

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	12/8/2014
Job End Date:	12/14/2014
State:	Texas
County:	Andrews
API Number:	42-003-46187-00-00
Operator Name:	Ares Energy Ltd
Well Name and Number:	UNIVERSITY 17 4H
Longitude:	-102.61603000
Latitude:	32.17812000
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	4,450
Total Base Water Volume (gal):	51,202
Total Base Non Water Volume:	2,507



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
Sand, Brown, 20/40	Baker Hughes	Proppant					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		32.42605	
HCl, 10.1 - 15%	Baker Hughes	Acidizing					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		31.59727	SmartCare Product
Super LC, 20/40	Baker Hughes	Proppant					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		19.97007	
Water	Operator	Carrier					
			Water	7732-18-5	100.00000	12.81891	
GW-4	Baker Hughes	Gelling Agent					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.82111	SmartCare Product
XLW-10A	Baker Hughes	Crosslinker					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.45638	
Acetic Acid 0.1-10% (w/Glacial)	Baker Hughes	Acidizing					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.28848	SmartCare Product
Enzyme G-I	Baker Hughes	Breaker					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.26210	SmartCare Product

Superset-W, 330 gl tote	Baker Hughes	Activator					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.22637	
InFlo 251G	Baker Hughes	Surfactant					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.21017	
Ferrotrol 280L , 330 gl tote	Baker Hughes	Clay Control					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.19478	SmartCare Product
Nitrogen	Baker Hughes	Nitrogen					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.13139	
Alpha 114, 260 gl tote	Baker Hughes	Biocide					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.12596	
Parasorb 5000, bag	Baker Hughes	Paraffin Inhibitor					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.08161	SmartCare Product
CI-39	Baker Hughes	Corrosion Inhibitor					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.07981	
FRW-18	Baker Hughes	Friction Reducer					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.07428	SmartCare Product
NE-13	Baker Hughes	Non-emulsifier					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.05178	
ScaleSorb 3, (50# bag)	Baker Hughes	Scale Inhibitor					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.04383	SmartCare Product
GBW-5	Baker Hughes	Breaker					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.03491	SmartCare Product
CI-27	Baker Hughes	Corrosion Inhibitor					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.01189	
GW-37L	Baker Hughes	Gelling Agent					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.00554	
Ferrotrol 800L	Baker Hughes	Iron Control					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.00164	
CI-31, 330 gal. tote	Baker Hughes	Corrosion Inhibitor					
			MSDS and Non-MSDS Ingredients Listed Below	N/A		0.00084	
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.							
Ingredients in Additive(s) (MSDS and non-MSDS)	Baker Hughes	See Trade Name(s) List					
			Crystalline Silica (Quartz)	14808-60-7	100.00000	32.21413	
			Water	7732-18-5	97.00000	27.79487	

		Silicon Dioxide (Silica Sand)	14808-60-7	97.00000	19.24363
		Hydrochloric Acid	7647-01-0	15.00000	4.70843
		P/F Resin	9003-35-4	5.00000	0.99194
		Guar Gum	9000-30-0	100.00000	0.81571
		2-Mercaptoethanol	60-24-2	100.00000	0.19350
		Ethylene Glycol	107-21-1	30.00000	0.13601
		Nitrogen	7727-37-9	100.00000	0.13053
		Methanol	67-56-1	60.00000	0.11974
		Poly (Oxyethylene) Nonylphenol Ether	9016-45-9	50.00000	0.11244
		Sodium Tetraborate	1330-43-4	20.00000	0.09068
		Diatomaceous Earth, Calcined (kieselguhr)	91053-39-3	70.00000	0.05675
		Sodium Hydroxide	1310-73-2	10.00000	0.04537
		Glutaraldehyde	111-30-8	30.00000	0.03754
		Ammonium Persulphate	7727-54-0	100.00000	0.03468
		Diatomaceous Earth, Calcined	91053-39-3	74.00000	0.03222
		Oxyalkylated Fatty Acid	61791-002	40.00000	0.03196
		Acetic Acid	64-19-7	10.00000	0.02866
		Isopropanol	67-63-0	40.00000	0.02462
		Formic Acid	64-18-6	60.00000	0.02429
		Aldehyde	104-55-2	30.00000	0.02378
		Tar Bases, Quinoline Derivs., Benzyl Chloride-Quaternized	72480-70-7	30.00000	0.02378
		Hydrotreated Light Distillate	64742-47-8	30.00000	0.02214
		Poly (acrylamide-co-acrylic acid) partial sodium salt	62649-23-4	30.00000	0.02214
		Ethanol	64-17-5	10.00000	0.02125
		Quaternary Ammonium Compounds	61789-68-2	40.00000	0.02058
		Alcohols, ethoxylated	68551-12-2	8.00000	0.01670
		Alcohols, C6-12, ethoxylated propoxylated	68937-66-6	7.00000	0.01462
		Alcohols, C10-16, ethoxylated propoxylated	69227-22-1	7.00000	0.01462
		Amino Trimethylene Phosphonic Acid	6419-19-8	28.00000	0.01219
		Mineral Oil	8042-47-5	15.00000	0.01216
		Acetic acid ethenyl ester, polymer with ethene	24937-78-8	15.00000	0.01216
		Quaternary Ammonium Compound	Trade Secret, disc.	30.00000	0.01051
		Ammonium Hydroxide	1336-21-6	5.00000	0.00968
		Cupric Chloride	7447-39-4	5.00000	0.00968
		Amines, unsatd, alkyl, ethoxylated	68155-39-5	4.00000	0.00835
		Diatomaceous Earth, Natural (kieselguhr)	61790-53-2	10.00000	0.00811
		Hemicellulase Enzyme Concentrate	9025-56-3	3.00000	0.00781
		Sulfurized polyolefin	68037-13-8	5.00000	0.00396
		Sodium Chloride	7647-14-5	5.00000	0.00375

		Thiourea Polymer	68527-49-1	30.00000	0.00354
		Fatty Acids	61790-12-3	30.00000	0.00354
		Polyoxyalkylenes	68951-67-7	30.00000	0.00354
		Propylene Glycol Ether	34590-94-8	60.00000	0.00330
		Xanthan Gum	11138-66-2	60.00000	0.00330
		Ethoxylated Amine	61791-31-9	5.00000	0.00257
		Ammonium Chloride	12125-02-9	3.00000	0.00221
		Hexamethylenetetramine	100-97-0	0.01000	0.00198
		Potassium Iodide	7681-11-0	2.00000	0.00159
		Oleamide DEA	93-83-4	2.00000	0.00148
		Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00148
		Propargyl Alcohol	107-19-7	10.00000	0.00118
		Trisodium Nitriloacetate	5064-31-3	60.00000	0.00098
		Crystalline Silica (Cristobalite)	14464-46-1	1.00000	0.00081
		Polyaklylene	7756-94-7	1.00000	0.00079
		Olefin	64743-02-8	5.00000	0.00059
		Crystalline Silica: Cristobalite	14464-46-1	1.00000	0.00044
		Phosphonic Acid	13598-36-2	1.00000	0.00044
		Potassium Acetate	127-08-2	0.50000	0.00040
		Sorbitan Monooleate	1338-43-8	0.50000	0.00037
		Polyoxyethylene Sorbitan Monooleate	9005-65-6	0.50000	0.00037
		Aromatic Aldehyde	Trade Secret, disc.	30.00000	0.00025
		Benzyl Chloride	100-44-7	1.00000	0.00006
		Cyclic Alkanes	Trade Secret, disc.	5.00000	0.00004
		2-Mercaptoethyl Alcohol	60-24-2	5.00000	0.00004
		Organic Sulfur Compound	Trade Secret, disc.	5.00000	0.00004
		Alkylene Oxide Block Polymer	Trade Secret, disc.	4.00000	0.00003
		Sodium Sulfate	7757-82-6	2.00000	0.00003
		Formaldehyde	50-00-0	0.05000	0.00001
		Diethylene Glycol	111-46-6	0.10000	0.00000

* 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)