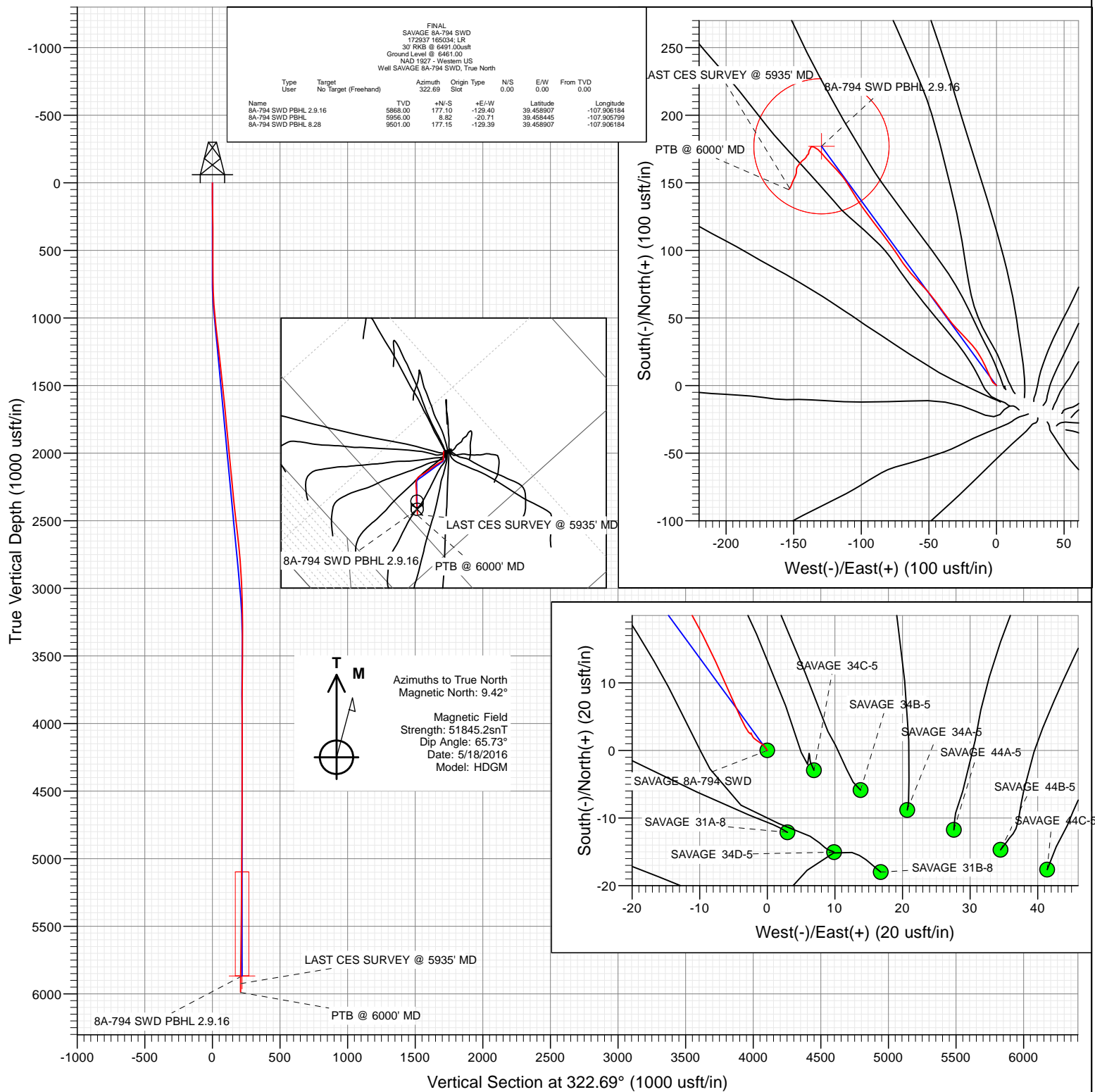




Project: Garfield County, CO (UTM 12N)
 Site: S8-T7S-R94W (SAVAGE)
 Well: SAVAGE 8A-794 SWD
 Wellbore: OH
 Design: FINAL



WELL DETAILS: SAVAGE 8A-794 SWD

Ground Level: 6461.00
 Easting: 2513883.10
 Northing: 14343843.70
 Latitude: 39.458421
 Longitude: -107.905726



Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well SAVAGE 8A-794 SWD
Project:	Garfield County, CO (UTM 12N)	TVD Reference:	30' RKB @ 6491.00usft
Site:	S8-T7S-R94W (SAVAGE)	MD Reference:	30' RKB @ 6491.00usft
Well:	SAVAGE 8A-794 SWD	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Project	Garfield County, CO (UTM 12N)		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 - Western US		
Map Zone:	Zone 12N (114 W to 108 W)		

Site		S8-T7S-R94W (SAVAGE)			
Site Position:		Northing:	14,343,841.00 usft	Latitude:	39.458413
From:	Map	Easting:	2,513,890.10 usft	Longitude:	-107.905702
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.97 °

Well	SAVAGE 8A-794 SWD					
Well Position	+N/-S	0.00 usft	Northing:	14,343,843.70 usft	Latitude:	39.458421
	+E/-W	0.00 usft	Easting:	2,513,883.10 usft	Longitude:	-107.905726
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,461.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/18/2016	9.42	65.73	51,845

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	322.69	

Survey Program	Date	5/22/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
115.00	6,000.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
115.00	0.53	328.55	115.00	0.45	-0.28	0.53	0.46	0.46		
146.00	0.66	318.80	146.00	0.71	-0.47	0.85	0.53	0.42		
176.00	1.06	300.34	175.99	0.98	-0.82	1.28	1.61	1.33		
207.00	0.88	309.22	206.99	1.28	-1.26	1.78	0.75	-0.58		
238.00	0.97	302.45	237.98	1.57	-1.66	2.25	0.46	0.29		
269.00	0.70	313.52	268.98	1.84	-2.02	2.69	1.01	-0.87		
299.00	0.40	347.62	298.98	2.07	-2.18	2.96	1.44	-1.00		
330.00	0.44	332.95	329.98	2.28	-2.25	3.18	0.37	0.13		
360.00	0.22	300.34	359.98	2.41	-2.35	3.34	0.94	-0.73		
390.00	0.09	265.89	389.98	2.44	-2.43	3.41	0.51	-0.43		
421.00	0.04	25.94	420.98	2.45	-2.45	3.43	0.37	-0.16		
451.00	0.18	37.02	450.98	2.49	-2.41	3.45	0.47	0.47		

Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well SAVAGE 8A-794 SWD
Project:	Garfield County, CO (UTM 12N)	TVD Reference:	30' RKB @ 6491.00usft
Site:	S8-T7S-R94W (SAVAGE)	MD Reference:	30' RKB @ 6491.00usft
Well:	SAVAGE 8A-794 SWD	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
481.00	0.09	35.70	480.98	2.55	-2.37	3.47	0.30	-0.30	
512.00	0.01	292.96	511.98	2.57	-2.36	3.48	0.30	-0.26	
573.00	0.04	237.41	572.98	2.56	-2.38	3.48	0.06	0.05	
665.00	0.18	256.74	664.98	2.51	-2.55	3.54	0.16	0.15	
758.00	1.41	331.36	757.97	3.48	-3.24	4.73	1.48	1.32	
853.00	3.16	336.20	852.89	6.90	-4.86	8.44	1.85	1.84	
948.00	5.14	335.85	947.64	13.18	-7.66	15.13	2.08	2.08	
1,042.00	6.24	330.22	1,041.17	21.46	-11.92	24.29	1.31	1.17	
1,137.00	6.42	319.67	1,135.60	29.99	-17.92	34.71	1.24	0.19	
1,231.00	7.03	314.75	1,228.95	38.05	-25.41	45.66	0.89	0.65	
1,326.00	6.24	320.11	1,323.31	46.10	-32.85	56.57	1.06	-0.83	
1,420.00	6.02	324.33	1,416.78	54.02	-39.00	66.61	0.53	-0.23	
1,515.00	6.28	324.24	1,511.23	62.29	-44.94	76.78	0.27	0.27	
1,609.00	5.63	318.27	1,604.72	69.90	-51.01	86.52	0.95	-0.69	
1,704.00	5.49	315.63	1,699.28	76.63	-57.29	95.67	0.31	-0.15	
1,798.00	5.54	318.53	1,792.84	83.24	-63.44	104.66	0.30	0.05	
1,893.00	5.54	326.35	1,887.40	90.49	-69.02	113.81	0.79	0.00	
1,987.00	5.05	326.44	1,981.00	97.72	-73.82	122.47	0.52	-0.52	
2,082.00	5.36	323.72	2,075.61	104.78	-78.76	131.07	0.42	0.33	
2,177.00	5.49	321.78	2,170.18	111.93	-84.19	140.06	0.24	0.14	
2,271.00	5.67	324.16	2,263.73	119.22	-89.69	149.19	0.31	0.19	
2,366.00	5.80	323.27	2,358.26	126.88	-95.31	158.68	0.17	0.14	
2,460.00	6.33	325.04	2,451.73	134.93	-101.12	168.61	0.60	0.56	
2,590.00	6.90	330.66	2,580.87	147.61	-109.06	183.51	0.66	0.44	
2,683.00	5.93	318.27	2,673.29	156.07	-114.99	193.83	1.81	-1.04	
2,777.00	4.75	316.51	2,766.88	162.51	-120.90	202.54	1.27	-1.26	
2,872.00	3.30	319.23	2,861.64	167.44	-125.39	209.18	1.54	-1.53	
2,967.00	3.12	318.97	2,956.49	171.46	-128.88	214.49	0.19	-0.19	
3,061.00	2.33	312.64	3,050.39	174.68	-131.96	218.92	0.90	-0.84	
3,156.00	2.11	289.26	3,145.32	176.57	-135.03	222.28	0.97	-0.23	
3,250.00	0.62	224.14	3,239.29	176.77	-137.02	223.65	2.06	-1.59	
3,345.00	0.62	189.16	3,334.29	175.90	-137.46	223.22	0.39	0.00	
3,439.00	0.62	213.41	3,428.28	174.97	-137.82	222.70	0.28	0.00	
3,534.00	0.57	209.81	3,523.28	174.13	-138.34	222.35	0.07	-0.05	
3,629.00	0.53	189.42	3,618.27	173.29	-138.65	221.87	0.21	-0.04	
3,723.00	0.66	186.96	3,712.27	172.32	-138.78	221.18	0.14	0.14	
3,818.00	0.44	202.60	3,807.26	171.44	-138.99	220.61	0.28	-0.23	
3,912.00	0.53	225.81	3,901.26	170.81	-139.44	220.37	0.23	0.10	
4,007.00	0.31	248.92	3,996.26	170.41	-140.00	220.39	0.29	-0.23	
4,102.00	0.35	191.97	4,091.26	170.03	-140.30	220.27	0.33	0.04	
4,196.00	0.09	207.44	4,185.25	169.69	-140.39	220.06	0.28	-0.28	
4,291.00	0.57	203.66	4,280.25	169.19	-140.61	219.79	0.51	0.51	
4,385.00	0.66	225.81	4,374.25	168.38	-141.19	219.50	0.27	0.10	
4,480.00	0.62	227.48	4,469.24	167.65	-141.96	219.39	0.05	-0.04	
4,575.00	0.66	234.60	4,564.24	166.99	-142.78	219.36	0.09	0.04	
4,669.00	0.70	221.15	4,658.23	166.24	-143.60	219.27	0.17	0.04	
4,763.00	0.79	224.05	4,752.22	165.34	-144.43	219.05	0.10	0.10	
4,858.00	1.06	220.80	4,847.21	164.21	-145.46	218.77	0.29	0.28	
4,953.00	1.10	215.96	4,942.19	162.80	-146.57	218.33	0.10	0.04	
5,047.00	0.79	214.12	5,036.18	161.54	-147.46	217.86	0.33	-0.33	
5,142.00	0.92	180.90	5,131.17	160.23	-147.84	217.06	0.53	0.14	
5,237.00	1.01	183.80	5,226.16	158.63	-147.91	215.83	0.11	0.09	
5,331.00	0.84	187.84	5,320.14	157.13	-148.06	214.72	0.19	-0.18	

Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well SAVAGE 8A-794 SWD
Project:	Garfield County, CO (UTM 12N)	TVD Reference:	30' RKB @ 6491.00usft
Site:	S8-T7S-R94W (SAVAGE)	MD Reference:	30' RKB @ 6491.00usft
Well:	SAVAGE 8A-794 SWD	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
5,426.00	0.88	203.13	5,415.13	155.76	-148.44	213.87	0.24	0.04	
5,520.00	1.06	199.70	5,509.12	154.28	-149.02	213.04	0.20	0.19	
5,614.00	1.06	209.99	5,603.10	152.71	-149.75	212.23	0.20	0.00	
5,709.00	1.36	203.22	5,698.08	150.91	-150.63	211.33	0.35	0.32	
5,803.00	1.45	200.41	5,792.05	148.77	-151.48	210.15	0.12	0.10	
5,898.00	1.45	205.77	5,887.02	146.56	-152.43	208.96	0.14	0.00	
5,935.00	1.10	224.58	5,924.01	145.89	-152.88	208.70	1.46	-0.95	LAST CES SURVEY @ 5935' MD
6,000.00	1.10	224.58	5,989.00	145.00	-153.76	208.53	0.00	0.00	PTB @ 6000' MD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
8A-794 SWD PBHL 2.9.1 - actual wellpath misses target center by 37.76usft at 5878.05usft MD (5867.07 TVD, 147.02 N, -152.21 E) - Circle (radius 50.00)	0.00	0.00	5,868.00	177.10	-129.40	14,344,016.25	2,513,747.70	39.458907	-107.906184
8A-794 SWD PBHL - actual wellpath misses target center by 193.08usft at 5935.00usft MD (5924.01 TVD, 145.89 N, -152.88 E) - Circle (radius 50.00)	0.00	0.00	5,956.00	8.82	-20.71	14,343,851.80	2,513,862.10	39.458445	-107.905799
8A-794 SWD PBHL 8.28 - actual wellpath misses target center by 3512.23usft at 6000.00usft MD (5989.00 TVD, 145.00 N, -153.76 E) - Circle (radius 50.00)	0.00	0.00	9,501.00	177.15	-129.39	14,344,016.30	2,513,747.70	39.458907	-107.906184

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
5,935.00	5,924.01	145.89	-152.88	LAST CES SURVEY @ 5935' MD
6,000.00	5,989.00	145.00	-153.76	PTB @ 6000' MD

Checked By: _____ Approved By: _____ Date: _____