

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/18/2015
Job End Date:	2/19/2015
State:	Texas
County:	Winkler
API Number:	42-495-33601-00-00
Operator Name:	Energen Resources Corporation
Well Name and Number:	University 35-20/Well No. 2H
Longitude:	-103.27846000
Latitude:	31.68811000
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	11,654
Total Base Water Volume (gal):	8,259,196
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					
			Fresh Water	7732-18-5	100.00000	91.32648	Density = 8.340
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	5.06029	
SSA-2	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	2.08026	
HYDROCHLORIC ACID 15%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.13117	
DCA-32003	Multi-Chem	Surfactant					
			Menthol	67-56-1	100.00000	0.07740	
			Alkylbenzene sulfonate, compd. with 2-propanamine	Proprietary	10.00000	0.00774	Density = 7.430
			Alkylbenzene sulfonate, compd. with triethanolamine	Proprietary	10.00000	0.00774	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02778	
Cla-Web™	Halliburton	Additive					

			Ammonium salt	Proprietary	60.00000	0.01569	Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
ScaleStop 54	Bosque Systems, LLC.	Scale Inhibitor					
			Polymer Dispensant	Proprietary	100.00000	0.00804	Density = 8.870
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00560	
OptiKleen-WFT™	Halliburton	Concentrate					
			Sodium perborate tetrahydrate	10486-00-7	100.00000	0.00510	
Chlorine Dioxide	Operator	Biocide					
			Chlorine Dioxide	10049-04-4	0.15000	0.00243	Density = 8.340
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00130	
			Propargyl alcohol	107-19-7	10.00000	0.00022	
LoSurf-360W	Halliburton	Surfactant					
			Poly(oxy-1,2-ethanediyl), alpha.-isodecyl-.omega.- hydroxy-	61827-42-7	30.00000	0.00037	
			Glycerine	56-81-5	10.00000	0.00012	
			Complex alkylamine	Proprietary	5.00000	0.00006	
OPTIFLO-III DELAYED RELEASE BREAKER	Halliburton	Breaker					
			Ammonium persulfate	7727-54-0	100.00000	0.00022	
			Crystalline silica, quartz	14808-60-7	30.00000	0.00007	
BA-20 BUFFERING AGENT	Halliburton	Buffer					
			Ammonium acetate	631-61-8	100.00000	0.00021	
			Acetic acid	64-19-7	30.00000	0.00006	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00007	
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
		Other Ingredient(s)					
			Water	7732-18-5		1.38430	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Proprietary		0.02778	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00594	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Proprietary		0.00463	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00463	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00463	

		Other Ingredient(s)					
			Quaternary amine	Proprietary		0.00131	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00093	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00093	
		Other Ingredient(s)					
			Fatty acids, tall oil	Proprietary		0.00065	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00065	
		Other Ingredient(s)					
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00065	
		Other Ingredient(s)					
			Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00028	
		Other Ingredient(s)					
			Quaternary amine	Proprietary		0.00026	
		Other Ingredient(s)					
			Olefins	Proprietary		0.00011	
		Other Ingredient(s)					
			Olefins	Proprietary		0.00011	
		Other Ingredient(s)					
			Cured acrylic resin	Proprietary		0.00007	
		Other Ingredient(s)					
			Silica gel	112926-00-8		0.00006	
		Other Ingredient(s)					
			Surfactant mixture	Proprietary		0.00006	
		Other Ingredient(s)					
			Surfactant mixture	Proprietary		0.00006	
		Other Ingredient(s)					
			Quaternary amine	Proprietary		0.00003	
		Other Ingredient(s)					
			Amine salts	Proprietary		0.00003	
		Other Ingredient(s)					
			Amine salts	Proprietary		0.00003	
		Other Ingredient(s)					
			Olefins	Proprietary		0.00002	
		Other Ingredient(s)					
			Olefins	Proprietary		0.00002	
		Other Ingredient(s)					
			Alkane	Proprietary		0.00001	
		Other Ingredient(s)					

			Crystalline Silica, Quartz	14808-60-7		0.00001	
		Other Ingredient(s)					
			Sodium bicarbonate	144-55-8		0.00000	
		Other Ingredient(s)					
			Sodium hydroxide	1310-73-2		0.00000	
		Other Ingredient(s)					
			Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8		0.00000	
		Other Ingredient(s)					
			Hydrogen peroxide	7722-84-1		0.00000	
		Other Ingredient(s)					
			Nitrotriacetic acid, trisodium salt monohydrate	5064-31-3		0.00000	
		Other Ingredient(s)					
			Sodium glycollate	2836-32-0		0.00000	
		Other Ingredient(s)					
			Sodium sulfate	7757-82-6		0.00000	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

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

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)