

30-025-42697



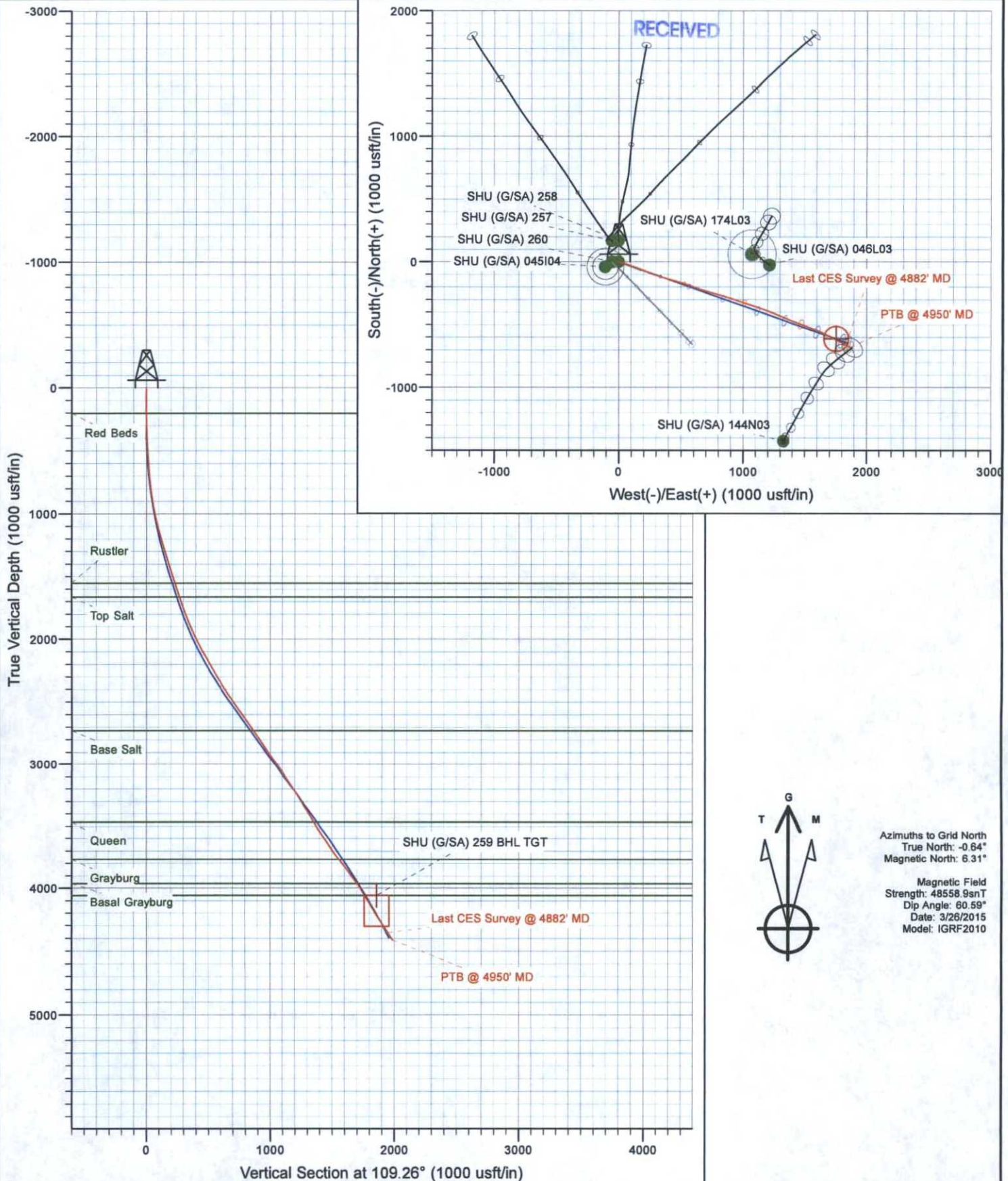
Project: HOBBS, SOUTH  
 Site: SOUTH HOBBS GRAYBURG-SA UNIT  
 Well: SHU (G/SA) 259  
 Wellbore: ST00  
 Design: Final  
 Rig: H&P 340 - KB - 16.5

HOBBS OCD

DEC 02 2015



CATHEDRAL



DEC 21 2015

# Cathedral Energy Services

## Survey Report

|                  |                              |                                     |                                                |
|------------------|------------------------------|-------------------------------------|------------------------------------------------|
| <b>Company:</b>  | OXY USA PERMIAN EOR          | <b>Local Co-ordinate Reference:</b> | Well SHU (G/SA) 259                            |
| <b>Project:</b>  | HOBBS, SOUTH                 | <b>TVD Reference:</b>               | Original KB @ 3628.5usft (H&P 340 - KB - 16.5) |
| <b>Site:</b>     | SOUTH HOBBS GRAYBURG-SA UNIT | <b>MD Reference:</b>                | Original KB @ 3628.5usft (H&P 340 - KB - 16.5) |
| <b>Well:</b>     | SHU (G/SA) 259               | <b>North Reference:</b>             | Grid                                           |
| <b>Wellbore:</b> | ST00                         | <b>Survey Calculation Method:</b>   | Minimum Curvature                              |
| <b>Design:</b>   | Final                        | <b>Database:</b>                    | USA EDM 5000 Multi Users DB                    |

|                    |                                                             |                      |                             |
|--------------------|-------------------------------------------------------------|----------------------|-----------------------------|
| <b>Project</b>     | HOBBS, SOUTH, North America, HOBBS, SOUTH - ALTURA HOBBS-OP |                      |                             |
| <b>Map System:</b> | US State Plane 1927 (Exact solution)                        | <b>System Datum:</b> | Mean Sea Level              |
| <b>Geo Datum:</b>  | NAD 1927 (NADCON CONUS)                                     |                      |                             |
| <b>Map Zone:</b>   | New Mexico East 3001                                        |                      | Using geodetic scale factor |

|                       |          |                              |                 |                   |             |
|-----------------------|----------|------------------------------|-----------------|-------------------|-------------|
| Site                  |          | SOUTH HOBBS GRAYBURG-SA UNIT |                 |                   |             |
| Site Position:        |          | Northing:                    | 617,518.60 usft | Latitude:         | 32.692216   |
| From:                 | Map      | Easting:                     | 859,408.09 usft | Longitude:        | -103.165105 |
| Position Uncertainty: | 1.0 usft | Slot Radius:                 | 600"            | Grid Convergence: | 0.63 °      |

|                      |                |          |                     |                 |               |              |
|----------------------|----------------|----------|---------------------|-----------------|---------------|--------------|
| Well                 | SHU (G/SA) 259 |          |                     |                 |               |              |
| Well Position        | +N/-S          | 0.0 usft | Northing:           | 615,883.16 usft | Latitude:     | 32.687543    |
|                      | +E/-W          | 0.0 usft | Easting:            | 865,266.56 usft | Longitude:    | -103.146125  |
| Position Uncertainty |                | 1.0 usft | Wellhead Elevation: | 3,612.0 usft    | Ground Level: | 3,612.0 usft |

|                  |                   |                    |                            |                          |                                |
|------------------|-------------------|--------------------|----------------------------|--------------------------|--------------------------------|
| <b>Wellbore</b>  | ST00              |                    |                            |                          |                                |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination<br/>(°)</b> | <b>Dip Angle<br/>(°)</b> | <b>Field Strength<br/>(nT)</b> |
|                  | IGRF2010          | 3/26/2015          | 6.95                       | 60.59                    | 48,559                         |

|                          |                                    |                         |                         |                          |     |
|--------------------------|------------------------------------|-------------------------|-------------------------|--------------------------|-----|
| <b>Design</b>            | Final                              |                         |                         |                          |     |
| <b>Audit Notes:</b>      |                                    |                         |                         |                          |     |
| <b>Version:</b>          | 1.0                                | <b>Phase:</b>           | ACTUAL                  | <b>Tie On Depth:</b>     | 0.0 |
| <b>Vertical Section:</b> | <b>Depth From (TVD)<br/>(usft)</b> | <b>+N/-S<br/>(usft)</b> | <b>+E/-W<br/>(usft)</b> | <b>Direction<br/>(°)</b> |     |
|                          | 0.0                                | 0.0                     | 0.0                     | 109.26                   |     |

|                        |                      |                          |                     |                                               |  |
|------------------------|----------------------|--------------------------|---------------------|-----------------------------------------------|--|
| <b>Survey Program</b>  | <b>Date</b>          | 9/22/2015                |                     |                                               |  |
| <b>From<br/>(usft)</b> | <b>To<br/>(usft)</b> | <b>Survey (Wellbore)</b> | <b>Tool Name</b>    | <b>Description</b>                            |  |
| 141.0                  | 4,950.0              | Survey #1 (ST00)         | MWD+HDGM+AX+SAG_B01 | OWSG MWD + HDGM + Axial Corr + Sag Correction |  |

|                                      |                            |                        |                                      |                         |                         |                                        |                                       |                                    |                                  |
|--------------------------------------|----------------------------|------------------------|--------------------------------------|-------------------------|-------------------------|----------------------------------------|---------------------------------------|------------------------------------|----------------------------------|
| <b>Survey</b>                        |                            |                        |                                      |                         |                         |                                        |                                       |                                    |                                  |
| <b>Measured<br/>Depth<br/>(usft)</b> | <b>Inclination<br/>(°)</b> | <b>Azimuth<br/>(°)</b> | <b>Vertical<br/>Depth<br/>(usft)</b> | <b>+N/-S<br/>(usft)</b> | <b>+E/-W<br/>(usft)</b> | <b>Vertical<br/>Section<br/>(usft)</b> | <b>Dogleg<br/>Rate<br/>(°/100usf)</b> | <b>Build<br/>Rate<br/>(°/100u)</b> | <b>Formations /<br/>Comments</b> |
| 0.0                                  | 0.00                       | 0.00                   | 0.0                                  | 0.0                     | 0.0                     | 0.0                                    | 0.00                                  | 0.00                               |                                  |
| 141.0                                | 0.10                       | 219.40                 | 141.0                                | -0.1                    | -0.1                    | 0.0                                    | 0.07                                  | 0.07                               |                                  |
| 292.0                                | 1.10                       | 98.10                  | 292.0                                | -0.4                    | 1.3                     | 1.3                                    | 0.76                                  | 0.66                               |                                  |
| 445.0                                | 2.90                       | 99.00                  | 444.9                                | -1.2                    | 6.6                     | 6.6                                    | 1.18                                  | 1.18                               |                                  |
| 624.0                                | 5.10                       | 99.80                  | 623.4                                | -3.3                    | 18.9                    | 18.9                                   | 1.23                                  | 1.23                               |                                  |
| 804.0                                | 6.80                       | 111.50                 | 802.5                                | -8.5                    | 36.7                    | 37.4                                   | 1.16                                  | 0.94                               |                                  |
| 984.0                                | 10.80                      | 110.50                 | 980.3                                | -18.4                   | 62.4                    | 65.0                                   | 2.22                                  | 2.22                               |                                  |
| 1,164.0                              | 16.60                      | 107.40                 | 1,155.1                              | -32.0                   | 102.8                   | 107.5                                  | 3.25                                  | 3.22                               |                                  |
| 1,343.0                              | 16.70                      | 110.60                 | 1,326.6                              | -48.7                   | 151.2                   | 158.8                                  | 0.52                                  | 0.06                               |                                  |
| 1,523.0                              | 18.80                      | 113.70                 | 1,498.1                              | -69.4                   | 202.0                   | 213.6                                  | 1.28                                  | 1.17                               |                                  |
| 1,547.0                              | 18.50                      | 113.60                 | 1,520.8                              | -72.5                   | 209.0                   | 221.2                                  | 1.26                                  | -1.25                              |                                  |
| 1,651.0                              | 17.70                      | 115.10                 | 1,619.6                              | -85.8                   | 238.5                   | 253.4                                  | 0.89                                  | -0.77                              |                                  |
| 1,831.0                              | 20.70                      | 105.60                 | 1,789.7                              | -106.0                  | 293.9                   | 312.4                                  | 2.40                                  | 1.67                               |                                  |

# Cathedral Energy Services

## Survey Report

**Company:** OXY USA PERMIAN EOR  
**Project:** HOBBS, SOUTH  
**Site:** SOUTH HOBBS GRAYBURG-SA UNIT  
**Well:** SHU (G/SA) 259  
**Wellbore:** ST00  
**Design:** Final

**Local Co-ordinate Reference:** Well SHU (G/SA) 259  
**TVD Reference:** Original KB @ 3628.5usft (H&P 340 - KB - 16.5)  
**MD Reference:** Original KB @ 3628.5usft (H&P 340 - KB - 16.5)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** USA EDM 5000 Multi Users DB

### Survey

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usf) | Build<br>Rate<br>(°/100u) | Formations /<br>Comments   |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|------------------------------|---------------------------|----------------------------|
| 2,011.0                     | 25.00              | 107.40         | 1,955.5                     | -125.9          | 360.9           | 382.2                         | 2.42                         | 2.39                      |                            |
| 2,190.0                     | 29.60              | 106.60         | 2,114.5                     | -149.9          | 439.4           | 464.2                         | 2.58                         | 2.57                      |                            |
| 2,370.0                     | 30.50              | 105.40         | 2,270.3                     | -174.7          | 526.0           | 554.2                         | 0.60                         | 0.50                      |                            |
| 2,550.0                     | 34.50              | 111.60         | 2,422.1                     | -205.6          | 617.5           | 650.8                         | 2.89                         | 2.22                      |                            |
| 2,730.0                     | 35.20              | 104.00         | 2,569.9                     | -237.0          | 715.3           | 753.4                         | 2.44                         | 0.39                      |                            |
| 2,910.0                     | 35.60              | 106.10         | 2,716.7                     | -264.0          | 816.0           | 857.4                         | 0.71                         | 0.22                      |                            |
| 3,090.0                     | 33.90              | 108.50         | 2,864.6                     | -294.5          | 913.9           | 959.9                         | 1.21                         | -0.94                     |                            |
| 3,270.0                     | 35.50              | 108.90         | 3,012.5                     | -327.4          | 1,011.0         | 1,062.4                       | 0.90                         | 0.89                      |                            |
| 3,450.0                     | 32.70              | 107.50         | 3,161.6                     | -358.9          | 1,106.8         | 1,163.3                       | 1.62                         | -1.56                     |                            |
| 3,630.0                     | 31.80              | 110.50         | 3,313.8                     | -390.1          | 1,197.6         | 1,259.3                       | 1.02                         | -0.50                     |                            |
| 3,809.0                     | 31.00              | 113.50         | 3,466.6                     | -425.0          | 1,284.1         | 1,352.4                       | 0.98                         | -0.45                     |                            |
| 3,989.0                     | 33.40              | 110.50         | 3,618.9                     | -460.9          | 1,373.0         | 1,448.2                       | 1.60                         | 1.33                      |                            |
| 4,169.0                     | 37.60              | 110.70         | 3,765.4                     | -497.7          | 1,470.8         | 1,552.7                       | 2.33                         | 2.33                      |                            |
| 4,349.0                     | 37.50              | 110.50         | 3,908.1                     | -536.3          | 1,573.5         | 1,662.3                       | 0.09                         | -0.06                     |                            |
| 4,529.0                     | 30.00              | 117.10         | 4,057.7                     | -576.0          | 1,665.1         | 1,761.9                       | 4.63                         | -4.17                     |                            |
| 4,709.0                     | 31.90              | 117.00         | 4,212.1                     | -618.1          | 1,747.5         | 1,853.6                       | 1.06                         | 1.06                      |                            |
| 4,882.0                     | 34.40              | 116.80         | 4,356.9                     | -660.9          | 1,831.9         | 1,947.3                       | 1.45                         | 1.45                      | Last CES Survey @ 4882' MD |
| 4,950.0                     | 34.40              | 116.80         | 4,413.0                     | -678.2          | 1,866.2         | 1,985.4                       | 0.00                         | 0.00                      | PTB @ 4950' MD             |

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|                  |                              |                                     |                                                |
|------------------|------------------------------|-------------------------------------|------------------------------------------------|
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| <b>Well:</b>     | SHU (G/SA) 259               | <b>North Reference:</b>             | Grid                                           |
| <b>Wellbore:</b> | ST00                         | <b>Survey Calculation Method:</b>   | Minimum Curvature                              |
| <b>Design:</b>   | Final                        | <b>Database:</b>                    | USA EDM 5000 Multi Users DB                    |

### Targets

| Target Name                                                                                          | Dip Angle | Dip Dir. | TVD     | +N/-S  | +E/-W   | Northing   | Easting    | Latitude  | Longitude   |
|------------------------------------------------------------------------------------------------------|-----------|----------|---------|--------|---------|------------|------------|-----------|-------------|
| - hit/miss target                                                                                    | (°)       | (°)      | (usft)  | (usft) | (usft)  | (usft)     | (usft)     |           |             |
| - Shape                                                                                              |           |          |         |        |         |            |            |           |             |
| SHU (G/SA) 259 BHL TC                                                                                | 0.00      | 0.00     | 4,059.0 | -612.8 | 1,754.2 | 615,270.36 | 867,020.86 | 32.685805 | -103.140447 |
| - actual wellpath misses target center by 82.7usft at 4579.5usft MD (4101.4 TVD, -587.6 N, 1687.7 E) |           |          |         |        |         |            |            |           |             |
| - Circle (radius 100.0)                                                                              |           |          |         |        |         |            |            |           |             |

### Formations

| Measured Depth | Vertical Depth | Name           | Lithology | Dip | Dip Direction |
|----------------|----------------|----------------|-----------|-----|---------------|
| (usft)         | (usft)         |                |           | (°) | (°)           |
| 203.5          | 203.5          | Red Beds       |           |     |               |
| 1,581.5        | 1,553.5        | Rustler        |           |     |               |
| 1,697.1        | 1,663.5        | Top Salt       |           |     |               |
| 2,924.6        | 2,728.5        | Base Salt      |           |     |               |
| 3,811.2        | 3,468.5        | Queen          |           |     |               |
| 4,172.9        | 3,768.5        | Grayburg       |           |     |               |
| 4,417.5        | 3,963.5        | Basal Grayburg |           |     |               |
| 4,529.9        | 4,058.5        | San Andres     |           |     |               |

### Design Annotations

| Measured Depth | Vertical Depth | Local Coordinates |              | Comment                    |
|----------------|----------------|-------------------|--------------|----------------------------|
| (usft)         | (usft)         | +N/-S (usft)      | +E/-W (usft) |                            |
| 4,882.0        | 4,356.9        | -660.9            | 1,831.9      | Last CES Survey @ 4882' MD |
| 4,950.0        | 4,413.0        | -678.2            | 1,866.2      | PTB @ 4950' MD             |

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_