

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/12/2016
Job End Date:	9/20/2016
State:	Texas
County:	Pecos
API Number:	42-371-39413-00-00
Operator Name:	Forge Energy, LLC
Well Name and Number:	UL 23 CURIOSITY 2H
Latitude:	30.79079400
Longitude:	-102.66118700
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,455
Total Base Water Volume (gal):	11,714,889
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	89.12144	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	1.11088	

FDP-S1226-15	Halliburton	Surfactant					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
CLAYFIX 3	Halliburton	Additive					
				Listed Below			
FDP-S1217-15	Halliburton	Friction Reducer					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
Payzone 845BCD-W	Catalyst Oilfield Services	Biocide					
				Listed Below			
CL-28M CROSSLINKER	Halliburton	Crosslinker					
				Listed Below			
OptiKleen-WF (TM)	Halliburton	Concentrate					
				Listed Below			
Payzone 217SI	Catalyst Oilfield Services	Scale Inhibitor					

				Listed Below			
CL-31 CROSSLINKER	Halliburton	Crosslinker					
				Listed Below			
MO-67	Halliburton	pH Control Additive					
				Listed Below			
FDP-S1016-11	Halliburton	Friction Reducer					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2	Halliburton	Proppant					
				Listed Below			
FDP-S1007-11	Halliburton	Surfactant					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
SAND- PREMIUM WHITE-40/70	Halliburton	Proppant					
				Listed Below			
FDP-S1233-16	Halliburton	Surfactant					
				Listed Below			

HYDROCHLORIC ACID	Halliburton	Solvent					
				Listed Below			
HPH BREAKER	Halliburton	Breaker					
				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	9.43074	
			Hydrochloric acid	7647-01-0	60.00000	0.39501	
			Glycol	Proprietary	30.00000	0.07306	
			Sodium chloride	7647-14-5	30.00000	0.06085	
			Acrylamide, sodium acrylate polymer	25987-30-8	60.00000	0.05244	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.05217	
			Terpenes and Terpenoids, sweet orange-oil	68647-72-3	30.00000	0.04388	
			Polyamine	Proprietary	30.00000	0.04388	
			Guar gum	9000-30-0	100.00000	0.03001	
			Ethoxylated alcohols	Proprietary	30.00000	0.02654	
			Polyacrylate	Proprietary	30.00000	0.02595	
			Polyoxyalkylenes	Proprietary	10.00000	0.01463	
			Ethoxylated fatty acid	Proprietary	10.00000	0.01450	
			Citrus, extract	94266-47-4	10.00000	0.01450	
			Isopropanol	67-63-0	30.00000	0.01305	
			Inorganic salt	Proprietary	5.00000	0.01096	
			Magnesium chloride hexahydrate	7791-18-6	5.00000	0.01010	
			Ethoxylated hydrocarbon	Proprietary	5.00000	0.00731	
			Potassium metaborate	13709-94-9	60.00000	0.00666	
			Sodium perborate tetrahydrate	10486-00-7	100.00000	0.00492	

			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8	5.00000	0.00437	
			Alcohols, C12-16, ethoxylated	68551-12-2	5.00000	0.00435	
			Salts	Proprietary	5.00000	0.00433	
			Amide	Proprietary	5.00000	0.00433	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Borate salts	Proprietary	60.00000	0.00320	
			Calcium chloride	10043-52-4	1.00000	0.00202	
			Sodium persulfate	7775-27-1	100.00000	0.00138	
			Sodium hydroxide	1310-73-2	30.00000	0.00133	
			Fatty acid ester	Proprietary	1.00000	0.00087	
			Methanol	67-56-1	60.00000	0.00058	
			Potassium hydroxide	1310-58-3	5.00000	0.00056	
			Fatty acids, tall oil	Proprietary	30.00000	0.00029	
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00029	
			Inorganic mineral	Proprietary	5.00000	0.00027	
			Alcohols, C12-13, ethoxylated	66455-14-9	30.00000	0.00017	
			Organic salt	Proprietary	0.10000	0.00015	
			Didecyltrimethylammonium chloride	7173-51-5	0.50000	0.00013	
			Olefins	Proprietary	5.00000	0.00012	
			Methyl alcohol	67-56-1	0.40000	0.00011	
			Propargyl alcohol	107-19-7	10.00000	0.00010	
			Phosphonate	Proprietary	0.15000	0.00006	
			Polymer	Proprietary	1.00000	0.00005	
			Ethyl alcohol	64-17-5	0.10000	0.00003	
			Enzyme	Proprietary	1.00000	0.00001	

			Sodium sulfate	7757-82-6	0.10000	0.00000	
			Ethylene oxide	75-21-8	0.01000	0.00000	
			1,2-Benzisothiazolin-3-one	2634-33-5	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)