

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

API 47-051-01763 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 DHS

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 39.817699 Easting 80.791676
Landing Point of Curve Northing 39.818272 Easting 80.794456
Bottom Hole Northing 39.841442 Easting 80.816118

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

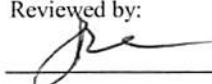
RECEIVED
Office of Oil and Gas
DEC 14 2017
WV Department of
Environmental Protection

Date permit issued 06/10/2014 Date drilling commenced 09/04/2014 Date drilling ceased 11/14/2014
Date completion activities began 04/28/2017 Date completion activities ceased 05/15/2017
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' & 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) N

Reviewed
2/2/18

Reviewed by:


API 47- 051 - 01763 Farm name CONSOLIDATED COAL COMPANY Well number MND 06 DHS

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"	110'	NEW	H-40		Y
Coal	17 1/2"	13 3/8"	718'	NEW	J-55		Y
Intermediate 1	12.38"	9 5/8"	2032'	NEW	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	16,756'	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 ³ /sks)	Volume (ft ³)	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 721 Tail 2536	14.8	Lead 1.54 Tail 1.37	total 4495.61	2070	8
Tubing							

Drillers TD (ft) 16,756 Loggers TD (ft) 16,755'

Deepest formation penetrated Marcellus Plug back to (ft) _____

Plug back procedure _____

Kick off depth (ft) 2,143'

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.

18 Centralizers on Intermediate String (Bow string centralizers on first two joints then every third joint to 100' from surface).

294 Bow Tech 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 _____

API 47- 051 - 01763 Farm name CONSOLIDATED COAL COMPANY Well number MND 06 DHS

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					See Attached

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

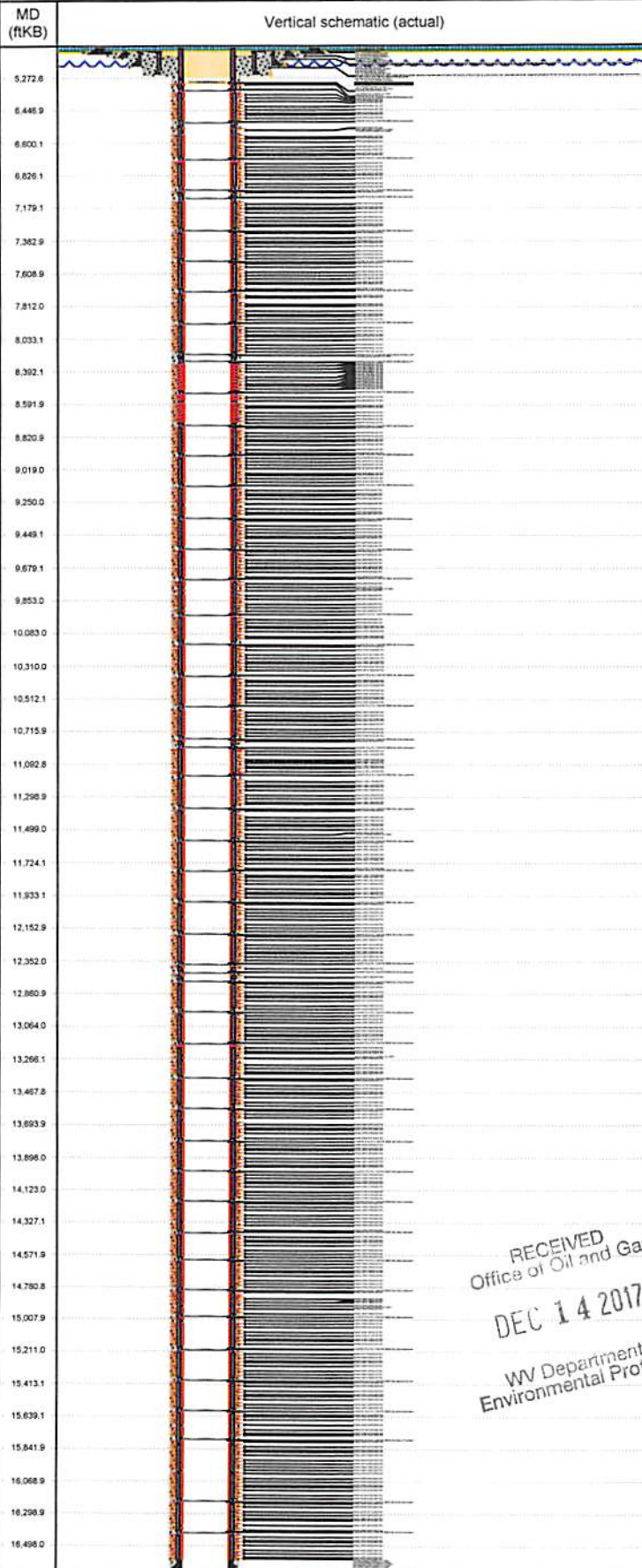
Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
								See Attached

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

Please insert additional pages as applicable.

Well Name: MND-6D-HS

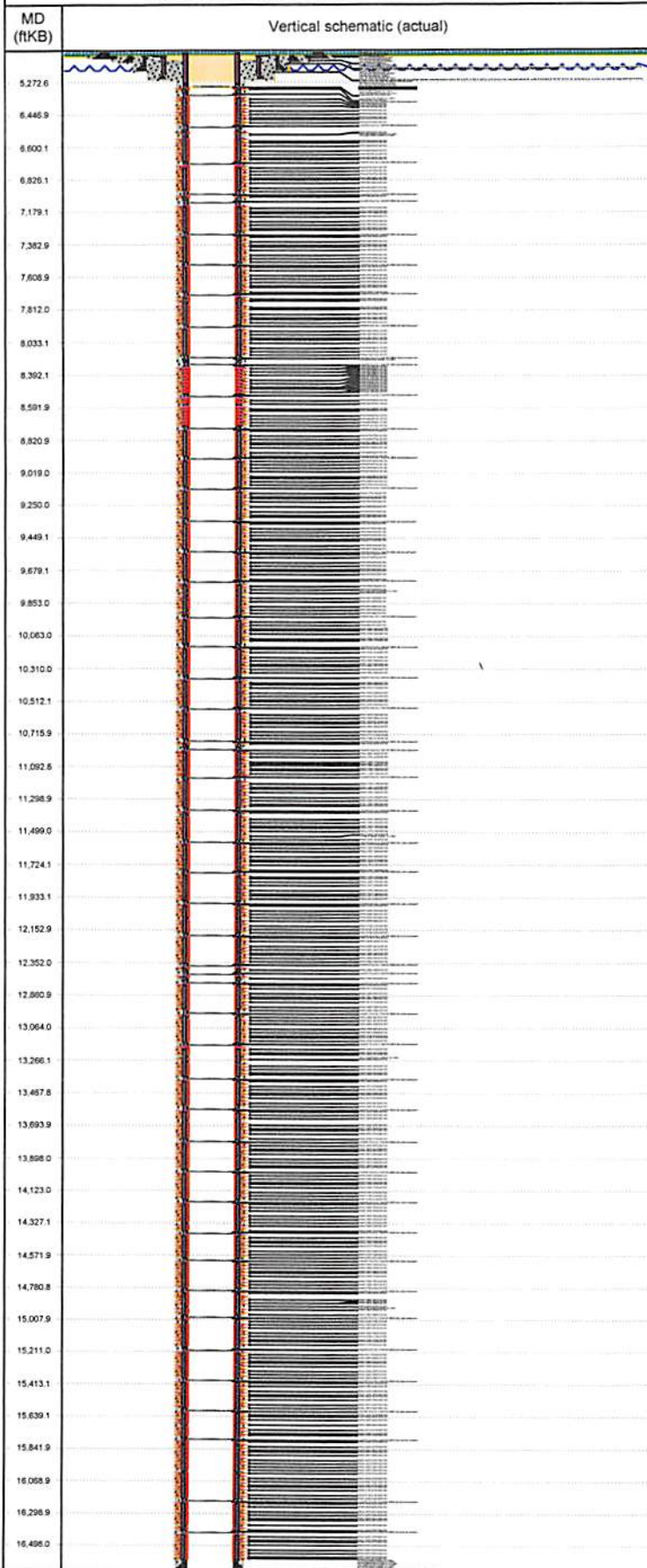
HORIZONTAL - Original Hole, 12/11/2017 3:06:57 PM



Well Header						
API 47-051-01763	Business Unit MARCELLUS	District 30	Well Config HORIZONTAL			
Original KB Elevation (ft) 748	KB - GL / MSL (ftKB) 25.90	Spud Date 9/4/2014	P & A Date			
Comment						
Directions To Well						
Current PBTD (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	24	26	40			
CONDUCTOR 2	18	40	135			
SURFACE	14 3/4	135	760			
INTERMEDIATE 1	12 1/4	760	2,070			
Zone Statuses						
Zone Name	Status Date	Status	Fluid Type	Job	Prod Method	
Casing Strings						
Csg Des	Run Date	OD (in)	Wt/Len (lb/ft)	Grade	Top, MD (ftKB)	MD (ftKB)
Conductor	8/10/2014	20	165.60	X-56	25.9	40.0
Conductor	8/24/2014	16	65.00	H-40	25.9	110.0
Surface	9/8/2014	13 3/8	54.50	J-55	25.9	745.0
Intermediate	11/5/2014	9 5/8	36.00	J-55	25.9	2,058.7
Production	11/13/2014	5 1/2	23.00	P-110	-2.3	16,756.0
Cement						
Des	Top (ftKB)	Btm (ftKB)				
Conductor Cement	25.9	40.0				
Conductor Cement	25.9	110.0				
Surface Casing Cement	26.0	745.0				
Intermediate 1 Casing Cement	25.9	2,058.7				
Production Casing Cement	41.0	165,756.0				
Tubing Components						
Item Des	OD (in)	Wt (lb/ft)	Grade	Jts	Len (ft)	
Perforation Data						
Linked Zone	Brnch/Stg	Sum of Entered Shot Total	Top (ftKB)	Btm (ftKB)	Date	
	52	58	6,120.00	6,292.00	5/14/2017	
	51	58	6,322.00	6,499.00	5/13/2017	
	50	58	6,526.00	6,701.00	5/13/2017	
	49	58	6,729.00	6,903.00	5/13/2017	
	48	58	6,930.00	7,105.00	5/13/2017	
	47	58	7,130.00	7,307.00	5/12/2017	
	46	58	7,332.00	7,509.00	5/12/2017	
	45	58	7,536.00	7,711.00	5/12/2017	
	44	58	7,736.00	7,909.00	5/12/2017	
	43	58	7,938.00	8,115.00	5/11/2017	
	42	58	8,140.00	8,317.00	5/11/2017	
	41	58	8,345.00	8,519.00	5/11/2017	
	40	58	8,544.00	8,719.00	5/11/2017	
	39	58	8,746.00	8,918.00	5/10/2017	
	38	58	8,948.00	9,122.00	5/10/2017	
	37	58	9,147.00	9,330.00	5/9/2017	
	36	58	9,352.00	9,529.00	5/9/2017	
35	58	9,554.00	9,731.00	5/9/2017		
34	58	9,758.00	9,933.00	5/9/2017		

Well Name: MND-6D-HS

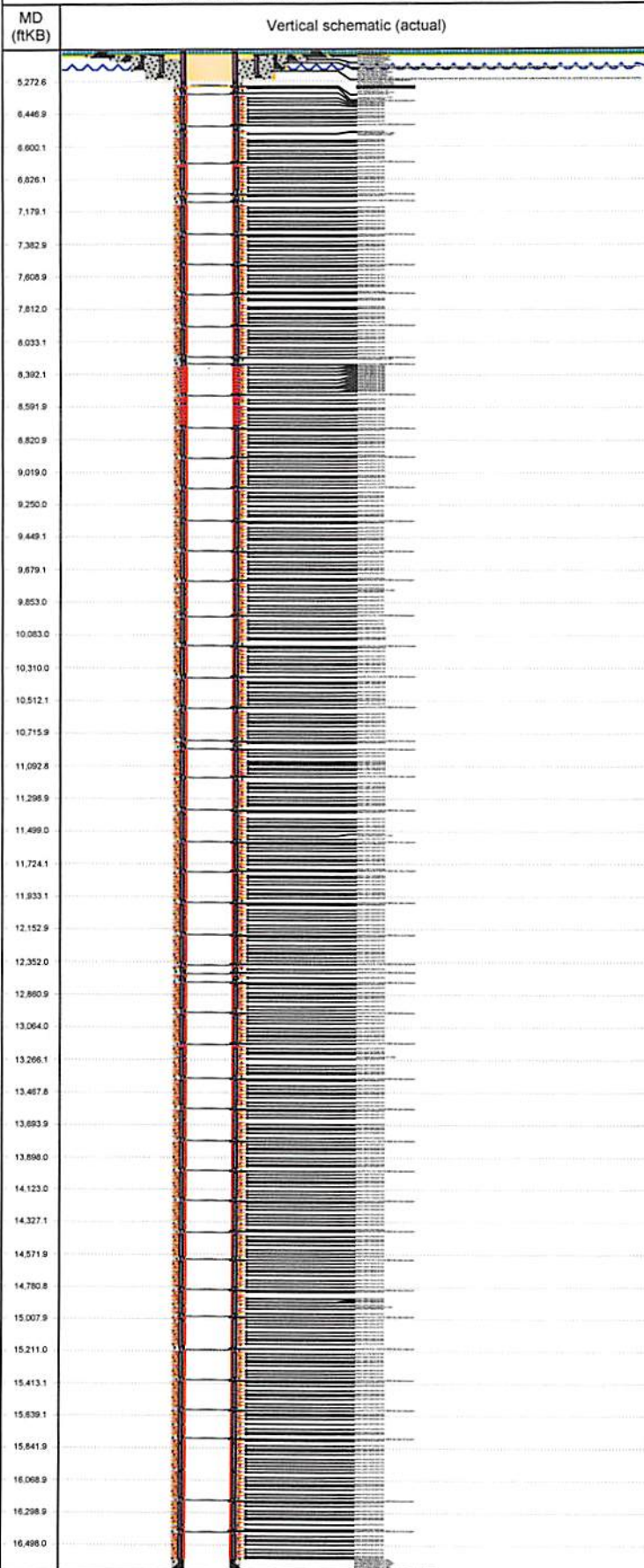
HORIZONTAL - Original Hole, 12/11/2017 3:06:58 PM



Perforation Data					
Linked Zone	Bnch/Stg	Sum of Entered Shot Total	Top (ftKB)	Btm (ftKB)	Date
	33	58	9,958.00	10,132.00	5/8/2017
	32	58	10,160.00	10,333.00	5/8/2017
	31	58	10,358.00	10,539.00	5/8/2017
	30	58	10,564.00	10,741.00	5/7/2017
	29	58	10,766.00	10,943.00	5/7/2017
	28	58	10,968.00	11,145.00	5/7/2017
	27	58	11,173.00	11,347.00	5/7/2017
	26	58	11,372.00	11,550.00	5/7/2017
	25	58	11,574.00	11,751.00	5/5/2017
	24	58	11,776.00	11,953.00	5/5/2017
	23	58	11,978.00	12,155.00	5/5/2017
	22	58	12,178.00	12,352.00	5/4/2017
	21	58	12,382.00	12,559.00	5/4/2017
	20	58	12,584.00	12,761.00	5/4/2017
	19	58	12,790.00	12,965.00	5/4/2017
	18	58	12,988.00	13,165.00	5/4/2017
	17	58	13,190.00	13,367.00	5/3/2017
	16	58	13,392.00	13,571.00	5/3/2017
	15	58	13,594.00	13,771.00	5/3/2017
	14	58	13,796.00	13,973.00	5/3/2017
	13	58	14,003.00	14,175.00	5/2/2017
	12	58	14,200.00	14,377.00	5/2/2017
	11	58	14,402.00	14,574.00	5/2/2017
	10	58	14,604.00	14,781.00	5/1/2017
	09	58	14,806.00	14,983.00	5/1/2017
	08	58	15,008.00	15,181.00	5/1/2017
	07	58	15,211.00	15,383.00	5/1/2017
	06	58	15,412.00	15,589.00	4/30/2017
	05	58	15,614.00	15,791.00	4/30/2017
	04	58	15,816.00	15,989.00	4/30/2017
	03	58	16,018.00	16,195.00	4/30/2017
	02	58	16,220.00	16,397.00	4/29/2017
	01	58	16,422.00	16,599.00	4/29/2017
Total (Sum)		3,016			
Other In Hole					
Run Date	Des	OD (in)	Top (ftKB)	Btm (ftKB)	
4/29/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	16,412.0	16,414.0	
4/30/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	16,210.0	16,212.0	
4/30/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	16,008.0	16,006.0	
4/30/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	15,769.0	15,771.0	
4/30/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	15,604.0	15,606.0	
5/1/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	15,399.0	15,401.0	
5/1/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	15,200.0	15,202.0	
5/1/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	14,998.0	15,000.0	
5/1/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	14,796.0	14,798.0	
5/2/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	14,589.0	14,591.0	
5/2/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	14,392.0	14,394.0	
5/2/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	14,190.0	14,192.0	
5/3/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	13,988.0	13,990.0	
5/3/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	13,790.0	13,792.0	
5/3/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	13,584.0	13,586.0	
5/3/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	13,382.0	13,384.0	
5/4/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	13,180.0	13,182.0	
5/4/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	12,978.0	12,980.0	
5/4/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	12,776.0	12,778.0	
5/4/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	12,574.0	12,576.0	
5/4/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	12,372.0	12,374.0	
5/5/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	12,170.0	12,172.0	
5/5/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	11,968.0	11,970.0	

Well Name: MND-6D-HS

HORIZONTAL - Original Hole, 12/11/2017 3:06:59 PM



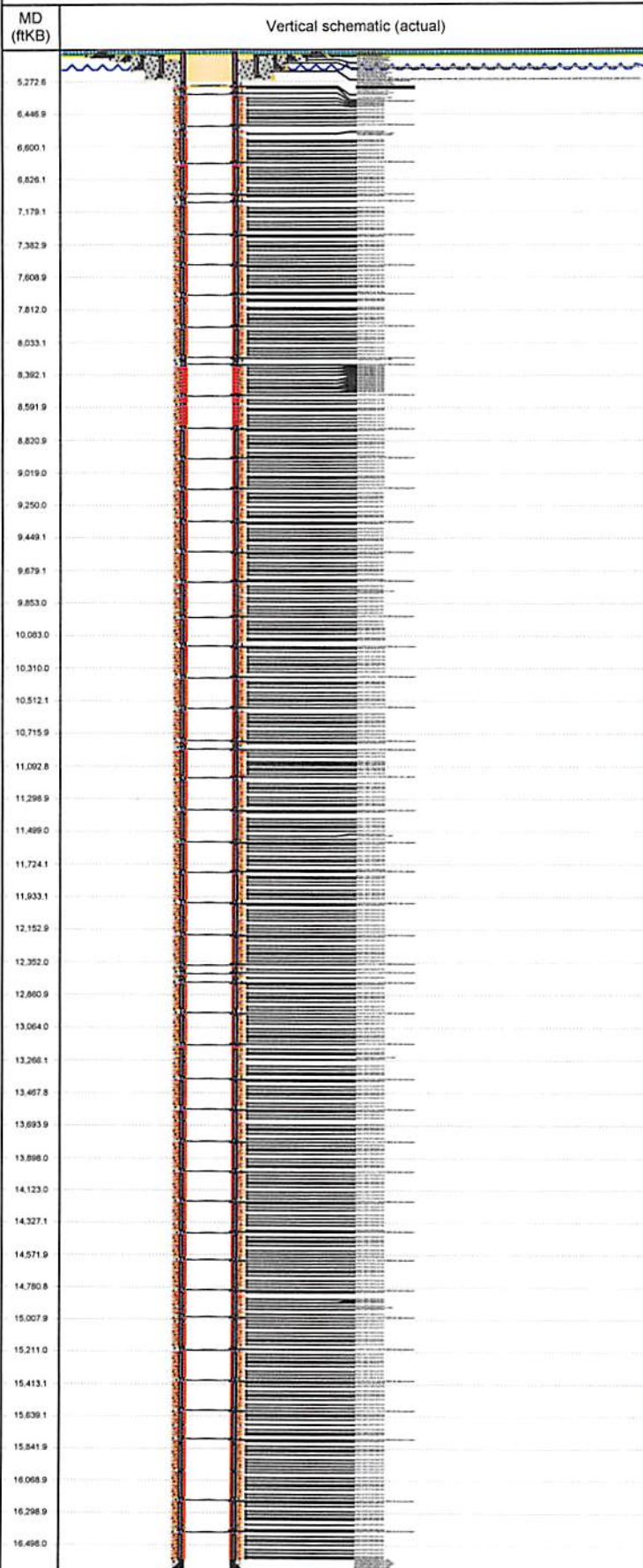
Other In Hole					
Run Date	Des	OD (in)	Top (ftKB)	Btn (ftKB)	
5/5/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	11,766.0	11,768.0	
5/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	11,564.0	11,566.0	
5/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	11,362.0	11,364.0	
5/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	11,160.0	11,162.0	
5/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	10,958.0	10,960.0	
5/7/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	10,756.0	10,758.0	
5/8/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	10,554.0	10,556.0	
5/8/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	10,348.0	10,350.0	
5/8/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	10,147.0	10,149.0	
5/9/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,948.0	9,950.0	
5/9/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,746.0	9,748.0	
5/9/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,545.0	9,547.0	
5/9/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,342.0	9,344.0	
5/10/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	9,137.0	9,139.0	
5/10/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,933.0	8,935.0	
5/11/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,736.0	8,738.0	
5/11/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,534.0	8,536.0	
5/11/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,332.0	8,334.0	
5/11/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	8,131.0	8,133.0	
5/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,928.0	7,930.0	
5/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,726.0	7,728.0	
5/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,524.0	7,526.0	
5/12/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,322.0	7,324.0	
5/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	7,120.0	7,122.0	
5/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,918.0	6,920.0	
5/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,719.0	6,721.0	
5/13/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,514.0	6,516.0	
5/14/2017	Composite Flow Through Plug (HALLIBURTON OBSIDIA...	4.37	6,307.0	6,309.0	
5/14/2017	Composite Bridge Plug	4.37	5,440.0	5,442.0	

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

Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	4/29/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
31,634.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,733.0	7,615.0	11.0	29.8
Bnch/Stg	Start Date	Primary Job Type	
	4/29/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
607,756.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,471.0	10,332.0	85.9	91.3
Bnch/Stg	Start Date	Primary Job Type	
	4/29/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
640,491.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,154.0	10,817.0	83.8	88.0
Bnch/Stg	Start Date	Primary Job Type	
	4/30/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
631,276.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
9,082.0	11,906.0	86.3	89.5

Well Name: MND-6D-HS

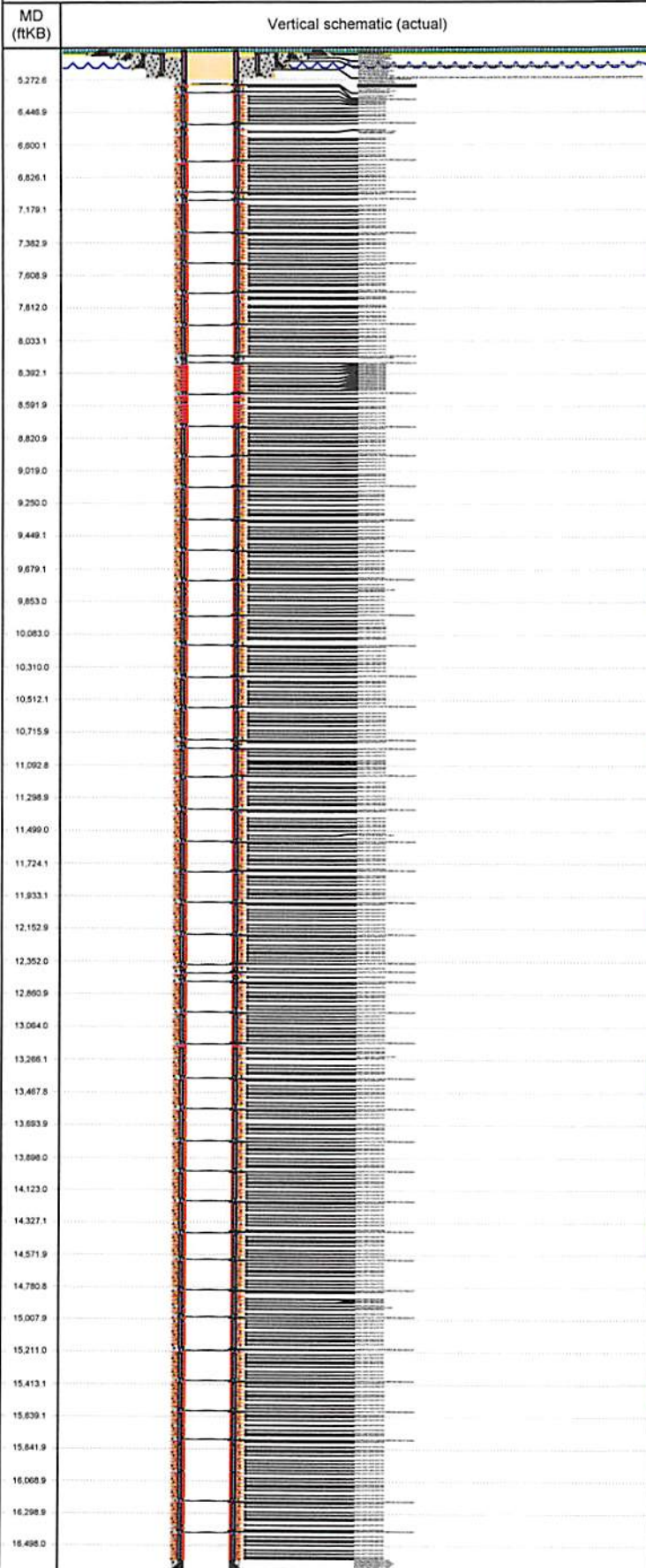
HORIZONTAL - Original Hole, 12/11/2017 3:07:00 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	4/30/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
656,161.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,279.0	9,506.0	87.7	93.0
Bnch/Stg	Start Date	Primary Job Type	
	4/30/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
581,658.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,368.0	10,420.0	88.2	92.4
Bnch/Stg	Start Date	Primary Job Type	
	5/1/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
581,830.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,130.0	10,494.0	88.2	91.9
Bnch/Stg	Start Date	Primary Job Type	
	5/1/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
564,958.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,195.0	9,117.0	93.4	95.3
Bnch/Stg	Start Date	Primary Job Type	
	5/1/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
602,632.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,339.0	9,268.0	94.7	97.2
Bnch/Stg	Start Date	Primary Job Type	
	5/1/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
573,963.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,185.0	10,338.0	86.9	91.0
Bnch/Stg	Start Date	Primary Job Type	
	5/2/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
570,133.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,557.0	10,263.0	88.8	92.6
Bnch/Stg	Start Date	Primary Job Type	
	5/2/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
616,207.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,459.0	9,924.0	93.3	94.4
Bnch/Stg	Start Date	Primary Job Type	
	5/2/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
579,293.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,210.0	9,682.0	90.1	93.2

Well Name: MND-6D-HS

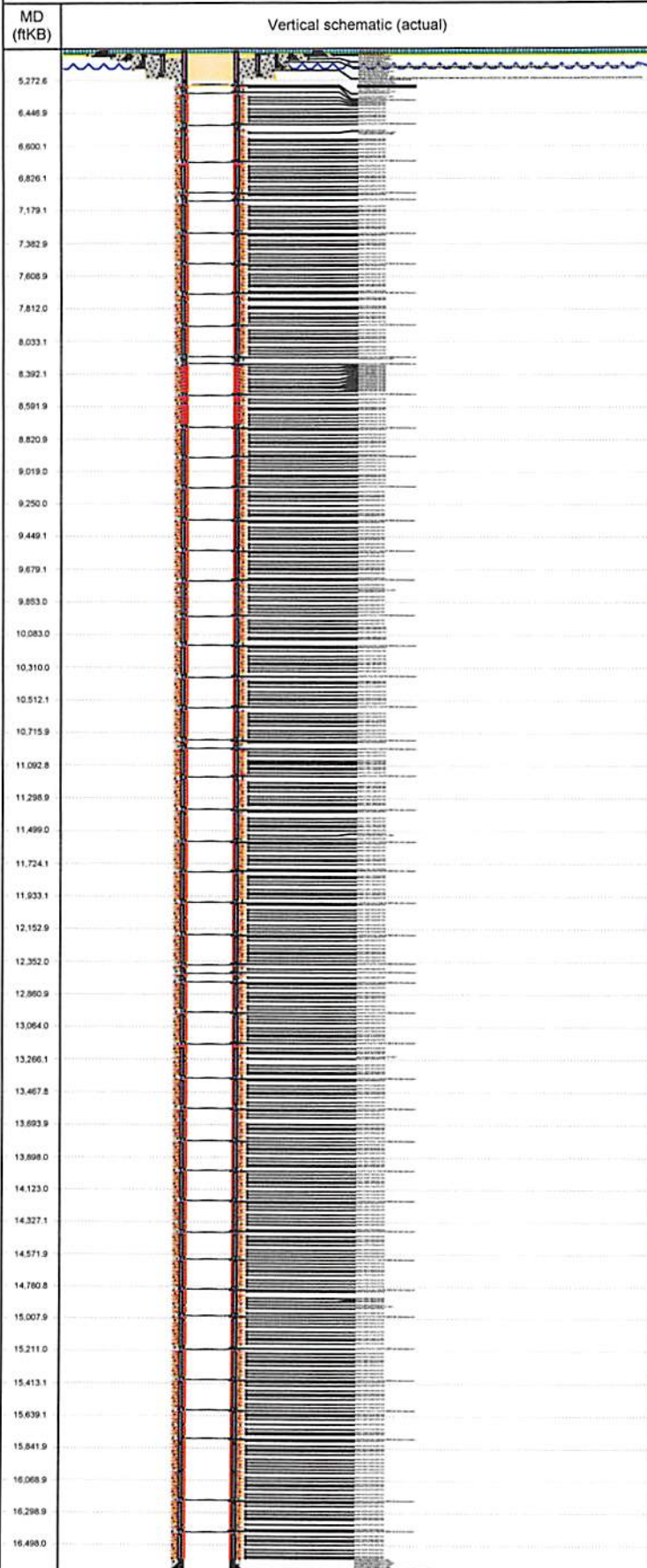
HORIZONTAL - Original Hole, 12/11/2017 3:07:02 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	5/2/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
576,063.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,401.0	10,749.0	89.1	93.2
Bnch/Stg	Start Date	Primary Job Type	
	5/3/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
596,282.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,173.0	9,142.0	88.5	91.6
Bnch/Stg	Start Date	Primary Job Type	
	5/3/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
565,202.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,416.0	9,288.0	92.9	100.1
Bnch/Stg	Start Date	Primary Job Type	
	5/3/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
516,579.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,472.0	9,371.0	93.4	98.6
Bnch/Stg	Start Date	Primary Job Type	
	5/3/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
564,614.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,256.0	9,597.0	90.5	95.4
Bnch/Stg	Start Date	Primary Job Type	
	5/4/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
554,547.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,531.0	10,315.0	91.9	95.3
Bnch/Stg	Start Date	Primary Job Type	
	5/4/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
508,284.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,452.0	9,122.0	93.1	97.1
Bnch/Stg	Start Date	Primary Job Type	
	5/4/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
510,174.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,575.0	9,486.0	95.4	100.8
Bnch/Stg	Start Date	Primary Job Type	
	5/4/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
499,493.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,539.0	9,637.0	96.2	100.5

Well Name: MND-6D-HS

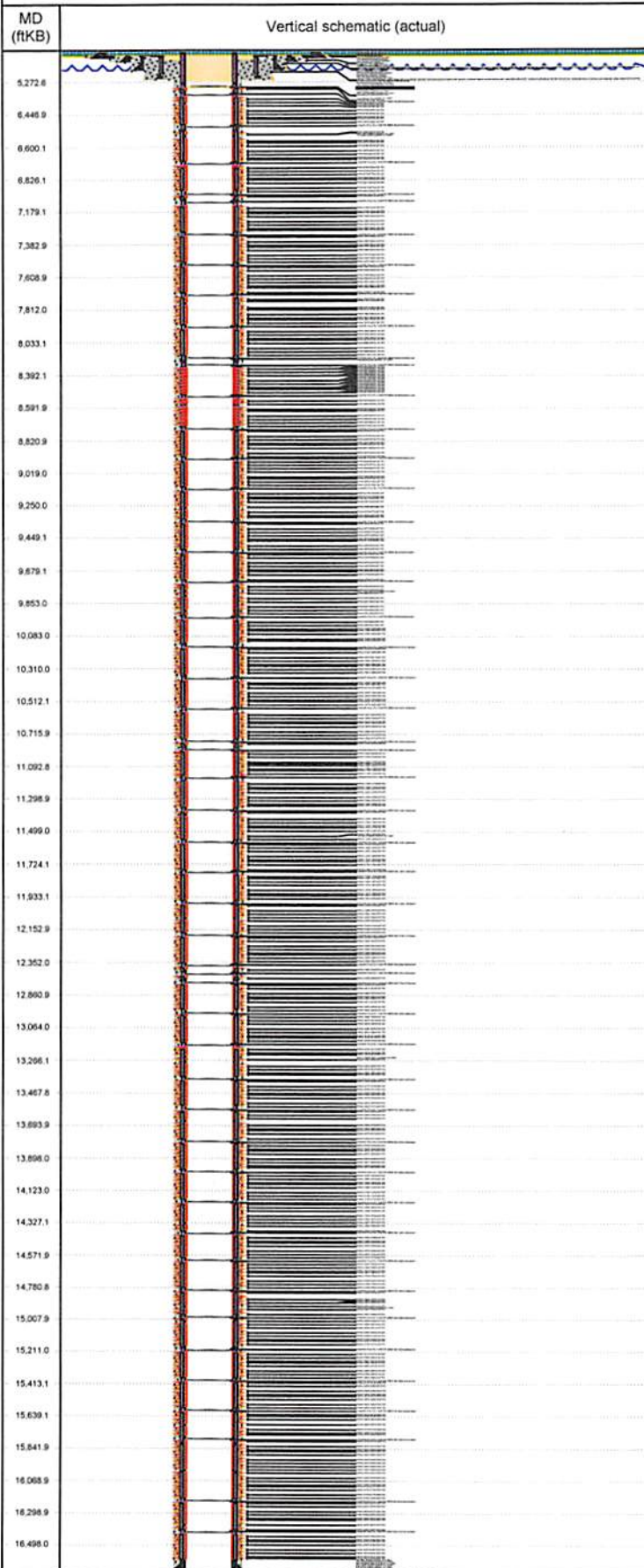
HORIZONTAL - Original Hole, 12/11/2017 3:07:03 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	5/4/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
510,405.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,845.0	9,686.0	89.9	92.6
Bnch/Stg	Start Date	Primary Job Type	
	5/5/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
518,889.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,253.0	9,639.0	95.2	100.6
Bnch/Stg	Start Date	Primary Job Type	
	5/5/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
540,687.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,952.0	10,239.0	91.4	93.9
Bnch/Stg	Start Date	Primary Job Type	
	5/5/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
644,985.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,580.0	9,785.0	89.1	94.3
Bnch/Stg	Start Date	Primary Job Type	
	5/7/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
577,752.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,390.0	10,172.0	93.1	96.4
Bnch/Stg	Start Date	Primary Job Type	
	5/7/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
509,531.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,218.0	9,877.0	90.4	97.0
Bnch/Stg	Start Date	Primary Job Type	
	5/7/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
525,462.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,306.0	9,695.0	93.4	101.3
Bnch/Stg	Start Date	Primary Job Type	
	5/7/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
494,529.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,725.0	9,911.0	88.6	94.7
Bnch/Stg	Start Date	Primary Job Type	
	5/8/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
500,047.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,592.0	9,194.0	89.5	95.5

Well Name: MND-6D-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:04 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 565,790.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,977.0	9,201.0	96.1	101.5
Bnch/Stg	Start Date	Primary Job Type	
	5/8/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 579,188.82			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,930.0	9,051.0	98.1	101.4
Bnch/Stg	Start Date	Primary Job Type	
	5/8/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 544,790.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,012.0	9,035.0	97.8	101.2
Bnch/Stg	Start Date	Primary Job Type	
	5/9/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 586,920.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
8,014.0	9,290.0	98.2	101.4
Bnch/Stg	Start Date	Primary Job Type	
	5/9/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 549,389.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,672.0	9,390.0	94.8	100.9
Bnch/Stg	Start Date	Primary Job Type	
	5/9/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 515,684.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,868.0	8,880.0	97.8	101.1
Bnch/Stg	Start Date	Primary Job Type	
	5/9/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 484,306.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,923.0	9,111.0	98.0	101.5
Bnch/Stg	Start Date	Primary Job Type	
	5/10/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 621,616.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,659.0	8,893.0	95.8	100.6
Bnch/Stg	Start Date	Primary Job Type	
	5/11/2017		
Comment # of Clusters = 8, # of Shots = 58 Volume Slurry Total (gal) 505,764.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,590.0	8,791.0	94.4	101.2

Well Name: MND-6D-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:05 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	5/11/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
544,756.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,416.0	8,320.0	98.2	101.0
Bnch/Stg	Start Date	Primary Job Type	
	5/11/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
573,589.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,393.0	8,775.0	97.6	100.9
Bnch/Stg	Start Date	Primary Job Type	
	5/11/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
480,526.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,332.0	8,917.0	94.7	99.3
Bnch/Stg	Start Date	Primary Job Type	
	5/11/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
460,080.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,469.0	9,121.0	98.1	102.6
Bnch/Stg	Start Date	Primary Job Type	
	5/12/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
482,584.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,268.0	8,339.0	97.3	101.3
Bnch/Stg	Start Date	Primary Job Type	
	5/12/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
521,194.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,195.0	8,257.0	98.6	102.7
Bnch/Stg	Start Date	Primary Job Type	
	5/12/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
520,909.20			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
7,035.0	7,815.0	96.6	100.5
Bnch/Stg	Start Date	Primary Job Type	
	5/12/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
436,695.00			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,969.0	8,442.0	93.2	95.9
Bnch/Stg	Start Date	Primary Job Type	
	5/13/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
412,872.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,964.0	7,784.0	95.3	100.2

Well Name: MND-6D-HS

HORIZONTAL - Original Hole, 12/11/2017 3:07:06 PM



Stimulation Intervals			
Bnch/Stg	Start Date	Primary Job Type	
	5/13/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
514,495.80			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,923.0	7,958.0	98.5	100.8
Bnch/Stg	Start Date	Primary Job Type	
	5/13/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
412,889.40			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,901.0	8,205.0	96.9	100.8
Bnch/Stg	Start Date	Primary Job Type	
	5/13/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
393,405.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,922.0	8,108.0	96.2	100.3
Bnch/Stg	Start Date	Primary Job Type	
	5/14/2017		
Comment			
# of Clusters = 8, # of Shots = 58			
Volume Slurry Total (gal)			
376,353.60			
Treat Pressure Avg (psi)	Treat Pressure Max (psi)	Slurry Rate Avg (bbl/min)	Slurry Rate Max (bbl/min)
6,922.0	8,761.0	95.9	100.5

API 47- 051 - 01763 Farm name CONSOLIDATED COAL COMPANY Well number MND 06 DHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>5940</u>	<u>TVD</u>	<u>16756</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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 _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY Estimated Orifice Pilot

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

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 Dr. City Canonsburg State PA Zip 15317

Cementing Company Schlumberger
Address 4600 J Barry Ct, Ste 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	

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

RECEIVED
Office of Oil and Gas

DEC 14 2017

WV Department of
Environmental Protection

Job Start Date:	5/14/2017
Job End Date:	5/14/2017
State:	West Virginia
County:	Marshall
API Number:	47-051-01763-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	MND 6 D
Latitude:	39.81754700
Longitude:	-80.79195000
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,898
Total Base Water Volume (gal):	27,178,419
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	87.29241	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.62838	

FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
				Listed Below			
OILPERM A	Halliburton	Non-ionic Surfactant					
				Listed Below			
HYDROCHLORI C ACID	Halliburton	Solvent					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, 100 LB SACK (100002158)	Halliburton	Proppant					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			
SC-30	X-Chem	Scale Inhibitor					

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

				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	12.05123	
			Hydrochloric acid	7647-01-0	7.50000	0.04446	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01779	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary	30.00000	0.01779	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01779	
			Acetic anhydride	108-24-7	100.00000	0.00284	
			Acetic acid	64-19-7	60.00000	0.00171	
			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	0.00029	
			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	
			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 Hydroxide	1310-73-2	1.50000		
			Glutaraldehyde	111-30-8	30.00000		
			Ethanol	64-17-5	5.00000		
			Didecyl dimethyl ammonium chloride	7173-51-5	10.00000		
			n-Alkyl dimethyl benzyl ammonium chloride	68424-85-1	10.00000		
			Water	7732-18-5	100.00000		

* 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)