

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	12/02/2011
Province:	BC
Region:	Altares
Well Number:	26297
Operator Name:	PETRONAS Energy Canada Ltd.
Well Name:	PETRONAS ET AL HZ ALTARES B-A093-I/094-B-01
Longitude:	-122.020776
Latitude:	56.143466
Long/Lat Projection:	NAD83
Production Type:	Undefined
True Vertical Depth (TVD):	5,200
Total Water Volume (m3)*:	18,420

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
HCl Acid; Slickwater; ClearFRAC	Talisman	Base Fluid; Antifoam Agent; Bactericide; Breaker; Chelating Agent; Corrosion Inhibitor; Friction Reducer; Gelling Agent; Hydrochloric Acid; Resin Coated Proppant; Rheology Modifier; Sand; Scale Inhibitor; Surfactant	Water (Includes Mix Water Supplied by Client)	-	100.00%	88.12590%	
HCl Acid; Slickwater; ClearFRAC	Schlumberger	Base Fluid; Antifoam Agent; Bactericide; Breaker; Chelating Agent; Corrosion Inhibitor; Friction Reducer; Gelling Agent; Hydrochloric Acid; Resin Coated Proppant; Rheology Modifier; Sand; Scale Inhibitor; Surfactant	Crystalline silica	-	93.42%	11.09320%	
			Crystalline silica	14808-60-7	3.66%	0.43432%	
			Hydrochloric Acid	7647-01-0	0.57%	0.06720%	
			Distillates (petroleum); hydrotreated light	64742-47-8	0.24%	0.02866%	
			Sodium salt of aliphatic amine acid		0.04%	0.00509%	
			Ethane-1,2-diol	107-21-1	0.04%	0.00504%	
			Alcohol ethoxylate C-10/16 with 6.5 EO	68002-97-1	0.03%	0.00358%	
			Diatomaceous earth; calcined	91053-39-3	0.02%	0.00194%	
			Methanol	67-56-1	0.01%	0.00156%	
			Fatty acid amidoalkyl betaine		0.01%	0.00100%	
			Aliphatic acids		0.01%	0.00094%	
			Aliphatic alcohols; ethoxylated #1		0.01%	0.00094%	
			Calcium chloride	10043-52-4	0.01%	0.00084%	
Sodium chloride	7647-14-5	0.01%	0.00084%				

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			Propan-2-ol	67-63-0	0.00%	0.00051%	
			Sodium hydroxide (impurity)	1310-73-2	0.00%	0.00042%	
			5-chloro-2-methyl-4-isothiazolin-3-one	26172-55-4	0.00%	0.00032%	
			Magnesium nitrate	10377-60-3	0.00%	0.00032%	
			Prop-2-yn-1-ol	107-19-7	0.00%	0.00031%	
			Ethoxylated alcohols		0.00%	0.00023%	
			Ethoxylated alcohols #2		0.00%	0.00023%	
			2-Methyl-4-isothiazolin-3-one	2682-20-4	0.00%	0.00016%	
			Magnesium chloride	7786-30-3	0.00%	0.00016%	
			Trisodium nitrilotriacetate (impurity)	5064-31-3	0.00%	0.00008%	
			Crystalline silica: Quartz (SiO ₂)	14808-60-7	0.00%	0.00003%	
			Crystalline silica: cristobalite	14464-46-1	0.00%	0.00003%	

* 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%

Information provided in this form with respect to ingredients in the fracturing fluid is consistent with the Material Safety Data Sheet (MSDS) information. The operator has completed this form with the information provided by the supplier. The operator cannot provide any of the supplier's proprietary information, trade secrets or confidential business information.