



**Kimmeridge Oil & Gas Limited
Broadford Bridge-1 Exploration Well**

Environment Agency Approved Drilling Fluids and Chemicals

17.1/2" Hole Section

Formulation	The drilling fluid is primarily water
Pure-Bore ¹	Modified plant starch
Ultra-Bore	Natural bentonite clay, increases density of fluid when required

12.1/4" Hole Section

Formulation	The drilling fluid is primarily water
Pure-Bore ¹	Modified plant starch
Pure-Bore LV ¹	As above but with lower viscosity
Sodium bicarbonate	Baking soda, increases density of drilling fluid
Citric acid	pH balancer to reduce drilling fluid alkalinity after cementing (commonly known as lemon or lime juice)
Potassium sulphate	Reduces swelling of shales and clays, (often used as a plant fertiliser, commonly known as sulphate of potash)

8.1/2" Hole Section

Formulation	The drilling fluid is primarily water
Pure-Bore ¹	Modified plant starch
Pure-Bore LV ¹	As above but with lower viscosity
Sodium bicarbonate	Baking soda, increases density of drilling fluid
Sodium Chloride	Common salt, increases density of drilling fluid
Citric acid	pH balancer to reduce drilling fluid alkalinity after cementing (commonly known as lemon or lime juice)
Potassium chloride	Increases density of drilling fluid and prevents clay swelling, (commonly used as a medicine, food-additive and fertiliser)

Cement & Cement additives

Class G cement	Plain Portland cement (waterproof impermeable concrete) made to high spec and tolerances
	Additives used where specific circumstances require
Tuned Spacer E+	Increases cement viscosity (thickens cement)
CFR-8L	Dispersant- used to aid mixing of the cement
Gas Stop	Used to stop air & any natural occurring gasses from entering the cement during setting (reacts with gas to form a gel)
Halad-300L NS	Prevents water/fluid in unhardened cement from entering surrounding porous rock. Loss of fluids results in rapid hardening with lessened strength and integrity
HR-4L	Increases thickening/hardening time of cement (retarder)
NF-6	Minimises trapped air bubbles in cement (de-foamer)
Silicate	Lightweight additive (extender) to reduce cement density

Well Completion Fluids

Protekt 4144	Restricts growth of sulphur and methane producing bacteria in well bore
Protekt 4200	Depletes oxygen level in well fluids to inhibit rusting of steel casing
Protekt 4852	Steel corrosion Inhibitor



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Contingency Products

Biocide CT-60/03	Restricts growth of sulphur and methane producing bacteria in well bore
Oxygen scavenger CT31/02WT	Depletes oxygen level in well fluids to inhibit rusting of steel casing
Corrosion inhibitor CT-17/02 WT	Steel corrosion inhibitor

Notes:

1. Pure-Bore is a water based drilling fluid made from natural plant-derived starches. It is non-toxic, biodegradable and the only drilling fluid formally approved by DEFRA for use in public drinking water supply wells. It is also registered with the UK Government's Centre for Environment Fisheries and Aquaculture Science (CEFAS) and with PLONOR (Pose Little or No Risk to the Environment, OSPAR list for offshore disposal).