S. Leverich 13-09 Pad
SR 524-13
Well SR 524-13 - Slot SR 524-13, True North Surveys

Terra Energy Partners, LLP
SR 524-13
Garfield County, CO (Nad 83)
RKB @ 8037.0ft

PROJECT DETAILS: Garfield County, CO (Nad 83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone

System Datum: Mean Sea Level

WELL DETAILS: SR 524-13

Ground Level: 8007.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1591962.800	2342185.300	39.435551	-107.829274	SR 524-13

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SR 524-13 BHL	10026.8	-1111.9	-2432.6	1590913.600	2339725.000	39.432498	-107.837886

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Departure	Annotation
200.0	200.0	1.93	213.00	-2.8	-1.8	2.8	3.4	Firsy Survey @ 200 MD/ 200 TVD
10026.8	10583.0	2.29	236.64	-1101.1	-2443.5	2680.1	2696.4	PTB @ 10583 MD/ 10026.8 TVD

SLOTS

Slot Name	+N/-S	+E/-W	Northing	Easting
OFFSET South Leverich 13-07B	14.1	49.2	1591975.598	2342234.824
OFFSET South Leverich 13-09D	17.7	69.0	1591978.733	2342254.682
OFFSET South Leverich 13-10A	6.8	29.4	1591968.823	2342214.873
OFFSET South Leverich 13-16C	317.3	1517.9	1591606.646	2343694.566
OFFSET South Leverich 18-05C	23.2	86.5	1591983.730	2342272.330
OFFSET South Leverich 18-12B	302.8	1532.0	1591620.850	2343709.057
SR 21-24	2.0	7.2	1591964.600	2342192.500
SR 24-13	9.6	-2.7	1591972.500	2342182.800
SR 321-24	4.1	14.4	1591966.500	2342199.800
SR 322-13	21.7	40.7	1591983.500	2342226.500
SR 323-13	15.7	19.0	1591978.000	2342204.700
SR 324-13	7.6	-9.9	1591970.700	2342175.600
SR 421-24	6.1	21.7	1591968.300	2342207.100
SR 422-13	19.7	33.4	1591981.600	2342219.200
SR 423-13	13.7	11.8	1591976.200	2342197.400
SR 424-13	-2.0	-7.3	1591961.000	2342178.000
SR 511-18	23.7	47.8	1591985.300	2342233.700
SR 521-24	10.0	36.1	1591971.900	2342221.600
SR 523-13	11.6	4.5	1591974.300	2342190.100
SR 524-13	0.0	0.0	1591962.800	2342185.300
WMC 314-18-793	33.8	84.0	1591994.400	2342270.100
WMC 412-18-793	25.7	55.1	1591987.100	2342241.000
WMC 414-18-793	22.1	79.5	1591982.900	2342265.300
WMC 423-18-793	29.8	69.6	1591990.800	2342255.600
WMC 512-18-793	27.8	62.3	1591989.000	2342248.300
WMC 514-18-793	16.1	57.8	1591977.400	2342243.500
WMC 523-18-793	31.8	76.7	1591992.600	2342262.800

Azimuths to True North
Magnetic North: 8.83°

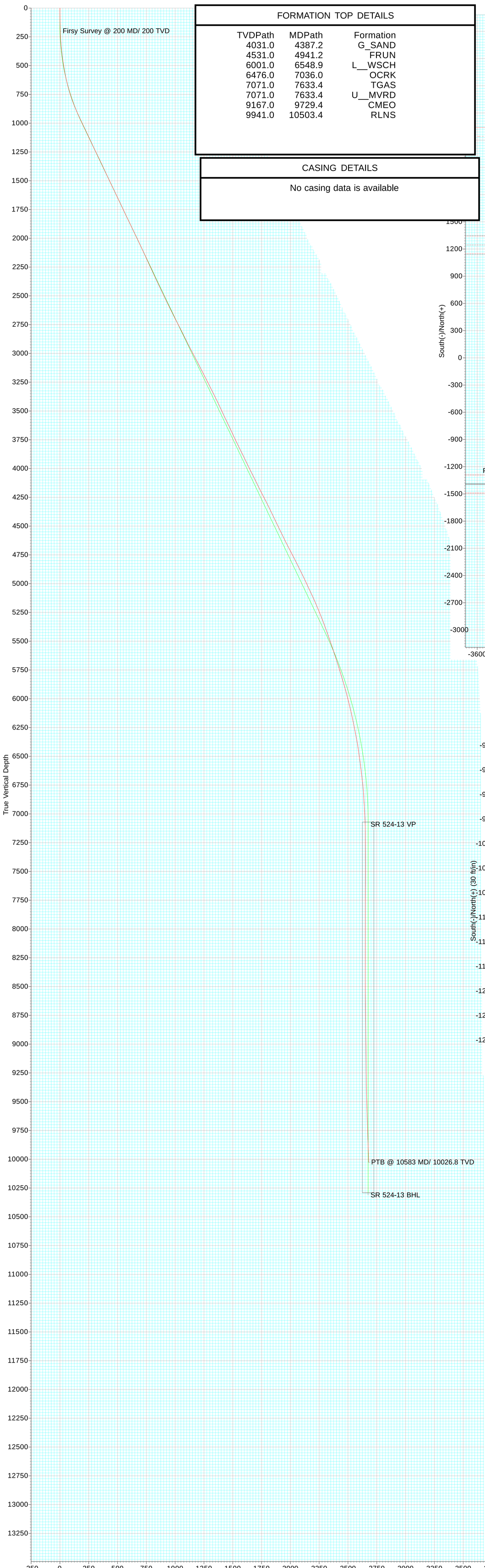
Magnetic Field
Strength: 50995.7snT
Dip Angle: 65.37°
Date: 4/5/2023
Model: HDGM

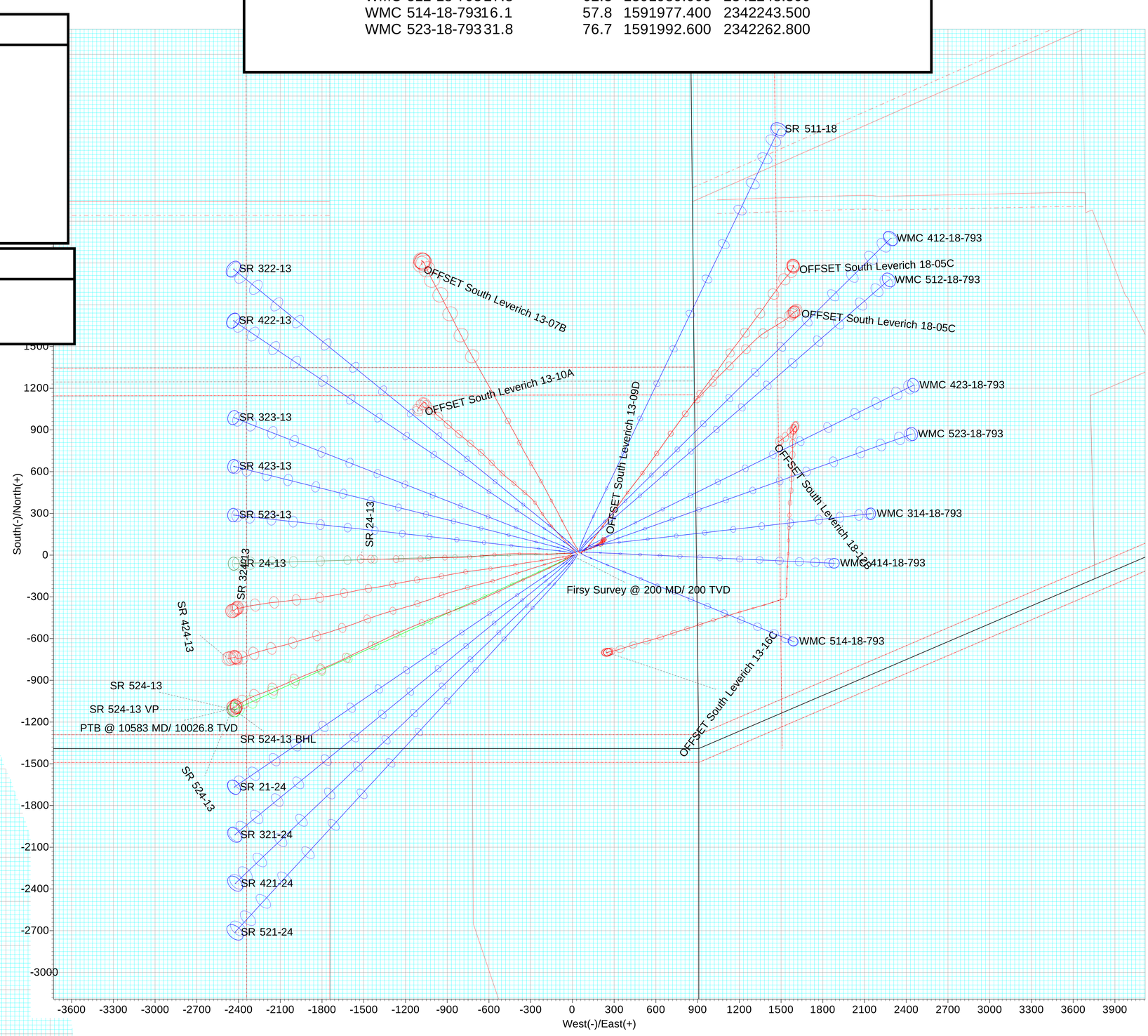
FORMATION TOP DETAILS

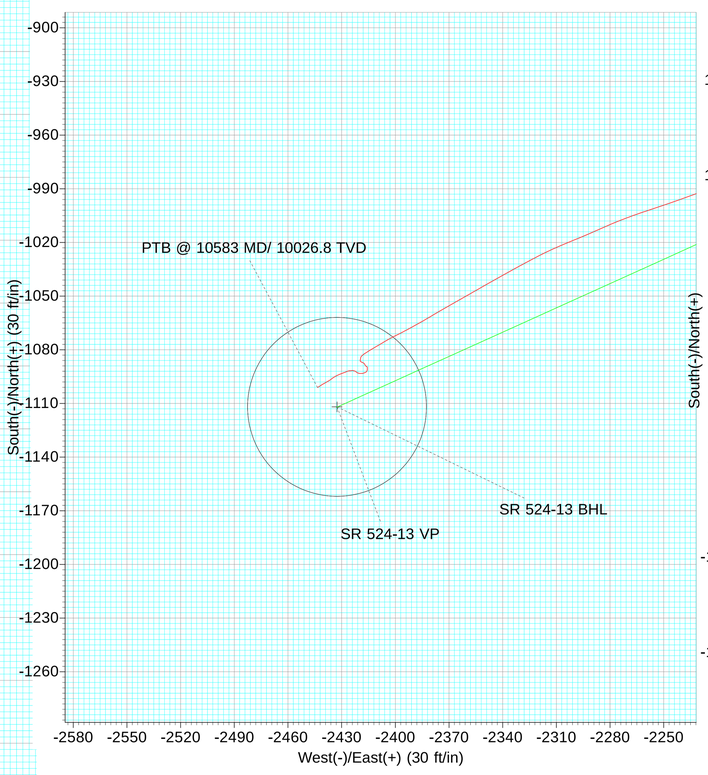
TVDPath	MDPath	Formation
4031.0	4387.2	G_SAND
4531.0	4941.2	FRUN
6001.0	6548.9	L__WSCH
6476.0	7036.0	OCRK
7071.0	7633.4	TGAS
7071.0	7633.4	U__MVRD
9167.0	9729.4	CMEO
9941.0	10503.4	RLNS

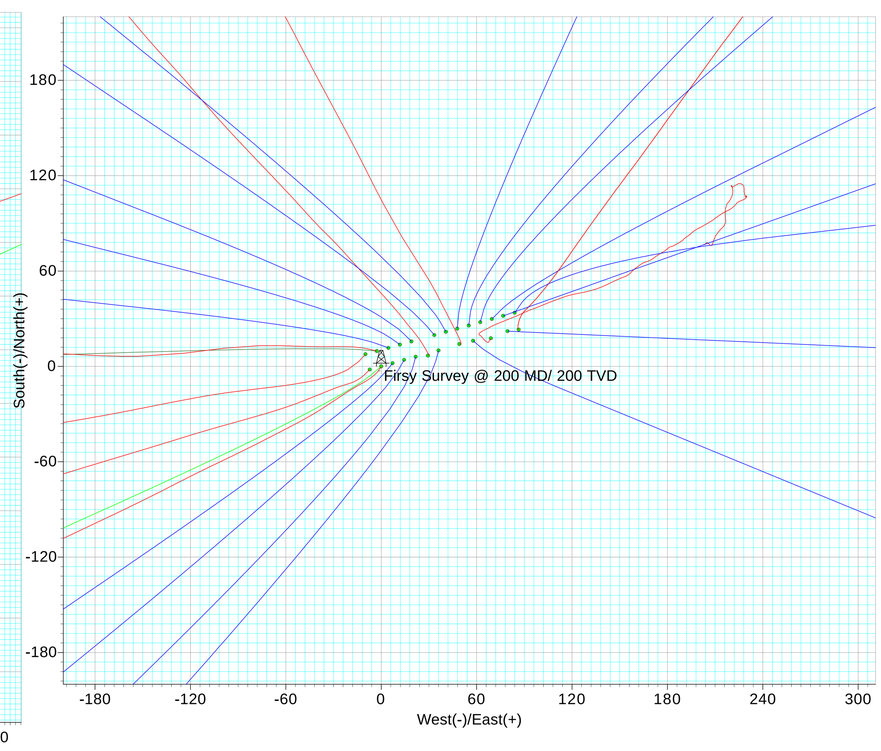
CASING DETAILS

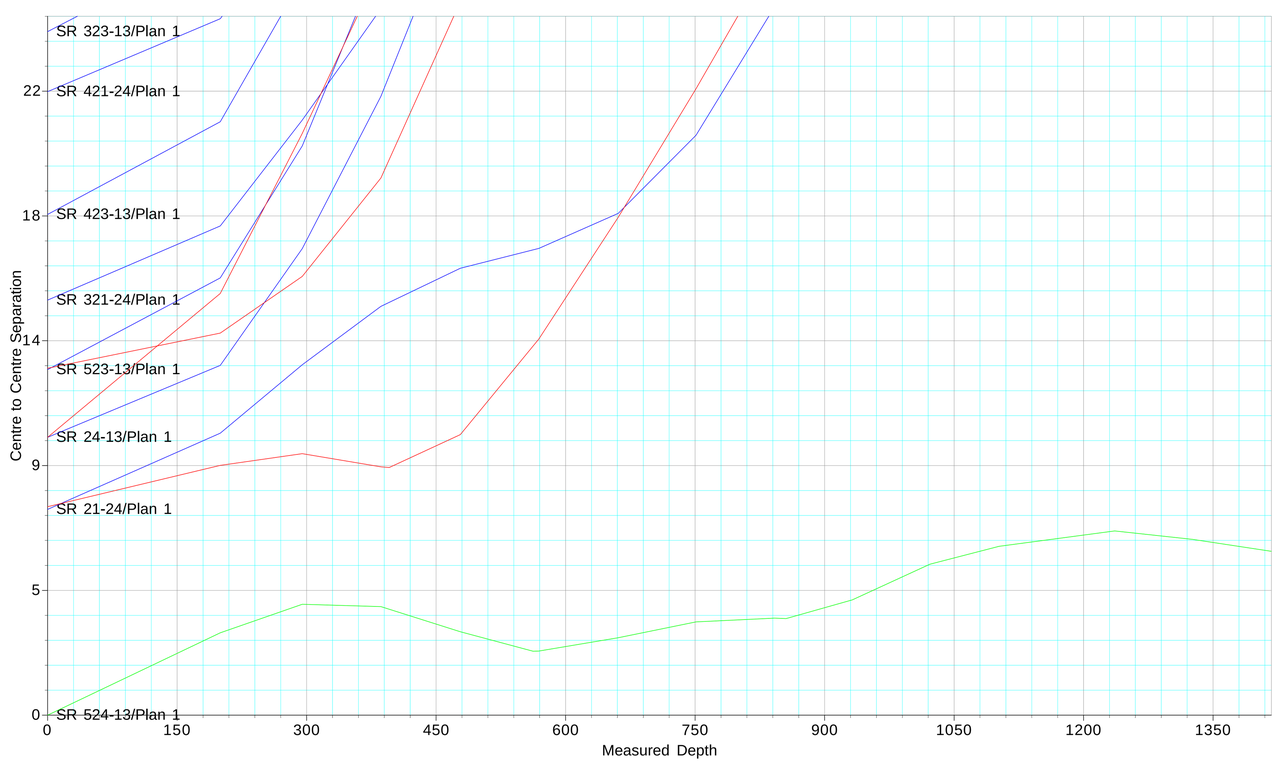
No casing data is available











NATIVE NAVIGATION

DIRECTIONAL DRILLING SPECIALISTS

Directional Survey Certification

Survey Company: Native Navigation **Survey Company Job #:** 23052765

Well Name: SR 524-13 **A.P.I.#** 05-045-24567 **Operator** Terra Energy Partners

Latitude: 40.217433 **Longitude:** -107.829274 **County, State:** Garfield County, CO

Legal Description (S,TS,R): Sec 13, T7S, R94W

Final Report 6/14/2023 **Date of First Survey** 6/7/2023 **Date of Last Survey:** 6/11/2023

Datum: NAD83 **Survey MD From:** 200.00 **To:** 10522 FT. **Tool Type:** MWD + HRGM

Bit to Sensor: 61 FT. **Rig (Company & Number):** HP 329 **RKB Height:** 30.00 FT.

Ground Elevation: 8007.00 **Northings:** 1591962.8 **Eastings:** 2342185.3

Surveyor Kyle Temple **Depth of Final Projection:** 10583 FT.

The data and calculations for this survey have been checked by me and conform to the calibration standards and operational procedures set forth by Native Navigation. I am authorized and qualified to review the data, calculations and this report, and that the report represents a true and correct Directional Survey of this well, based on the original data corrected to True North and obtained at the well site. Wellbore coordinates are calculated using the minimum curvature method.

Signature	Title	Company	Date
	Well Planner	Native Navigation	6/14/23

Terra Energy Partners, LLP

Garfield County, CO (Nad 83)
S. Leverich 13-09 Pad
SR 524-13 - Slot SR 524-13
OWB

Design: Surveys

Survey Certification Report

14 June, 2023

Company:	Terra Energy Partners, LLP	**Local Co-ordinate Reference:**	Well SR 524-13 - Slot SR 524-13
Project:	Garfield County, CO (Nad 83)	**TVD Reference:**	RKB @ 8037.0ft
Site:	S. Leverich 13-09 Pad	**MD Reference:**	RKB @ 8037.0ft
Well:	SR 524-13	**North Reference:**	True
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys	**Database:**	NN

Project Garfield County, CO (Nad 83)

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site S. Leverich 13-09 Pad

Site Position:		**Northing:**	1,591,962.800 usft	**Latitude:**	39.435551
From:	Map	**Easting:**	2,342,185.300 usft	**Longitude:**	-107.829274
Position Uncertainty:	0.0 ft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	-1.47 °

Well SR 524-13 - Slot SR 524-13

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,591,962.800 usft	**Latitude:**	39.435551
	+E/-W	0.0 ft	**Easting:**	2,342,185.300 usft	**Longitude:**	-107.829274
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	8,037.0 ft	**Ground Level:**	8,007.0 ft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/5/2023	8.83	65.37	50,996

Design Surveys

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	245.44

Survey Program **Date** 6/14/2023

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
200.0	10,583.0	Surveys (OWB)	OWSG (REV5) MWD HDGM	OWSG MWD - Standard

Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00
200.0	1.93	213.00	200.0	-2.8	-1.8	3.4	213.00
Firsy Survey @ 200 MD/ 200 TVD							
295.0	4.57	231.54	294.8	-6.5	-5.7	8.6	221.01
386.0	6.50	241.83	385.4	-11.2	-13.1	17.2	229.34
478.0	8.57	236.47	476.6	-17.5	-23.4	29.2	233.23
569.0	11.07	236.82	566.2	-26.0	-36.3	44.7	234.42
661.0	13.93	242.18	656.1	-36.0	-53.5	64.5	236.08
751.0	17.31	243.06	742.7	-47.1	-75.0	88.6	237.88
842.0	20.83	244.46	828.7	-60.2	-101.7	118.2	239.37
932.0	24.35	242.79	911.8	-75.6	-132.7	152.7	240.32
1,022.0	25.49	244.64	993.4	-92.4	-166.7	190.6	241.00

Company:	Terra Energy Partners, LLP	**Local Co-ordinate Reference:**	Well SR 524-13 - Slot SR 524-13
Project:	Garfield County, CO (Nad 83)	**TVD Reference:**	RKB @ 8037.0ft
Site:	S. Leverich 13-09 Pad	**MD Reference:**	RKB @ 8037.0ft
Well:	SR 524-13	**North Reference:**	True
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys	**Database:**	NN

Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)
1,102.0	25.53	244.46	1,065.6	-107.2	-197.8	225.0	241.54
1,236.0	24.92	245.52	1,186.8	-131.3	-249.5	282.0	242.24
1,326.0	26.10	246.66	1,268.1	-147.0	-285.0	320.7	242.70
1,417.0	25.40	246.05	1,350.0	-162.9	-321.2	360.1	243.11
1,507.0	24.92	244.90	1,431.5	-178.8	-356.0	398.4	243.33
1,598.0	25.80	245.17	1,513.7	-195.2	-391.3	437.3	243.49
1,688.0	25.31	244.20	1,594.9	-211.8	-426.4	476.1	243.58
1,778.0	25.58	244.20	1,676.2	-228.7	-461.2	514.8	243.63
1,868.0	25.00	244.64	1,757.6	-245.3	-495.9	553.2	243.68
1,959.0	25.80	245.70	1,839.8	-261.6	-531.3	592.3	243.78
2,049.0	25.84	245.84	1,920.8	-277.7	-567.1	631.4	243.91
2,140.0	25.31	245.87	2,002.9	-293.8	-602.9	670.7	244.02
2,230.0	25.18	245.26	2,084.3	-309.7	-637.9	709.1	244.10
2,321.0	24.57	243.94	2,166.8	-326.1	-672.4	747.3	244.13
2,411.0	25.00	248.51	2,248.5	-341.3	-707.0	785.0	244.23
2,502.0	24.35	248.33	2,331.2	-355.2	-742.3	822.9	244.42
2,592.0	25.97	248.16	2,412.7	-369.4	-777.8	861.1	244.59
2,683.0	25.05	248.77	2,494.8	-383.8	-814.3	900.2	244.76
2,773.0	26.81	250.35	2,575.7	-397.5	-851.1	939.4	244.96
2,864.0	26.15	249.91	2,657.2	-411.3	-889.3	979.8	245.18
2,954.0	27.51	249.12	2,737.5	-425.6	-927.4	1,020.3	245.35
3,045.0	26.76	249.74	2,818.5	-440.1	-966.2	1,061.7	245.51
3,135.0	26.28	247.98	2,899.0	-454.6	-1,003.7	1,101.9	245.63
3,226.0	27.82	248.24	2,980.1	-470.1	-1,042.1	1,143.2	245.72
3,317.0	27.60	247.98	3,060.6	-485.8	-1,081.4	1,185.5	245.81
3,407.0	27.07	247.89	3,140.6	-501.4	-1,119.7	1,226.8	245.88
3,497.0	26.85	246.49	3,220.8	-517.2	-1,157.3	1,267.6	245.92
3,588.0	26.76	245.78	3,302.0	-533.8	-1,194.8	1,308.6	245.93
3,679.0	26.32	246.13	3,383.4	-550.3	-1,231.9	1,349.3	245.93
3,769.0	24.96	246.40	3,464.6	-566.0	-1,267.6	1,388.2	245.94
3,860.0	25.44	244.11	3,546.9	-582.2	-1,302.8	1,426.9	245.92
3,950.0	25.62	244.55	3,628.1	-599.0	-1,337.7	1,465.7	245.88
4,040.0	24.61	244.11	3,709.6	-615.6	-1,372.1	1,503.9	245.84
4,131.0	26.14	244.02	3,791.8	-632.6	-1,407.2	1,542.9	245.79
4,221.0	26.54	244.73	3,872.5	-649.9	-1,443.2	1,582.8	245.76
4,312.0	25.44	244.55	3,954.3	-667.0	-1,479.3	1,622.7	245.73
4,402.0	27.03	244.73	4,035.0	-684.0	-1,515.2	1,662.4	245.70
4,493.0	25.75	243.94	4,116.5	-701.5	-1,551.7	1,702.9	245.67
4,583.0	27.20	244.03	4,197.1	-719.1	-1,587.7	1,743.0	245.63
4,674.0	26.94	243.85	4,278.1	-737.3	-1,624.9	1,784.4	245.59
4,765.0	26.10	243.76	4,359.5	-755.3	-1,661.4	1,825.0	245.55
4,855.0	25.27	244.90	4,440.6	-772.2	-1,696.5	1,864.0	245.53
4,945.0	26.15	247.28	4,521.7	-788.0	-1,732.2	1,903.0	245.54
5,036.0	25.84	247.45	4,603.5	-803.3	-1,769.0	1,942.9	245.58

Company:	Terra Energy Partners, LLP	**Local Co-ordinate Reference:**	Well SR 524-13 - Slot SR 524-13
Project:	Garfield County, CO (Nad 83)	**TVD Reference:**	RKB @ 8037.0ft
Site:	S. Leverich 13-09 Pad	**MD Reference:**	RKB @ 8037.0ft
Well:	SR 524-13	**North Reference:**	True
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys	**Database:**	NN

Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)
5,126.0	27.64	248.68	4,683.9	-818.4	-1,806.6	1,983.3	245.63
5,217.0	27.33	249.21	4,764.6	-833.5	-1,845.8	2,025.3	245.70
5,308.0	26.37	248.07	4,845.8	-848.5	-1,884.1	2,066.3	245.76
5,398.0	26.02	247.10	4,926.6	-863.6	-1,920.8	2,106.0	245.79
5,493.0	25.00	246.93	5,012.3	-879.6	-1,958.5	2,146.9	245.81
5,588.0	24.96	246.57	5,098.4	-895.4	-1,995.3	2,187.0	245.83
5,682.0	22.90	245.78	5,184.3	-910.8	-2,030.2	2,225.2	245.84
5,777.0	22.15	246.13	5,272.1	-925.7	-2,063.4	2,261.6	245.84
5,871.0	20.21	246.57	5,359.7	-939.3	-2,094.5	2,295.5	245.85
5,966.0	19.42	248.60	5,449.1	-951.6	-2,124.3	2,327.7	245.87
6,060.0	18.81	248.60	5,537.9	-962.8	-2,153.0	2,358.5	245.91
6,156.0	18.24	250.35	5,629.0	-973.5	-2,181.5	2,388.9	245.95
6,250.0	17.40	248.07	5,718.5	-983.7	-2,208.4	2,417.6	245.99
6,345.0	16.66	250.00	5,809.3	-993.7	-2,234.4	2,445.4	246.02
6,439.0	16.13	251.85	5,899.5	-1,002.4	-2,259.5	2,471.8	246.08
6,534.0	14.11	246.05	5,991.2	-1,011.2	-2,282.6	2,496.5	246.11
6,630.0	13.58	247.80	6,084.4	-1,020.2	-2,303.7	2,519.5	246.11
6,725.0	12.00	242.00	6,177.0	-1,029.0	-2,322.8	2,540.5	246.11
6,820.0	10.99	240.86	6,270.1	-1,038.1	-2,339.4	2,559.4	246.07
6,914.0	10.63	240.25	6,362.5	-1,046.7	-2,354.8	2,576.9	246.03
7,009.0	8.04	240.51	6,456.2	-1,054.4	-2,368.1	2,592.3	246.00
7,103.0	7.65	239.28	6,549.3	-1,060.8	-2,379.2	2,605.0	245.97
7,198.0	6.90	241.12	6,643.5	-1,066.8	-2,389.7	2,617.0	245.94
7,291.0	6.02	243.50	6,736.0	-1,071.6	-2,398.9	2,627.4	245.93
7,386.0	3.78	239.02	6,830.6	-1,075.5	-2,406.1	2,635.5	245.92
7,480.0	3.25	239.63	6,924.4	-1,078.4	-2,411.0	2,641.2	245.90
7,575.0	3.08	238.49	7,019.3	-1,081.1	-2,415.5	2,646.4	245.89
7,669.0	1.19	228.29	7,113.2	-1,083.1	-2,418.4	2,649.9	245.87
7,763.0	0.57	196.30	7,207.2	-1,084.2	-2,419.3	2,651.1	245.86
7,858.0	0.57	194.54	7,302.2	-1,085.1	-2,419.5	2,651.7	245.84
7,952.0	0.48	178.46	7,396.2	-1,085.9	-2,419.6	2,652.1	245.83
8,046.0	0.22	153.50	7,490.2	-1,086.5	-2,419.5	2,652.3	245.82
8,140.0	0.75	115.27	7,584.2	-1,086.9	-2,418.9	2,651.9	245.80
8,235.0	0.48	108.67	7,679.2	-1,087.3	-2,418.0	2,651.2	245.79
8,329.0	0.26	145.41	7,773.2	-1,087.6	-2,417.5	2,650.9	245.78
8,423.0	0.18	135.92	7,867.2	-1,087.9	-2,417.2	2,650.8	245.77
8,518.0	0.31	150.16	7,962.2	-1,088.2	-2,417.0	2,650.7	245.76
8,612.0	0.26	180.13	8,056.2	-1,088.7	-2,416.9	2,650.8	245.75
8,707.0	0.53	126.87	8,151.2	-1,089.1	-2,416.5	2,650.6	245.74
8,801.0	0.09	49.44	8,245.2	-1,089.4	-2,416.1	2,650.4	245.73
8,895.0	0.22	98.83	8,339.2	-1,089.3	-2,415.9	2,650.1	245.73
8,989.0	0.66	173.71	8,433.2	-1,089.9	-2,415.7	2,650.2	245.72
9,083.0	0.70	186.19	8,527.2	-1,091.0	-2,415.7	2,650.6	245.69
9,178.0	0.62	210.54	8,622.2	-1,092.0	-2,416.0	2,651.3	245.68
9,272.0	0.62	245.61	8,716.2	-1,092.7	-2,416.7	2,652.3	245.67

Company:	Terra Energy Partners, LLP	**Local Co-ordinate Reference:**	Well SR 524-13 - Slot SR 524-13
Project:	Garfield County, CO (Nad 83)	**TVD Reference:**	RKB @ 8037.0ft
Site:	S. Leverich 13-09 Pad	**MD Reference:**	RKB @ 8037.0ft
Well:	SR 524-13	**North Reference:**	True
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys	**Database:**	NN

Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)
9,367.0	0.70	252.11	8,811.1	-1,093.1	-2,417.7	2,653.3	245.67
9,461.0	0.66	270.48	8,905.1	-1,093.2	-2,418.8	2,654.4	245.68
9,556.0	0.75	267.23	9,000.1	-1,093.3	-2,420.0	2,655.5	245.69
9,650.0	0.92	301.68	9,094.1	-1,092.9	-2,421.2	2,656.5	245.71
9,745.0	0.92	311.88	9,189.1	-1,092.0	-2,422.5	2,657.2	245.74
9,839.0	1.05	261.96	9,283.1	-1,091.6	-2,423.9	2,658.3	245.76
9,933.0	0.92	267.84	9,377.1	-1,091.8	-2,425.5	2,659.9	245.77
10,027.0	1.80	246.84	9,471.1	-1,092.4	-2,427.6	2,662.0	245.77
10,122.0	1.71	250.44	9,566.0	-1,093.4	-2,430.3	2,664.9	245.78
10,215.0	1.89	243.06	9,659.0	-1,094.6	-2,433.0	2,667.9	245.78
10,310.0	1.71	231.37	9,753.9	-1,096.2	-2,435.5	2,670.8	245.77
10,404.0	1.93	241.83	9,847.9	-1,097.8	-2,438.0	2,673.7	245.76
10,499.0	1.89	239.37	9,942.8	-1,099.4	-2,440.7	2,676.9	245.75
10,522.0	2.29	236.64	9,965.8	-1,099.8	-2,441.4	2,677.7	245.75
10,583.0	2.29	236.64	10,026.8	-1,101.1	-2,443.5	2,680.1	245.74

PTB @ 10583 MD/ 10026.8 TVD

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
200.0	200.0	-2.8	-1.8	Firsy Survey @ 200 MD/ 200 TVD
10,583.0	10,026.8	-1,101.1	-2,443.5	PTB @ 10583 MD/ 10026.8 TVD

Checked By: _____ Approved By: _____ Date: _____