

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Operator

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*5. Lease Serial No.
NMNM130854

6. If Indian, Allottee or Tribe Name

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

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

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other8. Well Name and No.
COTTONBERRY 20 FEDERAL COM 2H

2. Name of Operator

CIMAREX ENERGY COMPANY OF CO

Contact: ARICKA EASTERLING

E-Mail: aeasterling@cimarex.com

9. API Well No.
30-015-43455-00-X1

3a. Address

202 S CHEYENNE AVE SUITE 1000
TULSA, OK 74103.4346

3b. Phone No. (include area code)

Ph: 918-560-7060

10. Field and Pool, or Exploratory
UNKNOWN

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 17 T25S R27E SWSE 195FSL 2225FEL

11. County or Parish, and State

EDDY COUNTY, NM

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

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original A
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	PD

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations 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 recompleat 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 requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Cimarex proposes to change the SHL to accommodate the drilling rig. No additional disturbance is required for the well pad.

Approved:

SHL 195 FSL & 2225 FEL Sec. 17-25S-27E

Proposed:

SHL 195 FSL & 2165 FEL Sec. 20-25S-27E

Please see attached proposed drilling plan, directional plan and plat

Eng OK, CRW 11/23/15

Original COAs Apply

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

Electronic Submission #323818 verified by the BLM Well Information System

For CIMAREX ENERGY COMPANY OF CO, sent to the Carlsbad

Committed to AFMSS for processing by CHRISTOPHER WALLS on 11/23/2015 (16CRW0018SE)

Name (Printed/Typed) ARICKA EASTERLING

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 11/17/2015

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By

Deputy Bell

Title

AFM

Date

11/24/15

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

CFO

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

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

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

WC-015-G-02 S252715A

¹ API Number 30-015-43455	² Pool Code 97816	³ Pool Name WC-015-S2S2715A; Bone Spring
⁴ Property Code 315640	⁵ Property Name COTTONBERRY 20 FEDERAL COM	⁶ Well Number 2H
⁷ OGRID No. 215099	⁸ Operator Name CIMAREX ENERGY CO.	⁹ Elevation 3136.8'

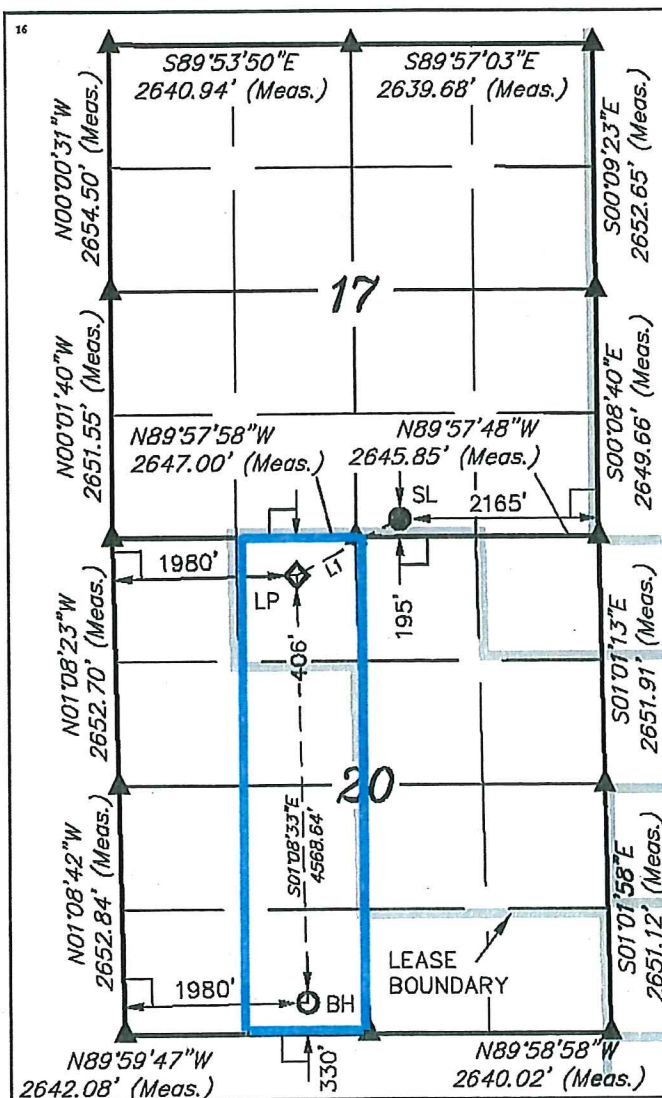
¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	17	25S	27E		195	SOUTH	2165	EAST	EDDY

¹¹ 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
N	20	25S	27E		330	SOUTH	1980	WEST	EDDY
¹² Dedicated Acres 160	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.						

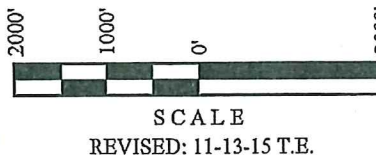
No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



NAD 83 (SURFACE LOCATION)
LATITUDE = 32°07'23.80" (32.123278)
LONGITUDE = 104°12'38.90" (104.210806)
NAD 27 (SURFACE LOCATION)
LATITUDE = 32°07'23.36" (32.123156)
LONGITUDE = 104°12'37.12" (104.210322)
STATE PLANE NAD 83 (N.M. EAST)
N: 408605.68 E: 579268.84
STATE PLANE NAD 27 (N.M. EAST)
N: 408548.29 E: 538085.60

NAD 83 (TARGET BOTTOM HOLE)
LATITUDE = 32°06'32.67" (32.109075)
LONGITUDE = 104°12'51.09" (104.214192)
NAD 27 (TARGET BOTTOM HOLE)
LATITUDE = 32°06'32.23" (32.108953)
LONGITUDE = 104°12'49.31" (104.213697)
STATE PLANE NAD 83 (N.M. EAST)
N: 403438.22 E: 578226.06
STATE PLANE NAD 27 (N.M. EAST)
N: 403380.94 E: 537042.75

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	S62°13'05"W	1287.21'



▲ = SECTION CORNERS LOCATED.

¹⁷ OPERATOR
CERTIFICATION

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

Aricka Easterling 11/17/15
Signature Date

Aricka Easterling

Printed Name

aeasterling@cimarex.com

E-mail Address

¹⁸ SURVEYOR
CERTIFICATION

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

June 11, 2014

Date of Survey

Signature and Seal of Professional Surveyor:



Certificate Number:

1. Geological Formations

TVD of target 7,322

Pilot Hole TD 8,100

MD at TD 12,812

Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	0	N/A	
OSE Groundwater	100	N/A	
Top Salt	1270	N/A	
Base Salt	1867	N/A	
Bell Canyon	2061	N/A	
Cherry Canyon	3016	N/A	
Brushy Canyon	4056	N/A	
Brushy Canyon Lower	5338	N/A	
Bone Spring	5612	Hydrocarbons	
Bone Spring A Shale	5756	Hydrocarbons	
Bone Spring C Shale	6103	Hydrocarbons	
1st Bone Spring Ss	6618	Hydrocarbons	
2nd Bone spring Ss	6985	Hydrocarbons	
2nd BS Ss Horz Target	7322	Hydrocarbons	
3rd BS Limestone	7420	Hydrocarbons	
Lwr 2nd Bone Spring Ss	7995	Hydrocarbons	
Base Lwr 2nd BS Ss	7998	Hydrocarbons	
TD (Pilot-hole)	8100	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	450	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	3.59	8.40	14.91
12 1/4	0	1996	9-5/8"	36.00	J-55	LT&C	1.87	3.25	6.17
8 3/4	0	6670	5-1/2"	17.00	L-80	LT&C	1.97	2.43	2.72
8 3/4	6670	12812	5-1/2"	17.00	L-80	BT&C	1.80	2.21	35.82
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

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

Cimarex Energy Co., Cottonberry 20 Federal Com #2H

	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.	N
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?	N
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	N
Is 2nd string set 100' to 600' below the base of salt?	N
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	N
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	N

3. Cementing Program

Casing	# Skt	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	91	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	195	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	386	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	120	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	656	10.80	2.35	9.60	17:43	Lead: Tuned Light I Class H
	1297	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface	0	33
Intermediate	0	44
Production	1841	17

Pilot Hole Cementing Specs

Pilot Hole Depth: 8100

KOP: 6747

See Original COAs

4. Pressure Control Equipment

	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
12 1/4	13 5/8	2M	Annular	X	50% of working pressure
			Blind Ram	X	2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	3M	Annular	X	50% of working pressure
			Blind Ram	X	3M
			Pipe Ram		
			Double Ram	X	
			Other		

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.

	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.
X	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.
N	Are anchors required by manufacturer?

5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 450'	FW Spud Mud	8.30 - 8.80	28	N/C
450' to 2041'	Brine Water	9.70 - 10.20	30-32	N/C
2041' to 12812'	FW/Cut Brine	8.70 - 9.20	30-32	N/C

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

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

Additional Logs Planned	Interval
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7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	3502 psi
Abnormal Temperature	No

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

X	H ₂ S is present
X	H ₂ S plan is attached

8. Other Facets of Operation

Borehole: Original Borehole

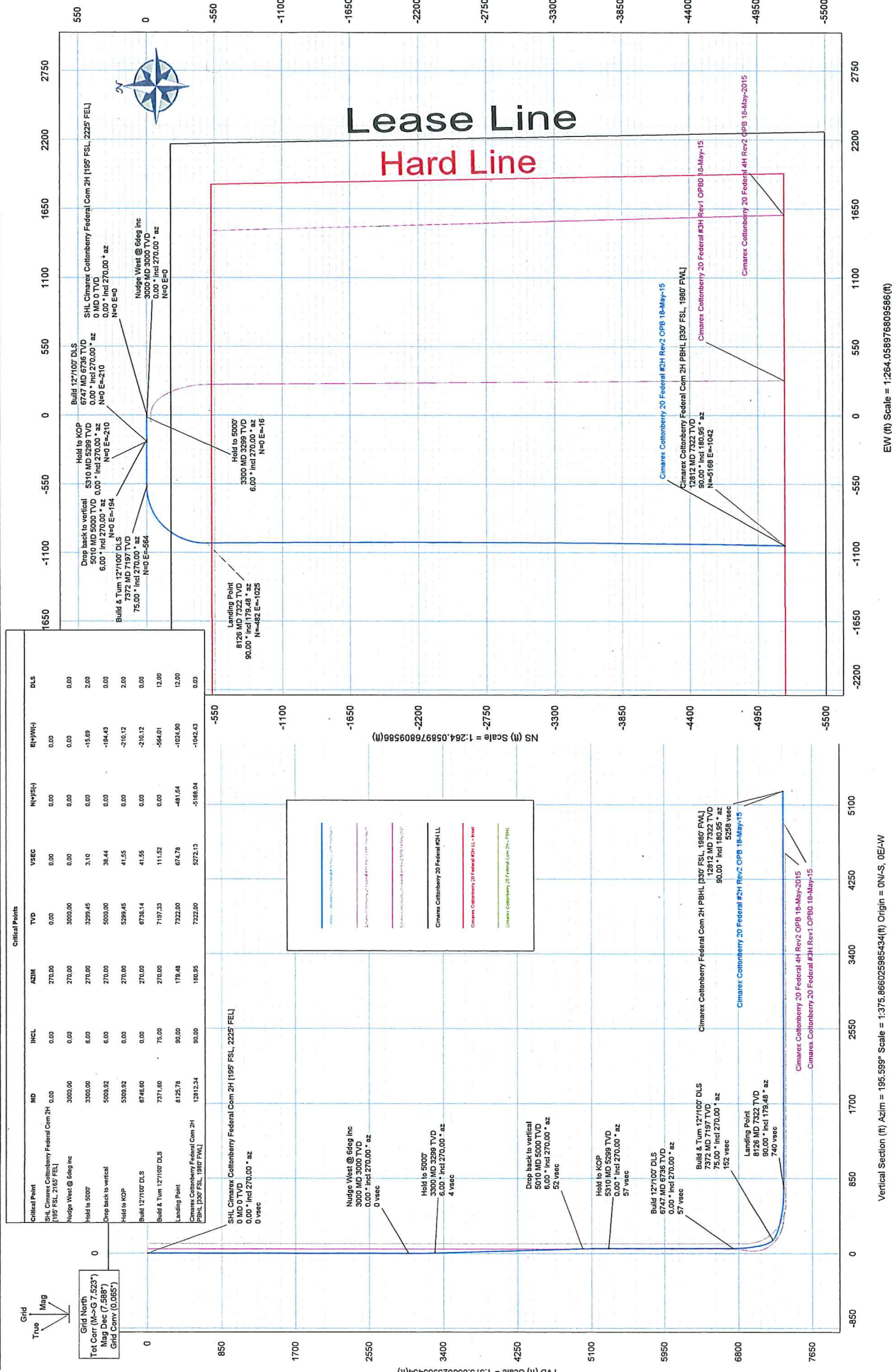
Well:	Cin
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al #2H

AD 83)

Structure:
Cimarex Cottonberry 20 Federal #2H

Gravity & Magnetic Parameters		Surface Location		NAD83 New Mexico State Plane, Eastern Zone, US Feet		Miscellaneous	
Model:	HQSN 2016	Date:	15-Nov-2016	Lat:	N 32 7 23.80	Grid Cont:	0.0652°
Height:	4091.62m	Gravity PS:	999.448mm (0.00656 Based)	Long:	W 104 12 30.90	Eastings:	679263.64105
Wavelength:	4091.62m	Gravity FS:	999.448mm (0.00656 Based)	Scale:	W 104 12 30.90	Scale Feet:	0.9999774
						Client: Cimarron Colliery Plot: Cimarron Colliery TYP Ref: RHE161.011 above MSL Station: Cimarron Colliery 20 Federal RD2 Rev2 OFR 15-May-16	
3	Office						
4	Office						
Copy number						for	



Cimarex Cottonberry 20 Federal #2H Rev2 OPB 18-May-15 Proposal Geodetic Report (Non-Def Plan)

Report Date: November 16, 2015 - 04:52 PM

Client: Cimarex

Field: NM Eddy County (NAD 83)

Structure / Slot: Cimarex Cottonberry 20 Federal #2H / Cimarex Cottonberry 20 Federal #2H

Well: Cimarex Cottonberry 20 Federal #2H

Borehole: Original Borehole

UWI / API#: Unknown / Unknown

Survey Name: Cimarex Cottonberry 20 Federal #2H Rev2 OPB 18-May-15

Survey Date: May 20, 2014

Tort / AHD / DDI / ERD Ratio: 178.969' / 5991.883 ft / 6.273 / 0.818

Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet

Location Lat / Long: N 32° 7' 23.79630", W 104° 12' 38.89901"

Location Grid N/E Y/X: N 408605.680 ftUS, E 579268.840 ftUS

CRS Grid Convergence Angle: 0.0652°

Grid Scale Factor: 0.99991074

Version / Patch: 2.8.572.0

Survey / DLS Computation: Minimum Curvature / Lubinski

Vertical Section Azimuth: 191.404° (Grid North)

Vertical Section Origin: 0.000 ft, 0.000 ft

TVD Reference Datum: RKB

TVD Reference Elevation: 3161.800 ft above MSL

Seabed / Ground Elevation: 3136.800 ft above MSL

Magnetic Declination: 7.588°

Total Gravity Field Strength: 998.4478mgn (9.80665 Based)

Gravity Model: GARM

Total Magnetic Field Strength: 48196.928 nT

Magnetic Dip Angle: 59.892°

Declination Date: November 16, 2015

Magnetic Declination Model: HDGM 2015

North Reference: Grid North

Grid Convergence Used: 0.0652°

Total Corr Mag North->Grid North: 7.5232°

Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL Cimarex Cottonberry Federal Com 2H [195' FSL, 2165' FEL]	0.00	0.00	270.00	0.00	-3161.80	0.00	0.00	0.00	N/A	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	100.00	0.00	270.00	100.00	-3061.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	200.00	0.00	270.00	200.00	-2961.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	300.00	0.00	270.00	300.00	-2861.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	400.00	0.00	270.00	400.00	-2761.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	500.00	0.00	270.00	500.00	-2661.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	600.00	0.00	270.00	600.00	-2561.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	700.00	0.00	270.00	700.00	-2461.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	800.00	0.00	270.00	800.00	-2361.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	900.00	0.00	270.00	900.00	-2261.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	1000.00	0.00	270.00	1000.00	-2161.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	1100.00	0.00	270.00	1100.00	-2061.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	1200.00	0.00	270.00	1200.00	-1961.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	1300.00	0.00	270.00	1300.00	-1861.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"
	1400.00	0.00	270.00	1400.00	-1761.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32° 7' 23.80"	W 104° 12' 38.90"

Comments	MD (ft)	Incl (°)	Azimuth (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
Nudge West @ 6deg inc	1500.00	0.00	270.00	1500.00	-1661.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	1600.00	0.00	270.00	1600.00	-1561.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	1700.00	0.00	270.00	1700.00	-1461.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	1800.00	0.00	270.00	1800.00	-1361.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	1900.00	0.00	270.00	1900.00	-1261.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2000.00	0.00	270.00	2000.00	-1161.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2100.00	0.00	270.00	2100.00	-1061.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2200.00	0.00	270.00	2200.00	-961.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2300.00	0.00	270.00	2300.00	-861.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2400.00	0.00	270.00	2400.00	-761.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2500.00	0.00	270.00	2500.00	-661.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2600.00	0.00	270.00	2600.00	-561.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2700.00	0.00	270.00	2700.00	-461.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2800.00	0.00	270.00	2800.00	-361.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	2900.00	0.00	270.00	2900.00	-261.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	3000.00	0.00	270.00	3000.00	-161.80	0.00	0.00	0.00	0.00	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	3100.00	2.00	270.00	3099.98	-61.82	0.35	0.00	-1.75	2.00	408605.68	579267.10	N 32 7 23.80	W 104 12 38.92
	3200.00	4.00	270.00	3199.84	38.04	1.38	0.00	-6.98	2.00	408605.68	579261.86	N 32 7 23.80	W 104 12 38.98
	3300.00	6.00	270.00	3299.45	137.65	3.10	0.00	-15.69	2.00	408605.68	579253.15	N 32 7 23.80	W 104 12 39.08
	3400.00	6.00	270.00	3398.90	237.10	5.17	0.00	-26.15	2.00	408605.68	579242.70	N 32 7 23.80	W 104 12 39.20
	3500.00	6.00	270.00	3498.36	336.56	7.24	0.00	-36.60	0.00	408605.68	579232.24	N 32 7 23.80	W 104 12 39.32
Hold to 5000'	3600.00	6.00	270.00	3597.81	436.01	9.30	0.00	-47.05	0.00	408605.68	579221.79	N 32 7 23.80	W 104 12 39.45
	3700.00	6.00	270.00	3697.26	535.46	11.37	0.00	-57.50	0.00	408605.68	579211.34	N 32 7 23.80	W 104 12 39.57
	3800.00	6.00	270.00	3796.71	634.91	13.44	0.00	-67.96	0.00	408605.68	579200.89	N 32 7 23.80	W 104 12 39.69
	3900.00	6.00	270.00	3896.17	734.37	15.50	0.00	-78.41	0.00	408605.68	579190.44	N 32 7 23.80	W 104 12 39.81
	4000.00	6.00	270.00	3995.62	833.82	17.57	0.00	-88.86	0.00	408605.68	579179.98	N 32 7 23.80	W 104 12 39.93
	4100.00	6.00	270.00	4095.07	933.27	19.64	0.00	-99.32	0.00	408605.68	579169.53	N 32 7 23.80	W 104 12 40.05
	4200.00	6.00	270.00	4194.52	1032.72	21.70	0.00	-109.77	0.00	408605.68	579159.08	N 32 7 23.80	W 104 12 40.18
	4300.00	6.00	270.00	4293.97	1132.17	23.77	0.00	-120.22	0.00	408605.68	579148.63	N 32 7 23.80	W 104 12 40.30
	4400.00	6.00	270.00	4393.43	1231.63	25.84	0.00	-130.67	0.00	408605.68	579138.18	N 32 7 23.80	W 104 12 40.42
	4500.00	6.00	270.00	4492.88	1331.08	27.90	0.00	-141.13	0.00	408605.68	579127.73	N 32 7 23.80	W 104 12 40.54
	4600.00	6.00	270.00	4592.33	1430.53	29.97	0.00	-151.58	0.00	408605.68	579117.27	N 32 7 23.80	W 104 12 40.66
	4700.00	6.00	270.00	4691.78	1529.98	32.04	0.00	-162.03	0.00	408605.68	579106.82	N 32 7 23.80	W 104 12 40.78
	4800.00	6.00	270.00	4791.23	1629.43	34.10	0.00	-172.49	0.00	408605.68	579096.37	N 32 7 23.80	W 104 12 40.90
	4900.00	6.00	270.00	4890.69	1728.89	36.17	0.00	-182.94	0.00	408605.68	579085.92	N 32 7 23.80	W 104 12 41.03
	5000.00	6.00	270.00	4990.14	1828.34	38.24	0.00	-193.39	0.00	408605.68	579075.47	N 32 7 23.80	W 104 12 41.15
	5009.92	6.00	270.00	5000.00	1838.20	38.44	0.00	-194.43	0.00	408605.68	579074.43	N 32 7 23.80	W 104 12 41.16
	5100.00	4.20	270.00	5089.72	1927.92	40.03	0.00	-202.43	2.00	408605.68	579066.42	N 32 7 23.80	W 104 12 41.25
	5200.00	2.20	270.00	5189.56	2027.76	41.13	0.00	-208.01	2.00	408605.68	579060.85	N 32 7 23.80	W 104 12 41.32
	5300.00	0.20	270.00	5289.54	2127.74	41.54	0.00	-210.10	2.00	408605.68	579058.75	N 32 7 23.80	W 104 12 41.34
Hold to KOP	5309.92	0.00	270.00	5299.45	2137.65	41.55	0.00	-210.12	2.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5400.00	0.00	270.00	5389.54	2227.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5500.00	0.00	270.00	5489.54	2327.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5600.00	0.00	270.00	5589.54	2427.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5700.00	0.00	270.00	5689.54	2527.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5800.00	0.00	270.00	5789.54	2627.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	5900.00	0.00	270.00	5889.54	2727.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6000.00	0.00	270.00	5989.54	2827.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6100.00	0.00	270.00	6089.54	2927.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6200.00	0.00	270.00	6189.54	3027.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6300.00	0.00	270.00	6289.54	3127.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6400.00	-0.00	270.00	6389.54	3227.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6500.00	0.00	270.00	6489.54	3327.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6600.00	0.00	270.00	6589.54	3427.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6700.00	0.00	270.00	6689.54	3527.74	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6746.60	0.00	270.00	6736.14	3574.34	41.55	0.00	-210.12	0.00	408605.68	579058.74	N 32 7 23.80	W 104 12 41.34
	6800.00	6.41	270.00	6789.43	3627.63	42.14	0.00	-213.11	12.00	408605.68	579055.75	N 32 7 23.80	W 104 12 41.38
	6900.00	18.41	270.00	6886.91	3725.11	46.38	0.00	-234.55	12.00	408605.68	579034.31	N 32 7 23.80	W 104 12 41.63
	7000.00	30.41	270.00	6977.81	3816.01	54.53	0.00	-275.80	12.00	408605.68	578993.06	N 32 7 23.80	W 104 12 42.11
	7100.00	42.41	270.00	7058.14	3896.34	66.25	0.00	-335.05	12.00	408605.68	578933.83	N 32 7 23.80	W 104 12 42.79
Build 12"/100' DLS													

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Eastings (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
Build & Turn 12°/100' DLS	7200.00	54.41	270.00	7124.40	3962.60	81.01	0.00	-409.70	12.00	408605.68	578659.18	N 32 7 23.80	W 104 12 43.66
	7300.00	66.41	270.00	7173.69	4011.89	98.17	0.00	-496.50	12.00	408605.68	578772.39	N 32 7 23.80	W 104 12 44.67
	7371.60	75.00	270.00	7197.33	4035.53	111.52	0.00	-564.01	12.00	408605.68	578704.88	N 32 7 23.80	W 104 12 45.46
	7400.00	75.02	266.47	7204.68	4042.88	117.77	-0.84	-591.43	12.00	408604.84	578677.47	N 32 7 23.79	W 104 12 45.78
Landing Point	7500.00	75.52	254.07	7230.20	4068.40	152.57	-17.16	-686.53	12.00	408588.52	578588.37	N 32 7 23.63	W 104 12 46.88
	7600.00	76.66	241.76	7254.34	4092.54	206.03	-53.59	-776.28	12.00	408552.09	578492.63	N 32 7 23.27	W 104 12 47.93
	7700.00	78.38	229.60	7276.03	4114.23	275.81	-108.55	-856.73	12.00	408497.14	578412.19	N 32 7 22.73	W 104 12 48.86
	7800.00	80.61	217.61	7294.33	4132.53	358.86	-179.64	-924.37	12.00	408426.06	578344.55	N 32 7 22.03	W 104 12 49.65
	7900.00	83.23	205.78	7308.43	4146.63	451.56	-263.73	-976.26	12.00	408341.97	578292.67	N 32 7 21.20	W 104 12 50.25
	8000.00	86.14	194.08	7317.73	4155.93	549.85	-357.17	-1010.11	12.00	408248.54	578248.54	N 32 7 20.27	W 104 12 50.65
	8100.00	89.20	182.47	7321.82	4160.02	649.43	-455.87	-1024.46	12.00	408149.85	578244.48	N 32 7 19.30	W 104 12 50.82
	8125.78	90.00	179.48	7322.00	4160.20	674.78	-481.64	-1024.90	12.00	408124.08	578244.04	N 32 7 19.04	W 104 12 50.82
	8200.00	90.00	179.50	7322.00	4160.20	747.40	-555.86	-1024.24	0.03	408049.87	578244.70	N 32 7 18.31	W 104 12 50.82
	8300.00	90.00	179.54	7322.00	4160.20	845.26	-655.86	-1023.40	0.03	407949.88	578245.53	N 32 7 17.32	W 104 12 50.81
	8400.00	90.00	179.57	7322.00	4160.20	943.13	-755.85	-1022.62	0.03	407849.90	578246.32	N 32 7 16.33	W 104 12 50.80
	8500.00	90.00	179.60	7322.00	4160.20	1041.01	-855.85	-1021.89	0.03	407749.91	578247.05	N 32 7 15.34	W 104 12 50.79
	8600.00	90.00	179.63	7322.00	4160.20	1138.90	-955.85	-1021.21	0.03	407649.92	578247.72	N 32 7 14.35	W 104 12 50.79
	8700.00	90.00	179.66	7322.00	4160.20	1236.80	-1055.85	-1020.59	0.03	407549.93	578248.34	N 32 7 13.36	W 104 12 50.77
	8800.00	90.00	179.69	7322.00	4160.20	1334.71	-1155.85	-1020.03	0.03	407449.94	578248.91	N 32 7 12.37	W 104 12 50.77
	8900.00	90.00	179.72	7322.00	4160.20	1432.63	-1255.84	-1019.52	0.03	407349.95	578249.42	N 32 7 11.38	W 104 12 50.77
	9000.00	90.00	179.75	7322.00	4160.20	1530.57	-1355.84	-1019.06	0.03	407249.96	578249.87	N 32 7 10.39	W 104 12 50.77
	9100.00	90.00	179.79	7322.00	4160.20	1628.51	-1455.84	-1018.66	0.03	407149.97	578250.27	N 32 7 9.40	W 104 12 50.76
	9200.00	90.00	179.82	7322.00	4160.20	1726.47	-1555.84	-1018.31	0.03	407049.98	578250.62	N 32 7 8.41	W 104 12 50.76
	9300.00	90.00	179.85	7322.00	4160.20	1824.44	-1655.84	-1018.02	0.03	406949.99	578250.91	N 32 7 7.42	W 104 12 50.76
	9400.00	90.00	179.88	7322.00	4160.20	1922.42	-1755.84	-1017.78	0.03	406850.00	578251.15	N 32 7 6.43	W 104 12 50.76
	9500.00	90.00	179.91	7322.00	4160.20	2020.41	-1855.84	-1017.60	0.03	406750.01	578251.33	N 32 7 5.44	W 104 12 50.76
	9600.00	90.00	180.00	7322.00	4160.20	2118.41	-1955.84	-1017.47	0.03	406650.02	578251.46	N 32 7 4.45	W 104 12 50.76
	9700.00	90.00	179.97	7322.00	4160.20	2216.42	-2055.84	-1017.40	0.03	406550.03	578251.53	N 32 7 3.46	W 104 12 50.76
	9800.00	90.00	180.00	7322.00	4160.20	2314.44	-2155.84	-1017.38	0.03	406450.04	578251.55	N 32 7 2.47	W 104 12 50.76
	9900.00	90.00	180.04	7322.00	4160.20	2412.47	-2255.84	-1017.42	0.03	406350.05	578251.52	N 32 7 1.49	W 104 12 50.76
	10000.00	90.00	180.07	7322.00	4160.20	2510.52	-2355.84	-1017.51	0.03	406250.05	578251.43	N 32 7 0.50	W 104 12 50.76
	10100.00	90.00	180.10	7322.00	4160.20	2608.57	-2455.84	-1017.65	0.03	406150.06	578251.28	N 32 6 59.51	W 104 12 50.77
	10200.00	90.00	180.13	7322.00	4160.20	2706.64	-2555.84	-1017.85	0.03	406050.07	578251.08	N 32 6 58.52	W 104 12 50.77
	10300.00	90.00	180.16	7322.00	4160.20	2804.71	-2655.84	-1018.10	0.03	405950.08	578250.83	N 32 6 57.53	W 104 12 50.77
	10400.00	90.00	180.19	7322.00	4160.20	2902.80	-2755.84	-1018.41	0.03	405850.09	578250.52	N 32 6 56.54	W 104 12 50.78
	10500.00	90.00	180.22	7322.00	4160.20	3000.89	-2855.84	-1018.78	0.03	405750.10	578250.16	N 32 6 55.55	W 104 12 50.78
	10600.00	90.00	180.26	7322.00	4160.20	3099.00	-2955.84	-1019.20	0.03	405650.11	578249.74	N 32 6 54.56	W 104 12 50.79
	10700.00	90.00	180.29	7322.00	4160.20	3197.12	-3055.84	-1019.67	0.03	405550.12	578249.26	N 32 6 53.57	W 104 12 50.79
	10800.00	90.00	180.32	7322.00	4160.20	3295.25	-3155.84	-1020.20	0.03	405450.13	578248.74	N 32 6 52.58	W 104 12 50.80
	10900.00	90.00	180.35	7322.00	4160.20	3393.39	-3255.83	-1020.78	0.03	405350.14	578248.15	N 32 6 51.59	W 104 12 50.81
	11000.00	90.00	180.38	7322.00	4160.20	3491.54	-3355.83	-1021.42	0.03	405250.15	578247.52	N 32 6 50.60	W 104 12 50.82
	11100.00	90.00	180.41	7322.00	4160.20	3589.70	-3455.83	-1022.11	0.03	405150.17	578246.83	N 32 6 49.61	W 104 12 50.83
	11200.00	90.00	180.44	7322.00	4160.20	3687.87	-3555.83	-1022.85	0.03	405050.18	578246.08	N 32 6 48.62	W 104 12 50.84
	11300.00	90.00	180.47	7322.00	4160.20	3786.05	-3655.82	-1023.65	0.03	404950.19	578245.28	N 32 6 47.63	W 104 12 50.85
	11400.00	90.00	180.51	7322.00	4160.20	3884.24	-3755.82	-1024.51	0.03	404850.20	578244.42	N 32 6 46.64	W 104 12 50.86
	11500.00	90.00	180.54	7322.00	4160.20	3982.44	-3855.82	-1025.42	0.03	404750.22	578243.51	N 32 6 45.65	W 104 12 50.87
	11600.00	90.00	180.57	7322.00	4160.20	4080.65	-3955.81	-1026.38	0.03	404650.23	578242.55	N 32 6 44.66	W 104 12 50.88
	11700.00	90.00	180.60	7322.00	4160.20	4178.88	-4055.81	-1027.40	0.03	404550.24	578241.53	N 32 6 43.67	W 104 12 50.90
	11800.00	90.00	180.63	7322.00	4160.20	4277.11	-4155.80	-1028.48	0.03	404450.26	578240.46	N 32 6 42.68	W 104 12 50.91
	11900.00	90.00	180.66	7322.00	4160.20	4375.35	-4255.79	-1029.61	0.03	404350.27	578239.33	N 32 6 41.70	W 104 12 50.93
	12000.00	90.00	180.69	7322.00	4160.20	4473.61	-4355.79	-1030.79	0.03	404250.29	578238.15	N 32 6 40.71	W 104 12 50.94
	12100.00	90.00	180.72	7322.00	4160.20	4571.87	-4455.78	-1032.03	0.03	404150.31	578236.91	N 32 6 39.72	W 104 12 50.96
	12200.00	90.00	180.76	7322.00	4160.20	4670.14	-4555.77	-1033.32	0.03	404050.33	578235.62	N 32 6 38.73	W 104 12 50.97
	12300.00	90.00	180.79	7322.00	4160.20	4768.42	-4655.76	-1034.67	0.03	403950.34	578234.27	N 32 6 37.74	W 104 12 50.99
	12400.00	90.00	180.82	7322.00	4160.20	4866.72	-4755.75	-1036.07	0.03	403850.36	578232.87	N 32 6 36.75	W 104 12 51.01
	12500.00	90.00	180.85	7322.00	4160.20	4965.02	-4855.74	-1037.52	0.03	403750.38	578231.41	N 32 6 35.76	W 104 12 51.03
	12600.00	90.00	180.88	7322.00	4160.20	5063.33	-4955.73	-1039.04	0.03	403650.40	578229.90	N 32 6 34.77	W 104 12 51.04
	12700.00	90.00	180.91	7322.00	4160.20	5161.66	-5055.72	-1040.60	0.03	403550.42	578228.33	N 32 6 33.78	W 104 12 51.08
	12800.00	90.00	180.94	7322.00	4160.20	5259.99	-5155.70	-1042.22	0.03	403450.45	578226.71	N 32 6 32.79	W 104 12 51.08

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Cimarex Cottonberry Federal Corn 2H PBHL [330' FSL, 1980' FWL]	12812.34	90.00	180.95	7322.00	4160.20	5272.13	-5168.04	-1042.43	0.03	403438.11	578226.51	N 32 6 32.67	W 104 12 51.09

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	25.000	1/100.000	30.000	30.000	SLB_MWID-STD-Depth Only	Original Borehole / Cimarex Cottonberry 20 Federal #2H Rev2
	1	25.000	12812.339	1/100.000	30.000	30.000	SLB_MWID-STD	OPB 18-May-15 Original Borehole / Cimarex Cottonberry 20 Federal #2H Rev2