

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**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.
NMNM27506

6. If Indian, Allottee or Tribe Name

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

SUBMIT IN TRIPLICATE - Other instructions on page

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

CHEVRON USA INCORPORATED

Contact: LAURA BECERRA

E-Mail: LBECERRA@CHEVRON.COM

3a. Address

6301 DEAUVILLE BLVD
MIDLAND, TX 79706

3b. Phone No. (include area code)

Ph: 432-687-7655

8. Well Name and No.

SD EA 29 32 FED COM P10 18H

9. API Well No.

30-025-44486-00-X1

10. Field and Pool or Exploratory Area

WC025G09S263327G-UP WOLFCAMP

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

Sec 29 T26S R33E NWNW 120FWL 2630FWL
32.021431 N Lat, 103.594322 W Lon

11. County or Parish, State

LEA COUNTY, NM

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

12. CHECK THE 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	☐ Hydraulic Fracturing	☐ 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 recomple 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 must 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 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Chevron respectfully requests a variance to make the following changes to the originally approved APD:

- change the BHL of this well to the new 100' North-South Lease line rule as agreed upon by the State of New Mexico OCD and BLM. Updated C-102 and directional survey with revised TVD and MD are attached.

- change the casing design to a 3-string design with 4-string liner contingency plan. Design factors have been updated for both designs in the attached 9 Pt drilling plan. Formations tops in the 9-point plan have also been updated utilizing data from pilot holes Chevron has drilled in the area.

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

Electronic Submission #455817 verified by the BLM Well Information System
For CHEVRON USA INCORPORATED, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 02/27/2019 (19PP1152SE)

Name (Printed/Typed) LAURA BECERRA

Title REGULATORY SPECIALIST

Signature (Electronic Submission)

Date 02/25/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTIA STEVENS

Title PETROLEUM ENGINEER

Date 03/05/2019

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 Hobbs

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.

(Instructions on page 2)

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

Additional data for EC transaction #455817 that would not fit on the form

32. Additional remarks, continued

- change the intermediate cement design from the 14.8 ppg class C cement slurry to the foam cement design shown in the attached documentation previously agreed upon. Updated 9 Pt drilling plan attached.

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

¹ API Number 30-025-44486	² Pool Code 98308	³ Pool Name NEEDMORE TANK;UPPER WOLFCAMP POOL
⁴ Property Code	⁵ Property Name SD EA 29 32 FED COM P10	⁶ Well Number 18H
⁷ OGRID No. 4323	⁸ Operator Name CHEVRON U.S.A. INC.	⁹ Elevation 3236'

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
C	29	26 SOUTH	33 EAST, N.M.P.M.		120'	NORTH	2630'	WEST	LEA

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
F	32	26 SOUTH	33 EAST, N.M.P.M.		25'	SOUTH	2430'	WEST	LEA

¹² Dedicated Acres 949.56	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. R-20300
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

¹⁶ SD EA 29 32 FED COM P10 NO. 18H WELL X= 729,184 Y= 372,262 LAT. 32.021307 N LONG. 103.593854 W NAD 27 X= 770,372 Y= 372,319 LAT. 32.021432 N LONG. 103.594321 W NAD83/2011 ELEVATION +3236' NAVD 88 PROPOSED FIRST TAKE POINT X= 728,984 Y= 372,281 LAT. 32.021362 N LONG. 103.594500 W NAD 27 X= 770,172 Y= 372,338 LAT. 32.021487 N LONG. 103.594966 W NAD83/2011 PROPOSED LAST TAKE POINT X= 729,046 Y= 364,733 LAT. 32.000612 N LONG. 103.594467 W NAD 27 X= 770,234 Y= 364,789 LAT. 32.000737 N LONG. 103.594932 W NAD83/2011 PROPOSED BOTTOM HOLE LOCATION X= 729,047 Y= 364,578 LAT. 32.000186 N LONG. 103.594466 W NAD 27 X= 770,235 Y= 364,634 LAT. 32.000311 N LONG. 103.594932 W NAD83/2011	Diagram showing sections 29 and 32. Section 29 is 2630' wide and 120' high. Section 32 is 2430' wide and 25' high. The proposed first take point is 100' FNL, 2430' FWL/2858' FEL. The proposed last take point is 180' FSL, 2430' FWL/2854' FEL. Corner coordinates are provided for points A, B, C, and D. CORNER COORDINATES TABLE (NAD 27) A - Y=372373.27, X=727875.49 B - Y=372382.09, X=729197.59 C - Y=364553.99, X=729259.12 D - Y=364544.81, X=727938.29	¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature: Date: 2/19/2019 Printed Name: Laura Becerra E-mail Address: LBecerra@chevron.om 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. Date of Survey: 03/06/2018 Signature and Seal of Professional Surveyor: Certificate Number: 23006
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Delaware Basin Changes to APD/COA for Federal Well



Well Name:

SD EA 29 32 Fed Com P10	18H	30-025-44486
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Rig: Nabors 1206

CVX CONTACT:

Tony Bacon
MCBU D&C Engineer – Nabors 1206
Chevron North America Exploration and Production Co.
MidContinent Business Unit
Office: (713) 372-4025
Cell: (406) 989-0415
Email: tonybacon@chevron.com

Summary of Changes to APD Submission

Chevron respectfully requests to change the well plans of these two Salado Draw pads to the new 100' North-South Lease line rule as agreed upon by the State of New Mexico OCD and BLM. The updated C-102 Plats and drill plans are attached.

Summary of Changes to APD Submission

Chevron respectfully requests to change the intermediate cement design from the 14.8 ppg class C cement slurry to the foam cement design shown below as previously agreed upon. Cement proposal is attached.

Current Cement Program

Slurry	Type	Top	Bottom	Weight	Yield	%Excess	Sacks	Water
<u>Intermediate</u>								
Stage 2 Lead	Class C	0	4570	11.9	2.53	200	1515	14.55
Stage 2 Tail	Class C	4570	4870	14.8	1.33	50	109	6.31
Stage 1 Lead	Class C	4870	11150	11.9	2.52	100	1154	14.57
Stage 1 Tail	Class C	11150	11650	14.8	1.33	50	202	3.3

Proposed Foam Cement Program

Slurry	Type	Top	Bottom	Weight	Yield	%Excess	Sacks	Water
<u>Intermediate</u>								
Unfoamed Cap Slurry	Class H	0	800	12.0	1.997	0	150	11.33
Foamed Lead Slurry	Class H	800	11025	13.0 (base) 10.0 (foamed)	1.57	35	2020	8.13
Unfoamed Tail Slurry	Class H	11025	~11650	13.0	1.57	35	160	8.13
Annulus Top Off Slurry (if needed)	Class C	0	752	14.8	1.364	0	200	6.61

ATTACHMENT: 1 – Chevron Foamed Intermediate Casing

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Rustler		1,043	
Castile		3,065	
Lamar		4,932	
Bell Canyon		4,956	
Cherry Canyon		5,990	
Brushy Canyon		7,519	
Bone Spring Limestone		9,110	
Upr. Avalon		9,145	
Top Bone Spring 1		10,069	
Top Bone Spring 2		10,616	
Top Bone Spring 3		11,740	
Wolfcamp		12,130	
Wolfcamp A1		12,326	
Wolfcamp A2		12,656	
Lateral TD (Wolfcamp A2)		12,735	20,100

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		700
Water	Rustler	1043
Water	Bell Canyon	4956
Water	Cherry Canyon	5990
Oil/Gas	Brushy Canyon	7519
Oil/Gas	Bone Spring Limestone	9110
Oil/Gas	Upr. Avalon	9145
Oil/Gas	Top Bone Spring 1	10,069
Oil/Gas	Top Bone Spring 2	10,616
Oil/Gas	Top Bone Spring 3	11,740
Oil/Gas	Wolfcamp	12,130
Oil/Gas	Wolfcamp A1	12,326
Oil/Gas	Wolfcamp A2	12,656

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

Will have a minimum of a 10000 psi rig stack (see proposed schematic) for drill out below surface (Wolfcamp is not exposed until drillout of the intermediate casing). Could possibly utilize the 5000 psi rig stack (see proposed schematic) for drill out below surface casing due to the availability of 10 M annular. (Wolfcamp is not exposed until drillout of the intermediate casing) Stack will be tested as specified in the attached testing requirements. Batch drilling of the surface, intermediate, and production will take place. A full BOP test will be performed unless approval from BLM is received otherwise. Flex choke hose will be used for all wells on the pad (see attached specs) BOP test will be conducted by a third party.

Chevron requests a variance to use a FMC UH2 Multibowl wellhead, which will be run through the rig floor on surface casing. BOPE will be nipped up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal.

4. CASING PROGRAM

a. The proposed casing program will be as follows:

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	850'	17-1/2"	13-3/8"	54.5 #	J55	STC	New
Intermediate	0'	11,500'	12-1/4"	9-5/8"	43.5#	L-80IC	LTC	New
Production	0'	20,100'	8-1/2"	5-1/2"	20.0 #	P-110-ICY	TXP BTC	New

An alternative casing design with a contingency string is as follows:

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	850'	17-1/2"	13-3/8"	54.5 #	J55	STC	New
Intermediate	0'	11,500'	12-1/4"	9-5/8"	43.5#	L-80IC	LTC	New
Liner	10,850'	12,300'	8-1/2"	7-5/8"	29.7 #	HCP-110	W-513	New
Production	0'	12,500'	6-3/4"	5.5"	20#	P-110-ICY	TXP BTC	New
(Taper String)	12,500'	20,100'	6-3/4"	5"	18#	P-110 IC	W-521	New

b. Casing design subject to revision based on geologic conditions encountered.

c. ***A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalculated & sent to the BLM prior to drilling.

d. Chevron will fill casing at a minimum of every 20 jts (840') while running for intermediate and production casing in order to maintain collapse SF.

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 1150'
Intermediate Casing: 11,650' TVD
Production Casing: 23,000' MD/12,851' TVD (10,300' VS @ 90 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.80	2.15	4.34	2.19
Intermediate	1.25	1.62	1.60	1.57
Production	1.10	1.19	2.35	1.32

Contingency Liner - 4 String Design

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.80	2.15	4.34	2.19
Intermediate	1.24	2.13	1.60	1.51
Liner	2.69	4.14	4.26	3.27
Production	1.12	1.21	1.76	1.38

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Liner	Prod
Burst Design				
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X			
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 16 ppg Frac Gradient		X	X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid				X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid				X
Collapse Design				
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X	X
Tension Design				
100k lb overpull	X	X	X	X

5. CEMENTING PROGRAM

Slurry	Type	Top	Bottom	Weight (ppg)	Yield (sx/cu ft)	%Excess Open Hole	Sacks	Water gal/sk	Additives
Surface									
Tail	Class C	0'	850'	14.8	1.33	50	650	6.57	Extender Antifoam Retarder
Intermediate									
Unfoamed Cap Slurry	Class H	0'	800	12	1.997	0	150	11.33	Antifoam Extender Salt Retarder Viscosifier
Foamed Lead Slurry	Class H	800	11025	13.0 (base) 10.0 (foamed)	1.57	35	2020	8.13	Foamer Foam Stabilizer Nitrogen
Unfoamed Tail Slurry	Class H	11,025'	11,650'	13	1.57	35	160	8.13	Antifoam Retarder Viscosifier
Annulus Top Off Slurry (if needed)	Class C	0'	752'	14.8	1.362	0	200	6.61	Antifoam Retarder Dispersent
Contingency Liner									
*No change to surface and intermediate cement design with implementation of contingency liner.									
Tail	Class H	10,850'	12,300'	15.6	1.22	17	123	5.34	
Production									
Lead	Class H	9850'	18,600'	15.6	1.183	35	2220	5.14	Antifoam Dispersent Fluid Loss Retarder Viscosifier
Tail	Class H	18,600'	20,100'	16.0	1.903	35	186	7.43	Antifoam Dispersent Fluid Loss Retarder Viscosifier

1. Final cement volumes will be determined by caliper.
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.
3. Production casing will have one horizontal type centralizer on every joint for the first 1000' from TD, then every other joint to EOB, and then every third joint to KOP. Bowspring type centralizers will be run from KOP to intermediate casing.

6. MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate	
0'	850'	Spud Mud	8.3-8.7	32 - 34	NC - NC	
850'	11,500'	Oil Based Mud	8.8-9.8	28 - 30	25-30	
11,150'	12,300'	Oil Based Mud	9.8-12.9	70 - 75	25 - 30	Liner Contingency
11,500'	20,100'	Oil Based Mud	9.8-14.8	70 - 75	25 - 30	

A closed system will be utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated -- a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole conditions dictate.

7. TESTING, LOGGING, AND CORING

The anticipated type and amount of testing, logging, and coring are as follows:

- Drill stem tests are not planned.
- The logging program will be as follows:

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

- Conventional whole core samples are not planned.
- A Directional Survey will be run.

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

- No abnormal pressures or temperatures are expected. Estimated BHP at intermediate TD is: **5750** psi
No abnormal pressures or temperatures are expected. Estimated BHP at production TD is: **9830** psi
- Hydrogen sulfide gas is not anticipated. An H2S Contingency plan is attached with this APD in the event that H2S is encountered



Chevron SD EA 29 32 Fed Com P10 18H Rev1 kFc 03Dec18 Proposal

Geodetic Report

(Def Plan)

Report Date: December 03, 2018 - 11:58 PM
Client: Chevron
Field: NM Lea County (NAD 27)
Structure / Slot: Chevron SD EA 29 32 Fed Com P10 Pad / 18H
Well: SD EA 29 32 Fed Com P10 18H
Borehole: SD EA 29 32 Fed Com P10 18H
UWI / API#: Unknown / Unknown
Survey Name: Chevron SD EA 29 32 Fed Com P10 18H Rev1 kFc 03Dec18
Survey Date: November 29, 2018
Tort / AHD / DDI / ERD Ratio: 103.418 * / 7884.455 ft / 6.110 / 0.619
Coordinate Reference System: NAD27 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 1' 16.70358", W 103° 35' 37.87953"
Location Grid N/E Y/X: N 372262.000 ftUS, E 729184.000 ftUS
CRS Grid Convergence Angle: 0.3921 *
Grid Scale Factor: 0.99996925
Version / Patch: 2.10.753.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 179.530 * (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB 32.5ft
TVD Reference Elevation: 3268.500 ft above
Seabed / Ground Elevation: 3238.000 ft above
Magnetic Declination: 6.731 *
Total Gravity Field Strength: 998.4326mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47719.203 nT
Magnetic Dip Angle: 59.654 *
Declination Date: November 29, 2018
Magnetic Declination Model: HDGM 2018
North Reference: Grid North
Grid Convergence Used: 0.3921 *
Total Corr Mag North->Grid North: 6.3385 *
Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Surface	0.00	0.00	275.43	0.00	0.00	0.00	0.00	N/A	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	100.00	0.00	289.08	100.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	200.00	0.00	289.08	200.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	300.00	0.00	289.08	300.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	400.00	0.00	289.08	400.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	500.00	0.00	289.08	500.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	600.00	0.00	289.08	600.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	700.00	0.00	289.08	700.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	800.00	0.00	289.08	800.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
Rustler	809.56	0.00	289.08	809.56	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
Surface Casing	872.00	0.00	289.08	872.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	900.00	0.00	289.08	900.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
Build 1"/100ft	972.00	0.00	289.08	972.00	0.00	0.00	0.00	0.00	372262.00	729184.00	N 32 1 16.70 W 103 35 37.88	
	1000.00	0.28	289.08	1000.00	-0.02	0.02	-0.06	1.00	372262.02	729183.94	N 32 1 16.70 W 103 35 37.88	
	1100.00	1.28	289.08	1099.99	-0.48	0.47	-1.35	1.00	372262.47	729182.65	N 32 1 16.71 W 103 35 37.90	
	1200.00	2.28	289.08	1199.94	-1.52	1.48	-4.29	1.00	372263.48	729179.71	N 32 1 16.72 W 103 35 37.93	
	1300.00	3.28	289.08	1299.82	-3.14	3.07	-8.87	1.00	372265.07	729175.13	N 32 1 16.73 W 103 35 37.98	
	1400.00	4.28	289.08	1399.60	-5.35	5.22	-15.10	1.00	372267.22	729168.90	N 32 1 16.76 W 103 35 38.05	
	1500.00	5.28	289.08	1499.25	-8.13	7.95	-22.98	1.00	372269.95	729161.02	N 32 1 16.78 W 103 35 38.15	
	1600.00	6.28	289.08	1598.74	-11.50	11.24	-32.49	1.00	372273.24	729151.51	N 32 1 16.82 W 103 35 38.26	
	1672.16	7.00	289.08	1670.42	-14.30	13.96	-40.38	1.00	372275.96	729143.62	N 32 1 16.84 W 103 35 38.35	
	1700.00	7.00	289.08	1698.05	-15.43	15.07	-43.59	0.00	372277.07	729140.41	N 32 1 16.86 W 103 35 38.38	
	1800.00	7.00	289.08	1797.31	-19.51	19.06	-55.11	0.00	372281.06	729128.89	N 32 1 16.90 W 103 35 38.52	
	1900.00	7.00	289.08	1896.56	-23.59	23.04	-66.63	0.00	372285.04	729117.37	N 32 1 16.94 W 103 35 38.65	
	2000.00	7.00	289.08	1995.81	-27.67	27.03	-78.15	0.00	372289.02	729105.85	N 32 1 16.98 W 103 35 38.79	
	2100.00	7.00	289.08	2095.07	-31.74	31.01	-89.67	0.00	372293.01	729094.33	N 32 1 17.02 W 103 35 38.92	
	2200.00	7.00	289.08	2194.32	-35.82	34.99	-101.19	0.00	372296.99	729082.81	N 32 1 17.06 W 103 35 39.05	
	2300.00	7.00	289.08	2293.58	-39.90	38.98	-112.71	0.00	372300.98	729071.29	N 32 1 17.10 W 103 35 39.19	
	2400.00	7.00	289.08	2392.83	-43.98	42.96	-124.23	0.00	372304.96	729059.77	N 32 1 17.14 W 103 35 39.32	
	2500.00	7.00	289.08	2492.09	-48.06	46.95	-135.75	0.00	372308.94	729048.25	N 32 1 17.18 W 103 35 39.45	
	2600.00	7.00	289.08	2591.34	-52.14	50.93	-147.27	0.00	372312.93	729036.73	N 32 1 17.22 W 103 35 39.59	
	2700.00	7.00	289.08	2690.59	-56.21	54.91	-158.79	0.00	372316.91	729025.21	N 32 1 17.26 W 103 35 39.72	
Drop 1"/100ft	2711.10	7.00	289.08	2701.61	-56.67	55.36	-160.07	0.00	372317.35	729023.94	N 32 1 17.26 W 103 35 39.73	
	2800.00	6.11	289.08	2789.93	-60.08	58.67	-169.66	1.00	372320.67	729014.34	N 32 1 17.30 W 103 35 39.85	
	2900.00	5.11	289.08	2889.45	-63.34	61.87	-178.91	1.00	372323.87	729005.10	N 32 1 17.33 W 103 35 39.95	
	3000.00	4.11	289.08	2989.12	-66.03	64.50	-186.51	1.00	372326.50	728997.50	N 32 1 17.35 W 103 35 40.04	
Castille	3070.50	3.41	289.08	3059.47	-67.57	66.01	-190.88	1.00	372328.01	728993.13	N 32 1 17.37 W 103 35 40.09	
	3100.00	3.11	289.08	3088.92	-68.13	66.56	-192.46	1.00	372328.56	728991.54	N 32 1 17.38 W 103 35 40.11	
	3200.00	2.11	289.08	3188.82	-69.66	68.05	-196.77	1.00	372330.04	728987.24	N 32 1 17.39 W 103 35 40.16	
	3300.00	1.11	289.08	3288.78	-70.60	68.97	-199.43	1.00	372330.96	728984.58	N 32 1 17.40 W 103 35 40.19	
	3400.00	0.11	289.08	3388.77	-70.96	69.32	-200.44	1.00	372331.31	728983.57	N 32 1 17.40 W 103 35 40.20	
Hold Vertical	3411.26	0.00	289.08	3400.03	-70.96	69.32	-200.45	1.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	3500.00	0.00	289.08	3488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	3600.00	0.00	289.08	3588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	3700.00	0.00	289.08	3688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	3800.00	0.00	289.08	3788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	3900.00	0.00	289.08	3888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4000.00	0.00	289.08	3988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4100.00	0.00	289.08	4088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4200.00	0.00	289.08	4188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4300.00	0.00	289.08	4288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4400.00	0.00	289.08	4388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4500.00	0.00	289.08	4488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4600.00	0.00	289.08	4588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4700.00	0.00	289.08	4688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4800.00	0.00	289.08	4788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Lamar	4887.52	0.00	289.08	4876.29	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	4900.00	0.00	289.08	4888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Ball Canyon	4915.39	0.00	289.08	4904.16	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5000.00	0.00	289.08	4988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5100.00	0.00	289.08	5088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5200.00	0.00	289.08	5188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5300.00	0.00	289.08	5288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5400.00	0.00	289.08	5388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5500.00	0.00	289.08	5488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5600.00	0.00	289.08	5588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5700.00	0.00	289.08	5688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5800.00	0.00	289.08	5788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	5900.00	0.00	289.08	5888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Cherry Canyon	5940.81	0.00	289.08	5929.58	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	6000.00	0.00	289.08	5988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	6100.00	0.00	289.08	6088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	6200.00	0.00	289.08	6188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	6300.00	0.00	289.08	6288.77	-70.9							

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6900.00	0.00	289.08	6888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7000.00	0.00	289.08	6988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7100.00	0.00	289.08	7088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7200.00	0.00	289.08	7188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7300.00	0.00	289.08	7288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7400.00	0.00	289.08	7388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7500.00	0.00	289.08	7488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Brushy Canyon	7512.01	0.00	289.08	7500.78	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7600.00	0.00	289.08	7588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7700.00	0.00	289.08	7688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7800.00	0.00	289.08	7788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	7900.00	0.00	289.08	7888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8000.00	0.00	289.08	7988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8100.00	0.00	289.08	8088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8200.00	0.00	289.08	8188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8300.00	0.00	289.08	8288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8400.00	0.00	289.08	8388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8500.00	0.00	289.08	8488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8600.00	0.00	289.08	8588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8700.00	0.00	289.08	8688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8800.00	0.00	289.08	8788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	8900.00	0.00	289.08	8888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9000.00	0.00	289.08	8988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Bone Spring	9052.73	0.00	289.08	9041.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Lime	9077.73	0.00	289.08	9066.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Avalon	9100.00	0.00	289.08	9088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9200.00	0.00	289.08	9188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9300.00	0.00	289.08	9288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9400.00	0.00	289.08	9388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9500.00	0.00	289.08	9488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9600.00	0.00	289.08	9588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9700.00	0.00	289.08	9688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9800.00	0.00	289.08	9788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	9900.00	0.00	289.08	9888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Top First Bone	9947.73	0.00	289.08	9936.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring	10000.00	0.00	289.08	9988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10100.00	0.00	289.08	10088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10200.00	0.00	289.08	10188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
First Bone	10237.73	0.00	289.08	10226.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring Shale	10300.00	0.00	289.08	10288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10400.00	0.00	289.08	10388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10500.00	0.00	289.08	10488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Top Second	10559.73	0.00	289.08	10548.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Bone Spring	10600.00	0.00	289.08	10588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10700.00	0.00	289.08	10688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10800.00	0.00	289.08	10788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	10900.00	0.00	289.08	10888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	11000.00	0.00	289.08	10988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Second Bone	11000.73	0.00	289.08	10989.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring 3rd	11100.00	0.00	289.08	11088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Carbonate Top	11106.73	0.00	289.08	11095.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Second Bone	11200.00	0.00	289.08	11188.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring 3rd	11224.23	0.00	289.08	11213.00	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Carbonate Base	11300.00	0.00	289.08	11288.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	11400.00	0.00	289.08	11388.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	11500.00	0.00	289.08	11488.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Third Bone	11514.23	0.00	289.08	11503.00	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring 1st	11525.23	0.00	289.08	11514.00	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Carbonate Top												
Intermediate												
Casing												
Third Bone	11583.23	0.00	289.08	11572.00	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring 1st	11600.00	0.00	289.08	11588.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Carbonate Base	11700.00	0.00	289.08	11688.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	11722.73	0.00	289.08	11711.50	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Top Third Bone	11800.00	0.00	289.08	11788.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
Spring	11900.00	0.00	289.08	11888.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	12000.00	0.00	289.08	11988.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
	12100.00	0.00	289.08	12088.77	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
KOP, Build	12100.26	0.00	289.08	12089.03	-70.96	69.32	-200.45	0.00	372331.32	728983.56	N 32 1 17.40 W 103 35 40.20	
10"/100ft	12137.76	3.75	179.53	12126.50	-69.74	68.09	-200.44	10.00	372330.09	728983.57	N 32 1 17.39 W 103 35 40.20	
Wolfcamp A	12200.00	9.97	179.53	12188.27	-62.30	60.66	-200.38	10.00	372322.66	728983.63	N 32 1 17.32 W 103 35 40.20	
	12218.57	11.83	179.53	12206.50	-58.79	57.15	-200.35	10.00	372319.15	728983.66	N 32 1 17.28 W 103 35 40.20	
Wolfcamp A X												
Base												
Wolfcamp A Y	12290.19	18.99	179.53	12275.50	-39.77	38.13	-200.19	10.00	372300.13	728983.81	N 32 1 17.09 W 103 35 40.20	
	12300.00	19.97	179.53	12284.75	-36.50	34.86	-200.17	10.00	372296.86	728983.84	N 32 1 17.06 W 103 35 40.20	
Wolfcamp A Y	12309.34	20.91	179.53	12293.50	-33.24	31.59	-200.14	10.00	372293.59	728983.87	N 32 1 17.03 W 103 35 40.20	
TGT 1												
Wolfcamp A1	12333.09	23.28	179.53	12315.50	-24.30	22.66	-200.07	10.00	372284.66	728983.94	N 32 1 16.94 W 103 35 40.20	
FTP Cross	12342.19	24.19	179.53	12323.83	-20.64	19.00	-200.04	10.00	372281.00	728983.97	N 32 1 16.91 W 103 35 40.20	
	12400											

Comments	MD	Ind	Azim GDL	TWD	VSEC	NS	EW	DLS	Northng	Eastng	Longitude	Latitude	(E/W...)
13700.00	89.42	179.53	12669.16	1207.10	-1203.70	-1203.00	-1203.00	30.00	30.00	30.00	30.00	30.00	30.00
13800.00	89.42	179.53	12670.18	1301.69	-1303.29	-1303.29	-1303.29	30.00	30.00	30.00	30.00	30.00	30.00
13900.00	89.42	179.53	12671.20	1403.28	-1403.28	-1403.28	-1403.28	30.00	30.00	30.00	30.00	30.00	30.00
14000.00	89.42	179.53	12672.22	1501.68	-1501.68	-1501.68	-1501.68	30.00	30.00	30.00	30.00	30.00	30.00
14100.00	89.42	179.53	12673.25	1603.26	-1603.26	-1603.26	-1603.26	30.00	30.00	30.00	30.00	30.00	30.00
14200.00	89.42	179.53	12674.27	1701.67	-1701.67	-1701.67	-1701.67	30.00	30.00	30.00	30.00	30.00	30.00
14300.00	89.42	179.53	12675.29	1801.67	-1801.67	-1801.67	-1801.67	30.00	30.00	30.00	30.00	30.00	30.00
14400.00	89.42	179.53	12676.31	1901.66	-1901.66	-1901.66	-1901.66	30.00	30.00	30.00	30.00	30.00	30.00
14500.00	89.42	179.53	12677.33	2003.23	-2003.23	-2003.23	-2003.23	30.00	30.00	30.00	30.00	30.00	30.00
14600.00	89.42	179.53	12678.35	2101.65	-2101.65	-2101.65	-2101.65	30.00	30.00	30.00	30.00	30.00	30.00
14700.00	89.42	179.53	12679.37	2201.65	-2201.65	-2201.65	-2201.65	30.00	30.00	30.00	30.00	30.00	30.00
14800.00	89.42	179.53	12680.39	2301.64	-2301.64	-2301.64	-2301.64	30.00	30.00	30.00	30.00	30.00	30.00
14900.00	89.42	179.53	12681.41	2403.20	-2403.20	-2403.20	-2403.20	30.00	30.00	30.00	30.00	30.00	30.00
15000.00	89.42	179.53	12682.43	2501.63	-2501.63	-2501.63	-2501.63	30.00	30.00	30.00	30.00	30.00	30.00
15100.00	89.42	179.53	12683.45	2601.63	-2601.63	-2601.63	-2601.63	30.00	30.00	30.00	30.00	30.00	30.00
15200.00	89.42	179.53	12684.48	2701.62	-2701.62	-2701.62	-2701.62	30.00	30.00	30.00	30.00	30.00	30.00
15300.00	89.42	179.53	12685.50	2801.62	-2801.62	-2801.62	-2801.62	30.00	30.00	30.00	30.00	30.00	30.00
15400.00	89.42	179.53	12686.52	2901.61	-2901.61	-2901.61	-2901.61	30.00	30.00	30.00	30.00	30.00	30.00
15500.00	89.42	179.53	12687.54	3001.61	-3001.61	-3001.61	-3001.61	30.00	30.00	30.00	30.00	30.00	30.00
15600.00	89.42	179.53	12688.56	3101.60	-3101.60	-3101.60	-3101.60	30.00	30.00	30.00	30.00	30.00	30.00
15700.00	89.42	179.53	12689.58	3203.13	-3203.13	-3203.13	-3203.13	30.00	30.00	30.00	30.00	30.00	30.00
15800.00	89.42	179.53	12690.60	3303.12	-3303.12	-3303.12	-3303.12	30.00	30.00	30.00	30.00	30.00	30.00
15900.00	89.42	179.53	12691.62	3403.11	-3403.11	-3403.11	-3403.11	30.00	30.00	30.00	30.00	30.00	30.00
16000.00	89.42	179.53	12692.64	3503.10	-3503.10	-3503.10	-3503.10	30.00	30.00	30.00	30.00	30.00	30.00
16100.00	89.42	179.53	12693.66	3601.57	-3601.57	-3601.57	-3601.57	30.00	30.00	30.00	30.00	30.00	30.00
16200.00	89.42	179.53	12694.68	3701.57	-3701.57	-3701.57	-3701.57	30.00	30.00	30.00	30.00	30.00	30.00
16300.00	89.42	179.53	12695.71	3801.56	-3801.56	-3801.56	-3801.56	30.00	30.00	30.00	30.00	30.00	30.00
16400.00	89.42	179.53	12696.73	3903.07	-3903.07	-3903.07	-3903.07	30.00	30.00	30.00	30.00	30.00	30.00
16500.00	89.42	179.53	12697.75	4001.55	-4001.55	-4001.55	-4001.55	30.00	30.00	30.00	30.00	30.00	30.00
16600.00	89.42	179.53	12698.77	4101.55	-4101.55	-4101.55	-4101.55	30.00	30.00	30.00	30.00	30.00	30.00
16700.00	89.42	179.53	12699.79	4201.54	-4201.54	-4201.54	-4201.54	30.00	30.00	30.00	30.00	30.00	30.00
16800.00	89.42	179.53	12700.81	4301.53	-4301.53	-4301.53	-4301.53	30.00	30.00	30.00	30.00	30.00	30.00
16900.00	89.42	179.53	12701.83	4401.53	-4401.53	-4401.53	-4401.53	30.00	30.00	30.00	30.00	30.00	30.00
17000.00	89.42	179.53	12702.85	4501.52	-4501.52	-4501.52	-4501.52	30.00	30.00	30.00	30.00	30.00	30.00
17100.00	89.42	179.53	12703.87	4601.52	-4601.52	-4601.52	-4601.52	30.00	30.00	30.00	30.00	30.00	30.00
17200.00	89.42	179.53	12704.89	4701.52	-4701.52	-4701.52	-4701.52	30.00	30.00	30.00	30.00	30.00	30.00
17300.00	89.42	179.53	12705.91	4801.51	-4801.51	-4801.51	-4801.51	30.00	30.00	30.00	30.00	30.00	30.00
17400.00	89.42	179.53	12706.94	4901.51	-4901.51	-4901.51	-4901.51	30.00	30.00	30.00	30.00	30.00	30.00
17500.00	89.42	179.53	12707.96	5001.50	-5001.50	-5001.50	-5001.50	30.00	30.00	30.00	30.00	30.00	30.00
17600.00	89.42	179.53	12708.98	5101.50	-5101.50	-5101.50	-5101.50	30.00	30.00	30.00	30.00	30.00	30.00
17700.00	89.42	179.53	12710.00	5201.49	-5201.96	-5202.96	-5202.96	30.00	30.00	30.00	30.00	30.00	30.00
17800.00	89.42	179.53	12711.02	5301.49	-5302.96	-5302.96	-5302.96	30.00	30.00	30.00	30.00	30.00	30.00
17900.00	89.42	179.53	12712.04	5401.48	-5402.94	-5402.94	-5402.94	30.00	30.00	30.00	30.00	30.00	30.00
18000.00	89.42	179.53	12713.06	5501.47	-5502.93	-5502.93	-5502.93	30.00	30.00	30.00	30.00	30.00	30.00
18100.00	89.42	179.53	12714.08	5601.47	-5602.92	-5602.92	-5602.92	30.00	30.00	30.00	30.00	30.00	30.00
18200.00	89.42	179.53	12715.10	5701.46	-5702.91	-5702.91	-5702.91	30.00	30.00	30.00	30.00	30.00	30.00
18300.00	89.42	179.53	12716.12	5801.46	-5802.90	-5802.90	-5802.90	30.00	30.00	30.00	30.00	30.00	30.00
18400.00	89.42	179.53	12717.14	5901.45	-5901.89	-5902.89	-5902.89	30.00	30.00	30.00	30.00	30.00	30.00
18500.00	89.42	179.53	12718.16	6001.45	-6002.88	-6002.88	-6002.88	30.00	30.00	30.00	30.00	30.00	30.00
18600.00	89.42	179.53	12719.19	6101.44	-6102.88	-6102.88	-6102.88	30.00	30.00	30.00	30.00	30.00	30.00
18700.00	89.42	179.53	12720.21	6201.44	-6202.87	-6202.87	-6202.87	30.00	30.00	30.00	30.00	30.00	30.00
18800.00	89.42	179.53	12721.23	6301.43	-6302.86	-6302.86	-6302.86	30.00	30.00	30.00	30.00	30.00	30.00
18900.00	89.42	179.53	12722.25	6401.43	-6402.85	-6402.85	-6402.85	30.00	30.00	30.00	30.00	30.00	30.00
19000.00	89.42	179.53	12723.27	6501.42	-6502.84	-6502.84	-6502.84	30.00	30.00	30.00	30.00	30.00	30.00
19100.00	89.42	179.53	12724.29	6601.41	-6602.83	-6602.83	-6602.83	30.00	30.00	30.00	30.00	30.00	30.00
19200.00	89.42	179.53	12725.31	6701.41	-6702.83	-6702.83	-6702.83	30.00	30.00	30.00	30.00	30.00	30.00
19300.00	89.42	179.53	12726.33	6801.41	-6802.82	-6802.82	-6802.82	30.00	30.00	30.00	30.00	30.00	30.00
19400.00	89.42	179.53	12727.35	6901.40	-6902.81	-6902.81	-6902.81	30.00	30.00	30.00	30.00	30.00	30.00
19500.00	89.42	179.53	12728.37	7001.40	-7002.80	-7002.80	-7002.80	30.00	30.00	30.00	30.00	30.00	30.00
19600.00	89.42	179.53	12729.40	7101.39	-7102.79	-7102.79	-7102.79	30.00	30.00	30.00	30.00	30.00	30.00
19700.00	89.42	179.53	12730.42	7201.38	-7202.78	-7202.78	-7202.78	30.00	30.00	30.00	30.00	30.00	30.00
19800.00	89.42	179.53	12731.44	7301.38	-7302.78	-7302.78	-7302.78	30.00	30.00	30.00	30.00	30.00	30.00
19900.00	89.42	179.53	12732.46	7401.38	-7402.77	-7402.77	-7402.77	30.00	30.00	30.00	30.00	30.00	30.00
20000.00	89.42	179.53	12733.48	7501.37	-7502.76	-7502.76	-7502.76	30.00	30.00	30.00	30.00	30.00	30.00
20100.00	89.42	179.53	12734.50	7601.40	-7602.78	-7602.78	-7602.78	30.00	30.00	30.00	30.00	30.00	30.00
20200.00	89.42	179.53	12735.52	7701.40	-7702.78	-7702.78	-7702.78	30.00	30.00	30.00	30.00	30.00	30.00
20300.00	89.42	179.53	12736.54	7801.40	-7802.78	-7802.78	-7802.78	30.00	30.00	30.00	30.00	30.00	30.00
20400.00	89.42	179.53	12737.56	7901.40	-7902.78	-7902.78	-7902.78	30.00	30.00	30.00	30.00	30.00	30.00
20500.00	89.42	179.53	12738.58	8001.40	-8002.78	-8002.78	-8002.78	30.00	30.00	30.00	30.00	30.00	30.00
20600.00	89.42	179.53	12739.60	8101.40	-8102.78	-8102.78	-8102.78	30.00	30.00	30.00	30.00	30.00	30.00
20700.00	89.42	179.53	12740.62	8201.40	-8202.78	-8202.78	-8202.78	30.00	30.00	30.00	30.00	30.00	30.00
20800.00	89.42	179.53	12741.64	8301.40	-8302.78	-8302.78	-8302.78	30.00	30.00	30.00	30.00	30.00	30.00
20900.00	89.42	179.53	12742.66	8401.40	-8402.78	-8402.78	-8402.78	30.00	30.00	30.00	30.00	30.00	30.00
21000.00	89.42	179.53	12743.68	8501.40	-8502.78	-8502.78	-8502.78	30.00	30.00	30.00	30.00	30.00	30.00
21100.00	89.42	179.53	12744.70	8601.40	-8602.78	-8602.78	-8602.78	30.00	30.00	30.00	30.00	30.00	30.00
21200.00	89.42	179.53	12745.72	8701.40	-8702.78	-8702.78	-8702.78	30.00	30.00	30.00	30.00	30.00	30.00
21300.00	89.42	179.53	12746.74	8801.40	-8802.78	-8802.78	-8802.78	30.00	30.00	30.00	30.00	30.00	30.00
21400.00	89.42	179.53	12747.7										

HALLIBURTON

CHEVRON - PERMIAN BASIN-EBUS
DONOTMAIL-1400 SMITH ST RM 43076
HOUSTON, TX, 77002
US

SD EA 29 32 FEDERAL COM P10 18H

LEA County, NM, US
API/UWI 30-025-44486-00
SEC: 29,TWP: 26,RNG: 33
Rig: NABORS 1206

Foamed Intermediate Casing

Cementing Cost Estimate
Proposal 314982 - Version 1.0
February 19, 2019

Submitted by:
Dillon Briers
3000 N Sam Houston Pkwy E
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HALLIBURTON

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*Halliburton appreciates the opportunity to present
this cost estimate and looks forward to being of service to you.*

1 Foreword

MIDLAND SALES OFFICE

1-800-844-8451

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PREPARED BY:

Dillon Briers, Account Representative

Cementing Best Practices

1. **Cement quality and weight:** You must choose cement slurry that is designed to solve the problems specific to each string of pipe.
2. **Waiting time:** You must hold the cement slurry in place and under pressure until it hardens. Cement slurry is a time-dependent liquid and must be allowed to undergo a hydration reaction to produce a competent cement sheath. Fresh cement slurry can be worked (thickening or pump time) as long as it is plastic, and the initial set of cement occurs during the rapid reaction stage. If the cement is not allowed to hydrate; it will be subject to changes in density, dilution, settling, water separation, and gas cutting that can lead to lack of zonal isolation with resultant bridging in the annulus.
3. **Pipe movement:** Pipe movement may be one of the single most influential factors in mud removal. Reciprocation and/or rotation mechanically breaks up gelled mud and constantly changes the flow patterns in the annulus for better cement bonding.
4. **Mud properties:** Plastic viscosity (PV) should be less than 15 centipoise (cp), and less than 10 cp, if possible, yield point (YP) should be less than 10 pound/100-square feet (lb/100 ft²) decreasing down to about 5 lb/100 ft².
5. **Mud gel strength:** A nonthixotropic mud is desirable for good mud removal. Mud left in the hole prior to running casing should have 10-second/10-minute/30-minute gel strength such that the 10-minute is less than double the 10-second and the 30-minute is less than 20 lb/100 ft²). Sufficient shear strength may not be achieved on a primary cement job to remove mud left in the hole should the mud develop more than 25 lb/100 ft².
6. **Mud fluid loss:** Decreasing the filtrate loss into a permeable zone enhances the creation of a thin filter cake. This increases the fluid mud in the hole, which is more easily removed. Generally, an API fluid loss of 7 or 8 milliliter (ml) is sufficient with high-temperature/high-pressure fluid loss (HTHP) no more than double this amount.
7. **Circulation:** Circulate bottoms up twice, or until well conditioned mud is being returned to the surface. There should be no cuttings in the mud returns. An annular velocity of 260 feet per minute is optimum (SPE/IADC 18617), if possible.
8. **Flow rate:** Turbulent flow is more desirable flow regime for mud removal. If turbulence cannot be achieved, better mud removal is found when maximum flow energy is used. The maximum pump rate should be determined to obtain the best flow regime.
9. **Hole size:** The optimum hole size recommended for good mud removal is 1.5 to 2 inches larger than the casing or liner size. Hole sizes larger than 2 inches annular space can be dealt with, but those that are smaller than 1.5 inches present difficult problems.
10. **Pipe Centralization:** This helps to create a uniform flow area perpendicular to flow direction. Cement will take the path of least resistance so that centralization is important in keeping the pipe off the walls of the hole. At least a 70 percent standoff should be achieved for centralization.
11. **Rat hole:** When applicable, a weighted viscous pill in the rat hole prevents cement from swapping with lighter weight mud when displacement stops.
12. **Shoe joint:** A shoe joint is recommended on all primary casings and liners. The length of the shoe joint will vary, although the absolute minimum length is one joint of pipe. If conditions exist, such as not running a bottom plug, two joints should be the minimum length.

2 Intermediate Foam Cementing

2.1 Job Information Intermediate Foam Cementing

Job Criticality Status: YELLOW

Well Name: SD EA 29 32 FEDERAL COM P10

Well #: 18H

Surface Casing

0 - 872 ft (MD)

Outer Diameter

13.375 in

Inner Diameter

12.615 in

Linear Weight

54.5 lbm/ft

Casing Grade

J-55

Thread Type

STC

12-1/4" Hole

872 - 11525 ft (MD)

Inner Diameter

12.25 in

Excess Factor

35 %

Intermediate Casing

0 - 11525 ft (MD)

0 - 11514 ft (TVD)

Outer Diameter

9.625 in

Inner Diameter

8.755 in

Linear Weight

43.5 lbm/ft

Casing Grade

L-80

Shoe Joint Length

80 ft

Thread Type

LTC

Mud Type

INTEGRATE

Mud Weight

8.9 lbm/gal

2.2 Job Volume Estimates

Intermediate Foam Cementing

Stage 1

Fluid 1: Water Spacer

Water Ahead

Fluid Density: 8.4 lbm/gal
Volume: 60 bbl

Fluid 2: Lead Slurry

VERSACEM (TM) SYSTEM

11.15 Gal/sk FRESH WATER

0.18 Gal/sk Foamer 1026

0.0250 % SA-1015

0.90 % HR-601

Fluid Weight: 12 lbm/gal
Slurry Yield: 1.997 ft³/sack
Total Mixing Fluid: 11.33 Gal/sack
Calculated Volume: 51.7 bbl
Proposed Volume: **51.7 bbl**
Top Of Fluid: 0 ft
Calculated Fill: 800 ft
Calculated sack: 145.36 sack
Proposed sack: 150 sack

Fluid 3: Foamed

VERSACEM (TM) SYSTEM

0.18 Gal/sk Foamer 1026

0.0250 % SA-1015

0.90 % HR-601

7.95 Gal/sk FRESH WATER

Fluid Weight: 13 lbm/gal
Slurry Yield: 1.57 ft³/sack
Total Mixing Fluid: 8.13 Gal/sack
Unfoamed Volume: 564.2 bbl
Proposed Volume: **769.2 bbl**
Foamed Weight: 10 lbm/gal
Avg Foamed Yield: 2.14 ft³/sack
Foamed Volume: 769.2 bbl
Top Of Fluid: 800 ft
Calculated Fill: 10225 ft
Calculated sack: 2017.81 sack
Proposed sack: 2020 sack

Fluid 4: Tail Slurry

VERSACEM (TM) SYSTEM

0.18 Gal/sk Foamer 1026

0.0250 % SA-1015

0.90 % HR-601

7.95 Gal/sk FRESH WATER

Fluid Weight: 13 lbm/gal
Slurry Yield: 1.57 ft³/sack
Total Mixing Fluid: 8.13 Gal/sack
Calculated Volume: 43.6 bbl
Proposed Volume: **43.6 bbl**
Top Of Fluid: 11025 ft
Calculated Fill: 500 ft
Calculated sack: 155.92 sack
Proposed sack: 160 sack

Fluid 5: Water Spacer
Brine

Fluid Density: 9.8 lbm/gal
Volume: 852.2 bbl

Fluid 6: Top Off Annulus
HALCEM (TM) SYSTEM
94 lbm/sk Premium Plus Cement
2 % Calcium Chloride, Pellet

Fluid Weight: 14.8 lbm/gal
Slurry Yield: 1.364 ft³/sack
Total Mixing Fluid: 6.61 Gal/sack
Calculated Volume: 48.6 bbl
Proposed Volume: 48.6 bbl
Calculated sack: 0 sack
Proposed sack: 200 sack

2.3 Volume Estimate Table Intermediate Foam Cementing

Calculations are used for volume estimation. Well conditions will dictate final cement job design.
Stage 1

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Water Ahead	8.4		60 bbl
2	CEMENT	Unfoamed Cap - VersaCem™ H	12		150 sack
3	CEMENT	Foamed Lead - VersaCem™ H	13	4	2020 sack
4	CEMENT	Unfoamed Tail - VersaCem™ H	13	4	160 sack
5	SPACER	Brine	9.8		852.2 bbl
6	CEMENT	HalCem - C	14.8		200 sack

NOTE: These slurries and spacers will require lab testing. The additives and concentrations are estimates based on field experience in the area and may need to be modified prior to the job. The proposed spacer is designed to be generally compatible with water base mud systems. Compatibility testing with field mud samples used may indicate changes in the additive package and the related costs.

Foam Output Parameter Summary:

Stage 1

Foam Calculation Method :	Constant Density	Calculated Gas :	203264.9 scf
Annulus Back Pressure :	0 psig	Additional Gas :	0 scf
Bottom Hole Circulating Temp :	165degF	Total Gas :	203264.9 scf
Mud Outlet Temperature :	80degF		

Fluid #	Fluid Name	Unfoamed Liquid Volume (bbl)	Beginning Density (lbm/gal)	Ending Density (lbm/gal)	Beginning Rate (scf/bbl)	Ending Rate (scf/bbl)
3	Foamed Lead - VersaCem™ H	3.5	10		57.07	58.2
3	Foamed Lead - VersaCem™ H	45.8	10		61.44	62.51
3	Foamed Lead - VersaCem™ H	514.9	10		110.76	111.79

2.4 Cost Estimate

Mtrl Nbr	Description	Qty	UOM	Net Amount
586274	CMT FOAMED INTERMEDIATE BOM 586274	1.00	JOB	0.00
***** Services *****				
1	ZI-MILEAGE FROM NEAREST HES BASE/UNIT Number of Units	210.00 3	MI	1,890.00
1068111	CMT EQPT PKG PRICING P/JOB <i>Includes 8 hours on location</i>	1.00	EA	3,000.00
828405	CMT SERVICES PACKAGE PRICING <i>Includes 8 hours on location</i>	1.00	JOB	4,700.00
76400	MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	105.00 108.353	MI	8,532.80
	SubTotal - Services			18,122.80
***** Materials *****				
452010	CMT, VersaCem (TM) system	150.00	SK	3,411.00
102166506	CHEM,FOAMER 1026, TOTE <i>Foamer 1026</i>	27.00	GAL	773.01
102077046	CHEM, SA-1015, 50 LB SACK <i>SA-1015</i>	4.00	LB	67.12
101328348	Chem - HR-601 - 50 Lb Bag <i>HR-601</i>	114.00	LB	498.18
452010	CMT, VersaCem (TM) system	2,020.00	SK	45,934.80
102166506	CHEM,FOAMER 1026, TOTE <i>Foamer 1026</i>	364.00	GAL	10,421.32
102077046	CHEM, SA-1015, 50 LB SACK <i>SA-1015</i>	43.00	LB	721.54
101328348	Chem - HR-601 - 50 Lb Bag <i>HR-601</i>	1,528.00	LB	6,677.36
452010	CMT, VersaCem (TM) system	160.00	SK	3,638.40
102166506	CHEM,FOAMER 1026, TOTE <i>Foamer 1026</i>	29.00	GAL	830.27
102077046	CHEM, SA-1015, 50 LB SACK <i>SA-1015</i>	4.00	LB	67.12
101328348	Chem - HR-601 - 50 Lb Bag <i>HR-601</i>	121.00	LB	528.77
452986	CMT, HalCem (TM) system	200.00	SK	1,992.00
101509387	CALCIUM CHLORIDE-PELLET, 50 LB SK <i>Calcium Chloride, Pellet</i>	8.00	SK	1,442.40
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI Unit of Measurement NUMBER OF EACH	4,299.00 EA 1	CF	8,598.00
	Total Net Amount	USD		103,724.09

Mtrl Nbr	Description	Qty	UOM	Net Amount
Optional Charge				
464256	CMT, Bulk Truck on loc, additional hours <i>Charged per hour per bin past 8 hours on location</i> HR/DAY/WEEK/MTH/YEAR/JOB/RUN HOURS	1.00 H 1	EA	150.00
16092	ADDITIONAL HOURS (PUMPING EQUIPMENT), ZI <i>Charged per hour per pump truck past 8 hours on location</i> HR/DAY/WEEK/MTH/YEAR/JOB/RUN HOURS	1.00 H 1	EA	675.00
367969	Circulating Iron Package used w/HES,CMT	1.00	EA	3,500.00
13	CSG PUMPING,STANDBY UNIT,/6HRS,ZI <i>Includes 8 hours on location</i> UNIT OF MEASURE - TIME H HOUR IN RANGE OF 6 HOURS	1.00 H 6	UN	7,875.00

Contract Name:
Primary Plant:
Secondary Plant:

Foam Cement Pricing
 Artesia South
 Odessa TX, USA

Contract#:
Price Book Ref:
Price Date:

0041045503
 PERMIAN BASIN
 03/15/2018

3 Nitrogen Service

3.1 Cost Estimate

Mtrl Nbr	Description	Qty	UOM	Net Amount
342210	N2 BOM-Foam Cementing w/o CT	1.00	JOB	0.00
3567	PS N2 MILEAGE FOR NITROGEN EQPT Number of Units	210.00 2	MI	823.20
3563	PS N2 TRANSPORT CHARGE NUMBER OF HOURS	1.00 4	UN	400.00
369461	PS N2 ENVIRONMENTAL CHARGE	1.00	JOB	254.00
373155	PS N2 DOT VEHICLE CHARGE	2.00	EA	96.40
11882	PS N2 OVERWEIGHT PERMIT FEE	1.00	EA	179.80
87054	PS N2 HEAVY TRUCKS >1 1/2 TONS PER MILE Number of Units	210.00 2	MI	172.20
353672	PS N2 PMPNG CHG 0-4K SCTM/0-113 SCMM PRESSURE UNITS (PSI/MPA/BAR) PUMPING PRESSURE	1.00 PSI 2000	UN	863.20
13459	CHEM LIQUID NITROGEN SCF	275,000.00	SCF	3,905.00
3570	PS N2 FLOW METER P/DAY NUMBER OF DAYS	1.00 1	EA	349.60
3564	PS RNTL N2 FOAM GENERATOR P/JOB ENTER FEET\METER\JOB\DAY NUMBER OF JOBS	1.00 JOB 1	EA	258.40
3565	PS N2 AUTO NITROGEN PUMPING P/JOB ENTER FEET\METER\JOB\DAY NUMBER OF JOBS	1.00 JOB 1	EA	1,756.80
	Total Net Amount	USD		9,058.60

Primary Plant: Odessa, TX, USA
Wellnite
Secondary Plant: Odessa, TX, USA
Wellnite

Price Book Ref: 27 - PERMIAN BASIN
Price Date: 02/18/2019

4 Proposal Cost Summary

Job Name	Cost
Intermediate Foam Cementing	103,724.09
Nitrogen Service	9,058.60
Total Cost USD	112,782.69

5 Conditions

The cost in this analysis is good for the materials and/or services outlined within and shall be valid for 30 days from the date of this proposal. In order to meet your needs under this proposal with a high quality of service and responsive timing, Halliburton will be allocating limited resources and committing valuable equipment and materials to your area of operations. Accordingly, the discounts reflected in this proposal are available only for materials and services awarded on a first-call basis. Alternate pricing may apply in the event that Halliburton is awarded work on any basis other than as a first-call provider.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. A copy of the latest version of our General Terms and Conditions is available from your Halliburton representative or at: <http://www.halliburton.com/terms> for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials.

Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.

If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice.

Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CHEVRON USA INC.
LEASE NO.:	NMNM27506
WELL NAME & NO.:	18H -SD EA 29 32 FED COM P10
SURFACE HOLE FOOTAGE:	120'/N & 2630'/W
BOTTOM HOLE FOOTAGE	25'/S & 2430'/W
LOCATION:	Section 29 T.26 S., R.33E., NMP
COUNTY:	LEA County, New Mexico

COA

All previous COAs still apply expect the following:

H2S	☐ Yes	☒ No	
Potash	☒ None	☐ Secretary	☐ R-111-P
Cave/Karst Potential	☐ Low	☒ Medium	☐ High
Variance	☐ None	☒ Flex Hose	☐ Other
Wellhead	☐ Conventional	☒ Multibowl	☐ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP

A. Hydrogen Sulfide

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The 13-3/8 inch surface casing shall be set at approximately **800** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - 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 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 will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- 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.

Operator shall filled 50% of casing with fluid while running intermediate casing to maintain collapse safety factor.

- 2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:

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

Additional cement maybe required. Excess calculates to 12%.

- ❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings , the cement on the 3rd casing string must come to surface.

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

- b. Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

CONTINGENCY PLAN

Notify BLM before proceeding with the contingency plan.

Operator shall filled 1/3rd casing with fluid while running liner to maintain collapse safety factor.

- 4. The minimum required fill of cement behind the 7-5/8 inch intermediate liner is:

- a. Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

5 1/2" casing shall be set at KOP.

Variance is approved for annular spacing between 7 5/8" x 5 1/2 " casing.

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

- b. Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

- 1. **Variance approved to use flex line from BOP to choke manifold.**

Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).

- 2. 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.**

- 3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 9-5/8 intermediate casing shoe shall be **10,000 (10M) psi.**

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)
393-3612

1. 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.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. 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.
3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall 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.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e.

changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. **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. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.**
7. 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.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. 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. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher 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. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. 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.
- f. 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. This test shall be performed prior to the test at full stack pressure.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

ZS 030419