

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENTFORM 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.

Carlsbad Field Office  
Old ArtesiaLease Serial No.  
NM81586

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.  
CEDAR CANYON 23 FEDERAL COM 3H9. API Well No.  
30-015-43290-00-X110. Field and Pool, or Exploratory  
PIERCE CROSSING-BONE SPRING11. County or Parish, and State  
EDDY COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other2. Name of Operator  
OXY USA INCORPORATEDContact: DAVID STEWART  
E-Mail: david\_stewart@oxy.com3a. Address  
5 GREENWAY PLAZA SUITE 110  
HOUSTON, TX 77046-05213b. Phone No. (include area code)  
Ph: 432.685.5717

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

Sec 22 T24S R29E NESE 2540FSL 200FEL

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

| TYPE OF SUBMISSION                                   | TYPE OF ACTION                                |                                           |                                                    |                                           |
|------------------------------------------------------|-----------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| <input checked="" type="checkbox"/> Notice of Intent | <input type="checkbox"/> Acidize              | <input type="checkbox"/> Deepen           | <input type="checkbox"/> Production (Start/Resume) | <input type="checkbox"/> Water Shut-Off   |
| <input type="checkbox"/> Subsequent Report           | <input type="checkbox"/> Alter Casing         | <input type="checkbox"/> Fracture Treat   | <input type="checkbox"/> Reclamation               | <input type="checkbox"/> Well Integrity   |
| <input type="checkbox"/> Final Abandonment Notice    | <input type="checkbox"/> Casing Repair        | <input type="checkbox"/> New Construction | <input type="checkbox"/> Recomplete                | <input checked="" type="checkbox"/> Other |
|                                                      | <input type="checkbox"/> Change Plans         | <input type="checkbox"/> Plug and Abandon | <input type="checkbox"/> Temporarily Abandon       | Change to Original APD                    |
|                                                      | <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Plug Back        | <input type="checkbox"/> Water Disposal            |                                           |

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.)

OXY USA Inc. respectfully requests approval for the following changes to the approved APD:

1. Amend casing/cementing program - Amend for current casing inventories and updated directional plan.

Surface Casing  
10-3/4" 40.5# J55 BTC new csg @ 0-480'. 14-3/4" hole  
SF Coll-7.6 SF Burst-1.54 SF Ten-2.89Intermediate Casing - 7-5/8" new casing @ 0-8200'M, 9-7/8" hole  
a. 7-5/8" 26.4# L-80 BTC new csg @ 0-6650'M  
SF Coll-1.19 SF Burst-1.29 SF Ten-1.88NM OIL CONSERVATION  
ARTESIA DISTRICT

OCT 11 2016

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SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

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

Electronic Submission #351444 verified by the BLM Well Information System  
For OXY USA INCORPORATED, sent to the Carlsbad  
Committed to AFMSS for processing by DEBORAH MCKINNEY on 09/19/2016 (16DLM0923SE)

Name (Printed/Typed) DAVID STEWART

Title REGULATORY ADVISOR

Signature (Electronic Submission)

Date 09/15/2016

## THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By MUSTAFA HAQUE

Title PETROLEUM ENGINEER

Date 10/04/2016

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 Carlsbad

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 \*\*

## Additional data for EC transaction #351444 that would not fit on the form

### 32. Additional remarks, continued

b. 7-5/8" 29.7# L-80 BTC new csg @ 6650-8150'M

SF Coll-1.13 SF Burst-1.43 SF Ten-3.43

OXY requests the option to set casing shallower yet still below the salts if losses or hole conditions require this. Cement volumes may be adjusted if casing is set shallower and a DV tool will be run at +/- 3101' in case a contingency second stage is required for cement to reach surface. If cement circulates on 1st stage, cancellation cone will be dropped.

#### Production Casing

a. 5-1/2" 20# P-110 USF new csg @ 0-8969'M. 6-3/4" hole

SF Coll-1.7 SF Burst-1.2 SF Ten-2.23

b. 4-1/2" 13.5# P-110 DQX new csg @ 8969-16352'M. 6-3/4" hole

SF Coll-1.7 SF Burst-1.2 SF Ten-1.96

Surface - Cement w/ 314sx PP cement w/ 2% CaCl<sub>2</sub>, 14.8ppg 1.35 yield, 500# CS in 6.5hr, 50% Excess

Intermediate - Circulate cement w/ 859sx Tuned Light (TM) system cmt w/ 3#/sx Kol-Seal + .125#/sx Poly-E-Flake + .8% HR-601, 10.2ppg 3.05 yield, 500# CS in 15.07hr, 75% Excess followed by 163sx Super H cmt w/ 3#/sx salt + .1% HR-800 + .3% CFR-3 + .5% HR-344 + 2#/sx Kol-Seal, 13.2ppg 1.65 yield, 500# CS in 12.57hr, 20% Excess.

Contingency 2nd Stage - Circulate cement to surface w/ 492sx HES light PP cmt w/ 5% Salt + .35% HR-800 + 3#/sx Kol-Seal + .125#/sx Poly-E-Flake, 12.9ppg 1.85 yield, 500# CS in 12.44hr, 75% Excess followed by 182sx PP cmt, 14.8ppg 1.33 yield, 500# CS in 6.31hr, 125% Excess.

Production - Cement w/ 515sx Super H cmt w/ 3#/sx salt + .1% HR-800 + .4% CFR-3 + .5% HR-344, 13.2ppg 1.63 yield, 500# CS in 15.15hr, 15% Excess. TOC @ 7650'

Description of Cement Additives: Salt (Accelerator); CFR-3 (Dispersant); Kol-Seal, Poly-E-Flake (Lost Circulation Additive); HR-344 (Low Fluid Loss Control); HR-601, HR-800 (Retarder)

The above cement volumes could be revised pending the caliper measurement.

### 2. Mud program -

| Depth        | Mud WT   | Vis Sec | Fluid Loss | Type           |
|--------------|----------|---------|------------|----------------|
| 0 - 480'     | 8.4-8.6  | 40-60   | N/C        | EnerSeal (MMH) |
| 480-3101'    | 9.8-10.0 | 35-45   | N/C        | Brine          |
| 3101-8150'   | 8.8-9.6  | 38-50   | N/C        | EnerSeal (MMH) |
| 8150'-16352' | 8.8-9.6  | 35-50   | N/C        | OBM            |

### 3. Start mudlogging from the intermediate casing shoe to TD.

4. Plan to drill the three well pad in batch by section: all surface sections, intermediate sections and production sections. The wellhead will be secured with a night cap whenever the rig is not over the well.

OCT 11 2016

**PECOS DISTRICT  
CONDITIONS OF APPROVAL**

**RECEIVED**

|                       |                                    |
|-----------------------|------------------------------------|
| OPERATOR'S NAME:      | OXY USA Inc.                       |
| LEASE NO.:            | NMNM081586                         |
| WELL NAME & NO.:      | Cedar Canyon 23 Federal Com 3H     |
| SURFACE HOLE FOOTAGE: | 2540'/S & 200'/E                   |
| BOTTOM HOLE FOOTAGE:  | 2260'/S & 2460'/W, SEC. 24         |
| LOCATION:             | Section 22, T.24 S., R.29 E., NMPM |
| COUNTY:               | Eddy County, New Mexico            |

**A. DRILLING OPERATIONS REQUIREMENTS**

**All previous COAs still apply, except for the following:**

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

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

☒ **Eddy County**

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

- Hydrogen Sulfide (H<sub>2</sub>S) monitors shall be installed prior to drilling out the surface shoe. If H<sub>2</sub>S 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.**
- 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.**
- 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 is located, this does not include the dog house or stairway area.

4. 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.

## **B. CASING**

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. 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.).

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

### **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.

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

Possibility of water flows in the Castile and Salado.

Possibility of lost circulation in the Rustler, Salado, and Delaware.

Medium Cave/Karst

1. The 10-3/4 inch surface casing shall be set at approximately 480 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
  - 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 is to include the lead cement slurry.**
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after

bringing cement to surface or 500 pounds compressive strength, whichever is greater.

- d. If cement falls back, remedial cementing will be done prior to drilling out that string.

**Formation below the 10-3/4" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole. Report results to BLM office.**

**Intermediate casing shall be kept fluid filled to meet the minimum collapse requirement.**

2. The minimum required fill of cement behind the 7-5/8 inch intermediate casing, is:

**Operator has proposed DV tool at depth of 3101', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.**

- a. First stage to DV tool:

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

- b. Second stage above DV tool:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.  
**Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

**Formation below the 7-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. Report results to BLM office.**

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

**If cement does not circulate to surface on the intermediate casing, the cement on the production casing must come to surface.**

3. The minimum required fill of cement behind the 5-1/2 X 4 1/2 inch production casing is:

☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification. **Excess calculates to 15% - Additional cement might be required.**

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

**MHH 10042016**

Borohole:  
Oxy Cedar Canyon 23 Federal 3H - Orig.  
BoroholeWell:  
Oxy Cedar Canyon 23 Federal 3HField:  
NM Eddy County (NAD 27)Structure:  
Oxy Cedar Canyon 23 Federal 3H

Gravity &amp; Magnetic Parameters

Model: NOGM 2018 Dip: 80.052 Date: 31-Aug-2018  
MagDec: 7.197 F3: 42297.623-Y Gravity F3: 859.487mga (8.20468 Based)

Surface Location

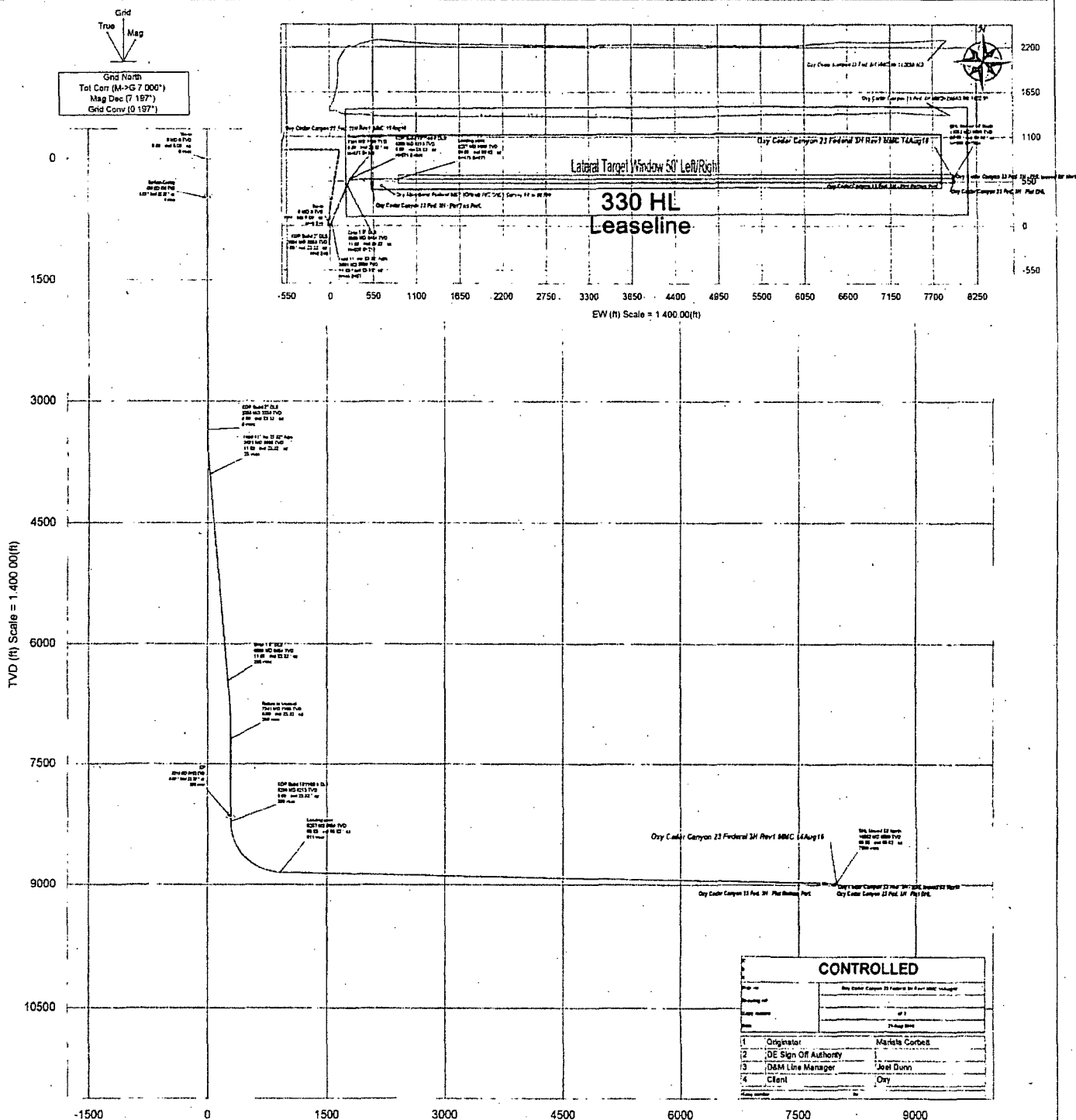
NAD27 New Mexico State Plane, Eastern Zone, U.S. Feet  
Lat: N 32 12 9.01 Northing: 437508.77015 Grid Conv: 6.1902  
Lon: W 103 57 50.29 Easting: 614265.87015 Scale Fact: 0.92972404

Measurements

Bore: Oxy Cedar Canyon TVD Ref: RKB(26.5 ft above MSL)  
Plan: Oxy Cedar Canyon 23 Federal 3H Rev1 MNC 14Aug18

## Critical Points

| Comments                | Survey M.D.<br>(ft) | Inclination<br>(deg) | Azimuth<br>(deg) | TVD (ft) | Sub-Sea<br>TVD | VS (ft) | HS (ft) | EW (ft) | Latitude (deg) | Longitude (deg) | Easting<br>(ft US) | Northing<br>(ft US) | DLS<br>(ft/100ft) | Tool Face<br>(deg) |
|-------------------------|---------------------|----------------------|------------------|----------|----------------|---------|---------|---------|----------------|-----------------|--------------------|---------------------|-------------------|--------------------|
| Tie-In                  | 0 00                | 0 00                 | 0 00             | 0 00     | -2983 60       | 0 00    | 0 00    | 0 00    | N 32 12 9 012  | W 103 57 50 092 | 614265 88          | 437586 70           |                   | 23 32              |
| Surface Casing          | 480 00              | 0 00                 | 23 32            | 480 00   | -2503 60       | 0 00    | 0 00    | 0 00    | N 32 12 9 012  | W 103 57 50 092 | 614265 88          | 437586 70           | 0 00              | 23 32              |
| KOP Build 2" DLS        | 3350 00             | 0 00                 | 23 32            | 3350 00  | 366 40         | 0 00    | 0 00    | 0 00    | N 32 12 9 012  | W 103 57 50 092 | 614265 88          | 437586 70           | 0 00              | 23 32              |
| Hold 11' Inc 23 32° Azm | 3901 44             | 11 03                | 23 32            | 3898 04  | 914 44         | 24 51   | 48 59   | 20 95   | N 32 12 9 492  | W 103 57 49 845 | 614286 83          | 437635 28           | 2 00              | 0 00               |
| Drop 15° DLS            | 6505 77             | 11 03                | 23 32            | 6454 27  | 3470 67        | 255 26  | 506 10  | 218 19  | N 32 12 14 012 | W 103 57 47 532 | 614484 05          | 438092 76           | 0 00              | 180 00             |
| Return to Vertical      | 7241 03             | 0 00                 | 23 32            | 7185 00  | 4201 40        | 287 94  | 570 88  | 246 12  | N 32 12 14 652 | W 103 57 47 204 | 614511 98          | 438157 54           | 1 50              | 23 32              |
| ICP                     | 8219 03             | 0 00                 | 23 32            | 8163 00  | 5179 40        | 287 94  | 570 88  | 246 12  | N 32 12 14 652 | W 103 57 47 204 | 614511 98          | 438157 54           | 0 00              | 23 32              |
| KOP Build 10"/100 R DLS | 8269 03             | 0 00                 | 23 32            | 8213 00  | 5229 40        | 287 94  | 570 88  | 246 12  | N 32 12 14 652 | W 103 57 47 204 | 614511 98          | 438157 54           | 0 00              | 89 82              |
| Landing point           | 9257 36             | 88 95                | 89 82            | 8849 51  | 5865 91        | 911 29  | 572 80  | 871 06  | N 32 12 14 650 | W 103 57 39 931 | 615136 87          | 438159 45           | 9 00              | 0 00               |
| BHL Moved 50' North     | 16351.68            | 88 95                | 89 82            | 8979 60  | 5996 00        | 7986.32 | 594 57  | 7964 16 | N 32 12 14 615 | W 103 56 17 383 | 622229 42          | 438181 22           | 0 00              |                    |



Vertical Section (ft) Azim = 85 73° Scale = 1 400 00(ft) Origin = ON/S. 0E/W

## Oxy Cedar Canyon 23 Federal 3H Rev1 MMC 14Aug16 Proposal Geodetic

Report  
(Non-Def Plan)

|                               |                                                                 |                                   |                              |
|-------------------------------|-----------------------------------------------------------------|-----------------------------------|------------------------------|
| Report Date:                  | August 31, 2016 - 11:45 AM                                      | Survey / DLS Computation:         | Minimum Curvature / Lubinski |
| Client:                       | OXY                                                             | Vertical Section Azimuth:         | 85 730 ° (Grid North)        |
| Field:                        | NM Eddy County (NAD 27)                                         | Vertical Section Origin:          | 0 000 ft, 0 000 ft           |
| Structure / Slot:             | Oxy Cedar Canyon 23 Federal 3H / Oxy Cedar Canyon 23 Federal 3H | TVD Reference Datum:              | RKB                          |
| Well:                         | Oxy Cedar Canyon 23 Federal 3H                                  | TVD Reference Elevation:          | 2983 600 ft above MSL        |
| Borehole:                     | Oxy Cedar Canyon 23 Federal 3H - Orig. Borehole                 | Seabed / Ground Elevation:        | 2957 100 ft above MSL        |
| UWI / API#:                   | Unknown / Unknown                                               | Magnetic Declination:             | 7 197 °                      |
| Survey Name:                  | Oxy Cedar Canyon 23 Federal 3H Rev1 MMC 14Aug16                 | Total Gravity Field Strength:     | 998 4674mgN (9 80665 Based)  |
| Survey Date:                  | August 14, 2016                                                 | Gravity Model:                    | GARM                         |
| Tort / AHD / DDI / ERD Ratio: | 111.007 ° / 8339.752 ft / 6.227 / 0.929                         | Total Magnetic Field Strength:    | 48207 629 nT                 |
| Coordinate Reference System:  | NAD27 New Mexico State Plane, Eastern Zone, US Feet             | Magnetic Dip Angle:               | 60.052 °                     |
| Location Lat / Long:          | N 32° 12' 9.01176" W 103° 57' 50.09152"                         | Declination Date:                 | August 31, 2016              |
| Location Grid N/E Y/X:        | N 437586 700 NUS, E 614265 880 NUS                              | Magnetic Declination Model:       | HDGM 2016                    |
| CRS Grid Convergence Angle:   | 0.1968 °                                                        | North Reference:                  | Grid North                   |
| Grid Scale Factor:            | 0.99992404                                                      | Grid Convergence Used:            | 0.1969 °                     |
| Version / Patch:              | 2 9 370 0                                                       | Total Corr Mag North->Grid North: | 7 0000 °                     |
|                               |                                                                 | Local Coord Referenced To:        | Structure Reference Point    |

| Comments                | MD<br>(ft) | Incl<br>(°) | Azim Grid<br>(°) | TVD<br>(ft) | VSEC<br>(ft) | NS<br>(ft) | EW<br>(ft) | DLS<br>(ft/100ft) | Northing<br>(ft) | Easting<br>(ft) | Latitude<br>(N/S) | Longitude<br>(E/W) |
|-------------------------|------------|-------------|------------------|-------------|--------------|------------|------------|-------------------|------------------|-----------------|-------------------|--------------------|
| Tie-In                  | 0 00       | 0 00        | 0 00             | 0 00        | 0 00         | 0 00       | 0 00       | N/A               | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 100 00     | 0 00        | 23.32            | 100 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 200 00     | 0 00        | 23.32            | 200 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 300 00     | 0 00        | 23.32            | 300 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 400 00     | 0 00        | 23.32            | 400 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 500 00     | 0 00        | 23.32            | 500 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 600 00     | 0 00        | 23.32            | 600 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 700 00     | 0 00        | 23.32            | 700 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 800 00     | 0 00        | 23.32            | 800 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 900 00     | 0 00        | 23.32            | 900 00      | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1000 00    | 0 00        | 23.32            | 1000 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1100 00    | 0 00        | 23.32            | 1100 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1200 00    | 0 00        | 23.32            | 1200 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1300 00    | 0 00        | 23.32            | 1300 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1400 00    | 0 00        | 23.32            | 1400 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1500 00    | 0 00        | 23.32            | 1500 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1600 00    | 0 00        | 23.32            | 1600 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1700 00    | 0 00        | 23.32            | 1700 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1800 00    | 0 00        | 23.32            | 1800 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 1900 00    | 0 00        | 23.32            | 1900 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2000 00    | 0 00        | 23.32            | 2000 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2100 00    | 0 00        | 23.32            | 2100 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2200 00    | 0 00        | 23.32            | 2200 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2300 00    | 0 00        | 23.32            | 2300 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2400 00    | 0 00        | 23.32            | 2400 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2500 00    | 0 00        | 23.32            | 2500 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2600 00    | 0 00        | 23.32            | 2600 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2700 00    | 0 00        | 23.32            | 2700 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2800 00    | 0 00        | 23.32            | 2800 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 2900 00    | 0 00        | 23.32            | 2900 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 3000 00    | 0 00        | 23.32            | 3000 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 3100 00    | 0 00        | 23.32            | 3100 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 3200 00    | 0 00        | 23.32            | 3200 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 3300 00    | 0 00        | 23.32            | 3300 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
| KOP Build 2" DLS        | 3350 00    | 0 00        | 23.32            | 3350 00     | 0 00         | 0 00       | 0 00       | 0 00              | 437586 70        | 614265 88       | N 32 12 9.01      | W 103 57 50.09     |
|                         | 3400 00    | 1 00        | 23.32            | 3400 00     | 0 20         | 0 40       | 0 17       | 2 00              | 437587 10        | 614266 05       | N 32 12 9.02      | W 103 57 50.09     |
|                         | 3500 00    | 3 00        | 23.32            | 3499 93     | 1 82         | 3 61       | 1 55       | 2 00              | 437590 31        | 614267 43       | N 32 12 9.05      | W 103 57 50.07     |
|                         | 3600 00    | 5 00        | 23.32            | 3599 68     | 5 05         | 10 01      | 4 32       | 2 00              | 437596 71        | 614270 20       | N 32 12 9.11      | W 103 57 50.04     |
|                         | 3700 00    | 7 00        | 23.32            | 3699 13     | 9 89         | 19 61      | 8 45       | 2 00              | 437606 31        | 614274 33       | N 32 12 9.21      | W 103 57 49.99     |
|                         | 3800 00    | 9 00        | 23.32            | 3798 15     | 16 34        | 32 39      | 13 96      | 2 00              | 437619 09        | 614279 84       | N 32 12 9.33      | W 103 57 49.93     |
|                         | 3900 00    | 11 00       | 23.32            | 3896 63     | 24 38        | 48 33      | 20 84      | 2 00              | 437635 03        | 614286 72       | N 32 12 9.49      | W 103 57 49.85     |
| Hold 11" Inc 23 32" Azm | 3901.44    | 11 03       | 23.32            | 3898.04     | 24 51        | 48 59      | 20 95      | 2 00              | 437635 28        | 614286 83       | N 32 12 9.49      | W 103 57 49.85     |
|                         | 4000 00    | 11 03       | 23.32            | 3994.78     | 33 24        | 65 90      | 28 41      | 0 00              | 437652 60        | 614294 29       | N 32 12 9.66      | W 103 57 49.76     |
|                         | 4100 00    | 11 03       | 23.32            | 4092 93     | 42 10        | 83 47      | 35 98      | 0 00              | 437670 16        | 614301 86       | N 32 12 9.84      | W 103 57 49.67     |
|                         | 4200 00    | 11 03       | 23.32            | 4191 09     | 50 96        | 101 04     | 43 56      | 0 00              | 437687 73        | 614309 44       | N 32 12 10 01     | W 103 57 49 58     |
|                         | 4300 00    | 11 03       | 23.32            | 4289 24     | 59 82        | 118 60     | 51 13      | 0 00              | 437705 29        | 614317 01       | N 32 12 10 18     | W 103 57 49 49     |
|                         | 4400 00    | 11 03       | 23.32            | 4387 39     | 68 68        | 136 17     | 58 71      | 0 00              | 437722 86        | 614324 58       | N 32 12 10 36     | W 103 57 49 40     |
|                         | 4500 00    | 11 03       | 23.32            | 4485 55     | 77 54        | 153 74     | 66 28      | 0 00              | 437740 43        | 614332 15       | N 32 12 10 53     | W 103 57 49 31     |
|                         | 4600 00    | 11 03       | 23.32            | 4583 70     | 86 40        | 171 30     | 73 85      | 0 00              | 437757 99        | 614339 73       | N 32 12 10 70     | W 103 57 49 23     |
|                         | 4700 00    | 11 03       | 23.32            | 4681 85     | 95 26        | 188 87     | 81 43      | 0 00              | 437775 56        | 614347 30       | N 32 12 10 88     | W 103 57 49 14     |
|                         | 4800 00    | 11 03       | 23.32            | 4780 01     | 104 12       | 206 44     | 89 00      | 0 00              | 437793 12        | 614354 87       | N 32 12 11 05     | W 103 57 49 05     |
|                         | 4900 00    | 11 03       | 23.32            | 4878 16     | 112 98       | 224 01     | 96 57      | 0 00              | 437810 69        | 614362 45       | N 32 12 11 23     | W 103 57 48 96     |
|                         | 5000 00    | 11 03       | 23.32            | 4976 31     | 121 84       | 241 57     | 104 15     | 0 00              | 437828 25        | 614370 02       | N 32 12 11 40     | W 103 57 48 87     |
|                         | 5100 00    | 11 03       | 23.32            | 5074 46     | 130 70       | 259 14     | 111 72     | 0 00              | 437845 82        | 614377 59       | N 32 12 11 57     | W 103 57 48 78     |
|                         | 5200 00    | 11 03       | 23.32            | 5172 62     | 139 56       | 276 71     | 119 30     | 0 00              | 437863 39        | 614385 17       | N 32 12 11 75     | W 103 57 48 69     |
|                         | 5300 00    | 11 03       | 23.32            | 5270 77     | 148 42       | 294 28     | 126 87     | 0 00              | 437880 95        | 614392 74       | N 32 12 11 92     | W 103 57 48 60     |
|                         | 5400 00    | 11 03       | 23.32            | 5368 92     | 157 29       | 311 84     | 134 44     | 0 00              | 437898 52        | 614400 31       | N 32 12 12 09     | W 103 57 48 51     |
|                         | 5500 00    | 11 03       | 23.32            | 5467 08     | 166 15       | 329 41     | 142 02     | 0 00              | 437916 08        | 614407 89       | N 32 12 12 27     | W 103 57 48 43     |
|                         | 5600 00    | 11 03       | 23.32            | 5565 23     | 175 01       | 346 98     | 149 59     | 0 00              | 437933 65        | 614415 46       | N 32 12 12 44     | W 103 57 48 34     |
|                         | 5700 00    | 11 03       | 23.32            | 5663 38     | 183 87       | 364 54     | 157 16     | 0 00              | 437951 22        | 614423 03       | N 32 12 12 61     | W 103 57 48 25     |
|                         | 5800 00    | 11 03       | 23.32            | 5761 54     | 192 73       | 382 11     | 164 74     | 0 00              | 437968 78        | 614430 60       | N 32 12 12 79     | W 103 57 48 16     |
|                         | 5900 00    | 11 03       | 23.32            | 5859 69     | 201 59       | 399 68     | 172 31     | 0 00              | 437986 35        | 614438 18       | N 32 12 12 96     | W 103 57 48 07     |
|                         | 6000 00    | 11 03       | 23.32            | 5957 84     | 210 45       | 417 25     | 179 88     | 0 00              | 438003 91        | 614445 75       | N 32 12 13 13     | W 103 57 47 98     |
|                         | 6100 00    | 11 03       | 23.32            | 6056 00     | 219 31       | 434 81     | 187 46     | 0 00              | 438021 48        | 614453 32       | N 32 12 13 31     | W 103 57 47 89     |
|                         | 6200 00    | 11 03       | 23.32            | 6154 15     | 228 17       | 452 38     | 195 03     | 0 00              | 438039 05        | 614460 90       | N 32 12 13 48     | W 103 57 47 80     |
|                         | 6300 00    | 11 03       | 23.32            | 6252 30     | 237 03       | 469 95     | 202 61     | 0 00              | 438056 61        | 614468 47       | N 32 12 13 66     | W 103 57 47 71     |
|                         | 6400 00    | 11 03       | 23.32            | 6350 45     | 245 89       | 487 52     | 210 18     | 0 00              | 438074 18        | 614476 04       | N 32 12 13 83     | W 103 57 47 63     |
|                         | 6500 00    | 11 03       | 23.32            | 6448 61     | 254 75       | 505 08     | 217 75     | 0 00              | 438091 74        | 614483 62       | N 32 12 14 00     | W 103 57 47 54     |
| Drop 1 5" DLS           | 6505 77    | 11 03       | 23.32            | 6454 27     | 255 26       | 506 10     | 218 19     | 0 00              | 438092 76        | 614484 05       | N 32 12 14 01     | W 103 57 47 53     |
|                         | 6600 00    | 9 62        | 23.32            | 6549 97     | 263 08       | 521 60     | 224 87     | 1 50              | 438108 26        | 614490 74       | N 32 12 14 17     | W 103 57 47 45     |
|                         | 6700 00    | 8 12        | 23.32            | 6645 78     | 270 22       | 535 75     | 230 98     | 1 50              | 438122 41        | 614496 84       | N 32 12 14 31     | W 103 57 47 38     |
|                         | 6800 00    | 6 62        | 23.32            | 6744 95     | 276 16       | 547 53     | 236 05     | 1 50              | 438134 18        | 614501 91       | N 32 12 14 42     | W 103 57 47 32     |
|                         | 6900 00    | 5 12        | 23.32            | 6844 42     | 280 89       | 556 91     | 240 10     | 1 50              | 438143 57        | 614505 96       | N 32 12 14 51     | W 103 57 47 28     |
|                         | 7000 00    | 3 62        | 23.32            | 6944 13     | 284 42       | 563 90     | 243 11     | 1 50              | 438150 55        | 614508 97       | N 32 12 14 58     | W 103 57 47 24     |
|                         | 7100 00    | 2 12        | 23.32            | 7044 00     |              |            |            |                   |                  |                 |                   |                    |

| Comments                    | MD<br>(ft) | Incl<br>(°) | Azim Grid<br>(°) | TVD<br>(ft) | VSEC<br>(ft) | NS<br>(ft) | EW<br>(ft) | DLS<br>(°/100ft) | Northing<br>(ftUS) | Easting<br>(ftUS) | Latitude<br>(N/S ° ° ' '')   | Longitude<br>(E/W ° ° ' '') |
|-----------------------------|------------|-------------|------------------|-------------|--------------|------------|------------|------------------|--------------------|-------------------|------------------------------|-----------------------------|
| Return to<br>Vertical       | 7241.03    | 0.00        | 23.32            | 7185.00     | 287.94       | 570.88     | 246.12     | 1.50             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7300.00    | 0.00        | 23.32            | 7243.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7400.00    | 0.00        | 23.32            | 7302.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7500.00    | 0.00        | 23.32            | 7361.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7600.00    | 0.00        | 23.32            | 7420.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7700.00    | 0.00        | 23.32            | 7479.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7800.00    | 0.00        | 23.32            | 7538.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 7900.00    | 0.00        | 23.32            | 7597.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 8000.00    | 0.00        | 23.32            | 7656.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 8100.00    | 0.00        | 23.32            | 7715.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 8200.00    | 0.00        | 23.32            | 7774.97     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
| KOP Build<br>10°/100 ft DLS | 8269.03    | 0.00        | 23.32            | 8213.00     | 287.94       | 570.88     | 246.12     | 0.00             | 438157.54          | 614511.98         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 8300.00    | 2.79        | 89.82            | 8243.96     | 288.69       | 570.88     | 246.87     | 9.00             | 438157.54          | 614512.73         | N 32 12 14.65 W 103 57 47.20 |                             |
|                             | 8400.00    | 11.79       | 89.82            | 8343.05     | 301.33       | 570.92     | 259.54     | 9.00             | 438157.58          | 614525.40         | N 32 12 14.65 W 103 57 47.05 |                             |
|                             | 8500.00    | 20.79       | 89.82            | 8438.94     | 329.27       | 571.01     | 287.56     | 9.00             | 438157.79          | 614553.42         | N 32 12 14.65 W 103 57 46.72 |                             |
|                             | 8600.00    | 29.79       | 89.82            | 8528.26     | 371.84       | 571.14     | 300.23     | 9.00             | 438157.97          | 614596.09         | N 32 12 14.65 W 103 57 46.23 |                             |
|                             | 8700.00    | 38.79       | 89.82            | 8611.80     | 427.97       | 571.31     | 366.51     | 9.00             | 438158.18          | 614652.36         | N 32 12 14.65 W 103 57 45.57 |                             |
|                             | 8800.00    | 47.79       | 89.82            | 8694.52     | 496.29       | 571.52     | 455.00     | 9.00             | 438158.42          | 614720.85         | N 32 12 14.65 W 103 57 44.77 |                             |
|                             | 8900.00    | 56.79       | 89.82            | 8745.62     | 575.11       | 571.76     | 534.03     | 9.00             | 438158.68          | 614799.87         | N 32 12 14.65 W 103 57 43.85 |                             |
|                             | 9000.00    | 65.79       | 89.82            | 8793.62     | 662.50       | 572.03     | 621.64     | 9.00             | 438158.93          | 614887.47         | N 32 12 14.65 W 103 57 42.83 |                             |
|                             | 9100.00    | 74.79       | 89.82            | 8827.31     | 756.31       | 572.32     | 715.69     | 9.00             | 438159.18          | 614961.51         | N 32 12 14.65 W 103 57 41.74 |                             |
|                             | 9200.00    | 83.79       | 89.82            | 8845.88     | 854.21       | 572.62     | 813.84     | 9.00             | 438159.43          | 615039.66         | N 32 12 14.65 W 103 57 40.60 |                             |
| Landing point               | 9257.36    | 88.95       | 89.82            | 8849.51     | 911.29       | 572.80     | 871.06     | 9.00             | 438159.68          | 615136.87         | N 32 12 14.65 W 103 57 39.93 |                             |
|                             | 9300.00    | 88.95       | 89.82            | 8859.29     | 953.62       | 572.83     | 913.70     | 9.00             | 438159.93          | 615179.51         | N 32 12 14.65 W 103 57 38.44 |                             |
|                             | 9400.00    | 88.95       | 89.82            | 8869.13     | 1053.54      | 573.24     | 1013.68    | 9.00             | 438159.98          | 615279.48         | N 32 12 14.65 W 103 57 36.27 |                             |
|                             | 9500.00    | 88.95       | 89.82            | 8878.96     | 1153.27      | 573.54     | 1113.66    | 0.00             | 438160.20          | 615379.46         | N 32 12 14.65 W 103 57 37.11 |                             |
|                             | 9600.00    | 88.95       | 89.82            | 8888.80     | 1253.00      | 573.85     | 1213.65    | 0.00             | 438160.50          | 615479.43         | N 32 12 14.65 W 103 57 35.94 |                             |
|                             | 9700.00    | 88.95       | 89.82            | 8898.63     | 1352.73      | 574.16     | 1313.63    | 0.00             | 438160.81          | 615579.41         | N 32 12 14.65 W 103 57 34.78 |                             |
|                             | 9800.00    | 88.95       | 89.82            | 8908.46     | 1452.46      | 574.46     | 1413.61    | 0.00             | 438161.12          | 615679.38         | N 32 12 14.65 W 103 57 33.62 |                             |
|                             | 9900.00    | 88.95       | 89.82            | 8918.30     | 1552.18      | 574.77     | 1513.59    | 0.00             | 438161.42          | 615779.36         | N 32 12 14.65 W 103 57 32.45 |                             |
|                             | 10000.00   | 88.95       | 89.82            | 8928.13     | 1651.91      | 575.08     | 1613.58    | 0.00             | 438161.73          | 615879.33         | N 32 12 14.65 W 103 57 31.29 |                             |
|                             | 10100.00   | 88.95       | 89.82            | 8937.96     | 1751.64      | 575.38     | 1713.56    | 0.00             | 438162.04          | 615979.31         | N 32 12 14.65 W 103 57 30.13 |                             |
|                             | 10200.00   | 88.95       | 89.82            | 8947.80     | 1851.37      | 575.69     | 1813.54    | 0.00             | 438162.35          | 616079.28         | N 32 12 14.65 W 103 57 28.96 |                             |
|                             | 10300.00   | 88.95       | 89.82            | 8957.63     | 1951.10      | 576.00     | 1913.53    | 0.00             | 438162.65          | 616179.25         | N 32 12 14.65 W 103 57 27.80 |                             |
|                             | 10400.00   | 88.95       | 89.82            | 8967.47     | 2050.83      | 576.30     | 2013.51    | 0.00             | 438162.96          | 616279.23         | N 32 12 14.65 W 103 57 26.64 |                             |
|                             | 10500.00   | 88.95       | 89.82            | 8977.30     | 2150.55      | 576.61     | 2113.49    | 0.00             | 438163.27          | 616379.21         | N 32 12 14.65 W 103 57 25.47 |                             |
|                             | 10600.00   | 88.95       | 89.82            | 8987.13     | 2250.28      | 576.92     | 2213.47    | 0.00             | 438163.57          | 616479.18         | N 32 12 14.64 W 103 57 24.31 |                             |
|                             | 10700.00   | 88.95       | 89.82            | 8996.96     | 2350.01      | 577.22     | 2313.46    | 0.00             | 438163.88          | 616579.16         | N 32 12 14.64 W 103 57 23.14 |                             |
|                             | 10800.00   | 88.95       | 89.82            | 9006.80     | 2449.74      | 577.53     | 2413.44    | 0.00             | 438164.19          | 616679.13         | N 32 12 14.64 W 103 57 21.98 |                             |
|                             | 10900.00   | 88.95       | 89.82            | 9016.63     | 2549.47      | 577.84     | 2513.42    | 0.00             | 438164.49          | 616779.11         | N 32 12 14.64 W 103 57 20.82 |                             |
|                             | 11000.00   | 88.95       | 89.82            | 9026.47     | 2649.19      | 578.15     | 2613.40    | 0.00             | 438164.80          | 616879.08         | N 32 12 14.64 W 103 57 19.65 |                             |
|                             | 11100.00   | 88.95       | 89.82            | 9036.30     | 2748.92      | 578.45     | 2713.39    | 0.00             | 438165.11          | 616979.06         | N 32 12 14.64 W 103 57 18.49 |                             |
|                             | 11200.00   | 88.95       | 89.82            | 9046.13     | 2848.65      | 578.76     | 2813.37    | 0.00             | 438165.41          | 617079.03         | N 32 12 14.64 W 103 57 17.33 |                             |
|                             | 11300.00   | 88.95       | 89.82            | 9055.96     | 2948.38      | 579.07     | 2913.35    | 0.00             | 438165.72          | 617179.01         | N 32 12 14.64 W 103 57 16.16 |                             |
|                             | 11400.00   | 88.95       | 89.82            | 9065.80     | 3048.11      | 579.37     | 3013.34    | 0.00             | 438166.03          | 617278.98         | N 32 12 14.64 W 103 57 15.00 |                             |
|                             | 11500.00   | 88.95       | 89.82            | 9075.63     | 3147.83      | 579.68     | 3113.32    | 0.00             | 438166.33          | 617378.96         | N 32 12 14.64 W 103 57 13.84 |                             |
|                             | 11600.00   | 88.95       | 89.82            | 9085.47     | 3247.56      | 579.99     | 3213.30    | 0.00             | 438166.64          | 617478.93         | N 32 12 14.64 W 103 57 12.67 |                             |
|                             | 11700.00   | 88.95       | 89.82            | 9095.30     | 3347.29      | 580.29     | 3313.28    | 0.00             | 438166.95          | 617578.91         | N 32 12 14.64 W 103 57 11.51 |                             |
|                             | 11800.00   | 88.95       | 89.82            | 9105.14     | 3447.02      | 580.60     | 3413.27    | 0.00             | 438167.25          | 617678.88         | N 32 12 14.64 W 103 57 10.35 |                             |
|                             | 11900.00   | 88.95       | 89.82            | 9114.97     | 3546.75      | 580.91     | 3513.25    | 0.00             | 438167.56          | 617778.86         | N 32 12 14.64 W 103 57 9.18  |                             |
|                             | 12000.00   | 88.95       | 89.82            | 9124.80     | 3646.48      | 581.21     | 3613.23    | 0.00             | 438167.87          | 617878.83         | N 32 12 14.64 W 103 57 8.02  |                             |
|                             | 12100.00   | 88.95       | 89.82            | 9134.63     | 3746.20      | 581.52     | 3713.21    | 0.00             | 438168.17          | 617978.81         | N 32 12 14.64 W 103 57 6.85  |                             |
|                             | 12200.00   | 88.95       | 89.82            | 9144.47     | 3845.93      | 581.83     | 3813.20    | 0.00             | 438168.48          | 618078.78         | N 32 12 14.64 W 103 57 5.69  |                             |
|                             | 12300.00   | 88.95       | 89.82            | 9154.30     | 3945.66      | 582.13     | 3913.18    | 0.00             | 438168.79          | 618178.76         | N 32 12 14.64 W 103 57 4.53  |                             |
|                             | 12400.00   | 88.95       | 89.82            | 9164.14     | 4045.39      | 582.44     | 4013.16    | 0.00             | 438169.10          | 618278.73         | N 32 12 14.64 W 103 57 3.36  |                             |
|                             | 12500.00   | 88.95       | 89.82            | 9173.97     | 4145.12      | 582.75     | 4113.15    | 0.00             | 438169.40          | 618378.70         | N 32 12 14.64 W 103 57 2.20  |                             |
|                             | 12600.00   | 88.95       | 89.82            | 9183.81     | 4244.84      | 583.05     | 4213.13    | 0.00             | 438169.71          | 618478.68         | N 32 12 14.64 W 103 57 1.04  |                             |
|                             | 12700.00   | 88.95       | 89.82            | 9193.64     | 4344.57      | 583.36     | 4313.11    | 0.00             | 438170.02          | 618578.65         | N 32 12 14.63 W 103 56 59.87 |                             |
|                             | 12800.00   | 88.95       | 89.82            | 9203.47     | 4444.30      | 583.67     | 4413.09    | 0.00             | 438170.32          | 618678.63         | N 32 12 14.63 W 103 56 58.71 |                             |
|                             | 12900.00   | 88.95       | 89.82            | 9213.31     | 4544.03      | 583.98     | 4513.08    | 0.00             | 438170.63          | 618778.60         | N 32 12 14.63 W 103 56 57.55 |                             |
|                             | 13000.00   | 88.95       | 89.82            | 9223.14     | 4643.76      | 584.28     | 4613.06    | 0.00             | 438170.94          | 618878.58         | N 32 12 14.63 W 103 56 56.38 |                             |
|                             | 13100.00   | 88.95       | 89.82            | 9232.97     | 4743.48      | 584.59     | 4713.04    | 0.00             | 438171.24          | 618978.55         | N 32 12 14.63 W 103 56 55.22 |                             |
|                             | 13200.00   | 88.95       | 89.82            | 9242.81     | 4843.21      | 584.90     | 4813.02    | 0.00             | 438171.55          | 619078.53         | N 32 12 14.63 W 103 56 54.06 |                             |
|                             | 13300.00   | 88.95       | 89.82            | 9252.64     | 4942.94      | 585.20     | 4913.01    | 0.00             | 438171.86          | 619178.50         | N 32 12 14.63 W 103 56 52.89 |                             |
|                             | 13400.00   | 88.95       | 89.82            | 9262.48     | 5042.67      | 585.51     | 5012.99    | 0.00             | 438172.16          | 619278.48         | N 32 12 14.63 W 103 56 51.73 |                             |
|                             | 13500.00   | 88.95       | 89.82            | 9272.31     | 5142.40      | 585.82     | 5112.97    | 0.00             | 438172.47          | 619378.45         | N 32 12 14.63 W 103 56 50.56 |                             |
|                             | 13600.00   | 88.95       | 89.82            | 9282.14     | 5242.12      | 586.12     | 5212.96    | 0.00             | 438172.78          | 619478.43         | N 32 12 14.63 W 103 56 49.40 |                             |
|                             | 13700.00   | 88.95       | 89.82            | 9291.97     | 5341.85      | 586.43     | 5312.94    | 0.00             | 438173.08          | 619578.40         | N 32 12 14.63 W 103 56 48.24 |                             |
|                             | 13800.00   | 88.95       | 89.82            | 9301.81     | 5441.58      | 586.74     | 5412.92    | 0.00             | 438173.39          | 619678.38         | N 32 12 14.63 W 103 56 47.07 |                             |
|                             | 13900.00   | 88.95       | 89.82            | 9311.64     | 5541.31      | 587.04     | 5512.90    | 0.00             | 438173.70          | 619778.35         | N 32 12 14.63 W 103 56 45.91 |                             |
|                             | 14000.00   | 88.95       | 89.82            | 9321.47     | 5641.04      | 587.35     | 5612.89    | 0.00             | 438174.00          | 619878.33         | N 32 12 14.63 W 103 56 44.75 |                             |
|                             | 14100.00   | 88.95       | 89.82            | 9331.31     | 5740.77      | 587.66     | 5712.87    | 0.00             | 438174.31          | 619978.30         | N 32 12 14.63 W 103 56 43.58 |                             |
|                             | 14200.00   | 88.95       | 89.82            | 9341.14     | 5840.50      | 587.96     | 5812.85    | 0.00             | 438174.62          | 620078.28         | N 32 12 14.63 W 103 56 42.42 |                             |
|                             | 14300.00   | 88.95       | 89.82            | 9350.97     | 5940.22      | 588.27     | 5912.83    | 0.00             | 438174.93          | 620178.25         | N 32 12 14.63 W 103 56 41.26 |                             |
|                             | 14400.00   | 88.95       | 89.82            | 9360.81     | 6039.95      | 588.58     | 6012.82    | 0.00             | 438175.23          | 620278.23         | N 32 12 14.63 W 103 56 40.09 |                             |
|                             | 14500.00   | 88.95       | 89.82            | 9370.64     | 6139.68      | 588.88     | 6112.80    | 0.00             | 438175.54          | 620378.20         | N 32                         |                             |



## Oxy Cedar Canyon 23 Federal 3H Rev1 MMC 14Aug16 Anti-Collision Summary Report

Analysis Date-24hr Time: August 31, 2016 - 11 44  
 Client: OXY  
 Field: NM Eddy County (NAD 27)  
 Structure: Oxy Cedar Canyon 23 Federal 3H  
 Slot: Oxy Cedar Canyon 23 Federal 3H  
 Well: Oxy Cedar Canyon 23 Federal 3H

Analysis Method: 3D Least Distance  
 Reference Trajectory: Oxy Cedar Canyon 23 Federal 3H Rev1 MMC 14Aug16 (Non-Def Plan)  
 Depth Interval: Every 10.00 Measured Depth (ft)  
 Rule Set: NAL Procedure D&M Anti-Collision Standard S002  
 Min Pts: All local minima indicated  
 Version / Patch: 2.9.370.0

Borehole: Oxy Cedar Canyon 23 Federal 3H - Orig Borehole  
 Scan MD Range: 0.00ft - 16351.68ft

Database \ Project: us1153app452 dr slb com\drilling-NM Eddy County 2.9

Trajectory Error Model: ISCWSA0 3-D 95.000% Confidence 2.7955 sigma

## Offset Trajectories Summary

## Offset Selection Criteria

Wellhead distance scan  
 Selection filters

Not performed:  
 Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans  
 - All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

| Offset Trajectory                                                                   | Separation | Allow    | Sep.      | Controlling | Reference Trajectory | Risk Level | Alert   | Status      |
|-------------------------------------------------------------------------------------|------------|----------|-----------|-------------|----------------------|------------|---------|-------------|
| CI-CI (ft)                                                                          | MAS (ft)   | EOU (ft) | Dev. (ft) | Rule        | MD (ft)              | TVD (ft)   | Minor   | Major       |
| Oxy Riverband Federal #007 (Offset) (INC ONLY Survey On to 9020ft) (Def Survey)     |            |          |           |             |                      |            |         |             |
| 822.93                                                                              | 32.81      | 820.43   | 790.13    | N/A         | MAS = 10.00 (m)      | 0.00       | 0.00    | Surface     |
| 822.65                                                                              | 32.81      | 820.11   | 789.84    | 21174.18    | MAS = 10.00 (m)      | 10.00      | 10.00   | MinPt-O-SF  |
| 822.44                                                                              | 32.81      | 819.93   | 789.63    | 70735.06    | MAS = 10.00 (m)      | 26.50      | 26.50   | WRP         |
| 735.60                                                                              | 223.32     | 585.86   | 512.28    | 4.98        | OSF1 50              | 4160.00    | 4151.83 | OSF<5.00    |
| 421.46                                                                              | 422.01     | 139.25   | -0.52     | 1.50        | OSF1 50              | 7790.00    | 7733.97 | OSF<1 50    |
| 324.31                                                                              | 486.77     | -1.16    | -162.47   | 1.00        | OSF1 50              | 8630.00    | 8554.94 | OSF<1 00    |
| 81.33                                                                               | 511.41     | -260.42  | -430.06   | 0.23        | OSF1 50              | 9040.00    | 8808.86 | OSF>1 00    |
| 343.77                                                                              | 515.20     | -0.53    | -171.43   | 1.00        | OSF1 50              | 9380.00    | 8651.76 | Ext Minor   |
| 510.50                                                                              | 515.55     | 165.97   | -5.05     | 1.49        | OSF1 50              | 9550.00    | 8854.88 | Ext Minor   |
| 1715.70                                                                             | 517.86     | 1369.63  | 1197.84   | 4.99        | OSF1 50              | 10760.00   | 8877.07 | OSF>5.00    |
| 7304.97                                                                             | 528.17     | 6952.02  | 6776.80   | 20.84       | OSF1 50              | 16351.68   | 8979.60 | Ext Alert   |
| Oxy Cedar Canyon 23 Fed 21H Rev1 MMC 15Aug16 (Non-Def Plan)                         |            |          |           |             |                      |            |         |             |
| 30.00                                                                               | 24.50      | 27.50    | 5.50      | N/A         | MAS = 7.47 (m)       | 0.00       | 0.00    | Surface     |
| 30.00                                                                               | 24.50      | 27.50    | 5.50      | 9521.72     | MAS = 7.47 (m)       | 26.50      | 26.50   | MinPt-O-SF  |
| 30.00                                                                               | 30.09      | 8.11     | -0.09     | 1.48        | OSF1 50              | 2990.00    | 2990.00 | OSF<1 50    |
| 30.00                                                                               | 33.49      | 6.84     | -3.49     | 1.33        | OSF1 50              | 3350.00    | 3350.00 | MinPt-CICI  |
| 30.11                                                                               | 33.86      | 8.71     | -3.74     | 1.32        | OSF1 50              | 3390.00    | 3390.00 | MINPT-O-EQU |
| 30.26                                                                               | 34.04      | 8.73     | -3.79     | 1.32        | OSF1 50              | 3410.00    | 3410.00 | MinPts      |
| 35.85                                                                               | 35.93      | 10.86    | -0.28     | 1.49        | OSF1 50              | 3620.00    | 3619.60 | OSF>1 50    |
| 234.69                                                                              | 72.20      | 185.73   | 182.50    | 5.00        | OSF1 50              | 6890.00    | 6834.46 | Ext Minor   |
| 388.50                                                                              | 73.60      | 338.60   | 314.00    | 8.14        | OSF1 50              | 8250.00    | 8223.97 | Ext Alert   |
| 390.05                                                                              | 74.09      | 339.82   | 315.96    | 8.12        | OSF1 50              | 8340.00    | 8283.82 | MinPts      |
| 7885.88                                                                             | 90.26      | 7824.66  | 7795.42   | 134.74      | OSF1 50              | 16351.68   | 8979.60 | MinPt-O-SF  |
| Oxy Cedar Canyon 23 Fed 21H Rev1 MMC 15Aug16 (Non-Def Plan)                         |            |          |           |             |                      |            |         |             |
| 50.00                                                                               | 32.81      | 57.50    | 27.20     | N/A         | MAS = 10.00 (m)      | 0.00       | 0.00    | Surface     |
| 50.00                                                                               | 32.81      | 57.50    | 27.20     | 19908.99    | MAS = 10.00 (m)      | 26.50      | 26.50   | WRP         |
| 50.00                                                                               | 32.81      | 45.96    | 27.20     | 4.98        | MAS = 10.00 (m)      | 1900.00    | 1900.00 | OSF<5.00    |
| 50.00                                                                               | 33.40      | 36.85    | 26.52     | 2.78        | OSF1 50              | 3350.00    | 3350.00 | OSF<5.00    |
| 50.12                                                                               | 33.86      | 36.71    | 26.26     | 2.75        | OSF1 50              | 3390.00    | 3390.00 | OSF<5.00    |
| 50.26                                                                               | 34.04      | 36.73    | 26.22     | 2.75        | OSF1 50              | 3410.00    | 3410.00 | OSF<5.00    |
| 50.87                                                                               | 34.49      | 37.04    | 26.38     | 2.74        | OSF1 50              | 3460.00    | 3459.97 | OSF<5.00    |
| 127.18                                                                              | 40.33      | 95.47    | 86.66     | 4.34        | OSF1 50              | 4100.00    | 4092.93 | OSF<5.00    |
| 821.54                                                                              | 69.39      | 574.55   | 552.26    | 13.89       | OSF1 50              | 8140.00    | 8063.97 | OSF<5.00    |
| 821.80                                                                              | 69.92      | 574.16   | 551.69    | 13.77       | OSF1 50              | 8269.03    | 8213.00 | OSF<5.00    |
| 821.65                                                                              | 70.00      | 574.15   | 551.65    | 12.76       | OSF1 50              | 8280.00    | 8223.97 | OSF<5.00    |
| 822.26                                                                              | 70.19      | 574.63   | 552.07    | 13.73       | OSF1 50              | 8310.00    | 8253.94 | OSF<5.00    |
| 8074.78                                                                             | 70.21      | 8027.14  | 8004.57   | 178.83      | OSF1 50              | 16351.68   | 8979.60 | OSF<5.00    |
| Oxy Riverband Federal #006 (Offset) (INC ONLY Survey On to 5185ft) (Non-Def Survey) |            |          |           |             |                      |            |         |             |
| 823.87                                                                              | 32.81      | 821.37   | 791.06    | N/A         | MAS = 10.00 (m)      | 0.00       | 0.00    | Surface     |
| 822.77                                                                              | 32.81      | 820.15   | 789.96    | 7045.42     | MAS = 10.00 (m)      | 26.50      | 26.50   | MinPt-O-SF  |
| 822.50                                                                              | 248.77     | 555.92   | 573.73    | 4.99        | OSF1 50              | 3190.00    | 3190.00 | OSF<5.00    |
| 804.73                                                                              | 306.60     | 600.16   | 499.13    | 3.97        | OSF1 50              | 4810.00    | 4495.36 | OSF<5.00    |
| 816.54                                                                              | 337.41     | 590.87   | 478.23    | 3.63        | OSF1 50              | 5240.00    | 5211.88 | OSF<5.00    |
| 970.87                                                                              | 293.13     | 774.72   | 677.84    | 5.00        | OSF1 50              | 5740.00    | 5702.64 | OSF<5.00    |
| 5113.32                                                                             | 241.32     | 4951.60  | 4872.00   | 32.10       | OSF1 50              | 11270.00   | 8886.42 | OSF<5.00    |
| 9422.43                                                                             | 315.14     | 9210.86  | 9106.29   | 45.05       | OSF1 50              | 16351.68   | 8979.60 | OSF<5.00    |
| River Band 23 Federal 16H (Offset) (INC ONLY Survey On to 5500ft) (Def Survey)      |            |          |           |             |                      |            |         |             |
| 3585.95                                                                             | 32.81      | 3582.69  | 3553.14   | 4671.29     | MAS = 10.00 (m)      | 0.00       | 0.00    | Surface     |
| 3585.95                                                                             | 32.81      | 3582.17  | 3553.14   | 2792.85     | MAS = 10.00 (m)      | 26.50      | 26.50   | WRP         |
| 1841.61                                                                             | 494.67     | 1315.80  | 1146.74   | 4.99        | OSF1 50              | 11050.00   | 9882.38 | OSF<5.00    |
| 1409.45                                                                             | 491.16     | 1081.18  | 918.30    | 4.32        | OSF1 50              | 11890.00   | 9897.79 | OSF<5.00    |
| 1409.48                                                                             | 491.22     | 1081.17  | 918.26    | 4.32        | OSF1 50              | 11900.00   | 9897.97 | OSF<5.00    |
| 1409.74                                                                             | 491.35     | 1081.34  | 918.39    | 4.32        | OSF1 50              | 11920.00   | 9898.34 | OSF<5.00    |
| 1666.27                                                                             | 502.95     | 1330.14  | 1163.32   | 4.99        | OSF1 50              | 12780.00   | 8914.11 | OSF<5.00    |
| 4677.83                                                                             | 518.51     | 4331.32  | 4159.32   | 13.59       | OSF1 50              | 16351.68   | 8979.60 | OSF<5.00    |
| Survey Riverband Federal #001 (Offset) (INC ONLY Survey On to 5500ft) (Def Survey)  |            |          |           |             |                      |            |         |             |
| 3634.08                                                                             | 32.81      | 3631.58  | 3601.28   | N/A         | MAS = 10.00 (m)      | 0.00       | 0.00    | Surface     |
| 3633.75                                                                             | 32.81      | 3631.20  | 3600.94   | 87811.31    | MAS = 10.00 (m)      | 26.50      | 26.50   | MinPt-O-SF  |
| 3633.59                                                                             | 228.69     | 3480.30  | 3404.90   | 24.08       | OSF1 50              | 3350.00    | 3350.00 | MinPt-CICI  |
| 3660.76                                                                             | 301.31     | 3459.05  | 3359.45   | 18.36       | OSF1 50              | 4810.00    | 4789.82 | MINPT-O-EQU |
| 3686.14                                                                             | 336.65     | 3480.87  | 3349.45   | 18.54       | OSF1 50              | 5590.00    | 5535.41 | MinPts      |
| 3666.51                                                                             | 336.89     | 3461.08  | 3349.62   | 16.53       | OSF1 50              | 5600.00    | 5565.23 | MinPt-O-SF  |
| 11929.29                                                                            | 328.50     | 11709.45 | 11600.78  | 54.68       | OSF1 50              | 16351.68   | 8979.60 | TO          |

| Offset Trajectory                                                                   | Separation |          |          | Allow<br>Dev. (ft) | Sep<br>Fact. | Controlling<br>Rule | Reference Trajectory |          | Risk Level |       |       | Alert | Status      |
|-------------------------------------------------------------------------------------|------------|----------|----------|--------------------|--------------|---------------------|----------------------|----------|------------|-------|-------|-------|-------------|
|                                                                                     | CI-CI (ft) | MAS (ft) | EOU (ft) |                    |              |                     | MD (ft)              | TVD (ft) | Alert      | Minor | Major |       |             |
| Survey: Riverbend Federal 8029<br>(Offset) INC ONLY 0 to 7000 ft<br>MD (Ref Survey) |            |          |          |                    |              |                     |                      |          |            |       |       |       |             |
|                                                                                     | 4906.98    | 32.81    | 4904.48  | 4874.17            | N/A          | MAS = 10.00 (m)     | 0.00                 | 0.00     |            |       |       |       | Surface     |
|                                                                                     | 4906.75    | 32.81    | 4904.22  | 4873.94            | 182155.38    | MAS = 10.00 (m)     | 26.50                | 26.50    |            |       |       |       | MinPt-O-SF  |
|                                                                                     | 4906.66    | 185.63   | 4782.08  | 4721.03            | 40.17        | OSF1 50             | 3350.00              | 3350.00  |            |       |       |       | MinPt-CICI  |
|                                                                                     | 4915.00    | 212.86   | 4772.25  | 4702.13            | 35.03        | OSF1 50             | 3870.00              | 3867.15  |            |       |       |       | MinPt-O-EOU |
|                                                                                     | 5003.54    | 319.26   | 4785.07  | 4684.20            | 23.68        | OSF1 50             | 5970.00              | 5928.40  |            |       |       |       | MinPt-O-ADP |
|                                                                                     | 5025.45    | 342.00   | 4798.62  | 4683.43            | 22.19        | OSF1 50             | 6400.00              | 6350.45  |            |       |       |       | MinPt-O-ADP |
|                                                                                     | 5051.08    | 441.89   | 4755.68  | 4609.18            | 17.23        | OSF1 50             | 8020.00              | 7963.97  |            |       |       |       | MinPts      |
|                                                                                     | 5051.11    | 441.88   | 4755.68  | 4609.21            | 17.23        | OSF1 50             | 8030.00              | 7973.97  |            |       |       |       | MinPt-O-SF  |
|                                                                                     | 12789.90   | 442.19   | 12494.28 | 12347.72           | 43.62        | OSF1 50             | 16351.68             | 8978.60  |            |       |       |       | TD          |

# PERFORMANCE DATA

**TMK Ultra Premium SF™**  
**Technical Data Sheet**

**5.500 in**

**20.00 lbs/ft**

**P-110**

## Tubular Parameters

|                     |       |                 |                              |         |     |
|---------------------|-------|-----------------|------------------------------|---------|-----|
| Size                | 5.500 | in              | Minimum Yield                | 110,000 | psi |
| Nominal Weight      | 20.00 | lbs/ft          | Minimum Tensile              | 125,000 | psi |
| Grade               | P-110 |                 | Yield Load                   | 641,000 | lbs |
| PE Weight           | 19.81 | lbs/ft          | Tensile Load                 | 728,000 | lbs |
| Wall Thickness      | 0.361 | in              | Min. Internal Yield Pressure | 12,600  | psi |
| Nominal ID          | 4.778 | in              | Collapse Pressure            | 11,100  | psi |
| Drift Diameter      | 4.653 | in              |                              |         |     |
| Nom. Pipe Body Area | 5.828 | in <sup>2</sup> |                              |         |     |

## Connection Parameters

|                              |         |                 |
|------------------------------|---------|-----------------|
| Connection OD                | 5.646   | in              |
| Connection ID                | 4.734   | in              |
| Make-Up Loss                 | 5.526   | in              |
| Critical Section Area        | 5.289   | in <sup>2</sup> |
| Tension Efficiency           | 90.5    | %               |
| Compression Efficiency       | 90.5    | %               |
| Yield Load In Tension        | 580,000 | lbs             |
| Min. Internal Yield Pressure | 12,600  | psi             |
| Collapse Pressure            | 11,100  | psi             |

## Make-Up Torques

|                     |        |        |
|---------------------|--------|--------|
| Min. Make-Up Torque | 10,100 | ft-lbs |
| Opt. Make-Up Torque | 10,600 | ft-lbs |
| Max. Make-Up Torque | 11,700 | ft-lbs |
| Yield Torque        | 15,600 | ft-lbs |

Printed on: February-25-2014

### NOTE:

The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine considering the specific installation and operation parameters. Information that is printed or downloaded is no longer controlled by TMK IPSCO and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest TMK IPSCO technical information, please contact TMK IPSCO Technical Sales toll-free at 1-888-258-2000.



# PERFORMANCE DATA

TMK UP ULTRA™ DQX  
Technical Data Sheet

4.500 in

13.50 lbs/ft

P-110

## Tubular Parameters

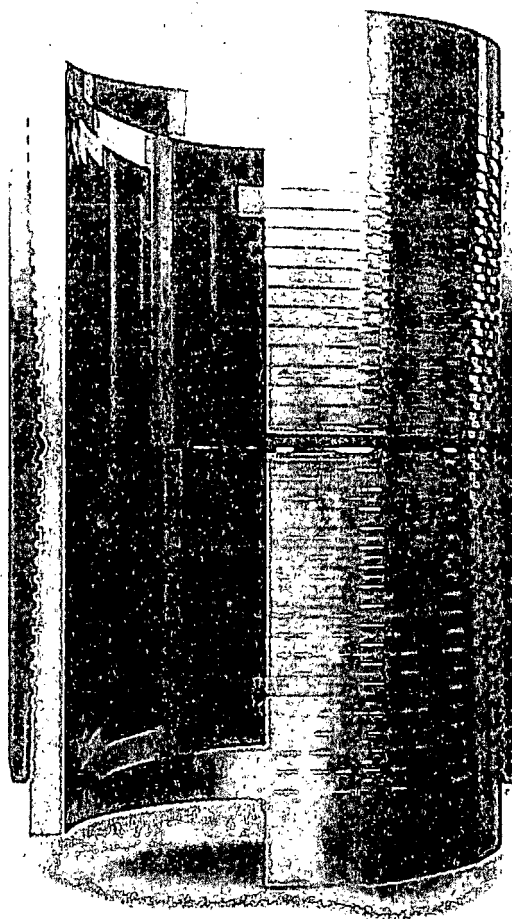
|                     |       |                 |                              |         |     |
|---------------------|-------|-----------------|------------------------------|---------|-----|
| Size                | 4.500 | in              | Minimum Yield                | 110,000 | psi |
| Nominal Weight      | 13.50 | lbs/ft          | Minimum Tensile              | 125,000 | psi |
| Grade               | P-110 |                 | Yield Load                   | 422,000 | lbs |
| PE Weight           | 13.04 | lbs/ft          | Tensile Load                 | 479,000 | lbs |
| Wall Thickness      | 0.290 | in              | Min. Internal Yield Pressure | 12,400  | psi |
| Nominal ID          | 3.920 | in              | Collapse Pressure            | 10,700  | psi |
| Drift Diameter      | 3.795 | in              |                              |         |     |
| Nom. Pipe Body Area | 3.836 | in <sup>2</sup> |                              |         |     |

## Connection Parameters

|                              |         |                 |
|------------------------------|---------|-----------------|
| Connection OD                | 5.000   | in              |
| Connection ID                | 3.920   | in              |
| Make-Up Loss                 | 3.772   | in              |
| Critical Section Area        | 3.836   | in <sup>2</sup> |
| Tension Efficiency           | 100.0   | %               |
| Compression Efficiency       | 100.0   | %               |
| Yield Load In Tension        | 422,000 | lbs             |
| Min. Internal Yield Pressure | 12,400  | psi             |
| Collapse Pressure            | 10,700  | psi             |
| Uniaxial Bending             | 112     | °/ 100 ft       |

## Make-Up Torques

|                     |        |        |
|---------------------|--------|--------|
| Min. Make-Up Torque | 6,000  | ft-lbs |
| Opt. Make-Up Torque | 6,700  | ft-lbs |
| Max. Make-Up Torque | 7,300  | ft-lbs |
| Yield Torque        | 10,800 | ft-lbs |



Printed on: October-22-2014

## NOTE

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