

Nadel & Gussman HEYCO, LLC

Eddy County, New Mexico (NAD83)

Sec 9, T18S, R26E

Iron Duke #4H

Wellbore #1

Plan: Design #1

DDC Well Planning Report

05 November, 2013

Oil Conservation Division

Case No. 73

Exhibit No. 13



DDC
Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Iron Duke #4H
Company:	Nadel & Gussman HEYCO, LLC	TVD Reference:	WELL @ 3384.8usft (Original Well Elev)
Project:	Eddy County, New Mexico (NAD83)	MD Reference:	WELL @ 3384.8usft (Original Well Elev)
Site:	Sec 9, T18S, R26E	North Reference:	Grid
Well:	Iron Duke #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Eddy County, New Mexico (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 9, T18S, R26E		
Site Position:		Northing:	640,802.92 usft
From:	Map	Easting:	527,181.30 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 45' 41.738 N
		Longitude:	104° 22' 45.786 W
		Grid Convergence:	-0.02 °

Well	Iron Duke #4H		
Well Position	+N/-S	1,975.3 usft	Northing: 642,778.20 usft
	+E/-W	-4,751.3 usft	Easting: 522,430.02 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Latitude: 32° 46' 1.260 N
			Longitude: 104° 23' 41.442 W
			Ground Level: 3,384.8 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/5/2013	7.71	60.49	48,613

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	89.78

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,051.0	0.00	0.00	2,051.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,151.0	10.00	81.00	2,150.5	1.4	8.6	10.00	10.00	0.00	81.00	
2,952.2	90.00	89.96	2,625.0	14.8	573.1	10.00	9.98	1.12	9.09	
7,132.2	90.00	89.96	2,625.0	18.0	4,753.0	0.00	0.00	0.00	0.00	PBHL Iron Duke #4

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Wellbore:	Wellbore #1		
Design:	Design #1		

Planned 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	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP @ 2051' / Build @ 10°/100'									
2,051.0	0.00	0.00	2,051.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	4.90	81.00	2,099.9	0.3	2.1	2.1	10.00	10.00	0.00
Build & Turn @ 10°/100'									
2,151.0	10.00	81.00	2,150.5	1.4	8.6	8.6	10.00	10.00	0.00
2,200.0	14.86	84.02	2,198.3	2.7	19.1	19.1	10.00	9.92	6.16
2,250.0	19.84	85.59	2,246.0	4.0	33.9	33.9	10.00	9.96	3.15
2,300.0	24.82	86.55	2,292.3	5.3	52.8	52.9	10.00	9.97	1.92
2,350.0	29.81	87.21	2,336.7	6.5	75.8	75.8	10.00	9.98	1.31
2,400.0	34.81	87.69	2,378.9	7.7	102.4	102.5	10.00	9.99	0.97
2,450.0	39.80	88.07	2,418.7	8.8	132.7	132.7	10.00	9.99	0.75
2,500.0	44.80	88.37	2,455.7	9.9	166.3	166.4	10.00	9.99	0.61
2,550.0	49.80	88.63	2,489.6	10.8	203.1	203.1	10.00	9.99	0.51
2,600.0	54.79	88.85	2,520.1	11.7	242.6	242.6	10.00	9.99	0.44
2,650.0	59.79	89.04	2,547.1	12.5	284.6	284.7	10.00	9.99	0.39
2,700.0	64.79	89.22	2,570.4	13.1	328.9	328.9	10.00	10.00	0.35
2,750.0	69.78	89.38	2,589.7	13.7	375.0	375.0	10.00	10.00	0.32
2,800.0	74.78	89.53	2,604.9	14.2	422.6	422.7	10.00	10.00	0.30
2,850.0	79.78	89.67	2,615.9	14.5	471.4	471.4	10.00	10.00	0.29
2,900.0	84.78	89.81	2,622.6	14.7	520.9	520.9	10.00	10.00	0.28
End of Curve & Turn @ 2952' MD / 90° Inc. / 89.96° Azm. / 2625' TVD									
2,952.2	90.00	89.96	2,625.0	14.8	573.1	573.1	10.00	10.00	0.28
3,000.0	90.00	89.96	2,625.0	14.9	620.8	620.9	0.00	0.00	0.00
3,100.0	90.00	89.96	2,625.0	14.9	720.8	720.9	0.00	0.00	0.00
3,200.0	90.00	89.96	2,625.0	15.0	820.8	820.9	0.00	0.00	0.00
3,300.0	90.00	89.96	2,625.0	15.1	920.8	920.9	0.00	0.00	0.00
3,400.0	90.00	89.96	2,625.0	15.2	1,020.8	1,020.9	0.00	0.00	0.00
3,500.0	90.00	89.96	2,625.0	15.2	1,120.8	1,120.9	0.00	0.00	0.00
3,600.0	90.00	89.96	2,625.0	15.3	1,220.8	1,220.9	0.00	0.00	0.00
3,700.0	90.00	89.96	2,625.0	15.4	1,320.8	1,320.9	0.00	0.00	0.00
3,800.0	90.00	89.96	2,625.0	15.5	1,420.8	1,420.9	0.00	0.00	0.00
3,900.0	90.00	89.96	2,625.0	15.6	1,520.8	1,520.9	0.00	0.00	0.00

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Wellbore:	Wellbore #1		
Design:	Design #1		

Planned 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)
4,000.0	90.00	89.96	2,625.0	15.6	1,620.8	1,620.9	0.00	0.00	0.00
4,100.0	90.00	89.96	2,625.0	15.7	1,720.8	1,720.9	0.00	0.00	0.00
4,200.0	90.00	89.96	2,625.0	15.8	1,820.8	1,820.9	0.00	0.00	0.00
4,300.0	90.00	89.96	2,625.0	15.9	1,920.8	1,920.9	0.00	0.00	0.00
4,400.0	90.00	89.96	2,625.0	15.9	2,020.8	2,020.9	0.00	0.00	0.00
4,500.0	90.00	89.96	2,625.0	16.0	2,120.8	2,120.9	0.00	0.00	0.00
4,600.0	90.00	89.96	2,625.0	16.1	2,220.8	2,220.9	0.00	0.00	0.00
4,700.0	90.00	89.96	2,625.0	16.2	2,320.8	2,320.9	0.00	0.00	0.00
4,800.0	90.00	89.96	2,625.0	16.2	2,420.8	2,420.9	0.00	0.00	0.00
4,900.0	90.00	89.96	2,625.0	16.3	2,520.8	2,520.9	0.00	0.00	0.00
5,000.0	90.00	89.96	2,625.0	16.4	2,620.8	2,620.9	0.00	0.00	0.00
5,100.0	90.00	89.96	2,625.0	16.5	2,720.8	2,720.9	0.00	0.00	0.00
5,200.0	90.00	89.96	2,625.0	16.6	2,820.8	2,820.9	0.00	0.00	0.00
5,300.0	90.00	89.96	2,625.0	16.6	2,920.8	2,920.9	0.00	0.00	0.00
5,400.0	90.00	89.96	2,625.0	16.7	3,020.8	3,020.9	0.00	0.00	0.00
5,500.0	90.00	89.96	2,625.0	16.8	3,120.8	3,120.9	0.00	0.00	0.00
5,600.0	90.00	89.96	2,625.0	16.9	3,220.8	3,220.9	0.00	0.00	0.00
5,700.0	90.00	89.96	2,625.0	16.9	3,320.8	3,320.9	0.00	0.00	0.00
5,800.0	90.00	89.96	2,625.0	17.0	3,420.8	3,420.9	0.00	0.00	0.00
5,900.0	90.00	89.96	2,625.0	17.1	3,520.8	3,520.9	0.00	0.00	0.00
6,000.0	90.00	89.96	2,625.0	17.2	3,620.8	3,620.9	0.00	0.00	0.00
6,100.0	90.00	89.96	2,625.0	17.3	3,720.8	3,720.9	0.00	0.00	0.00
6,200.0	90.00	89.96	2,625.0	17.3	3,820.8	3,820.9	0.00	0.00	0.00
6,300.0	90.00	89.96	2,625.0	17.4	3,920.8	3,920.9	0.00	0.00	0.00
6,400.0	90.00	89.96	2,625.0	17.5	4,020.8	4,020.9	0.00	0.00	0.00
6,500.0	90.00	89.96	2,625.0	17.6	4,120.8	4,120.9	0.00	0.00	0.00
6,600.0	90.00	89.96	2,625.0	17.6	4,220.8	4,220.9	0.00	0.00	0.00
6,700.0	90.00	89.96	2,625.0	17.7	4,320.8	4,320.9	0.00	0.00	0.00
6,800.0	90.00	89.96	2,625.0	17.8	4,420.8	4,420.9	0.00	0.00	0.00
6,900.0	90.00	89.96	2,625.0	17.9	4,520.8	4,520.9	0.00	0.00	0.00
7,000.0	90.00	89.96	2,625.0	17.9	4,620.8	4,620.9	0.00	0.00	0.00
7,100.0	90.00	89.96	2,625.0	18.0	4,720.8	4,720.9	0.00	0.00	0.00
PBHL @ 7132' MD / 2625' TVD									
7,132.2	90.00	89.96	2,625.0	18.0	4,753.0	4,753.0	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL Iron Duke #4H	0.00	360.00	2,625.0	18.0	4,753.0	642,796.25	527,183.02	32° 46' 1.463 N	104° 22' 45.776 W
- plan hits target center									
- Point									

DDC
Well Planning Report

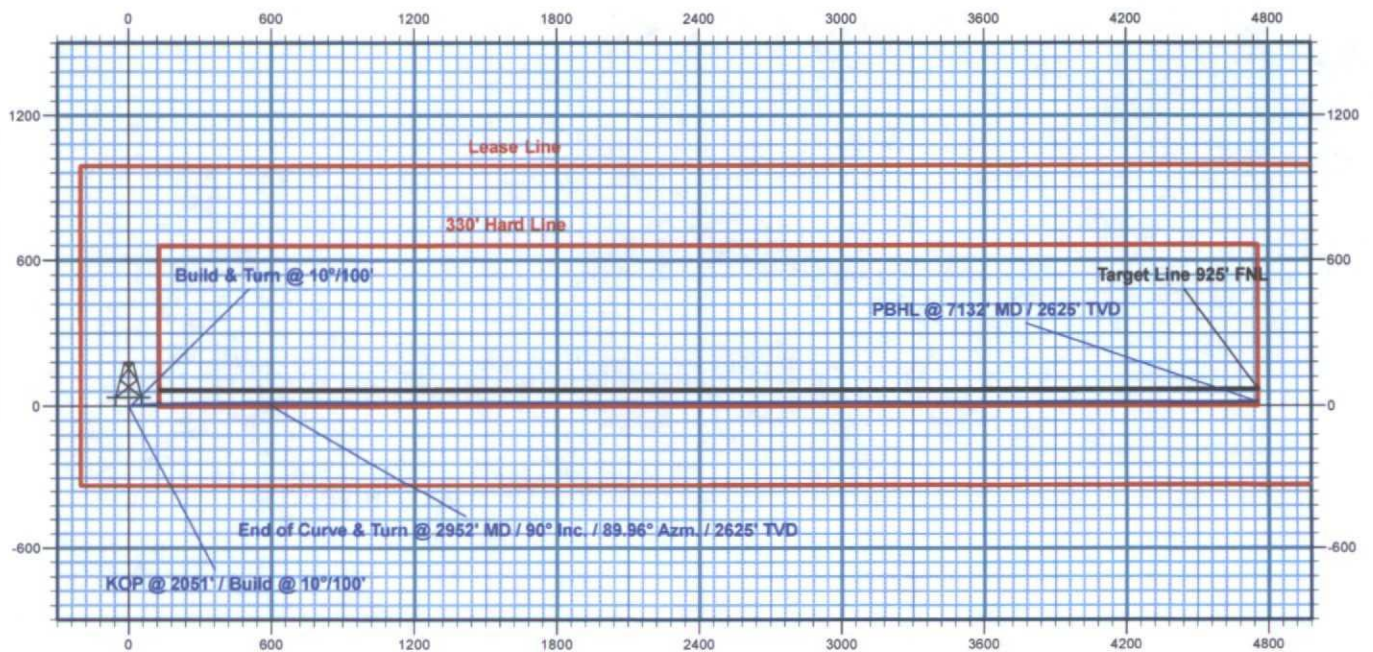


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Project:	Eddy County, New Mexico (NAD83)	MD Reference:	WELL @ 3384.8usft (Original Well Elev)
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Well:	Iron Duke #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,051.0	2,051.0	0.0	0.0	KOP @ 2051' / Build @ 10°/100'
2,151.0	2,150.5	1.4	8.6	Build & Turn @ 10°/100'
2,952.2	2,625.0	14.8	573.1	End of Curve & Turn @ 2952' MD / 90° Inc. / 89.96° Azm. / 2625' TVD
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Sec 9, T18S, R26E
Iron Duke #4H
Quote 130966
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