Fresh Water**                                      20 bbls

**Density**    8.3 ppg

**Lead Slurry**

**35:65:6 Poz:Class C**                                      570 sacks

**Density**    12.5 ppg

**Yield**    1.96 cf/sack

**Tail Slurry**

**60:40 Poz:Class C (MPA)**                                      375 sacks

**Density**    13.8 ppg

**Yield**    1.34 cf/sack

**Displacement**

**Displacement Fluid**                                      177 bbls

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Long String  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## WELL DATA

### ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
8.921 CASING	3,000	3,000
8.835 CASING	4,350	4,350
8.500 HOLE	12,350	8,305

### SUSPENDED PIPES

DIAMETER (in)		WEIGHT (lbs/ft)	DEPTH(ft)	
O.D.	I.D.		MEASURED	TRUE VERTICAL
5.500	4.892	17	12,350	8,305

**STAGE: 1**      Float Collar set @      12,310 ft  
                  Mud Density      9.20 ppg  
                  Est. Static Temp.      142 ° F  
                  Est. Circ. Temp.      142 ° F

### VOLUME CALCULATIONS

4,750 ft    x    0.2291 cf/ft    with    50 % excess    =    1632.2 cf  
 40 ft      x    0.1305 cf/ft    with    0 % excess    =    5.2 cf (inside pipe)  
**TOTAL SLURRY VOLUME** =    1637.4 cf  
    =    292 bbls

**STAGE: 2**      Stage Collar set @      7,600 ft  
                  Mud Density      9.20 ppg  
                  Est. Static Temp.      137 ° F  
                  Est. Circ. Temp.      121 ° F

### VOLUME CALCULATIONS

500 ft    x    0.2607 cf/ft    with    0 % excess    =    130.4 cf  
 2,150 ft    x    0.2291 cf/ft    with    100 % excess    =    985.0 cf  
 1,100 ft    x    0.2291 cf/ft    with    100 % excess    =    504.0 cf  
**TOTAL SLURRY VOLUME** =    1619.4 cf  
    =    289 bbls

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Long String  
**Date:** February 10, 2010



**Proposal No:** 215855731A

## FLUID SPECIFICATIONS

### STAGE NO.: 1

Spacer 10.0 bbls Fresh Water @ 8.34 ppg  
 Spacer 1,500.0 gals Mud Clean II @ 8.45 ppg  
 Spacer 10.0 bbls Fresh Water @ 8.34 ppg

FLUID	VOLUME CU-FT	VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
Cement Slurry	1637	/ 1.31	= 1250 sacks (50:50) Poz (Fly Ash):Class H Cement + 5% bwow Sodium Chloride + 0.3% bwoc CD-32 + 0.5% bwoc FL-25 + 2% bwoc Bentonite + 0.6% bwoc Sodium Metasilicate + 0.5% bwoc FL-52A + 58.3% Fresh Water

Displacement 286.2 bbls Displacement Fluid

### CEMENT PROPERTIES

#### SLURRY NO. 1

Slurry Weight (ppg)	14.20
Slurry Yield (cf/sack)	1.31
Amount of Mix Water (gps)	5.88
Estimated Pumping Time - 70 BC (HH:MM)	4:00
Free Water (mls) @ 140 ° F @ 90 ° angle	0.0
Fluid Loss (cc/30min) at 1000 psi and 140 ° F	50.0

#### COMPRESSIVE STRENGTH

12 hrs @ 140 ° F (psi)	250
24 hrs @ 140 ° F (psi)	1500
72 hrs @ 140 ° F (psi)	2000

**Operator Name:** Devon Energy Corp  
**Well Name:** Cotton Draw Unit #110H  
**Job Description:** Long String  
**Date:** February 10, 2010



**Proposal No:** 215855731A

**FLUID SPECIFICATIONS (Continued)**

**STAGE NO.: 2**

Spacer 20.0 bbls Fresh Water @ 8.34 ppg

Lead Slurry 1115 / 1.96 = 570 sacks (35:65) Poz (Fly Ash):Class C Cement +  
1% bwow Sodium Chloride + 0.125 lbs/sack Cello  
Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A +  
103.2% Fresh Water

Tail Slurry 504 / 1.34 = 375 sacks (60:40) Poz (Fly Ash):Class C Cement +  
1% bwow Sodium Chloride + 0.2% bwoc R-3 +  
0.125 lbs/sack Cello Flake + 0.5% bwoc BA-10A +  
4% bwoc MPA-5 + 63.2% Fresh Water

Displacement 176.7 bbls Displacement Fluid

**CEMENT PROPERTIES**

	SLURRY NO. 1	SLURRY NO. 2
Slurry Weight (ppg)	12.50	13.80
Slurry Yield (cf/sack)	1.96	1.34
Amount of Mix Water (gps)	10.76	6.21
Estimated Pumping Time - 70 BC (HH:MM)	3:30	2:30
Free Water (mls) @ ° F @ 90 ° angle		
Fluid Loss (cc/30min) at 1000 psi and ° F		
<b>COMPRESSIVE STRENGTH</b>		
12 hrs @ 116 ° F (psi)	300	800
24 hrs @ 116 ° F (psi)	650	1900
72 hrs @ 116 ° F (psi)	900	2700

CEMENT VOLUMES MAY VARY BASED ON CALIPER.



**Weatherford®**

## **Drilling Services**

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## **Proposal**

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**devon**

COTTON DRAW UNIT #110H

EDDY COUNTY, NM

WELL FILE: **PLAN 1**

FEBRUARY 8, 2010

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**Weatherford International, Ltd.**

P.O. Box 61028

Midland, TX 79711 USA

+1.432.561.8892 Main

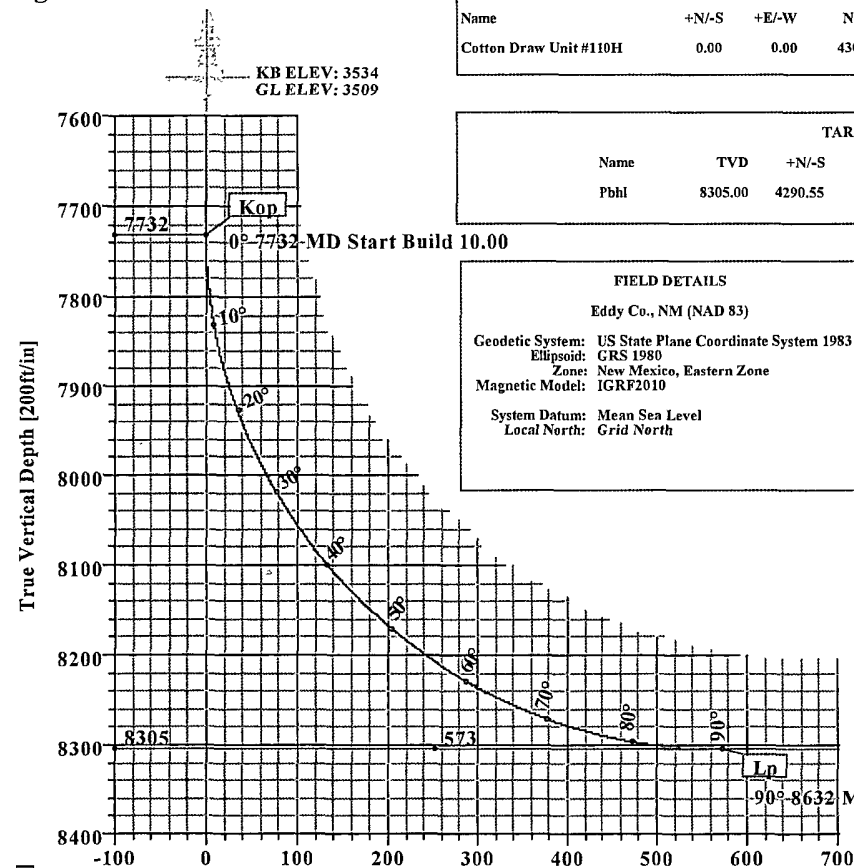
+1.432.561.8895 Fax

[www.weatherford.com](http://www.weatherford.com)

# devon

COTTON DRAW UNIT #110H  
EDDY CO., NEW MEXICO

Rig H&P 214



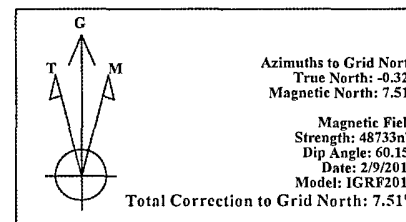
SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	359.66	0.00	0.00	0.00	0.00	0.00	0.00	
2	7732.04	0.00	359.66	7732.04	0.00	0.00	0.00	0.00	0.00	
3	8632.04	90.00	359.66	8305.00	572.95	-3.39	10.00	359.66	572.96	
4	12349.71	90.00	359.66	8305.00	4290.55	-25.42	0.00	0.00	4290.63	Pbhl

WELL DETAILS							
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
Cotton Draw Unit #110H	0.00	0.00	430785.29	725547.06	32°10'58.449N	103°44'16.477W	N/A

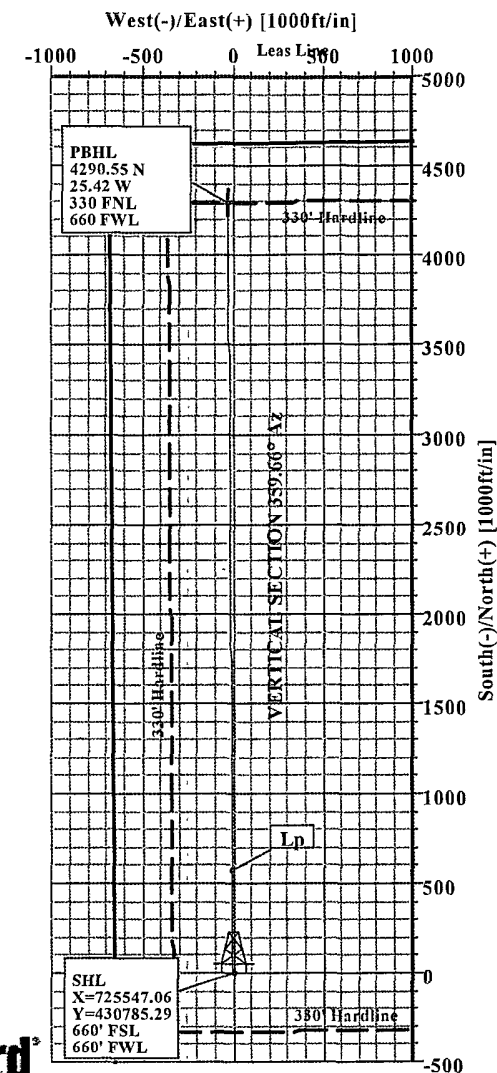
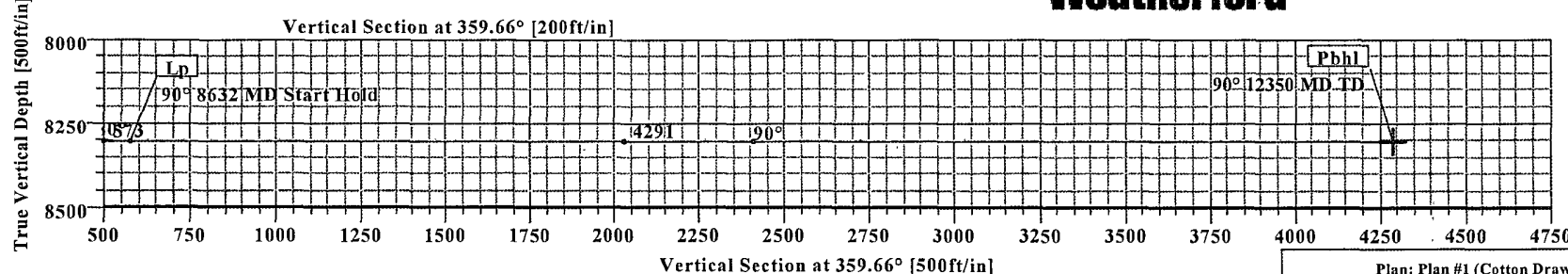
TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
Pbhl	8305.00	4290.55	-25.42	435075.84	725521.65	Point

**FIELD DETAILS**  
Eddy Co., NM (NAD 83)  
Geodetic System: US State Plane Coordinate System 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico, Eastern Zone  
Magnetic Model: IGRF2010  
System Datum: Mean Sea Level  
Local North: Grid North

**SITE DETAILS**  
Cotton Draw Unit #110H  
Site Centre Northing: 430785.29  
Easting: 725547.06  
Ground Level: 3509.00  
Positional Uncertainty: 0.00  
Convergence: 0.32



**Weatherford**



Plan: Plan #1 (Cotton Draw Unit #110H/1)  
Created By: Russell W Joyner  
Date: 2/9/2010



# Weatherford International Ltd.

## WFT Plan Report - Geographic

**Weatherford**

<b>Company:</b> Devon Energy	<b>Date:</b> 2/9/2010	<b>Time:</b> 08:01:21	<b>Page:</b> 1
<b>Field:</b> Eddy Co., NM (NAD 83)	<b>Co-ordinate(NE) Reference:</b> Well: Cotton Draw Unit #110H, Grid North		
<b>Site:</b> Cotton Draw Unit #110H	<b>Vertical (TVD) Reference:</b> SITE 3534.0		
<b>Well:</b> Cotton Draw Unit #110H	<b>Section (VS) Reference:</b> Well (0.00N,0.00E,359.66Azi)		
<b>Wellpath:</b> 1	<b>Survey Calculation Method:</b> Minimum Curvature	<b>Db:</b> Sybase	

**Field:** Eddy Co., NM (NAD 83)**Map System:** US State Plane Coordinate System 1983  
**Geo Datum:** GRS 1980  
**Sys Datum:** Mean Sea Level**Map Zone:** New Mexico, Eastern Zone  
**Coordinate System:** Well Centre  
**Geomagnetic Model:** IGRF2010**Site:** Cotton Draw Unit #110H

<b>Site Position:</b>	<b>Northing:</b> 430785.29 ft	<b>Latitude:</b> 32 10 58.449 N
<b>From:</b> Map	<b>Easting:</b> 725547.06 ft	<b>Longitude:</b> 103 44 16.477 W
<b>Position Uncertainty:</b> 0.00 ft		<b>North Reference:</b> Grid
<b>Ground Level:</b> 3509.00 ft		<b>Grid Convergence:</b> 0.32 deg

**Well:** Cotton Draw Unit #110H**Slot Name:**

<b>Well Position:</b> +N/-S 0.00 ft	<b>Northing:</b> 430785.29 ft	<b>Latitude:</b> 32 10 58.449 N
+E/-W 0.00 ft	<b>Easting:</b> 725547.06 ft	<b>Longitude:</b> 103 44 16.477 W
<b>Position Uncertainty:</b> 0.00 ft		

**Wellpath:** 1

<b>Current Datum:</b> SITE	<b>Height</b> 3534.00 ft	<b>Drilled From:</b> Surface
<b>Magnetic Data:</b> 2/9/2010		<b>Tie-on Depth:</b> 0.00 ft
<b>Field Strength:</b> 48733 nT		<b>Above System Datum:</b> Mean Sea Level
<b>Vertical Section:</b> Depth From (TVD)	+N/-S	<b>Declination:</b> 7.83 deg
ft	ft	<b>Mag Dip Angle:</b> 60.15 deg
		<b>+E/-W</b>
		ft
		<b>Direction</b>
		deg
0.00	0.00	0.00
		359.66

**Plan Section Information**

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	TFO deg	Target
0.00	0.00	359.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7732.04	0.00	359.66	7732.04	0.00	0.00	0.00	0.00	0.00	0.00	
8632.04	90.00	359.66	8305.00	572.95	-3.39	10.00	10.00	0.00	359.66	
12349.71	90.00	359.66	8305.00	4290.55	-25.42	0.00	0.00	0.00	0.00	Pbhl

**Survey**

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Comment
7700.00	0.00	359.66	7700.00	0.00	0.00	0.00	0.00	430785.29	725547.06	
7732.04	0.00	359.66	7732.04	0.00	0.00	0.00	0.00	430785.29	725547.06	Kop
7800.00	6.80	359.66	7799.84	4.03	-0.02	4.03	10.00	430789.32	725547.04	
7900.00	16.80	359.66	7897.60	24.44	-0.14	24.44	10.00	430809.73	725546.92	
8000.00	26.80	359.66	7990.34	61.52	-0.36	61.52	10.00	430846.81	725546.70	
8100.00	36.80	359.66	8075.22	114.15	-0.68	114.15	10.00	430899.44	725546.39	
8200.00	46.80	359.66	8149.68	180.71	-1.07	180.71	10.00	430966.00	725545.99	
8300.00	56.80	359.66	8211.45	259.19	-1.54	259.19	10.00	431044.48	725545.53	
8400.00	66.80	359.66	8258.65	347.20	-2.06	347.21	10.00	431132.49	725545.01	
8500.00	76.80	359.66	8289.85	442.07	-2.62	442.08	10.00	431227.36	725544.44	
8600.00	86.80	359.66	8304.10	540.92	-3.20	540.93	10.00	431326.21	725543.86	
8632.04	90.00	359.66	8305.00	572.95	-3.39	572.96	10.00	431358.24	725543.67	Lp
8700.00	90.00	359.66	8305.00	640.90	-3.80	640.92	0.00	431426.19	725543.27	
8800.00	90.00	359.66	8305.00	740.90	-4.39	740.92	0.00	431526.19	725542.67	
8900.00	90.00	359.66	8305.00	840.90	-4.98	840.92	0.00	431626.19	725542.08	
9000.00	90.00	359.66	8305.00	940.90	-5.57	940.92	0.00	431726.19	725541.49	
9100.00	90.00	359.66	8305.00	1040.90	-6.17	1040.92	0.00	431826.19	725540.90	
9200.00	90.00	359.66	8305.00	1140.90	-6.76	1140.92	0.00	431926.19	725540.30	
9300.00	90.00	359.66	8305.00	1240.89	-7.35	1240.92	0.00	432026.18	725539.71	
9400.00	90.00	359.66	8305.00	1340.89	-7.94	1340.92	0.00	432126.18	725539.12	



# Weatherford International Ltd.

## WFT Plan Report - Geographic

**Weatherford**

Company: Devon Energy  
Field: Eddy Co., NM (NAD 83)  
Site: Cotton Draw Unit #110H  
Well: Cotton Draw Unit #110H  
Wellpath: 1

Date: 2/9/2010 Time: 08:01:21 Page: 2  
Co-ordinate(NE) Reference: Well: Cotton Draw Unit #110H, Grid North  
Vertical (TVD) Reference: SITE 3534.0  
Section (VS) Reference: Well (0.00N,0.00E,359.66Azi)  
Survey Calculation Method: Minimum Curvature Db: Sybase

**Survey**

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Comment
9500.00	90.00	359.66	8305.00	1440.89	-8.54	1440.92	0.00	432226.18	725538.53	
9600.00	90.00	359.66	8305.00	1540.89	-9.13	1540.92	0.00	432326.18	725537.94	
9700.00	90.00	359.66	8305.00	1640.89	-9.72	1640.92	0.00	432426.18	725537.34	
9800.00	90.00	359.66	8305.00	1740.89	-10.31	1740.92	0.00	432526.18	725536.75	
9900.00	90.00	359.66	8305.00	1840.88	-10.91	1840.92	0.00	432626.17	725536.16	
10000.00	90.00	359.66	8305.00	1940.88	-11.50	1940.92	0.00	432726.17	725535.57	
10100.00	90.00	359.66	8305.00	2040.88	-12.09	2040.92	0.00	432826.17	725534.97	
10200.00	90.00	359.66	8305.00	2140.88	-12.68	2140.92	0.00	432926.17	725534.38	
10300.00	90.00	359.66	8305.00	2240.88	-13.28	2240.92	0.00	433026.17	725533.79	
10400.00	90.00	359.66	8305.00	2340.87	-13.87	2340.92	0.00	433126.16	725533.20	
10500.00	90.00	359.66	8305.00	2440.87	-14.46	2440.92	0.00	433226.16	725532.60	
10600.00	90.00	359.66	8305.00	2540.87	-15.05	2540.92	0.00	433326.16	725532.01	
10700.00	90.00	359.66	8305.00	2640.87	-15.65	2640.92	0.00	433426.16	725531.42	
10800.00	90.00	359.66	8305.00	2740.87	-16.24	2740.92	0.00	433526.16	725530.83	
10900.00	90.00	359.66	8305.00	2840.87	-16.83	2840.92	0.00	433626.16	725530.23	
11000.00	90.00	359.66	8305.00	2940.86	-17.42	2940.92	0.00	433726.15	725529.64	
11100.00	90.00	359.66	8305.00	3040.86	-18.02	3040.92	0.00	433826.15	725529.05	
11200.00	90.00	359.66	8305.00	3140.86	-18.61	3140.92	0.00	433926.15	725528.46	
11300.00	90.00	359.66	8305.00	3240.86	-19.20	3240.92	0.00	434026.15	725527.86	
11400.00	90.00	359.66	8305.00	3340.86	-19.79	3340.92	0.00	434126.15	725527.27	
11500.00	90.00	359.66	8305.00	3440.86	-20.39	3440.92	0.00	434226.15	725526.68	
11600.00	90.00	359.66	8305.00	3540.85	-20.98	3540.92	0.00	434326.14	725526.09	
11700.00	90.00	359.66	8305.00	3640.85	-21.57	3640.92	0.00	434426.14	725525.49	
11800.00	90.00	359.66	8305.00	3740.85	-22.16	3740.92	0.00	434526.14	725524.90	
11900.00	90.00	359.66	8305.00	3840.85	-22.75	3840.92	0.00	434626.14	725524.31	
12000.00	90.00	359.66	8305.00	3940.85	-23.35	3940.92	0.00	434726.14	725523.72	
12100.00	90.00	359.66	8305.00	4040.84	-23.94	4040.92	0.00	434826.13	725523.12	
12200.00	90.00	359.66	8305.00	4140.84	-24.53	4140.92	0.00	434926.13	725522.53	
12300.00	90.00	359.66	8305.00	4240.84	-25.12	4240.92	0.00	435026.13	725521.94	
12349.71	90.00	359.66	8305.00	4290.55	-25.42	4290.63	0.00	435075.84	725521.65	Pbhl

**Targets**

Name	Description Dip. Dir.	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<--- Latitude ---> Deg Min Sec	<--- Longitude ---> Deg Min Sec
Pbhl		8305.00	4290.55	-25.42	435075.84	725521.65	32 11 40.908 N	103 44 16.497 W

**Casing Points**

MD	TVD	Diameter	Hole Size	Name

**Annotation**

MD ft	TVD ft	
7732.04	7732.04	Kop
8632.04	8305.00	Lp
12349.71	8305.00	Pbhl





**Weatherford International Ltd.**  
**WFT Plan Report - Geographic**



**Weatherford**

<b>Company:</b> Devon Energy	<b>Date:</b> 2/9/2010	<b>Time:</b> 08:01:21	<b>Page:</b> 3
<b>Field:</b> Eddy Co., NM (NAD 83)	<b>Co-ordinate(NE) Reference:</b>	Well: Cotton Draw Unit #110H, Grid North	
<b>Site:</b> Cotton Draw Unit #110H	<b>Vertical (TVD) Reference:</b>	SITE 3534.0	
<b>Well:</b> Cotton Draw Unit #110H	<b>Section (VS) Reference:</b>	Well (0.00N,0.00E,359.66Azi)	
<b>Wellpath:</b> 1	<b>Survey Calculation Method:</b>	Minimum Curvature	Db: Sybase

**Formations**

MD	TVD	Formations	Lithology	Dip Angle	Dip Direction

**Weatherford®****Weatherford Drilling Services**

GeoDec v5.03

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Report Date: February 09, 2010  
Job Number: \_\_\_\_\_  
Customer: Devon Energy  
Well Name: Cotton Draw Unit #110H  
API Number: \_\_\_\_\_  
Rig Name: \_\_\_\_\_  
Location: Eddy Co, NM  
Block: \_\_\_\_\_  
Engineer: R Joyner

---

US State Plane 1983	Geodetic Latitude / Longitude
System: New Mexico Eastern Zone	System: Latitude / Longitude
Projection: Transverse Mercator/Gauss Kruger	Projection: Geodetic Latitude and Longitude
Datum: North American Datum 1983	Datum: North American Datum 1983
Ellipsoid: GRS 1980	Ellipsoid: GRS 1980
North/South 430785.290 USFT	Latitude 32.1829049 DEG
East/West 725547.064 USFT	Longitude -103.7379057 DEG
Grid Convergence: .32°	
Total Correction: +7.51°	

---

Geodetic Location WGS84	Elevation =	0.0 Meters
Latitude =	32.18290° N	32° 10 min 58.458 sec
Longitude =	103.73791° W	103° 44 min 16.460 sec

---

Magnetic Declination =	7.83°	[True North Offset]
Local Gravity =	.9988 g	Checksum = 6577
Local Field Strength =	48729 nT	Magnetic Vector X = 24026 nT
Magnetic Dip =	60.15°	Magnetic Vector Y = 3302 nT
Magnetic Model =	IGRF-2010g11	Magnetic Vector Z = 42266 nT
Spud Date =	Feb 09, 2010	Magnetic Vector H = 24252 nT

---

Signed: \_\_\_\_\_

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

## PECOS DISTRICT CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>Devon</b>
<b>LEASE NO.:</b>	<b>NMNM-0121121</b>
<b>WELL NAME &amp; NO.:</b>	<b>Cotton Draw Unit 110</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>660' FSL &amp; 660' FWL</b>
<b>BOTTOM HOLE FOOTAGE</b>	<b>330' FNL &amp; 660' FWL</b>
<b>LOCATION:</b>	<b>Section 25, T. 24 S., R 31 E., NMPM</b>
<b>COUNTY:</b>	<b>Eddy County, New Mexico</b>

### I. DRILLING

#### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

☒ **Eddy County**

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

1. **Although Hydrogen Sulfide has not been reported in this section, it is always a potential hazard. If Hydrogen Sulfide is encountered, please report measured amounts and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

## **B. CASING**

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.

---

~~Centralizers required on surface casing per Onshore Order 2.III.B.1.f.~~

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

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

Possible lost circulation in Delaware, Bone Spring

Possible H2O flows in Castile, Salado, Delaware, Bone Spring

1. The 13-3/8 inch surface casing shall be set at approximately 900 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. Fresh water mud to be used to setting depth.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

- d. If cement falls back, remedial cementing will be done prior to drilling out that string.
- 2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:

☒ Cement to surface. If cement does not circulate see B.1.a-d above.

**Centralizers required on horizontal leg, must be type for horizontal service and minimum of one every other joint.**

- 3. The minimum required fill of cement behind the 5-1/2 inch production casing is:

- a. First stage to DV tool, cement shall:

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job.

- b. Second stage above DV tool, cement shall:

☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification.

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

## **C. PRESSURE CONTROL**

- 1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
- 2. 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. Operator installing a 5M system and testing as a 3M.**
  - a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 9-5/8 inch intermediate casing shoe shall be **5000 (5M) psi. 5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**
4. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. Casing cut-off and BOP installation will not be initiated until the cement has had 4-6 hours of setup time in a water basin and 12 hours in the potash areas. This time will start after the cement plug is bumped. Testing the BOP/BOPE against a plug can commence after meeting the above conditions plus the BOP installation-time.
  - b. The tests shall be done by an independent service company utilizing a test plug.
  - c. The results of the test shall be reported to the appropriate BLM office.
  - d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
  - e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

#### **D. DRILL STEM TEST**

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

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