

# Suncor Energy

Firebag(NAD83)

Pad 123(10-30-94-5W4)

SUNCOR P123P8 FIREBAG 8-31-94-5

102/8-31(P123P8) Lic #0490457

Design: 102/8-31(P123P8) - Final Survey

## Sperry Drilling Services Combo Report

15 May, 2019

BH UWI : 102083109405W400

TD Date : 8th May, 2019

Well Coordinates: 6,337,976.50 N, 512,591.70 E (57° 11' 05.28" N, 110° 47' 30.08" W)

Ground Level: 584.50 m

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well SUNCOR P123P8 FIREBAG 8-31-94-5

Actual RKB @ 593.70m (Nabors #102)

N

True

SI

Version: 5000.15 Build: 91

**HALLIBURTON**

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
					Northing (m)	Easting (m)	Northing (m)	Easting (m)			
0.00	0.00	0.00	-593.70	0.00	0.00 N	0.00 E	6,337,976.50	512,591.70	0.000	0.00	
9.20	0.00	0.00	-584.50	9.20	0.00 N	0.00 E	6,337,976.50	512,591.70	0.000	0.00	RKB to GL
15.48	0.15	309.95	-578.22	15.48	0.01 N	0.01 W	6,337,976.51	512,591.69	0.717	0.00	
24.42	0.31	358.74	-569.28	24.42	0.04 N	0.02 W	6,337,976.54	512,591.68	0.803	0.03	
34.84	0.38	15.49	-558.86	34.84	0.10 N	0.01 W	6,337,976.60	512,591.69	0.351	0.10	
44.37	1.19	40.99	-549.33	44.37	0.20 N	0.07 E	6,337,976.70	512,591.77	2.716	0.21	
53.64	2.02	56.35	-540.06	53.64	0.37 N	0.27 E	6,337,976.87	512,591.96	3.002	0.40	
59.00	2.53	54.57	-534.71	58.99	0.49 N	0.44 E	6,337,976.99	512,592.14	2.881	0.55	
75.00	3.80	52.62	-518.73	74.97	1.01 N	1.15 E	6,337,977.52	512,592.85	2.389	1.18	Interpolation @ Surface Casing
81.50	4.31	52.30	-512.25	81.45	1.29 N	1.51 E	6,337,977.80	512,593.21	2.356	1.51	
85.33	4.99	55.79	-508.43	85.27	1.48 N	1.77 E	6,337,977.98	512,593.46	5.774	1.72	DDE-5°
90.87	6.00	59.41	-502.92	90.78	1.76 N	2.21 E	6,337,978.27	512,593.91	5.774	2.07	
100.32	7.72	61.05	-493.54	100.16	2.32 N	3.19 E	6,337,978.83	512,594.89	5.495	2.77	
109.94	10.35	63.59	-484.04	109.66	3.01 N	4.53 E	6,337,979.53	512,596.23	8.293	3.66	
118.96	12.95	67.47	-475.20	118.50	3.76 N	6.19 E	6,337,980.28	512,597.88	9.027	4.65	
128.58	16.41	66.80	-465.90	127.80	4.71 N	8.44 E	6,337,981.24	512,600.12	10.803	5.93	
137.97	19.54	66.06	-456.97	136.73	5.87 N	11.09 E	6,337,982.41	512,602.78	10.026	7.47	
147.15	22.27	66.49	-448.39	145.31	7.19 N	14.09 E	6,337,983.73	512,605.77	8.936	9.22	
156.47	24.87	66.85	-439.85	153.85	8.66 N	17.51 E	6,337,985.22	512,609.19	8.382	11.20	
165.81	27.34	67.15	-431.46	162.24	10.27 N	21.30 E	6,337,986.83	512,612.97	7.945	13.35	
175.14	29.64	66.95	-423.26	170.44	12.00 N	25.40 E	6,337,988.58	512,617.06	7.402	15.68	
184.21	32.69	67.57	-415.50	178.20	13.82 N	29.72 E	6,337,990.41	512,621.38	10.144	18.13	
193.71	34.63	67.48	-407.60	186.10	15.83 N	34.59 E	6,337,992.44	512,626.24	6.128	20.85	
202.96	36.88	65.61	-400.09	193.61	17.98 N	39.55 E	6,337,994.60	512,631.19	8.112	23.72	
212.32	40.13	63.84	-392.77	200.93	20.47 N	44.81 E	6,337,997.11	512,636.45	10.998	26.97	
221.95	43.99	62.26	-385.62	208.08	23.40 N	50.56 E	6,338,000.05	512,642.19	12.468	30.73	
231.42	47.92	61.35	-379.04	214.66	26.62 N	56.56 E	6,338,003.29	512,648.18	12.621	34.81	
240.83	51.19	61.03	-372.93	220.77	30.07 N	62.83 E	6,338,006.76	512,654.44	10.454	39.17	
249.88	54.23	61.66	-367.45	226.25	33.52 N	69.15 E	6,338,010.23	512,660.75	10.213	43.53	
259.25	57.91	62.19	-362.22	231.48	37.18 N	76.01 E	6,338,013.91	512,667.59	11.866	48.17	
268.30	61.45	61.81	-357.65	236.05	40.84 N	82.90 E	6,338,017.60	512,674.48	11.785	52.84	
277.55	64.40	62.47	-353.44	240.26	44.69 N	90.19 E	6,338,021.47	512,681.75	9.755	57.73	
286.74	67.26	61.80	-349.68	244.02	48.61 N	97.60 E	6,338,025.41	512,689.15	9.547	62.72	
295.93	69.82	61.57	-346.32	247.38	52.67 N	105.13 E	6,338,029.49	512,696.66	8.386	67.86	
305.15	72.90	61.45	-343.37	250.33	56.83 N	112.80 E	6,338,033.68	512,704.33	10.029	73.14	
314.31	76.81	61.31	-340.98	252.72	61.07 N	120.56 E	6,338,037.94	512,712.08	12.813	78.49	
323.52	78.48	60.01	-339.01	254.69	65.48 N	128.41 E	6,338,042.37	512,719.90	6.834	84.02	
332.77	78.57	58.28	-337.17	256.53	70.13 N	136.19 E	6,338,047.04	512,727.67	5.506	89.79	
342.21	79.43	56.32	-335.37	258.33	75.13 N	143.98 E	6,338,052.07	512,735.45	6.697	95.91	

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

Measured			TVD	Vertical	Local Coordinates		Map Coordinates		Dogleg	Vertical	
Depth	Inclination	Azimuth	below	Depth	Northing	Easting	Northing	Easting	Rate	Section	Comments
(m)	(°)	(°)	System	(m)	(m)	(m)	(m)	(m)	(°/30m)	(m)	
348.62	80.00	54.48	-334.22	259.48	78.71 N	149.18 E	6,338,055.67	512,740.63	8.862	100.23	DDE-80°
351.54	80.26	53.65	-333.72	259.98	80.40 N	151.51 E	6,338,057.36	512,742.96	8.862	102.25	
360.68	80.19	51.02	-332.17	261.53	85.91 N	158.63 E	6,338,062.89	512,750.07	8.510	108.76	
369.83	80.96	48.88	-330.67	263.03	91.71 N	165.54 E	6,338,068.72	512,756.96	7.368	115.54	
378.95	81.44	46.18	-329.28	264.42	97.80 N	172.19 E	6,338,074.82	512,763.59	8.918	122.56	
387.87	80.63	43.62	-327.89	265.81	104.04 N	178.41 E	6,338,081.08	512,769.79	8.930	129.66	
397.29	79.56	41.30	-326.27	267.43	110.88 N	184.67 E	6,338,087.95	512,776.03	8.036	137.37	
406.54	79.79	38.47	-324.61	269.09	117.87 N	190.51 E	6,338,094.95	512,781.85	9.060	145.15	
415.66	80.52	35.58	-323.05	270.65	125.04 N	195.92 E	6,338,102.14	512,787.24	9.669	153.05	
425.14	80.72	32.72	-321.50	272.20	132.78 N	201.17 E	6,338,109.89	512,792.46	8.952	161.49	
434.39	80.97	29.62	-320.03	273.67	140.59 N	205.89 E	6,338,117.72	512,797.16	9.959	169.93	
444.02	80.99	26.80	-318.52	275.18	148.97 N	210.39 E	6,338,126.11	512,801.63	8.677	178.89	
453.17	81.85	24.57	-317.15	276.55	157.12 N	214.31 E	6,338,134.28	512,805.53	7.760	187.54	
462.60	81.30	23.01	-315.77	277.93	165.66 N	218.07 E	6,338,142.83	512,809.27	5.212	196.54	
471.82	80.93	20.16	-314.35	279.35	174.13 N	221.42 E	6,338,151.31	512,812.59	9.241	205.42	
481.35	81.06	17.59	-312.86	280.84	183.04 N	224.47 E	6,338,160.22	512,815.61	8.001	214.68	
490.77	81.92	15.26	-311.46	282.24	191.97 N	227.10 E	6,338,169.16	512,818.22	7.833	223.91	
500.17	81.57	13.21	-310.11	283.59	200.99 N	229.39 E	6,338,178.19	512,820.48	6.570	233.17	
509.27	81.44	10.59	-308.77	284.93	209.79 N	231.25 E	6,338,187.00	512,822.30	8.553	242.15	
518.52	81.88	7.70	-307.43	286.27	218.83 N	232.70 E	6,338,196.04	512,823.73	9.383	251.30	
527.89	82.87	5.14	-306.18	287.52	228.06 N	233.74 E	6,338,205.27	512,824.74	8.720	260.58	
537.38	85.36	3.33	-305.21	288.49	237.47 N	234.44 E	6,338,214.68	512,825.41	9.713	269.99	
546.90	87.48	2.61	-304.62	289.08	246.96 N	234.93 E	6,338,224.17	512,825.87	7.054	279.45	
556.05	88.08	1.48	-304.26	289.44	256.09 N	235.25 E	6,338,233.31	512,826.17	4.192	288.53	
565.23	87.42	0.66	-303.90	289.80	265.27 N	235.43 E	6,338,242.48	512,826.31	3.438	297.62	
574.67	87.21	0.12	-303.46	290.24	274.69 N	235.49 E	6,338,251.91	512,826.35	1.840	306.95	
584.29	89.23	0.09	-303.16	290.54	284.31 N	235.51 E	6,338,261.53	512,826.34	6.300	316.46	
593.83	89.83	0.15	-303.08	290.62	293.85 N	235.53 E	6,338,271.07	512,826.33	1.896	325.90	
603.24	89.97	359.98	-303.06	290.64	303.26 N	235.54 E	6,338,280.48	512,826.31	0.702	335.20	
612.61	90.13	0.06	-303.07	290.63	312.63 N	235.54 E	6,338,289.85	512,826.28	0.573	344.47	
621.99	89.93	0.74	-303.08	290.62	322.01 N	235.61 E	6,338,299.23	512,826.32	2.267	353.75	
631.38	89.53	0.67	-303.03	290.67	331.40 N	235.72 E	6,338,308.62	512,826.41	1.297	363.05	
636.00	89.40	1.07	-302.99	290.71	336.02 N	235.79 E	6,338,313.24	512,826.46	2.731	367.63	
653.00	89.63	1.31	-302.85	290.85	353.01 N	236.15 E	6,338,330.23	512,826.77	0.587	384.48	ICP
661.10	89.74	1.42	-302.80	290.90	361.11 N	236.34 E	6,338,338.33	512,826.93	0.576	392.52	
670.65	89.98	1.46	-302.78	290.92	370.66 N	236.58 E	6,338,347.88	512,827.14	0.764	401.99	
679.92	90.07	1.21	-302.78	290.92	379.93 N	236.79 E	6,338,357.15	512,827.33	0.860	411.19	
689.20	90.19	1.07	-302.80	290.90	389.20 N	236.98 E	6,338,366.43	512,827.49	0.596	420.39	
698.75	90.28	1.03	-302.84	290.86	398.75 N	237.15 E	6,338,375.97	512,827.63	0.309	429.85	

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

Measured			TVD	Vertical	Local Coordinates		Map Coordinates		Dogleg	Vertical	
Depth	Inclination	Azimuth	below	Depth	Northing	Easting	Northing	Easting	Rate	Section	Comments
(m)	(°)	(°)	System	(m)	(m)	(m)	(m)	(m)	(°/30m)	(m)	
712.75	89.98	1.02	-302.87	290.83	412.75 N	237.40 E	6,338,389.97	512,827.84	0.643	443.73	
727.55	89.66	0.65	-302.83	290.87	427.55 N	237.62 E	6,338,404.77	512,828.01	0.992	458.39	
741.55	89.73	359.92	-302.75	290.95	441.55 N	237.69 E	6,338,418.77	512,828.04	1.571	472.24	
755.47	89.71	359.78	-302.69	291.01	455.47 N	237.65 E	6,338,432.69	512,827.96	0.305	486.00	
769.47	90.25	0.11	-302.68	291.02	469.47 N	237.64 E	6,338,446.69	512,827.90	1.356	499.84	
783.69	90.25	359.53	-302.74	290.96	483.69 N	237.59 E	6,338,460.91	512,827.82	1.224	513.89	
797.69	90.00	358.86	-302.77	290.93	497.69 N	237.40 E	6,338,474.91	512,827.58	1.532	527.70	
811.75	90.42	358.92	-302.83	290.87	511.74 N	237.13 E	6,338,488.96	512,827.26	0.905	541.56	
825.75	90.07	358.79	-302.88	290.82	525.74 N	236.85 E	6,338,502.96	512,826.94	0.800	555.35	
840.25	90.66	359.04	-302.98	290.72	540.24 N	236.57 E	6,338,517.46	512,826.62	1.326	569.64	
854.25	90.91	0.18	-303.17	290.53	554.23 N	236.48 E	6,338,531.45	512,826.48	2.501	583.47	
868.02	90.45	0.64	-303.33	290.37	568.00 N	236.57 E	6,338,545.22	512,826.54	1.417	597.10	
882.02	90.41	0.67	-303.44	290.26	582.00 N	236.73 E	6,338,559.22	512,826.66	0.107	610.96	
895.93	89.67	0.29	-303.45	290.25	595.91 N	236.85 E	6,338,573.13	512,826.73	1.794	624.73	
909.93	88.76	0.18	-303.26	290.44	609.91 N	236.91 E	6,338,587.13	512,826.74	1.964	638.58	
923.77	88.96	0.12	-302.98	290.72	623.75 N	236.95 E	6,338,600.97	512,826.74	0.453	652.26	
937.77	89.40	359.81	-302.78	290.92	637.75 N	236.94 E	6,338,614.97	512,826.69	1.153	666.10	
951.84	89.61	0.12	-302.66	291.04	651.81 N	236.93 E	6,338,629.04	512,826.64	0.798	680.01	
965.84	90.24	0.24	-302.64	291.06	665.81 N	236.97 E	6,338,643.04	512,826.64	1.374	693.86	
979.83	90.68	0.45	-302.75	290.95	679.80 N	237.06 E	6,338,657.03	512,826.68	1.045	707.70	
993.83	89.73	0.36	-302.80	290.90	693.80 N	237.16 E	6,338,671.02	512,826.73	2.045	721.56	
1,007.62	89.71	0.50	-302.73	290.97	707.59 N	237.26 E	6,338,684.81	512,826.80	0.308	735.21	
1,021.62	90.21	0.77	-302.73	290.97	721.59 N	237.41 E	6,338,698.81	512,826.91	1.218	749.07	
1,035.99	90.33	0.53	-302.79	290.91	735.96 N	237.58 E	6,338,713.18	512,827.03	0.560	763.30	
1,049.99	89.50	0.38	-302.77	290.93	749.96 N	237.69 E	6,338,727.18	512,827.10	1.807	777.16	
1,064.04	89.76	0.57	-302.68	291.02	764.01 N	237.80 E	6,338,741.23	512,827.17	0.688	791.06	
1,078.04	90.00	0.26	-302.65	291.05	778.01 N	237.91 E	6,338,755.23	512,827.23	0.840	804.92	
1,092.22	90.19	0.67	-302.68	291.02	792.19 N	238.02 E	6,338,769.41	512,827.30	0.956	818.96	
1,106.22	90.18	0.65	-302.72	290.98	806.19 N	238.18 E	6,338,783.41	512,827.42	0.048	832.82	
1,120.03	89.45	0.00	-302.68	291.02	820.00 N	238.26 E	6,338,797.22	512,827.45	2.123	846.48	
1,134.03	89.53	359.86	-302.55	291.15	834.00 N	238.24 E	6,338,811.22	512,827.39	0.346	860.32	
1,147.84	89.75	0.01	-302.46	291.24	847.81 N	238.23 E	6,338,825.03	512,827.34	0.578	873.97	
1,161.84	89.92	359.97	-302.42	291.28	861.81 N	238.23 E	6,338,839.03	512,827.29	0.374	887.81	
1,175.88	90.27	0.10	-302.45	291.25	875.85 N	238.23 E	6,338,853.07	512,827.26	0.798	901.70	
1,189.88	90.91	0.17	-302.59	291.11	889.85 N	238.27 E	6,338,867.07	512,827.25	1.380	915.54	
1,203.67	92.12	0.64	-302.96	290.74	903.63 N	238.36 E	6,338,880.85	512,827.30	2.824	929.18	
1,217.67	90.40	359.77	-303.26	290.44	917.63 N	238.41 E	6,338,894.85	512,827.31	4.130	943.03	
1,231.60	90.24	0.34	-303.34	290.36	931.56 N	238.43 E	6,338,908.78	512,827.28	1.275	956.80	
1,245.60	89.43	0.02	-303.30	290.40	945.55 N	238.47 E	6,338,922.78	512,827.28	1.866	970.65	

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
Depth (m)	Inclination (°)	Azimuth (°)	System	Depth (m)	Northing (m)	Easting (m)	Northing (m)	Easting (m)			
1,259.69	88.81	0.24	-303.09	290.61	959.64 N	238.50 E	6,338,936.87	512,827.27	1.401	984.58	
1,273.69	89.12	0.06	-302.83	290.87	973.64 N	238.54 E	6,338,950.87	512,827.26	0.768	998.43	
1,287.88	89.84	359.52	-302.70	291.00	987.83 N	238.49 E	6,338,965.05	512,827.17	1.903	1,012.45	
1,301.88	90.05	359.15	-302.69	291.01	1,001.83 N	238.33 E	6,338,979.05	512,826.96	0.912	1,026.26	
1,315.87	89.69	359.20	-302.66	291.04	1,015.82 N	238.12 E	6,338,993.04	512,826.72	0.779	1,040.06	
1,329.87	89.81	359.87	-302.60	291.10	1,029.82 N	238.01 E	6,339,007.04	512,826.56	1.459	1,053.89	
1,343.69	89.36	0.84	-302.50	291.20	1,043.64 N	238.10 E	6,339,020.86	512,826.61	2.321	1,067.56	
1,357.69	89.67	0.36	-302.38	291.32	1,057.63 N	238.24 E	6,339,034.86	512,826.71	1.224	1,081.42	
1,372.15	90.02	0.56	-302.34	291.36	1,072.09 N	238.36 E	6,339,049.32	512,826.78	0.836	1,095.74	
1,386.15	90.72	0.40	-302.43	291.27	1,086.09 N	238.48 E	6,339,063.32	512,826.86	1.539	1,109.59	
1,399.98	90.62	359.94	-302.59	291.11	1,099.92 N	238.52 E	6,339,077.15	512,826.86	1.021	1,123.27	
1,413.98	89.46	359.88	-302.60	291.10	1,113.92 N	238.50 E	6,339,091.15	512,826.79	2.489	1,137.11	
1,427.47	89.86	359.95	-302.52	291.18	1,127.41 N	238.48 E	6,339,104.64	512,826.73	0.903	1,150.44	
1,441.47	90.20	0.01	-302.53	291.17	1,141.41 N	238.47 E	6,339,118.64	512,826.68	0.740	1,164.28	
1,455.04	90.51	0.52	-302.61	291.09	1,154.98 N	238.53 E	6,339,132.20	512,826.70	1.319	1,177.71	
1,469.04	90.58	0.25	-302.75	290.95	1,168.98 N	238.63 E	6,339,146.20	512,826.75	0.598	1,191.56	
1,482.94	90.71	0.23	-302.90	290.80	1,182.88 N	238.69 E	6,339,160.10	512,826.77	0.284	1,205.31	
1,496.94	90.31	0.11	-303.03	290.67	1,196.88 N	238.73 E	6,339,174.10	512,826.77	0.895	1,219.16	
1,510.56	89.14	359.83	-302.96	290.74	1,210.50 N	238.72 E	6,339,187.72	512,826.72	2.650	1,232.62	
1,524.56	89.34	359.82	-302.78	290.92	1,224.50 N	238.68 E	6,339,201.72	512,826.63	0.429	1,246.46	
1,538.02	89.67	0.41	-302.66	291.04	1,237.96 N	238.70 E	6,339,215.18	512,826.62	1.507	1,259.77	
1,552.02	89.51	359.94	-302.56	291.14	1,251.96 N	238.75 E	6,339,229.18	512,826.62	1.064	1,273.61	
1,565.87	89.78	0.38	-302.47	291.23	1,265.81 N	238.79 E	6,339,243.03	512,826.62	1.118	1,287.31	
1,579.87	89.79	359.93	-302.42	291.28	1,279.81 N	238.82 E	6,339,257.03	512,826.61	0.965	1,301.16	
1,593.90	90.04	359.91	-302.40	291.30	1,293.84 N	238.80 E	6,339,271.06	512,826.55	0.536	1,315.03	
1,607.90	90.33	0.23	-302.45	291.25	1,307.84 N	238.82 E	6,339,285.06	512,826.52	0.925	1,328.87	
1,622.08	90.81	0.32	-302.59	291.11	1,322.01 N	238.89 E	6,339,299.24	512,826.55	1.033	1,342.90	
1,636.08	90.73	0.38	-302.78	290.92	1,336.01 N	238.97 E	6,339,313.24	512,826.59	0.214	1,356.75	
1,650.00	89.89	0.26	-302.85	290.85	1,349.93 N	239.05 E	6,339,327.16	512,826.63	1.829	1,370.52	
1,664.00	90.09	0.02	-302.85	290.85	1,363.93 N	239.09 E	6,339,341.16	512,826.62	0.669	1,384.37	
1,678.11	90.30	359.95	-302.90	290.80	1,378.04 N	239.08 E	6,339,355.27	512,826.57	0.471	1,398.32	
1,692.11	90.44	0.24	-302.99	290.71	1,392.04 N	239.11 E	6,339,369.27	512,826.55	0.690	1,412.16	
1,705.96	90.45	0.34	-303.09	290.61	1,405.89 N	239.18 E	6,339,383.12	512,826.58	0.218	1,425.87	
1,719.96	89.92	0.24	-303.14	290.56	1,419.89 N	239.25 E	6,339,397.12	512,826.61	1.156	1,439.72	
1,734.56	89.05	0.75	-303.01	290.69	1,434.49 N	239.37 E	6,339,411.71	512,826.69	2.072	1,454.17	
1,748.56	89.18	0.67	-302.79	290.91	1,448.49 N	239.55 E	6,339,425.71	512,826.82	0.327	1,468.03	
1,762.72	89.60	0.78	-302.64	291.06	1,462.64 N	239.73 E	6,339,439.87	512,826.96	0.920	1,482.06	
1,776.72	90.24	0.57	-302.62	291.08	1,476.64 N	239.89 E	6,339,453.87	512,827.08	1.443	1,495.92	
1,791.38	90.51	0.64	-302.72	290.98	1,491.30 N	240.05 E	6,339,468.53	512,827.19	0.571	1,510.44	

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
					Northing (m)	Easting (m)	Northing (m)	Easting (m)			
1,805.38	90.35	0.32	-302.82	290.88	1,505.30 N	240.16 E	6,339,482.53	512,827.26	0.767	1,524.30	
1,819.43	90.46	0.40	-302.92	290.78	1,519.35 N	240.25 E	6,339,496.58	512,827.31	0.290	1,538.20	
1,833.43	90.28	0.24	-303.01	290.69	1,533.35 N	240.33 E	6,339,510.58	512,827.34	0.516	1,552.05	
1,847.36	89.35	359.80	-302.97	290.73	1,547.28 N	240.33 E	6,339,524.51	512,827.30	2.216	1,565.83	
1,859.00	89.23	359.46	-302.82	290.88	1,558.92 N	240.26 E	6,339,536.15	512,827.19	0.929	1,577.32	
1,870.00	89.37	359.48	-302.69	291.01	1,569.92 N	240.16 E	6,339,547.14	512,827.06	0.386	1,588.18	Liner Toe
1,880.00	89.50	359.50	-302.59	291.11	1,579.92 N	240.07 E	6,339,557.14	512,826.94	0.395	1,598.05	Extrap to TD

### Design Annotations

Measured Depth (m)	Vertical Depth (m)	Local Coordinates		Comment
		+N/-S (m)	+E/-W (m)	
9.20	9.20	0.00	0.00	RKB to GL
75.00	74.97	1.01	1.15	Interpolation @ Surface Casing
85.33	85.27	1.48	1.77	DDE-5°
348.62	259.48	78.71	149.18	DDE-80°
653.00	290.85	353.01	236.15	ICP
1,870.00	291.01	1,569.92	240.16	Liner Toe
1,880.00	291.11	1,579.92	240.07	Extrap to TD

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (m)
				+N/_S (m)	+E/-W (m)	
TD	No Target (Freehand)	8.64	Slot	0.00	0.00	0.00

### Survey tool program

From (m)	To (m)	Survey/Plan	Survey Tool
9.20	59.00	102/8-31(P123P8) Surface Job #905494619	MWD+IFR1(fd2)-no SAG
75.00	636.00	102/8-31(P123P8) Build Job #905494619	MWD+IFR1+MS(No SAG) (fd2)
653.00	1,880.00	102/8-3 (P123P8) Lateral Job #905494619	MWD+IFR1+MS(No SAG) (fd2)

## Design Report for SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) - Final Survey

**Casing Details**

Measured Depth (m)	Vertical Depth (m)	Name	Casing Diameter (mm)	Hole Diameter (mm)
656.00	290.87	Open Hole	0.00	375.00
1,880.00	291.11	Open Hole	0.00	270.00

**Design Targets**

Target Name - hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (m)	+N/-S (°)	+E/-W (°)	Northing (m)	Easting (m)	Latitude	Longitude
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**Directional Difficulty Index**

Average Dogleg over Survey:	3.103 °/30m	Maximum Dogleg over Survey:	12.813 °/30m at 314.31 m
Net Tortousity applicable to Plans:	0.799 °/30m	Directional Difficulty Index:	6.844

**Audit Info**

## North Reference Sheet for Pad 123(10-30-94-5W4) - SUNCOR P123P8 FIREBAG 8-31-94-5 - 102/8-31(P123P8) Lic #0490457

All data is in Meters unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to Actual RKB @ 593.70m (Nabors #102). Northing and Easting are relative to SUNCOR P123P8 FIREBAG 8-31-94-5

Coordinate System is Universal Transverse Mercator, Zone 12N (114 W to 108 W) using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is 111° 0' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:0° 0' 0.000 N°

False Easting: 500,000.00m, False Northing: 0.00m, Scale Reduction: 0.99960194

Grid Coordinates of Well: 6,337,976.50 m N, 512,591.70 m E

Geographical Coordinates of Well: 57° 11' 05.28" N, 110° 47' 30.08" W

Grid Convergence at Surface is: 0.18°

Based upon Minimum Curvature type calculations, at a Measured Depth of 1,880.00m

the Bottom Hole Displacement is 1,598.05m in the Direction of 8.64° ( True).

Magnetic Convergence at surface is: -14.20° (15 May 2013, , BGGM2018)

