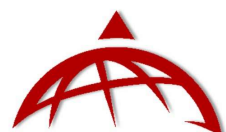




**Anglian Oil Company Ltd.
Northern Lights, AA Pad, AA16, Slot 09, Run #4**

**Job No. AB-CD-12345678
Survey Date: 23 September 2017**

**True North Directional Services Inc.
Survey Uncertainty Report**



True North
Directional Services Inc.



True North Directional Services Inc.

Survey Uncertainty Report



Database:	Example Project Database	Local Coordinate Reference:	Well AA16
Company:	Anglian Oil Company Ltd.	TVD Reference:	WELL @ 2,065.65ft (Well Elev.)
Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Project	Northern Lights		
Map System:	Universal Transverse Mercator	System Datum:	Mean Sea Level
Geo Datum:			
Map Zone:	Zone 12 North		

Site	AA Pad				
Site Position:		Northing (m):	6,789,358.01 N	Latitude:	61° 14' 01.1642" N
From:	Map	Easting (m):	572,458.01 E	Longitude:	109° 39' 01.3541" W
Position Uncertainty:	16.40ft	Slot Radius:	0in	Grid Convergence:	1.18°

Well	AA16					
Well Position:	+N/-S	-91.21ft	Northing (m):	6,789,330.21 N	Latitude:	61° 14' 00.2426" N
	+E/-W	114.93ft	Easting (m):	572,493.04 E	Longitude:	109° 38' 59.0443" W
Position Uncertainty:		0.83ft	Wellhead Elevation:	2,065.65ft	Ground Level:	2,060.40ft

Wellbore	Lateral #1			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF 2025	19/09/2017	13.58	80.73	58,568.4

Survey	Run #4			
Audit Notes:				
Version:	AB-CD-12345678	Phase:	Tie On Depth:	3,926.69ft

Vertical Section:	Depth from TVD (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	86.00

Survey Program		17/11/2025			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	981.26	Run #1	GYRO-NS	OWSG Gyrocompass Gyro	
981.26	2,508.28	Run #2	MWD	MWD	
2,508.28	3,926.69	Run #3	MWD	MWD	
3,926.69	5,371.72	Run #4	MWD+IFR1+FDIR	MWD+IFR1+FDIR	

Position Uncertainty										
Measured Depth (ft)	Incl. (°)	Az. (°)	Vertical Depth (ft)	Ellipsoid +N/-S (ft)	Ellipsoid +E/-W (ft)	Vertical Section (ft)	Vertical 1/2 Axis (ft)	Minor 1/2 Axis (ft)	Major 1/2 Axis (ft)	Major Axis Azim. (°)
Run #1										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.83	0.00
36.09	0.22	120.07	36.09	-0.03	0.06	0.06	2.23	0.92	0.95	120.07
66.67	0.17	210.70	66.67	-0.10	0.09	0.08	2.26	0.98	1.02	160.60
96.11	0.22	129.57	96.11	-0.18	0.11	0.10	2.28	1.03	1.05	158.24
126.29	0.50	99.70	126.29	-0.24	0.28	0.27	2.30	1.13	1.16	173.61
155.36	0.16	271.07	155.36	-0.26	0.37	0.35	2.32	1.13	1.16	167.02
185.42	0.00	285.70	185.42	-0.26	0.32	0.30	2.35	1.23	1.26	167.12
216.99	0.09	77.62	216.99	-0.25	0.35	0.33	2.37	1.24	1.26	167.54
244.51	0.20	96.45	244.51	-0.25	0.41	0.39	2.39	1.33	1.35	168.54
276.98	0.32	254.18	276.98	-0.28	0.38	0.36	2.42	1.35	1.36	167.19
307.18	0.08	200.31	307.18	-0.33	0.29	0.27	2.44	1.43	1.45	13.11



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Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Position Uncertainty										
Measured Depth (ft)	Incl. (°)	Az. (°)	Vertical Depth (ft)	Ellipsoid +N/-S (ft)	Ellipsoid +E/-W (ft)	Vertical Section (ft)	Vertical 1/2 Axis (ft)	Minor 1/2 Axis (ft)	Major 1/2 Axis (ft)	Major Axis Azim. (°)
336.85	0.04	237.93	336.85	-0.35	0.27	0.25	2.47	1.52	1.53	13.30
364.69	0.31	263.01	364.69	-0.36	0.19	0.16	2.49	1.61	1.63	10.12
395.92	0.04	187.97	395.92	-0.39	0.10	0.08	2.52	1.68	1.69	9.26
427.42	0.07	34.51	427.41	-0.38	0.11	0.09	2.54	1.68	1.69	9.41
457.20	0.01	172.63	457.20	-0.37	0.12	0.10	2.57	1.69	1.71	9.37
485.85	0.27	203.05	485.85	-0.43	0.10	0.07	2.59	1.79	1.80	5.93
517.80	0.12	55.45	517.80	-0.48	0.10	0.06	2.62	1.80	1.81	9.23
547.52	0.01	1.28	547.52	-0.46	0.12	0.09	2.64	1.88	1.89	8.21
574.87	0.18	196.73	574.87	-0.50	0.11	0.07	2.67	1.88	1.89	7.44
591.40	0.39	141.52	591.40	-0.57	0.14	0.10	2.70	1.93	1.94	15.47
619.50	0.13	279.76	619.50	-0.64	0.16	0.12	2.72	1.94	1.95	11.52
650.05	0.20	145.16	650.05	-0.68	0.16	0.11	2.75	1.96	1.97	9.21
680.86	0.21	266.64	680.86	-0.72	0.13	0.08	2.78	1.98	1.99	11.16
708.54	0.35	227.15	708.54	-0.78	0.02	-0.03	2.81	2.07	2.08	6.56
740.33	0.03	72.73	740.33	-0.85	-0.04	-0.10	2.84	2.07	2.08	10.27
769.94	0.28	112.69	769.94	-0.87	0.03	-0.03	2.86	2.16	2.17	9.69
799.40	1.08	92.72	799.40	-0.91	0.38	0.31	2.89	2.26	2.29	6.98
830.49	2.74	116.33	830.46	-1.26	1.34	1.25	2.92	2.38	2.53	20.20
860.59	4.70	105.57	860.50	-1.91	3.17	3.03	2.94	2.51	2.94	19.72
889.35	6.74	105.41	889.12	-2.67	5.93	5.73	2.97	2.65	3.45	15.36
919.42	8.89	105.63	918.91	-3.77	9.87	9.58	2.99	2.83	4.01	15.48
951.24	11.25	107.50	950.24	-5.36	15.20	14.79	3.47	3.06	4.64	16.69
981.26	14.00	112.80	979.53	-7.65	21.34	20.76	4.26	3.36	5.35	20.72

Run #2

1,007.79	17.10	120.53	1,005.09	-10.88	27.66	26.83	5.10	3.59	6.69	27.78
1,037.57	19.54	125.54	1,033.35	-16.00	35.48	34.28	5.73	3.67	7.36	33.20
1,052.50	20.91	126.01	1,047.37	-19.11	39.78	38.25	6.07	3.72	7.69	34.58
1,065.34	22.08	126.37	1,059.31	-21.79	43.47	41.84	6.36	3.77	7.97	35.76
1,096.90	25.14	128.42	1,088.22	-29.48	53.50	51.31	7.07	3.94	8.65	37.21
1,116.99	26.96	129.90	1,106.28	-35.20	60.42	57.74	7.44	4.11	9.11	38.58
1,127.85	27.95	130.62	1,115.91	-38.29	64.16	61.33	7.64	4.20	9.36	39.32
1,155.46	30.67	131.45	1,139.98	-47.16	74.34	70.87	8.15	4.51	10.03	40.85
1,178.80	32.62	132.67	1,159.86	-55.48	83.49	79.37	8.46	4.83	10.51	41.82
1,186.43	33.27	133.03	1,166.26	-58.19	86.48	82.21	8.57	4.94	10.66	42.14
1,215.04	35.83	132.94	1,189.82	-69.25	98.35	93.28	8.93	5.41	11.26	42.95
1,239.29	37.69	132.85	1,209.25	-79.21	109.06	103.19	9.15	5.88	11.69	42.91
1,247.99	38.36	132.82	1,216.10	-82.78	112.91	106.86	9.23	6.05	11.85	42.89
1,276.95	40.91	132.87	1,238.40	-95.34	126.45	119.49	9.48	6.69	12.41	42.90
1,303.58	42.91	133.12	1,258.22	-107.48	139.47	131.62	9.61	7.34	12.89	43.12
1,304.81	43.01	133.13	1,259.12	-108.04	140.07	132.19	9.62	7.37	12.91	43.12
1,312.33	43.56	133.17	1,264.60	-111.63	143.89	135.70	9.66	7.57	13.02	43.20
1,336.66	45.36	133.29	1,281.96	-123.24	156.25	147.27	9.77	8.21	13.37	43.45
1,365.12	47.88	133.28	1,301.51	-137.42	171.31	161.30	9.87	9.03	13.86	43.62
1,382.26	49.20	133.09	1,312.85	-146.26	180.75	170.03	9.89	9.56	14.13	43.52
1,395.15	50.20	132.95	1,321.19	-152.91	187.86	176.73	9.90	9.95	14.33	43.44
1,427.45	53.25	132.13	1,341.20	-170.05	206.54	194.18	9.95	11.02	14.82	42.52
1,455.79	55.59	132.17	1,357.68	-185.52	223.63	210.14	9.84	12.02	15.29	41.72
1,485.02	57.95	132.55	1,373.70	-201.99	241.70	227.02	9.76	13.09	15.67	42.14
1,515.86	60.20	132.93	1,389.55	-219.95	261.13	245.15	9.64	14.26	16.03	43.46



True North Directional Services Inc.

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Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Position Uncertainty										
Measured Depth (ft)	Incl. (°)	Az. (°)	Vertical Depth (ft)	Ellipsoid +N/-S (ft)	Ellipsoid +E/-W (ft)	Vertical Section (ft)	Vertical 1/2 Axis (ft)	Minor 1/2 Axis (ft)	Major 1/2 Axis (ft)	Major Axis Azim. (°)
1,546.16	62.83	132.36	1,404.00	-237.99	280.72	263.43	9.52	15.46	16.38	43.68
1,575.92	65.58	132.78	1,416.94	-256.11	300.45	281.85	9.34	16.68	16.74	50.75
1,608.06	68.03	132.64	1,429.60	-276.14	322.16	302.11	9.14	17.05	18.05	131.09
1,638.18	70.05	132.94	1,440.37	-295.25	342.80	321.37	8.97	17.30	19.35	131.66
1,666.31	73.04	132.82	1,449.27	-313.40	362.34	339.60	8.81	17.54	20.60	131.81
1,695.92	75.28	132.82	1,457.36	-332.77	383.24	359.10	8.62	17.77	21.94	132.15
1,725.56	77.25	132.17	1,464.39	-352.21	404.47	378.91	8.51	17.93	23.30	132.59
1,755.58	80.09	132.69	1,470.29	-372.07	426.19	399.20	8.43	18.08	24.70	132.66
1,787.19	82.56	132.61	1,475.06	-393.24	449.17	420.65	8.36	18.22	26.18	132.46
1,807.46	82.36	132.65	1,477.72	-406.85	463.96	434.45	8.38	18.25	27.14	132.48
1,816.43	82.28	132.66	1,478.92	-412.87	470.50	440.55	8.39	18.27	27.56	132.49
1,846.46	82.69	132.40	1,482.84	-433.00	492.44	461.03	8.51	18.28	28.98	132.54
1,877.47	82.58	132.56	1,486.82	-453.77	515.11	482.21	8.63	18.29	30.45	132.56
1,906.22	82.51	132.31	1,490.55	-473.00	536.15	501.85	8.76	18.29	31.82	132.56
1,937.24	83.24	132.74	1,494.40	-493.81	558.84	523.03	8.88	18.31	33.30	132.54
1,965.87	82.97	131.27	1,497.84	-512.83	579.96	542.77	8.99	18.32	34.68	132.63
1,995.82	82.88	131.14	1,501.53	-532.41	602.32	563.71	9.14	18.32	36.13	132.78
2,027.14	82.68	132.14	1,505.46	-553.05	625.54	585.44	9.29	18.33	37.63	132.61
2,055.51	83.00	130.83	1,509.00	-571.70	646.63	605.17	9.42	18.33	39.01	132.56
2,086.77	82.55	131.36	1,512.93	-592.08	670.00	627.06	9.58	18.34	40.52	132.58
2,118.26	82.64	132.06	1,516.99	-612.86	693.31	648.87	9.74	18.34	42.04	132.42
2,146.16	82.69	131.00	1,520.55	-631.21	714.03	668.26	9.88	18.35	43.40	132.39
2,177.90	83.20	130.97	1,524.45	-651.86	737.81	690.54	10.02	18.37	44.94	132.42
2,206.59	82.36	130.29	1,528.05	-670.40	759.40	710.79	10.18	18.37	46.34	132.39
2,236.31	83.07	128.10	1,531.82	-689.03	782.26	732.29	10.34	18.35	47.81	132.43
2,268.40	83.01	125.89	1,535.71	-708.19	807.69	756.32	10.50	18.33	49.42	132.46
2,297.47	82.93	123.02	1,539.27	-724.52	831.48	778.92	10.66	18.26	50.90	132.44
2,327.48	83.10	120.55	1,542.92	-740.20	856.80	803.08	10.83	18.17	52.44	132.31
2,356.85	83.17	119.05	1,546.43	-754.69	882.10	827.31	10.99	18.10	53.94	132.06
2,385.78	83.76	115.59	1,549.73	-767.88	907.63	851.86	11.14	17.99	55.43	131.76
2,417.32	84.46	113.29	1,552.96	-780.86	936.19	879.44	11.29	17.85	57.06	131.37
2,447.78	84.25	110.91	1,555.96	-792.27	964.27	906.66	11.46	17.72	58.61	130.90
2,478.52	84.46	109.36	1,558.98	-802.80	992.99	934.57	11.65	17.60	60.16	130.37
2,508.28	85.34	106.12	1,561.63	-811.83	1,021.22	962.10	11.81	17.45	61.65	129.82

Run #3

2,514.84	85.07	105.81	1,562.18	-813.54	1,027.53	968.25	11.77	17.69	61.87	129.83
2,546.57	83.80	104.31	1,565.25	-821.83	1,058.00	998.09	11.61	18.83	62.94	129.87
2,577.84	84.23	101.70	1,568.51	-828.83	1,088.30	1,027.83	11.64	18.65	63.34	129.77
2,606.25	84.50	99.84	1,571.30	-834.11	1,116.08	1,055.17	11.63	18.49	63.73	129.64
2,624.67	84.56	99.00	1,573.06	-837.02	1,134.18	1,073.01	11.64	18.46	63.99	129.51
2,637.09	84.61	98.43	1,574.23	-838.99	1,146.39	1,085.07	11.64	18.44	64.16	129.43
2,666.52	85.25	95.37	1,576.83	-842.51	1,175.48	1,113.85	11.64	18.36	64.61	129.19
2,681.97	85.15	94.01	1,578.12	-843.59	1,190.84	1,129.07	11.65	18.30	64.87	129.04
2,696.57	85.06	92.72	1,579.37	-844.62	1,205.35	1,143.50	11.66	18.24	65.11	128.91
2,726.43	85.84	89.66	1,581.74	-845.24	1,235.10	1,173.13	11.68	18.17	65.61	128.57
2,756.09	86.50	87.97	1,583.72	-844.62	1,264.69	1,202.69	11.69	18.23	66.10	128.18
2,786.27	86.39	85.87	1,585.59	-843.01	1,294.77	1,232.81	11.72	18.40	66.59	127.73
2,815.86	87.09	82.89	1,587.27	-840.11	1,324.17	1,262.34	11.76	18.54	67.10	127.25
2,845.19	87.19	81.39	1,588.73	-836.11	1,353.19	1,291.57	11.80	18.77	67.59	126.74
2,875.80	87.30	77.72	1,590.21	-830.57	1,383.25	1,321.94	11.85	19.04	68.11	126.16



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Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Position Uncertainty										
Measured Depth (ft)	Incl. (°)	Az. (°)	Vertical Depth (ft)	Ellipsoid +N/-S (ft)	Ellipsoid +E/-W (ft)	Vertical Section (ft)	Vertical 1/2 Axis (ft)	Minor 1/2 Axis (ft)	Major 1/2 Axis (ft)	Major Axis Azim. (°)
2,898.68	87.70	75.78	1,591.20	-825.17	1,405.46	1,344.50	11.89	19.26	68.49	125.70
2,908.25	87.87	74.96	1,591.57	-822.91	1,414.75	1,353.90	11.90	19.35	68.66	125.50
2,935.25	87.96	73.07	1,592.56	-815.48	1,440.69	1,380.29	11.95	19.69	69.10	124.94
2,966.35	88.97	69.39	1,593.39	-805.48	1,470.12	1,410.35	12.01	20.14	69.58	124.25
2,996.28	89.33	67.20	1,593.83	-794.42	1,497.92	1,438.85	12.08	20.58	70.05	123.57
3,024.30	89.38	64.34	1,594.15	-782.86	1,523.45	1,465.15	12.15	21.07	70.44	122.91
3,026.72	89.38	64.09	1,594.18	-781.86	1,525.65	1,467.39	12.15	21.11	70.48	122.85
3,055.66	89.55	64.55	1,594.44	-769.33	1,551.73	1,494.28	12.23	21.75	70.87	122.20
3,086.70	89.58	65.98	1,594.68	-756.34	1,579.91	1,523.31	12.31	22.69	71.24	121.53
3,116.03	89.69	65.52	1,594.86	-744.29	1,606.66	1,550.82	12.39	23.53	71.61	120.88
3,147.26	90.20	65.16	1,594.89	-731.26	1,635.04	1,580.05	12.49	24.34	72.06	120.14
3,176.98	89.48	65.19	1,594.98	-718.78	1,662.02	1,607.83	12.58	25.13	72.48	119.43
3,205.76	89.93	64.48	1,595.13	-706.55	1,688.06	1,634.66	12.67	25.88	72.91	118.72
3,221.17	90.05	64.71	1,595.13	-699.97	1,701.99	1,649.01	12.72	26.29	73.15	118.34
3,238.34	90.18	64.96	1,595.09	-692.64	1,717.52	1,665.02	12.78	26.74	73.41	117.91
3,267.40	90.24	65.62	1,594.99	-680.49	1,743.92	1,692.21	12.88	27.56	73.86	117.19
3,296.96	89.71	65.74	1,595.00	-668.31	1,770.86	1,719.93	12.99	28.36	74.35	116.43
3,326.59	90.40	64.24	1,594.97	-655.79	1,797.71	1,747.58	13.10	29.07	74.87	115.64
3,355.69	90.18	65.14	1,594.82	-643.35	1,824.02	1,774.69	13.21	29.78	75.39	114.87
3,387.91	90.12	64.85	1,594.73	-629.73	1,853.21	1,804.77	13.34	30.62	75.97	114.00
3,416.88	90.30	64.12	1,594.62	-617.25	1,879.36	1,831.72	13.45	31.29	76.53	113.21
3,447.85	90.29	64.91	1,594.46	-603.92	1,907.31	1,860.54	13.58	32.04	77.13	112.36
3,477.38	89.81	65.42	1,594.44	-591.52	1,934.11	1,888.14	13.70	32.78	77.71	111.55
3,508.15	89.53	64.98	1,594.61	-578.61	1,962.04	1,916.90	13.84	33.49	78.36	110.69
3,535.51	90.40	64.80	1,594.63	-567.00	1,986.82	1,942.43	13.96	34.08	78.96	109.92
3,566.16	90.20	65.90	1,594.47	-554.22	2,014.67	1,971.10	14.09	34.78	79.64	109.07
3,595.72	90.07	66.03	1,594.40	-542.18	2,041.67	1,998.87	14.23	35.45	80.32	108.23
3,625.87	89.85	65.24	1,594.42	-529.74	2,069.13	2,027.14	14.37	36.05	81.05	107.39
3,656.61	89.40	65.14	1,594.62	-516.84	2,097.04	2,055.88	14.52	36.64	81.82	106.53
3,685.97	89.64	65.23	1,594.87	-504.52	2,123.69	2,083.32	14.66	37.21	82.56	105.71
3,715.57	89.57	64.18	1,595.07	-491.87	2,150.44	2,110.89	14.80	37.74	83.32	104.89
3,747.36	89.90	64.41	1,595.22	-478.08	2,179.09	2,140.43	14.96	38.30	84.16	104.03
3,777.77	89.76	64.59	1,595.31	-464.99	2,206.54	2,168.73	15.11	38.86	84.98	103.20
3,807.40	89.49	63.96	1,595.50	-452.13	2,233.23	2,196.25	15.27	39.36	85.79	102.40
3,838.37	89.67	64.33	1,595.73	-438.62	2,261.10	2,224.99	15.43	39.87	86.66	101.59
3,865.93	89.97	64.83	1,595.82	-426.79	2,285.99	2,250.65	15.57	40.34	87.44	100.86
3,896.31	90.22	65.07	1,595.77	-413.93	2,313.51	2,279.00	15.73	40.83	88.33	100.08
3,926.69	89.90	65.12	1,595.73	-401.14	2,341.06	2,307.38	15.90	41.29	89.24	99.31

Run #4

3,942.41	90.07	64.68	1,595.74	-394.39	2,355.27	2,322.05	15.94	41.32	89.62	99.20
3,955.73	90.22	64.31	1,595.70	-388.68	2,367.30	2,334.44	15.98	41.34	89.94	99.10
3,964.40	90.31	64.06	1,595.66	-384.96	2,375.13	2,342.49	16.00	41.36	90.14	99.04
3,993.73	89.80	64.76	1,595.63	-372.29	2,401.59	2,369.77	16.00	41.35	90.26	98.98
4,025.56	89.68	64.07	1,595.78	-358.55	2,430.29	2,399.36	16.01	41.37	90.39	98.91
4,056.33	90.22	64.64	1,595.80	-345.23	2,458.03	2,427.96	16.02	41.38	90.51	98.83
4,085.04	89.60	65.23	1,595.85	-333.07	2,484.04	2,454.75	16.04	41.43	90.62	98.75
4,113.62	89.78	65.04	1,596.00	-321.05	2,509.96	2,481.45	16.06	41.46	90.74	98.68
4,145.83	89.61	65.20	1,596.17	-307.50	2,539.19	2,511.56	16.08	41.48	90.88	98.59
4,174.67	90.33	64.73	1,596.18	-295.30	2,565.32	2,538.47	16.10	41.50	91.02	98.51



True North Directional Services Inc.

Survey Uncertainty Report



Database:	Example Project Database	Local Coordinate Reference:	Well AA16
Company:	Anglian Oil Company Ltd.	TVD Reference:	WELL @ 2,065.65ft (Well Elev.)
Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Position Uncertainty										
Measured Depth (ft)	Incl. (°)	Az. (°)	Vertical Depth (ft)	Ellipsoid +N/-S (ft)	Ellipsoid +E/-W (ft)	Vertical Section (ft)	Vertical 1/2 Axis (ft)	Minor 1/2 Axis (ft)	Major 1/2 Axis (ft)	Major Axis Azim. (°)
4,187.80	90.19	65.20	1,596.12	-289.81	2,577.24	2,550.72	16.11	41.52	91.08	98.47
4,204.89	90.00	65.82	1,596.10	-282.66	2,592.77	2,566.73	16.13	41.55	91.16	98.42
4,214.73	89.93	65.70	1,596.10	-278.60	2,601.73	2,575.97	16.14	41.56	91.20	98.39
4,235.01	89.80	65.46	1,596.15	-270.24	2,620.20	2,594.97	16.16	41.60	91.29	98.32
4,264.11	89.77	65.16	1,596.26	-258.08	2,646.64	2,622.19	16.20	41.62	91.44	98.24
4,277.23	90.02	65.04	1,596.28	-252.54	2,658.54	2,634.45	16.21	41.63	91.51	98.20
4,294.52	90.35	64.87	1,596.23	-245.23	2,674.21	2,650.59	16.23	41.64	91.61	98.14
4,323.79	90.00	65.45	1,596.14	-232.94	2,700.77	2,677.94	16.27	41.69	91.75	98.04
4,355.41	90.34	64.30	1,596.04	-219.51	2,729.40	2,707.44	16.32	41.72	91.93	97.94
4,384.05	89.87	64.13	1,595.99	-207.05	2,755.19	2,734.04	16.37	41.73	92.10	97.85
4,416.57	89.69	64.52	1,596.12	-192.97	2,784.49	2,764.25	16.42	41.79	92.27	97.73
4,443.86	90.26	65.48	1,596.13	-181.43	2,809.23	2,789.73	16.47	41.88	92.41	97.62
4,475.00	89.69	65.95	1,596.14	-168.63	2,837.61	2,818.94	16.53	41.97	92.58	97.49
4,504.46	89.66	64.65	1,596.31	-156.32	2,864.38	2,846.50	16.59	42.01	92.76	97.38
4,536.45	89.57	65.39	1,596.52	-142.81	2,893.37	2,876.36	16.66	42.06	92.96	97.26
4,566.08	89.72	65.65	1,596.70	-130.53	2,920.34	2,904.12	16.73	42.14	93.13	97.13
4,594.52	89.40	64.06	1,596.92	-118.45	2,946.08	2,930.64	16.79	42.17	93.32	97.02
4,625.85	90.09	65.58	1,597.06	-105.12	2,974.44	2,959.86	16.87	42.24	93.52	96.89
4,654.53	90.18	65.00	1,596.99	-93.13	3,000.49	2,986.68	16.94	42.33	93.70	96.76
4,683.99	89.72	64.44	1,597.02	-80.55	3,027.13	3,014.13	17.02	42.37	93.91	96.64
4,713.81	90.11	65.17	1,597.06	-67.86	3,054.11	3,041.94	17.10	42.45	94.11	96.51
4,744.78	89.76	65.85	1,597.10	-55.02	3,082.30	3,070.95	17.19	42.57	94.30	96.36
4,776.34	90.20	65.92	1,597.11	-42.12	3,111.10	3,100.59	17.28	42.67	94.52	96.21
4,804.76	90.15	65.27	1,597.02	-30.38	3,136.98	3,127.22	17.37	42.73	94.73	96.08
4,834.58	89.76	64.01	1,597.05	-17.61	3,163.93	3,154.99	17.46	42.76	94.96	95.95
4,865.39	89.55	64.81	1,597.24	-4.31	3,191.71	3,183.64	17.56	42.84	95.19	95.81
4,881.79	89.67	65.12	1,597.35	2.60	3,206.59	3,198.95	17.61	42.90	95.31	95.72
4,894.65	89.77	65.37	1,597.41	8.02	3,218.25	3,210.97	17.65	42.95	95.40	95.66
4,924.97	89.68	63.53	1,597.55	21.09	3,245.60	3,239.17	17.75	43.01	95.64	95.52
4,954.00	90.11	65.36	1,597.61	33.62	3,271.80	3,266.17	17.85	43.10	95.86	95.37
4,985.46	89.75	63.64	1,597.65	47.16	3,300.19	3,295.44	17.96	43.20	96.10	95.21
5,014.60	90.15	64.14	1,597.68	59.98	3,326.35	3,322.43	18.07	43.26	96.34	95.07
5,046.75	89.57	64.69	1,597.75	73.86	3,355.35	3,352.33	18.19	43.39	96.59	94.90
5,063.15	89.80	64.95	1,597.84	80.82	3,370.21	3,367.63	18.25	43.45	96.72	94.81
5,075.88	89.99	65.15	1,597.87	86.21	3,381.74	3,379.52	18.30	43.50	96.82	94.74
5,106.43	90.38	63.57	1,597.77	99.43	3,409.28	3,407.91	18.42	43.57	97.08	94.58
5,119.55	90.06	63.56	1,597.72	105.28	3,421.03	3,420.04	18.47	43.60	97.20	94.52
5,137.04	89.63	63.56	1,597.77	113.06	3,436.68	3,436.20	18.54	43.64	97.35	94.43
5,165.09	90.26	64.59	1,597.79	125.33	3,461.91	3,462.22	18.65	43.76	97.58	94.27
5,181.49	89.86	64.32	1,597.77	132.43	3,476.70	3,477.48	18.71	43.82	97.72	94.18
5,195.80	89.50	64.08	1,597.86	138.62	3,489.59	3,490.76	18.77	43.87	97.84	94.10
5,224.31	90.44	64.33	1,597.87	151.03	3,515.26	3,517.23	18.89	43.96	98.09	93.95
5,249.33	90.07	64.44	1,597.76	161.84	3,537.83	3,540.50	19.00	44.06	98.30	93.81
5,256.13	89.98	64.47	1,597.76	164.78	3,543.96	3,546.82	19.02	44.08	98.36	93.77
5,269.26	89.97	64.72	1,597.76	170.38	3,555.83	3,559.04	19.08	44.13	98.48	93.69
5,285.43	89.96	65.02	1,597.77	177.28	3,570.46	3,574.13	19.15	44.20	98.62	93.60
5,317.26	90.34	64.40	1,597.68	190.88	3,599.23	3,603.78	19.29	44.31	98.91	93.42
5,344.49	90.01	64.10	1,597.60	202.71	3,623.76	3,629.07	19.41	44.38	99.17	93.28
5,357.61	89.82	63.86	1,597.62	208.49	3,635.54	3,641.24	19.47	44.42	99.29	93.21
5,371.72	89.62	63.62	1,597.69	214.70	3,648.20	3,654.29	19.53	44.46	99.43	93.13



True North Directional Services Inc.

Survey Uncertainty Report



Database:	Example Project Database	Local Coordinate Reference:	Well AA16
Company:	Anglian Oil Company Ltd.	TVD Reference:	WELL @ 2,065.65ft (Well Elev.)
Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Targets									
Target Name	Dip	Dip	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
-hit/miss target	Angle	Dir.	(ft)	(ft)	(ft)	(ft)	(ft)		
-Shape	(°)	(°)							
AA16 LP	90.00	65.00	1,596.45	-704.13	1,703.93	22,273,956.73 N	1,879,958.19 E	61° 13' 52.9604" N 109° 38' 24.5300" W	
- survey misses the target center by 4.81ft at 3,221.17ft MD (1,595.13TVD, 699.94 S, 1,701.98 E)									
- Polygon									
AA16 LP (1)	82.75	131.74	1,486.68	-410.05	459.58	22,274,250.82 N	1,878,713.83 E	61° 13' 56.1108" N 109° 38' 49.8279" W	
- survey misses the target center by 10.47ft at 1,807.46ft MD (1,477.72TVD, 406.85 S, 463.96 E)									
- Circle									
AA16 LP (2)	90.00	65.00	1,596.45	-787.33	1,525.53	22,273,873.54 N	1,879,779.78 E	61° 13' 52.1776" N 109° 38' 28.2102" W	
- survey misses the target center by 5.38ft at 3,024.30ft MD (1,594.15TVD, 782.92 S, 1,523.47 E)									
- Circle									
AA16 TD	90.00	65.00	1,596.45	405.12	4,082.70	22,275,065.98 N	1,882,336.95 E	61° 14' 03.3943" N 109° 37' 35.4556" W	
- survey does not penetrate the target plane									
- Polygon									

Formations					
Measured Depth	Vertical Depth	Subsea Depth	Name	Dip Angle	Dip Direction
(ft)	(ft)	(ft)		(°)	(°)
1,052.50	1,047.37	-1,018.28	Formation #1	4.00	80.00
1,116.99	1,106.28	-959.37	Formation #2	8.00	100.00
1,178.80	1,159.86	-905.79	Formation #3	12.00	120.00
1,239.29	1,209.25	-856.40	Formation #4	16.00	140.00
1,303.58	1,258.22	-807.43	Formation #5	20.00	160.00
1,382.26	1,312.85	-752.79	Formation #6	24.00	180.00
	1,509.18	-556.46	Dipping Plane #4		65.00
2,681.97	1,578.12	-487.52	Dipping Plane #3		65.00
2,898.68	1,591.20	-474.44	Dipping Plane #1	0.00	65.00
2,898.68	1,591.20	-474.44	Dipping Plane #2	0.00	65.00

Casing Points				
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(ft)	(ft)		(in)	(in)
1,312.33	1,264.60	13 3/8in Casing	13 3/8	17 1/2
2,624.67	1,573.06	9 5/8in Casing	9 5/8	12 1/4
5,249.33	1,597.76	7in Casing	7	9 1/2
5,371.72	1,597.69	4 1/2in Liner	4 1/2	6 1/2

Survey Uncertainty Annotations				
Measured Depth	Vertical Depth	+N/-S	+E/-W	Comment
(ft)	(ft)	(ft)	(ft)	
2,514.84	1,562.18	-813.63	1,027.51	Shallow test MWD and Motor
2,514.84	1,562.18	-813.63	1,027.51	Wash to bottom
2,514.84	1,562.18	-813.63	1,027.51	Safety meeting, clean floor
2,514.84	1,562.18	-813.63	1,027.51	Pick up BHA
3,942.41	1,595.74	-394.47	2,355.31	Circulate Bottoms Up



True North Directional Services Inc.

Survey Uncertainty Report



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Company:	Anglian Oil Company Ltd.	TVD Reference:	WELL @ 2,065.65ft (Well Elev.)
Project:	Northern Lights	MD Reference:	WELL @ 2,065.65ft (Well Elev.)
Site:	AA Pad	North reference:	Grid North
Well:	AA16	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1	Output errors are at	2.00 sigma
Survey:	Run #4		

Survey Uncertainty Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
3,942.41	1,595.74	-394.47	2,355.31	FIT
3,955.73	1,595.70	-388.73	2,367.33	Replace cap gasket on pump
4,187.80	1,596.12	-289.74	2,577.21	Survey Depth: 4,187.80 ft., Inc: 90.25°, Azm: 65.75°
4,214.73	1,596.10	-278.62	2,601.74	Swap pumps, sync MWD
4,214.73	1,596.10	-278.62	2,601.74	Hanging up, hard time controlling toolface
4,277.23	1,596.28	-252.55	2,658.55	CO2 on floor
4,654.53	1,596.99	-93.13	3,000.49	Totco crashed
4,881.79	1,597.35	2.63	3,206.57	Auto driller issues
5,063.15	1,597.84	80.84	3,370.20	Work On Pumps
5,119.55	1,597.72	105.27	3,421.03	Work On Pumps
5,181.49	1,597.77	132.40	3,476.71	Swap Pumps
5,269.26	1,597.76	170.41	3,555.81	Attempted to slide, Pressure was up and down, sweep was in the hole and dusting up mud. Could not c
5,357.61	1,597.62	208.46	3,635.55	Swap pumps
5,371.72	1,597.69	214.70	3,648.20	Rig up and tear down

Checked By:	Approved By:	Date:
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