Hydraulic Fracturing (HF) Fluid Product Component Information

State:	PA
County:	Bradford
API Number:	37-015-20183-00
Operator Name:	Talisman Energy USA Inc.
Well Name:	Knights (01-044-01) L 1H
Completion End Date:	1/1/2010
Total Volume Pumped (bbl):	85825
True Vertical Depth (TVD):	6425.51

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients**	Ingredient Concentration in additive (% by volume)*	Ingredient concentration in HF fluid (% by volume)*
Water	-	Creates a fracture network and carries sand to fractures	Surface Water	100.0%	94.46654%
Sand	HES	When the pressure is released the sand placed will hold the fracture open	Silicon Dioxide	95.0%	4.54574%
Friction Reducer	HES	Reduces friction between the fluid and the pipe	Hydrotreated light petroleum distillate	20.0%	0.014781%
Scale Inhibitor	HES	Mitigates scale formation on tubulars and perforations	Hydrogen Chloride	7.5%	0.002033%
Biocide	HES	Eliminates bacteria in carrier fluid	Sodium Chlorite	7.5%	0.002654%
Acid	HES	Dissolves cement and material near the wellbore to provide pumping pressure relief	Hydrogen Chloride	28.0%	0.028707%
Corrosion Inhibitor	HES	Prevents precipitation of metal oxides	Methanol	7.5%	0.000045%
			Propargyl alcohol	45.0%	0.000334%
Iron Control Agent	HES	Prevents the corrosion of the pipe	Acetic acid	39.0%	0.001333%
			Acetic anhydride	60.0%	0.001973%

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

** Ingredients include only the hazardous components as defined by the guidelines outlined for Material Safety Data Sheets (MSDS) sheets

All component information listed was obtained from supplier Material Safety Data Sheets (MSDS). The Occupational Safety and Health Administration (OSHA) sets the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200 (i). As a result, the Operator does not have the legal authority to disclose any supplier "proprietary", "trade secret", or "confidential business information".