

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/29/2013
Job End Date:	4/29/2013
State:	Colorado
County:	Weld
API Number:	05-123-36638-00-00
Operator Name:	PDC Energy
Well Name and Number:	Leffler 26T-421
Longitude:	-104.74000000
Latitude:	40.54000000
Datum:	NAD83
Federal/Tribal Well:	NO
Total Base Water Volume (gal):	2,455,039
Total Base Non Water Volume:	



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
Water	Operator	Carrier					
			Water	7732-18-5	100.00000	84.47038	Density = 8.340
Sand - Premium White	Halliburton	Proppant					
			Crystalline silica quartz	14808-60-7	100.00000	13.87537	
CRC 20/40	Halliburton	Proppant					
			Crystalline Silica Quartz	14808-60-7	100.00000	0.79450	
			Phenol / formaldehyde resin	9003-35-4	5.00000	0.03972	
			Hexamethylenetetramine	100-97-0	2.00000	0.01589	
WG-18	Halliburton	Gelling Agent					
			Guar Gum Derivative	Proprietary	100.00000	0.21703	
Vicon NF Breaker	Halliburton	Breaker					
			Sodium chloride	7647-14-5	30.00000	0.09235	
			Chlorous acid, sodium salt	7758-19-2	10.00000	0.03078	
BA-20	Halliburton	Buffer					
			Ammonium Acetate	631-61-8	100.00000	0.06677	
			Acetic Acid	64-19-7	30.00000	0.02003	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.03489	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.01745	
			Naphthalene	91-20-3	5.00000	0.00291	

			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-branched	127087-87-0	5.00000	0.00291	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00058	
OilPerm A&B Blend	Halliburton	Surfactant					
			Terpenes and Terpenoids, sweet orange-oil	68647-72-3	30.00000	0.01775	
			Isopropanol	67-63-0	30.00000	0.01775	
CL-23	Halliburton	Crosslinker					
			Zirconium, acetate lactate oxo ammonium complexes	68909-34-2	60.00000	0.02358	
			Ammonium chloride	12125-02-9	27.00000	0.01179	
Cat-3/Cat-4 Blend	Halliburton	Activator					
			EDTA/Copper chelate	Proprietary	30.00000	0.02090	
Cla-Web	Halliburton	Clay Control					
			Ammonium Salt	Proprietary	60.00000	0.01435	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	Proprietary	30.00000	0.00525	
SP Breaker	Halliburton	Breaker					
			Sodium Persulfate	7775-27-1	100.00000	0.00045	
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.							
	Halliburton	Other Chemicals					
			Water	7732-18-5		0.46369	
			Sodium bicarbonate	144-55-8		0.01085	
			Terpenes and Terpenoids	68956-56-9		0.00592	
			Silica, amorphous - fumed	7631-86-9		0.00217	
			Sodium Chloride	7647-14-5		0.00207	
			Quaternary Amine	34004-36-9		0.00120	
			Tall oil acid diethanolamide	68155-20-4		0.00087	
			Quaternary Amine	3327-22-8		0.00024	
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00017	
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00017	
			Quaternary Amine	75-50-3		0.00002	
			Ethoxylated Fatty Acid	61791-29-5		0.01775	
			Ethoxylated Fatty Acid	61791-12-6		0.01775	
			Alcohols, C12-16, ethoxylated	61791-08-0		0.01775	
			Oxyalkylated Phenolic Resin	63428-92-2		0.01745	
			Oxyalkylated Phenolic Resin	29316-47-0		0.00582	
			Polyacrylamide Copolymer	62649-23-4		0.00525	
			Ammonium acetate	631-61-8		0.00196	
			Ammonium chloride	12125-02-9		0.00087	
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00087	
			Amine Salts	593-81-7		0.00002	
			Amine Salts	75-57-0		0.00002	

* 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)