KellyDown Tips

Periodic tips to help you use KellyDown more effectively

Left/Right, Above/Below Plan in Vertical Wells

Problem: Explaining the concepts of *Left/Right* and *Above/Below* relative to the well-plan becomes challenging when the well-plan is vertical. In these situations, customers often struggle to understand how positional relationships are determined.

Cause: KellyDown provides two sets of positional data that describe the relationship between survey points and their associated proposal: the *Left/Right* and *Above/Below* columns. When the wellplan has inclination, determining whether a survey point lies left or right of the plan, or above or below it, is straightforward. However, when the wellplan is vertical at a given depth, there is no directional reference. As a result, it becomes impossible to logically determine whether the wellbore is left, right, above, below, ahead, or behind the plan.

Solution: The *Left/Right Plan* and *Above/Below Plan* values are intended to help the directional driller understand the wellbore's position relative to the proposal. For example, if the well is left of the plan, the driller knows to steer right to return to plan.

Confusion arises when the plan is vertical and therefore lacks directional orientation. In such cases, describing the well as "left" or "right" of the plan is not meaningful. A more accurate description would reference cardinal directions—north, south, east, or west. However, many drillers find this difficult to visualize because they typically work in terms of *highside azimuth*.

When the drilled well has inclination, a driller may instead think of the *plan* as being left or right of the *well*. To avoid this ambiguity, KellyDown replaces left/right terminology with *Distance to Plan* and *Highside Direction to Plan*.

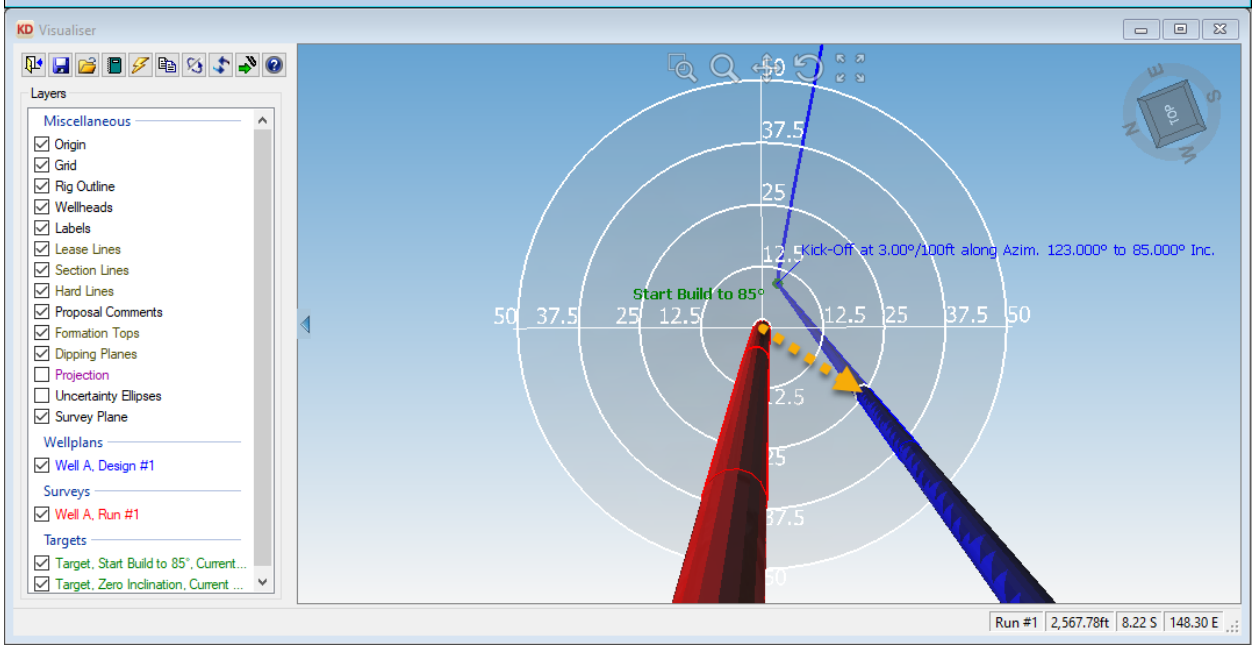
In the example shown in the screenshot, the Visualiser is rotated to a highside-relative view. The plan is vertical near the bottom survey, and the wellbore is approximately 25 ft off plan, requiring correction. The last survey shows an inclination of 0.87°, which theoretically allows the driller to use the highside angle to steer back toward the plan.

While the driller can see that a slight right turn and a small drop in inclination would correct the trajectory, the very low inclination means that highside-based steering is unreliable. As corrections begin, the *Highside Direction to Plan* will fluctuate significantly.

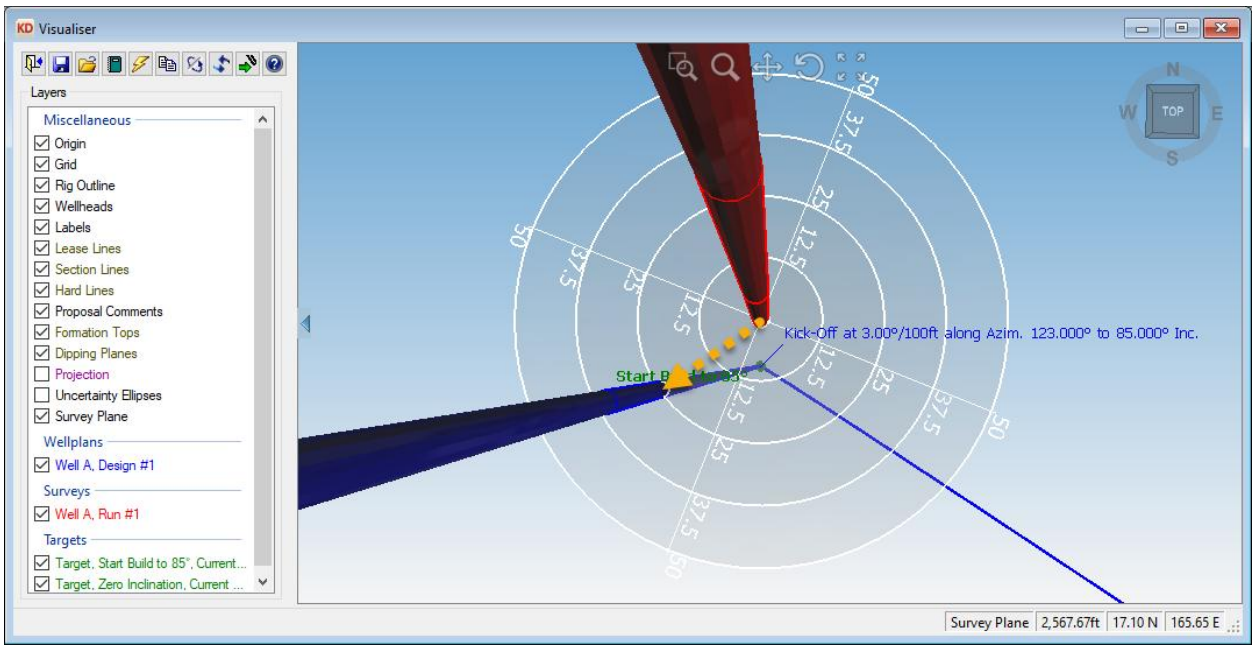
Instead, the driller should use the *North Direction to Plan*, steering the well toward 234°, a direction that will remain stable as the wellbore moves back toward the plan.

Survey Data [Well A - Run #1]

No.	Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Planned Inclination (°)	Planned Azimuth (°)	Left/Right Wellplan (ft)	Above/Below Wellplan (ft)	Distance to Plan (ft)	Highside Direction to Plan	North Direction to Plan
16	1,423.32	13.88	100.25	1,418.86	8.31 N	53.24 E	3.20	40.58	12.70	100.00	17.43 L	4.39 A	17.97	103.88	203.74
17	1,513.15	15.46	98.99	1,505.76	4.52 N	75.67 E	1.80	61.56	14.60	100.00	17.60 L	5.45 A	18.42	108.18	206.55
18	1,599.65	12.98	99.82	1,589.60	1.07 N	96.63 E	2.88	81.13	12.01	100.00	17.83 L	6.82 A	19.09	111.11	210.43
19	1,690.15	10.25	100.27	1,678.24	2.10 S	114.57 E	3.01	97.99	9.31	100.00	17.82 L	8.32 A	19.67	114.75	214.68
20	1,779.06	7.48	99.97	1,766.08	4.52 S	128.06 E	3.12	110.68	6.65	100.00	17.79 L	9.69 A	20.25	118.59	218.36
21	1,869.92	5.11	100.87	1,856.39	6.30 S	137.86 E	2.61	119.92	3.94	100.00	17.73 L	11.26 A	21.01	121.56	222.33
22	1,959.35	2.03	98.18	1,945.63	7.28 S	143.34 E	3.45	125.08	1.28	100.00	17.72 L	12.76 A	21.83	127.57	225.73
23	2,048.67	1.18	357.73	2,034.92	6.59 S	144.87 E	2.83	126.00	0.00	0.00	22.45 L	5.57 A	23.14	-131.54	226.20
24	2,136.71	1.05	109.84	2,122.95	5.96 S	145.59 E	2.10	126.28	0.00	0.00	23.37 L	5.84 A	24.09	116.46	226.30
25	2,222.59	0.45	135.41	2,208.83	6.46 S	146.56 E	0.78	127.37	0.00	0.00	23.47 L	6.93 A	24.47	93.32	228.72
26	2,313.34	0.74	155.36	2,299.58	7.25 S	147.06 E	0.40	128.21	0.00	0.00	23.06 L	7.76 A	24.34	75.52	230.89
27	2,401.49	1.12	95.50	2,387.71	7.85 S	148.15 E	1.11	129.45	0.00	0.00	23.14 L	9.02 A	24.83	138.06	233.56
28	2,494.65	0.87	268.14	2,480.87	7.96 S	148.35 E	2.13	129.68	0.00	0.00	23.15 L	9.23 A	24.93	-34.11	234.03
29	2,581.56	0.87	111.29	2,567.78	8.22 S	148.30 E	1.96	129.78	0.00	0.00	22.90 L	9.34 A	24.73	123.17	234.45

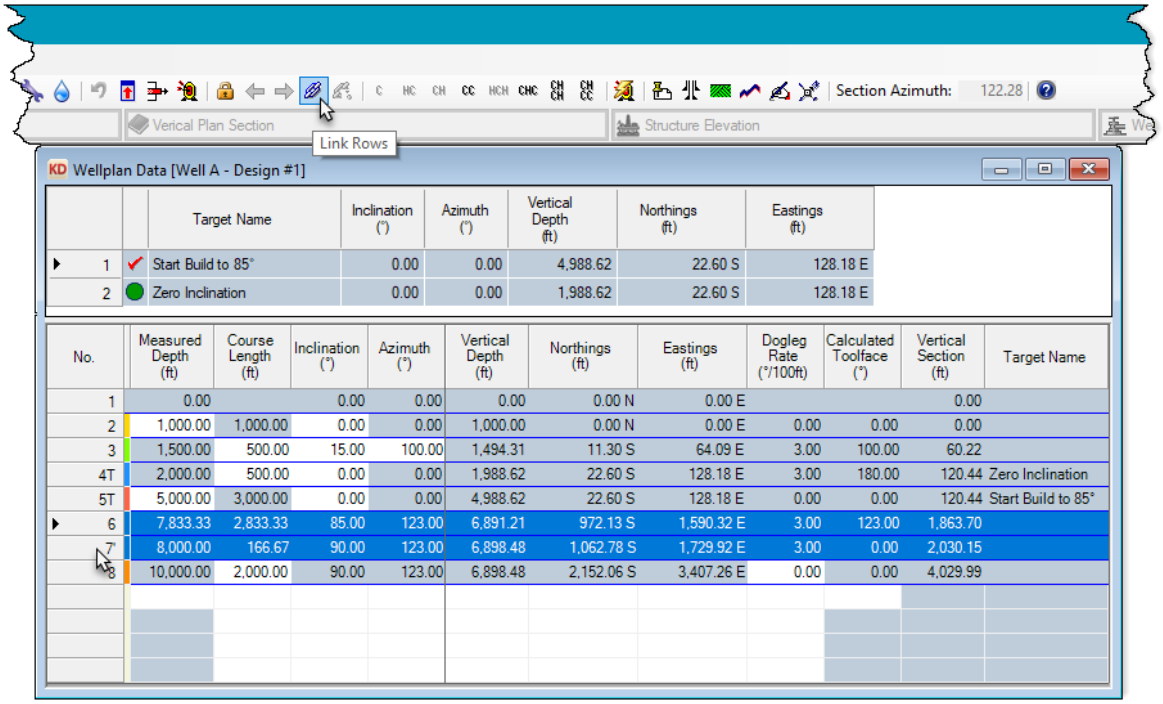


If the Visualiser is rotated to reference *North* rather than *Highside*, the driller can maintain a consistent heading toward the southwest (243°) until the wellbore is realigned with the plan.



Some tool-pushers still prefer to see *Left/Right* and *Above/Below* values during corrections, even when the plan is vertical. If required, the plan can be modified as follows:

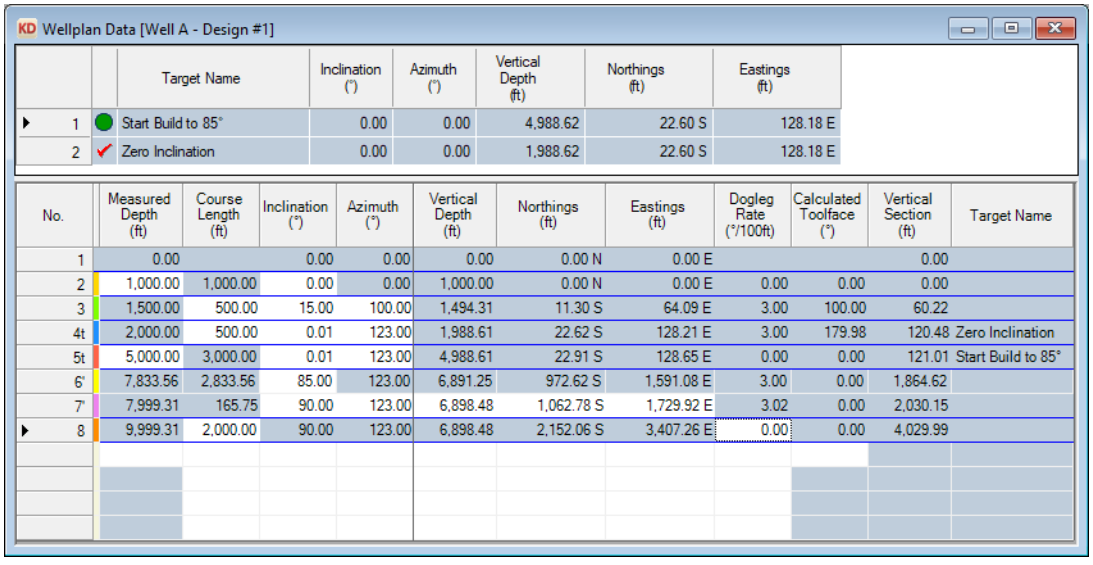
1. Open the *Proposal Editor* and select the two lines immediately below the two lines with zero inclination.
2. Click *Link Rows* on the toolbar (this locks the coordinates of the second selected row).



		Target Name	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)
1	✓	Start Build to 85°	0.00	0.00	4,988.62	22.60 S	128.18 E
2	●	Zero Inclination	0.00	0.00	1,988.62	22.60 S	128.18 E

No.	Measured Depth (ft)	Course Length (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Dogleg Rate (°/100ft)	Calculated Toolface (°)	Vertical Section (ft)	Target Name
1	0.00		0.00	0.00	0.00	0.00 N	0.00 E			0.00	
2	1,000.00	1,000.00	0.00	0.00	1,000.00	0.00 N	0.00 E	0.00	0.00	0.00	
3	1,500.00	500.00	15.00	100.00	1,494.31	11.30 S	64.09 E	3.00	100.00	60.22	
4T	2,000.00	500.00	0.00	0.00	1,988.62	22.60 S	128.18 E	3.00	180.00	120.44	Zero Inclination
5T	5,000.00	3,000.00	0.00	0.00	4,988.62	22.60 S	128.18 E	0.00	0.00	120.44	Start Build to 85°
6	7,833.33	2,833.33	85.00	123.00	6,891.21	972.13 S	1,590.32 E	3.00	123.00	1,863.70	
7	8,000.00	166.67	90.00	123.00	6,898.48	1,062.78 S	1,729.92 E	3.00	0.00	2,030.15	
8	10,000.00	2,000.00	90.00	123.00	6,898.48	2,152.06 S	3,407.26 E	0.00	0.00	4,029.99	

3. Change the two zero-inclination fields to 0.01°, and set the corresponding azimuth fields to match the next row (e.g., 123.00° in the example)



		Target Name	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)
1	●	Start Build to 85°	0.00	0.00	4,988.62	22.60 S	128.18 E
2	✓	Zero Inclination	0.00	0.00	1,988.62	22.60 S	128.18 E

No.	Measured Depth (ft)	Course Length (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Dogleg Rate (°/100ft)	Calculated Toolface (°)	Vertical Section (ft)	Target Name
1	0.00		0.00	0.00	0.00	0.00 N	0.00 E			0.00	
2	1,000.00	1,000.00	0.00	0.00	1,000.00	0.00 N	0.00 E	0.00	0.00	0.00	
3	1,500.00	500.00	15.00	100.00	1,494.31	11.30 S	64.09 E	3.00	100.00	60.22	
4t	2,000.00	500.00	0.01	123.00	1,988.61	22.62 S	128.21 E	3.00	179.98	120.48	Zero Inclination
5t	5,000.00	3,000.00	0.01	123.00	4,988.61	22.91 S	128.65 E	0.00	0.00	121.01	Start Build to 85°
6'	7,833.56	2,833.56	85.00	123.00	6,891.25	972.62 S	1,591.08 E	3.00	0.00	1,864.62	
7'	7,999.31	165.75	90.00	123.00	6,898.48	1,062.78 S	1,729.92 E	3.02	0.00	2,030.15	
8	9,999.31	2,000.00	90.00	123.00	6,898.48	2,152.06 S	3,407.26 E	0.00	0.00	4,029.99	

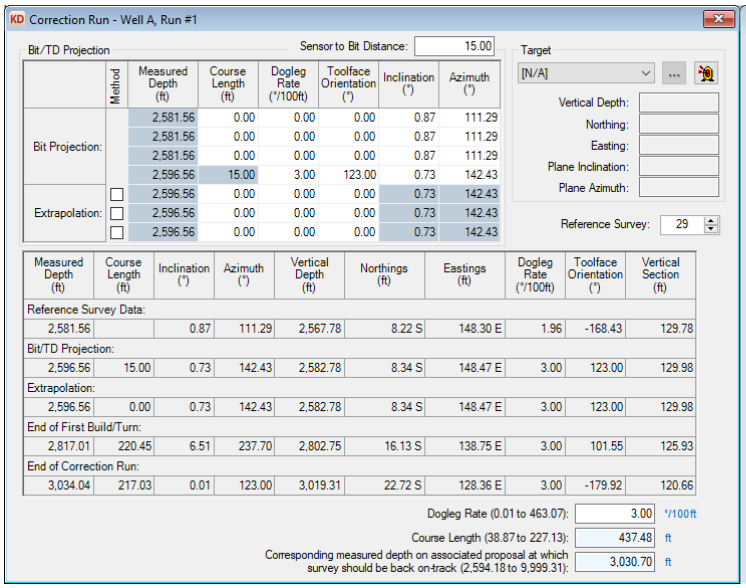
4. Confirm that the coordinates of the rows below row #6 remain unchanged
5. Save the plan.

This adjustment allows the *Left/Right* and *Above/Below* columns to display values referenced to the proposed direction, even though the plan has no inclination at that depth.

Survey Data [Well A - Run #1]

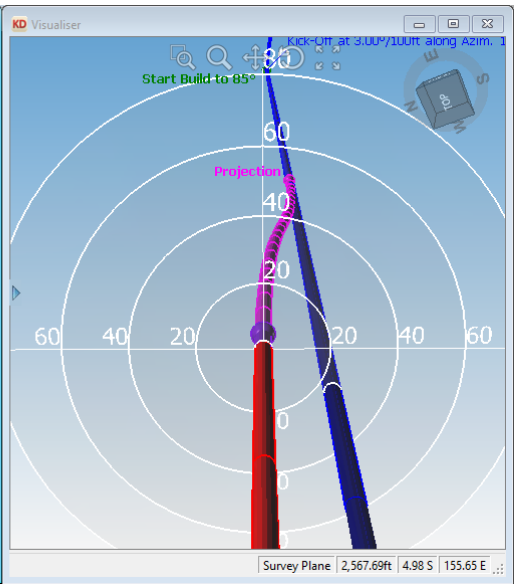
No.	Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Planned Inclination (°)	Planned Azimuth (°)	Left/Right Wellplan (ft)	Above/Below Wellplan (ft)	Distance to Plan (ft)	Highside Direction to Plan	North Direction to Plan
16	1,423.32	13.88	100.25	1,418.86	8.31 N	53.24 E	3.20	40.58	12.70	100.00	17.43 L	4.39 A	17.97	103.88	203.74
17	1,513.15	15.46	98.99	1,505.76	4.52 N	75.67 E	1.80	61.56	14.60	100.00	17.60 L	5.45 A	18.42	108.18	206.55
18	1,599.65	12.98	99.82	1,589.60	1.07 N	96.63 E	2.88	81.13	12.01	100.00	17.83 L	6.82 A	19.09	111.10	210.43
19	1,690.15	10.25	100.27	1,678.24	2.10 S	114.57 E	3.01	97.99	9.31	100.01	17.83 L	8.31 A	19.67	114.73	214.66
20	1,779.06	7.48	99.97	1,766.08	4.52 S	128.06 E	3.12	110.68	6.66	100.02	17.80 L	9.67 A	20.25	118.56	218.32
21	1,869.92	5.11	100.87	1,856.39	6.30 S	137.86 E	2.61	119.92	3.95	100.04	17.75 L	11.23 A	21.00	121.50	222.26
22	1,959.35	2.03	98.18	1,945.63	7.28 S	143.34 E	3.45	125.08	1.28	100.16	17.77 L	12.67 A	21.83	127.48	225.64
23	2,048.67	1.18	357.73	2,034.92	6.59 S	144.87 E	2.83	126.00	0.01	123.00	22.52 L	5.24 A	23.12	-131.67	226.07
24	2,136.71	1.05	109.84	2,122.95	5.96 S	145.59 E	2.10	126.28	0.01	123.00	23.45 L	5.48 A	24.08	116.31	226.14
25	2,222.59	0.45	135.41	2,208.83	6.46 S	146.56 E	0.78	127.37	0.01	123.00	23.55 L	6.55 A	24.45	93.13	228.54
26	2,313.34	0.74	155.36	2,299.58	7.25 S	147.06 E	0.40	128.21	0.01	123.00	23.16 L	7.38 A	24.31	75.30	230.67
27	2,401.49	1.12	95.50	2,387.71	7.85 S	148.15 E	1.11	129.45	0.01	123.00	23.25 L	8.61 A	24.79	137.82	233.31
28	2,494.65	0.87	268.14	2,480.87	7.96 S	148.35 E	2.13	129.68	0.01	123.00	23.27 L	8.81 A	24.88	-34.39	233.75
29	2,581.56	0.87	111.29	2,567.78	8.22 S	148.30 E	1.96	129.78	0.01	123.00	23.02 L	8.90 A	24.68	122.85	234.14
*	Add New Survey Record														

For a more robust and accurate approach, consider using the *Correction Run* module. It provides a detailed, step-by-step guide showing exactly how to bring the wellbore back to plan.



	Method	Measured Depth (ft)	Course Length (ft)	Dogleg Rate (°/100ft)	Toolface Orientation (°)	Inclination (°)	Azimuth (°)
Bit Projection:		2,581.56	0.00	0.00	0.00	0.87	111.29
		2,581.56	0.00	0.00	0.00	0.87	111.29
		2,581.56	0.00	0.00	0.00	0.87	111.29
		2,596.56	15.00	3.00	123.00	0.73	142.43
Extrapolation:	☐	2,596.56	0.00	0.00	0.00	0.73	142.43
	☐	2,596.56	0.00	0.00	0.00	0.73	142.43
	☐	2,596.56	0.00	0.00	0.00	0.73	142.43

Measured Depth (ft)	Course Length (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Dogleg Rate (°/100ft)	Toolface Orientation (°)	Vertical Section (ft)
Reference Survey Data:									
2,581.56		0.87	111.29	2,567.78	8.22 S	148.30 E	1.96	-168.43	129.78
Bit/TD Projection:									
2,596.56	15.00	0.73	142.43	2,582.78	8.34 S	148.47 E	3.00	123.00	129.98
Extrapolation:									
2,596.56	0.00	0.73	142.43	2,582.78	8.34 S	148.47 E	3.00	123.00	129.98
End of First Build/Turn:									
2,817.01	220.45	6.51	237.70	2,802.75	16.13 S	138.75 E	3.00	101.55	125.93
End of Correction Run:									
3,034.04	217.03	0.01	123.00	3,019.31	22.72 S	128.36 E	3.00	-179.92	120.66



A comprehensive correction report is also available.

True North Directional Services Inc.

Anglian Oil Company Ltd.
Eastern Skies

Anglian

Correction Run Report for Structure Elevation, Well A, Run #1

Measured Depth (ft)	Course Length (ft)	Incl. (°)	(Grid) Azimuth (°)	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface (°)	Travelling Cylinder Distance (ft)	Travelling Cylinder Highside Direction
Existing Survey Data											
2,222.59		0.45	135.41	2,208.83	6.46 S	146.56 E	127.37			24.45	93.13
2,313.34	90.75	0.74	155.36	2,299.58	7.25 S	147.06 E	128.21	0.40	45.06	24.31	75.30
2,401.49	88.14	1.12	95.50	2,387.71	7.85 S	148.15 E	129.45	1.11	-100.84	24.79	137.82
2,494.65	93.17	0.87	268.14	2,480.87	7.96 S	148.35 E	129.68	2.13	176.77	24.88	-34.39
2,581.56	86.91	0.87	111.29	2,567.78	8.22 S	148.30 E	129.78	1.96	-168.43	24.68	122.85
Projection to Bit											
2,596.56	15.00	0.73	142.43	2,582.78	8.34 S	148.47 E	129.98	3.00	123.00	24.75	92.15
Correction to Well Plan											
2,600.00	3.44	0.72	150.54	2,586.22	8.38 S	148.49 E	130.02	3.00	101.55	24.74	84.13
2,700.00	100.00	3.04	230.40	2,686.16	10.61 S	146.75 E	129.74	3.00	93.44	22.07	6.36
2,800.00	100.00	6.00	237.16	2,785.84	15.14 S	140.31 E	126.72	3.00	13.60	14.25	0.58
2,817.01	17.01	6.51	237.70	2,802.75	16.13 S	138.75 E	125.93	3.00	6.86	12.40	0.08
2,900.00	82.99	4.02	237.65	2,885.38	20.20 S	132.32 E	122.66	3.00	-179.92	4.71	0.13
3,000.00	100.00	1.02	237.27	2,985.28	22.56 S	128.62 E	120.79	3.00	-179.87	0.30	0.51
Corrected to Well Plan											
3,034.04	34.04	0.01	123.00	3,019.31	22.72 S	128.36 E	120.66	3.00	-179.49	0.00	0.00

All data is in Feet (US Survey) unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to Well A. Northings and Eastings are relative to Well A.

The dogleg severity is in Degrees per 100 feet (US Survey).
Vertical Section is from Well A calculated along an azimuth of 122.28° (Grid).

Based upon minimum curvature calculations, at a measured depth of 3,034.04ft,
the bottom hole displacement is 130.36ft, in the direction of 100.04° (Grid).

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