

FINAL
 Island Ranch 11D-24
 145195/13637; SC
 KB=24' @ 5079.5usft
 Ground Elevation @ 5055.5
 NAD 1927 (NADCON CONUS)
 Well Island Ranch 11D-24, True North

Surface Hole Location
 Island Ranch 11D-24
 Lat : 39.433822
 Long : -108.063611

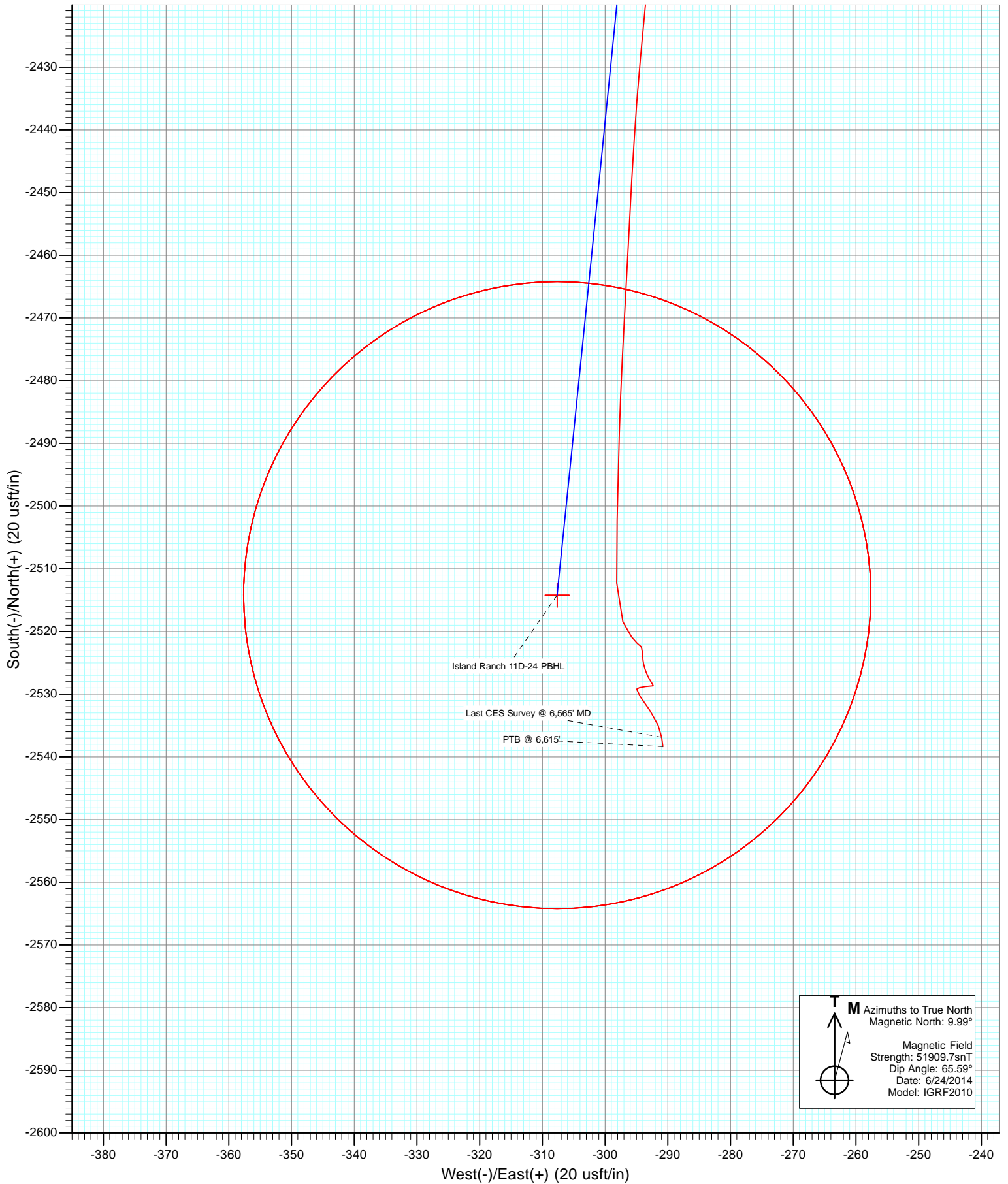
M Azimuths to True North
 Magnetic North: 9.99°
 Magnetic Field
 Strength: 51909.7snT
 Dip Angle: 65.59°
 Date: 6/24/2014
 Model: IGRF2010

DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Island Ranch 11D-24 TOG	-2514.2	-307.6	590599.14	1275607.57	39.426919	-108.064700
Island Ranch 11D-24 PBHL	-2514.2	-307.6	590599.14	1275607.57	39.426919	-108.064700



Project: Garfield County, CO
Site: S13-T7S-R96W (Island Ranch)
Well: Island Ranch 11D-24
Wellbore: DD
Design: FINAL



Cathedral Energy Services

Survey Report

Company: Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference: Well Island Ranch 11D-24
Project: Garfield County, CO	TVD Reference: KB=24' @ 5079.5usft
Site: S13-T7S-R96W (Island Ranch)	MD Reference: KB=24' @ 5079.5usft
Well: Island Ranch 11D-24	North Reference: True
Wellbore: DD	Survey Calculation Method: Minimum Curvature
Design: FINAL	Database: USA EDM 5000 Multi Users DB

Project Garfield County, CO		
Map System: US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum: NAD 1927 (NADCON CONUS)		
Map Zone: Colorado Central 502		

Site S13-T7S-R96W (Island Ranch)				
Site Position:	Northing:	1,019,013.23 usft	Latitude:	40.624725
From: Lat/Long	Easting:	2,338,017.18 usft	Longitude:	-104.282679
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16"		Grid Convergence:	0.77 °

Well Island Ranch 11D-24				
Well Position	+N/-S	0.0 usft	Northing:	593,103.65 usft
	+E/-W	0.0 usft	Easting:	1,275,986.01 usft
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft
			Latitude:	39.433822
			Longitude:	-108.063611
			Ground Level:	5,055.5 usft

Wellbore DD					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/24/2014	9.99	65.59	51,910

Design FINAL				
Audit Notes:				
Version: 1.0	Phase: ACTUAL	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	186.98

Survey Program		Date 6/29/2014
From (usft)	To (usft)	Survey (Wellbore)
105.0	6,615.0	Survey #1 (DD)
		Tool Name ISCWSA MWD
		Description MWD - Standard

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
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
105.0	0.10	52.00	105.0	0.1	0.1	-0.1	0.10	0.10	
145.0	0.60	356.90	145.0	0.3	0.1	-0.3	1.37	1.25	
205.0	1.50	278.10	205.0	0.7	-0.7	-0.6	2.51	1.50	
267.0	3.20	244.30	266.9	0.1	-3.1	0.3	3.43	2.74	
328.0	4.80	234.40	327.8	-2.1	-6.7	2.9	2.85	2.62	
389.0	6.20	226.40	388.5	-5.9	-11.1	7.2	2.61	2.30	
449.0	7.30	216.40	448.1	-11.2	-15.7	13.0	2.68	1.83	
510.0	8.70	206.70	508.5	-18.5	-20.1	20.8	3.18	2.30	
571.0	10.60	199.40	568.6	-27.9	-24.1	30.6	3.70	3.11	
632.0	12.50	192.80	628.4	-39.6	-27.4	42.6	3.79	3.11	
693.0	14.40	188.10	687.7	-53.5	-29.9	56.8	3.59	3.11	
784.0	17.60	185.90	775.2	-78.4	-32.9	81.9	3.58	3.52	

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Survey Report

Company:	Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference:	Well Island Ranch 11D-24
Project:	Garfield County, CO	TD Reference:	KB=24' @ 5079.5usft
Site:	S13-T7S-R96W (Island Ranch)	MVD Reference:	KB=24' @ 5079.5usft
Well:	Island Ranch 11D-24	North Reference:	True
Wellbore:	DD	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
875.0	20.30	187.50	861.3	-107.8	-36.4	111.4	3.02	2.97	
979.0	23.60	189.00	957.7	-146.2	-42.0	150.3	3.22	3.17	
1,074.0	26.50	191.00	1,043.8	-185.8	-49.0	190.4	3.18	3.05	
1,169.0	29.80	191.20	1,127.5	-229.8	-57.7	235.1	3.48	3.47	
1,264.0	33.80	189.60	1,208.2	-279.0	-66.7	285.1	4.30	4.21	
1,359.0	37.30	189.00	1,285.5	-333.5	-75.6	340.3	3.70	3.68	
1,455.0	39.50	188.60	1,360.7	-392.5	-84.7	399.8	2.31	2.29	
1,550.0	42.50	186.60	1,432.4	-454.2	-92.9	462.2	3.45	3.16	
1,645.0	44.70	186.40	1,501.2	-519.3	-100.3	527.7	2.32	2.32	
1,740.0	47.50	185.20	1,567.1	-587.4	-107.2	596.1	3.08	2.95	
1,835.0	46.80	184.30	1,631.7	-656.8	-113.0	665.7	1.01	-0.74	
1,930.0	48.90	189.00	1,695.5	-726.7	-121.2	736.1	4.28	2.21	
2,025.0	49.10	188.20	1,757.8	-797.6	-131.9	807.7	0.67	0.21	
2,120.0	48.90	187.80	1,820.1	-868.6	-141.9	879.4	0.38	-0.21	
2,215.0	48.90	187.20	1,882.6	-939.6	-151.2	951.0	0.48	0.00	
2,310.0	48.80	186.60	1,945.1	-1,010.6	-159.8	1,022.5	0.49	-0.11	
2,405.0	48.70	185.90	2,007.7	-1,081.6	-167.6	1,094.0	0.56	-0.11	
2,500.0	48.10	185.80	2,070.8	-1,152.3	-174.8	1,165.0	0.64	-0.63	
2,595.0	50.30	185.80	2,132.9	-1,223.8	-182.1	1,236.9	2.32	2.32	
2,690.0	50.10	185.10	2,193.7	-1,296.5	-189.0	1,309.8	0.60	-0.21	
2,785.0	50.00	184.50	2,254.7	-1,369.1	-195.1	1,382.6	0.50	-0.11	
2,880.0	49.20	183.60	2,316.3	-1,441.2	-200.2	1,454.9	1.11	-0.84	
2,975.0	50.10	185.50	2,377.8	-1,513.4	-206.0	1,527.2	1.79	0.95	
3,071.0	49.70	185.20	2,439.6	-1,586.5	-212.8	1,600.6	0.48	-0.42	
3,166.0	50.10	184.90	2,500.8	-1,658.9	-219.2	1,673.2	0.49	0.42	
3,262.0	49.40	185.00	2,562.8	-1,731.9	-225.6	1,746.5	0.73	-0.73	
3,356.0	46.30	185.40	2,625.9	-1,801.3	-231.9	1,816.1	3.31	-3.30	
3,451.0	45.80	185.50	2,691.8	-1,869.4	-238.4	1,884.5	0.53	-0.53	
3,546.0	44.70	186.00	2,758.7	-1,936.5	-245.1	1,951.9	1.22	-1.16	
3,641.0	44.00	186.50	2,826.6	-2,002.5	-252.3	2,018.3	0.82	-0.74	
3,736.0	40.60	186.40	2,896.9	-2,066.0	-259.5	2,082.2	3.58	-3.58	
3,831.0	37.40	184.80	2,970.7	-2,125.5	-265.4	2,142.0	3.53	-3.37	
3,926.0	33.50	184.70	3,048.1	-2,180.4	-270.0	2,197.1	4.11	-4.11	
4,021.0	29.80	186.10	3,128.9	-2,230.0	-274.6	2,246.9	3.97	-3.89	
4,117.0	26.50	189.10	3,213.6	-2,274.9	-280.5	2,292.1	3.74	-3.44	
4,211.0	25.00	186.70	3,298.3	-2,315.3	-286.2	2,333.0	1.94	-1.60	
4,307.0	23.20	182.90	3,385.9	-2,354.4	-289.5	2,372.1	2.47	-1.87	
4,402.0	20.40	183.00	3,474.1	-2,389.6	-291.3	2,407.3	2.95	-2.95	
4,497.0	18.40	185.60	3,563.7	-2,421.1	-293.6	2,438.8	2.29	-2.11	
4,592.0	14.90	183.00	3,654.7	-2,448.2	-295.7	2,466.0	3.77	-3.68	
4,687.0	12.00	183.10	3,747.1	-2,470.3	-296.9	2,488.0	3.05	-3.05	
4,782.0	10.00	181.80	3,840.3	-2,488.4	-297.7	2,506.1	2.12	-2.11	
4,877.0	6.80	181.00	3,934.3	-2,502.2	-298.1	2,519.9	3.37	-3.37	
4,972.0	5.30	179.40	4,028.8	-2,512.3	-298.1	2,529.9	1.59	-1.58	
5,067.0	2.40	152.50	4,123.5	-2,518.4	-297.2	2,535.9	3.52	-3.05	
5,162.0	1.00	144.80	4,218.5	-2,520.9	-295.8	2,538.1	1.49	-1.47	
5,256.0	0.70	131.00	4,312.5	-2,521.9	-294.9	2,539.0	0.38	-0.32	
5,351.0	0.30	122.80	4,407.5	-2,522.4	-294.2	2,539.5	0.43	-0.42	
5,446.0	1.20	179.30	4,502.5	-2,523.5	-294.0	2,540.6	1.12	0.95	
5,541.0	0.50	169.50	4,597.5	-2,524.9	-293.9	2,541.9	0.75	-0.74	
5,636.0	0.40	161.60	4,692.5	-2,525.7	-293.7	2,542.6	0.12	-0.11	
5,731.0	0.80	160.60	4,787.5	-2,526.6	-293.4	2,543.5	0.42	0.42	
5,826.0	0.60	145.30	4,882.5	-2,527.6	-292.9	2,544.5	0.29	-0.21	

Cathedral Energy Services

Survey Report

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Project: Garfield County, CO	TVD Reference: KB=24' @ 5079.5usft
Site: S13-T7S-R96W (Island Ranch)	MD Reference: KB=24' @ 5079.5usft
Well: Island Ranch 11D-24	North Reference: True
Wellbore: DD	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
5,922.0	0.40	152.90	4,978.4	-2,528.4	-292.5	2,545.2	0.22	-0.21	
6,016.0	0.00	235.30	5,072.4	-2,528.6	-292.3	2,545.4	0.43	-0.43	
6,111.0	1.50	264.00	5,167.4	-2,528.8	-293.5	2,545.7	1.58	1.58	
6,206.0	0.40	211.10	5,262.4	-2,529.2	-294.9	2,546.3	1.37	-1.16	
6,301.0	1.40	140.90	5,357.4	-2,530.4	-294.4	2,547.4	1.39	1.05	
6,396.0	1.80	148.10	5,452.4	-2,532.5	-292.9	2,549.4	0.47	0.42	
6,491.0	1.50	153.70	5,547.3	-2,534.9	-291.5	2,551.6	0.36	-0.32	
6,565.0	1.70	172.90	5,621.3	-2,536.9	-291.0	2,553.4	0.77	0.27	Last CES Survey @ 6,565' MD
6,615.0	1.70	172.90	5,671.3	-2,538.4	-290.8	2,554.9	0.00	0.00	PTB @ 6,615'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Island Ranch 11D-24 TC - hit/miss target - Shape	0.00	0.00	3,760.0	-2,514.2	-307.6	590,599.14	1,275,607.57	39.426919	-108.064700
- actual wellpath misses target center by 41.7usft at 4708.2usft MD (3767.8 TVD, -2474.6 N, -297.1 E)									
- Circle (radius 50.0)									
Island Ranch 11D-24 PE - actual wellpath misses target center by 27.6usft at 6542.0usft MD (5598.3 TVD, -2536.2 N, -291.1 E)	0.00	0.00	5,599.0	-2,514.2	-307.6	590,599.14	1,275,607.57	39.426919	-108.064700
- Circle (radius 50.0)									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
6,565.0	5,621.3	-2,536.9	-291.0	Last CES Survey @ 6,565' MD	
6,615.0	5,671.3	-2,538.4	-290.8	PTB @ 6,615'	

Checked By: _____ Approved By: _____ Date: _____