

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/21/2016
Job End Date:	5/24/2016
State:	Texas
County:	Winkler
API Number:	42-495-33639-60-00
Operator Name:	Forge Energy, LLC
Well Name and Number:	UL 21 Bighorn 1H
Latitude:	31.69403644
Longitude:	-103.25929470
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	11,875
Total Base Water Volume (gal):	22,111,905
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	91.24826	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.96319	

MC B-8614	Halliburton	Biocide					
				Listed Below			
DCA-23003 - Primary	Halliburton	Friction Reducer					
				Listed Below			
PAYZONE217SI	Catalysts Oilfield Services	Scale Inhibitor					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
CLAYFIX 3	Halliburton	Additive					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
FDP-S1226-15	Halliburton	Surfactant					
				Listed Below			

FDP-S1175-15	Halliburton	Surfactant					
				Listed Below			
OptiKleen-WF (TM)	Halliburton	Concentrate					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
HYDROCHLORIC ACID	Halliburton	Solvent					
				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	7.51987	
			Hydrochloric acid	7647-01-0	60.00000	0.50107	
			Isopropanol	67-63-0	30.00000	0.04007	
			Sodium chloride	7647-14-5	30.00000	0.03121	
			Hydrotreated Light Petroleum Distillate	64742-47-8	30.00000	0.02829	
			Sodium perborate tetrahydrate	10486-00-7	100.00000	0.00996	
			Glutaraldehyde	111-30-8	30.00000	0.00868	
			Terpenes and Terpenoids, Sweet Orange-Oil	68647-72-3	5.00000	0.00668	

			Ethoxylated Alcohols	Proprietary	5.00000	0.00668	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary	5.00000	0.00520	
			Magnesium chloride hexahydrate	7791-18-6	5.00000	0.00520	
			Ethoxylated Branched C13 Alcohol	78330-21-9	5.00000	0.00472	
			Alcohols, C12-13, ethoxylated	66455-14-9	60.00000	0.00323	
			Phosphonate	Proprietary	15.00000	0.00274	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00145	
			Calcium chloride	10043-52-4	1.00000	0.00104	
			Methanol	67-56-1	60.00000	0.00087	
			Guar gum	9000-30-0	100.00000	0.00083	
			Fatty acids, tall oil	Proprietary	30.00000	0.00041	
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00041	
			Ethoxylated alcohols	Proprietary	30.00000	0.00041	
			Ethanol	64-17-5	1.00000	0.00029	
			Alcohols, C12-16, ethoxylated	68551-12-2	5.00000	0.00027	
			Olefins	Proprietary	5.00000	0.00017	
			Propargyl alcohol	107-19-7	10.00000	0.00014	
			Sodium persulfate	7775-27-1	100.00000	0.00004	
			Phosphoric acid	7664-38-2	0.10000	0.00003	
			Sodium sulfate	7757-82-6	0.10000	0.00000	

* 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)