

## Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	2012-06-09
State:	California
County:	Kern
API Number:	0403046934
Operator Name:	Vintage
Well Name and Number:	TM20 14W
Longitude:	-119.22
Latitude:	35.46
Long/Lat Projection:	NAD27
Production Type:	Oil
True Vertical Depth (TVD):	7,090
Total Water Volume (gal)*:	336,830

### 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
4% KCL Water	Operator				100.00%	87.42986%	Density = 8.540
SAND - COMMON WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	0.27671%	
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	11.51285%	
FR-66	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00%	0.00805%	
EXPEDITE 225 COMPONENT A	Halliburton	Resin	Epoxy resin	Confidential Business Information	100.00%	0.18791%	
			Butyl glycidyl ether	2426-08-6	30.00%	0.05637%	
			Butyl lactate	138-22-7	10.00%	0.01879%	
EXPEDITE 225 COMPONENT B	Halliburton	Hardener	Methanol	67-56-1	60.00%	0.06361%	
			Modified cycloaliphatic amine adduct	Mixture	60.00%	0.06361%	

			Phosphate ester	Confidential Business Information	10.00%	0.01060%
BC-140	Halliburton	Crosslinker	Ethylene glycol	107-21-1	30.00%	0.01441%
			Monoethanolamine borate	26038-87-9	60.00%	0.02881%
MO-67	Halliburton	pH Control Additive	Sodium hydroxide	1310-73-2	30.00%	0.01472%
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic acid	64-19-7	60.00%	0.00033%
			Acetic anhydride	108-24-7	100.00%	0.00054%
LGC-36 UC	Halliburton	Liquid Gel Concentrate	Guar gum	9000-30-0	60.00%	0.17874%
			Naphtha, hydrotreated heavy	64742-48-9	60.00%	0.17874%
LOSURF-300 NONIONIC SURFACTANT	Halliburton	Surfactant	Isopropanol	67-63-0	60.00%	0.03737%
			Light aromatic solvent	64742-95-6	30.00%	0.01869%
			Ethoxylated nonylphenol	Confidential Business Information	10.00%	0.00623%
BE-3S BACTERICIDE	Halliburton	Biocide	2,2 Dibromo-3-nitrilopropionamide	10222-01-2	100.00%	0.00055%
			2-Monobromo-3-nitrilopropionamide	1113-55-9	5.00%	0.00003%
SP BREAKER	Halliburton	Breaker	Sodium persulfate	7775-27-1	100.00%	0.00146%

			Alcohols, C12-16, ethoxylated	68551-12-2		
			Ammonium chloride	12125-02-9		
			Crystalline silica, quartz	14808-60-7		
			Ethylenediamine	107-15-3		
			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		
			Naphthalene	91-20-3		
			Organo Amino Silane	Confidential Business Information		
			Phosphoric acid	7664-38-2		
			Polyacrylamide Copolymer	Confidential Business Information		
			Quaternary Amine	Confidential Business Information		
			Quaternary ammonium	68953-58-2		

	compounds, bis(hydrogenated tallow alkyl) dimethyl, salts with bentonite	
	Siloxanes and silicones, dimethyl,	63148-52-7
	Sodium chloride	7647-14-5
	Sodium sulfate	7757-82-6
	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.

Ingredients Listed Below The White Line Are Part of the Fluid Composition Provided by Halliburton Which Do Not Appear On the Material Safety Data Sheets (MSDS)

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