



Project: HOBBS, SOUTH
Site: SOUTH HOBBS GRAYBURG-SA UNIT
Well: SHU (G/SA) 256
Wellbore: ST00
Design: Plan #5 (09.04.15 AT)
Rig: H&P 340 - KB - 16.5

30-025-42647

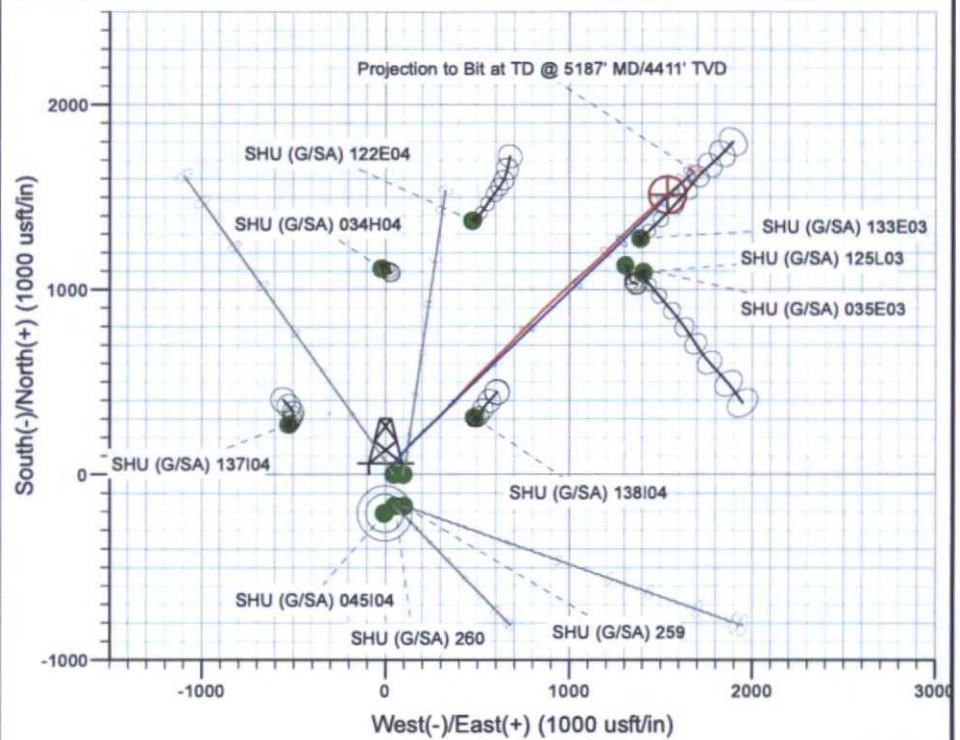
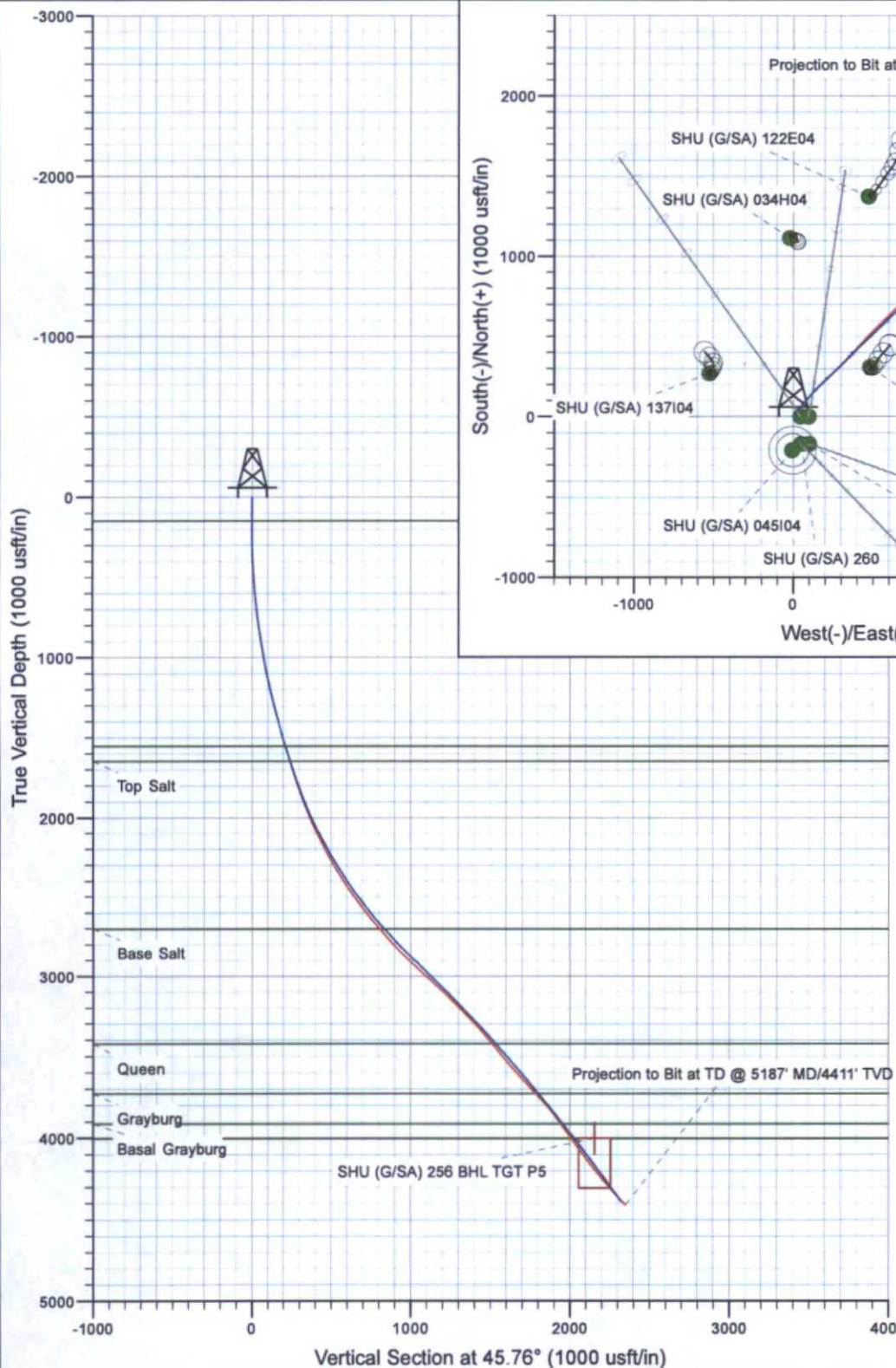
HOBBS OCD

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Azimuths to Grid North
True North: -0.64°
Magnetic North: 6.44°

Magnetic Field
Strength: 48525.3snT
Dip Angle: 80.80°
Date: 9/4/2015
Model: HDGM

DEC 21 2015

Cathedral Energy Services

Survey Report

Company:	OXY USA PERMIAN EOR	Local Co-ordinate Reference:	Well SHU (G/SA) 256
Project:	HOBBS, SOUTH	TVD Reference:	Original KB @ 3628.7usft (H&P 340 - KB - 16.5)
Site:	SOUTH HOBBS GRAYBURG-SA UNIT	MD Reference:	Original KB @ 3628.7usft (H&P 340 - KB - 16.5)
Well:	SHU (G/SA) 256	North Reference:	Grid
Wellbore:	ST00	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Project	HOBBS, SOUTH, North America, HOBBS, SOUTH - ALTURA HOBBS-OP		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	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) 256					
Well Position	+N/-S	0.0 usft	Northing:	616,052.21 usft	Latitude:	32.688011
	+E/-W	0.0 usft	Easting:	865,164.97 usft	Longitude:	-103.146449
Position Uncertainty		1.0 usft	Wellhead Elevation:	3,612.2 usft	Ground Level:	3,612.2 usft

Wellbore	ST00				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/4/2015	7.08	60.80	48,525

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	1,599.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	45.76	

Survey Program	Date	9/7/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
140.0	1,599.0	Surface (Surface)	MWD+HDGM+AX+SAG_B0(	OWSG MWD + HDGM + Axial Corr + Sag Correction	
1,654.0	5,187.0	Survey #1 (ST00)	MWD+HDGM+AX+SAG_B0(	OWSG MWD + HDGM + Axial Corr + Sag Correction	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
140.0	0.20	105.00	140.0	-0.1	0.2	0.1	0.14	0.14	
294.0	1.10	40.20	294.0	1.0	1.4	1.7	0.67	0.58	
446.0	3.10	27.70	445.9	5.8	4.3	7.1	1.34	1.32	
626.0	5.80	37.10	625.3	17.3	12.1	20.7	1.55	1.50	
806.0	8.30	39.40	803.9	34.6	25.8	42.6	1.40	1.39	
985.0	9.80	42.90	980.7	55.8	44.4	70.7	0.89	0.84	
1,165.0	12.30	40.20	1,157.4	81.6	67.2	105.1	1.42	1.39	
1,344.0	15.30	39.30	1,331.2	114.5	94.4	147.5	1.68	1.68	
1,530.0	17.60	45.10	1,509.6	153.3	129.9	200.0	1.52	1.24	
1,599.0	17.60	45.10	1,575.3	168.0	144.7	220.9	0.00	0.00	Last surface survey @ 1599' MD/1575' TVD
1,654.0	17.10	45.80	1,627.8	179.6	156.4	237.3	0.99	-0.91	

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Well:	SHU (G/SA) 256	North Reference:	Grid
Wellbore:	ST00	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,833.0	18.80	46.50	1,798.1	217.8	196.2	292.5	0.96	0.95	
2,013.0	22.30	46.40	1,966.6	261.3	241.9	355.6	1.94	1.94	
2,193.0	25.60	46.20	2,131.1	311.8	294.8	428.7	1.83	1.83	
2,373.0	30.20	42.40	2,290.2	372.2	353.4	512.8	2.74	2.56	
2,553.0	34.20	41.60	2,442.4	443.4	417.5	608.5	2.23	2.22	
2,733.0	37.90	44.80	2,588.0	520.5	490.1	714.3	2.31	2.06	
2,913.0	40.80	46.20	2,727.1	600.5	571.5	828.4	1.88	1.81	
3,093.0	44.70	43.80	2,859.3	686.9	657.8	950.5	2.35	2.17	
3,273.0	48.10	44.40	2,983.4	780.5	748.5	1,080.8	1.90	1.89	
3,453.0	46.20	46.00	3,105.8	873.5	842.1	1,212.7	1.24	-1.06	
3,633.0	44.00	47.10	3,232.9	961.2	934.7	1,340.2	1.30	-1.22	
3,813.0	41.50	48.10	3,365.1	1,043.6	1,024.9	1,462.3	1.44	-1.39	
3,992.0	39.40	48.60	3,501.3	1,120.8	1,111.6	1,578.3	1.19	-1.17	
4,173.0	44.20	45.10	3,636.2	1,203.4	1,199.5	1,698.9	2.95	2.65	
4,352.0	43.30	45.60	3,765.5	1,290.3	1,287.5	1,822.7	0.54	-0.50	
4,532.0	36.20	48.20	3,903.8	1,369.1	1,371.4	1,937.6	4.05	-3.94	
4,712.0	36.30	48.00	4,048.9	1,440.1	1,450.6	2,044.0	0.09	0.06	
4,892.0	39.20	49.30	4,191.3	1,512.9	1,533.3	2,154.0	1.67	1.61	
5,072.0	42.80	50.80	4,327.1	1,588.7	1,623.9	2,271.8	2.07	2.00	
5,118.0	43.70	51.10	4,360.6	1,608.5	1,648.4	2,303.2	2.01	1.96	
5,187.0	43.70	51.10	4,410.5	1,638.5	1,685.5	2,350.6	0.00	0.00	Projection to Bit at TD @ 5187' MD/4411' TVD

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHU (G/SA) 256 BHL TC	0.00	0.00	4,004.0	1,513.3	1,537.4	617,565.57	866,702.46	32.692122	-103.141398
- actual wellpath misses target center by 118.0usft at 4745.9usft MD (4076.2 TVD, 1453.6 N, 1465.7 E)									
- Circle (radius 100.0)									
SHU (G/SA) 256 BHL TC	0.00	0.00	4,004.0	1,473.7	-994.7	617,525.97	864,170.19	32.692092	-103.149628
- actual wellpath misses target center by 2130.7usft at 3418.6usft MD (3082.1 TVD, 856.2 N, 824.3 E)									
- Circle (radius 0.0)									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,599.0	1,575.3	168.0	144.7	Last surface survey @ 1599' MD/1575' TVD
5,187.0	4,410.5	1,638.5	1,685.5	Projection to Bit at TD @ 5187' MD/4411' TVD

Checked By: _____ Approved By: _____ Date: _____