

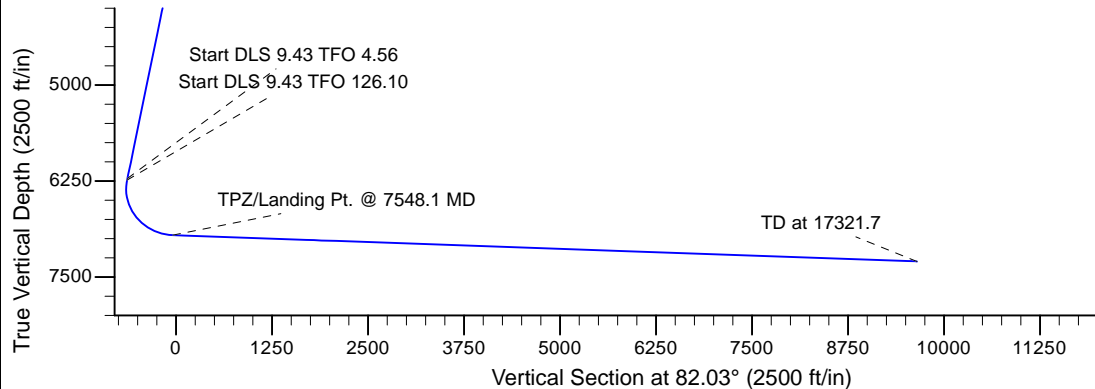
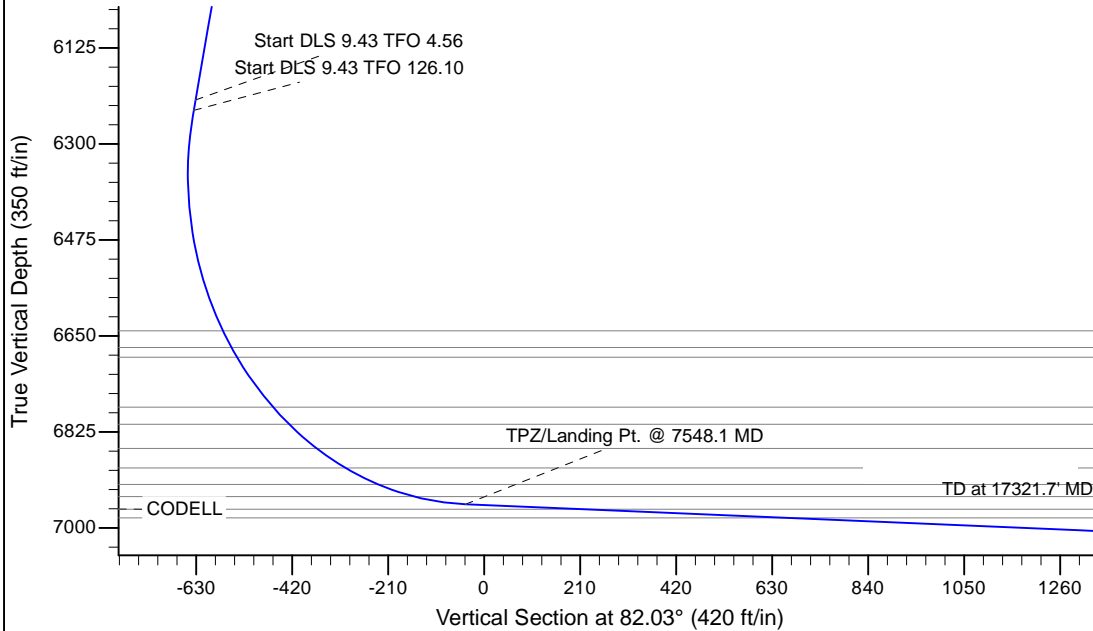
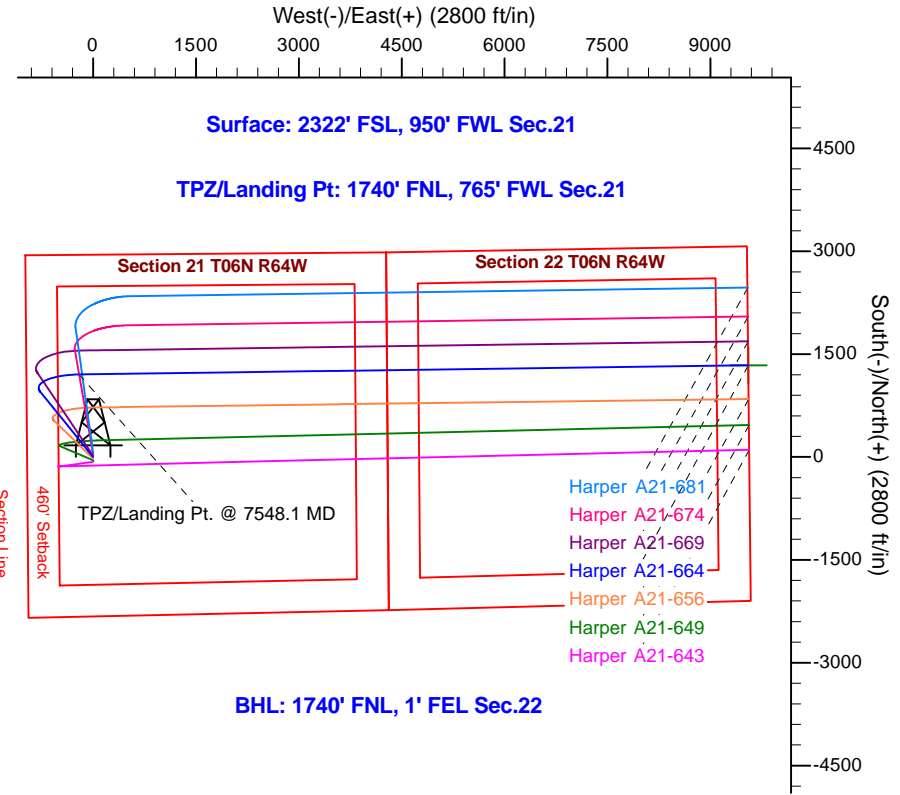
Project: Wells Ranch
 Site: A Section 21-T6N-R64W Weld County, CO
 Well: Harper A21-664
 Wellbore: Original Drilling
 Design: APD - Rev 0

Northern Region - DJ Basin

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Northern Zone
 System Datum: Mean Sea Level

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-/S	+E-/W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	2600.0	0.00	0.00	2600.0	0.0	0.0	0.00	0.00	0.0	
3	3687.5	21.75	321.00	3661.6	158.5	-128.3	2.00	321.00	-105.1	
4	6442.0	21.75	321.00	6220.0	0.0	0.0	0.00	0.00	-631.3	
5	6462.4	23.66	321.38	6238.8	957.9	-775.6	9.43	4.56	-635.3	
6	7548.1	88.00	89.22	6957.0	1205.0	-210.0	9.43	126.10	-40.9	
7	17321.7	88.00	89.22	7298.1	1338.1	9556.7	0.00	0.00	9649.9	Harper A21-664 BHL 1740'FNL, 1'FEL



T G M

Azimuths to Grid North
 True North: -0.61°
 Magnetic North: 7.55°

Magnetic Field
 Strength: 52504.0snT
 Dip Angle: 66.95°
 Date: 12/29/2016
 Model: IGRF2015

WELL DETAILS: Harper A21-664					
Northing	Easting	Ground Elevation:	Latitude	Longitude	
0.0	0.0	1415673.58	3261196.58	40.4706300	-104.5611700

Plan: APD - Rev 0 (Harper A21-664/Original Drilling)
 Created By: Shailey Jewell Date: 16:17, December 29 2016

OK to submit with 2A as per Noble Drilling
 12/29/2016 4:22

Northern Region - DJ Basin

**Wells Ranch
A Section 21
Harper A21-664**

Original Drilling

Plan: APD - Rev 0

Standard Planning Report

29 December, 2016

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Project	Wells Ranch, Weld County Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	A Section 21				
Site Position:	Northing:	1,414,202.83 usft	Latitude:	40.4665920	
From:	Lat/Long	Easting:	3,261,231.91 usft	Longitude:	-104.5610990
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.61 °

Well	Harper A21-664					
Well Position	+N/-S	1,470.8 ft	Northing:	1,415,673.58 usft	Latitude:	40.4706300
	+E/-W	-35.3 ft	Easting:	3,261,196.58 usft	Longitude:	-104.5611700
Position Uncertainty		0.0 ft	Wellhead Elevation:		Ground Level:	4,742.0 ft

Wellbore	Original Drilling				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/29/2016	8.16	66.95	52,503.95199758

Design	APD - Rev 0			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	82.03

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,687.5	21.75	321.00	3,661.6	158.5	-128.3	2.00	2.00	0.00	321.00	
6,442.0	21.75	321.00	6,220.0	951.7	-770.7	0.00	0.00	0.00	0.00	
6,462.4	23.66	321.38	6,238.8	957.9	-775.6	9.43	9.40	1.87	4.56	
7,548.1	88.00	89.22	6,957.0	1,205.0	-210.0	9.43	5.93	11.77	126.10	
17,321.7	88.00	89.22	7,298.1	1,338.1	9,556.7	0.00	0.00	0.00	0.00	Harper A21-664 BHL

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
50.0	0.00	0.00	50.0	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
150.0	0.00	0.00	150.0	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
250.0	0.00	0.00	250.0	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
350.0	0.00	0.00	350.0	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
450.0	0.00	0.00	450.0	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
550.0	0.00	0.00	550.0	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
650.0	0.00	0.00	650.0	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
750.0	0.00	0.00	750.0	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
850.0	0.00	0.00	850.0	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
950.0	0.00	0.00	950.0	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
1,050.0	0.00	0.00	1,050.0	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
1,150.0	0.00	0.00	1,150.0	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
1,250.0	0.00	0.00	1,250.0	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
1,350.0	0.00	0.00	1,350.0	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
1,450.0	0.00	0.00	1,450.0	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
1,550.0	0.00	0.00	1,550.0	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
1,650.0	0.00	0.00	1,650.0	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
1,750.0	0.00	0.00	1,750.0	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
1,850.0	0.00	0.00	1,850.0	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
1,950.0	0.00	0.00	1,950.0	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
2,050.0	0.00	0.00	2,050.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,150.0	0.00	0.00	2,150.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,250.0	0.00	0.00	2,250.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,350.0	0.00	0.00	2,350.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,450.0	0.00	0.00	2,450.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,550.0	0.00	0.00	2,550.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,650.0	1.00	321.00	2,650.0	0.3	-0.3	-0.2	2.00	2.00	0.00

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,700.0	2.00	321.00	2,700.0	1.4	-1.1	-0.9	2.00	2.00	0.00
2,750.0	3.00	321.00	2,749.9	3.1	-2.5	-2.0	2.00	2.00	0.00
2,800.0	4.00	321.00	2,799.8	5.4	-4.4	-3.6	2.00	2.00	0.00
2,850.0	5.00	321.00	2,849.7	8.5	-6.9	-5.6	2.00	2.00	0.00
2,900.0	6.00	321.00	2,899.5	12.2	-9.9	-8.1	2.00	2.00	0.00
2,950.0	7.00	321.00	2,949.1	16.6	-13.4	-11.0	2.00	2.00	0.00
3,000.0	8.00	321.00	2,998.7	21.7	-17.5	-14.4	2.00	2.00	0.00
3,050.0	9.00	321.00	3,048.2	27.4	-22.2	-18.2	2.00	2.00	0.00
3,100.0	10.00	321.00	3,097.5	33.8	-27.4	-22.4	2.00	2.00	0.00
3,150.0	11.00	321.00	3,146.6	40.9	-33.1	-27.1	2.00	2.00	0.00
3,200.0	12.00	321.00	3,195.6	48.7	-39.4	-32.3	2.00	2.00	0.00
3,250.0	13.00	321.00	3,244.4	57.1	-46.2	-37.8	2.00	2.00	0.00
3,300.0	14.00	321.00	3,293.1	66.1	-53.6	-43.9	2.00	2.00	0.00
3,350.0	15.00	321.00	3,341.5	75.9	-61.4	-50.3	2.00	2.00	0.00
3,400.0	16.00	321.00	3,389.6	86.2	-69.8	-57.2	2.00	2.00	0.00
3,450.0	17.00	321.00	3,437.6	97.3	-78.8	-64.5	2.00	2.00	0.00
3,500.0	18.00	321.00	3,485.3	109.0	-88.2	-72.3	2.00	2.00	0.00
3,550.0	19.00	321.00	3,532.7	121.3	-98.2	-80.5	2.00	2.00	0.00
3,600.0	20.00	321.00	3,579.8	134.3	-108.7	-89.1	2.00	2.00	0.00
3,650.0	21.00	321.00	3,626.6	147.9	-119.7	-98.1	2.00	2.00	0.00
3,687.5	21.75	321.00	3,661.6	158.5	-128.3	-105.1	2.00	2.00	0.00
3,700.0	21.75	321.00	3,673.2	162.1	-131.3	-107.5	0.00	0.00	0.00
3,750.0	21.75	321.00	3,719.6	176.5	-142.9	-117.1	0.00	0.00	0.00
3,800.0	21.75	321.00	3,766.1	190.9	-154.6	-126.6	0.00	0.00	0.00
3,850.0	21.75	321.00	3,812.5	205.3	-166.2	-136.2	0.00	0.00	0.00
3,900.0	21.75	321.00	3,858.9	219.7	-177.9	-145.7	0.00	0.00	0.00
3,950.0	21.75	321.00	3,905.4	234.1	-189.6	-155.3	0.00	0.00	0.00
4,000.0	21.75	321.00	3,951.8	248.5	-201.2	-164.8	0.00	0.00	0.00
4,050.0	21.75	321.00	3,998.3	262.9	-212.9	-174.4	0.00	0.00	0.00
4,100.0	21.75	321.00	4,044.7	277.3	-224.5	-183.9	0.00	0.00	0.00
4,150.0	21.75	321.00	4,091.1	291.7	-236.2	-193.5	0.00	0.00	0.00
4,200.0	21.75	321.00	4,137.6	306.1	-247.9	-203.0	0.00	0.00	0.00
4,250.0	21.75	321.00	4,184.0	320.5	-259.5	-212.6	0.00	0.00	0.00
4,300.0	21.75	321.00	4,230.5	334.9	-271.2	-222.1	0.00	0.00	0.00
4,350.0	21.75	321.00	4,276.9	349.3	-282.8	-231.7	0.00	0.00	0.00
4,400.0	21.75	321.00	4,323.3	363.7	-294.5	-241.2	0.00	0.00	0.00
4,450.0	21.75	321.00	4,369.8	378.1	-306.2	-250.8	0.00	0.00	0.00
4,500.0	21.75	321.00	4,416.2	392.5	-317.8	-260.3	0.00	0.00	0.00
4,550.0	21.75	321.00	4,462.7	406.9	-329.5	-269.9	0.00	0.00	0.00
4,600.0	21.75	321.00	4,509.1	421.3	-341.1	-279.4	0.00	0.00	0.00
4,650.0	21.75	321.00	4,555.5	435.7	-352.8	-289.0	0.00	0.00	0.00
4,700.0	21.75	321.00	4,602.0	450.1	-364.5	-298.5	0.00	0.00	0.00
4,750.0	21.75	321.00	4,648.4	464.5	-376.1	-308.1	0.00	0.00	0.00
4,800.0	21.75	321.00	4,694.9	478.9	-387.8	-317.6	0.00	0.00	0.00
4,850.0	21.75	321.00	4,741.3	493.3	-399.4	-327.2	0.00	0.00	0.00
4,900.0	21.75	321.00	4,787.8	507.7	-411.1	-336.7	0.00	0.00	0.00
4,950.0	21.75	321.00	4,834.2	522.1	-422.8	-346.3	0.00	0.00	0.00
5,000.0	21.75	321.00	4,880.6	536.5	-434.4	-355.8	0.00	0.00	0.00
5,050.0	21.75	321.00	4,927.1	550.9	-446.1	-365.4	0.00	0.00	0.00
5,100.0	21.75	321.00	4,973.5	565.3	-457.7	-374.9	0.00	0.00	0.00
5,150.0	21.75	321.00	5,020.0	579.7	-469.4	-384.5	0.00	0.00	0.00
5,200.0	21.75	321.00	5,066.4	594.1	-481.1	-394.0	0.00	0.00	0.00
5,250.0	21.75	321.00	5,112.8	608.5	-492.7	-403.6	0.00	0.00	0.00
5,300.0	21.75	321.00	5,159.3	622.9	-504.4	-413.1	0.00	0.00	0.00

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,350.0	21.75	321.00	5,205.7	637.3	-516.0	-422.7	0.00	0.00	0.00
5,400.0	21.75	321.00	5,252.2	651.7	-527.7	-432.2	0.00	0.00	0.00
5,450.0	21.75	321.00	5,298.6	666.1	-539.4	-441.8	0.00	0.00	0.00
5,500.0	21.75	321.00	5,345.0	680.5	-551.0	-451.3	0.00	0.00	0.00
5,550.0	21.75	321.00	5,391.5	694.9	-562.7	-460.9	0.00	0.00	0.00
5,600.0	21.75	321.00	5,437.9	709.3	-574.3	-470.4	0.00	0.00	0.00
5,650.0	21.75	321.00	5,484.4	723.7	-586.0	-480.0	0.00	0.00	0.00
5,700.0	21.75	321.00	5,530.8	738.0	-597.7	-489.5	0.00	0.00	0.00
5,750.0	21.75	321.00	5,577.2	752.4	-609.3	-499.1	0.00	0.00	0.00
5,800.0	21.75	321.00	5,623.7	766.8	-621.0	-508.6	0.00	0.00	0.00
5,850.0	21.75	321.00	5,670.1	781.2	-632.6	-518.2	0.00	0.00	0.00
5,900.0	21.75	321.00	5,716.6	795.6	-644.3	-527.7	0.00	0.00	0.00
5,950.0	21.75	321.00	5,763.0	810.0	-656.0	-537.3	0.00	0.00	0.00
6,000.0	21.75	321.00	5,809.4	824.4	-667.6	-546.8	0.00	0.00	0.00
6,050.0	21.75	321.00	5,855.9	838.8	-679.3	-556.4	0.00	0.00	0.00
6,100.0	21.75	321.00	5,902.3	853.2	-690.9	-566.0	0.00	0.00	0.00
6,150.0	21.75	321.00	5,948.8	867.6	-702.6	-575.5	0.00	0.00	0.00
6,200.0	21.75	321.00	5,995.2	882.0	-714.3	-585.1	0.00	0.00	0.00
6,250.0	21.75	321.00	6,041.6	896.4	-725.9	-594.6	0.00	0.00	0.00
6,300.0	21.75	321.00	6,088.1	910.8	-737.6	-604.2	0.00	0.00	0.00
6,350.0	21.75	321.00	6,134.5	925.2	-749.2	-613.7	0.00	0.00	0.00
6,400.0	21.75	321.00	6,181.0	939.6	-760.9	-623.3	0.00	0.00	0.00
6,442.0	21.75	321.00	6,220.0	951.7	-770.7	-631.3	0.00	0.00	0.00
6,450.0	22.50	321.16	6,227.4	954.1	-772.6	-632.8	9.43	9.40	1.96
6,462.4	23.66	321.38	6,238.8	957.9	-775.6	-635.3	9.43	9.40	1.81
6,500.0	21.75	329.13	6,273.5	969.7	-783.9	-641.9	9.43	-5.08	20.60
6,550.0	19.88	341.34	6,320.2	985.8	-791.4	-647.1	9.43	-3.74	24.42
6,600.0	18.98	355.28	6,367.4	1,001.9	-794.8	-648.2	9.43	-1.80	27.88
6,650.0	19.18	9.72	6,414.7	1,018.1	-794.1	-645.2	9.43	0.41	28.88
6,700.0	20.46	23.14	6,461.8	1,034.3	-789.2	-638.2	9.43	2.55	26.83
6,750.0	22.63	34.57	6,508.3	1,050.2	-780.3	-627.2	9.43	4.33	22.86
6,800.0	25.46	43.84	6,554.0	1,065.9	-767.4	-612.2	9.43	5.66	18.55
6,850.0	28.76	51.25	6,598.5	1,081.2	-750.6	-593.4	9.43	6.60	14.81
6,900.0	32.38	57.19	6,641.5	1,096.0	-730.0	-570.9	9.43	7.25	11.87
6,950.0	36.23	62.01	6,682.8	1,110.2	-705.6	-544.9	9.43	7.70	9.66
7,000.0	40.25	66.02	6,722.1	1,123.7	-677.8	-515.5	9.43	8.03	8.00
7,050.0	44.38	69.40	6,759.1	1,136.4	-646.7	-482.8	9.43	8.26	6.76
7,100.0	48.59	72.31	6,793.5	1,148.3	-612.4	-447.3	9.43	8.43	5.82
7,150.0	52.87	74.86	6,825.1	1,159.2	-575.3	-409.0	9.43	8.56	5.11
7,200.0	57.20	77.14	6,853.8	1,169.1	-535.6	-368.3	9.43	8.66	4.56
7,250.0	61.57	79.21	6,879.2	1,177.9	-493.4	-325.4	9.43	8.73	4.13
7,300.0	65.96	81.11	6,901.3	1,185.5	-449.3	-280.5	9.43	8.79	3.80
7,350.0	70.38	82.89	6,919.9	1,192.0	-403.3	-234.1	9.43	8.83	3.55
7,400.0	74.81	84.57	6,934.9	1,197.2	-355.9	-186.5	9.43	8.87	3.36
7,450.0	79.25	86.18	6,946.1	1,201.1	-307.4	-137.8	9.43	8.89	3.22
7,500.0	83.71	87.74	6,953.5	1,203.7	-258.0	-88.6	9.43	8.91	3.13
7,548.1	88.00	89.22	6,957.0	1,205.0	-210.0	-40.9	9.43	8.92	3.07
7,550.0	88.00	89.22	6,957.1	1,205.0	-208.2	-39.0	0.00	0.00	0.00
7,600.0	88.00	89.22	6,958.8	1,205.7	-158.2	10.5	0.00	0.00	0.00
7,650.0	88.00	89.22	6,960.6	1,206.4	-108.2	60.1	0.00	0.00	0.00
7,700.0	88.00	89.22	6,962.3	1,207.1	-58.3	109.7	0.00	0.00	0.00
7,750.0	88.00	89.22	6,964.0	1,207.7	-8.3	159.3	0.00	0.00	0.00
7,800.0	88.00	89.22	6,965.8	1,208.4	41.7	208.8	0.00	0.00	0.00
7,850.0	88.00	89.22	6,967.5	1,209.1	91.6	258.4	0.00	0.00	0.00

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
7,900.0	88.00	89.22	6,969.3	1,209.8	141.6	308.0	0.00	0.00	0.00	
7,950.0	88.00	89.22	6,971.0	1,210.5	191.6	357.6	0.00	0.00	0.00	
8,000.0	88.00	89.22	6,972.8	1,211.1	241.5	407.1	0.00	0.00	0.00	
8,050.0	88.00	89.22	6,974.5	1,211.8	291.5	456.7	0.00	0.00	0.00	
8,100.0	88.00	89.22	6,976.3	1,212.5	341.5	506.3	0.00	0.00	0.00	
8,150.0	88.00	89.22	6,978.0	1,213.2	391.4	555.9	0.00	0.00	0.00	
8,200.0	88.00	89.22	6,979.7	1,213.9	441.4	605.4	0.00	0.00	0.00	
8,250.0	88.00	89.22	6,981.5	1,214.5	491.4	655.0	0.00	0.00	0.00	
8,300.0	88.00	89.22	6,983.2	1,215.2	541.3	704.6	0.00	0.00	0.00	
8,350.0	88.00	89.22	6,985.0	1,215.9	591.3	754.2	0.00	0.00	0.00	
8,400.0	88.00	89.22	6,986.7	1,216.6	641.3	803.8	0.00	0.00	0.00	
8,450.0	88.00	89.22	6,988.5	1,217.3	691.2	853.3	0.00	0.00	0.00	
8,500.0	88.00	89.22	6,990.2	1,217.9	741.2	902.9	0.00	0.00	0.00	
8,550.0	88.00	89.22	6,992.0	1,218.6	791.1	952.5	0.00	0.00	0.00	
8,600.0	88.00	89.22	6,993.7	1,219.3	841.1	1,002.1	0.00	0.00	0.00	
8,650.0	88.00	89.22	6,995.5	1,220.0	891.1	1,051.6	0.00	0.00	0.00	
8,700.0	88.00	89.22	6,997.2	1,220.7	941.0	1,101.2	0.00	0.00	0.00	
8,750.0	88.00	89.22	6,998.9	1,221.4	991.0	1,150.8	0.00	0.00	0.00	
8,800.0	88.00	89.22	7,000.7	1,222.0	1,041.0	1,200.4	0.00	0.00	0.00	
8,850.0	88.00	89.22	7,002.4	1,222.7	1,090.9	1,249.9	0.00	0.00	0.00	
8,900.0	88.00	89.22	7,004.2	1,223.4	1,140.9	1,299.5	0.00	0.00	0.00	
8,950.0	88.00	89.22	7,005.9	1,224.1	1,190.9	1,349.1	0.00	0.00	0.00	
9,000.0	88.00	89.22	7,007.7	1,224.8	1,240.8	1,398.7	0.00	0.00	0.00	
9,050.0	88.00	89.22	7,009.4	1,225.4	1,290.8	1,448.3	0.00	0.00	0.00	
9,100.0	88.00	89.22	7,011.2	1,226.1	1,340.8	1,497.8	0.00	0.00	0.00	
9,150.0	88.00	89.22	7,012.9	1,226.8	1,390.7	1,547.4	0.00	0.00	0.00	
9,200.0	88.00	89.22	7,014.6	1,227.5	1,440.7	1,597.0	0.00	0.00	0.00	
9,250.0	88.00	89.22	7,016.4	1,228.2	1,490.7	1,646.6	0.00	0.00	0.00	
9,300.0	88.00	89.22	7,018.1	1,228.8	1,540.6	1,696.1	0.00	0.00	0.00	
9,350.0	88.00	89.22	7,019.9	1,229.5	1,590.6	1,745.7	0.00	0.00	0.00	
9,400.0	88.00	89.22	7,021.6	1,230.2	1,640.6	1,795.3	0.00	0.00	0.00	
9,450.0	88.00	89.22	7,023.4	1,230.9	1,690.5	1,844.9	0.00	0.00	0.00	
9,500.0	88.00	89.22	7,025.1	1,231.6	1,740.5	1,894.4	0.00	0.00	0.00	
9,550.0	88.00	89.22	7,026.9	1,232.2	1,790.4	1,944.0	0.00	0.00	0.00	
9,600.0	88.00	89.22	7,028.6	1,232.9	1,840.4	1,993.6	0.00	0.00	0.00	
9,650.0	88.00	89.22	7,030.4	1,233.6	1,890.4	2,043.2	0.00	0.00	0.00	
9,700.0	88.00	89.22	7,032.1	1,234.3	1,940.3	2,092.7	0.00	0.00	0.00	
9,750.0	88.00	89.22	7,033.8	1,235.0	1,990.3	2,142.3	0.00	0.00	0.00	
9,800.0	88.00	89.22	7,035.6	1,235.6	2,040.3	2,191.9	0.00	0.00	0.00	
9,850.0	88.00	89.22	7,037.3	1,236.3	2,090.2	2,241.5	0.00	0.00	0.00	
9,900.0	88.00	89.22	7,039.1	1,237.0	2,140.2	2,291.1	0.00	0.00	0.00	
9,950.0	88.00	89.22	7,040.8	1,237.7	2,190.2	2,340.6	0.00	0.00	0.00	
10,000.0	88.00	89.22	7,042.6	1,238.4	2,240.1	2,390.2	0.00	0.00	0.00	
10,050.0	88.00	89.22	7,044.3	1,239.0	2,290.1	2,439.8	0.00	0.00	0.00	
10,100.0	88.00	89.22	7,046.1	1,239.7	2,340.1	2,489.4	0.00	0.00	0.00	
10,150.0	88.00	89.22	7,047.8	1,240.4	2,390.0	2,538.9	0.00	0.00	0.00	
10,200.0	88.00	89.22	7,049.5	1,241.1	2,440.0	2,588.5	0.00	0.00	0.00	
10,250.0	88.00	89.22	7,051.3	1,241.8	2,490.0	2,638.1	0.00	0.00	0.00	
10,300.0	88.00	89.22	7,053.0	1,242.4	2,539.9	2,687.7	0.00	0.00	0.00	
10,350.0	88.00	89.22	7,054.8	1,243.1	2,589.9	2,737.2	0.00	0.00	0.00	
10,400.0	88.00	89.22	7,056.5	1,243.8	2,639.8	2,786.8	0.00	0.00	0.00	
10,450.0	88.00	89.22	7,058.3	1,244.5	2,689.8	2,836.4	0.00	0.00	0.00	
10,500.0	88.00	89.22	7,060.0	1,245.2	2,739.8	2,886.0	0.00	0.00	0.00	
10,550.0	88.00	89.22	7,061.8	1,245.8	2,789.7	2,935.5	0.00	0.00	0.00	

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,600.0	88.00	89.22	7,063.5	1,246.5	2,839.7	2,985.1	0.00	0.00	0.00
10,650.0	88.00	89.22	7,065.3	1,247.2	2,889.7	3,034.7	0.00	0.00	0.00
10,700.0	88.00	89.22	7,067.0	1,247.9	2,939.6	3,084.3	0.00	0.00	0.00
10,750.0	88.00	89.22	7,068.7	1,248.6	2,989.6	3,133.9	0.00	0.00	0.00
10,800.0	88.00	89.22	7,070.5	1,249.2	3,039.6	3,183.4	0.00	0.00	0.00
10,850.0	88.00	89.22	7,072.2	1,249.9	3,089.5	3,233.0	0.00	0.00	0.00
10,900.0	88.00	89.22	7,074.0	1,250.6	3,139.5	3,282.6	0.00	0.00	0.00
10,950.0	88.00	89.22	7,075.7	1,251.3	3,189.5	3,332.2	0.00	0.00	0.00
11,000.0	88.00	89.22	7,077.5	1,252.0	3,239.4	3,381.7	0.00	0.00	0.00
11,050.0	88.00	89.22	7,079.2	1,252.6	3,289.4	3,431.3	0.00	0.00	0.00
11,100.0	88.00	89.22	7,081.0	1,253.3	3,339.4	3,480.9	0.00	0.00	0.00
11,150.0	88.00	89.22	7,082.7	1,254.0	3,389.3	3,530.5	0.00	0.00	0.00
11,200.0	88.00	89.22	7,084.4	1,254.7	3,439.3	3,580.0	0.00	0.00	0.00
11,250.0	88.00	89.22	7,086.2	1,255.4	3,489.3	3,629.6	0.00	0.00	0.00
11,300.0	88.00	89.22	7,087.9	1,256.0	3,539.2	3,679.2	0.00	0.00	0.00
11,350.0	88.00	89.22	7,089.7	1,256.7	3,589.2	3,728.8	0.00	0.00	0.00
11,400.0	88.00	89.22	7,091.4	1,257.4	3,639.1	3,778.3	0.00	0.00	0.00
11,450.0	88.00	89.22	7,093.2	1,258.1	3,689.1	3,827.9	0.00	0.00	0.00
11,500.0	88.00	89.22	7,094.9	1,258.8	3,739.1	3,877.5	0.00	0.00	0.00
11,550.0	88.00	89.22	7,096.7	1,259.4	3,789.0	3,927.1	0.00	0.00	0.00
11,600.0	88.00	89.22	7,098.4	1,260.1	3,839.0	3,976.7	0.00	0.00	0.00
11,650.0	88.00	89.22	7,100.2	1,260.8	3,889.0	4,026.2	0.00	0.00	0.00
11,700.0	88.00	89.22	7,101.9	1,261.5	3,938.9	4,075.8	0.00	0.00	0.00
11,750.0	88.00	89.22	7,103.6	1,262.2	3,988.9	4,125.4	0.00	0.00	0.00
11,800.0	88.00	89.22	7,105.4	1,262.8	4,038.9	4,175.0	0.00	0.00	0.00
11,850.0	88.00	89.22	7,107.1	1,263.5	4,088.8	4,224.5	0.00	0.00	0.00
11,900.0	88.00	89.22	7,108.9	1,264.2	4,138.8	4,274.1	0.00	0.00	0.00
11,950.0	88.00	89.22	7,110.6	1,264.9	4,188.8	4,323.7	0.00	0.00	0.00
12,000.0	88.00	89.22	7,112.4	1,265.6	4,238.7	4,373.3	0.00	0.00	0.00
12,050.0	88.00	89.22	7,114.1	1,266.2	4,288.7	4,422.8	0.00	0.00	0.00
12,100.0	88.00	89.22	7,115.9	1,266.9	4,338.7	4,472.4	0.00	0.00	0.00
12,150.0	88.00	89.22	7,117.6	1,267.6	4,388.6	4,522.0	0.00	0.00	0.00
12,200.0	88.00	89.22	7,119.3	1,268.3	4,438.6	4,571.6	0.00	0.00	0.00
12,250.0	88.00	89.22	7,121.1	1,269.0	4,488.6	4,621.1	0.00	0.00	0.00
12,300.0	88.00	89.22	7,122.8	1,269.6	4,538.5	4,670.7	0.00	0.00	0.00
12,350.0	88.00	89.22	7,124.6	1,270.3	4,588.5	4,720.3	0.00	0.00	0.00
12,400.0	88.00	89.22	7,126.3	1,271.0	4,638.4	4,769.9	0.00	0.00	0.00
12,450.0	88.00	89.22	7,128.1	1,271.7	4,688.4	4,819.5	0.00	0.00	0.00
12,500.0	88.00	89.22	7,129.8	1,272.4	4,738.4	4,869.0	0.00	0.00	0.00
12,550.0	88.00	89.22	7,131.6	1,273.0	4,788.3	4,918.6	0.00	0.00	0.00
12,600.0	88.00	89.22	7,133.3	1,273.7	4,838.3	4,968.2	0.00	0.00	0.00
12,650.0	88.00	89.22	7,135.1	1,274.4	4,888.3	5,017.8	0.00	0.00	0.00
12,700.0	88.00	89.22	7,136.8	1,275.1	4,938.2	5,067.3	0.00	0.00	0.00
12,750.0	88.00	89.22	7,138.5	1,275.8	4,988.2	5,116.9	0.00	0.00	0.00
12,800.0	88.00	89.22	7,140.3	1,276.5	5,038.2	5,166.5	0.00	0.00	0.00
12,850.0	88.00	89.22	7,142.0	1,277.1	5,088.1	5,216.1	0.00	0.00	0.00
12,900.0	88.00	89.22	7,143.8	1,277.8	5,138.1	5,265.6	0.00	0.00	0.00
12,950.0	88.00	89.22	7,145.5	1,278.5	5,188.1	5,315.2	0.00	0.00	0.00
13,000.0	88.00	89.22	7,147.3	1,279.2	5,238.0	5,364.8	0.00	0.00	0.00
13,050.0	88.00	89.22	7,149.0	1,279.9	5,288.0	5,414.4	0.00	0.00	0.00
13,100.0	88.00	89.22	7,150.8	1,280.5	5,338.0	5,464.0	0.00	0.00	0.00
13,150.0	88.00	89.22	7,152.5	1,281.2	5,387.9	5,513.5	0.00	0.00	0.00
13,200.0	88.00	89.22	7,154.2	1,281.9	5,437.9	5,563.1	0.00	0.00	0.00
13,250.0	88.00	89.22	7,156.0	1,282.6	5,487.8	5,612.7	0.00	0.00	0.00

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
13,300.0	88.00	89.22	7,157.7	1,283.3	5,537.8	5,662.3	0.00	0.00	0.00
13,350.0	88.00	89.22	7,159.5	1,283.9	5,587.8	5,711.8	0.00	0.00	0.00
13,400.0	88.00	89.22	7,161.2	1,284.6	5,637.7	5,761.4	0.00	0.00	0.00
13,450.0	88.00	89.22	7,163.0	1,285.3	5,687.7	5,811.0	0.00	0.00	0.00
13,500.0	88.00	89.22	7,164.7	1,286.0	5,737.7	5,860.6	0.00	0.00	0.00
13,550.0	88.00	89.22	7,166.5	1,286.7	5,787.6	5,910.1	0.00	0.00	0.00
13,600.0	88.00	89.22	7,168.2	1,287.3	5,837.6	5,959.7	0.00	0.00	0.00
13,650.0	88.00	89.22	7,170.0	1,288.0	5,887.6	6,009.3	0.00	0.00	0.00
13,700.0	88.00	89.22	7,171.7	1,288.7	5,937.5	6,058.9	0.00	0.00	0.00
13,750.0	88.00	89.22	7,173.4	1,289.4	5,987.5	6,108.4	0.00	0.00	0.00
13,800.0	88.00	89.22	7,175.2	1,290.1	6,037.5	6,158.0	0.00	0.00	0.00
13,850.0	88.00	89.22	7,176.9	1,290.7	6,087.4	6,207.6	0.00	0.00	0.00
13,900.0	88.00	89.22	7,178.7	1,291.4	6,137.4	6,257.2	0.00	0.00	0.00
13,950.0	88.00	89.22	7,180.4	1,292.1	6,187.4	6,306.8	0.00	0.00	0.00
14,000.0	88.00	89.22	7,182.2	1,292.8	6,237.3	6,356.3	0.00	0.00	0.00
14,050.0	88.00	89.22	7,183.9	1,293.5	6,287.3	6,405.9	0.00	0.00	0.00
14,100.0	88.00	89.22	7,185.7	1,294.1	6,337.3	6,455.5	0.00	0.00	0.00
14,150.0	88.00	89.22	7,187.4	1,294.8	6,387.2	6,505.1	0.00	0.00	0.00
14,200.0	88.00	89.22	7,189.1	1,295.5	6,437.2	6,554.6	0.00	0.00	0.00
14,250.0	88.00	89.22	7,190.9	1,296.2	6,487.1	6,604.2	0.00	0.00	0.00
14,300.0	88.00	89.22	7,192.6	1,296.9	6,537.1	6,653.8	0.00	0.00	0.00
14,350.0	88.00	89.22	7,194.4	1,297.5	6,587.1	6,703.4	0.00	0.00	0.00
14,400.0	88.00	89.22	7,196.1	1,298.2	6,637.0	6,752.9	0.00	0.00	0.00
14,450.0	88.00	89.22	7,197.9	1,298.9	6,687.0	6,802.5	0.00	0.00	0.00
14,500.0	88.00	89.22	7,199.6	1,299.6	6,737.0	6,852.1	0.00	0.00	0.00
14,550.0	88.00	89.22	7,201.4	1,300.3	6,786.9	6,901.7	0.00	0.00	0.00
14,600.0	88.00	89.22	7,203.1	1,300.9	6,836.9	6,951.2	0.00	0.00	0.00
14,650.0	88.00	89.22	7,204.9	1,301.6	6,886.9	7,000.8	0.00	0.00	0.00
14,700.0	88.00	89.22	7,206.6	1,302.3	6,936.8	7,050.4	0.00	0.00	0.00
14,750.0	88.00	89.22	7,208.3	1,303.0	6,986.8	7,100.0	0.00	0.00	0.00
14,800.0	88.00	89.22	7,210.1	1,303.7	7,036.8	7,149.6	0.00	0.00	0.00
14,850.0	88.00	89.22	7,211.8	1,304.3	7,086.7	7,199.1	0.00	0.00	0.00
14,900.0	88.00	89.22	7,213.6	1,305.0	7,136.7	7,248.7	0.00	0.00	0.00
14,950.0	88.00	89.22	7,215.3	1,305.7	7,186.7	7,298.3	0.00	0.00	0.00
15,000.0	88.00	89.22	7,217.1	1,306.4	7,236.6	7,347.9	0.00	0.00	0.00
15,050.0	88.00	89.22	7,218.8	1,307.1	7,286.6	7,397.4	0.00	0.00	0.00
15,100.0	88.00	89.22	7,220.6	1,307.7	7,336.6	7,447.0	0.00	0.00	0.00
15,150.0	88.00	89.22	7,222.3	1,308.4	7,386.5	7,496.6	0.00	0.00	0.00
15,200.0	88.00	89.22	7,224.0	1,309.1	7,436.5	7,546.2	0.00	0.00	0.00
15,250.0	88.00	89.22	7,225.8	1,309.8	7,486.4	7,595.7	0.00	0.00	0.00
15,300.0	88.00	89.22	7,227.5	1,310.5	7,536.4	7,645.3	0.00	0.00	0.00
15,350.0	88.00	89.22	7,229.3	1,311.1	7,586.4	7,694.9	0.00	0.00	0.00
15,400.0	88.00	89.22	7,231.0	1,311.8	7,636.3	7,744.5	0.00	0.00	0.00
15,450.0	88.00	89.22	7,232.8	1,312.5	7,686.3	7,794.0	0.00	0.00	0.00
15,500.0	88.00	89.22	7,234.5	1,313.2	7,736.3	7,843.6	0.00	0.00	0.00
15,550.0	88.00	89.22	7,236.3	1,313.9	7,786.2	7,893.2	0.00	0.00	0.00
15,600.0	88.00	89.22	7,238.0	1,314.5	7,836.2	7,942.8	0.00	0.00	0.00
15,650.0	88.00	89.22	7,239.8	1,315.2	7,886.2	7,992.4	0.00	0.00	0.00
15,700.0	88.00	89.22	7,241.5	1,315.9	7,936.1	8,041.9	0.00	0.00	0.00
15,750.0	88.00	89.22	7,243.2	1,316.6	7,986.1	8,091.5	0.00	0.00	0.00
15,800.0	88.00	89.22	7,245.0	1,317.3	8,036.1	8,141.1	0.00	0.00	0.00
15,850.0	88.00	89.22	7,246.7	1,317.9	8,086.0	8,190.7	0.00	0.00	0.00
15,900.0	88.00	89.22	7,248.5	1,318.6	8,136.0	8,240.2	0.00	0.00	0.00
15,950.0	88.00	89.22	7,250.2	1,319.3	8,186.0	8,289.8	0.00	0.00	0.00

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
16,000.0	88.00	89.22	7,252.0	1,320.0	8,235.9	8,339.4	0.00	0.00	0.00
16,050.0	88.00	89.22	7,253.7	1,320.7	8,285.9	8,389.0	0.00	0.00	0.00
16,100.0	88.00	89.22	7,255.5	1,321.3	8,335.8	8,438.5	0.00	0.00	0.00
16,150.0	88.00	89.22	7,257.2	1,322.0	8,385.8	8,488.1	0.00	0.00	0.00
16,200.0	88.00	89.22	7,258.9	1,322.7	8,435.8	8,537.7	0.00	0.00	0.00
16,250.0	88.00	89.22	7,260.7	1,323.4	8,485.7	8,587.3	0.00	0.00	0.00
16,300.0	88.00	89.22	7,262.4	1,324.1	8,535.7	8,636.8	0.00	0.00	0.00
16,350.0	88.00	89.22	7,264.2	1,324.7	8,585.7	8,686.4	0.00	0.00	0.00
16,400.0	88.00	89.22	7,265.9	1,325.4	8,635.6	8,736.0	0.00	0.00	0.00
16,450.0	88.00	89.22	7,267.7	1,326.1	8,685.6	8,785.6	0.00	0.00	0.00
16,500.0	88.00	89.22	7,269.4	1,326.8	8,735.6	8,835.2	0.00	0.00	0.00
16,550.0	88.00	89.22	7,271.2	1,327.5	8,785.5	8,884.7	0.00	0.00	0.00
16,600.0	88.00	89.22	7,272.9	1,328.1	8,835.5	8,934.3	0.00	0.00	0.00
16,650.0	88.00	89.22	7,274.6	1,328.8	8,885.5	8,983.9	0.00	0.00	0.00
16,700.0	88.00	89.22	7,276.4	1,329.5	8,935.4	9,033.5	0.00	0.00	0.00
16,750.0	88.00	89.22	7,278.1	1,330.2	8,985.4	9,083.0	0.00	0.00	0.00
16,800.0	88.00	89.22	7,279.9	1,330.9	9,035.4	9,132.6	0.00	0.00	0.00
16,850.0	88.00	89.22	7,281.6	1,331.6	9,085.3	9,182.2	0.00	0.00	0.00
16,900.0	88.00	89.22	7,283.4	1,332.2	9,135.3	9,231.8	0.00	0.00	0.00
16,950.0	88.00	89.22	7,285.1	1,332.9	9,185.3	9,281.3	0.00	0.00	0.00
17,000.0	88.00	89.22	7,286.9	1,333.6	9,235.2	9,330.9	0.00	0.00	0.00
17,050.0	88.00	89.22	7,288.6	1,334.3	9,285.2	9,380.5	0.00	0.00	0.00
17,100.0	88.00	89.22	7,290.4	1,335.0	9,335.1	9,430.1	0.00	0.00	0.00
17,150.0	88.00	89.22	7,292.1	1,335.6	9,385.1	9,479.7	0.00	0.00	0.00
17,200.0	88.00	89.22	7,293.8	1,336.3	9,435.1	9,529.2	0.00	0.00	0.00
17,250.0	88.00	89.22	7,295.6	1,337.0	9,485.0	9,578.8	0.00	0.00	0.00
17,300.0	88.00	89.22	7,297.3	1,337.7	9,535.0	9,628.4	0.00	0.00	0.00
17,321.7	88.00	89.22	7,298.1	1,338.1	9,556.7	9,649.9	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Harper A21-664 BHL 17 - hit/miss target - Shape - Point	0.00	0.00	7,298.1	1,338.1	9,556.7	1,417,011.68	3,270,753.25	40.4740200	-104.5267700

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Harper A21-664
Company:	Northern Region - DJ Basin	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Project:	Wells Ranch	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site:	A Section 21	North Reference:	Grid
Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
504.0	504.0	PIERRE		0.00		
691.0	691.0	UPPER PIERRE AQUIFER TOP		0.00		
1,531.0	1,531.0	UPPER PIERRE AQUIFER BASE		0.00		
3,689.0	3,663.0	PARKMAN		0.00		
4,283.3	4,215.0	SUSSEX		0.00		
5,079.0	4,954.0	SHANNON		0.00		
6,135.2	5,935.0	TEEPEE BUTTES		0.00		
6,899.4	6,641.0	SHARON SPRINGS		0.00		
6,935.4	6,671.0	NIO A CHALK		0.00		
6,957.7	6,689.0	NIO A MARL		0.00		
7,079.9	6,780.0	NIO B CHALK		0.00		
7,127.1	6,811.0	NIO B MARL		0.00		
7,202.2	6,855.0	NIO C CHALK		0.00		
7,275.6	6,891.0	NIO C MARL		0.00		
7,353.2	6,921.0	NIO D CHALK		0.00		
7,434.3	6,943.0	FT. HAYES		0.00		
7,806.0	6,966.0	CODELL		0.00		
8,264.5	6,982.0	CARLILE		0.00		

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
2,600.0	2,600.0	0.0	0.0	KOP - Start Build 2.00	
6,442.0	6,220.0	951.7	-770.7	Start DLS 9.43 TFO 4.56	
6,462.4	6,238.8	957.9	-775.6	Start DLS 9.43 TFO 126.10	
7,548.1	6,957.0	1,205.0	-210.0	TPZ/Landing Pt. @ 7548.1 MD	
17,321.7	7,298.1	1,338.1	9,556.7	TD at 17321.7	

Northern Region - DJ Basin

Wells Ranch

A Section 21

Harper A21-664

Original Drilling

APD - Rev 0

Anticollision Summary Report

29 December, 2016

Anticollision Summary Report

Company:	Northern Region - DJ Basin	Local Co-ordinate Reference:	Well Harper A21-664
Project:	Wells Ranch	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference APD - Rev 0	
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.0 ft
Warning Levels Evaluated at:	2.79 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program	Date 12/29/2016			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	17,321.7	APD - Rev 0 (Original Drilling)	MWD+IFR1+MS_WY	Fixed:v2:Rockies, crustal dec + 3-axis correction

Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Summary						
Offset Well - Wellbore - Design						
A Section 19						
Anderson 03-19 (PA) - Original Drilling - Original Drilling -	6,642.0	6,308.1	8,687.4	8,487.1	43.388	CC
Anderson 03-19 (PA) - Original Drilling - Original Drilling -	6,650.0	6,315.7	8,687.4	8,487.0	43.335	ES
Anderson 03-19 (PA) - Original Drilling - Original Drilling -	7,150.0	6,726.1	8,887.7	8,674.5	41.685	SF
Ley 07-19 - Original Drilling - Original Drilling - As Drilled	6,616.5	6,357.1	7,456.9	7,416.9	186.473	CC, ES
Ley 07-19 - Original Drilling - Original Drilling - As Drilled	7,150.0	6,832.1	7,677.9	7,635.4	180.757	SF
Ley 08-19 - Original Drilling - Original Drilling - As Drilled	6,609.7	6,287.6	6,268.8	6,229.0	157.483	CC, ES
Ley 08-19 - Original Drilling - Original Drilling - As Drilled	7,000.0	6,653.5	6,390.3	6,348.5	152.690	SF
Luppens 05-19 - Original Drilling - Original Drilling - As D						Out of range
Roth 11-19 - Original Drilling - Original Drilling - As Drilled	6,582.1	6,240.9	8,918.1	8,875.7	210.207	CC
Roth 11-19 - Original Drilling - Original Drilling - As Drilled	6,600.0	6,257.7	8,918.4	8,875.6	208.405	ES
Roth 11-19 - Original Drilling - Original Drilling - As Drilled	7,350.0	6,808.3	9,337.8	9,284.1	173.887	SF
Roth 14-19 (PA) - Original Drilling - Original Drilling - As D	6,552.4	6,224.5	9,149.9	8,950.9	45.986	CC, ES
Roth 14-19 (PA) - Original Drilling - Original Drilling - As D	7,150.0	6,727.1	9,409.5	9,195.1	43.886	SF
Roth 19-19 - Original Drilling - Original Drilling - As Drilled	6,572.4	6,300.0	9,553.7	9,512.5	232.235	CC, ES
Roth 19-19 - Original Drilling - Original Drilling - As Drilled	7,150.0	7,150.0	9,806.1	9,761.5	220.115	SF
Roth 22-19 - Original Drilling - Original Drilling - As Drilled	6,600.1	6,367.9	9,233.6	9,191.5	219.261	CC, ES
Roth 22-19 - Original Drilling - Original Drilling - As Drilled	7,200.0	7,200.0	9,507.8	9,462.6	210.021	SF
Roth 23-19 - Original Drilling - Original Drilling - As Drilled	6,561.7	6,256.2	8,865.7	8,824.9	217.133	CC, ES
Roth 23-19 - Original Drilling - Original Drilling - As Drilled	7,350.0	7,350.0	9,301.5	9,256.6	207.380	SF
Roth 25-19 - Original Drilling - Original Drilling - As Drilled	6,601.2	6,487.8	8,215.2	8,173.6	197.228	CC, ES
Roth 25-19 - Original Drilling - Original Drilling - As Drilled	7,000.0	6,880.1	8,340.6	8,296.8	190.710	SF
Roth A19-12 - Original Drilling - Original Drilling - As Drill	6,592.6	6,364.2	9,863.7	9,823.4	244.250	CC, ES
Roth A19-12 - Original Drilling - Original Drilling - As Drill	7,000.0	6,692.0	9,994.8	9,952.5	236.055	SF
Roth A19-13 (PA) - Original Drilling - Original Drilling - As						Out of range
Weber 04-19 (PA) - Original Drilling - Original Drilling - As	6,639.0	6,311.3	9,966.3	9,766.0	49.744	CC
Weber 04-19 (PA) - Original Drilling - Original Drilling - As	6,650.0	6,321.7	9,966.4	9,765.8	49.662	ES
Weber 04-19 (PA) - Original Drilling - Original Drilling - As	6,800.0	6,461.0	9,987.6	9,782.5	48.698	SF
Winter 09-19 - Original Drilling - Original Drilling - As Dril	6,564.6	6,259.0	6,355.4	6,315.0	157.495	CC, ES
Winter 09-19 - Original Drilling - Original Drilling - As Dril	7,050.0	7,050.0	6,533.2	6,489.6	149.882	SF
Winter 15-19 - Original Drilling - Original Drilling - As Dril	6,544.3	6,216.9	8,068.1	7,869.2	40.579	CC
Winter 15-19 - Original Drilling - Original Drilling - As Dril	6,550.0	6,222.2	8,068.1	7,869.1	40.544	ES
Winter 15-19 - Original Drilling - Original Drilling - As Dril	7,100.0	6,695.5	8,292.6	8,079.0	38.827	SF
Winter 15-19-0 (PA) - Original Drilling - Original Drilling -	4,200.0	4,041.6	8,398.1	8,271.8	66.501	SF
Winter 15-19-0 (PA) - Original Drilling - Original Drilling -	5,146.8	3,700.0	8,351.5	8,231.4	69.539	CC, ES
Winters 10-19 - Original Drilling - Original Drilling - As Dr	6,581.9	6,205.0	7,930.6	7,890.4	197.382	CC, ES
Winters 10-19 - Original Drilling - Original Drilling - As Dr	7,100.0	7,100.0	8,137.3	8,093.6	186.235	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Summary Report

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Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 20						
Offset Well - Wellbore - Design						
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,772.9	2,729.2	2,346.7	2,331.6	155.571	CC
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,900.0	2,856.4	2,347.0	2,331.2	148.609	ES
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	6,650.0	6,348.3	2,829.2	2,788.0	68.544	SF
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	6,469.5	6,181.2	2,597.9	2,557.3	64.047	CC, ES
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	6,700.0	6,389.4	2,635.2	2,593.2	62.695	SF
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	4,141.6	4,011.3	3,461.0	3,335.6	27.603	CC
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	4,900.0	4,715.8	3,472.4	3,323.7	23.342	ES
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	6,850.0	6,526.5	3,680.3	3,471.4	17.614	SF
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	5,216.7	5,050.8	1,286.5	1,255.4	41.432	CC
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	5,300.0	5,124.8	1,287.0	1,255.3	40.630	ES
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	6,550.0	6,282.0	1,395.8	1,354.7	33.993	SF
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	6,541.5	6,296.4	6,828.5	6,780.4	142.027	CC
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	6,550.0	6,304.3	6,828.6	6,780.3	141.469	ES
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	7,300.0	6,888.4	7,216.3	7,155.6	118.736	SF
Simmons 42-20D - Original Drilling - Original Drilling - As	6,621.1	6,407.8	797.7	754.1	18.292	CC, ES
Simmons 42-20D - Original Drilling - Original Drilling - As	6,700.0	6,482.3	803.2	759.1	18.185	SF
Snider 1-20EG - Original Drilling - Original Drilling - As D	6,292.0	5,945.2	4,385.6	4,346.6	112.453	CC
Snider 1-20EG - Original Drilling - Original Drilling - As D	6,300.0	5,949.3	4,385.6	4,346.5	112.297	ES
Snider 1-20EG - Original Drilling - Original Drilling - As D	6,950.0	6,481.2	4,554.8	4,512.1	106.575	SF
Stump A20-11 - Original Drilling - Original Drilling - As Dr	6,542.3	6,307.4	3,925.0	3,884.2	96.065	CC
Stump A20-11 - Original Drilling - Original Drilling - As Dr	6,550.0	6,313.2	3,925.1	3,884.2	95.948	ES
Stump A20-11 - Original Drilling - Original Drilling - As Dr	6,800.0	6,500.0	3,977.1	3,934.8	94.075	SF
Stump A20-12 - Original Drilling - Original Drilling - As Dr	6,567.5	6,287.3	4,778.0	4,737.5	118.177	CC, ES
Stump A20-12 - Original Drilling - Original Drilling - As Dr	6,900.0	6,719.7	4,865.7	4,823.2	114.378	SF
Stump A20-13 - Original Drilling - Original Drilling - As Dr	6,502.1	6,200.7	5,496.4	5,455.7	135.002	CC, ES
Stump A20-13 - Original Drilling - Original Drilling - As Dr	6,900.0	6,560.0	5,608.1	5,565.3	130.867	SF
Winter 20-19 - Original Drilling - Original Drilling - As Dril	6,561.2	6,397.1	6,892.9	6,851.4	166.455	CC, ES
Winter 20-19 - Original Drilling - Original Drilling - As Dril	6,950.0	6,767.3	7,009.0	6,965.5	161.307	SF
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,590.5	6,629.1	6,500.9	6,450.6	129.378	CC, ES
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,900.0	6,905.5	6,578.3	6,526.6	127.294	SF
Winter 39-19 - Original Drilling - Original Drilling - As Dril	6,537.8	6,405.9	5,907.2	5,865.2	140.794	CC, ES
Winter 39-19 - Original Drilling - Original Drilling - As Dril	6,900.0	6,691.1	6,007.0	5,963.2	137.378	SF
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,578.9	6,656.7	5,451.1	5,402.4	111.836	CC, ES
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,850.0	6,908.9	5,509.4	5,459.4	110.176	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Summary Report

Company:	Northern Region - DJ Basin	Local Co-ordinate Reference:	Well Harper A21-664
Project:	Wells Ranch	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 21						
Offset Well - Wellbore - Design						
Culbreath 23-21 - Original Drilling - Original Drilling - As D	2,373.3	2,333.5	1,306.9	1,293.9	100.616	CC
Culbreath 23-21 - Original Drilling - Original Drilling - As D	2,600.0	2,554.4	1,307.5	1,293.3	91.947	ES
Culbreath 23-21 - Original Drilling - Original Drilling - As D	9,300.0	6,970.6	1,507.3	1,444.6	24.025	SF
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	10,045.8	6,990.2	1,597.1	1,342.4	6.269	CC, ES
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	10,200.0	6,995.5	1,604.6	1,347.8	6.248	SF
Harper A21-618 - Original Drilling - APD - Rev 0	2,000.0	1,985.0	1,472.8	1,460.8	121.850	CC
Harper A21-618 - Original Drilling - APD - Rev 0	2,100.0	2,066.2	1,473.4	1,460.7	116.610	ES
Harper A21-618 - Original Drilling - APD - Rev 0	17,321.7	16,708.2	2,966.6	2,588.0	7.835	SF
Harper A21-626 - Original Drilling - APD - Rev 0	2,662.2	2,671.2	1,445.8	1,429.5	88.929	CC
Harper A21-626 - Original Drilling - APD - Rev 0	2,700.0	2,712.5	1,445.9	1,429.4	87.649	ES
Harper A21-626 - Original Drilling - APD - Rev 0	17,321.7	16,776.3	2,437.2	2,059.2	6.447	SF
Harper A21-631 - Original Drilling - APD - Rev 0	2,979.9	3,105.5	1,386.2	1,367.6	74.297	CC
Harper A21-631 - Original Drilling - APD - Rev 0	3,000.0	3,125.6	1,386.3	1,367.5	73.782	ES
Harper A21-631 - Original Drilling - APD - Rev 0	17,321.7	16,721.6	2,088.3	1,715.2	5.597	SF
Harper A21-637 - Original Drilling - APD - Rev 0	3,265.1	3,482.1	1,272.1	1,251.3	61.040	CC
Harper A21-637 - Original Drilling - APD - Rev 0	3,300.0	3,517.0	1,272.3	1,251.2	60.364	ES
Harper A21-637 - Original Drilling - APD - Rev 0	17,302.5	16,577.9	1,704.7	1,335.8	4.621	SF
Harper A21-643 - Original Drilling - APD - Rev 0	2,000.0	1,999.0	69.2	57.1	5.706	CC
Harper A21-643 - Original Drilling - APD - Rev 0	2,100.0	2,098.7	69.5	56.7	5.454	ES
Harper A21-643 - Original Drilling - APD - Rev 0	17,321.7	16,636.4	1,333.6	974.6	3.715	SF
Harper A21-649 - Original Drilling - APD - Rev 0	2,600.0	2,600.0	47.4	31.5	2.979	CC, ES
Harper A21-649 - Original Drilling - APD - Rev 0	17,321.7	16,731.8	965.9	613.2	2.739	SF
Harper A21-656 - Original Drilling - APD - Rev 0	2,600.0	2,600.0	21.9	6.0	1.375	Level 3, CC, ES, SF
Harper A21-669 - Original Drilling - APD - Rev 0	2,400.0	2,401.0	21.9	7.2	1.492	Level 3, CC, ES, SF
Harper A21-674 - Original Drilling - APD - Rev 0	2,200.0	2,201.0	43.7	30.3	3.264	CC, ES
Harper A21-674 - Original Drilling - APD - Rev 0	17,321.7	16,777.0	829.9	476.2	2.346	SF
Harper A21-681 - Original Drilling - APD - Rev 0	2,000.0	2,002.0	65.6	53.4	5.401	CC, ES
Harper A21-681 - Original Drilling - APD - Rev 0	17,321.7	16,827.4	1,240.5	873.7	3.382	SF
Kona A19-616 - Original Drilling - APD - Rev 0	1,900.0	1,881.0	1,474.8	1,463.4	128.832	CC, ES
Kona A19-616 - Original Drilling - APD - Rev 0	9,800.0	6,372.9	3,493.5	3,425.9	51.681	SF
Kona A19-624 - Original Drilling - APD - Rev 0	2,609.2	2,594.0	1,452.9	1,437.0	91.425	CC, ES
Kona A19-624 - Original Drilling - APD - Rev 0	9,300.0	6,871.2	2,789.0	2,724.2	43.075	SF
Kona A19-630 - Original Drilling - APD - Rev 0	2,850.5	2,941.4	1,391.5	1,373.8	78.561	CC, ES
Kona A19-630 - Original Drilling - APD - Rev 0	6,650.0	7,918.9	2,084.7	2,029.2	37.565	SF
Kona A19-636 - Original Drilling - APD - Rev 0	2,988.3	3,149.7	1,316.9	1,297.9	69.286	CC
Kona A19-636 - Original Drilling - APD - Rev 0	3,000.0	3,161.0	1,316.9	1,297.8	69.000	ES
Kona A19-636 - Original Drilling - APD - Rev 0	6,700.0	8,334.1	1,750.1	1,690.2	29.197	SF
Kona A19-640 - Original Drilling - APD - Rev 0	1,900.0	1,899.0	165.4	153.9	14.379	CC, ES
Kona A19-640 - Original Drilling - APD - Rev 0	2,100.0	2,087.9	171.9	159.3	13.607	SF
Kona A19-646 - Original Drilling - APD - Rev 0	2,600.0	2,600.0	157.5	141.6	9.909	CC, ES
Kona A19-646 - Original Drilling - APD - Rev 0	2,800.0	2,800.2	163.4	146.2	9.532	SF
Kona A19-652 - Original Drilling - APD - Rev 0	2,600.0	2,600.0	151.8	135.9	9.550	CC, ES
Kona A19-652 - Original Drilling - APD - Rev 0	2,800.0	2,796.8	157.9	140.8	9.226	SF
Kona A19-662 - Original Drilling - APD - Rev 0	7,450.0	7,473.0	116.0	62.2	2.156	SF
Kona A19-662 - Original Drilling - APD - Rev 0	7,497.0	7,427.1	115.7	62.1	2.159	CC, ES
Kona A19-670 - Original Drilling - APD - Rev 0	1,900.0	1,902.0	163.9	152.4	14.238	CC, ES
Kona A19-670 - Original Drilling - APD - Rev 0	7,708.2	7,242.4	456.8	400.7	8.131	SF
Kona A19-679 - Original Drilling - APD - Rev 0	2,500.0	2,501.0	150.2	135.0	9.837	CC, ES
Kona A19-679 - Original Drilling - APD - Rev 0	2,700.0	2,696.3	154.4	137.9	9.361	SF
Kona A19-685 - Original Drilling - APD - Rev 0	2,300.0	2,301.0	151.8	137.8	10.830	CC, ES
Kona A19-685 - Original Drilling - APD - Rev 0	2,600.0	2,591.8	160.5	144.6	10.132	SF
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	5,260.8	5,104.9	170.6	9.2	1.057	Level 2, CC
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	5,300.0	5,141.3	171.3	8.6	1.053	Level 2, ES, SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Summary Report

Company:	Northern Region - DJ Basin	Local Co-ordinate Reference:	Well Harper A21-664
Project:	Wells Ranch	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 21						
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	8,970.1	7,004.6	857.8	620.1	3.608	CC
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	9,000.0	7,005.7	858.3	620.0	3.602	ES, SF
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,780.2	6,975.7	343.7	286.8	6.039	CC, ES, SF
McKee 31-21 - Original Drilling - Original Drilling - As Dril	10,015.2	7,088.8	1,219.9	1,143.8	16.045	CC, ES
McKee 31-21 - Original Drilling - Original Drilling - As Dril	10,300.0	7,092.2	1,252.7	1,171.9	15.514	SF
McKee 32-21 - Original Drilling - Original Drilling - As Dril	10,025.2	7,007.0	316.6	240.0	4.135	CC, ES, SF
McKee 41-21 - Original Drilling - Original Drilling - As Dril	11,318.3	7,021.3	1,178.1	1,078.6	11.839	CC, ES
McKee 41-21 - Original Drilling - Original Drilling - As Dril	11,500.0	7,030.6	1,192.0	1,089.1	11.589	SF
McKee 42-21 - Original Drilling - Original Drilling - As Dril	11,382.6	7,034.7	493.8	393.0	4.899	CC, ES
McKee 42-21 - Original Drilling - Original Drilling - As Dril	11,400.0	7,035.2	494.1	393.2	4.899	SF
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	11,336.8	7,027.2	1,369.6	1,091.0	4.916	CC, ES
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	11,400.0	7,029.4	1,371.0	1,091.6	4.907	SF
Wells Trust 13-21 - Original Drilling - Original Drilling - As	100.0	57.0	633.2	633.0	3,411.172	CC
Wells Trust 13-21 - Original Drilling - Original Drilling - As	1,400.0	1,356.8	634.2	626.9	86.078	ES
Wells Trust 13-21 - Original Drilling - Original Drilling - As	3,900.0	3,807.1	773.6	752.0	35.769	SF
Wells Trust 14-21 - Original Drilling - Original Drilling - As	2,540.7	2,482.8	1,797.3	1,783.4	129.562	CC
Wells Trust 14-21 - Original Drilling - Original Drilling - As	2,600.0	2,542.0	1,797.3	1,783.1	126.589	ES
Wells Trust 14-21 - Original Drilling - Original Drilling - As	8,800.0	6,947.8	3,311.6	3,259.0	62.936	SF
Wells Trust 24-21 - Original Drilling - Original Drilling - As	2,622.2	2,566.1	1,697.3	1,683.1	119.170	CC, ES
Wells Trust 24-21 - Original Drilling - Original Drilling - As	9,400.0	6,977.6	3,111.3	3,050.4	51.106	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Summary Report

Company:	Northern Region - DJ Basin	Local Co-ordinate Reference:	Well Harper A21-664
Project:	Wells Ranch	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

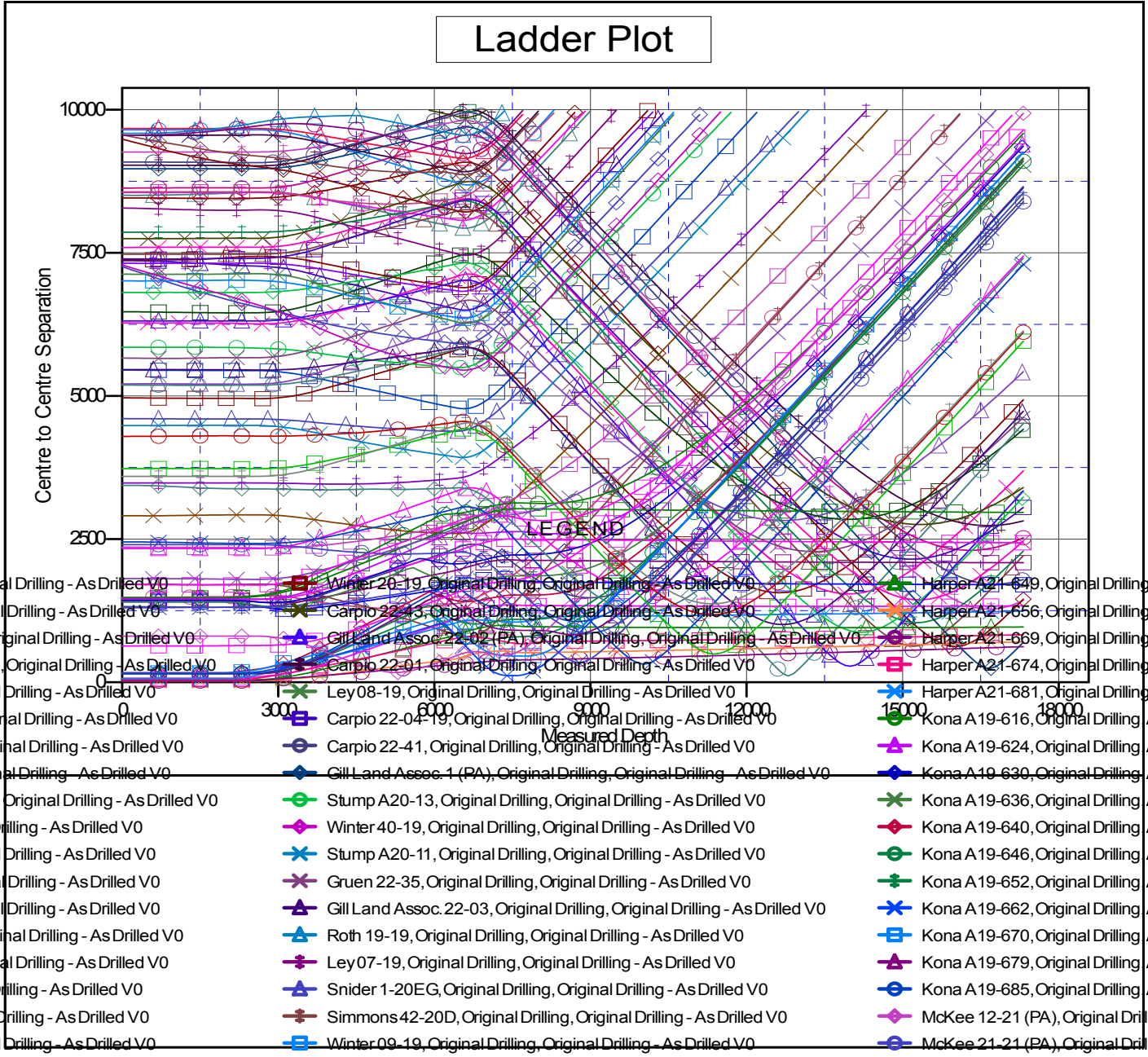
Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 22						
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,643.3	7,028.0	2,736.6	2,538.8	13.831	CC
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,700.0	7,028.0	2,737.2	2,538.5	13.773	ES
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	17,000.0	7,028.0	2,759.8	2,557.7	13.653	SF
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	15,153.2	7,103.0	2,149.8	1,970.4	11.984	CC
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	15,200.0	7,103.0	2,150.3	1,970.2	11.940	ES
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	15,400.0	7,103.0	2,163.9	1,981.6	11.871	SF
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,800.4	7,198.9	1,704.4	1,458.0	6.919	CC, ES, SF
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,327.7	7,119.0	2,756.0	2,582.5	15.886	CC
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,400.0	7,119.0	2,757.0	2,582.3	15.789	ES
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,700.0	7,119.0	2,781.0	2,602.9	15.610	SF
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,293.8	7,100.0	2,304.8	2,113.5	12.044	CC
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,300.0	7,100.0	2,304.9	2,113.4	12.038	ES
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,500.0	7,100.0	2,314.1	2,120.1	11.932	SF
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,670.1	7,227.4	1,276.6	893.2	3.330	CC
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,700.0	7,228.4	1,276.9	892.8	3.325	ES, SF
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	15,202.3	7,090.0	629.4	460.6	3.729	CC, ES, SF
Eisenstat 22-15 - Original Drilling - Original Drilling - As D	16,013.1	7,094.0	624.9	439.3	3.367	CC, ES, SF
Eisenstat 22-21 - Original Drilling - Original Drilling - As D	14,206.8	7,095.0	873.0	720.1	5.709	CC, ES
Eisenstat 22-21 - Original Drilling - Original Drilling - As D	14,300.0	7,095.0	877.9	723.3	5.676	SF
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,800.0	7,077.0	112.0	-10.0	0.918	Level 1, ES
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,803.7	7,077.0	111.9	-10.0	0.918	Level 1, CC, SF
Gill Land Assoc. 1 (PA) - Original Drilling - Original Drillin	16,664.6	7,228.2	242.2	-141.1	0.632	Level 1, CC, ES, SF
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,987.3	7,144.7	280.5	-50.2	0.848	Level 1, CC, ES, SF
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,695.2	7,062.0	1,007.6	882.5	8.057	CC
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,700.0	7,062.0	1,007.6	882.4	8.050	ES
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,800.0	7,062.0	1,013.0	885.9	7.970	SF
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	15,279.8	7,187.8	1,042.0	685.9	2.926	CC
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	15,300.0	7,188.5	1,042.2	685.6	2.923	ES, SF
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,642.4	7,057.3	1,564.2	1,440.8	12.674	CC, ES
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,800.0	7,063.7	1,572.1	1,446.8	12.551	SF
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,941.6	7,064.0	2,845.0	2,697.7	19.309	CC
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	14,000.0	7,064.0	2,845.6	2,697.4	19.193	ES
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	14,400.0	7,064.0	2,881.7	2,728.6	18.816	SF
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,965.8	7,145.6	1,543.5	1,395.3	10.413	CC
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	14,000.0	7,146.7	1,543.9	1,395.2	10.383	ES
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	14,100.0	7,149.9	1,549.3	1,399.6	10.349	SF
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,684.6	6,990.7	2,824.7	2,700.9	22.820	CC
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,700.0	6,991.7	2,824.7	2,700.7	22.774	ES
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	13,300.0	7,027.5	2,890.7	2,759.3	21.991	SF
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,293.3	7,016.0	2,281.9	2,146.6	16.864	CC
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,300.0	7,016.0	2,281.9	2,146.5	16.851	ES
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,600.0	7,016.0	2,302.4	2,163.4	16.555	SF
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	15,316.7	7,045.0	1,440.2	1,268.2	8.374	CC, ES
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	15,400.0	7,045.0	1,442.6	1,269.7	8.343	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Summary Report

Company:	Northern Region - DJ Basin	Local Co-ordinate Reference:	Well Harper A21-664
Project:	Wells Ranch	TVD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Reference Site:	A Section 21	MD Reference:	WELL @ 4772.0ft (Original Well Elev.)
Site Error:	0.0 ft	North Reference:	Grid
Reference Well:	Harper A21-664	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.79 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4772.0ft (Original Well Elev.) Coordinates are relative to: Harper A21-664
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
 Central Meridian is -105.5000000 Grid Convergence at Surface is: 0.61°

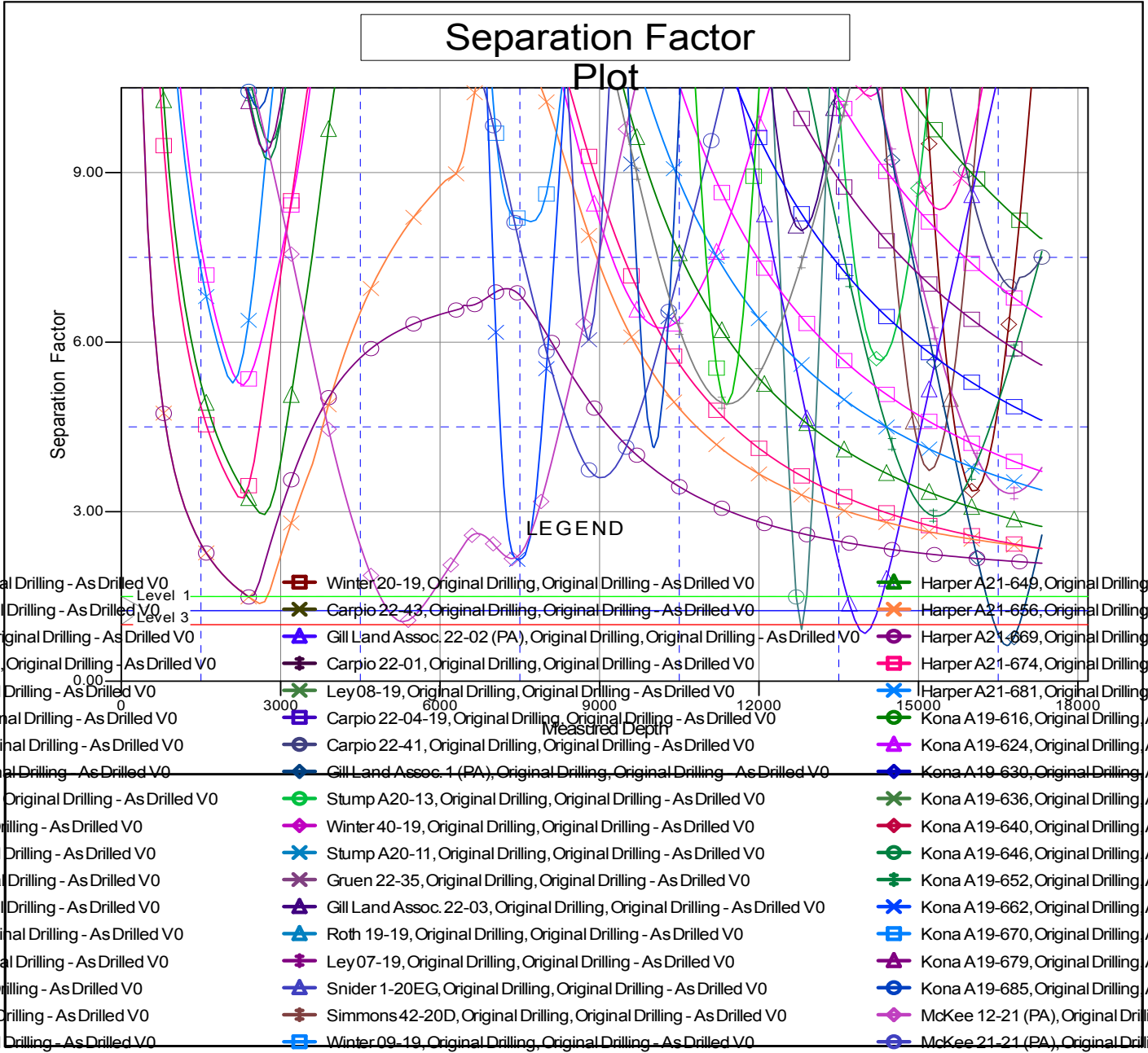


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