

OCD – HOBBS
06/17/2020
RECEIVED

NORTHERN DELAWARE BASIN

LEA COUNTY, NM

BULLDOG

HARRIER FED COM #304H

OWB

Design: AWP

Standard Survey Report

08 November, 2019

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Project	LEA COUNTY, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	BULLDOG		
Site Position:		Northing:	398,637.10 usft
From:	Map	Easting:	741,887.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 5' 36.820 N
		Longitude:	103° 33' 8.116 W
		Grid Convergence:	0.42 °

Well	HARRIER FED COM #304H		
Well Position	+N/-S	0.0 usft	Northing: 388,326.40 usft
	+E/-W	0.0 usft	Easting: 711,291.50 usft
Position Uncertainty	3.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 3' 56.841 N
		Longitude:	103° 39' 4.521 W
		Ground Level:	3,247.1 usft

Wellbore	OWB		
Magnetics	Model Name	Sample Date	Declination (°)
	WMM2015	10/18/2018	6.86
			Dip Angle (°)
			59.87
			Field Strength (nT)
			47,684.25984654

Design	AWP		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			358.99

Survey Program	Date	11/8/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	9,328.0	GYRO-INTER (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
9,409.0	20,382.0	MWD-CURVE/LATERAL (OWB)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.64	158.39	100.0	-0.5	0.2	-0.5	0.64	0.64	0.00
125.0	0.70	155.06	125.0	-0.8	0.3	-0.8	0.29	0.24	-13.32
150.0	0.63	157.75	150.0	-1.1	0.4	-1.1	0.31	-0.28	10.76
175.0	0.68	160.63	175.0	-1.3	0.5	-1.3	0.24	0.20	11.52
200.0	0.69	154.44	200.0	-1.6	0.7	-1.6	0.30	0.04	-24.76
225.0	0.58	158.00	225.0	-1.8	0.8	-1.9	0.47	-0.44	14.24
250.0	0.54	160.11	250.0	-2.1	0.9	-2.1	0.18	-0.16	8.44
275.0	0.53	152.57	275.0	-2.3	0.9	-2.3	0.28	-0.04	-30.16
300.0	0.55	154.61	300.0	-2.5	1.1	-2.5	0.11	0.08	8.16

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Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
325.0	0.63	151.55	325.0	-2.7	1.2	-2.8	0.34	0.32	-12.24
350.0	0.68	148.32	350.0	-3.0	1.3	-3.0	0.25	0.20	-12.92
375.0	0.57	139.85	375.0	-3.2	1.5	-3.2	0.57	-0.44	-33.88
400.0	0.67	137.71	400.0	-3.4	1.6	-3.4	0.41	0.40	-8.56
425.0	0.72	129.71	425.0	-3.6	1.9	-3.6	0.44	0.20	-32.00
450.0	0.80	131.09	450.0	-3.8	2.1	-3.9	0.33	0.32	5.52
475.0	0.88	121.98	475.0	-4.0	2.4	-4.1	0.62	0.32	-36.44
500.0	0.81	126.33	500.0	-4.2	2.7	-4.3	0.38	-0.28	17.40
525.0	0.85	125.79	525.0	-4.5	3.0	-4.5	0.16	0.16	-2.16
550.0	0.94	129.66	550.0	-4.7	3.3	-4.8	0.43	0.36	15.48
575.0	0.86	124.55	575.0	-4.9	3.6	-5.0	0.45	-0.32	-20.44
600.0	1.03	128.78	600.0	-5.2	4.0	-5.3	0.73	0.68	16.92
625.0	1.01	126.25	625.0	-5.5	4.3	-5.5	0.20	-0.08	-10.12
650.0	1.16	129.87	650.0	-5.7	4.7	-5.8	0.66	0.60	14.48
675.0	0.81	131.95	674.9	-6.0	5.0	-6.1	1.41	-1.40	8.32
700.0	1.04	135.91	699.9	-6.3	5.3	-6.4	0.95	0.92	15.84
725.0	1.04	138.05	724.9	-6.6	5.6	-6.7	0.16	0.00	8.56
750.0	1.29	131.07	749.9	-7.0	6.0	-7.1	1.15	1.00	-27.92
775.0	1.25	129.21	774.9	-7.4	6.4	-7.5	0.23	-0.16	-7.44
800.0	1.18	126.63	799.9	-7.7	6.8	-7.8	0.36	-0.28	-10.32
825.0	1.22	131.59	824.9	-8.0	7.2	-8.1	0.45	0.16	19.84
850.0	1.41	132.08	849.9	-8.4	7.6	-8.5	0.76	0.76	1.96
875.0	1.39	124.72	874.9	-8.8	8.1	-8.9	0.72	-0.08	-29.44
900.0	1.11	111.23	899.9	-9.0	8.6	-9.2	1.62	-1.12	-53.96
925.0	1.05	109.42	924.9	-9.2	9.0	-9.4	0.28	-0.24	-7.24
950.0	0.91	104.59	949.9	-9.3	9.5	-9.5	0.65	-0.56	-19.32
975.0	0.90	108.03	974.9	-9.4	9.8	-9.6	0.22	-0.04	13.76
1,000.0	1.05	93.89	999.9	-9.5	10.2	-9.7	1.13	0.60	-56.56
1,025.0	0.76	88.54	1,024.9	-9.5	10.6	-9.7	1.21	-1.16	-21.40
1,050.0	0.69	96.54	1,049.9	-9.5	11.0	-9.7	0.49	-0.28	32.00
1,075.0	0.71	96.63	1,074.9	-9.6	11.3	-9.8	0.08	0.08	0.36
1,100.0	0.76	95.57	1,099.9	-9.6	11.6	-9.8	0.21	0.20	-4.24
1,125.0	0.75	87.69	1,124.9	-9.6	11.9	-9.8	0.42	-0.04	-31.52
1,150.0	0.73	91.30	1,149.9	-9.6	12.2	-9.8	0.20	-0.08	14.44
1,175.0	0.70	96.33	1,174.9	-9.6	12.5	-9.8	0.28	-0.12	20.12
1,200.0	0.80	99.40	1,199.9	-9.7	12.9	-9.9	0.43	0.40	12.28
1,225.0	0.88	91.94	1,224.9	-9.7	13.2	-9.9	0.54	0.32	-29.84
1,250.0	0.75	102.60	1,249.9	-9.8	13.6	-10.0	0.80	-0.52	42.64
1,275.0	0.64	103.61	1,274.9	-9.8	13.9	-10.1	0.44	-0.44	4.04
1,300.0	0.65	105.28	1,299.9	-9.9	14.1	-10.1	0.09	0.04	6.68
1,325.0	0.59	102.16	1,324.9	-10.0	14.4	-10.2	0.28	-0.24	-12.48
1,350.0	0.60	102.51	1,349.9	-10.0	14.7	-10.3	0.04	0.04	1.40
1,375.0	0.53	102.55	1,374.9	-10.1	14.9	-10.3	0.28	-0.28	0.16

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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,400.0	0.70	118.35	1,399.9	-10.2	15.2	-10.4	0.95	0.68	63.20	
1,425.0	0.61	109.96	1,424.8	-10.3	15.4	-10.5	0.53	-0.36	-33.56	
1,450.0	0.63	118.95	1,449.8	-10.4	15.7	-10.7	0.40	0.08	35.96	
1,475.0	0.63	118.50	1,474.8	-10.5	15.9	-10.8	0.02	0.00	-1.80	
1,500.0	0.66	121.36	1,499.8	-10.7	16.1	-10.9	0.18	0.12	11.44	
1,525.0	0.71	134.59	1,524.8	-10.8	16.4	-11.1	0.66	0.20	52.92	
1,550.0	0.62	126.33	1,549.8	-11.0	16.6	-11.3	0.53	-0.36	-33.04	
1,575.0	0.67	120.57	1,574.8	-11.2	16.8	-11.5	0.33	0.20	-23.04	
1,600.0	0.63	121.05	1,599.8	-11.3	17.1	-11.6	0.16	-0.16	1.92	
1,625.0	0.81	142.88	1,624.8	-11.5	17.3	-11.9	1.30	0.72	87.32	
1,650.0	0.78	145.33	1,649.8	-11.8	17.5	-12.1	0.18	-0.12	9.80	
1,675.0	0.70	145.79	1,674.8	-12.1	17.7	-12.4	0.32	-0.32	1.84	
1,700.0	0.63	148.43	1,699.8	-12.3	17.8	-12.7	0.31	-0.28	10.56	
1,725.0	0.78	146.27	1,724.8	-12.6	18.0	-12.9	0.61	0.60	-8.64	
1,750.0	0.64	156.35	1,749.8	-12.9	18.2	-13.2	0.75	-0.56	40.32	
1,775.0	0.78	152.95	1,774.8	-13.1	18.3	-13.5	0.58	0.56	-13.60	
1,800.0	0.68	148.58	1,799.8	-13.4	18.4	-13.7	0.46	-0.40	-17.48	
1,825.0	0.73	153.51	1,824.8	-13.7	18.6	-14.0	0.31	0.20	19.72	
1,850.0	0.81	159.01	1,849.8	-14.0	18.7	-14.3	0.44	0.32	22.00	
1,875.0	0.78	149.72	1,874.8	-14.3	18.9	-14.6	0.53	-0.12	-37.16	
1,900.0	0.75	150.14	1,899.8	-14.6	19.0	-14.9	0.12	-0.12	1.68	
1,925.0	0.82	166.23	1,924.8	-14.9	19.2	-15.3	0.92	0.28	64.36	
1,950.0	0.84	162.83	1,949.8	-15.3	19.3	-15.6	0.21	0.08	-13.60	
1,975.0	0.65	164.13	1,974.8	-15.6	19.4	-15.9	0.76	-0.76	5.20	
2,000.0	1.16	175.87	1,999.8	-16.0	19.4	-16.3	2.16	2.04	46.96	
2,025.0	0.98	178.04	2,024.8	-16.4	19.4	-16.8	0.74	-0.72	8.68	
2,050.0	1.01	175.64	2,049.8	-16.9	19.5	-17.2	0.21	0.12	-9.60	
2,075.0	1.01	181.87	2,074.8	-17.3	19.5	-17.6	0.44	0.00	24.92	
2,100.0	1.09	180.62	2,099.8	-17.8	19.5	-18.1	0.33	0.32	-5.00	
2,125.0	1.06	179.48	2,124.8	-18.2	19.5	-18.6	0.15	-0.12	-4.56	
2,150.0	1.01	186.58	2,149.8	-18.7	19.4	-19.0	0.55	-0.20	28.40	
2,175.0	1.21	180.33	2,174.8	-19.2	19.4	-19.5	0.93	0.80	-25.00	
2,200.0	0.98	184.09	2,199.8	-19.6	19.4	-20.0	0.96	-0.92	15.04	
2,225.0	1.17	182.82	2,224.8	-20.1	19.4	-20.4	0.77	0.76	-5.08	
2,250.0	1.11	181.36	2,249.8	-20.6	19.4	-20.9	0.27	-0.24	-5.84	
2,275.0	1.24	186.78	2,274.8	-21.1	19.3	-21.5	0.68	0.52	21.68	
2,300.0	1.17	187.96	2,299.7	-21.6	19.2	-22.0	0.30	-0.28	4.72	
2,325.0	1.15	187.27	2,324.7	-22.1	19.2	-22.5	0.10	-0.08	-2.76	
2,350.0	1.04	183.87	2,349.7	-22.6	19.1	-23.0	0.51	-0.44	-13.60	
2,375.0	0.84	189.42	2,374.7	-23.0	19.1	-23.4	0.88	-0.80	22.20	
2,400.0	0.84	202.59	2,399.7	-23.4	19.0	-23.7	0.77	0.00	52.68	
2,425.0	0.80	209.45	2,424.7	-23.7	18.8	-24.0	0.42	-0.16	27.44	
2,450.0	0.84	209.06	2,449.7	-24.0	18.7	-24.3	0.16	0.16	-1.56	

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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
2,475.0	0.95	203.65	2,474.7	-24.4	18.5	-24.7	0.55	0.44	-21.64	
2,500.0	0.86	207.88	2,499.7	-24.7	18.3	-25.0	0.45	-0.36	16.92	
2,525.0	0.77	202.89	2,524.7	-25.0	18.2	-25.4	0.46	-0.36	-19.96	
2,550.0	1.03	210.89	2,549.7	-25.4	18.0	-25.7	1.15	1.04	32.00	
2,575.0	1.06	204.15	2,574.7	-25.8	17.8	-26.1	0.51	0.12	-26.96	
2,600.0	0.98	207.86	2,599.7	-26.2	17.6	-26.5	0.41	-0.32	14.84	
2,625.0	0.85	211.09	2,624.7	-26.5	17.4	-26.8	0.56	-0.52	12.92	
2,650.0	0.96	214.63	2,649.7	-26.9	17.2	-27.2	0.49	0.44	14.16	
2,675.0	0.97	213.83	2,674.7	-27.2	16.9	-27.5	0.07	0.04	-3.20	
2,700.0	1.15	217.48	2,699.7	-27.6	16.7	-27.9	0.77	0.72	14.60	
2,725.0	1.16	214.13	2,724.7	-28.0	16.4	-28.3	0.27	0.04	-13.40	
2,750.0	0.99	224.68	2,749.7	-28.4	16.1	-28.6	1.04	-0.68	42.20	
2,775.0	1.14	232.67	2,774.7	-28.7	15.7	-28.9	0.84	0.60	31.96	
2,800.0	1.14	229.88	2,799.7	-29.0	15.3	-29.2	0.22	0.00	-11.16	
2,825.0	1.14	236.27	2,824.7	-29.3	14.9	-29.5	0.51	0.00	25.56	
2,850.0	1.20	238.63	2,849.7	-29.5	14.5	-29.8	0.31	0.24	9.44	
2,875.0	0.96	248.03	2,874.7	-29.8	14.1	-30.0	1.19	-0.96	37.60	
2,900.0	1.05	247.45	2,899.7	-29.9	13.7	-30.2	0.36	0.36	-2.32	
2,925.0	0.91	259.90	2,924.7	-30.1	13.3	-30.3	1.02	-0.56	49.80	
2,950.0	0.85	285.22	2,949.7	-30.0	12.9	-30.3	1.56	-0.24	101.28	
2,975.0	0.79	295.26	2,974.6	-29.9	12.6	-30.1	0.62	-0.24	40.16	
3,000.0	0.97	312.79	2,999.6	-29.7	12.3	-29.9	1.29	0.72	70.12	
3,025.0	0.78	306.57	3,024.6	-29.5	12.0	-29.7	0.85	-0.76	-24.88	
3,050.0	0.87	308.37	3,049.6	-29.2	11.7	-29.4	0.37	0.36	7.20	
3,075.0	0.83	303.42	3,074.6	-29.0	11.4	-29.2	0.33	-0.16	-19.80	
3,100.0	0.66	307.15	3,099.6	-28.8	11.1	-29.0	0.71	-0.68	14.92	
3,125.0	0.72	295.75	3,124.6	-28.7	10.9	-28.9	0.60	0.24	-45.60	
3,150.0	0.39	303.91	3,149.6	-28.6	10.6	-28.7	1.35	-1.32	32.64	
3,175.0	0.30	335.35	3,174.6	-28.5	10.5	-28.6	0.82	-0.36	125.76	
3,200.0	0.23	335.32	3,199.6	-28.3	10.5	-28.5	0.28	-0.28	-0.12	
3,225.0	0.30	355.03	3,224.6	-28.2	10.5	-28.4	0.46	0.28	78.84	
3,250.0	0.38	15.50	3,249.6	-28.1	10.5	-28.3	0.58	0.32	81.88	
3,275.0	0.61	61.43	3,274.6	-27.9	10.6	-28.1	1.76	0.92	183.72	
3,300.0	0.75	69.12	3,299.6	-27.8	10.9	-28.0	0.67	0.56	30.76	
3,325.0	0.59	66.64	3,324.6	-27.7	11.2	-27.9	0.65	-0.64	-9.92	
3,350.0	0.94	70.06	3,349.6	-27.6	11.5	-27.8	1.41	1.40	13.68	
3,375.0	0.98	65.53	3,374.6	-27.4	11.9	-27.6	0.34	0.16	-18.12	
3,400.0	1.06	72.55	3,399.6	-27.3	12.3	-27.5	0.59	0.32	28.08	
3,425.0	1.07	66.66	3,424.6	-27.1	12.7	-27.3	0.44	0.04	-23.56	
3,450.0	1.08	67.69	3,449.6	-26.9	13.1	-27.2	0.09	0.04	4.12	
3,475.0	1.08	63.48	3,474.6	-26.7	13.6	-27.0	0.32	0.00	-16.84	
3,500.0	0.93	72.64	3,499.6	-26.6	14.0	-26.8	0.88	-0.60	36.64	
3,525.0	0.74	79.21	3,524.6	-26.5	14.3	-26.7	0.85	-0.76	26.28	
3,550.0	0.65	63.20	3,549.6	-26.4	14.6	-26.6	0.85	-0.36	-64.04	

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,575.0	0.68	77.47	3,574.6	-26.3	14.9	-26.6	0.67	0.12	57.08
3,600.0	0.70	68.66	3,599.6	-26.2	15.2	-26.5	0.43	0.08	-35.24
3,625.0	0.63	69.54	3,624.6	-26.1	15.4	-26.4	0.28	-0.28	3.52
3,650.0	0.69	65.91	3,649.6	-26.0	15.7	-26.3	0.29	0.24	-14.52
3,675.0	0.52	84.49	3,674.6	-25.9	16.0	-26.2	1.03	-0.68	74.32
3,700.0	0.58	82.32	3,699.6	-25.9	16.2	-26.2	0.25	0.24	-8.68
3,725.0	0.56	85.42	3,724.6	-25.9	16.4	-26.2	0.15	-0.08	12.40
3,750.0	0.56	83.15	3,749.6	-25.8	16.7	-26.1	0.09	0.00	-9.08
3,775.0	0.56	77.06	3,774.6	-25.8	16.9	-26.1	0.24	0.00	-24.36
3,800.0	0.50	80.62	3,799.6	-25.8	17.2	-26.1	0.27	-0.24	14.24
3,825.0	0.56	78.94	3,824.6	-25.7	17.4	-26.0	0.25	0.24	-6.72
3,850.0	0.65	80.28	3,849.6	-25.7	17.6	-26.0	0.36	0.36	5.36
3,875.0	0.51	74.12	3,874.6	-25.6	17.9	-25.9	0.61	-0.56	-24.64
3,900.0	0.78	69.26	3,899.6	-25.5	18.2	-25.8	1.10	1.08	-19.44
3,925.0	0.78	82.60	3,924.6	-25.4	18.5	-25.8	0.72	0.00	53.36
3,950.0	0.79	77.87	3,949.6	-25.4	18.8	-25.7	0.26	0.04	-18.92
3,975.0	0.81	84.87	3,974.6	-25.3	19.2	-25.7	0.40	0.08	28.00
4,000.0	1.07	93.72	3,999.6	-25.3	19.6	-25.7	1.19	1.04	35.40
4,025.0	1.17	95.07	4,024.6	-25.4	20.1	-25.7	0.41	0.40	5.40
4,050.0	1.24	96.70	4,049.6	-25.4	20.6	-25.8	0.31	0.28	6.52
4,075.0	1.33	95.94	4,074.5	-25.5	21.1	-25.8	0.37	0.36	-3.04
4,100.0	1.27	95.45	4,099.5	-25.5	21.7	-25.9	0.24	-0.24	-1.96
4,125.0	1.11	98.95	4,124.5	-25.6	22.2	-26.0	0.70	-0.64	14.00
4,150.0	1.19	111.98	4,149.5	-25.7	22.7	-26.1	1.09	0.32	52.12
4,175.0	1.11	120.29	4,174.5	-26.0	23.2	-26.4	0.74	-0.32	33.24
4,200.0	1.16	134.61	4,199.5	-26.3	23.5	-26.7	1.15	0.20	57.28
4,225.0	1.50	142.68	4,224.5	-26.7	23.9	-27.1	1.55	1.36	32.28
4,250.0	1.64	145.11	4,249.5	-27.2	24.3	-27.7	0.62	0.56	9.72
4,275.0	2.14	147.21	4,274.5	-27.9	24.8	-28.4	2.02	2.00	8.40
4,300.0	2.11	150.45	4,299.5	-28.7	25.3	-29.2	0.50	-0.12	12.96
4,325.0	2.15	152.13	4,324.5	-29.5	25.7	-30.0	0.30	0.16	6.72
4,350.0	2.11	153.91	4,349.4	-30.4	26.1	-30.8	0.31	-0.16	7.12
4,375.0	1.92	163.65	4,374.4	-31.2	26.4	-31.6	1.56	-0.76	38.96
4,400.0	1.77	170.56	4,399.4	-32.0	26.6	-32.4	1.07	-0.60	27.64
4,425.0	1.69	175.52	4,424.4	-32.7	26.7	-33.2	0.68	-0.32	19.84
4,450.0	1.78	172.13	4,449.4	-33.5	26.8	-33.9	0.55	0.36	-13.56
4,475.0	1.72	170.54	4,474.4	-34.2	26.9	-34.7	0.31	-0.24	-6.36
4,500.0	1.71	170.74	4,499.4	-35.0	27.0	-35.4	0.05	-0.04	0.80
4,525.0	1.78	168.99	4,524.4	-35.7	27.2	-36.2	0.35	0.28	-7.00
4,550.0	1.85	168.08	4,549.3	-36.5	27.3	-37.0	0.30	0.28	-3.64
4,575.0	1.72	170.69	4,574.3	-37.2	27.5	-37.7	0.61	-0.52	10.44
4,600.0	1.73	170.52	4,599.3	-38.0	27.6	-38.5	0.04	0.04	-0.68
4,625.0	1.83	169.80	4,624.3	-38.8	27.7	-39.2	0.41	0.40	-2.88

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,650.0	1.79	170.12	4,649.3	-39.5	27.9	-40.0	0.17	-0.16	1.28
4,675.0	1.55	166.15	4,674.3	-40.2	28.0	-40.7	1.07	-0.96	-15.88
4,700.0	1.64	171.32	4,699.3	-40.9	28.2	-41.4	0.68	0.36	20.68
4,725.0	1.62	172.39	4,724.3	-41.6	28.3	-42.1	0.15	-0.08	4.28
4,750.0	1.34	168.53	4,749.3	-42.3	28.4	-42.8	1.19	-1.12	-15.44
4,775.0	0.69	159.01	4,774.3	-42.7	28.5	-43.2	2.68	-2.60	-38.08
4,800.0	0.75	147.02	4,799.2	-43.0	28.6	-43.5	0.65	0.24	-47.96
4,825.0	0.78	135.37	4,824.2	-43.2	28.8	-43.7	0.63	0.12	-46.60
4,850.0	0.93	134.69	4,849.2	-43.5	29.1	-44.0	0.60	0.60	-2.72
4,875.0	0.91	128.10	4,874.2	-43.8	29.4	-44.3	0.43	-0.08	-26.36
4,900.0	1.17	133.66	4,899.2	-44.1	29.7	-44.6	1.11	1.04	22.24
4,925.0	0.98	129.61	4,924.2	-44.4	30.1	-44.9	0.82	-0.76	-16.20
4,950.0	0.95	132.08	4,949.2	-44.6	30.4	-45.2	0.21	-0.12	9.88
4,975.0	0.97	135.01	4,974.2	-44.9	30.7	-45.5	0.21	0.08	11.72
5,000.0	0.91	133.71	4,999.2	-45.2	31.0	-45.8	0.25	-0.24	-5.20
5,025.0	0.92	134.48	5,024.2	-45.5	31.3	-46.0	0.06	0.04	3.08
5,050.0	0.85	131.34	5,049.2	-45.8	31.6	-46.3	0.34	-0.28	-12.56
5,075.0	0.96	132.79	5,074.2	-46.0	31.9	-46.6	0.45	0.44	5.80
5,100.0	0.99	130.95	5,099.2	-46.3	32.2	-46.9	0.17	0.12	-7.36
5,125.0	0.86	141.66	5,124.2	-46.6	32.4	-47.2	0.86	-0.52	42.84
5,150.0	1.04	129.00	5,149.2	-46.9	32.7	-47.5	1.10	0.72	-50.64
5,175.0	0.55	170.09	5,174.2	-47.2	32.9	-47.7	2.89	-1.96	164.36
5,200.0	0.38	184.27	5,199.2	-47.4	33.0	-47.9	0.82	-0.68	56.72
5,225.0	0.56	243.30	5,224.2	-47.5	32.8	-48.1	1.96	0.72	236.12
5,250.0	0.75	247.83	5,249.2	-47.6	32.6	-48.2	0.79	0.76	18.12
5,275.0	0.56	229.40	5,274.2	-47.7	32.3	-48.3	1.13	-0.76	-73.72
5,300.0	0.73	263.42	5,299.2	-47.8	32.1	-48.4	1.64	0.68	136.08
5,325.0	0.83	253.25	5,324.2	-47.9	31.8	-48.5	0.68	0.40	-40.68
5,350.0	0.82	249.67	5,349.2	-48.0	31.4	-48.6	0.21	-0.04	-14.32
5,375.0	0.72	248.43	5,374.2	-48.2	31.1	-48.7	0.41	-0.40	-4.96
5,400.0	0.72	252.21	5,399.2	-48.3	30.8	-48.8	0.19	0.00	15.12
5,425.0	0.68	257.28	5,424.2	-48.3	30.5	-48.9	0.29	-0.16	20.28
5,450.0	0.74	247.77	5,449.2	-48.4	30.2	-49.0	0.53	0.24	-38.04
5,475.0	0.67	242.42	5,474.2	-48.6	29.9	-49.1	0.38	-0.28	-21.40
5,500.0	0.73	252.91	5,499.2	-48.7	29.7	-49.2	0.56	0.24	41.96
5,525.0	0.87	246.70	5,524.2	-48.8	29.3	-49.3	0.66	0.56	-24.84
5,550.0	0.81	253.08	5,549.2	-48.9	29.0	-49.4	0.44	-0.24	25.52
5,575.0	0.81	247.62	5,574.2	-49.0	28.6	-49.5	0.31	0.00	-21.84
5,600.0	0.83	255.67	5,599.2	-49.2	28.3	-49.6	0.47	0.08	32.20
5,625.0	0.91	247.98	5,624.2	-49.3	28.0	-49.8	0.57	0.32	-30.76
5,650.0	1.18	255.07	5,649.2	-49.4	27.5	-49.9	1.20	1.08	28.36
5,675.0	0.98	232.73	5,674.2	-49.6	27.1	-50.1	1.85	-0.80	-89.36
5,700.0	1.17	233.44	5,699.2	-49.9	26.7	-50.4	0.76	0.76	2.84

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,725.0	1.32	228.41	5,724.1	-50.2	26.3	-50.7	0.74	0.60	-20.12	
5,750.0	1.35	214.98	5,749.1	-50.7	25.9	-51.1	1.25	0.12	-53.72	
5,775.0	1.86	196.38	5,774.1	-51.3	25.6	-51.7	2.89	2.04	-74.40	
5,800.0	1.83	187.87	5,799.1	-52.1	25.5	-52.5	1.10	-0.12	-34.04	
5,825.0	2.24	190.40	5,824.1	-53.0	25.3	-53.4	1.68	1.64	10.12	
5,850.0	3.34	195.52	5,849.1	-54.1	25.0	-54.6	4.51	4.40	20.48	
5,875.0	4.11	198.59	5,874.0	-55.7	24.6	-56.1	3.18	3.08	12.28	
5,900.0	4.25	196.88	5,899.0	-57.4	24.0	-57.8	0.75	0.56	-6.84	
5,925.0	4.37	198.29	5,923.9	-59.2	23.4	-59.6	0.64	0.48	5.64	
5,950.0	4.34	196.97	5,948.8	-61.0	22.9	-61.4	0.42	-0.12	-5.28	
5,975.0	4.45	198.22	5,973.7	-62.9	22.3	-63.2	0.58	0.44	5.00	
6,000.0	4.36	197.21	5,998.7	-64.7	21.7	-65.1	0.48	-0.36	-4.04	
6,025.0	4.48	198.10	6,023.6	-66.5	21.1	-66.9	0.55	0.48	3.56	
6,050.0	4.50	198.67	6,048.5	-68.4	20.5	-68.7	0.20	0.08	2.28	
6,075.0	4.52	199.47	6,073.4	-70.2	19.9	-70.6	0.26	0.08	3.20	
6,100.0	4.44	198.72	6,098.4	-72.1	19.2	-72.4	0.40	-0.32	-3.00	
6,125.0	4.40	198.68	6,123.3	-73.9	18.6	-74.2	0.16	-0.16	-0.16	
6,150.0	4.56	197.86	6,148.2	-75.8	18.0	-76.1	0.69	0.64	-3.28	
6,175.0	4.65	197.68	6,173.1	-77.7	17.4	-78.0	0.36	0.36	-0.72	
6,200.0	4.59	197.51	6,198.0	-79.6	16.8	-79.9	0.25	-0.24	-0.68	
6,225.0	4.65	196.59	6,223.0	-81.5	16.2	-81.8	0.38	0.24	-3.68	
6,250.0	4.64	197.82	6,247.9	-83.4	15.6	-83.7	0.40	-0.04	4.92	
6,275.0	4.40	196.75	6,272.8	-85.3	15.0	-85.6	1.02	-0.96	-4.28	
6,300.0	5.03	198.36	6,297.7	-87.3	14.4	-87.5	2.57	2.52	6.44	
6,325.0	5.35	199.86	6,322.6	-89.4	13.6	-89.6	1.39	1.28	6.00	
6,350.0	5.48	200.40	6,347.5	-91.6	12.8	-91.8	0.56	0.52	2.16	
6,375.0	5.63	201.02	6,372.4	-93.9	12.0	-94.1	0.65	0.60	2.48	
6,400.0	5.59	201.79	6,397.3	-96.2	11.1	-96.4	0.34	-0.16	3.08	
6,425.0	5.28	201.08	6,422.2	-98.4	10.2	-98.5	1.27	-1.24	-2.84	
6,450.0	5.68	200.97	6,447.0	-100.6	9.3	-100.8	1.60	1.60	-0.44	
6,475.0	5.66	201.28	6,471.9	-102.9	8.5	-103.0	0.15	-0.08	1.24	
6,500.0	5.71	200.40	6,496.8	-105.2	7.6	-105.3	0.40	0.20	-3.52	
6,525.0	5.77	201.97	6,521.7	-107.6	6.7	-107.7	0.67	0.24	6.28	
6,550.0	5.73	200.83	6,546.5	-109.9	5.8	-110.0	0.48	-0.16	-4.56	
6,575.0	5.78	204.22	6,571.4	-112.2	4.8	-112.3	1.37	0.20	13.56	
6,600.0	5.67	209.45	6,596.3	-114.4	3.7	-114.5	2.13	-0.44	20.92	
6,625.0	5.59	211.91	6,621.2	-116.5	2.4	-116.6	1.02	-0.32	9.84	
6,650.0	5.49	212.56	6,646.1	-118.6	1.1	-118.6	0.47	-0.40	2.60	
6,675.0	5.57	211.84	6,670.9	-120.6	-0.1	-120.6	0.42	0.32	-2.88	
6,700.0	5.63	212.06	6,695.8	-122.7	-1.4	-122.6	0.25	0.24	0.88	
6,725.0	5.67	212.94	6,720.7	-124.8	-2.8	-124.7	0.38	0.16	3.52	
6,750.0	5.64	211.70	6,745.6	-126.8	-4.1	-126.8	0.50	-0.12	-4.96	
6,775.0	5.83	214.43	6,770.5	-128.9	-5.4	-128.8	1.33	0.76	10.92	
6,800.0	5.48	212.96	6,795.3	-131.0	-6.8	-130.8	1.52	-1.40	-5.88	

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,825.0	5.72	214.03	6,820.2	-133.0	-8.2	-132.9	1.05	0.96	4.28
6,850.0	5.69	213.38	6,845.1	-135.1	-9.5	-134.9	0.28	-0.12	-2.60
6,875.0	5.79	213.51	6,870.0	-137.2	-10.9	-137.0	0.40	0.40	0.52
6,900.0	5.89	214.72	6,894.8	-139.3	-12.3	-139.0	0.63	0.40	4.84
6,925.0	5.81	214.01	6,919.7	-141.4	-13.8	-141.1	0.43	-0.32	-2.84
6,950.0	5.83	216.05	6,944.6	-143.5	-15.2	-143.2	0.83	0.08	8.16
6,975.0	5.74	220.03	6,969.4	-145.4	-16.8	-145.1	1.64	-0.36	15.92
7,000.0	5.54	219.44	6,994.3	-147.3	-18.4	-147.0	0.83	-0.80	-2.36
7,025.0	5.58	220.51	7,019.2	-149.2	-19.9	-148.8	0.44	0.16	4.28
7,050.0	5.34	221.27	7,044.1	-151.0	-21.5	-150.6	1.00	-0.96	3.04
7,075.0	5.50	221.09	7,069.0	-152.8	-23.0	-152.3	0.64	0.64	-0.72
7,100.0	5.55	221.90	7,093.9	-154.6	-24.6	-154.1	0.37	0.20	3.24
7,125.0	5.53	222.13	7,118.7	-156.4	-26.2	-155.9	0.12	-0.08	0.92
7,150.0	5.66	222.72	7,143.6	-158.2	-27.9	-157.6	0.57	0.52	2.36
7,175.0	5.80	222.08	7,168.5	-160.0	-29.6	-159.5	0.62	0.56	-2.56
7,200.0	5.61	222.68	7,193.4	-161.8	-31.2	-161.3	0.80	-0.76	2.40
7,225.0	5.51	220.95	7,218.3	-163.6	-32.9	-163.0	0.78	-0.40	-6.92
7,250.0	5.30	221.00	7,243.2	-165.4	-34.4	-164.8	0.84	-0.84	0.20
7,275.0	5.37	219.60	7,268.0	-167.2	-35.9	-166.5	0.59	0.28	-5.60
7,300.0	5.21	221.76	7,292.9	-168.9	-37.4	-168.3	1.02	-0.64	8.64
7,325.0	4.92	223.14	7,317.8	-170.6	-38.9	-169.9	1.26	-1.16	5.52
7,350.0	4.51	220.53	7,342.8	-172.1	-40.3	-171.4	1.85	-1.64	-10.44
7,375.0	4.38	222.15	7,367.7	-173.6	-41.5	-172.8	0.72	-0.52	6.48
7,400.0	4.34	220.87	7,392.6	-175.0	-42.8	-174.2	0.42	-0.16	-5.12
7,425.0	4.31	222.20	7,417.5	-176.4	-44.1	-175.6	0.42	-0.12	5.32
7,450.0	4.10	221.31	7,442.5	-177.8	-45.3	-176.9	0.88	-0.84	-3.56
7,475.0	4.31	222.16	7,467.4	-179.1	-46.5	-178.3	0.88	0.84	3.40
7,500.0	4.23	220.82	7,492.3	-180.5	-47.7	-179.6	0.51	-0.32	-5.36
7,525.0	4.24	222.19	7,517.3	-181.9	-48.9	-181.0	0.41	0.04	5.48
7,550.0	4.20	221.97	7,542.2	-183.3	-50.2	-182.4	0.17	-0.16	-0.88
7,575.0	4.03	225.24	7,567.1	-184.6	-51.4	-183.6	1.16	-0.68	13.08
7,600.0	4.03	223.10	7,592.1	-185.8	-52.6	-184.9	0.60	0.00	-8.56
7,625.0	4.10	223.69	7,617.0	-187.1	-53.9	-186.1	0.33	0.28	2.36
7,650.0	4.11	222.72	7,641.9	-188.4	-55.1	-187.4	0.28	0.04	-3.88
7,675.0	4.24	222.55	7,666.9	-189.8	-56.3	-188.7	0.52	0.52	-0.68
7,700.0	4.16	222.68	7,691.8	-191.1	-57.6	-190.1	0.32	-0.32	0.52
7,725.0	4.24	223.45	7,716.7	-192.4	-58.8	-191.4	0.39	0.32	3.08
7,750.0	4.24	224.44	7,741.7	-193.8	-60.1	-192.7	0.29	0.00	3.96
7,775.0	4.11	221.85	7,766.6	-195.1	-61.3	-194.0	0.92	-0.52	-10.36
7,800.0	3.89	221.86	7,791.5	-196.4	-62.5	-195.3	0.88	-0.88	0.04
7,825.0	3.72	219.07	7,816.5	-197.7	-63.6	-196.5	1.01	-0.68	-11.16
7,850.0	3.68	217.68	7,841.4	-198.9	-64.6	-197.8	0.39	-0.16	-5.56
7,875.0	3.56	219.29	7,866.4	-200.2	-65.6	-199.0	0.63	-0.48	6.44

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,900.0	3.64	219.80	7,891.3	-201.4	-66.6	-200.2	0.34	0.32	2.04
7,925.0	3.61	218.88	7,916.3	-202.6	-67.6	-201.4	0.26	-0.12	-3.68
7,950.0	3.56	214.90	7,941.2	-203.8	-68.5	-202.6	1.02	-0.20	-15.92
7,975.0	3.63	215.03	7,966.2	-205.1	-69.4	-203.9	0.28	0.28	0.52
8,000.0	3.90	208.09	7,991.1	-206.5	-70.3	-205.3	2.12	1.08	-27.76
8,025.0	3.97	206.70	8,016.1	-208.0	-71.0	-206.8	0.47	0.28	-5.56
8,050.0	4.09	206.40	8,041.0	-209.6	-71.8	-208.3	0.49	0.48	-1.20
8,075.0	3.98	207.41	8,066.0	-211.2	-72.6	-209.9	0.52	-0.44	4.04
8,100.0	4.04	206.35	8,090.9	-212.7	-73.4	-211.4	0.38	0.24	-4.24
8,125.0	4.02	204.49	8,115.8	-214.3	-74.2	-213.0	0.53	-0.08	-7.44
8,150.0	4.08	205.70	8,140.8	-215.9	-74.9	-214.6	0.42	0.24	4.84
8,175.0	4.04	203.12	8,165.7	-217.5	-75.6	-216.2	0.75	-0.16	-10.32
8,200.0	4.01	204.88	8,190.6	-219.1	-76.4	-217.8	0.51	-0.12	7.04
8,225.0	4.03	206.06	8,215.6	-220.7	-77.1	-219.3	0.34	0.08	4.72
8,250.0	4.01	203.78	8,240.5	-222.3	-77.9	-220.9	0.64	-0.08	-9.12
8,275.0	3.84	204.60	8,265.5	-223.9	-78.6	-222.5	0.72	-0.68	3.28
8,300.0	3.82	206.80	8,290.4	-225.4	-79.3	-223.9	0.59	-0.08	8.80
8,325.0	3.83	203.14	8,315.4	-226.9	-80.0	-225.4	0.98	0.04	-14.64
8,350.0	3.72	205.49	8,340.3	-228.4	-80.7	-226.9	0.76	-0.44	9.40
8,375.0	3.70	204.00	8,365.2	-229.9	-81.3	-228.4	0.39	-0.08	-5.96
8,400.0	3.68	204.93	8,390.2	-231.3	-82.0	-229.8	0.25	-0.08	3.72
8,425.0	3.54	205.40	8,415.1	-232.8	-82.7	-231.3	0.57	-0.56	1.88
8,450.0	3.61	205.80	8,440.1	-234.2	-83.3	-232.7	0.30	0.28	1.60
8,475.0	3.41	206.50	8,465.0	-235.5	-84.0	-234.0	0.82	-0.80	2.80
8,500.0	3.41	206.85	8,490.0	-236.9	-84.7	-235.3	0.08	0.00	1.40
8,525.0	3.33	208.62	8,515.0	-238.2	-85.4	-236.6	0.52	-0.32	7.08
8,550.0	3.39	207.82	8,539.9	-239.5	-86.1	-237.9	0.30	0.24	-3.20
8,575.0	3.25	208.47	8,564.9	-240.7	-86.7	-239.2	0.58	-0.56	2.60
8,600.0	3.49	202.55	8,589.8	-242.1	-87.4	-240.5	1.69	0.96	-23.68
8,625.0	3.34	209.36	8,614.8	-243.4	-88.0	-241.8	1.73	-0.60	27.24
8,650.0	3.29	207.77	8,639.7	-244.7	-88.7	-243.1	0.42	-0.20	-6.36
8,675.0	3.05	207.96	8,664.7	-245.9	-89.4	-244.3	0.96	-0.96	0.76
8,700.0	3.08	207.54	8,689.7	-247.1	-90.0	-245.4	0.15	0.12	-1.68
8,725.0	2.97	208.67	8,714.6	-248.2	-90.6	-246.6	0.50	-0.44	4.52
8,750.0	3.27	212.03	8,739.6	-249.4	-91.3	-247.8	1.40	1.20	13.44
8,775.0	3.01	210.67	8,764.6	-250.6	-92.0	-248.9	1.08	-1.04	-5.44
8,800.0	2.93	210.02	8,789.5	-251.7	-92.7	-250.0	0.35	-0.32	-2.60
8,825.0	2.76	210.99	8,814.5	-252.8	-93.3	-251.1	0.71	-0.68	3.88
8,850.0	2.70	211.80	8,839.5	-253.8	-93.9	-252.1	0.29	-0.24	3.24
8,875.0	2.49	217.46	8,864.4	-254.7	-94.6	-253.0	1.32	-0.84	22.64
8,900.0	2.41	215.36	8,889.4	-255.6	-95.2	-253.8	0.48	-0.32	-8.40
8,925.0	2.23	217.56	8,914.4	-256.4	-95.8	-254.7	0.80	-0.72	8.80
8,950.0	2.05	223.61	8,939.4	-257.1	-96.4	-255.3	1.15	-0.72	24.20

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,975.0	1.68	224.90	8,964.4	-257.7	-97.0	-255.9	1.49	-1.48	5.16
9,000.0	1.75	226.20	8,989.4	-258.2	-97.5	-256.4	0.32	0.28	5.20
9,025.0	1.65	232.87	9,014.3	-258.7	-98.1	-256.9	0.89	-0.40	26.68
9,050.0	1.53	231.06	9,039.3	-259.1	-98.6	-257.3	0.52	-0.48	-7.24
9,075.0	1.39	247.14	9,064.3	-259.4	-99.1	-257.6	1.72	-0.56	64.32
9,100.0	1.04	253.29	9,089.3	-259.6	-99.6	-257.8	1.49	-1.40	24.60
9,125.0	1.25	257.35	9,114.3	-259.7	-100.1	-257.9	0.90	0.84	16.24
9,150.0	1.21	257.94	9,139.3	-259.9	-100.6	-258.0	0.17	-0.16	2.36
9,175.0	1.07	257.17	9,164.3	-260.0	-101.1	-258.1	0.56	-0.56	-3.08
9,200.0	1.20	261.33	9,189.3	-260.1	-101.6	-258.2	0.62	0.52	16.64
9,225.0	1.17	254.29	9,214.3	-260.2	-102.1	-258.3	0.59	-0.12	-28.16
9,250.0	1.21	257.40	9,239.3	-260.3	-102.6	-258.4	0.30	0.16	12.44
9,275.0	1.29	262.53	9,264.3	-260.4	-103.2	-258.5	0.55	0.32	20.52
9,300.0	1.50	265.10	9,289.3	-260.5	-103.8	-258.6	0.88	0.84	10.28
9,325.0	1.53	249.12	9,314.3	-260.6	-104.4	-258.7	1.69	0.12	-63.92
9,328.0	1.57	248.27	9,317.3	-260.6	-104.5	-258.7	1.54	1.33	-28.33
9,416.0	1.62	251.47	9,405.2	-261.5	-106.8	-259.5	0.12	0.06	3.64
9,479.0	2.19	321.05	9,468.2	-260.8	-108.4	-258.9	3.53	0.90	110.44
9,511.0	4.55	341.59	9,500.2	-259.1	-109.2	-257.2	8.17	7.38	64.19
9,542.0	7.10	345.53	9,531.0	-256.1	-110.0	-254.1	8.32	8.23	12.71
9,573.0	9.02	353.14	9,561.7	-251.8	-110.8	-249.8	7.07	6.19	24.55
9,604.0	11.22	358.88	9,592.2	-246.4	-111.2	-244.4	7.80	7.10	18.52
9,636.0	13.16	357.23	9,623.5	-239.7	-111.4	-237.7	6.16	6.06	-5.16
9,667.0	15.39	355.82	9,653.5	-232.0	-111.9	-230.0	7.28	7.19	-4.55
9,671.2	15.74	355.84	9,657.6	-230.9	-111.9	-228.9	8.45	8.45	0.51
FTP @ 9671.2'MD									
9,698.0	18.01	355.96	9,683.2	-223.2	-112.5	-221.1	8.45	8.45	0.44
9,729.0	20.43	355.59	9,712.5	-213.0	-113.2	-210.9	7.82	7.81	-1.19
9,760.0	22.62	355.08	9,741.3	-201.6	-114.2	-199.6	7.09	7.06	-1.65
9,790.0	25.33	355.83	9,768.7	-189.5	-115.1	-187.4	9.09	9.03	2.50
9,822.0	27.44	355.38	9,797.4	-175.3	-116.2	-173.2	6.62	6.59	-1.41
9,852.0	29.34	356.67	9,823.8	-161.1	-117.2	-159.0	6.65	6.33	4.30
9,884.0	31.96	358.61	9,851.3	-144.8	-117.9	-142.7	8.75	8.19	6.06
9,915.0	34.31	359.40	9,877.3	-127.8	-118.2	-125.7	7.71	7.58	2.55
9,946.0	36.93	0.01	9,902.5	-109.8	-118.3	-107.7	8.53	8.45	1.97
9,977.0	40.53	0.65	9,926.6	-90.4	-118.1	-88.3	11.68	11.61	2.06
10,006.0	43.64	1.05	9,948.2	-71.0	-117.8	-68.9	10.76	10.72	1.38
10,037.0	46.10	1.47	9,970.1	-49.1	-117.4	-47.0	7.99	7.94	1.35
10,068.0	48.04	2.97	9,991.2	-26.4	-116.5	-24.4	7.19	6.26	4.84
10,099.0	51.00	2.93	10,011.4	-2.9	-115.3	-0.8	9.55	9.55	-0.13
10,129.0	54.77	2.77	10,029.5	21.0	-114.1	23.0	12.57	12.57	-0.53
10,160.0	62.03	3.10	10,045.7	47.4	-112.7	49.3	23.44	23.42	1.06
10,192.0	68.32	3.49	10,059.1	76.3	-111.1	78.3	19.69	19.66	1.22
10,223.0	74.28	4.14	10,069.1	105.6	-109.1	107.5	19.33	19.23	2.10

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,309.0	87.88	3.69	10,082.4	190.2	-103.3	192.0	15.82	15.81	-0.52	
10,402.0	87.78	2.13	10,085.9	283.0	-98.6	284.7	1.68	-0.11	-1.68	
10,494.0	88.96	359.91	10,088.5	374.9	-97.0	376.6	2.73	1.28	-2.41	
10,587.0	90.84	358.99	10,088.7	467.9	-97.9	469.6	2.25	2.02	-0.99	
10,681.0	92.23	359.09	10,086.1	561.9	-99.4	563.5	1.48	1.48	0.11	
10,774.0	90.57	358.58	10,083.9	654.8	-101.3	656.5	1.87	-1.78	-0.55	
10,866.0	90.80	358.92	10,082.8	746.8	-103.3	748.5	0.45	0.25	0.37	
10,961.0	91.97	358.93	10,080.5	841.8	-105.1	843.5	1.23	1.23	0.01	
11,054.0	90.32	358.76	10,078.6	934.7	-107.0	936.5	1.78	-1.77	-0.18	
11,147.0	90.70	358.59	10,077.8	1,027.7	-109.1	1,029.5	0.45	0.41	-0.18	
11,240.0	91.38	358.84	10,076.1	1,120.6	-111.2	1,122.4	0.78	0.73	0.27	
11,333.0	89.54	359.52	10,075.4	1,213.6	-112.6	1,215.4	2.11	-1.98	0.73	
11,425.0	89.94	0.15	10,075.8	1,305.6	-112.8	1,307.4	0.81	0.43	0.68	
11,518.0	89.91	0.77	10,075.9	1,398.6	-112.1	1,400.4	0.67	-0.03	0.67	
11,612.0	89.76	359.33	10,076.2	1,492.6	-112.0	1,494.4	1.54	-0.16	-1.53	
11,705.0	89.06	358.38	10,077.1	1,585.6	-113.8	1,587.4	1.27	-0.75	-1.02	
11,798.0	89.66	358.69	10,078.2	1,678.6	-116.2	1,680.3	0.73	0.65	0.33	
11,891.0	90.38	359.21	10,078.1	1,771.5	-117.9	1,773.3	0.95	0.77	0.56	
11,984.0	90.87	359.37	10,077.1	1,864.5	-119.1	1,866.3	0.55	0.53	0.17	
12,076.0	91.39	359.41	10,075.3	1,956.5	-120.1	1,958.3	0.57	0.57	0.04	
12,167.0	89.59	359.08	10,074.5	2,047.5	-121.3	2,049.3	2.01	-1.98	-0.36	
12,260.0	89.04	359.08	10,075.6	2,140.5	-122.8	2,142.3	0.59	-0.59	0.00	
12,352.0	89.54	359.34	10,076.8	2,232.5	-124.0	2,234.3	0.61	0.54	0.28	
12,474.0	91.24	359.09	10,075.9	2,354.4	-125.7	2,356.3	1.41	1.39	-0.20	
12,569.0	92.82	357.96	10,072.6	2,449.3	-128.1	2,451.2	2.04	1.66	-1.19	
12,661.0	92.04	359.08	10,068.7	2,541.2	-130.5	2,543.1	1.48	-0.85	1.22	
12,753.0	89.60	359.93	10,067.4	2,633.2	-131.3	2,635.1	2.81	-2.65	0.92	
12,846.0	89.23	0.22	10,068.3	2,726.2	-131.2	2,728.1	0.51	-0.40	0.31	
12,939.0	89.87	0.35	10,069.0	2,819.2	-130.7	2,821.1	0.70	0.69	0.14	
13,033.0	90.18	0.55	10,069.0	2,913.2	-130.0	2,915.0	0.39	0.33	0.21	
13,126.0	88.98	0.59	10,069.7	3,006.2	-129.1	3,008.0	1.29	-1.29	0.04	
13,218.0	87.42	0.12	10,072.6	3,098.1	-128.5	3,099.9	1.77	-1.70	-0.51	
13,311.0	87.82	358.15	10,076.4	3,191.0	-129.9	3,192.8	2.16	0.43	-2.12	
13,403.0	90.08	356.64	10,078.1	3,282.9	-134.1	3,284.8	2.95	2.46	-1.64	
13,494.0	90.74	356.14	10,077.5	3,373.7	-139.8	3,375.7	0.91	0.73	-0.55	
13,587.0	90.87	358.59	10,076.2	3,466.6	-144.1	3,468.6	2.64	0.14	2.63	
13,679.0	91.13	358.94	10,074.6	3,558.6	-146.1	3,560.6	0.47	0.28	0.38	
13,772.0	92.22	359.65	10,071.8	3,651.5	-147.2	3,653.6	1.40	1.17	0.76	
13,866.0	91.01	359.27	10,069.2	3,745.5	-148.1	3,747.5	1.35	-1.29	-0.40	
13,958.0	90.58	359.34	10,067.9	3,837.5	-149.2	3,839.5	0.47	-0.47	0.08	
14,052.0	91.71	358.84	10,066.0	3,931.4	-150.7	3,933.5	1.31	1.20	-0.53	
14,144.0	92.57	359.27	10,062.6	4,023.4	-152.2	4,025.4	1.04	0.93	0.47	
14,237.0	91.16	359.23	10,059.6	4,116.3	-153.4	4,118.4	1.52	-1.52	-0.04	

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,332.0	90.31	359.03	10,058.4	4,211.3	-154.9	4,213.4	0.92	-0.89	-0.21
14,426.0	90.22	359.16	10,057.9	4,305.3	-156.4	4,307.4	0.17	-0.10	0.14
14,519.0	90.98	0.19	10,056.9	4,398.3	-156.9	4,400.4	1.38	0.82	1.11
14,612.0	91.31	0.35	10,055.1	4,491.2	-156.4	4,493.3	0.39	0.35	0.17
14,704.0	93.19	1.10	10,051.5	4,583.2	-155.3	4,585.2	2.20	2.04	0.82
14,796.0	91.29	0.98	10,047.9	4,675.1	-153.6	4,677.1	2.07	-2.07	-0.13
14,890.0	89.46	359.90	10,047.3	4,769.1	-152.9	4,771.0	2.26	-1.95	-1.15
14,982.0	90.95	0.52	10,046.9	4,861.1	-152.6	4,863.0	1.75	1.62	0.67
15,077.0	89.42	0.30	10,046.6	4,956.1	-151.9	4,958.0	1.63	-1.61	-0.23
15,170.0	89.07	0.21	10,047.9	5,049.0	-151.5	5,050.9	0.39	-0.38	-0.10
15,264.0	89.50	0.61	10,049.0	5,143.0	-150.8	5,144.9	0.62	0.46	0.43
15,357.0	89.32	359.02	10,050.0	5,236.0	-151.1	5,237.9	1.72	-0.19	-1.71
15,450.0	91.89	358.60	10,049.0	5,329.0	-153.0	5,330.9	2.80	2.76	-0.45
15,542.0	91.06	359.17	10,046.6	5,420.9	-154.8	5,422.8	1.09	-0.90	0.62
15,635.0	90.31	359.54	10,045.5	5,513.9	-155.9	5,515.8	0.90	-0.81	0.40
15,728.0	89.88	359.25	10,045.4	5,606.9	-156.8	5,608.8	0.56	-0.46	-0.31
15,819.0	89.51	359.56	10,045.9	5,697.9	-157.8	5,699.8	0.53	-0.41	0.34
15,912.0	90.20	359.68	10,046.1	5,790.9	-158.4	5,792.8	0.75	0.74	0.13
16,005.0	90.33	358.93	10,045.7	5,883.9	-159.5	5,885.8	0.82	0.14	-0.81
16,097.0	90.70	358.39	10,044.8	5,975.9	-161.7	5,977.8	0.71	0.40	-0.59
16,190.0	91.21	358.27	10,043.3	6,068.8	-164.4	6,070.8	0.56	0.55	-0.13
16,283.0	88.77	358.28	10,043.3	6,161.8	-167.2	6,163.8	2.62	-2.62	0.01
16,376.0	90.42	359.10	10,044.0	6,254.7	-169.3	6,256.8	1.98	1.77	0.88
16,468.0	91.06	358.44	10,042.8	6,346.7	-171.3	6,348.7	1.00	0.70	-0.72
16,561.0	90.72	357.71	10,041.3	6,439.6	-174.4	6,441.7	0.87	-0.37	-0.78
16,655.0	88.30	358.82	10,042.1	6,533.6	-177.3	6,535.7	2.83	-2.57	1.18
16,748.0	88.70	358.37	10,044.6	6,626.5	-179.5	6,628.7	0.65	0.43	-0.48
16,841.0	90.66	359.32	10,045.1	6,719.5	-181.4	6,721.7	2.34	2.11	1.02
16,935.0	92.66	359.94	10,042.4	6,813.5	-182.0	6,815.6	2.23	2.13	0.66
17,027.0	92.40	359.78	10,038.3	6,905.4	-182.2	6,907.5	0.33	-0.28	-0.17
17,119.0	93.95	359.66	10,033.2	6,997.2	-182.7	6,999.4	1.69	1.68	-0.13
17,211.0	94.22	359.61	10,026.6	7,089.0	-183.3	7,091.1	0.30	0.29	-0.05
17,303.0	90.31	359.73	10,023.0	7,180.9	-183.8	7,183.0	4.25	-4.25	0.13
17,396.0	88.97	358.72	10,023.6	7,273.9	-185.1	7,276.0	1.80	-1.44	-1.09
17,488.0	88.49	358.31	10,025.6	7,365.8	-187.4	7,368.0	0.69	-0.52	-0.45
17,581.0	90.23	359.32	10,026.7	7,458.8	-189.4	7,461.0	2.16	1.87	1.09
17,674.0	91.12	359.51	10,025.6	7,551.8	-190.3	7,554.0	0.98	0.96	0.20
17,767.0	89.03	359.07	10,025.5	7,644.8	-191.5	7,647.0	2.30	-2.25	-0.47
17,860.0	89.31	359.65	10,026.8	7,737.8	-192.5	7,740.0	0.69	0.30	0.62
17,955.0	89.44	359.56	10,027.8	7,832.8	-193.2	7,834.9	0.17	0.14	-0.09
18,049.0	88.37	359.41	10,029.6	7,926.7	-194.0	7,928.9	1.15	-1.14	-0.16
18,143.0	89.24	0.97	10,031.6	8,020.7	-193.7	8,022.9	1.90	0.93	1.66
18,236.0	88.91	1.31	10,033.1	8,113.7	-191.8	8,115.8	0.51	-0.35	0.37

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well HARRIER FED COM #304H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3278.1usft (P 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3278.1usft (P 106)
Well:	HARRIER FED COM #304H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	EDM_Users

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
18,330.0	90.62	1.02	10,033.5	8,207.7	-189.9	8,209.7	1.85	1.82	-0.31
18,422.0	91.05	1.08	10,032.1	8,299.6	-188.3	8,301.7	0.47	0.47	0.07
18,517.0	90.08	0.52	10,031.2	8,394.6	-186.9	8,396.6	1.18	-1.02	-0.59
18,609.0	90.08	0.43	10,031.1	8,486.6	-186.2	8,488.6	0.10	0.00	-0.10
18,704.0	89.95	0.29	10,031.1	8,581.6	-185.6	8,583.5	0.20	-0.14	-0.15
18,797.0	91.00	1.13	10,030.3	8,674.6	-184.4	8,676.5	1.45	1.13	0.90
18,891.0	92.26	1.71	10,027.6	8,768.5	-182.1	8,770.4	1.48	1.34	0.62
18,986.0	89.58	1.54	10,026.1	8,863.5	-179.4	8,865.3	2.83	-2.82	-0.18
19,080.0	88.44	1.32	10,027.7	8,957.4	-177.0	8,959.1	1.24	-1.21	-0.23
19,173.0	91.37	358.92	10,027.9	9,050.4	-176.9	9,052.1	4.07	3.15	-2.58
19,265.0	91.08	358.37	10,025.9	9,142.4	-179.0	9,144.1	0.68	-0.32	-0.60
19,358.0	91.33	358.18	10,023.9	9,235.3	-181.8	9,237.1	0.34	0.27	-0.20
19,453.0	92.21	358.16	10,021.0	9,330.2	-184.9	9,332.0	0.93	0.93	-0.02
19,546.0	89.95	359.77	10,019.3	9,423.2	-186.5	9,425.0	2.98	-2.43	1.73
19,639.0	90.12	359.94	10,019.2	9,516.2	-186.8	9,518.0	0.26	0.18	0.18
19,731.0	90.00	359.71	10,019.1	9,608.2	-187.1	9,610.0	0.28	-0.13	-0.25
19,824.0	91.08	0.31	10,018.2	9,701.1	-187.0	9,702.9	1.33	1.16	0.65
19,917.0	93.42	1.22	10,014.6	9,794.1	-185.8	9,795.8	2.70	2.52	0.98
20,010.0	94.52	1.85	10,008.1	9,886.8	-183.3	9,888.5	1.36	1.18	0.68
20,103.0	92.79	2.16	10,002.2	9,979.6	-180.1	9,981.2	1.89	-1.86	0.33
20,197.0	92.23	1.60	9,998.1	10,073.4	-177.0	10,075.0	0.84	-0.60	-0.60
20,291.0	92.96	1.21	9,993.8	10,167.3	-174.7	10,168.8	0.88	0.78	-0.41
20,322.0	94.15	1.55	9,991.9	10,198.2	-173.9	10,199.7	3.99	3.84	1.10
Final MWD SVY @ 20322'MD									
20,329.9	94.15	1.55	9,991.3	10,206.1	-173.7	10,207.6	0.00	0.00	0.00
LTP @ 20329.9'MD									
20,382.0	94.15	1.55	9,987.6	10,258.0	-172.3	10,259.5	0.00	0.00	0.00
PTD @ 20382'MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,671.2	9,657.6	-230.9	-111.9	FTP @ 9671.2'MD
20,322.0	9,991.9	10,198.2	-173.9	Final MWD SVY @ 20322'MD
20,329.9	9,991.3	10,206.1	-173.7	LTP @ 20329.9'MD
20,382.0	9,987.6	10,258.0	-172.3	PTD @ 20382'MD

Checked By: _____	Approved By: _____	Date: _____
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