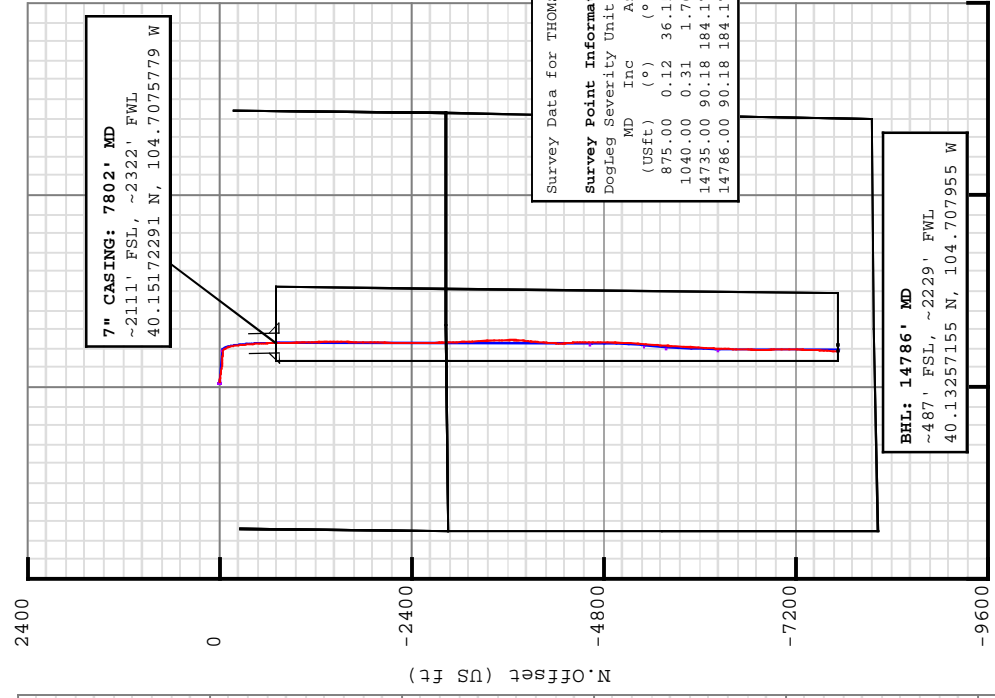


**Field: Wattenberg**  
Map Unit: USFT  
Projected Coordinate System: NAD83 / Colorado North (ftUS)

Vertical Reference Datum (VRD): Mean Sea Level

**Site: THOMSEN 6-7HZ Pad**  
Unit: USFeet TVD Reference:  
Company Name: Andarko Petroleum  
Position: Northing: 1299840.67USft Latitude: 40.153754°  
Easting: 3220948.57USft Longitude: -104.709538°  
North Reference: True Grid Convergence: 0.51°  
Elevation Above VRD: 4952.00USft

**Slot: THOMSEN 36C-18HZ**  
Position:  
Offset is from Site centre  
+N/-S: 1.09USft Northing: 1299842.30USft Latitude: 40.153757°  
+E/-W: 60.10USft Easting: 3221008.66USft Longitude: -104.709323°  
Elevation Above VRD: 4952.00USft



**7" CASING: 7802' MD**  
~2111' FSL, ~2322' FWL  
40.15172291 N, 104.7075779 W

**BHL: 14786' MD**  
~487' FSL, ~2229' FWL  
40.13257155 N, 104.707955 W

Survey Data for THOMSEN 36C-18HZ

**Survey Point Information:**  
Dogleg Severity Unit: °/100.00ft

MD (USft)	Inc (°)	Az (°)	TVD (USft)	Long (°)	Lat (°)
875.00	0.12	36.15	875.00	40.153753	-104.709321
1040.00	0.31	1.76	1039.99	40.153754	-104.709320
14735.00	90.18	184.17	7360.30	40.132711	-104.707942
14786.00	90.18	184.17	7360.14	40.132572	-104.707955

**Casing Point Information:**

Name	MD (USft)	TVD (USft)
7 in	7802.00	7349.34

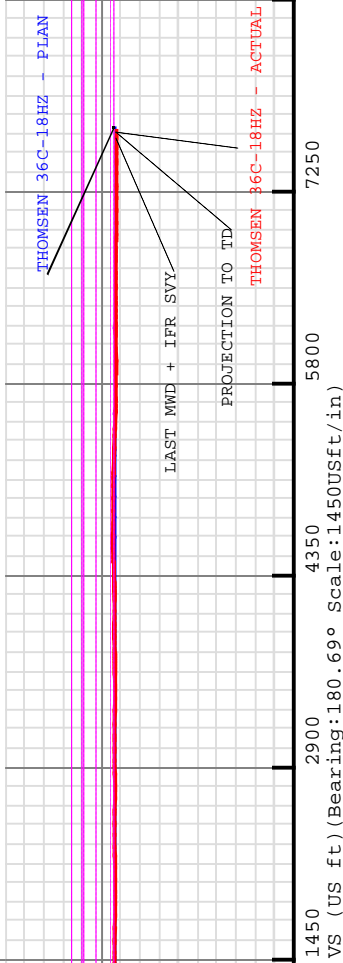
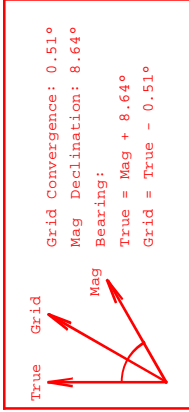
**Formation Point Information:**

Name	TVD Elevation (USft)	MD (USft)
SUSSEX	4624.00	353.00
SHARON SPRINGS	7035.00	-2058.00
TOP NIOBRARA	7105.00	-2128.00
NIOBRARA B	7129.00	-2152.00
NIOBRARA C	7212.00	-2235.00
FORT HAYS	7321.00	-2344.00
CODELL	7345.00	-2368.00

**Target Set Information:**

Name: 36C-18HZ  
Position offsets from Site centre

Name	TVD (USft)	+N/-S (USft)	+E/-W (USft)	Long (°)
36C-18HZ Rev. PBHL	7351.00	-7742.40	468.25	40.132500
36C-18HZ PBHL	7352.00	-7742.40	538.25	40.132500



**THOMSEN 36C-18HZ - ACTUAL**

VS (US ft) (Bearing: 180.69° Scale: 1450USft/in)



## FINAL SURVEYS







5D Survey Report

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**Andarko Petroleum**

**Field Name:** *Wattenberg*  
**Site Name:** *THOMSEN 6-7HZ Pad*  
**Well Name:** *THOMSEN 36C-18HZ*  
**Survey:** *Definitive Survey*

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**Weatherford®**

DEFINITIVE SURVEYS FOR THE THOMSEN 36C-18HZ

<b>Site Name</b> THOMSEN 6-7HZ Pad	<p><b>Units :</b> US ft</p> <p><b>North Reference :</b> True</p> <p><b>Northing :</b> 1299840.67 US ft</p> <p><b>Easting :</b> 3220948.57 US ft</p> <p><b>Convergence Angle :</b> 0.51</p> <p><b>Latitude :</b> 40.153754</p> <p><b>Longitude :</b> -104.709538</p> <p><b>Position</b></p> <p><b>Elevation above:</b>4952.00 US ft</p> <p><b>Comment :</b></p>
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<b>Slot Name</b> THOMSEN 36C-18HZ	<p><b>Position (Offsets relative to Site Centre)</b></p> <p><b>+N / -S :</b> 1.09 US ft</p> <p><b>+E / -W :</b> 60.10 US ft</p> <p><b>Northing :</b>1299842.30 US ft</p> <p><b>Easting :</b>3221008.66 US ft</p> <p><b>Latitude :</b> 40.153757</p> <p><b>Longitude :</b> -104.709323</p> <p><b>Slot TVD Reference :</b> Ground Elevation</p> <p><b>Elevation above :</b> 4952.00 US ft</p> <p><b>Comment :</b></p>
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<b>Well Name</b> THOMSEN 36C-18HZ	<p><b>Type :</b> Main well</p> <p><b>Rig Height</b> <i>Drill Floor</i> : 25.00 US ft</p> <p><b>Relative to :</b> 4977.00 US ft</p> <p><b>Closure Distance :</b> 7726.9 US ft</p> <p><b>Closure Azimuth :</b> 177.162°</p> <p><b>Vertical Section (Position of Origin Relative to Site )</b></p> <p><b>+N / -S :</b> 1.09 US ft</p> <p><b>+E / -W :</b> 60.10 US ft</p> <p><b>Az :</b>180.69°</p> <p><b>UWI :</b></p> <p><b>Comment :</b></p>
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<b>Target Set</b>	<p><b>Name :</b> 36C-18HZ</p> <p><b>Number of Targets :</b> 2</p>
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<b>Comment :</b>	<p><b>TargetName:</b> 36C-18HZ Rev. PBHL</p> <p><b>Shape:</b> Cuboid</p> <p><b>+N / -S :</b> -7742.40US ft</p> <p><b>+E / -W :</b> 468.25 US ft</p> <p><b>TVD (Drill Floor) :</b> 7351.00 US ft</p> <p><b>Position (Relative to centre)</b></p> <p><b>Northing :</b> 1292102.75 US ft</p> <p><b>Easting :</b> 3221485.82US ft</p> <p><b>Latitude :</b> 40°7'57.000014"</p> <p><b>Longitude :</b> -104°42'28.308051"</p> <p><b>Orientation</b></p> <p><b>Dimensions</b></p> <p><b>Azimuth :</b> 0.00°</p> <p><b>Length :</b> 1.00 US ft</p> <p><b>Inclination :</b> 0.00°</p> <p><b>Breadth :</b> 1.00 US ft</p> <p><b>Height :</b> 1.00 US ft</p>
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5D Survey Report

<b>TargetName:</b> 36C-18HZ PBHL	<b>Position (Relative to centre)</b>	
<b>Shape:</b> Cuboid	<b>+ N / -S : -7742.40US ft</b>	<b>Latitude : 40°7'57.000000"</b>
	<b>+ E / -W : 538.25 US ft</b>	<b>Longitude : -104°42'27.406800"</b>
	<b>TVD (Drill Floor) : 7352.00 US ft</b>	
<b>Orientation</b>	<b>Azimuth : 0.00°</b>	<b>Inclination : 0.00°</b>
<b>Dimensions</b>	<b>Length : 1.00 US ft</b>	<b>Breadth : 1.00 US ft</b>
		<b>Height : 1.00 US ft</b>

<b>Survey Name :Definitive Survey</b>		
<b>Date : 04/Mar/2013</b>	<b>Survey Tool :</b>	<b>Company :</b>
<b>Magnetic Model</b>		
<b>Model Name: BGGM</b>	<b>Date: 26/Feb/2013</b>	<b>Field Strength: 52775.5 nT</b>
<b>Survey Tool Ranges</b>		<b>Declination: 8.64°</b>
<b>Name</b>	<b>Start MD (us ft)</b>	<b>End MD (us ft)</b>
NSG Static GMS	0.00	875.00
MWD + IFR	875.00	14786.00
		SURFACE GYRC
		MWD+IFR

<b>Casing Points (Relative to centre, TVD relative to Drill Floor )</b>	<b>Name</b>	<b>MD (US ft)</b>
		7 in
		7802.00
		7349.34

Well path created using minimum curvature

<b>Survey Points (Relative to centre, TVD relative to Drill Floor )</b>													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N Offset (US ft)	E Offset (US ft)	Nothing (US ft)	Easting (US ft)	Latitude (°)	Longitude (°)	ΔLS (°/100 US ft)	ΔLS (US ft)	VS (US ft)	Comment
0.00	0.00	0.00	0.00	1.09	60.10	1299842.30	3221008.66	40.153757	-104.709323	0.00	-0.00	-0.00	2
25.00	0.00	0.00	25.00	1.09	60.10	1299842.30	3221008.66	40.153757	-104.709323	0.00	-0.00	-0.00	
125.00	0.24	184.93	125.00	0.88	60.08	1299842.09	3221008.64	40.153756	-104.709323	0.24	0.21	0.21	
225.00	0.20	74.35	225.00	0.72	60.23	1299841.93	3221008.80	40.153756	-104.709323	0.36	0.37	0.37	
325.00	0.16	169.27	325.00	0.63	60.42	1299841.84	3221008.99	40.153756	-104.709322	0.27	0.46	0.46	
425.00	0.45	132.93	425.00	0.22	60.74	1299841.44	3221009.31	40.153755	-104.709321	0.33	0.86	0.86	
525.00	0.14	318.89	525.00	0.05	60.95	1299841.27	3221009.52	40.153754	-104.709320	0.59	1.03	1.03	
625.00	0.29	161.14	625.00	-0.10	60.95	1299841.12	3221009.52	40.153754	-104.709320	0.42	1.18	1.18	
725.00	0.28	284.78	725.00	-0.28	60.79	1299840.94	3221009.37	40.153753	-104.709321	0.50	1.36	1.36	
825.00	0.30	147.96	825.00	-0.44	60.69	1299840.78	3221009.27	40.153753	-104.709321	0.54	1.52	1.52	
875.00	0.12	36.15	875.00	-0.50	60.80	1299840.71	3221009.37	40.153753	-104.709321	0.72	1.58	1.58	TIE ON
1040.00	0.31	1.76	1039.99	0.08	60.91	1299841.30	3221009.48	40.153754	-104.709320	0.13	1.00	1.00	FIRST MWD + IFR SVY

5D Survey Report

Survey Points (Relative to centre, TVD relative to Drill Floor )													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	∇.Offset (US ft)	F.Offset (US ft)	Northing (US ft)	Eastng (US ft)	Latitude (°)	Longitude (°)	∇.S (°/100 US ft)	∇.S (US ft)	Comment	
1131.00	0.43	7.72	1130.99	0.67	60.96	1299841.88	3221009.53	40.153756	-104.709320	0.14	0.41		
1223.00	0.25	347.53	1222.99	1.20	60.97	1299842.42	3221009.53	40.153757	-104.709320	0.23	-0.13		
1314.00	0.25	13.24	1313.99	1.59	60.97	1299842.81	3221009.53	40.153758	-104.709320	0.12	-0.51		
1405.00	0.35	7.39	1404.99	2.06	61.05	1299843.28	3221009.60	40.153760	-104.709320	0.11	-0.98		
1497.00	0.36	343.35	1496.99	2.62	61.00	1299843.83	3221009.55	40.153761	-104.709320	0.16	-1.54		
1589.00	0.49	307.22	1588.98	3.13	60.61	1299844.35	3221009.15	40.153763	-104.709321	0.32	-2.05		
1773.00	0.47	292.70	1772.98	3.90	59.29	1299845.10	3221007.82	40.153765	-104.709326	0.07	-2.80		
1865.00	0.66	302.18	1864.97	4.33	58.49	1299845.52	3221007.02	40.153766	-104.709329	0.23	-3.22		
1956.00	0.58	322.72	1955.97	4.97	57.77	1299846.16	3221006.29	40.153768	-104.709331	0.26	-3.85		
2046.00	0.92	303.04	2045.96	5.73	56.88	1299846.91	3221005.41	40.153770	-104.709334	0.47	-4.60		
2138.00	1.27	301.36	2137.94	6.66	55.40	1299847.83	3221003.91	40.153772	-104.709340	0.38	-5.51		
2230.00	0.35	73.05	2229.94	7.27	54.79	1299848.44	3221003.30	40.153774	-104.709342	1.66	-6.12		
2223.00	0.45	55.48	2322.93	7.56	55.37	1299848.73	3221003.87	40.153775	-104.709340	0.17	-6.42		
2507.00	0.45	311.25	2506.93	8.45	55.42	1299849.62	3221003.91	40.153777	-104.709340	0.39	-7.30		
2599.00	1.59	193.33	2598.92	7.45	54.85	1299848.61	3221003.36	40.153774	-104.709342	2.00	-6.29		
2692.00	1.82	158.56	2691.88	4.82	55.09	1299845.98	3221003.62	40.153767	-104.709341	1.12	-3.67		
2784.00	1.20	148.98	2783.85	2.63	56.12	1299843.80	3221004.67	40.153761	-104.709337	0.73	-1.49		
2879.00	0.47	159.69	2878.84	1.41	56.77	1299842.59	3221005.33	40.153758	-104.709335	0.78	-0.28		
2975.00	1.12	86.11	2974.83	1.11	57.85	1299842.30	3221006.41	40.153757	-104.709331	1.13	0.01		
3070.00	2.30	103.21	3069.79	0.73	60.63	1299841.95	3221009.19	40.153756	-104.709321	1.34	0.35		
3165.00	3.50	86.80	3164.66	0.46	65.38	1299841.72	3221013.95	40.153755	-104.709304	1.52	0.57		
3260.00	3.53	91.58	3259.49	0.54	71.20	1299841.85	3221019.76	40.153755	-104.709283	0.31	0.41		
3355.00	4.56	93.11	3354.24	0.25	77.97	1299841.62	3221026.54	40.153755	-104.709259	1.19	0.62		
3450.00	5.89	89.46	3448.84	0.09	86.70	1299841.54	3221035.27	40.153754	-104.709228	1.34	0.68		
3545.00	6.45	101.82	3543.29	-0.96	96.80	1299840.58	3221045.38	40.153751	-104.709192	1.51	1.61		
3640.00	6.50	100.24	3637.69	-3.01	107.31	1299838.62	3221055.91	40.153746	-104.709154	1.19	3.53		
3735.00	6.35	94.50	3732.09	-4.38	117.84	1299837.35	3221066.45	40.153742	-104.709116	0.69	4.77		
3829.00	6.06	90.04	3825.54	-4.79	127.99	1299837.03	3221076.60	40.153741	-104.709080	0.60	5.06		
3924.00	5.98	98.72	3920.02	-5.54	137.89	1299836.36	3221086.51	40.153739	-104.709045	0.96	5.69		
4019.00	6.47	100.44	4014.46	-7.26	148.05	1299834.73	3221096.68	40.153734	-104.709008	0.55	7.29		
4114.00	7.84	102.48	4108.72	-9.63	159.64	1299832.47	3221108.29	40.153728	-104.708967	1.47	9.52		
4208.00	8.23	97.21	4201.79	-11.86	172.57	1299830.35	3221121.25	40.153721	-104.708921	0.89	11.60		
4303.00	6.11	97.98	4296.05	-13.42	184.33	1299828.90	3221133.01	40.153717	-104.708879	2.23	13.01		
4398.00	5.28	92.60	4390.58	-14.32	193.70	1299828.08	3221142.40	40.153715	-104.708845	1.04	13.80		
4492.00	5.39	97.69	4484.17	-15.10	202.40	1299827.38	3221151.10	40.153713	-104.708814	0.52	14.48		
4587.00	5.27	102.17	4578.76	-16.62	211.08	1299825.94	3221159.80	40.153708	-104.708783	0.46	15.89		
4682.00	6.07	100.89	4673.29	-18.49	220.28	1299824.15	3221169.01	40.153703	-104.708750	0.85	17.65		
4776.00	6.98	106.54	4766.69	-21.05	230.64	1299821.68	3221179.39	40.153696	-104.708713	1.18	20.09		
4871.00	7.77	101.25	4860.90	-23.95	242.47	1299818.89	3221191.25	40.153688	-104.708671	1.10	22.84		
4966.00	8.21	96.43	4954.98	-25.96	255.51	1299816.99	3221204.30	40.153683	-104.708624	0.84	24.70		
5060.00	7.74	95.47	5048.07	-27.32	268.48	1299815.75	3221217.29	40.153679	-104.708578	0.52	25.90		

5D Survey Report

Survey Points (Relative to centre, TVD relative to Drill Floor )													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	∇.Offset (US ft)	∇.Offset (US ft)	∇.Offset (US ft)	Northing (US ft)	Easting (US ft)	Latitude (°)	Longitude (°)	∇.S (°/100 US ft)	∇.S (US ft)	Comment
5155.00	8.64	94.35	5142.10	-28.47	281.96	1299814.72	3221230.78	40.153676	-104.708529	0.96	26.89		
5250.00	8.93	92.64	5235.99	-29.35	296.44	1299813.97	3221245.27	40.153673	-104.708477	0.41	27.59		
5345.00	7.23	92.24	5330.04	-29.92	309.78	1299813.51	3221258.61	40.153672	-104.708430	1.79	28.00		
5439.00	6.78	90.44	5423.34	-30.20	321.24	1299813.34	3221270.07	40.153671	-104.708389	0.53	28.14		
5534.00	6.75	90.48	5517.68	-30.29	332.43	1299813.35	3221281.26	40.153671	-104.708349	0.03	28.10		
5629.00	6.40	86.23	5612.05	-29.99	343.30	1299813.75	3221292.13	40.153672	-104.708310	0.63	27.66		
5723.00	6.19	94.33	5705.49	-30.02	353.58	1299813.80	3221302.41	40.153672	-104.708273	0.97	27.58		
5818.00	5.59	97.94	5799.98	-31.05	363.27	1299812.86	3221312.11	40.153669	-104.708238	0.74	28.49		
5912.00	6.32	96.93	5893.48	-32.31	372.94	1299811.69	3221321.79	40.153665	-104.708204	0.78	29.63		
6007.00	7.61	92.59	5987.77	-33.22	384.42	1299810.88	3221333.27	40.153663	-104.708163	1.47	30.40		
6102.00	7.08	90.65	6081.99	-33.57	396.55	1299810.64	3221345.41	40.153662	-104.708119	0.62	30.61		
6196.00	7.04	94.93	6175.28	-34.13	408.09	1299810.18	3221356.95	40.153660	-104.708078	0.56	31.03		
6291.00	7.00	98.32	6269.57	-35.47	419.61	1299808.95	3221368.49	40.153657	-104.708037	0.44	32.23		
6386.00	7.09	98.72	6363.85	-37.20	431.14	1299807.32	3221380.03	40.153652	-104.707996	0.11	33.82		
6480.00	7.46	91.82	6457.10	-38.27	442.97	1299806.35	3221391.87	40.153649	-104.707953	1.01	34.75		
6575.00	5.81	91.73	6551.46	-38.61	453.94	1299806.11	3221402.84	40.153648	-104.707914	1.74	34.96		
6638.00	5.36	110.41	6614.16	-39.73	459.89	1299805.04	3221408.80	40.153645	-104.707893	2.96	36.01		
6670.00	8.40	131.17	6645.94	-41.80	463.05	1299803.01	3221411.98	40.153639	-104.707881	12.13	38.03		
6701.00	11.17	146.18	6676.49	-45.78	466.43	1299799.05	3221415.39	40.153628	-104.707869	12.08	41.98		
6733.00	13.31	156.35	6707.76	-51.73	469.63	1299793.13	3221418.65	40.153612	-104.707858	9.47	47.89		
6764.00	13.51	154.30	6737.92	-58.26	472.63	1299786.63	3221421.71	40.153594	-104.707847	1.66	54.38		
6796.00	12.91	151.67	6769.07	-64.78	475.95	1299780.14	3221425.08	40.153576	-104.707835	2.65	60.86		
6827.00	13.31	150.96	6799.26	-70.95	479.32	1299774.00	3221428.51	40.153559	-104.707823	1.39	66.98		
6859.00	13.63	149.91	6830.38	-77.43	483.00	1299767.55	3221432.25	40.153541	-104.707810	1.26	73.42		
6890.00	12.62	147.24	6860.57	-83.44	486.67	1299761.58	3221435.96	40.153525	-104.707797	3.80	79.38		
6922.00	13.00	147.46	6891.77	-89.41	490.49	1299755.64	3221439.85	40.153509	-104.707783	1.20	85.31		
6953.00	15.63	155.87	6921.81	-96.16	494.08	1299748.92	3221443.49	40.153490	-104.707770	10.79	92.02		
6985.00	18.77	161.11	6952.38	-104.97	497.51	1299740.14	3221447.00	40.153466	-104.707758	10.93	100.79		
7017.00	20.07	161.64	6982.56	-115.06	500.90	1299730.09	3221450.48	40.153438	-104.707746	4.10	110.83		
7048.00	22.24	164.41	7011.47	-125.76	504.16	1299719.42	3221453.83	40.153409	-104.707734	7.71	121.49		
7080.00	25.79	168.81	7040.70	-138.42	507.14	1299706.78	3221456.92	40.153374	-104.707724	12.42	134.12		
7111.00	28.88	169.45	7068.23	-152.40	509.82	1299692.82	3221459.73	40.153336	-104.707714	10.01	148.06		
7143.00	32.19	171.01	7095.79	-168.42	512.56	1299676.83	3221462.62	40.153292	-104.707704	10.64	164.05		
7174.00	35.72	172.64	7121.50	-185.56	515.01	1299659.71	3221465.22	40.153245	-104.707696	11.76	181.16		
7206.00	38.60	173.67	7147.00	-204.75	517.31	1299640.55	3221467.69	40.153192	-104.707687	9.21	200.32		
7237.00	41.69	174.25	7170.69	-224.62	519.41	1299620.69	3221469.97	40.153137	-104.707680	10.04	220.16		
7269.00	45.40	174.46	7193.88	-246.56	521.58	1299598.78	3221472.33	40.153077	-104.707672	11.60	242.07		
7300.00	49.65	175.02	7214.81	-269.32	523.67	1299576.03	3221474.62	40.153015	-104.707665	13.77	264.81		
7332.00	52.82	174.03	7234.85	-294.15	526.06	1299551.22	3221477.23	40.152946	-104.707656	10.20	289.61		
7363.00	55.78	175.53	7252.94	-319.22	528.34	1299526.18	3221479.74	40.152878	-104.707648	10.32	314.65		
7395.00	59.79	175.04	7269.99	-346.20	530.57	1299499.22	3221482.21	40.152804	-104.707640	12.60	341.59		

## 5D Survey Report

Survey Points (Relative to centre, TVD relative to Drill Floor )												
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	∇.Offset (US ft)	∇.Offset (US ft)	Northing (US ft)	Eastng (US ft)	Latitude (°)	Longitude (°)	∇LS (°/100 US ft)	∇S (US ft)	Comment
7426.00	64.00	174.66	7284.59	-373.42	533.02	1299472.02	3221484.90	40.152729	-104.707631	13.62	366.79	
7458.00	58.30	175.86	7297.53	-402.58	535.44	1299442.88	3221487.58	40.152649	-104.707622	13.87	397.92	
7490.00	70.83	175.90	7308.70	-432.49	537.59	1299412.99	3221490.00	40.152567	-104.707615	7.91	427.80	
7521.00	73.42	176.60	7318.21	-461.93	539.52	1299383.57	3221492.19	40.152486	-104.707608	8.63	457.21	
7553.00	75.89	177.29	7326.68	-492.74	541.16	1299352.78	3221494.11	40.152401	-104.707602	7.99	488.00	
7584.00	78.09	177.50	7333.66	-522.91	542.53	1299322.62	3221495.75	40.152319	-104.707597	7.13	518.15	
7616.00	80.88	177.83	7339.50	-554.35	543.82	1299291.20	3221497.31	40.152232	-104.707593	8.78	549.57	
7647.00	84.40	178.00	7343.47	-585.06	544.93	1299260.49	3221498.70	40.152148	-104.707589	11.37	580.27	
7679.00	86.78	178.25	7345.93	-616.95	545.98	1299228.62	3221500.03	40.152060	-104.707585	7.48	612.14	
7710.00	88.39	179.25	7347.24	-647.91	546.65	1299197.66	3221500.98	40.151975	-104.707582	6.11	643.10	
7742.00	88.60	179.33	7348.08	-679.90	547.05	1299165.68	3221501.66	40.151888	-104.707581	0.70	675.08	
7802.00	88.98	179.05	7349.34	-739.88	547.89	1299105.71	3221503.04	40.151723	-104.707578	0.78	735.04	7 in
7934.00	89.82	178.45	7350.72	-871.84	550.77	1298973.78	3221507.09	40.151361	-104.707568	0.78	866.96	
8027.00	90.88	178.27	7350.16	-964.80	553.43	1298880.85	3221510.58	40.151105	-104.707558	1.16	959.88	
8119.00	89.51	178.22	7349.84	-1056.75	556.25	1298788.92	3221514.22	40.150853	-104.707548	1.49	1051.79	
8210.00	91.11	178.70	7349.35	-1147.72	558.69	1298697.98	3221517.47	40.150603	-104.707539	1.84	1142.72	
8302.00	91.48	178.38	7347.27	-1239.66	561.04	1298606.06	3221520.64	40.150351	-104.707531	0.53	1234.63	
8393.00	90.18	178.10	7345.95	-1330.61	563.83	1298515.15	3221524.24	40.150101	-104.707521	1.46	1325.53	
8485.00	90.06	179.98	7345.76	-1422.59	565.37	1298423.18	3221526.60	40.149849	-104.707515	2.05	1417.49	
8576.00	90.35	181.80	7345.44	-1513.58	563.96	1298332.19	3221526.00	40.149599	-104.707521	2.03	1508.49	
8668.00	89.21	181.27	7345.79	-1605.54	561.49	1298240.20	3221524.36	40.149347	-104.707529	1.37	1600.47	
8760.00	88.94	181.10	7347.27	-1697.51	559.59	1298148.22	3221523.27	40.149094	-104.707536	0.35	1692.46	
8852.00	88.85	180.57	7349.05	-1789.48	558.25	1298056.24	3221522.75	40.148842	-104.707541	0.58	1784.44	
8944.00	89.12	180.57	7350.68	-1881.46	557.34	1297964.26	3221522.66	40.148589	-104.707544	0.29	1876.43	
9035.00	90.37	181.80	7351.08	-1972.44	555.45	1297873.27	3221521.59	40.148339	-104.707551	1.93	1967.42	
9125.00	90.93	181.82	7350.06	-2062.39	552.61	1297783.30	3221519.55	40.148092	-104.707561	0.62	2057.40	
9217.00	90.62	180.92	7348.82	-2154.35	550.41	1297691.32	3221518.17	40.147840	-104.707569	1.03	2149.38	
9309.00	91.17	180.60	7347.38	-2246.33	548.19	1297599.33	3221517.77	40.147587	-104.707573	0.69	2241.37	
9372.00	90.49	180.28	7346.47	-2309.32	548.71	1297536.34	3221517.85	40.147415	-104.707575	1.19	2304.36	
9464.00	90.43	180.31	7345.73	-2401.32	548.23	1297444.34	3221518.19	40.147162	-104.707577	0.07	2396.36	
9555.00	89.69	179.29	7345.63	-2492.32	548.55	1297353.35	3221519.32	40.146912	-104.707576	1.38	2487.34	
9648.00	88.46	178.75	7347.13	-2585.29	550.14	1297260.39	3221521.74	40.146657	-104.707570	1.44	2580.29	
9741.00	89.38	179.25	7348.89	-2678.26	551.77	1297167.44	3221524.19	40.146402	-104.707564	1.13	2673.23	
9833.00	90.79	178.80	7348.75	-2770.24	553.33	1297075.48	3221526.58	40.146149	-104.707559	1.61	2765.19	
9928.00	90.97	178.63	7347.29	-2865.20	555.46	1296980.54	3221529.55	40.145889	-104.707551	0.26	2860.12	
10023.00	90.88	176.86	7345.76	-2960.12	559.20	1296885.66	3221534.14	40.145628	-104.707538	1.87	2954.98	
10117.00	89.94	177.87	7345.09	-3054.01	563.52	1296791.81	3221539.29	40.145370	-104.707522	1.47	3048.82	
10212.00	88.89	176.85	7346.06	-3148.90	567.89	1296696.96	3221544.52	40.145110	-104.707507	1.54	3143.65	
10306.00	89.88	177.47	7347.06	-3242.78	572.55	1296603.13	3221550.01	40.144852	-104.707490	1.24	3237.46	
10401.00	89.08	177.60	7347.93	-3337.69	576.64	1296508.26	3221554.94	40.144592	-104.707475	0.85	3332.31	
10495.00	89.51	177.97	7349.08	-3431.61	580.27	1296414.37	3221559.41	40.144334	-104.707462	0.60	3426.19	

5D Survey Report

Survey Points (Relative to centre, TVD relative to Drill Floor )												
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N Offset (US ft)	E Offset (US ft)	Northing (US ft)	Eastng (US ft)	Latitude (°)	Longitude (°)	CLS (°/100 US ft)	VS (US ft)	Comment
10590.00	90.86	178.57	7348.78	-3526.56	585.14	1296319.45	3221563.12	40.144073	-104.707452	1.56	3521.10	
10685.00	90.70	178.84	7348.06	-3621.54	585.29	1296224.50	3221566.12	40.143812	-104.707444	0.95	3616.04	
10779.00	89.74	182.51	7348.28	-3715.51	584.18	1296130.52	3221565.85	40.143554	-104.707446	3.91	3710.02	
10874.00	92.65	186.70	7346.30	-3810.15	576.56	1296035.81	3221559.07	40.143295	-104.707476	5.37	3804.75	
10968.00	91.15	184.80	7343.18	-3903.62	567.15	1295942.26	3221550.49	40.143038	-104.707509	2.57	3898.32	
11063.00	88.58	184.76	7343.40	-3998.28	559.23	1295847.53	3221543.42	40.142778	-104.707538	2.71	3993.07	
11158.00	90.25	183.44	7344.37	-4093.03	552.44	1295752.73	3221537.48	40.142518	-104.707562	2.24	4087.89	
11252.00	90.25	184.67	7343.96	-4186.79	545.79	1295658.91	3221531.67	40.142261	-104.707586	1.31	4181.73	
11347.00	90.80	177.63	7343.09	-4281.71	543.89	1295563.98	3221530.61	40.142000	-104.707593	7.43	4276.66	
11441.00	90.99	174.54	7341.62	-4375.47	550.30	1295470.29	3221537.86	40.141743	-104.707570	3.29	4370.34	
11536.00	93.88	178.82	7337.58	-4470.19	555.80	1295375.62	3221544.20	40.141483	-104.707550	5.43	4464.99	
11631.00	90.86	178.46	7333.66	-4565.07	558.05	1295280.76	3221547.30	40.141222	-104.707542	3.20	4559.83	
11725.00	89.32	179.75	7333.51	-4659.05	559.52	1295186.79	3221549.60	40.140964	-104.707537	2.14	4653.79	
11820.00	89.91	181.10	7334.15	-4754.05	558.82	1295091.80	3221549.75	40.140703	-104.707539	1.55	4748.79	
11914.00	89.94	181.77	7334.27	-4848.02	556.46	1294997.81	3221548.23	40.140446	-104.707548	0.71	4842.78	
12009.00	89.57	181.87	7334.68	-4942.97	553.45	1294902.84	3221546.06	40.140185	-104.707558	0.40	4937.76	
12482.00	87.66	185.15	7346.21	-5414.96	526.74	1294430.63	3221523.56	40.138889	-104.707654	1.09	5410.03	
12577.00	88.40	183.62	7349.48	-5509.62	519.48	1294335.91	3221517.14	40.138629	-104.707680	1.79	5504.78	
12671.00	87.29	183.82	7353.01	-5603.35	513.38	1294242.12	3221511.89	40.138372	-104.707702	1.20	5598.58	
12766.00	89.69	183.02	7355.52	-5698.14	507.72	1294147.28	3221507.07	40.138112	-104.707722	2.66	5693.43	
12861.00	90.06	183.47	7355.73	-5792.99	502.34	1294052.39	3221502.53	40.137851	-104.707741	0.61	5788.33	
12955.00	89.63	183.17	7355.98	-5886.83	496.90	1293958.51	3221497.93	40.137594	-104.707761	0.56	5882.23	
13050.00	90.62	182.85	7355.77	-5981.70	491.91	1293863.60	3221493.78	40.137333	-104.707779	1.10	5977.16	
13144.00	90.74	182.99	7354.66	-6075.57	487.12	1293769.69	3221489.83	40.137076	-104.707796	0.20	6071.08	
13239.00	90.68	183.81	7353.48	-6170.40	481.49	1293674.82	3221485.05	40.136815	-104.707816	0.87	6165.96	
13334.00	89.44	181.01	7353.38	-6265.30	477.49	1293579.88	3221481.90	40.136555	-104.707830	3.22	6260.91	
13428.00	89.94	182.92	7353.89	-6359.24	474.27	1293485.92	3221479.51	40.136297	-104.707842	2.10	6354.88	
13523.00	89.57	181.26	7354.30	-6454.17	470.81	1293390.96	3221476.89	40.136036	-104.707854	1.79	6449.85	
13617.00	89.82	182.51	7354.80	-6548.12	467.71	1293296.99	3221474.64	40.135778	-104.707865	1.36	6543.82	
13712.00	90.18	180.90	7354.80	-6643.07	464.89	1293202.01	3221472.66	40.135518	-104.707875	1.74	6638.80	
13807.00	90.06	180.91	7354.60	-6738.06	463.39	1293107.01	3221472.01	40.135257	-104.707881	0.13	6733.80	
13901.00	88.58	178.44	7355.71	-6832.04	463.92	1293013.04	3221473.38	40.134999	-104.707879	3.06	6827.77	
13996.00	89.94	179.33	7356.94	-6927.01	465.77	1292918.09	3221476.07	40.134738	-104.707872	1.71	6922.71	
14090.00	89.32	180.04	7357.55	-7021.01	466.28	1292824.10	3221477.43	40.134480	-104.707870	1.00	7016.70	
14185.00	88.83	180.25	7359.08	-7116.00	466.04	1292729.12	3221478.03	40.134220	-104.707871	0.56	7111.68	
14279.00	89.63	180.19	7360.34	-7209.99	465.68	1292635.13	3221478.51	40.133962	-104.707872	0.85	7205.67	
14374.00	89.94	181.43	7360.70	-7304.97	464.34	1292540.13	3221478.01	40.133701	-104.707877	1.35	7300.66	

## 5D Survey Report

Survey Points (Relative to centre, TVD relative to Drill Floor)												
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N. Offset (US ft)	E. Offset (US ft)	Northing (US ft)	Eastng (US ft)	Latitude (°)	Longitude (°)	DLS (°/100 US ft)	VS (US ft)	Comment
14469.00	90.55	182.29	7360.29	-7399.92	461.26	1292445.16	3221475.78	40.133440	-104.707888	1.11	7395.64	
14563.00	89.26	182.62	7360.45	-7493.83	457.23	1292351.22	3221472.59	40.133182	-104.707903	1.42	7489.60	
14658.00	90.43	183.96	7360.71	-7588.67	451.78	1292256.33	3221467.98	40.132922	-104.707922	1.87	7584.49	
14735.00	90.18	184.17	7360.30	-7665.48	446.32	1292179.48	3221463.21	40.132711	-104.707942	0.42	7661.36	LAST MWD + IFR SVY
14786.00	90.18	184.17	7360.14	-7716.34	442.61	1292128.59	3221459.95	40.132572	-104.707955	0.00	7712.26	PROJECTION TO TC

Formation Points (Relative to centre, TVD relative to Drill Floor)					
Name	MC (US ft)	TVD (US ft)	F. Dip (°)	F. Dir (°)	
SUSSEX	4632.45	4624.00	0	0	
SHARON SPRINGS	7073.69	7035.00	0	0	
TOP NIOBRARA	7153.96	7105.00	0	0	
NIOBRARA B	7183.29	7129.00	0	0	
NIOBRARA C	7295.68	7212.00	0	0	
FORT HAYS	7530.99	7321.00	0	0	
CODELL	7664.77	7345.00	0	0	