

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47 - 051 - 01761 County Marshall District Franklin  
Quad Powhatan Point Pad Name MND 06 Field/Pool Name N/A  
Farm name Consolidated Coal Company Well Number MND 06 EHS  
Operator (as registered with the OOG) Noble Energy, Inc.  
Address 1000 Noble Energy Drive City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 39.817687 Easting 80.791727  
Landing Point of Curve Northing 39.817319 Easting 80.796267  
Bottom Hole Northing 39.837700 Easting 80.815286

Elevation (ft) 722' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Synthetic Oil Based

RECEIVED  
Office of Oil and Gas  
DEC 14 2017  
WV Department of  
Environmental Protection

Date permit issued 06/10/2014 Date drilling commenced 09/02/2014 Date drilling ceased 11/23/2014  
Date completion activities began 03/07/2017 Date completion activities ceased 04/27/2017  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 128' and 265' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft none noted for offsets Void(s) encountered (Y/N) depths N-drilled in pillar  
Coal depth(s) ft 284' - 294' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) No

Reviewed 2/2/18 Reviewed by: [Signature] 03/02/2018

API 47-051 - 01761 Farm name Consolidated Coal Company Well number MND 06 EHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	26"	20"	40'	New	DH-36		Y
Surface	18"	16"	116'	New	H-40		Y
Coal	17.5"	13 3/8"	717'	New	J-55		Y
Intermediate 1	12.38"	9 5/8"	2031'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5 1/2"	15,646.5'	New	P-110		Y
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CaCl 1.15					0	8
Surface	CaCl 1.15					0	8
Coal	Type 1 / Class A	490	15.6	1.39	681.1	0	8
Intermediate 1	Type 1 / Class A	745	15.6	1.18	879.1	0	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	lead 718 tail 2250	14.8	Lead 1.54 tail 1.37	total 4,490.99	1815.0	8
Tubing							

Drillers TD (ft) 15,646.5' Loggers TD (ft) 15,653'  
 Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

RECEIVED  
Office of Oil and Gas  
DEC 14 2017  
WV Department of Environmental Protection

Kick off depth (ft) 3656'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING No centralizers used on conductor.  
 19 Centralizers on Intermediate String (Bow string centralizers on first two joints then every third joint to 100' from surface).  
 289 Centralizers on Production String (rigid bow string every joint to KOP, rigid bow spring every third joint from KOP to top of cement).

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_



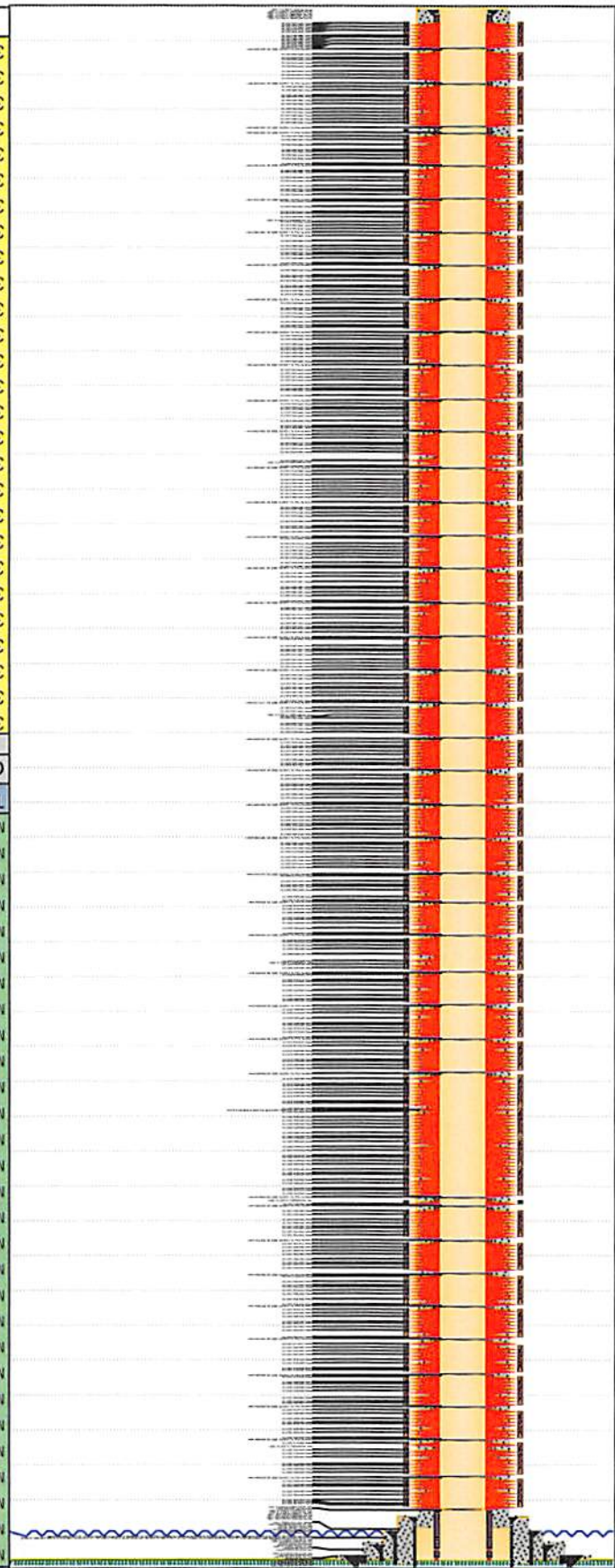
# Frac Wellbore Schematic Report

18 12/20/18  
**energy**

**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:22 PM

Vertical schematic (actual)



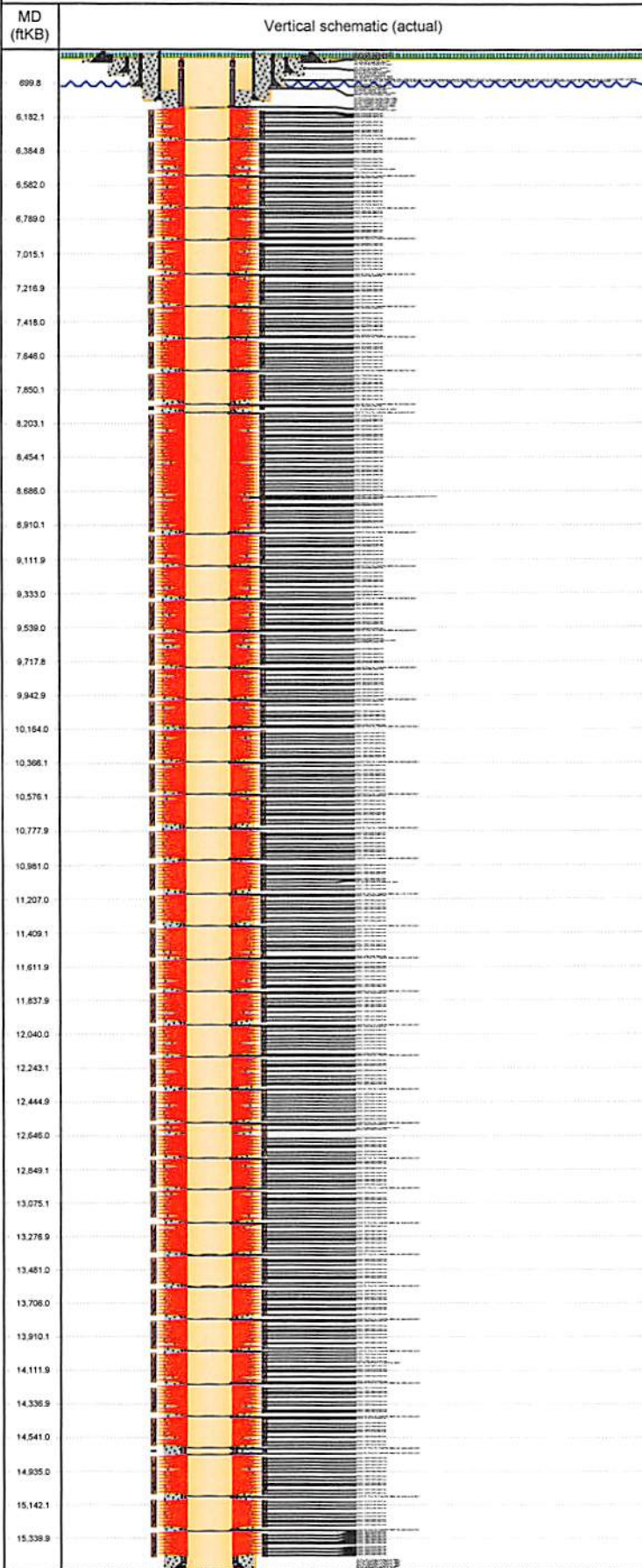
MD (ftB)	Linked Zone	Bch/Stg	Sum of Entered Shot Total	Top (ftKB)	Btm (ftKB)	Date
899.8	MARCELLUS, Original Hole	28	58	9,430.00	9,769.00	3/20/2017
9,182.1	MARCELLUS, Original Hole	27	58	10,175.00	10,349.00	3/20/2017
9,384.8	MARCELLUS, Original Hole	26	58	10,175.00	10,349.00	3/20/2017
9,520.0	MARCELLUS, Original Hole	25	58	10,374.00	10,551.00	3/20/2017
9,620.0	MARCELLUS, Original Hole	24	58	10,576.00	10,748.00	3/19/2017
9,799.0	MARCELLUS, Original Hole	23	58	10,778.00	10,955.00	3/19/2017
9,820.0	MARCELLUS, Original Hole	22	58	10,980.00	11,157.00	3/19/2017
9,848.0	MARCELLUS, Original Hole	21	58	11,182.00	11,359.00	3/19/2017
9,910.1	MARCELLUS, Original Hole	20	58	11,386.00	11,561.00	3/18/2017
9,919.0	MARCELLUS, Original Hole	19	58	11,586.00	11,763.00	3/18/2017
9,930.0	MARCELLUS, Original Hole	18	58	11,788.00	11,961.00	3/18/2017
9,939.0	MARCELLUS, Original Hole	17	58	11,990.00	12,167.00	3/17/2017
9,990.0	MARCELLUS, Original Hole	16	58	12,192.00	12,369.00	3/17/2017
9,990.0	MARCELLUS, Original Hole	15	58	12,397.00	12,571.00	3/17/2017
9,990.0	MARCELLUS, Original Hole	14	58	12,596.00	12,773.00	3/17/2017
9,990.0	MARCELLUS, Original Hole	13	58	12,798.00	12,975.00	3/16/2017
9,990.0	MARCELLUS, Original Hole	12	58	13,000.00	13,180.00	3/16/2017
9,990.0	MARCELLUS, Original Hole	11	58	13,202.00	13,379.00	3/16/2017
9,990.0	MARCELLUS, Original Hole	10	58	13,404.00	13,581.00	3/15/2017
9,990.0	MARCELLUS, Original Hole	9	58	13,606.00	13,783.00	3/15/2017
9,990.0	MARCELLUS, Original Hole	8	58	13,808.00	13,985.00	3/14/2017
9,990.0	MARCELLUS, Original Hole	7	58	14,015.00	14,187.00	3/14/2017
9,990.0	MARCELLUS, Original Hole	6	58	14,211.00	14,391.00	3/13/2017
9,990.0	MARCELLUS, Original Hole	5	58	14,414.00	14,591.00	3/13/2017
9,990.0	MARCELLUS, Original Hole	4	58	14,617.00	14,791.00	3/13/2017
9,990.0	MARCELLUS, Original Hole	3B	28	14,880.00	14,822.00	3/12/2017
9,990.0	MARCELLUS, Original Hole	3A	58	14,910.00	15,087.00	3/8/2017
10,164.0	MARCELLUS, Original Hole	2	58	15,115.00	15,289.00	3/7/2017
10,268.1	MARCELLUS, Original Hole	1	58	15,314.00	15,489.00	3/7/2017
<b>Total (Sum)</b>				<b>2,696</b>		
<b>Other In Hole</b>						
Run Date	Des	OD (in)	Top (ftKB)	Btm (ftKB)		
3/7/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	15,304.0	15,306.0		
3/8/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	15,102.0	15,104.0		
3/13/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	14,806.0	14,808.0		
3/13/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	14,606.0	14,608.0		
3/13/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	14,404.0	14,406.0		
3/13/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	14,202.0	14,204.0		
3/14/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	14,000.0	14,002.0		
3/15/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	13,802.0	13,804.0		
3/15/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	13,596.0	13,598.0		
3/16/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	13,394.0	13,396.0		
3/16/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	13,192.0	13,194.0		
3/16/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	12,990.0	12,992.0		
3/17/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	12,788.0	12,790.0		
3/17/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	12,586.0	12,588.0		
3/17/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	12,384.0	12,386.0		
3/17/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	12,182.0	12,184.0		
3/18/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	11,980.0	11,982.0		
3/18/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	11,778.0	11,780.0		
3/18/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	11,576.0	11,578.0		
3/19/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	11,374.0	11,376.0		
3/19/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	11,174.0	11,176.0		
3/19/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	10,970.0	10,972.0		
3/19/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	10,768.0	10,770.0		
3/19/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	10,566.0	10,568.0		
3/20/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	10,364.0	10,366.0		
3/20/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	10,162.0	10,164.0		
3/20/2017	Composite Flow Through Plug (HALLBURTON OBSIDIA	4.37	9,960.0	9,960.0		



**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:23 PM

Vertical schematic (actual)



Other In Hole					
Run Date	Des	OD (in)	Top (ftKB)	Btm (ftKB)	
3/20/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,756.0	9,758.0	
3/21/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,556.0	9,558.0	
3/21/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,348.0	9,350.0	
3/21/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,152.0	9,154.0	
3/21/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,950.0	8,952.0	
4/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,142.0	8,144.0	
4/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,940.0	7,942.0	
4/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,738.0	7,740.0	
4/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,536.0	7,538.0	
4/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,334.0	7,336.0	
4/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,132.0	7,134.0	
4/26/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,930.0	6,932.0	
4/26/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,728.0	6,730.0	
4/26/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,526.0	6,528.0	
4/27/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,324.0	6,326.0	
4/27/2017	Composite Bridge Plug	4.37	5,490.0	5,492.0	

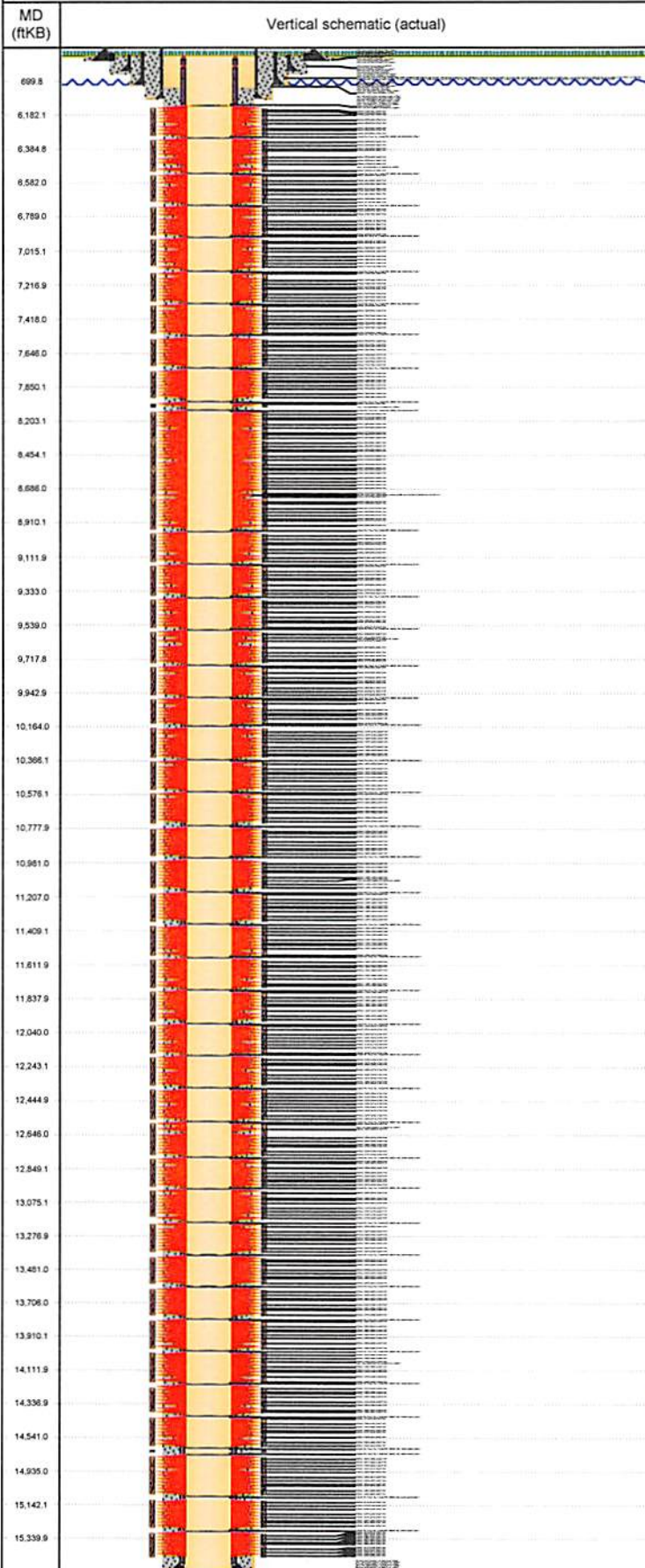
Logs			
Date	Type	Top, MD (ftKB)	Btm, MD (ftKB)

Stimulation Intervals				
Bnch/Stg	Start Date	Primary Job Type		
	3/7/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 58				
Volume Slurry Total (gal)				
35,364.00				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
7,636.0	9,971.0	16.9	32.3	
Bnch/Stg	Start Date	Primary Job Type		
	3/7/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 58				
Volume Slurry Total (gal)				
630,222.60				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
7,999.0	10,562.0	80.7	87.6	
Bnch/Stg	Start Date	Primary Job Type		
	3/8/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 58				
Volume Slurry Total (gal)				
615,258.00				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
7,586.0	10,055.0	83.1	83.9	
Bnch/Stg	Start Date	Primary Job Type		
	3/8/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 58				
Volume Slurry Total (gal)				
355,816.86				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
9,519.0	14,161.0	64.0	86.6	
Bnch/Stg	Start Date	Primary Job Type		
	3/8/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 58				
Volume Slurry Total (gal)				
19,538.40				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
6,545.0	11,450.0	4.3	5.4	
Bnch/Stg	Start Date	Primary Job Type		
	3/12/2017	COMPLETION - ORIGINAL		
Comment				
# of Clusters = 8, # of Shots = 86				
Volume Slurry Total (gal)				
717,057.60				
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)	
8,936.0	10,706.0	91.0	96.9	



Well Name: MND-6E-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:23 PM

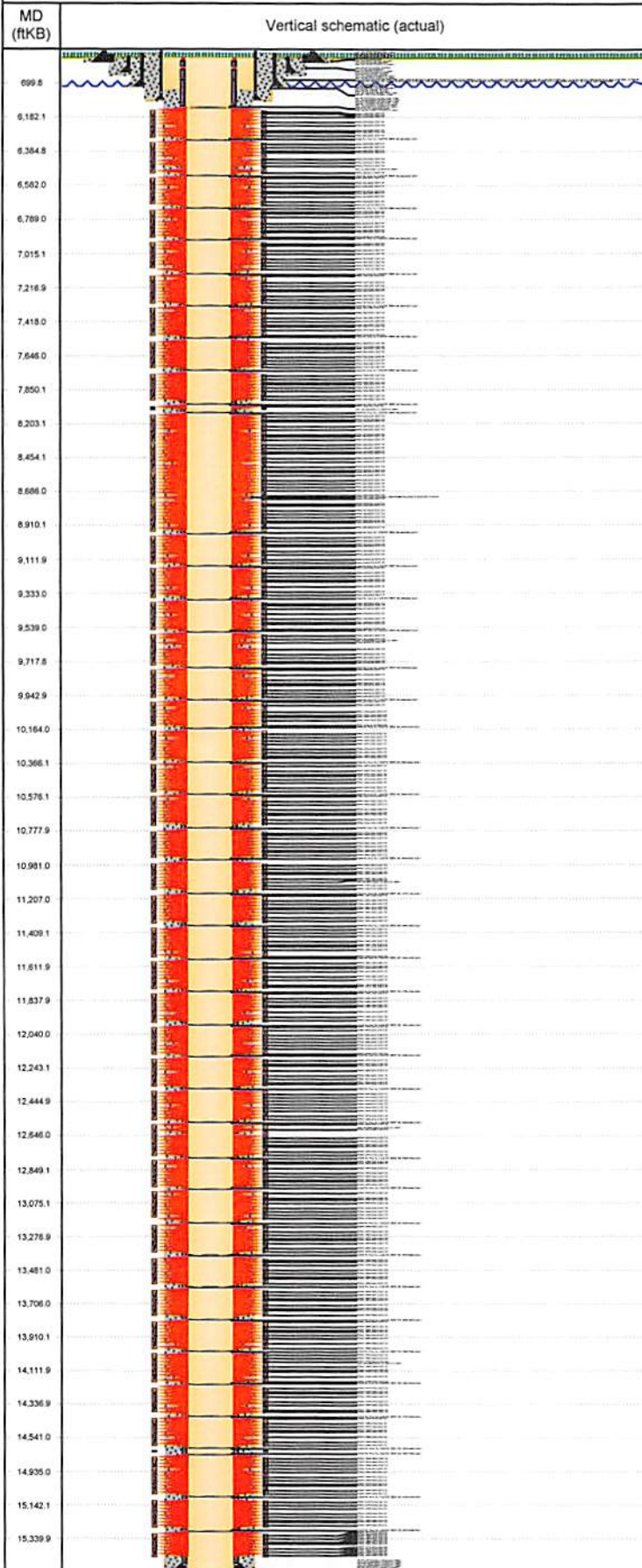


Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	3/12/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 26,800.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,290.0	8,493.0	19.6	26.9
Bnch/Stg	Start Date	Primary Job Type	
	3/13/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 555,643.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,282.0	11,665.0	93.7	94.0
Bnch/Stg	Start Date	Primary Job Type	
	3/13/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 623,855.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,282.0	12,004.0	87.0	92.6
Bnch/Stg	Start Date	Primary Job Type	
	3/14/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 626,971.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,638.0	10,517.0	91.6	99.1
Bnch/Stg	Start Date	Primary Job Type	
	3/14/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 580,099.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,730.0	10,842.0	94.6	97.7
Bnch/Stg	Start Date	Primary Job Type	
	3/14/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 710,056.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,996.0	12,128.0	96.2	96.2
Bnch/Stg	Start Date	Primary Job Type	
	3/15/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 759,015.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
10,197.0	12,908.0	70.9	97.0
Bnch/Stg	Start Date	Primary Job Type	
	3/16/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 569,536.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,152.0	11,628.0	88.2	94.3
Bnch/Stg	Start Date	Primary Job Type	
	3/16/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 531,342.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,291.0	9,804.0	85.5	87.1



**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:24 PM

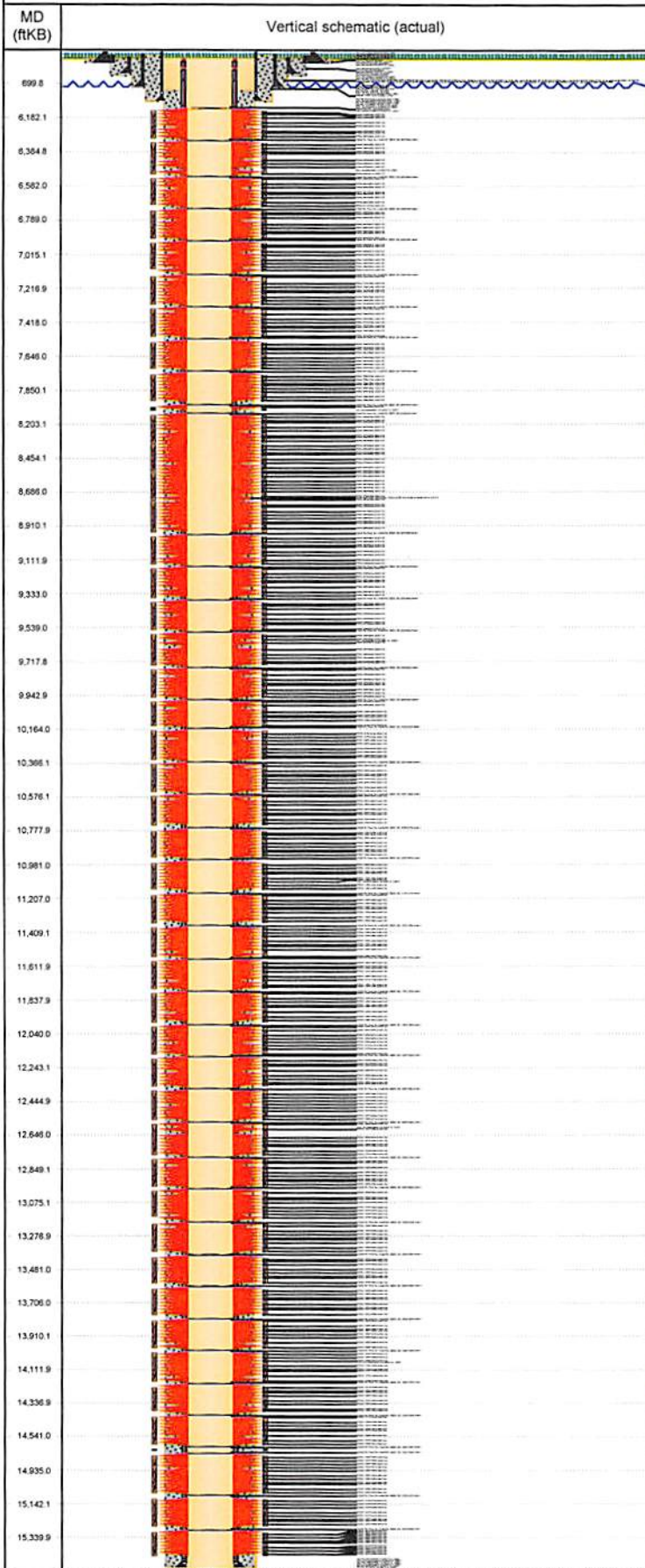


Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	3/16/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
520,367.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,140.0	9,710.0	91.7	93.0
Bnch/Stg	Start Date	Primary Job Type	
	3/16/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
543,501.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,836.0	8,506.0	90.2	91.2
Bnch/Stg	Start Date	Primary Job Type	
	3/17/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
535,810.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,872.0	9,922.0	90.1	90.7
Bnch/Stg	Start Date	Primary Job Type	
	3/17/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
516,978.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,351.0	9,501.0	88.3	90.1
Bnch/Stg	Start Date	Primary Job Type	
	3/17/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
537,352.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,388.0	9,300.0	89.7	91.5
Bnch/Stg	Start Date	Primary Job Type	
	3/17/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
536,499.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,732.0	8,253.0	90.7	91.3
Bnch/Stg	Start Date	Primary Job Type	
	3/18/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
552,274.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,680.0	10,028.0	87.6	88.8
Bnch/Stg	Start Date	Primary Job Type	
	3/18/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
643,057.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,541.0	9,799.0	90.4	91.6
Bnch/Stg	Start Date	Primary Job Type	
	3/18/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
607,517.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,130.0	8,931.0	90.2	92.9



**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:25 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	3/19/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 556,290.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,755.0	10,205.0	90.1	94.8
Bnch/Stg	Start Date	Primary Job Type	
	3/19/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 628,677.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,549.0	9,883.0	88.2	90.9
Bnch/Stg	Start Date	Primary Job Type	
	3/19/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 541,216.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,815.0	9,393.0	90.4	93.3
Bnch/Stg	Start Date	Primary Job Type	
	3/19/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 634,523.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,092.0	8,743.0	88.6	92.5
Bnch/Stg	Start Date	Primary Job Type	
	3/20/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 542,896.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,885.0	7,395.0	94.8	96.2
Bnch/Stg	Start Date	Primary Job Type	
	3/20/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 531,321.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
4,928.0	5,254.0	89.5	91.0
Bnch/Stg	Start Date	Primary Job Type	
	3/20/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 585,622.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,204.0	8,965.0	87.2	90.1
Bnch/Stg	Start Date	Primary Job Type	
	3/20/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 561,401.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,748.0	11,097.0	87.7	90.5
Bnch/Stg	Start Date	Primary Job Type	
	3/21/2017	COMPLETION - ORIGINAL	
Comment # of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal) 632,646.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,260.0	10,377.0	86.4	89.9



# Frac Wellbore Schematic Report

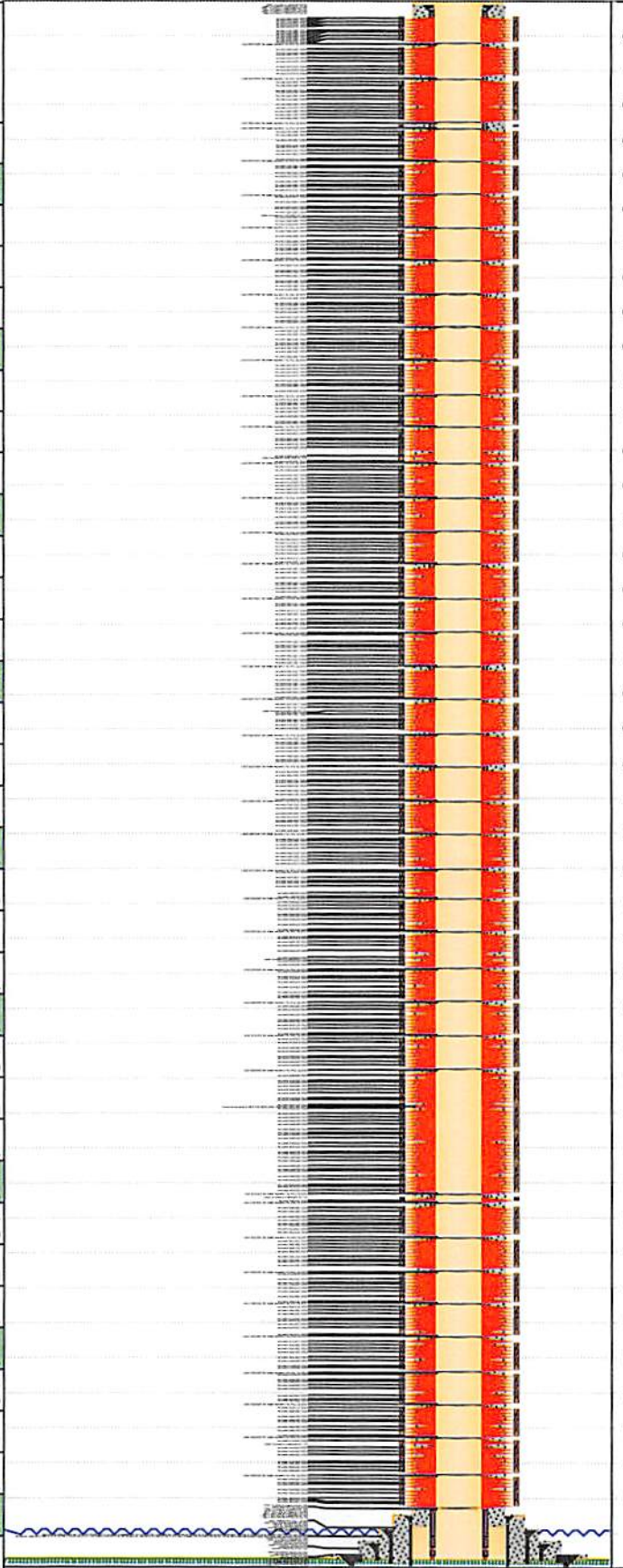


Well Name: MND-6E-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:26 PM

MD (ftKB)

Vertical schematic (actual)



Stimulation Intervals	Bndt/Sig	Start Date	Primary Job Type	Completion - ORIGINAL	Comment	# of Clusters = 8, # of Shots = 58	Volume Slurry Total (gal)	Treat Pressure Avg (psi)	Slurry Rate Avg (bbbl/min)	Slurry Rate Max (bbbl/min)
		3/21/2017	COMPLETION - ORIGINAL				511,740.60	7,784.0	10,966.0	90.7
		3/21/2017	COMPLETION - ORIGINAL				493,029.60	8,377.0	12,500.0	84.2
		3/21/2017	COMPLETION - ORIGINAL				711,055.80	8,155.0	9,090.0	85.0
		3/21/2017	COMPLETION - ORIGINAL				641,596.20	8,135.0	9,218.0	88.4
		3/22/2017	COMPLETION - ORIGINAL				606,131.40	7,442.0	8,704.0	86.6
		3/22/2017	COMPLETION - ORIGINAL				569,679.60	7,375.0	8,086.0	88.4
		3/22/2017	COMPLETION - ORIGINAL				461,542.20	7,579.0	13,569.0	88.8
		3/22/2017	COMPLETION - ORIGINAL				6,447.00	8,985.0	13,673.0	3.1
		3/23/2017	COMPLETION - ORIGINAL				12,213.60	4,865.0	13,625.0	3.3
										6.1



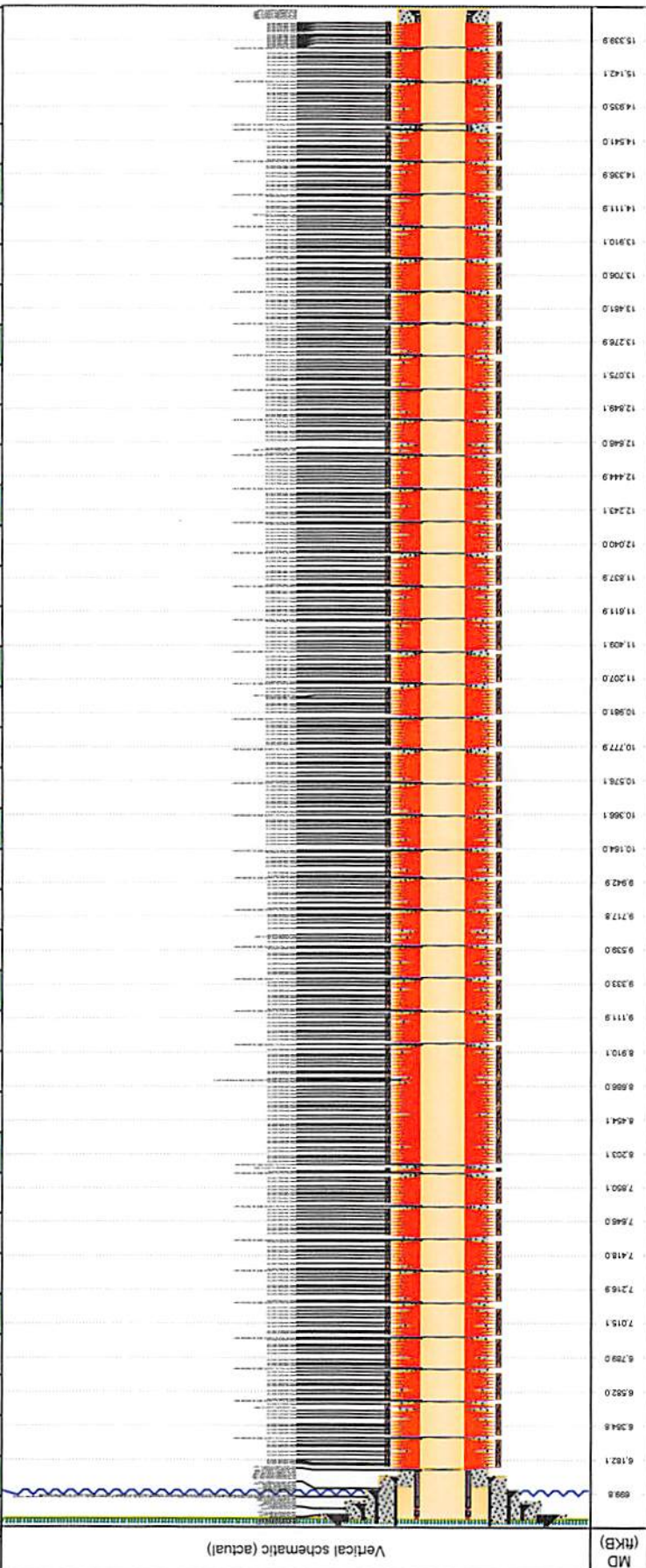
**Frac Wellbore Schematic Report**

**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:26 PM

**Stimulation Intervals**

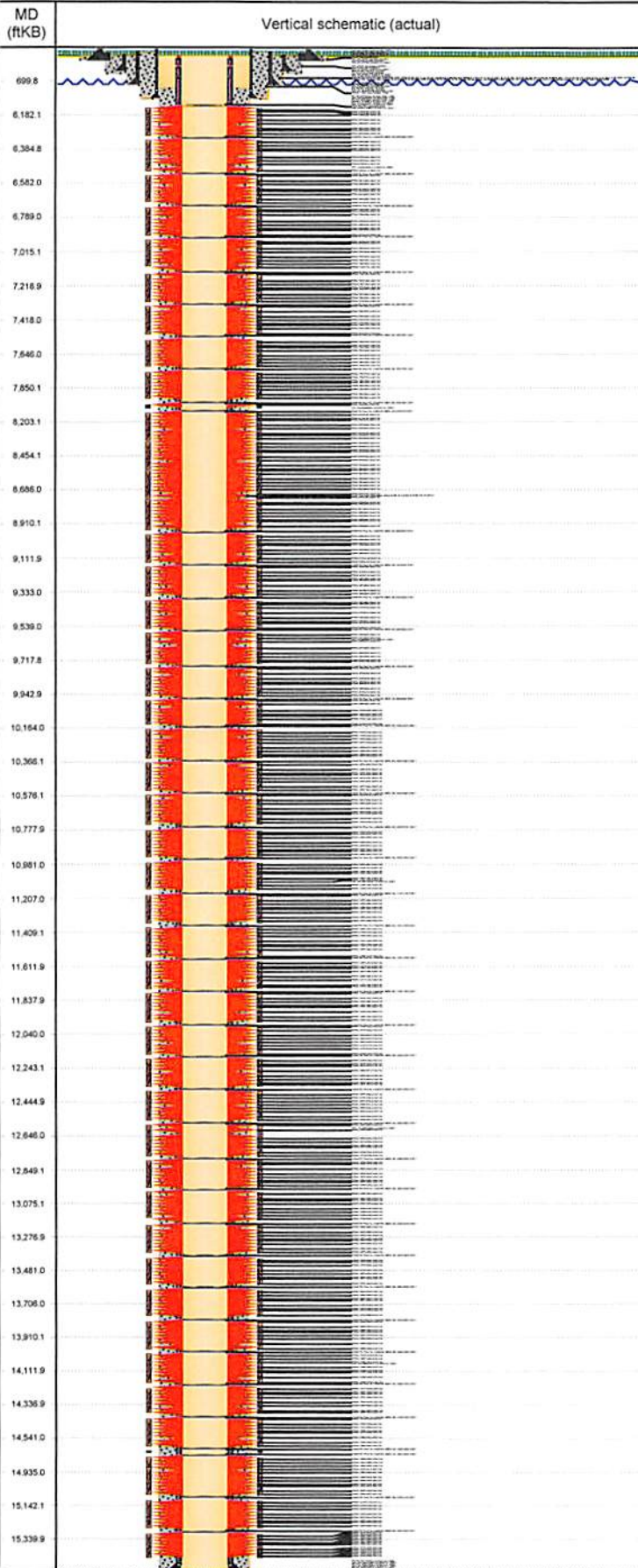
Bch/Slg	Start Date	Primary Job Type	Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
	4/7/2017	COMPLETION - ORIGINAL	3,983.0	4,956.0	16.4	25.1
	4/12/2017	COMPLETION - ORIGINAL	7,785.0	9,306.0	97.7	102.1
	4/12/2017	COMPLETION - ORIGINAL	6,769.0	8,431.0	90.5	92.5
	4/12/2017	COMPLETION - ORIGINAL	7,268.0	8,288.0	94.4	100.7
	4/12/2017	COMPLETION - ORIGINAL	7,308.0	7,826.0	93.8	97.0
	4/13/2017	COMPLETION - ORIGINAL	8,128.0	10,887.0	88.6	92.0
	4/26/2017	COMPLETION - ORIGINAL	6,888.0	8,279.0	90.5	100.5
	4/26/2017	COMPLETION - ORIGINAL	7,432.0	8,831.0	97.2	102.2





Well Name: MND-6E-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:27 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	4/26/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
464,809.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,135.0	8,434.0	98.5	100.6
Bnch/Stg	Start Date	Primary Job Type	
	4/27/2017	COMPLETION - ORIGINAL	
Comment			
# of Clusters = 8, # of Shots = 59			
Volume Slurry Total (gal)			
405,153.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,924.0	7,546.0	100.0	102.2



Perforations						
API	Well Name	Date	Top (ftKB)	Btm (ftKB)	Com	Entered Shot Total
47-051-01761	MND-6E-HS	4/27/2017	6,132.00	6,309.00	STG #46	58
47-051-01761	MND-6E-HS	4/26/2017	6,334.00	6,511.00	STG #45	58
47-051-01761	MND-6E-HS	4/26/2017	6,536.00	6,713.00	STG #44	58
47-051-01761	MND-6E-HS	4/26/2017	6,738.00	6,915.00	STG #43	58
47-051-01761	MND-6E-HS	4/13/2017	6,940.00	7,117.00	STG #42	58
47-051-01761	MND-6E-HS	4/13/2017	7,142.00	7,319.00	STG #41	58
47-051-01761	MND-6E-HS	4/12/2017	7,344.00	7,521.00	STG #40	58
47-051-01761	MND-6E-HS	4/12/2017	7,546.00	7,718.00	STG #39	58
47-051-01761	MND-6E-HS	4/12/2017	7,748.00	7,925.00	STG #38	58
47-051-01761	MND-6E-HS	4/7/2017	7,950.00	8,124.00	STG #37	58
47-051-01761	MND-6E-HS	3/22/2017	8,152.00	8,329.00	STG #36	58
47-051-01761	MND-6E-HS	3/22/2017	8,254.00	8,531.00	STG #35	58
47-051-01761	MND-6E-HS	3/22/2017	8,733.00	8,556.00	STG #34	58
47-051-01761	MND-6E-HS	3/21/2017	8,760.00	8,930.00	STG #33	58
47-051-01761	MND-6E-HS	3/21/2017	8,960.00	9,137.00	STG #32	58
47-051-01761	MND-6E-HS	3/21/2017	9,162.00	9,335.00	STG #31	58
47-051-01761	MND-6E-HS	3/21/2017	9,365.00	9,541.00	STG #30	58
47-051-01761	MND-6E-HS	3/20/2017	9,566.00	9,743.00	STG #29	58
47-051-01761	MND-6E-HS	3/20/2017	9,943.00	9,769.00	STG #28	58
47-051-01761	MND-6E-HS	3/20/2017	9,970.00	10,147.00	STG #27	58
47-051-01761	MND-6E-HS	3/20/2017	10,175.00	10,349.00	STG #26	58
47-051-01761	MND-6E-HS	3/20/2017	10,374.00	10,551.00	STG #25	58
47-051-01761	MND-6E-HS	3/19/2017	10,576.00	10,748.00	STG #24	58
47-051-01761	MND-6E-HS	3/19/2017	10,778.00	10,955.00	STG #23	58
47-051-01761	MND-6E-HS	3/19/2017	10,980.00	11,157.00	STG #22	58
47-051-01761	MND-6E-HS	3/19/2017	11,182.00	11,359.00	STG #21	58
47-051-01761	MND-6E-HS	3/18/2017	11,386.00	11,561.00	STG #20	58
47-051-01761	MND-6E-HS	3/18/2017	11,586.00	11,763.00	STG #19	58
47-051-01761	MND-6E-HS	3/18/2017	11,788.00	11,961.00	STG #18	58
47-051-01761	MND-6E-HS	3/17/2017	11,990.00	12,167.00	STG #17	58
47-051-01761	MND-6E-HS	3/17/2017	12,192.00	12,369.00	STG #16	58
47-051-01761	MND-6E-HS	3/17/2017	12,397.00	12,571.00	STG #15	58
47-051-01761	MND-6E-HS	3/17/2017	12,596.00	12,773.00	STG #14	58
47-051-01761	MND-6E-HS	3/16/2017	12,798.00	12,975.00	STG #13	58
47-051-01761	MND-6E-HS	3/16/2017	13,000.00	13,180.00	STG #12	58
47-051-01761	MND-6E-HS	3/16/2017	13,202.00	13,379.00	STG #11	58
47-051-01761	MND-6E-HS	3/15/2017	13,404.00	13,581.00	STG #10	58
47-051-01761	MND-6E-HS	3/15/2017	13,606.00	13,783.00	STG #9	58
47-051-01761	MND-6E-HS	3/14/2017	13,808.00	13,985.00	STG #8	58
47-051-01761	MND-6E-HS	3/14/2017	14,015.00	14,187.00	STG #7	58
47-051-01761	MND-6E-HS	3/13/2017	14,211.00	14,391.00	STG #6	58
47-051-01761	MND-6E-HS	3/13/2017	14,414.00	14,591.00	STG #5	58
47-051-01761	MND-6E-HS	3/13/2017	14,791.00	14,617.00	STG #4	58
47-051-01761	MND-6E-HS	3/12/2017	14,880.00	14,822.00	STG #3B	28
47-051-01761	MND-6E-HS	3/8/2017	14,910.00	15,087.00	STG #3A	58
47-051-01761	MND-6E-HS	3/7/2017	15,115.00	15,289.00	STG #2	58
47-051-01761	MND-6E-HS	3/7/2017	15,314.00	15,489.00	STG# 1	58

03/02/2018



Well Header							
API: 47-051-01761	Well Name: MND-6E-HS						
WR-35 - Stimulation Information Per Stage							
Int Des	Start Date	Slurry Rate Avg (bbl/min)	P Treat Avg (psi)	P Breakdown (psi)	ISIP (psi)	Propant Deliver (lb)	Vol Slurry Total (gal)
STGN 1 INJ TEST	3/7/2017	16.9	7,636.00		6,060.00	0	35,364.00
STGN 1	3/7/2017	80.7	7,999.00	5,742.00	3,182.00	611,518.00	630,222.60
STGN 2	3/8/2017	83.1	7,586.00	5,338.00	3,465.00	599,382.00	615,258.00
STGN 3A	3/8/2017	64	9,519.00	5,694.00		156,568.00	355,816.86
STGN 3A INJ TEST	3/8/2017	4.3	6,545.00			0	19,538.40
STGN 3B	3/12/2017	91	8,936.00	5,715.00	3,207.00	711,645.00	717,057.60
STGN 3B INJ TEST	3/12/2017	19.6	7,290.00			0	26,800.20
STGN 4	3/13/2017	93.7	8,282.00		3,533.00	607,000.00	555,643.20
STGN 5	3/13/2017	87	8,282.00	5,241.00	3,591.00	606,672.00	623,855.40
STGN 6	3/14/2017	91.6	8,638.00	5,589.00	3,645.00	599,438.00	626,971.80
STGN 7	3/14/2017	94.6	8,730.00	5,469.00	3,625.00	599,266.00	580,099.80
STGN 8	3/14/2017	96.2	8,996.00	5,587.00	3,405.00	603,414.00	710,056.20
STGN 9	3/15/2017	70.9	10,197.00	6,309.00	2,972.00	602,852.00	759,015.60
STGN 10	3/16/2017	88.2	8,152.00	6,473.00	2,933.00	604,455.00	569,536.80
STGN 11	3/16/2017	85.5	8,291.00	5,403.00	3,538.00	603,527.00	531,342.00
STGN 12	3/16/2017	91.7	8,140.00	5,763.00	3,885.00	607,348.00	520,367.40
STGN 13	3/16/2017	90.2	7,836.00	4,985.00	3,199.00	606,035.00	543,501.00
STGN 14	3/17/2017	90.1	7,872.00	4,878.00	3,590.00	597,744.00	535,810.80
STGN 15	3/17/2017	88.3	8,351.00	5,212.00	3,586.00	600,877.00	516,978.00
STGN 16	3/17/2017	89.7	8,388.00	5,103.00	3,125.00	602,210.00	537,352.20
STGN 17	3/17/2017	90.7	7,732.00	5,123.00	3,788.00	606,348.00	536,499.60
STGN 18	3/18/2017	87.6	7,680.00	4,871.00	3,384.00	600,150.00	552,274.80
STGN 19	3/18/2017	90.4	8,541.00	5,295.00	3,522.00	600,017.00	643,057.80
STGN 20	3/18/2017	90.2	8,130.00	4,821.00	4,336.00	600,600.00	607,517.40
STGN 21	3/19/2017	90.1	7,755.00	5,229.00	4,185.00	601,299.00	556,290.00
STGN 22	3/19/2017	88.2	8,549.00	8,376.00	4,419.00	598,094.00	628,677.00
STGN 23	3/19/2017	90.4	7,815.00	9,201.00	4,388.00	605,222.00	541,216.20
STGN 24	3/19/2017	88.6	8,092.00	5,090.00	4,244.00	600,362.00	634,523.40
STGN 25	3/20/2017	94.8	7,885.00	5,063.00	4,382.00	605,278.00	542,896.20
STGN 26	3/20/2017	89.5	4,928.00	4,885.00	3,562.00	597,022.00	531,321.00
STGN 27	3/20/2017	87.2	8,204.00	4,834.00	3,898.00	545,424.00	585,622.80
STGN 28	3/20/2017	87.7	8,748.00	4,737.00	4,035.00	601,225.00	561,401.40
STGN 29	3/21/2017	86.4	8,260.00	4,893.00	4,058.00	584,671.00	632,646.00
STGN 30	3/21/2017	90.7	7,784.00	5,333.00	5,533.00	541,699.00	511,740.60
STGN 31	3/21/2017	84.2	8,377.00	5,139.00	8,734.00	417,205.00	493,029.60
STGN 32	3/21/2017	90.4	8,155.00	5,069.00	3,328.00	731,070.00	711,055.80
STGN 33	3/21/2017	88.4	8,135.00	4,911.00	4,259.00	622,006.00	641,596.20
STGN 34	3/22/2017	86.6	7,442.00	5,126.00	4,708.00	594,375.00	606,131.40
STGN 35	3/22/2017	88.4	7,375.00	7,918.00	3,477.00	597,745.00	569,679.60
STGN 36	3/22/2017	88.8	7,579.00	8,196.00		434,355.00	461,542.20
STGN 36 INJ TEST	3/22/2017	3.1	8,985.00			0	6,447.00
STGN 36 INJ TEST 2	3/23/2017	3.3	4,865.00			0	12,213.60
STGN 37 INJ TEST	4/7/2017	16.4	3,983.00			0	14,952.00
STGN 37	4/12/2017	97.7	7,785.00	5,132.00	4,240.00	684,566.00	590,058.00
STGN 38	4/12/2017	90.5	6,769.00	5,231.00	4,285.00	681,209.00	594,346.20
STGN 39	4/12/2017	94.4	7,268.00	5,339.00	4,282.00	602,539.00	555,794.40
STGN 40	4/12/2017	93.8	7,308.00	5,158.00	3,969.00	602,553.00	528,410.40
STGN 41	4/13/2017	91.4	7,090.00	5,306.00	4,647.00	602,597.00	522,417.00



API 47- 051 - 01761 Farm name Consolidated Coal Company Well number MND 06 EHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	5801	TVD 15653 MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump  
 SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs  
 OPEN FLOW Gas Oil NGL Water GAS MEASURED BY  
 44500 mcfpd 1485 bpd 2881 bpd 389 bpd  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
					See Attached

Please insert additional pages as applicable.

Drilling Contractor Nomac 79 Drilling  
 Address 171 Locust Ave. Ext. City Mt. Morris State PA Zip 15349

Logging Company Baker Hughes  
 Address 400 Technology Drive City Canonsburg State PA Zip 15317

Cementing Company Schlumberger  
 Address 4600 J. Barry Ct., Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company Schlumberger  
 Address 4600 J Barry Ct., Ste 200 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Logan Boughal Telephone 832-639-7447  
 Signature  Title Regulatory Analyst II Date 12/11/2017



## MND 6

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale and Sandstone	0	284	0	284	
Pittsburgh Coal	284	294	284	294	
Shale and Sandstone	294	706	294	706	
Dunkard Sand	706	727	706	727	
Shale	727	876	727	876	
Gas Sand	876	947	876	5972	
Shale	947	1016	947	6191	
1st Salt Sand	1016	1032	1016	6313	
Shale	1032	1139	1032	6719	
2nd Salt Sand	1139	1168	1139	7118	
Shale and Sandstone	1168	1298	1168	7333	
Maxton Sand	1298	1345	1298	8194	
Shale	1345	1363	1345	8194	
Big Lime	1363	1435	1363	8541	
Big Injun	1435	1705	1435	8869	
Price	1705	1803	1705	8890	
Murrysville	1803	1910	1803	8983	
Shale and Sandstone	1910	2448	1910	8998	
Gordon	2448	2478	2448	9073	
Shale and Sandstone	2478	2999	2478	9179	
Fifth Sand	2999	3052	2999	9995	
Shale and Sandstone	3052	3854	3052	9179	
Warren Sand	3854	3863	3860	9995	
Shale	3863	4580	3869	10660	
Java Shale	4580	4664	4593	not encountered	
Pipe Creek Shale	4664	4739	4678	not encountered	
Angola Shale	4739	5323	4754	not encountered	
Rhinestreet	5323	5642	5344	not encountered	
Cashaqua	5642	5714	5666	not encountered	
Middlesex	5714	5737	5739	not encountered	
West River	5737	5798	5762	not encountered	
Burkett	5798	5822	5824	not encountered	
Tully Limestone	5822	5848	5848	not encountered	
Hamilton	5848	5883	5875	not encountered	
Marcellus	5883	5936	5910	not encountered	
Onondaga	5936	5944	5964	not encountered	
Huntersville	5944	6158	5972	6191	
Oriskany	6158	6270	6191	6313	
Helderburg	6270	6530	6313	6719	
Bass Island Dolomite	6530	6609	6719	7118	
Salina G Big Lime	6609	6809	7118	7333	
Salina F	6809	7608	7333	8194	
Lockport Dolomite	7608	7930	8194	8541	
Rochester Shale	7930	8235	8541	8869	
Dayton Fm/Packer Shell	8235	8254	8869	8890	

03/02/2018



Shale	8254	8341	8890	8983	
Clinton Sand	8341	8355	8983	8998	
Shale	8355	8424	8998	9073	
Medina Sand	8424	8523	9073	9179	
Queenston Shale	8523	9280	9179	9995	
Reedsville Shale	9280	9898	9995	10660	Gas
Utica Shale	9898	10511	10660	not encountered	
Point Pleasant	10511	10631	not encountered	not encountered	
Trenton Limestone	10631		not encountered	not encountered	



## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/30/2017
Job End Date:	4/30/2017
State:	West Virginia
County:	Marshall
API Number:	47-051-01761-08-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	MND 6 E
Latitude:	39.81761194
Longitude:	-80.79191611
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,801
Total Base Water Volume (gal):	25,540,574
Total Base Non Water Volume:	0



### Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.26727	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.17811	

SP BREAKER	Halliburton	Breaker					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			
OILPERM A	Halliburton	Non-ionic Surfactant					
				Listed Below			
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			
HYDROCHLORIC ACID	Halliburton	Solvent					



				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
SC-30	X-Chem	Scale Inhibitor					
				Listed Below			
B-84	X-Chem	Biocide					
				Listed Below			

Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.

			Crystalline silica, quartz	14808-60-7	100.00000	11.52608	
			Inorganic salt	Proprietary	30.00000	0.01818	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01818	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01818	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Hydrochloric acid	7647-01-0	7.50000	0.01063	
			Acetic anhydride	108-24-7	100.00000	0.00283	
			Acetic acid	64-19-7	60.00000	0.00170	
			Ethanol	64-17-5	60.00000	0.00057	
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00038	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00028	
			Methanol	67-56-1	60.00000	0.00028	
			Fatty acids, tall oil	Proprietary	30.00000	0.00014	

			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00014	
			Ethoxylated alcohols	Proprietary	30.00000	0.00014	
			Olefins	Proprietary	5.00000	0.00006	
			Guar gum	9000-30-0	100.00000	0.00006	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			Naphthalene	91-20-3	5.00000	0.00005	
			Propargyl alcohol	107-19-7	10.00000	0.00005	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
			Sodium persulfate	7775-27-1	100.00000	0.00000	
			Sodium sulfate	7757-82-6	0.10000	0.00000	
			Water	7732-18-5	100.00000		
			Sodium Hydroxide	1310-73-2	1.50000		
			Didecyl dimethyl ammonium chloride	7173-51-5	10.00000		
			n-Alkyl dimethyl benzyl ammonium chloride	68424-85-1	10.00000		
			Ethanol	64-17-5	5.00000		
			Glutaraldehyde	111-30-8	30.00000		

\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

\*\*\* If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)





**Frac Wellbore Schematic Report**

**Well Name: MND-6E-HS**

HORIZONTAL - Original Hole, 12/11/2017 3:07:21 PM

**Well Header**

API	47-051-01761	Business Unit	MARCELLUS	District	30	Well Comp	HORIZONTAL
Original KB Elevation (ft)	748	KB - GL / MSL (ftKB)	25.90	Spud Date	9/2/2014	P & A Date	

Comment

Directions To Well

Current FBTD (mKB)

**Bottom Hole Location**

North-South Distance (ft) From N or S Line

East-West Distance (ft) From E or W Line

**Plug Back Total Depths**

Date

Depth (ftKB)

Method

Com

**Wellbore Sections**

Section Des

Size (in)

Act Top, MD (ftKB)

Act Btm, MD (ftKB)

CONDUCTOR 1

CONDUCTOR 2

SURFACE

INTERMEDIATE

PRODUCTION

Zone Name

Status

Fluid Type

Job

Prod Method

**Casing Strings**

Csg Des

Run Date

OD (in)

WtLen (lb/ft)

Grade

Top, MD (ftKB)

MD (ftKB)

Conductor

Conductor

Surface

Intermediate 1

Production

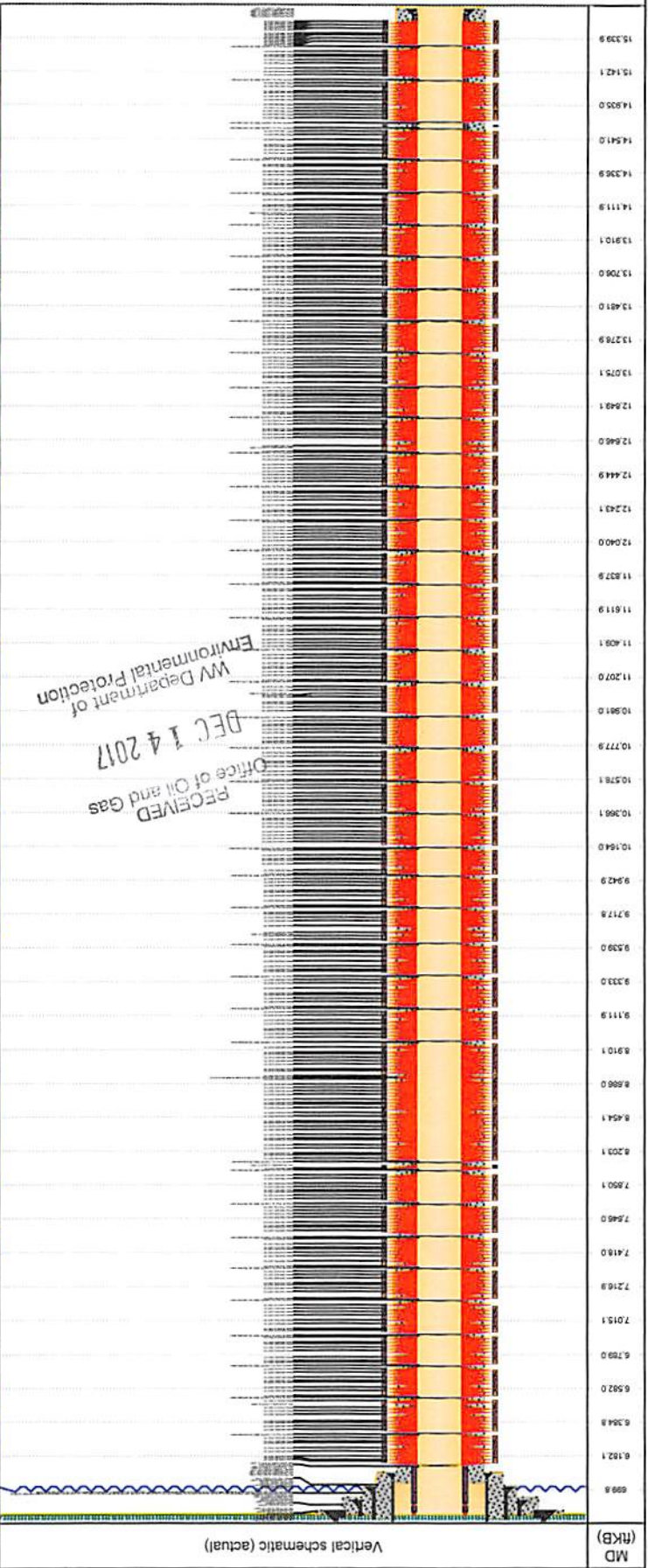
Cement

Des

Top (ftKB)

Btm (ftKB)

Date



Sum of Entered Shot Total	Top (ftKB)	Btm (ftKB)	Date
58	6,132.00	6,309.00	4/27/2017
58	6,334.00	6,511.00	4/26/2017
58	6,536.00	6,713.00	4/26/2017
58	6,738.00	6,915.00	4/26/2017
58	6,940.00	7,117.00	4/11/2017
58	7,142.00	7,319.00	4/13/2017
58	7,344.00	7,521.00	4/12/2017
58	7,546.00	7,718.00	4/12/2017
58	7,748.00	7,925.00	4/11/2017
58	7,950.00	8,124.00	4/7/2017
58	8,152.00	8,329.00	3/22/2017
58	8,354.00	8,531.00	3/22/2017
58	8,556.00	8,733.00	3/22/2017
58	8,760.00	8,930.00	3/21/2017
58	8,960.00	9,137.00	3/21/2017
58	9,162.00	9,335.00	3/21/2017
58	9,365.00	9,541.00	3/21/2017
58	9,566.00	9,743.00	3/20/2017

**Perforation Data**

Item Des

OD (in)

Wt (lb/ft)

Grade

Jts

Len (ft)

**Tubing Components**

Production Casing Cement

1,815.0

15,646.5

Intermediate 1 Casing Cement

0.0

2,058.0

Surface

26.0

744.0

Conductor Cement

25.9

135.9

Conductor Cement

40.0

40.0

Des

Top (ftKB)

Btm (ftKB)

Production

11/22/2014

5 1/2

23.00

P-110

25.9

15,646.5

Intermediate 1

11/17/2014

9 5/8

36.00

HCK-55

-6.7

2,058.3

Surface

9/10/2014

13 3/8

54.50

J-55

-4.3

744.0

Conductor

8/24/2014

16

65.00

H-40

6.0

116.0

Conductor

8/10/2014

20

165.60

X-56

0.0

40.0

Csg Des

Run Date

OD (in)

WtLen (lb/ft)

Grade

Top, MD (ftKB)

MD (ftKB)

**Casing Strings**

Zone Name

Status

Fluid Type

Job

Prod Method

**Zone Statuses**

CONDUCTOR 1

24

18

40

26

CONDUCTOR 2

14 3/4

120

760

2,070

SURFACE

8 3/4

15,653

**Wellbore Sections**

Section Des

Size (in)

Act Top, MD (ftKB)

Act Btm, MD (ftKB)

**Wellbore Sections**

CONDUCTOR 1

24

18

40

26

**Wellbore Sections**

CONDUCTOR 2

14 3/4

120

760

2,070

**Wellbore Sections**

SURFACE

8 3/4

15,653

**Wellbore Sections**

PRODUCTION

12 1/4

760

2,070

**Wellbore Sections**

INTERMEDIATE

9 5/8

36.00

HCK-55

-6.7

2,058.3

**Wellbore Sections**

PRODUCTION

5 1/2

23.00

P-110

25.9

15,646.5

**Wellbore Sections**

CONDUCTOR