

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	5/4/2012
State:	California
County:	Kern
API Number:	04-030-23384
Operator Name:	Seneca Resources
Well Name and Number:	Citrus 1 RD
Longitude:	-119.671021
Latitude:	35.542064
Long/Lat Projection:	NAD83
Production Type:	Oil
True Vertical Depth (TVD):	8,821
Total Water Volume (gal)*:	518,801

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
3% KCL Water	Operator				100.00%	76.04337%	Density = 8.480
SAND - 100 MESH	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	0.41484%	
SAND - 20/40 PREMIUM	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	22.50317%	
LOSURF-300M™	Halliburton	Surfactant	1,2,4 Trimethylbenzene	95-63-6	1.00%	0.00056%	
			Ethanol	64-17-5	60.00%	0.03345%	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00%	0.01673%	
			Naphthalene	91-20-3	1.00%	0.00056%	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	10.00%	0.00558%	
FR-66	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00%	0.00366%	
MO-67	Halliburton	pH Control Additive	Sodium hydroxide	1310-73-2	30.00%	0.01735%	

VICON NF BREAKER	Halliburton	Breaker	Chlorous acid, sodium salt	7758-19-2	10.00%	0.01787%
			Sodium chloride	7647-14-5	30.00%	0.05362%
CAT-3 ACTIVATOR	Halliburton	Activator	EDTA/Copper chelate	Confidential Business Information	30.00%	0.00183%
CL-28M CROSSLINKER	Halliburton	Crosslinker	Crystalline silica, quartz	14808-60-7	5.00%	0.00286%
			Borate salts	Confidential Business Information	60.00%	0.03430%
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic acid	64-19-7	60.00%	0.00214%
			Acetic anhydride	108-24-7	100.00%	0.00356%
LGC-36 UC	Halliburton	Liquid Gel Concentrate	Guar gum	9000-30-0	60.00%	0.36604%
			Naphtha, hydrotreated heavy	64742-48-9	60.00%	0.36604%
GEL-STAL STABILIZER	Halliburton	Stabilizer	Sodium thiosulfate	7772-98-7	60.00%	0.03192%
BE-3S BACTERICIDE	Halliburton	Biocide	2,2 Dibromo-3-nitrilopropionamide	10222-01-2	100.00%	0.00121%
			2-Monobromo-3-nitrilopropionamide	1113-55-9	5.00%	0.00006%
OPTIFLO-III DELAYED RELEASE BREAKER	Halliburton	Breaker	Ammonium persulfate	7727-54-0	100.00%	0.00069%
			Crystalline silica, quartz	14808-60-7	30.00%	0.00021%
K-38	Halliburton	Crosslinker	Disodium octaborate tetrahydrate	12008-41-2	100.00%	0.00207%
Ingredients Listed Below This Line Are Part of the Fluid Composition Provided by Halliburton Which Do Not Appear On the Material Safety Data Sheets (MSDS)						
			Alcohols, C12-16, ethoxylated	68551-12-2		
			Ammonium chloride	12125-02-9		
			Crystalline silica, quartz	14808-60-7		
			Cured Acrylic Resin	Confidential Business Information		
			Fatty alcohol polyglycol ether surfactant	9043-30-5		
			Formaldehyde polymer with 4,1,1-dimethylethyl phenolmethyl oxirane	29316-47-0		
			Formaldehyde polymer with methyl oxirane, 4-nonylphenol and oxirane	63428-92-2		
			Inorganic mineral	Proprietary		
			Naphthalene	91-20-3		
			Polyacrylamide Copolymer	Confidential Business		

		Information
	Polymer	Proprietary
	Quaternary ammonium compounds, bis(hydrogenated tallow alkyl) dimethyl, salts with bentonite	68953-58-2
	Sodium chloride	7647-14-5
	Sodium sulfate	7757-82-6
	Sodium sulfite	7757-83-7
	Sorbitan monooleate polyoxyethylene derivative	9005-65-6
	Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8
	Tall oil acid diethanolamide	68155-20-4
	Water	7732-18-5

* 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.

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Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)