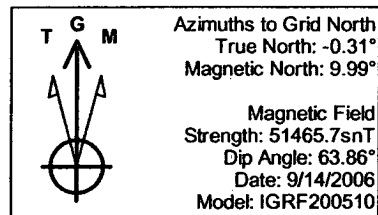




Project: Carson National Forest
Site: Carracas Mesa
Well: Carracas 24 A #10
Wellbore: Directional Survey
Plan: Final Survey (Carracas 24 A #10/Directional Survey)



PROJECT DETAILS: Carson National Forest, SE S24, T32N, R5W

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone

System Datum: Mean Sea Level

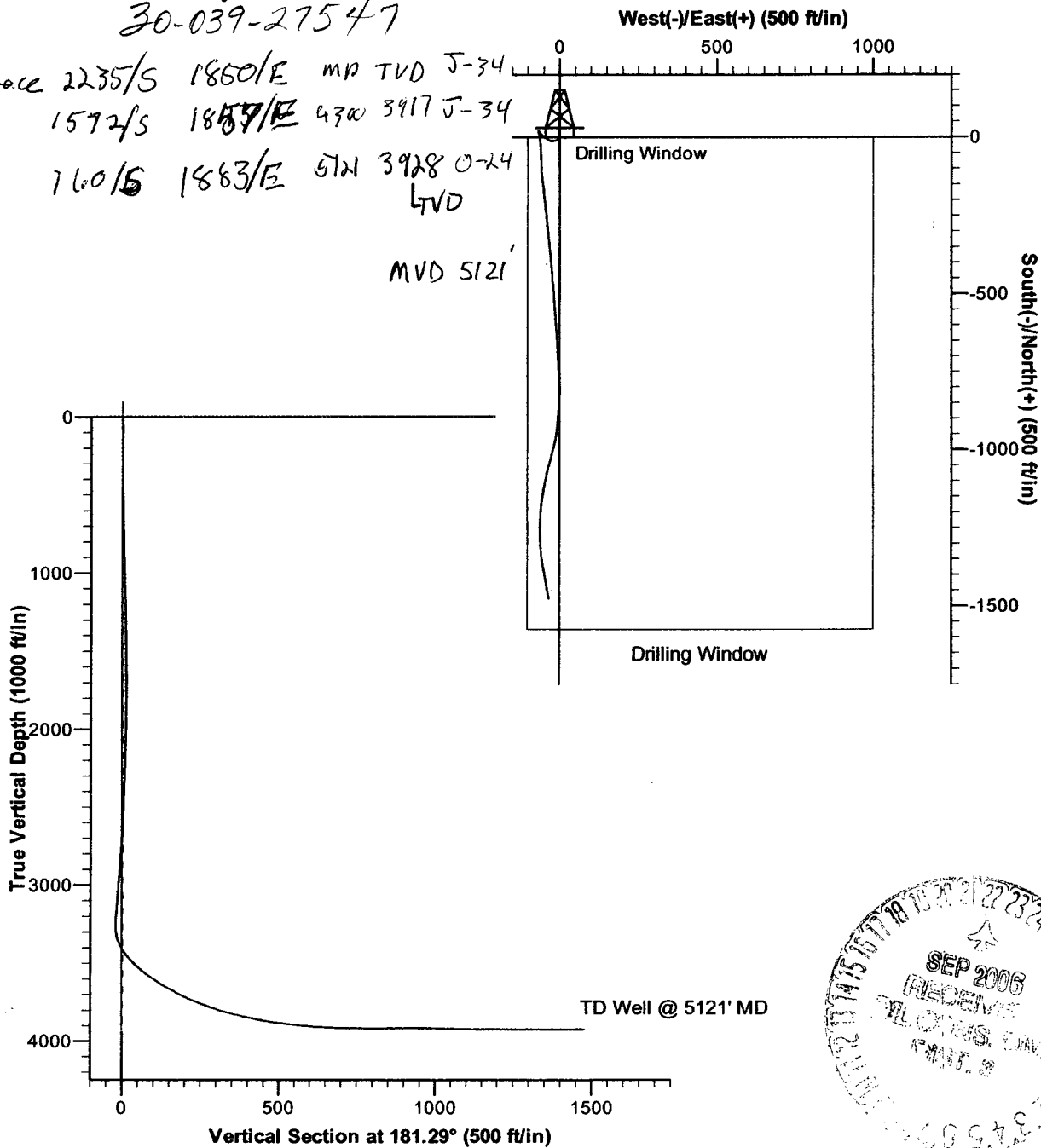
SURFACE LOCATION

Easting: 2875746.63
Northing: 2170845.86

Energen
30-039-27547

Surface 2235/S 1850/E MP TVD J-34
BHL1 1572/S 1857/E 4300 3917 J-34
BHL2 1160/S 1863/E 5121 3928 O-24
LTV

MVD 5121'



2

Energen

Energen Resources - Survey



Company: Energen Resources
Project: Carson National Forest, SE S24, T32N, R5W
Site: Carracas Mesa
Well: Carracas 24 A #10
Wellbore: Directional Survey
Design: Final Survey

Local Co-ordinate Reference: Well Carracas 24 A #10
TVD Reference: WELL @ 15.0ft (Original Well Elev)
MD Reference: WELL @ 15.0ft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Project	Carson National Forest, SE S24, T32N, R5W, , New Horizontal Drill		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	Carracas Mesa		
Site Position:		Northing:	2,170,845.86 ft
From:	Lat/Long	Easting:	2,875,746.63 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	36° 57' 52.386 N
		Longitude:	107° 18' 38.885 W
		Grid Convergence:	0.31 °

Well	Carracas 24 A #10, Single Lateral		
Well Position	+N/-S	0.0 ft	Northing: 2,170,845.86 ft
	+E/-W	0.0 ft	Easting: 2,875,746.63 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft
		Latitude:	36° 57' 52.386 N
		Longitude:	107° 18' 38.885 W
		Ground Level:	0.0 ft

Wellbore	Directional Survey				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	9/14/2006	10.30	63.86	51,466

Design	Final Survey				
Audit Notes:					
Version:	Phase:	PROTOTYPE		Tie On Depth:	5,106.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	181.29	

Survey Tool Program	Date 9/14/2006				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	5,106.0	Design Plan (Carracas 24 A #10 Wellbore	MWD	MWD - Standard	

Planned Survey						
MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
0.0	0.0	0.00	0.00	0.0	0.0	0.0
100.0	100.0	0.09	223.74	0.1	-0.1	-0.1
200.0	200.0	0.18	223.74	0.2	-0.2	-0.2
300.0	300.0	0.27	223.74	0.5	-0.5	-0.5
400.0	400.0	0.36	223.74	0.9	-0.9	-0.9
493.0	493.0	0.44	223.74	1.4	-1.4	-1.3
500.0	500.0	0.45	223.94	1.4	-1.4	-1.3
600.0	600.0	0.61	225.96	2.1	-2.1	-2.0
700.0	700.0	0.77	227.13	3.0	-2.9	-2.9
800.0	800.0	0.93	227.91	4.0	-3.9	-4.0
900.0	900.0	1.10	228.45	5.2	-5.1	-5.3
927.0	927.0	1.14	228.57	5.6	-5.4	-5.7

Energen

Energen Resources - Survey



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Wellbore: Directional Survey
Design: Final Survey

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
1,000.0	999.9	1.17	233.01	6.5	-6.4	-6.8
1,100.0	1,099.9	1.23	238.66	7.7	-7.5	-8.6
1,200.0	1,199.9	1.29	243.80	8.8	-8.6	-10.5
1,300.0	1,299.9	1.36	248.41	9.8	-9.5	-12.6
1,357.0	1,356.8	1.41	250.81	10.3	-10.0	-13.9
1,400.0	1,399.8	1.43	253.18	10.7	-10.3	-14.9
1,500.0	1,499.8	1.47	258.48	11.3	-10.9	-17.4
1,600.0	1,599.8	1.53	263.41	11.8	-11.4	-19.9
1,700.0	1,699.7	1.60	267.95	12.1	-11.6	-22.7
1,791.0	1,790.7	1.67	271.73	12.1	-11.6	-25.3
1,800.0	1,799.7	1.66	272.38	12.1	-11.6	-25.5
1,900.0	1,899.6	1.59	280.05	11.9	-11.3	-28.3
2,000.0	1,999.6	1.55	288.26	11.3	-10.6	-31.0
2,100.0	2,099.6	1.54	296.73	10.3	-9.6	-33.5
2,200.0	2,199.5	1.57	305.10	9.0	-8.2	-35.8
2,222.0	2,221.5	1.58	306.89	8.6	-7.8	-36.3
2,300.0	2,299.5	1.74	306.19	7.3	-6.5	-38.1
2,400.0	2,399.4	1.94	305.46	5.5	-4.6	-40.7
2,500.0	2,499.4	2.15	304.87	3.5	-2.5	-43.6
2,600.0	2,599.3	2.35	304.39	1.4	-0.3	-46.9
2,653.0	2,652.3	2.46	304.16	0.1	1.0	-48.7
2,700.0	2,699.2	2.50	306.76	-1.0	2.1	-50.4
2,800.0	2,799.1	2.60	311.99	-3.7	5.0	-53.8
2,900.0	2,899.0	2.72	316.80	-6.9	8.2	-57.1
3,000.0	2,998.9	2.86	321.18	-10.5	11.9	-60.3
3,087.0	3,085.8	2.99	324.64	-14.0	15.4	-63.0
3,100.0	3,098.8	2.95	324.55	-14.5	16.0	-63.4
3,170.0	3,168.7	2.73	324.02	-17.3	18.8	-65.4
3,209.0	3,207.6	2.46	325.17	-18.7	20.2	-66.4
3,240.0	3,238.6	1.67	320.42	-19.6	21.1	-67.1
3,250.0	3,248.6	1.07	304.38	-19.8	21.3	-67.2
3,271.0	3,269.6	0.97	211.61	-19.7	21.2	-67.5
3,302.0	3,300.6	3.69	174.43	-18.5	20.0	-67.5
3,332.0	3,330.4	6.95	169.16	-15.8	17.3	-67.1
3,350.0	3,348.3	9.01	169.53	-13.3	14.8	-66.6
3,362.0	3,360.1	10.38	169.69	-11.3	12.8	-66.3
3,375.0	3,372.9	11.93	170.43	-8.9	10.4	-65.8
3,393.0	3,390.4	14.07	171.18	-4.9	6.4	-65.2
3,400.0	3,397.2	14.88	171.51	-3.2	4.6	-64.9
3,424.0	3,420.2	17.67	172.41	3.5	-2.0	-64.0
3,425.0	3,421.2	17.82	172.49	3.8	-2.3	-64.0
3,450.0	3,444.7	21.48	174.06	12.1	-10.7	-63.0
3,454.0	3,448.4	22.07	174.26	13.6	-12.2	-62.8
3,485.0	3,476.8	24.97	175.31	25.9	-24.5	-61.7

Energen

Energen Resources - Survey



Company: Energen Resources
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Site: Carracas Mesa
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Wellbore: Directional Survey
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Local Co-ordinate Reference: Well Carracas 24 A #10
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Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
3,500.0	3,490.4	26.25	175.85	32.3	-30.9	-61.2
3,516.0	3,504.6	27.61	176.37	39.5	-38.2	-60.7
3,547.0	3,531.8	30.07	177.42	54.4	-53.1	-59.9
3,550.0	3,534.4	30.25	177.45	55.9	-54.6	-59.8
3,578.0	3,558.4	31.92	177.68	70.4	-69.0	-59.2
3,600.0	3,576.9	33.55	177.68	82.2	-80.9	-58.8
3,609.0	3,584.3	34.21	177.68	87.2	-85.9	-58.5
3,640.0	3,609.5	37.20	176.28	105.3	-104.0	-57.6
3,650.0	3,617.4	38.02	175.72	111.4	-110.1	-57.2
3,671.0	3,633.8	39.75	174.61	124.5	-123.2	-56.0
3,701.0	3,656.5	41.50	173.73	143.8	-142.7	-54.1
3,732.0	3,679.5	42.65	173.55	164.4	-163.3	-51.8
3,750.0	3,692.7	43.75	173.55	176.6	-175.5	-50.4
3,762.0	3,701.3	44.49	173.55	184.9	-183.8	-49.4
3,794.0	3,723.4	47.84	173.55	207.8	-206.8	-46.8
3,800.0	3,727.4	48.35	173.57	212.2	-211.2	-46.3
3,826.0	3,744.3	50.56	173.64	231.8	-230.9	-44.1
3,850.0	3,759.3	52.39	173.99	250.4	-249.5	-42.1
3,856.0	3,762.9	52.85	174.08	255.1	-254.3	-41.6
3,888.0	3,781.9	54.61	174.52	280.7	-279.9	-39.1
3,900.0	3,788.8	55.32	174.63	290.5	-289.7	-38.1
3,919.0	3,799.4	56.45	174.79	306.1	-305.4	-36.7
3,951.0	3,816.5	59.09	174.35	333.0	-332.3	-34.1
3,982.0	3,831.7	62.17	174.43	359.8	-359.2	-31.5
4,000.0	3,839.8	64.00	174.54	375.8	-375.2	-29.9
4,013.0	3,845.4	65.33	174.61	387.4	-386.9	-28.8
4,043.0	3,857.4	67.62	174.87	414.8	-414.3	-26.3
4,050.0	3,860.0	68.10	174.87	421.2	-420.7	-25.7
4,074.0	3,868.6	69.73	174.87	443.4	-443.0	-23.7
4,075.0	3,869.0	69.85	174.88	444.4	-444.0	-23.6
4,100.0	3,877.0	72.93	175.10	467.9	-467.6	-21.6
4,104.0	3,878.1	73.42	175.14	471.7	-471.4	-21.2
4,135.0	3,886.6	74.83	175.23	501.4	-501.1	-18.7
4,166.0	3,894.4	76.15	175.84	531.2	-531.0	-16.4
4,197.0	3,901.5	77.29	175.93	561.3	-561.1	-14.2
4,200.0	3,902.1	77.54	175.90	564.2	-564.0	-14.0
4,228.0	3,907.6	79.84	175.66	591.5	-591.4	-12.0
4,250.0	3,911.2	81.71	176.23	613.1	-613.1	-10.5
4,259.0	3,912.4	82.48	176.46	622.0	-622.0	-9.9
4,289.0	3,915.9	84.15	176.46	651.7	-651.7	-8.1
4,300.0	3,917.0	84.57	176.58	662.6	-662.6	-7.4
4,321.0	3,918.8	85.38	176.81	683.5	-683.5	-6.2
4,350.0	3,920.8	86.88	176.81	712.3	-712.4	-4.6
4,381.0	3,921.7	89.60	177.16	743.2	-743.3	-3.0

Energen

Energen Resources - Survey



Company: Energen Resources
Project: Carson National Forest, SE S24, T32N, R5W
Site: Carracas Mesa
Well: Carracas 24 A #10
Wellbore: Directional Survey
Design: Final Survey

Local Co-ordinate Reference: Well Carracas 24 A #10
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Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	V. Sec (ft)	N/S (ft)	E/W (ft)
4,400.0	3,921.9	89.37	177.49	762.2	-762.3	-2.1
4,432.0	3,922.3	88.99	178.04	794.1	-794.3	-0.8
4,450.0	3,922.5	90.27	179.77	812.1	-812.3	-0.5
4,463.0	3,922.3	91.19	181.02	825.1	-825.3	-0.6
4,495.0	3,921.4	92.15	183.57	857.1	-857.2	-1.9
4,500.0	3,921.2	91.92	183.84	862.1	-862.2	-2.2
4,526.0	3,920.6	90.75	185.24	888.0	-888.1	-4.2
4,558.0	3,919.9	91.54	184.98	919.9	-920.0	-7.1
4,575.0	3,919.9	88.98	186.71	936.9	-936.9	-8.8
4,589.0	3,920.4	86.88	188.14	950.8	-950.8	-10.6
4,600.0	3,920.9	87.24	189.96	961.7	-961.6	-12.4
4,621.0	3,921.8	87.93	193.42	982.3	-982.2	-16.6
4,653.0	3,922.9	88.20	195.09	1,013.5	-1,013.2	-24.5
4,684.0	3,924.0	87.67	194.03	1,043.6	-1,043.2	-32.3
4,700.0	3,924.7	87.58	193.37	1,059.2	-1,058.7	-36.1
4,716.0	3,925.4	87.49	192.71	1,074.9	-1,074.3	-39.7
4,747.0	3,926.6	88.11	191.40	1,105.3	-1,104.6	-46.1
4,750.0	3,926.6	88.20	191.18	1,108.3	-1,107.5	-46.7
4,778.0	3,927.3	88.99	189.11	1,135.9	-1,135.0	-51.6
4,800.0	3,927.6	89.68	187.68	1,157.7	-1,156.8	-54.9
4,809.0	3,927.6	89.96	187.09	1,166.7	-1,165.7	-56.0
4,841.0	3,927.6	89.96	184.72	1,198.6	-1,197.6	-59.3
4,850.0	3,927.6	90.04	183.93	1,207.6	-1,206.5	-60.0
4,872.0	3,927.6	90.22	181.99	1,229.6	-1,228.5	-61.1
4,904.0	3,927.5	90.04	179.71	1,261.6	-1,260.5	-61.6
4,935.0	3,927.4	90.31	177.07	1,292.5	-1,291.5	-60.7
4,950.0	3,927.4	90.10	176.05	1,307.5	-1,306.5	-59.8
4,966.0	3,927.4	89.87	174.96	1,323.4	-1,322.4	-58.6
4,998.0	3,927.5	89.69	172.06	1,355.1	-1,354.2	-54.9
5,000.0	3,927.5	89.67	171.90	1,357.1	-1,356.2	-54.7
5,029.0	3,927.7	89.43	169.51	1,385.6	-1,384.8	-50.0
5,100.0	3,928.2	89.87	169.51	1,455.1	-1,454.6	-37.1
5,121.0	3,928.2	90.00	169.51	1,475.6	-1,475.3	-33.2

Checked By: _____ Approved By: _____ Date: _____