

PDC ENERGY

**WELD COUNTY, COLORADO
NE NW SEC. 19 T4N R63W 6th P.M.
SATER 19M-243ST**

SIDETRACK - JOB #2016-10-135

14 March, 2016

Plan: PROPOSAL #5



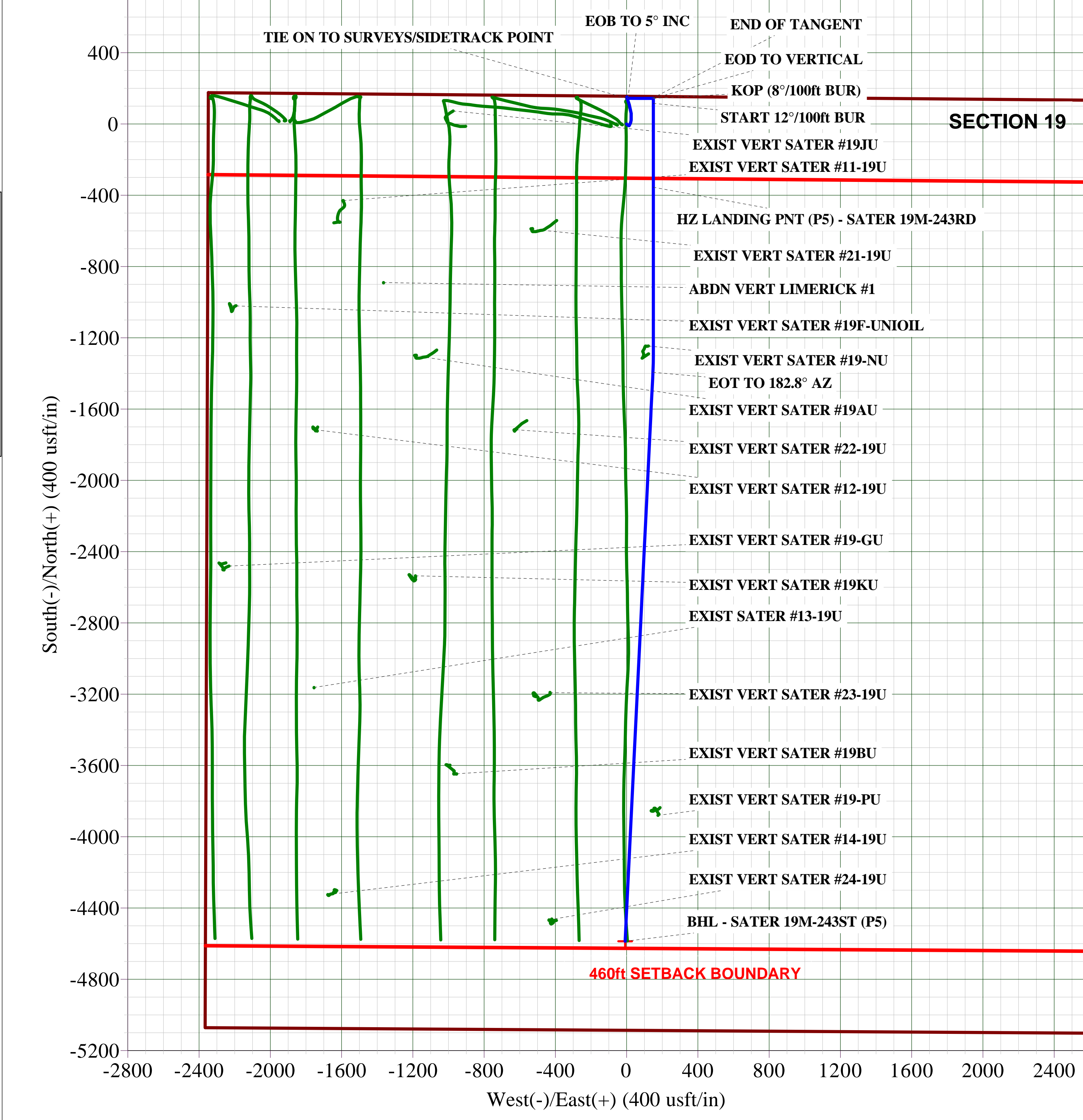
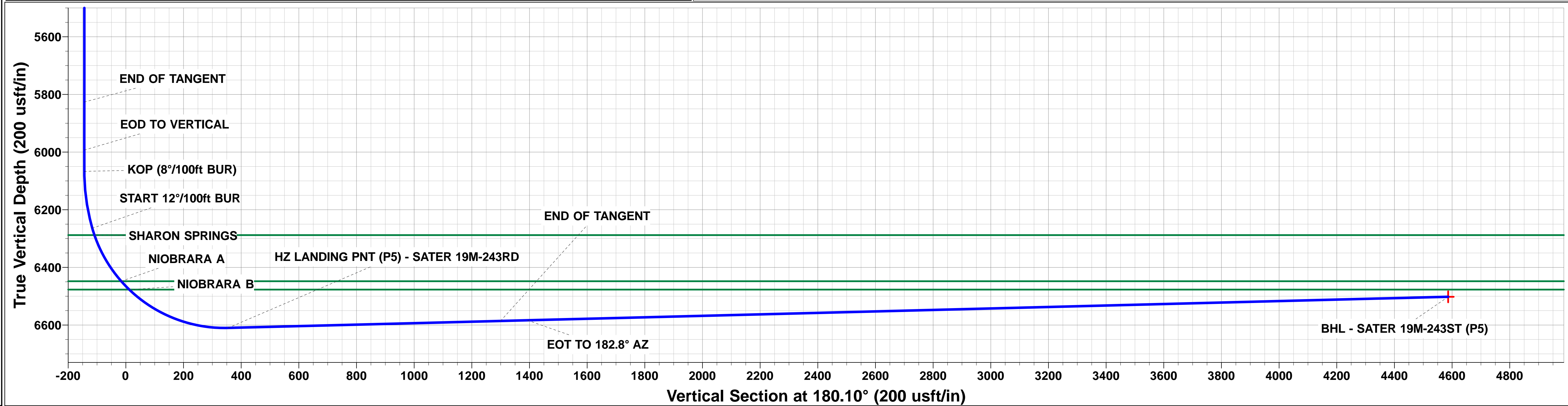
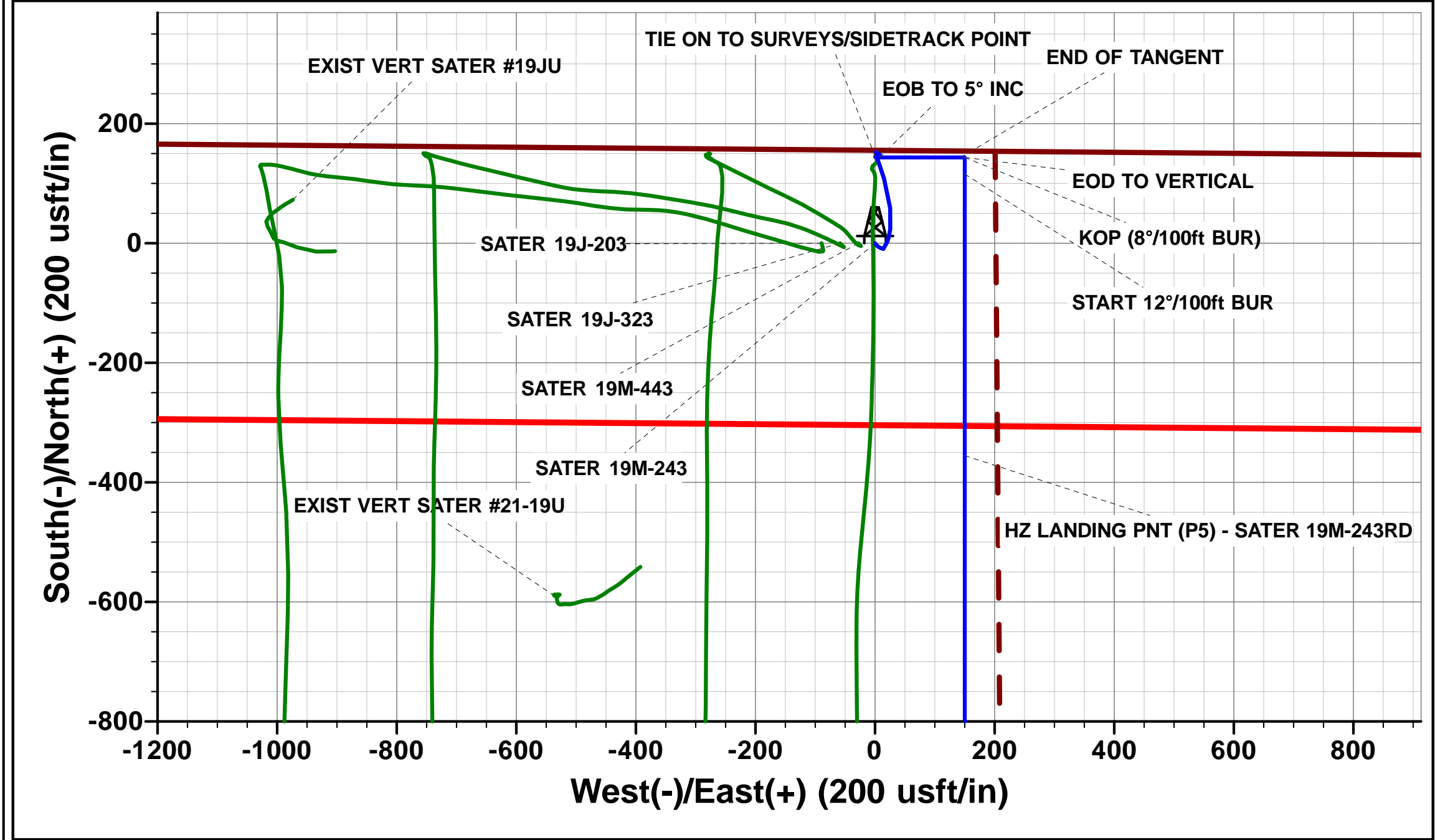
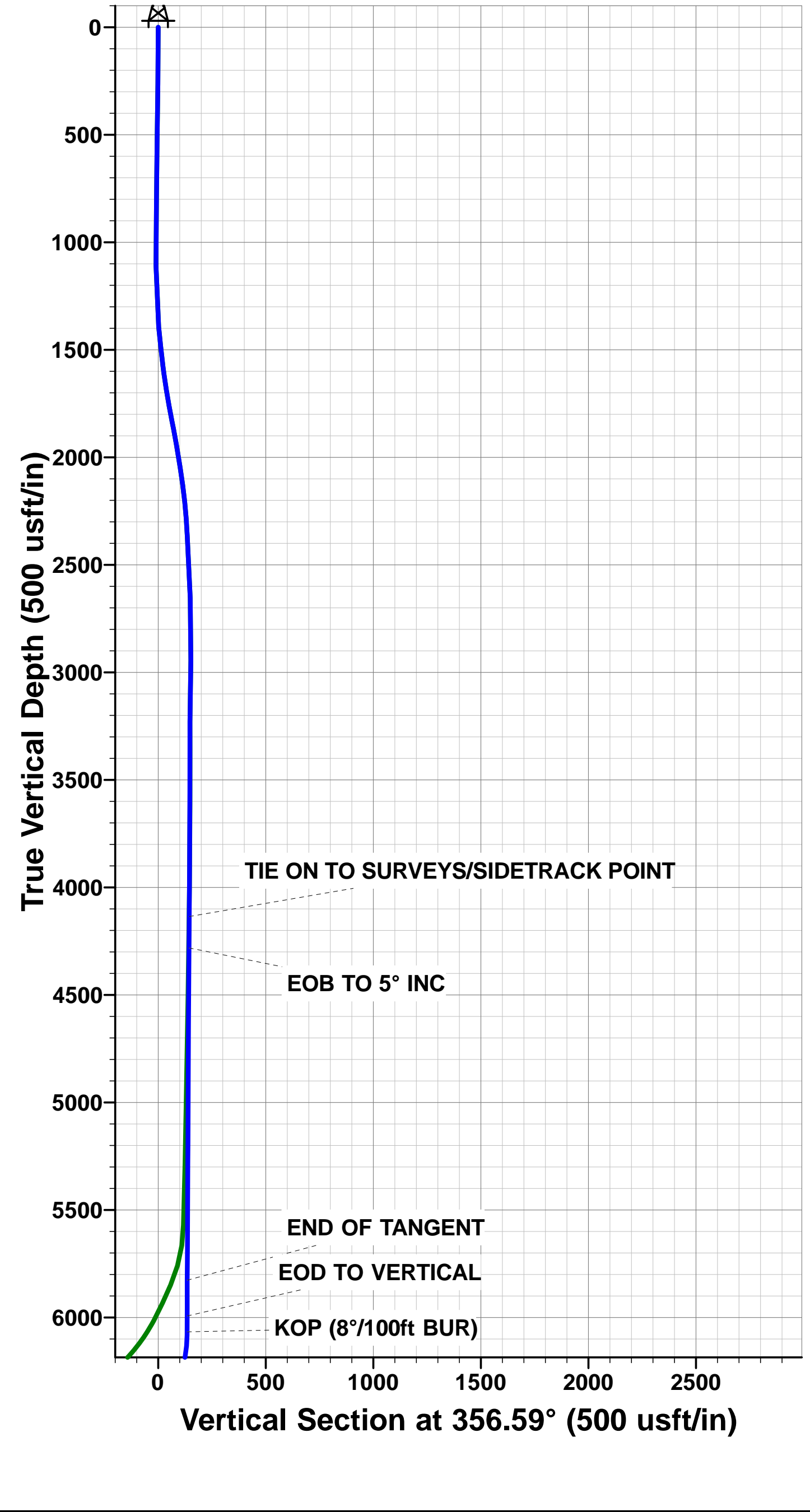


Project: WELD COUNTY, COLORADO
Site: NE NW SEC. 19 T4N R63W 6th P.M.
Well: SATER 19M-243ST
Wellbore: SIDETRACK - JOB #2016-10-135
Design: PROPOSAL #5

ANNOTATIONS								
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
4135.6	4147.0	0.90	132.60	144.5	0.5	-144.5	0.0	TIE ON TO SURVEYS/SIDETRACK POINT
4281.4	4293.0	5.00	90.00	143.7	7.7	-143.7	7.4	EOB TO 5° INC
5826.5	5844.0	5.00	90.00	143.7	142.9	-144.0	142.5	END OF TANGENT
5993.0	6010.7	0.00	0.00	143.7	150.2	-144.0	149.8	EOD TO VERTICAL
6066.9	6084.6	0.00	0.00	143.7	150.2	-144.0	149.8	KOP (8°/100ft BUR)
6264.3	6284.6	16.00	180.00	116.0	150.2	-116.3	177.6	START 12°/100ft BUR
6610.0	6913.4	91.46	180.00	-355.1	150.2	354.9	648.7	HZ LANDING PNT (P5) - SATER 19M-243RD
6585.9	7858.6	91.46	180.00	-1300.0	150.2	1299.8	1593.6	END OF TANGENT
6583.5	7952.0	91.46	182.80	-1393.4	147.9	1393.1	1686.9	EOT TO 182.8° AZ
6502.0	11150.1	91.46	182.80	-4586.6	-8.4	4586.6	4884.0	BHL - SATER 19M-243RD (P5)

PROPOSED LOCAL COORDINATES:
SHL: 155ft FNL & 2349t FWL Sec 19
HZ LP: 511.6ft FNL & 2599.6ft FWL Sec 19
BHL: 500ft FSL & 2356ft FWL Sec 19

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL - SATER 19M-243ST (P5)	6502.0	-4586.6	-8.4	40.291840	-104.481300



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SATER 19M-243ST
Company:	PDC ENERGY	TVD Reference:	KB @ 4677.0usft (ENS 135)
Project:	WELD COUNTY, COLORADO	MD Reference:	KB @ 4677.0usft (ENS 135)
Site:	NE NW SEC. 19 T4N R63W 6th P.M.	North Reference:	True
Well:	SATER 19M-243ST	Survey Calculation Method:	Minimum Curvature
Wellbore:	SIDETRACK - JOB #2016-10-135		
Design:	PROPOSAL #5		

Project	WELD COUNTY, COLORADO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	NE NW SEC. 19 T4N R63W 6th P.M.		
Site Position:		Northing:	1,355,375.92 usft
From:	Lat/Long	Easting:	3,284,031.34 usft
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft
		Latitude:	40.304430
		Longitude:	-104.481590
		Grid Convergence:	0.66 °

Well	SATER 19M-243ST		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	89.3 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	40.304430
		Longitude:	-104.481270
		Ground Level:	4,664.0 usft

Wellbore	SIDETRACK - JOB #2016-10-135				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/03/2016	8.19	66.85	52,518

Design	PROPOSAL #5				
Audit Notes:					
Version:	Phase:	PROTOTYPE	Tie On Depth:	4,147.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	6,502.0	0.0	0.0	180.10	

Plan Sections											
MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100usf)	Turn Rate (°/100usf)	TFO (°)	Target
4,147.0	0.90	132.60	4,135.6	-541.4	144.5	0.5	0.00	0.00	0.00	0.00	
4,293.0	5.00	90.00	4,281.4	-395.6	143.7	7.7	3.00	2.81	-29.18	-50.58	
5,844.0	5.00	90.00	5,826.5	1,149.5	143.7	142.9	0.00	0.00	0.00	0.00	
6,010.7	0.00	0.00	5,993.0	1,316.0	143.7	150.2	3.00	-3.00	0.00	180.00	
6,084.6	0.00	0.00	6,066.9	1,389.9	143.7	150.2	0.00	0.00	0.00	0.00	
6,284.6	16.00	180.00	6,264.3	1,587.3	116.0	150.2	8.00	8.00	0.00	180.00	
6,913.4	91.46	180.00	6,610.0	1,933.0	-355.1	150.2	12.00	12.00	0.00	0.00	
6,963.4	91.46	180.00	6,608.7	1,931.7	-405.1	150.2	0.00	0.00	0.00	0.00	
7,036.4	91.46	182.19	6,606.9	1,929.9	-478.1	148.8	3.00	0.00	3.00	89.95	
11,149.2	91.46	182.19	6,502.0	1,825.0	-4,586.6	-8.4	0.00	0.00	0.00	0.00	BHL - SATER 19M-

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SATER 19M-243ST
Company:	PDC ENERGY	TVD Reference:	KB @ 4677.0usft (ENS 135)
Project:	WELD COUNTY, COLORADO	MD Reference:	KB @ 4677.0usft (ENS 135)
Site:	NE NW SEC. 19 T4N R63W 6th P.M.	North Reference:	True
Well:	SATER 19M-243ST	Survey Calculation Method:	Minimum Curvature
Wellbore:	SIDETRACK - JOB #2016-10-135		
Design:	PROPOSAL #5		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TIE ON TO SURVEYS/SIDETRACK POINT										
4,147.0	0.90	132.60	4,135.6	541.36	144.5	0.5	-144.5	0.57	0.46	-25.24
4,200.0	2.27	99.85	4,188.6	488.38	144.0	1.9	-144.1	3.00	2.59	-61.80
EOB TO 5° INC										
4,293.0	5.00	90.00	4,281.4	395.58	143.7	7.7	-143.7	3.00	2.93	-10.59
4,300.0	5.00	90.00	4,288.4	388.60	143.7	8.3	-143.7	0.00	0.00	0.00
4,400.0	5.00	90.00	4,388.0	288.98	143.7	17.1	-143.8	0.00	0.00	0.00
4,500.0	5.00	90.00	4,487.6	189.36	143.7	25.8	-143.8	0.00	0.00	0.00
4,600.0	5.00	90.00	4,587.3	89.74	143.7	34.5	-143.8	0.00	0.00	0.00
4,700.0	5.00	90.00	4,686.9	-9.88	143.7	43.2	-143.8	0.00	0.00	0.00
4,800.0	5.00	90.00	4,786.5	-109.50	143.7	51.9	-143.8	0.00	0.00	0.00
4,900.0	5.00	90.00	4,886.1	-209.11	143.7	60.6	-143.8	0.00	0.00	0.00
5,000.0	5.00	90.00	4,985.7	-308.73	143.7	69.3	-143.9	0.00	0.00	0.00
5,100.0	5.00	90.00	5,085.4	-408.35	143.7	78.1	-143.9	0.00	0.00	0.00
5,200.0	5.00	90.00	5,185.0	-507.97	143.7	86.8	-143.9	0.00	0.00	0.00
5,300.0	5.00	90.00	5,284.6	-607.59	143.7	95.5	-143.9	0.00	0.00	0.00
5,400.0	5.00	90.00	5,384.2	-707.21	143.7	104.2	-143.9	0.00	0.00	0.00
5,500.0	5.00	90.00	5,483.8	-806.83	143.7	112.9	-143.9	0.00	0.00	0.00
5,600.0	5.00	90.00	5,583.5	-906.45	143.7	121.6	-144.0	0.00	0.00	0.00
5,700.0	5.00	90.00	5,683.1	-1,006.07	143.7	130.4	-144.0	0.00	0.00	0.00
5,800.0	5.00	90.00	5,782.7	-1,105.69	143.7	139.1	-144.0	0.00	0.00	0.00
END OF TANGENT										
5,844.0	5.00	90.00	5,826.5	-1,149.52	143.7	142.9	-144.0	0.00	0.00	0.00
5,900.0	3.32	90.00	5,882.4	-1,205.37	143.7	147.0	-144.0	3.00	-3.00	0.00
6,000.0	0.32	90.00	5,982.3	-1,305.31	143.7	150.1	-144.0	3.00	-3.00	0.00
EOD TO VERTICAL										
6,010.7	0.00	0.00	5,993.0	-1,316.01	143.7	150.2	-144.0	2.99	-2.99	0.00
KOP (8°/100ft BUR)										
6,084.6	0.00	0.00	6,066.9	-1,389.91	143.7	150.2	-144.0	0.00	0.00	0.00
6,100.0	1.23	180.00	6,082.3	-1,405.31	143.6	150.2	-143.8	8.02	8.02	0.00
6,200.0	9.23	180.00	6,181.8	-1,504.81	134.5	150.2	-134.7	8.00	8.00	0.00
START 12°/100ft BUR										
6,284.6	16.00	180.00	6,264.3	-1,587.32	116.0	150.2	-116.3	8.00	8.00	0.00
6,300.0	17.85	180.00	6,279.1	-1,602.05	111.5	150.2	-111.8	12.03	12.03	0.00
SHARON SPRINGS										
6,309.4	18.98	180.00	6,288.0	-1,611.00	108.5	150.2	-108.8	12.00	12.00	0.00
6,400.0	29.85	180.00	6,370.3	-1,693.35	71.1	150.2	-71.4	12.00	12.00	0.00
NIORARA A										
6,495.7	41.33	180.00	6,448.0	-1,771.00	15.6	150.2	-15.8	12.00	12.00	0.00
6,500.0	41.85	180.00	6,451.3	-1,774.25	12.7	150.2	-13.0	12.00	12.00	0.00
NIORARA B										
6,535.8	46.15	180.00	6,477.0	-1,800.00	-12.2	150.2	11.9	12.00	12.00	0.00
6,600.0	53.85	180.00	6,518.2	-1,841.23	-61.3	150.2	61.1	12.00	12.00	0.00
6,700.0	65.85	180.00	6,568.4	-1,891.36	-147.6	150.2	147.4	12.00	12.00	0.00
6,800.0	77.85	180.00	6,599.5	-1,922.46	-242.5	150.2	242.2	12.00	12.00	0.00
6,900.0	89.85	180.00	6,610.1	-1,933.15	-341.7	150.2	341.5	12.00	12.00	0.00
HZ LANDING PNT (P5) - SATER 19M-243RD										
6,913.4	91.46	180.00	6,610.0	-1,932.99	-355.1	150.2	354.9	12.00	12.00	0.00
END OF TANGENT										
6,963.4	91.46	180.00	6,608.7	-1,931.72	-405.1	150.2	404.8	0.00	0.00	0.00
7,000.0	91.46	181.10	6,607.8	-1,930.79	-441.7	149.8	441.4	3.00	0.00	3.00
EOT TO 182.19° AZ										

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SATER 19M-243ST
Company:	PDC ENERGY	TVD Reference:	KB @ 4677.0usft (ENS 135)
Project:	WELD COUNTY, COLORADO	MD Reference:	KB @ 4677.0usft (ENS 135)
Site:	NE NW SEC. 19 T4N R63W 6th P.M.	North Reference:	True
Well:	SATER 19M-243ST	Survey Calculation Method:	Minimum Curvature
Wellbore:	SIDETRACK - JOB #2016-10-135		
Design:	PROPOSAL #5		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,036.4	91.46	182.19	6,606.9	-1,929.86	-478.1	148.8	477.8	3.00	0.00	3.00
7,100.0	91.46	182.19	6,605.2	-1,928.24	-541.6	146.3	541.3	0.00	0.00	0.00
7,200.0	91.46	182.19	6,602.7	-1,925.69	-641.5	142.5	641.2	0.00	0.00	0.00
7,300.0	91.46	182.19	6,600.1	-1,923.14	-741.4	138.7	741.1	0.00	0.00	0.00
7,400.0	91.46	182.19	6,597.6	-1,920.59	-841.3	134.9	841.0	0.00	0.00	0.00
7,500.0	91.46	182.19	6,595.0	-1,918.04	-941.2	131.1	940.9	0.00	0.00	0.00
7,600.0	91.46	182.19	6,592.5	-1,915.49	-1,041.1	127.2	1,040.8	0.00	0.00	0.00
7,700.0	91.46	182.19	6,589.9	-1,912.94	-1,141.0	123.4	1,140.7	0.00	0.00	0.00
7,800.0	91.46	182.19	6,587.4	-1,910.39	-1,240.9	119.6	1,240.7	0.00	0.00	0.00
7,900.0	91.46	182.19	6,584.8	-1,907.84	-1,340.8	115.8	1,340.6	0.00	0.00	0.00
8,000.0	91.46	182.19	6,582.3	-1,905.29	-1,440.7	112.0	1,440.5	0.00	0.00	0.00
8,100.0	91.46	182.19	6,579.7	-1,902.74	-1,540.6	108.1	1,540.4	0.00	0.00	0.00
8,200.0	91.46	182.19	6,577.2	-1,900.19	-1,640.4	104.3	1,640.3	0.00	0.00	0.00
8,300.0	91.46	182.19	6,574.6	-1,897.64	-1,740.3	100.5	1,740.2	0.00	0.00	0.00
8,400.0	91.46	182.19	6,572.1	-1,895.09	-1,840.2	96.7	1,840.1	0.00	0.00	0.00
8,500.0	91.46	182.19	6,569.5	-1,892.54	-1,940.1	92.8	1,940.0	0.00	0.00	0.00
8,600.0	91.46	182.19	6,567.0	-1,889.99	-2,040.0	89.0	2,039.9	0.00	0.00	0.00
8,700.0	91.46	182.19	6,564.4	-1,887.44	-2,139.9	85.2	2,139.8	0.00	0.00	0.00
8,800.0	91.46	182.19	6,561.9	-1,884.89	-2,239.8	81.4	2,239.7	0.00	0.00	0.00
8,900.0	91.46	182.19	6,559.3	-1,882.34	-2,339.7	77.6	2,339.6	0.00	0.00	0.00
9,000.0	91.46	182.19	6,556.8	-1,879.80	-2,439.6	73.7	2,439.5	0.00	0.00	0.00
9,100.0	91.46	182.19	6,554.2	-1,877.25	-2,539.5	69.9	2,539.4	0.00	0.00	0.00
9,200.0	91.46	182.19	6,551.7	-1,874.70	-2,639.4	66.1	2,639.3	0.00	0.00	0.00
9,300.0	91.46	182.19	6,549.1	-1,872.15	-2,739.3	62.3	2,739.2	0.00	0.00	0.00
9,400.0	91.46	182.19	6,546.6	-1,869.60	-2,839.2	58.4	2,839.1	0.00	0.00	0.00
9,500.0	91.46	182.19	6,544.0	-1,867.05	-2,939.1	54.6	2,939.0	0.00	0.00	0.00
9,600.0	91.46	182.19	6,541.5	-1,864.50	-3,039.0	50.8	3,038.9	0.00	0.00	0.00
9,700.0	91.46	182.19	6,538.9	-1,861.95	-3,138.9	47.0	3,138.8	0.00	0.00	0.00
9,800.0	91.46	182.19	6,536.4	-1,859.40	-3,238.8	43.2	3,238.7	0.00	0.00	0.00
9,900.0	91.46	182.19	6,533.8	-1,856.85	-3,338.7	39.3	3,338.6	0.00	0.00	0.00
10,000.0	91.46	182.19	6,531.3	-1,854.30	-3,438.5	35.5	3,438.5	0.00	0.00	0.00
10,100.0	91.46	182.19	6,528.8	-1,851.75	-3,538.4	31.7	3,538.4	0.00	0.00	0.00
10,200.0	91.46	182.19	6,526.2	-1,849.20	-3,638.3	27.9	3,638.3	0.00	0.00	0.00
10,300.0	91.46	182.19	6,523.7	-1,846.65	-3,738.2	24.1	3,738.2	0.00	0.00	0.00
10,400.0	91.46	182.19	6,521.1	-1,844.10	-3,838.1	20.2	3,838.1	0.00	0.00	0.00
10,500.0	91.46	182.19	6,518.6	-1,841.55	-3,938.0	16.4	3,938.0	0.00	0.00	0.00
10,600.0	91.46	182.19	6,516.0	-1,839.00	-4,037.9	12.6	4,037.9	0.00	0.00	0.00
10,700.0	91.46	182.19	6,513.5	-1,836.45	-4,137.8	8.8	4,137.8	0.00	0.00	0.00
10,800.0	91.46	182.19	6,510.9	-1,833.90	-4,237.7	4.9	4,237.7	0.00	0.00	0.00
10,900.0	91.46	182.19	6,508.4	-1,831.35	-4,337.6	1.1	4,337.6	0.00	0.00	0.00
11,000.0	91.46	182.19	6,505.8	-1,828.81	-4,437.5	-2.7	4,437.5	0.00	0.00	0.00
11,100.0	91.46	182.19	6,503.3	-1,826.26	-4,537.4	-6.5	4,537.4	0.00	0.00	0.00
BHL - SATER 19M-243RD (P5)										
11,149.2	91.46	182.19	6,502.0	-1,825.00	-4,586.5	-8.4	4,586.5	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SATER 19M-243ST
Company:	PDC ENERGY	TVD Reference:	KB @ 4677.0usft (ENS 135)
Project:	WELD COUNTY, COLORADO	MD Reference:	KB @ 4677.0usft (ENS 135)
Site:	NE NW SEC. 19 T4N R63W 6th P.M.	North Reference:	True
Well:	SATER 19M-243ST	Survey Calculation Method:	Minimum Curvature
Wellbore:	SIDETRACK - JOB #2016-10-135		
Design:	PROPOSAL #5		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,309.4	6,288.0	SHARON SPRINGS			
6,495.7	6,448.0	NIOBRARA A			
6,535.8	6,477.0	NIOBRARA B			

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,147.0	4,135.6	144.5	0.5	TIE ON TO SURVEYS/SIDETRACK POINT
4,293.0	4,281.4	143.7	7.7	EOB TO 5° INC
5,844.0	5,826.5	143.7	142.9	END OF TANGENT
6,010.7	5,993.0	143.7	150.2	EOD TO VERTICAL
6,084.6	6,066.9	143.7	150.2	KOP (8°/100ft BUR)
6,284.6	6,264.3	116.0	150.2	START 12°/100ft BUR
6,913.4	6,610.0	-355.1	150.2	HZ LANDING PNT (P5) - SATER 19M-243RD
6,963.4	6,608.7	-405.1	150.2	END OF TANGENT
7,036.4	6,606.9	-478.1	148.8	EOT TO 182.19° AZ
11,149.2	6,502.0	-4,586.5	-8.4	BHL - SATER 19M-243RD (P5)