

Volumes and Constituents in Proposed Fracture Stimulation Fluid for Waukivory Pilot

(Based on information provided by AGL's service provider)

Compound Present	Product	Purpose	Well Pre-Treatment ⁽¹⁾	Treated Water	Linear Gel	Cross-Linked Gel	Indicative Quantity ⁽²⁾
% volume of compound in fluid							(litres)
Water	H ₂ O	Main Fracture Fluid	88.12%	99.81%	99.65%	99.53%	5,988,194
Hydrochloric Acid	HCl	Clean Perforations and Casing	10.88%	-	-	-	870
Citric Acid	FE-2	Iron Sequesterant	0.36%	-	-	-	29
Ground Coffee Beans	HAI-150E	Corrosion Inhibitor	0.04%	-	-	-	3
Acetic Acid	Acetic Acid	pH Adjusting Agent	0.60%	0.03%	0.03%	0.03%	1,848
THPS Tetrakis(hydroxymethyl) Phosphonium Sulfate ⁽³⁾	Tolcide PS75	Bactericide	-	0.01%	0.01%	0.01%	450
Guar Gum	WG-36	Gelling Agent	-	-	0.16%	0.16%	7,513
Hemicellulase Enzyme 15%, Carbohydrate 85%	GBW-30	Gel Breaker	-	-	<0.01%	<0.01%	92
Choline Chloride	Choline Chloride	Clay Stabiliser	-	0.15%	0.15%	0.15%	9,000
Monoethanolamine borate	BC-140C	Cross-Linker	-	-	-	0.11%	-
Sodium Hydroxide	Caustic Soda	pH Buffer	-	-	-	0.01%	-
Total			100.00%	100.00%	100.00%	100.00%	6,008,000

Indicative Volume of Fluid ⁽²⁾	Well Pre-Treatment ⁽¹⁾	Treated Water	Linear Gel	Total Treatment
Average per well (L)	2,000	350,000	1,150,000	1,502,000
Total for all 4 wells (L)	8,000	1,400,000	4,600,000	6,008,000

Quantity of Proppant - quartz silica sand	Total Treatment
Average per well (kg)	206,750
Total for all 4 wells (kg)	827,000

Notes:

⁽¹⁾Well pre-treatment is conducted to clean casing and perforations prior to fracture stimulation.

⁽²⁾The volumes of each fluid are indicative only and actual volumes cannot be determined until fracture stimulation treatment occurs. This is because during the fracture stimulation treatment AGL monitors the fracture growth using a variety of diagnostic tools. This allows AGL to analyse the fracture geometry and fine-tune the final volumes. In addition, information gained from the initial treatments will enhance design of subsequent treatments.

⁽³⁾As an alternative to using THPS as a bactericide, AGL may use product BE-7 (a mixture of sodium hypochlorite and sodium hydroxide) in treated water, that will be used in the linear gel and cross-linked gel recipes at a concentration by volume of 0.015% sodium hypochlorite and 0.001% sodium hydroxide, which will represent a total volume of 900 litres sodium hypochlorite and 60 litres of sodium hydroxide. The HHERA Table 8 has also assessed these compounds in the alternative bactericide.