



**Scientific Drilling**

# **Orca Operating Company**

**McPherson County Kansas**

**Section 36-19S-1W**

**Alfred 1-36H**

**Sump Hole**

**Survey: Survey #1 MWD**

## **Survey Completion Report**

**13 October, 2010**



**Scientific Drilling**

<b>Company:</b> Orca Operating Company	<b>Local Co-ordinate Reference:</b> Well Alfred 1-36H
<b>Project:</b> McPherson County Kansas	<b>TVD Reference:</b> 1-36H @ 1582.0usft
<b>Site:</b> Section 36-19S-1W	<b>MD Reference:</b> 1-36H @ 1582.0usft
<b>Well:</b> Alfred 1-36H	<b>North Reference:</b> True
<b>Wellbore:</b> Sump Hole	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Sump Hole	<b>Database:</b> EDMOKC

<b>Project</b> McPherson County Kansas, McPherson County, South Central Kansas			
<b>Map System:</b> US State Plane 1983	<b>System Datum:</b> Mean Sea Level		
<b>Geo Datum:</b> North American Datum 1983			
<b>Map Zone:</b> Kansas Southern Zone			

<b>Site</b> Section 36-19S-1W			
<b>Site Position:</b>	<b>Northing:</b> 1,931,663.88 usft	<b>Latitude:</b>	38° 21' 44.339 N
<b>From:</b> Lat/Long	<b>Easting:</b> 1,630,558.55 usft	<b>Longitude:</b>	97° 23' 24.477 W
<b>Position Uncertainty:</b> 0.0 usft	<b>Slot Radius:</b> 0"	<b>Grid Convergence:</b>	0.68 °

<b>Well</b> Alfred 1-36H, Mississippi			
<b>Well Position</b>	<b>+N/-S</b> 0.0 usft	<b>Northing:</b> 1,931,663.88 usft	<b>Latitude:</b> 38° 21' 44.339 N
	<b>+E/-W</b> 0.0 usft	<b>Easting:</b> 1,630,558.55 usft	<b>Longitude:</b> 97° 23' 24.477 W
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b> 1,582.0 usft	<b>Ground Level:</b> 1,566.0 usft

<b>Wellbore</b> Sump Hole					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	04/07/10	4.45	66.47	52,823

<b>Design</b> Sump Hole				
<b>Audit Notes:</b>				
<b>Version:</b> 1.0	<b>Phase:</b> ACTUAL	<b>Tie On Depth:</b> 0.0		
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	155.00

<b>Survey Program</b>		<b>Date</b> 10/02/10
From (usft)	To (usft)	Survey (Wellbore)
496.0	3,530.0	Survey #1 MWD (Sump Hole)
Tool Name	Description	
MWD	MWD - Standard	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00
496.0	1.36	114.80	496.0	-2.5	5.3	4.5	0.27
752.0	1.00	112.61	751.9	-4.6	10.2	8.5	0.14
1,007.0	0.47	113.99	1,006.9	-5.9	13.2	10.9	0.21
1,263.0	0.57	123.91	1,262.9	-7.0	15.2	12.8	0.05
1,519.0	0.17	137.87	1,518.9	-8.0	16.5	14.2	0.16
1,769.0	0.24	333.51	1,768.9	-7.8	16.5	14.1	0.16
1,871.0	0.18	183.48	1,870.9	-7.8	16.4	14.0	0.40
1,901.0	0.38	143.93	1,900.9	-7.9	16.5	14.1	0.89
1,930.0	0.50	171.82	1,929.9	-8.1	16.5	14.3	0.83
1,959.0	1.20	154.35	1,958.9	-8.5	16.7	14.8	2.55
1,989.0	3.04	167.03	1,988.8	-9.6	17.0	15.9	6.29

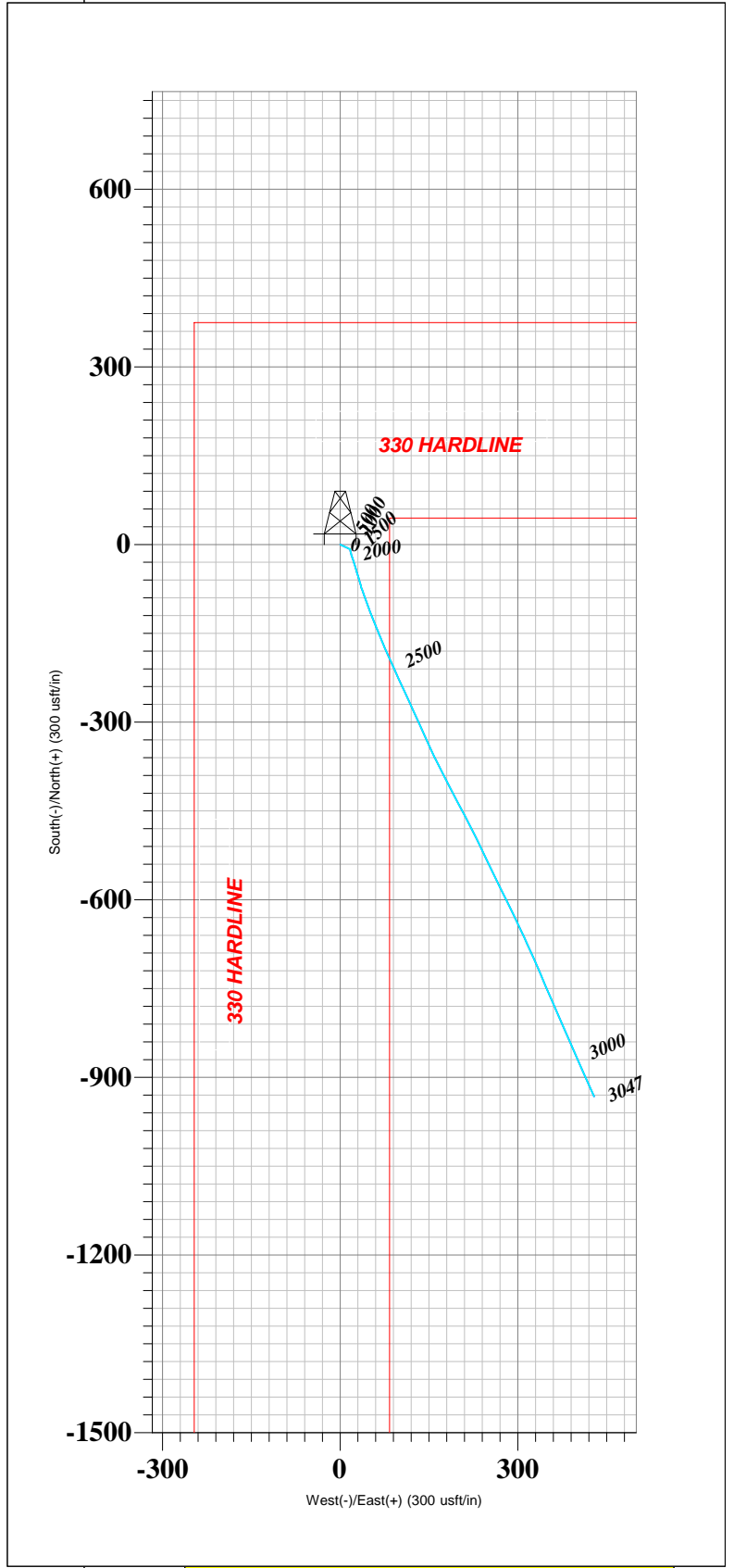
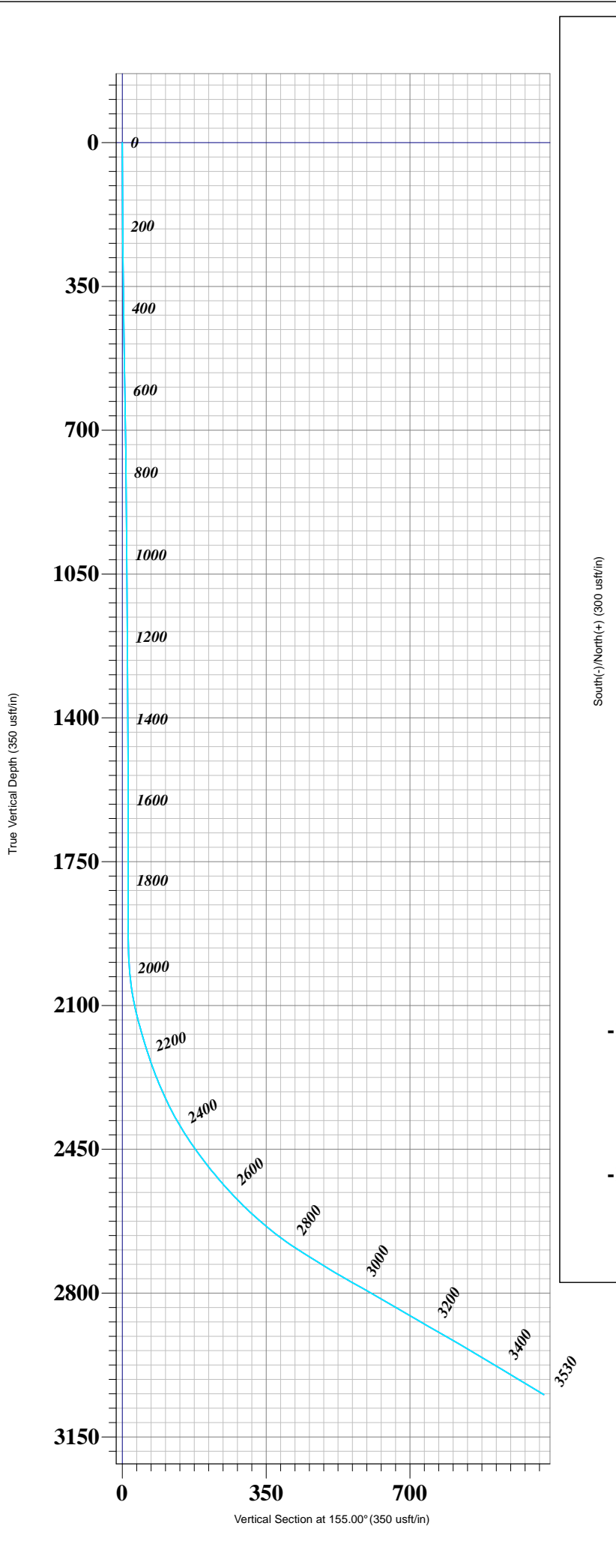
<b>Company:</b>	Orca Operating Company	<b>Local Co-ordinate Reference:</b>	Well Alfred 1-36H
<b>Project:</b>	McPherson County Kansas	<b>TVD Reference:</b>	1-36H @ 1582.0usft
<b>Site:</b>	Section 36-19S-1W	<b>MD Reference:</b>	1-36H @ 1582.0usft
<b>Well:</b>	Alfred 1-36H	<b>North Reference:</b>	True
<b>Wellbore:</b>	Sump Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Sump Hole	<b>Database:</b>	EDMOKC

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
2,019.0	5.15	167.68	2,018.8	-11.7	17.5	18.0	7.03	
2,049.0	7.40	165.65	2,048.6	-14.9	18.2	21.2	7.54	
2,079.0	10.30	161.79	2,078.2	-19.3	19.6	25.7	9.86	
2,108.0	12.57	160.50	2,106.6	-24.7	21.4	31.4	7.88	
2,139.0	14.64	162.54	2,136.8	-31.6	23.7	38.7	6.85	
2,170.0	16.31	163.77	2,166.6	-39.5	26.1	46.9	5.49	
2,197.0	17.18	162.62	2,192.5	-47.0	28.4	54.6	3.45	
2,228.0	18.77	163.68	2,222.0	-56.1	31.1	64.0	5.24	
2,258.0	19.99	164.98	2,250.3	-65.7	33.8	73.9	4.31	
2,289.0	21.94	160.65	2,279.2	-76.3	37.1	84.9	8.03	
2,320.0	24.23	160.54	2,307.7	-87.8	41.1	96.9	7.39	
2,351.0	25.72	160.13	2,335.8	-100.1	45.6	110.0	4.84	
2,381.0	27.83	159.04	2,362.6	-112.8	50.3	123.4	7.22	
2,410.0	30.36	157.86	2,388.0	-125.9	55.5	137.5	8.95	
2,441.0	32.91	158.56	2,414.4	-141.0	61.5	153.8	8.31	
2,471.0	34.84	157.39	2,439.3	-156.5	67.8	170.5	6.79	
2,503.0	36.76	156.30	2,465.2	-173.7	75.1	189.2	6.32	
2,533.0	37.84	155.73	2,489.1	-190.3	82.5	207.3	3.78	
2,564.0	39.77	156.12	2,513.2	-208.0	90.4	226.8	6.28	
2,595.0	41.93	155.30	2,536.7	-226.5	98.8	247.0	7.18	
2,624.0	42.61	155.44	2,558.1	-244.2	106.9	266.5	2.37	
2,655.0	45.01	155.51	2,580.5	-263.8	115.8	288.0	7.74	
2,686.0	47.28	155.47	2,602.0	-284.1	125.1	310.4	7.32	
2,715.0	48.65	155.27	2,621.4	-303.7	134.1	331.9	4.75	
2,746.0	50.41	155.85	2,641.5	-325.2	143.8	355.5	5.85	
2,773.0	52.57	155.39	2,658.3	-344.4	152.5	376.6	8.11	
2,802.0	54.76	153.40	2,675.5	-365.5	162.6	400.0	9.36	
2,833.0	57.07	152.85	2,692.9	-388.4	174.3	425.6	7.60	
2,863.0	58.32	152.53	2,708.9	-410.9	185.9	450.9	4.26	
2,895.0	58.07	152.34	2,725.8	-435.0	198.5	478.1	0.93	
2,926.0	58.61	152.37	2,742.1	-458.4	210.7	504.5	1.74	
2,958.0	60.14	153.19	2,758.4	-482.9	223.3	532.0	5.27	
2,988.0	60.54	154.27	2,773.2	-506.2	234.8	558.0	3.40	
3,019.0	60.42	154.34	2,788.5	-530.5	246.5	585.0	0.43	
3,050.0	60.20	154.04	2,803.8	-554.8	258.3	611.9	1.10	
3,082.0	60.04	153.84	2,819.8	-579.7	270.5	639.7	0.74	
3,112.0	59.97	153.59	2,834.8	-603.0	282.0	665.7	0.76	
3,143.0	59.68	154.48	2,850.4	-627.1	293.7	692.5	2.65	
3,174.0	59.93	154.56	2,866.0	-651.3	305.2	719.3	0.84	
3,203.0	60.03	155.87	2,880.5	-674.1	315.7	744.4	3.93	
3,233.0	60.49	156.02	2,895.3	-697.9	326.4	770.4	1.59	
3,264.0	60.23	156.95	2,910.7	-722.6	337.1	797.3	2.74	
3,293.0	59.35	156.68	2,925.3	-745.6	347.0	822.4	3.14	
3,323.0	59.27	156.55	2,940.6	-769.3	357.2	848.2	0.46	

<b>Company:</b> Orca Operating Company	<b>Local Co-ordinate Reference:</b> Well Alfred 1-36H
<b>Project:</b> McPherson County Kansas	<b>TVD Reference:</b> 1-36H @ 1582.0usft
<b>Site:</b> Section 36-19S-1W	<b>MD Reference:</b> 1-36H @ 1582.0usft
<b>Well:</b> Alfred 1-36H	<b>North Reference:</b> True
<b>Wellbore:</b> Sump Hole	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Sump Hole	<b>Database:</b> EDMOKC

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
3,354.0	59.26	156.48	2,956.4	-793.7	367.8	874.8	0.20	
3,386.0	59.00	156.34	2,972.8	-818.9	378.8	902.3	0.90	
3,418.0	59.02	156.34	2,989.3	-844.0	389.8	929.7	0.06	
3,450.0	58.91	156.07	3,005.8	-869.1	400.9	957.1	0.80	
3,482.0	59.20	156.20	3,022.3	-894.2	412.0	984.6	0.97	
3,530.0	59.20	156.20	3,046.8	-931.9	428.6	1,025.8	0.00	

Checked By: _____	Approved By: _____	Date: _____
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**Vertical Section Azimuth**  
155.00

Survey: Survey #1 MWD (Alfred 1-36H/Sump Hole)  
 Created By: Genie Lightfoot Date: 9:50, October 13 2010

WELL DETAILS: Alfred 1-36H						
Ground Level: 1566.0						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1931962.88	1630538.55	38° 21' 44.339" N	97° 23' 24.477" W	

**Sump Hole**  
 Bottom Hole From Surface  
 3046.8' TVD 931.9' S & 428.6' E  
 3530.0' MD 1025.8' VS @ 155.00 Az.