ENVIRONMENT PLAN SUMMARY

Gorgon Project: Barrow Island Drilling & Completions Program

Document ID:	ABU130500181	Revision:	4
Issue Date:	16 November 2016	Copy No:	0

This summary of the Gorgon Project: Barrow Island Drilling and Completions Program Environmental Plan has been submitted to comply with Regulation 11(7)(8) of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012*.*

1.0 INTRODUCTION

Chevron Australia Pty Ltd (Chevron) are currently developing the gas reserves of the Greater Gorgon Area (Figure 1.1). Subsea gathering systems and subsea pipelines are to be installed to deliver feed gas from the Gorgon and Jansz–Io gas fields to the west coast of Barrow Island (BWI). The feed gas pipeline system is to be buried as it traverses from the west coast to the east coast of the Island where the system ties in to the Gas Treatment Plant located at Town Point. The Gas Treatment Plant will comprise three Liquefied Natural Gas trains capable of producing a nominal capacity of five Million Tonnes Per Annum per train. The Gas Treatment Plant will also produce condensate and domestic gas.

A total of 20 wells are required on Barrow Island to support the Gorgon Project comprised of Carbon dioxide (CO_2) injection and associated management wells and produced water disposal wells. These wells are required to be managed under a Department of Mines and Petroleum (DMP) approved Environmental Plan.

2.0 DESCRIPTION OF THE ACTIVITY

The scope of this EP is restricted to drilling and completion of onshore wells associated with the Gorgon Project: Barrow Island Drilling and Completion Program. The proposed program includes:

- Mobilisation, Transport and Logistics.
- Drilling Operations.
- Drill Fluid and Cuttings Management.
- Completions.
- Vertical Seismic Profiling.
- Support Services.

A crew of approximately 65 personnel is likely to be required to complete the scope of works, including rig crews, drilling co-ordinators, specialised logging services, geologists and other support personnel. A brief description of the project components covered under the Gorgon Project: Barrow Island Drilling and Completions Program Environmental Plan is included in Table 2:1.

Table 2:1: Components associated with the Gorgon Barrow Island Drilling and Completion Program

Component	Description
Mobilisation, Transport and Logistics.	Drilling activities require equipment, materials and personnel to be transported to and around Barrow Island. Equipment, materials and personnel will be transported via existing established pathways. No new roads or access tracks are required for this project.
Drilling Operations.	The program will use a newly constructed Automated Drilling Rig (Ensign Rig 963) to drill a total of 19 wells. These include: ♦ Nine CO_2 injection wells directionally drilled from the three CO_2 Injection Drill Centres north of the Gas Treatment Plant site (Figure 3.1). ♦ Two reservoir surveillance wells for CO_2 plume movement and

Component	Description
	calibrate reservoir models. ♦ Four pressure management (water production) wells for managing pressure in the Dupuy Formation. ♦ Two pressure management water injection wells for the reinjection of water produced from the lower Dupuy Formation by pressure management wells. Two additional wells are required to enable the disposal of Gorgon LNG plant produced water, treated effluent from the wastewater treatment plant and stormwater run-off from the LNG plant facility.
Drill Fluid and Cuttings Management.	**Drill Fluids** A dewatering facility is to be installed within close proximity of Gorgon's wastewater disposal wells. This facility will be utilised to separate solids and liquids from the drill fluids enabling liquids to be disposed via the disposal wells. **Drill cuttings management** In accordance with the Solid and Liquid Waste Management Plan, options for the handling and disposal of drill cuttings include: • bagging and shipping off-island to a licensed onshore waste facility as per existing logistics pathways • use of temporary storage areas and/ or purpose-built cuttings holding facilities (CHF) e.g. existing facility on lease F54A subsequent to operational handover Chemical disclosure information has been included as attachment 1 in accordance with the DMP's Chemical and Other Substance Disclosure Details Guidelines.
Completions.	Completions are required for all of the 19 wells; however the level of completion differs dependent on the well type. The recompletion of an existing (data) well for reservoir surveillance is also within the scope of this program. Production tubing (smaller diameter pipe than casing) is to be installed in each well to provide a conduit for production or injection of fluid from/into the formation. Completion equipment such as down hole gauges, a tubing retrievable safety valve, production packer to anchor the tubing, gas lift mandrel or electrical submersible pump will be run in the production tubing string to provide safe and efficient injection of fluid from surface facilities through the production tubing into the formation. A well services rig may be used to support well recompletions.
Vertical Seismic Profiling.	Vertical Seismic Profiles (VSP) are to be acquired over the area of the CO_2 injection site located in the northern section of Barrow Island (BWI). The maximum VSP program is likely to include surveys at all the injection well and reservoir surveillance wells. Preliminary investigation suggests that the VSP program will include: • Zero-offset VSP at injection wells and produced water wells. • Casing hole VSP at reservoir surveillance wells.
Support Services	Support services such as accommodation, amenities (toilets and crib) and chemical storage will be managed externally to the project.

2.1 Timing

The drill rig has been mobilised to Barrow Island for use in the Barrow Island Joint Venture 2012 Infill Drilling program. Additional equipment needed for the Gorgon Project: Barrow Island Drilling and Completion Program will be mobilised to Barrow Island throughout the life of the program. Commencement of the drilling program is scheduled for Q2 2013 and is expected to continue for a period of approximately 18 months. Each well is expected to take approximately one month to drill and complete.

2.2 Location

Barrow Island is located off the Pilbara coast 85 km north-north-east of the town of Onslow and 140 km west of Karratha. The Island is approximately 25 km long and 10 km wide and covers 23, 567 ha. It is the largest of a group of islands, including the Montebello and Lowendal Islands.

Reservoir CO_2 is proposed to be disposed of by injection into the Dupuy Formation which is located more than 2000 m below Barrow Island. In total 19 wells are proposed to be drilled across six drill centres (Figure 2.1). The scope of the program also includes the recompletion of an existing (data) well. The coordinates of the drill centres are included in **Table 2:2**.

Table 2:2: Approximate coordinates of the drill centres associated with the Gorgon Barrow Island Drilling and Completion Program.

Drill Centre	E	N
A	338784	7701982
B	338723	7704264
C	338730	7706917
D	335199	7707103
E	334259	7702676
Z	338801	7699274
Data well	338206	7704293

2.3 Stakeholder Liaison / Consultation

Regular consultation with stakeholders has been undertaken by Chevron Australia throughout the development of the environmental impact assessment management documentation for the Gorgon Gas Development and Jansz Feed Gas Pipeline.

Stakeholder consultation has included engagement with the community, government departments, industry operators and contractors to Chevron Australia via planning workshops, risk assessments, meetings, teleconferences, and the formal environmental approval processes.

There is no resident population on Barrow Island. The Island has been actively used for petroleum exploration and production purposes since 1957 and access to Barrow Island is restricted to personnel associated with oilfield operations, DPaW staff, and Gorgon Gas Development and Jansz Feed Gas Pipeline staff. As such the relevant stakeholders associated with the Gorgon Project:

Barrow Island Drilling and Completion Program have been identified as the Department of Parks and Wildlife (DPaW) and the DMP. No issues regarding the program have been identified.

Figure 2.1: Overview of the drill centres associated with the propsoed Drilling and Completion Program

3.0 DESCRIPTION OF THE RECEIVING ENVIRONMENT

Barrow Island is an A Class Nature Reserve. Its environment has been comprehensively described in several reports, notably the Gorgon Gas Development Revised and Expanded Proposal. The physical, biological, cultural and socio-economic environment of Barrow Island is discussed broadly in the following sections.

3.1 Landform and Geomorphology

Barrow Island has an elongate, roughly oval shape with a surface area of approximately 23,483 ha. At its highest point, the island rises to approximately 68 m above sea level. It is comprised of Tertiary and Quaternary limestone lying within the Barrow Sub-basin, an offshore trough of the Carnarvon Sedimentary Basin.

The surface of Barrow Island is comprised almost entirely of limestone outcrops and deposits overlain in parts by alluvium, colluvium and aeolian sands. The central areas are characterised by limestone ridges and plateaux. Rugged, dissected cliffs occur on the west coast. The east coast is characterised by relatively low cliffs, embayments and beaches. The coastal sands comprise white calcareous sands, pink sands and red sands.

3.2 Flora and Vegetation

No additional clearing or earthworks are intended as part of this drilling program and all drill pads and access requirements are to be cleared in accordance with the Carbon Dioxide Injection System – Pipeline Consent to Construct Environmental Management Plan.

3.3 Fauna and Fauna Habitat

Stygofauna

Thirteen species of troglobitic (cave dwelling) fauna and 43 species of stygofauna (obligate underground aquatic fauna) have been recorded from Barrow Island. The distribution of subterranean fauna over Barrow Island has not been definitively established. However, based on the known characteristics of the groundwater and karst formations it is likely that subterranean fauna, particularly stygofauna, are distributed over most, if not all, of the island.

Marine Reptiles

Four species of marine turtle (loggerhead, green, hawksbill and flatback) nest on the beaches of Barrow Island during summer. The beaches on the western coast of Barrow Island are a major breeding ground for green turtles (*Chelonia mydas*) and lesser rookeries for hawksbill (*Eretmochelys imbricata*) and loggerhead (*Caretta caretta*) turtles. The sandy beaches on the east coast of Barrow Island are primarily used by nesting flatback turtles (*Natator depressus*). All sea turtles are specially protected under the Wildlife Conservation Act 1950 and listed under the EPBC Act.

Mammals

Barrow Island supports thirteen species of resident terrestrial mammals, with a further two species of bats recorded as vagrants to the island. Five of these species are included on Schedule 1 of the Western Australian Wildlife Conservation Act 1950 and the Threatened (Vulnerable) Species list of the EPBC Act.

These five species are:

- Burrowing bettong or boodie (*Bettongia lesueur*)
- Barrow Island golden bandicoot (*Isoodon auratus barrowensis*)
- Spectacled hare-wallaby (*Lagorchestes conspicillatus conspicillatus*)
- Barrow Island euro (*Macropus robustus isabellinus*)
- Black-flanked rock-wallaby (*Petrogale lateralis lateralis*)

3.4 Groundwater and Surface Water

An extensive brackish to saline shallow aquifer is known to be present in the fractured karst limestone system of Barrow Island. The existing data suggests a typical island groundwater/seawater interface system, with a lens of less saline water overlying the seawater. Application of the Ghyben–Herzberg principle suggests that the "freshwater" lens may extend to depths of approximately 25 m below sea level.

Depth to groundwater ranges from nil at the coast to over 50 m at the centre of the island and is essentially related to topography. Groundwater elevation over most of the island is thought to vary little above sea level; however a shallow mound (up to 0.6 m high) is developed in the central part of the island. The height of this mound would vary according to rainfall.

Permanent fresh surface water sources are only known on BWI at three freshwater seeps on the west coast of the Island. Seasonal inundation often results in flooding and development of ephemeral watercourses. No ephemeral watercourses are located within proximity of the proposed drill centres with the closest known major ephemeral creek line located 195 m away from Drill Centre C.

3.5 Socio-Economic Environment

BWI is gazetted as a Class A Nature Reserve for the protection of native flora and fauna, vested in the Conservation Commission of Western Australia, and managed by the DPaW. BWI was first declared a Class A reserve in 1910 (Reserve No. 11648). There is no resident population on Barrow Island. The Island has been actively used for petroleum exploration and production purposes since 1957 and access to the Island is restricted to personnel associated with oilfield operations, DPaW staff, and Gorgon Gas Development and Jansz Feed Gas Pipeline staff.

3.6 Cultural Heritage

No additional clearing or earthworks are intended as part of this drilling program and all drill pads are to be cleared in accordance with the Carbon Dioxide Injection System – Pipeline Consent to Construct Environmental Management Plan. Information regarding cultural heritage and site specific surveys at the drill locations prior to clearing is included within the aforementioned plan

3.7 Native Title

There are no lodged native title claims over Barrow Island.

4.0 MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

All aspects of the project have been subjected to a comprehensive impact and risk assessment. The main environmental aspects, impacts and potential risks are detailed in Table 4:1. To ensure the potential environmental risks identified through the risk assessment are managed appropriately, Chevron has developed a range of management strategies (controls) that will be implemented throughout the course of the project. A summary of the main strategies are detailed in Table 4:1.

Table 4:1: Summary of Key Aspects, Impacts, Risks and Controls

Aspect	Hazards	Potential Impact	Controls
Fauna	• Unauthorised feeding collection or killing of fauna by personnel. • Fauna strikes from vehicles. • Fauna entrapment in facilities • Subterranean fauna impacted by sub-surface fluid loss	Fauna injury/casualties	• All personnel shall be made aware of that they are not permitted to intentionally feed, harass, harm, injure or kill fauna via the induction process. • Enforcement and monitoring of vehicle speed limits (60 km/hr during daylight and 40 km/hr from dusk onwards). • Vehicle access restricted to authorised roads • Drilling material large enough to house fauna shall be inspected for fauna prior to use. • Prior to exiting the F54A CHF, personnel shall ensure fauna egress ropes are in place • Only trained and licensed personnel shall handle fauna • Primarily (RO) fresh-water with gel sweeps to be used to drill beyond extent of the freshwater aquifer. • Total Drill fluid loss will be reported to the DMP in the quarterly emission report and Close Out Report.
	Fauna disturbance/behavioural change from light, noise and vibration generated from drilling activities.	Fauna disturbance/behavioural change (due to human interaction, noise, and light emissions)	• Lights shall be directed onto work areas with light spill minimised with the use of shielded light fittings and directional lights where practicable. • Only necessary artificial lighting shall be used. • Plant and equipment shall be maintained to ensure noise control equipment is correctly fitted and operating at design performance.
Emissions to Air	• Combustion of hydrocarbon fuels for power generation or fuels in stationary plant equipment and vehicles • Venting of nitrogen during flow back completions.	Greenhouse gas generation / air emissions	• All machinery shall be maintained as per the manufacturer's guidelines. • Diesel used to be maintained throughout the project. • Nitrogen venting only to be undertaken for flow back and completion activities.
	• Use of vehicles. • Drill fluid mixing & cementing operations.	Dust	• Vehicle speeds shall be restricted to the speed limits in force on Barrow Island roads, and at the construction site, to minimise dust generation. • Dust suppression techniques shall be employed where material cannot be stabilised e.g. water carts, sprays, dust guards, wind breaks or covers.

Aspect	Hazards	Potential Impact	Controls
Spills / Leaks (Unplanned event)	• Single point failure • Loss of containment during transfer • Damage to infrastructure resulting in loss of containment • Loss of well control	• Soil contamination Emissions to air	• For the bulk transfer of fuel, bulk transfer hoses shall be fitted with dry break couplings. • Bulk transfers (including refueling) that occur at the drill site shall have spill protection in place (i.e. drip trays prior to refueling). • Waste volumes to be maintained throughout the program. • Cuttings are to be contained within non0permeable HDPE lined skips / containers when stored on the drill pad. • During transfer of drill fluids to the facility, personnel shall be on standby to shut off valves should hoses fail. • All hazardous liquids shall have secondary containment in accordance with the MSDS. • Bunds shall be regularly inspected and liquids removed as required. • Stationary equipment (such as generators, lighting towers pumps etc) shall be provided with spill protection. • Bulk Fuel tanks shall be double skinned / bunded. • Chevron's DSM, tool pusher and Driller will have well control certification. • Spills are to be cleaned up immediately (where safe to do so)
Emergency Response (wildfire and cyclone)	• Fire resulting from sources such as lightning strikes, smoking and • hot works. • Cyclone / weather events.	Habitat and vegetation loss/fragmentation/alteration	• Hot work activities in restricted/designated areas without a permit are prohibited • To minimise the risk of fires due to smoking, smoking shall take place in designated, cleared smoking areas only. Smoking areas shall have portable fire fighting equipment and lighters. • All flammable chemical storage areas shall have fire extinguishers in the vicinity (at a minimum to meet AS 1940). • Equipment, materials and resources shall be available to respond to a fire including trained emergency response personnel. Fire fighting equipment shall be stored at all suitable work sites • Personnel shall be trained in the location of the fire fighting equipment in their work area. • Completion of Pre cyclone checklist shows pre cyclone activities complete.
Waste	• Generation and disposal of non-hazardous waste stream to approved mainland facility or on BWI. • Discharge of untreated wastewater to terrestrial environment. • Inappropriate waste	Habitat and vegetation loss/fragmentation/alteration	• At-source receptacles will be available at worksites to store and segregated waste • Waste storage containers which contain material that has the potential to attract fauna or create windblown rubbish shall be covered/closed at all times and be secured to resist severe weather conditions. (e.g. general waste, food waste). • Waste receptacles shall be placed in areas that are easily accessible • Waste receptacles shall be clearly identified for their designated waste stream. • Contaminated wastewater will be removed by a vacuum tanker. • Portable toilets and other temporary facilities e.g. crib rooms, shall be self-contained

Aspect	Hazards	Potential Impact	Controls
	disposal from third party waste contractor • Release of waste to terrestrial environment during transport or storage		• Prior to delivery of cuttings, ensure a minimum freeboard of 0.5 m within cuttings holding facility, with excess fluids removed via a vacuum tanker. • Vehicles unloading cuttings at the cuttings holding facility will only unload within the existing spill containment area within the facility (note this area is area laid with 2.00 mm HDPE liner). • Following the unloading of cuttings into the Cuttings Holding Facility, a Waste Management Form will be completed to track the quantities of wastes unloaded. • Transfer and/or transport of liquid waste shall be conducted such that risk of spills is reduced and minor spills are contained e.g. use spill trays and spill mats at transfer points and transport in sealed containers. • Above ground pipes and containment facilities shall be protected from vehicular impact. • The only waste streams to be disposed of down hole are: o Liquid waste extracted by de-watering drilling fluid, o Flow back fluid/water and o Completion brine • Volumes of treated effluent disposed of via deep well injection on Barrow Island to be maintained. • Fluid loss volumes during drilling activities to be maintained
Quarantine	• Transit of personnel and freight to BWI. • Vehicle, equipment, materials and personnel movements on BWI. • Food handling / eating	Introduction or spread of non-indigenous species to BWI via transit of freight or personnel.	• All personnel will be made aware of quarantine provisions and requirements on BWI. • No food is to be consumed outside dedicated crib facilities. • All food waste to be segregated and contained on the drill site prior to removal for final disposal • Vehicles shall be inspected cleaned down as required when exiting a weed hygiene zone

5.0 MANAGEMENT APPROACH

The Chevron management strategies will be implemented in accordance with Chevron Australia's Operational Excellence Management System (OEMS). Chevron's OEMS is aligned to ISO 14001 and key components of the management system that will be implemented are included in Table 5:1.

Table 5:1: Summary of Key Implementation Measures

Key Implementation Measures	Brief description
Roles & Responsibilities	Accountabilities and responsibilities are defined for personnel involved in the projects implementation.
Training and Communication	Detailed inductions are provided to educate personnel of both Barrow Island and project specific environmental risks. The project specific induction details specific management strategies required to be implemented for the project.
Auditing and Inspections	Auditing and inspections are undertaken to identify gaps in management of risk and assign corrective actions to responsible personnel.
Routine Reporting	Chevron Australia has a number of internal and external environmental reporting requirements. Routing reporting provides information regarding Chevron's environmental performance.
Emergency Response	Chevron's Emergency Response Procedures have been developed to manage potential emergency situations. The emergency response procedures are reviewed and updated regularly.

6.0 CONTACT DETAILS

For further information about this project or this Environmental Management Plan, please contact:

Company Name	Chevron Australia Pty Ltd
Position	Gorgon Operations Manager/PGPA Operations Manager (public contact)
Business Address	GPO Box S1580, Perth WA 6845
Telephone Number	08 9413 6764/08 9216 4000 (public contact number)
Fax Number	08 9413 6067
Email Address	ask@chevron.com

Attachment 1: Chemical Disclosure Information

Trade Name	Supplier Name	Purpose of use	Component Name	CAS #	Maximum Ingredient Concentration	Maximum ingredient concentration (%) in total fluid used[1]	Eco-toxicity information
Cementing							
Class G - Silica Blend D956	Schlumberger	CO2 resilient **cement**	Portland cement	65997-15-1	40 - 70	NR ("Not Required")	Acute Fish Toxicity 96h LC50: 41.2 (Oreochromis niloticus) Source: Adamu *et al*. 2008
			Crystalline silica	14808-60-7	15 - 40		Biodegradation is "not applicable" for crystalline silica since it is inorganic. Concentration-based toxicity values were not available. Silica is a naturally occurring, insoluble component of soil. Silica plays an essential role in most plants and animals. Synthetic amorphous silica: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Crustacean Toxicity 24h EL50: >10000 mg/L (Daphnia magna); Na-Al silicates: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Algae Toxicity 72h NOEL:10000 mg/L (Scenedesmus subspicatus) Source: IUCLID 2000
Flyash	Schlumberger	CO2 resilient cement	Fly Ash	68131-74-8	>75%	NR	Acute Algae Toxicity 72h EC10: 1400-2000 mg/L (Scenedesmus subspicatus); Acute Fish Toxicity 48h NOEC: 700-2000 mg/L (Leuciscus idus); Acute Crustacean Toxicity 24h EC50: 140-2000 mg/L (Daphnia magna); Source: IUCLID 2000
			Crystalline silica, quartz	14808-60-7	5-10%		Biodegradation is "not applicable" for crystalline silica since it is inorganic. Concentration-based toxicity values were not available. Silica is a naturally occurring, insoluble component of soil. Silica plays an essential role in most plants and animals. Synthetic amorphous silica: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Crustacean Toxicity 24h EL50: >10000 mg/L (Daphnia magna); Na-Al silicates: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Algae Toxicity 72h NOEL:10000 mg/L (Scenedesmus subspicatus) Source: IUCLID 2000
Silicalite Liquid	Halliburton	Liquid Extender	Silica, amorphous - fumed	7631-86-9	30 - 60%	NR	""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected." Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum); Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia); Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio); Source: IUCLID 2000
			Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	<0.1%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is present at low concentrations in the product; and • Component is likely to be largely bound up in the cement matrix.
			Water	7732-18-5	30 - 60%		No Hazard
Latex 3000	Halliburton	Mechanical Properties Enhancer	Functionalized Styrene Butadiene Latex	403824-26-0	30-60%	NR	Acute Fish Toxicity: LC50: (96 hour) 97811 mg/l (fish) estimated Acute Crustaceans Toxicity:EC50(48 Hour): 16552 mg/l (Daphnia magna) estimated
			Water	7732-18-5	30-60%		
			4-Vinylcyclohexene	100-40-3	Trace		
			Styrene	100-42-5	Trace		
			Butadiene	106-99-0	Trace		

[1] Maximum concentrations may vary based on site conditions and operational specifications. In accordance with the Department of Mines and Petroleum Information Sheet, "substances inserted 'down-hole' for well construction (e.g. well cement and lining) do not need to be reported as a percent per content." Therefore this column of information is not required to be provided for cementing products.

Halad-413L	Halliburton	Liquid Fluid Loss Control	Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated	473268-27-8	10-30%	NR	HALAD 413 (HALAD 413L is HALAD 413 in solution): Log Pow: <0 – 3.5 (OECD 117) Biodegradation(28 Days): 6.1% (OECD 306) Acute Algae Toxicity 72h EC50: 1102 mg/L (Skeletonema costatum) Acute Crustacean Toxicity 48h LC50: >2000 mg/L (Acartia tonsa) HALAD 413L: Acute Fish Toxicity 96h LC50: >1000 mg/L (Scophthalmus maximus)
			Water	7732-18-5	60-100%		
CFR-3L	Halliburton	Dispersant	Sulfonic acid salt	40104-76-5	30 - 60%	NR	CFR-3 (CFR-3L is CFR-3 in solution): Log Pow: <0 (OECD 117) Biodegradation(28 Days): 5% (Marine BODIS) Acute Algae Toxicity 72h EC50: >3300 mg/L (Skeletonema costatum) Acute Crustacean Toxicity 48h LC50: 1687 mg/L (Acartia tonsa)
			Water	7732-18-5	60-100%		
D-Air 3000L	Halliburton	Defoamer	Alkenes, C15-C18	93762-80-2	60 - 100%	NR	Acute Algae Toxicity 96h EC50 : 22 mg/L (Pseudokirchneriella subcapitata) Acute Fish Toxicity Data 96h LC50 : >1000 mg/L (Salmo gairdneri) Acute Crustacean Toxicity 48h EC50: 480 mg/L (Daphnia magna)
			Silica, amorphous precipitated	67762-90-7	10 - 30%		Component is a synthetic surface modified Amorphous Silica (CAS #: 7631-86-9); Fish and Invertebrate toxicity testing with Amorphous Silica have shown low hazard for this component. Source: OECD SIDS
			Polypropylene glycol	25322-69-4	30-60%		Acute Fish Toxicity 96h LC50: 1700 mg/L (Lepomis macrochirus); Source: ECOTOX
WellLife 684	Halliburton	Mechanical Properties Enhancer	Carbon	7440-44-0	100%	NR	No data was available in the IUCLID for this component. Chemical activated carbons were found not to be toxic to waste-water bacteria. Source: IUCLID 2000 Fish Toxicity NOEC 14d: 2 ng/organism (Danio rerio); Source: ECOTOX
Microbond HT	Halliburton	Expansion	Magnesium oxide	1309-48-4	100%	NR	No data was available in the IUCLID for this component, as "magnesium ions are a major component of all natural waters". Source: IUCLID 2000
Water		Base Fluid	Water	7732-18-5	100%	NR	No Hazard

Chemical Disclosure Details continued

Trade Name	Supplier Name	Purpose of use	Component Name	CAS #	Maximum Component Concentration	Maximum ingredient concentration (%) in total fluid used[2]	Eco-toxicity information
Baroid Drilling Fluids – KCl / Polymer / Glycol System							
BARABUF	Halliburton	pH Control	Magnesium Oxide	1309-48-4	60-100%	0.046	No data was available in the IUCLID for this component, as "magnesium ions are a major component of all natural waters". Source: IUCLID 2000
Potassium Chloride	Halliburton	Shale Inhibition	Potassium Chloride	7447-40-7	60-100%	6.441	Acute Crustacean Toxicity TLM96: 100-330 mg/L (Crangon crangon)
PAC-LE	Halliburton	Fluid Loss Additive	Polysaccharide	9004-32-4	60-100%	0.715	Acute Fish Toxicity TLM96: > 500 mg/L (Golden orfe)
			Glyoxal	107-22-2	< 0.1%		
GEM CP	Halliburton	Shale Stabilizer	Polyalkylene glycol	9038-95-3	60-100%	2.51	Acute Fish Toxicity EC50: 86 mg/L (Abra alba); Acute Crustacean Toxicity TLM48: 356 mg/L (Acartia tonsa); Acute Algae Toxicity EC50: 465 mg/L (Skeletonema costatum)
Barite	Halliburton	Density	Barium Sulfate	7727-43-7	60-100%	16.85	Acute Fish Toxicity TLM96: 7500 mg/L (Oncorhynchus mykiss)
			Crystalline silica, quartz	14808-60-7	1-5%		
Barazan D Plus	Halliburton	Viscosifier	Xanthan Gum	11138-66-2	60-100%	0.389	Component is readily biodegradable; product is "non-hazardous". Source: IUCLID 2000 Acute Fish Toxicity 48h LC50: 320-560 mg/L (Oncorhynchus mykiss); Source: ECOTOX
EZ MUD DP	Halliburton	Shale Inhibitor	Polyacrylamide / polyacrylate copolymer	25085-02-3	60-100%	0.120	Acute Crustacean Toxicity TLM48: 2202 mg/L (Acartia tonsa); Acute Algae Toxicity EC50: 4310 mg/L (Skeletonema costatum)
			Water	7732-18-5	5-10%		
Water		Base Fluid	Water	7732-18-5	100%	72.972	No hazard
Baroid Drilling Fluids – Spud Mud							
Bentonite	Halliburton	Viscosifier	Bentonite	1302-78-9	60-100%	11.18	Bentonite: Acute Fish Toxicity (Marine) 96h LC50: 8-19 g/L (Salmo gairdneri) Source: IUCLID 2000
			Crystalline silica, quartz	14808-60-7	1-5%		
			Crystalline silica, tridymite	15468-32-3	0-1%		
			Crystalline silica, cristobalite	14464-46-1	0-1%		
BARABUF	Halliburton	pH Control	Magnesium Oxide	1309-48-4	60-100%	0.05	Acute Crustacean Toxicity TLM96: 665,500 mg/L (Mysidopsis bahia)
Lime	Halliburton	pH Control	Calcium hydroxide	1305-62-0	60-100%	.05	Acute Fish Toxicity TLM96: 100-500 mg/L (Oncorhynchus mykiss); Acute Crustaceans Toxicity TLM96: 478,520 mg/L (Mysidopsis bahia)
Water		Base Fluid	Water	7732-18-5	100%	72.972	No hazard

[2] Maximum concentrations may vary based on site conditions and operational specifications.

Chemical Disclosure Details continued

Trade Name	Supplier Name	Purpose of use	Component Name	CAS #	Maximum Component Concentration	Maximum ingredient concentration (%) in total fluid used[3]	Eco-toxicity information
Additional cementing products (to be used in different cement mixes as required)[4]							
Gascon-469	Halliburton	Liquid Extender (High Temp)	Sodium hydroxide	1310-73-2	< 1%	NR	The inorganic substance has a high water solubility, and is not expected to bioconcentrate in organisms; "Biodegradation is not applicable." Algae toxicity (i.e. mortality) has been shown at pH >8.5. Concentration-based toxicity values were not available. Acute Fish Toxicity 96h LC50: 45.4 mg/L (Oncorhynchus mykiss); Source: IUCLID 2000
			Silica, amorphous - fumed	7631-86-9	10 - 30%		"SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected." Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum); Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia); Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio); Source: IUCLID 2000
			Water	7732-18-5	60-100%		No hazard
Econolite -L	Halliburton	Liquid Extender (Low Temp)	Sodium metasilicate, anhydrous	6834-92-0	30-60%	NR	Component is an inorganic substance with "No bioaccumulation potential"; "studies on biodegradation are not applicable." Crustracean Toxicity 100h EC50: 247 mg/L (Daphnia magna); Acute Fish Toxicity 96h LC50: 301-478 mg/L (Lepomis macrochirus); Source: IUCLID 2000
			Water	7732-18-5	60-100%		No hazard
Halad-344 EXP	Halliburton	Liquid Fluid Loss Control	,N-dimethylacrylamide copolymer with calcium	103115-52-2	60-100%	NR	HALAD-344: Log Pow: <0 (OECD 117); Biodegradation (28 days): 0%; Acute Fish Toxicity 96h LC50: > 1000 mg/l (Scophthalmus maximus) Sodium sulfate: Acute Fish Toxicity 96h LC50: 120 mg/L (Gambusia affinis); Acute Crustacean Toxicity 48h LC50: 578 mg/L (Daphnia magna); Source: IUCLID Calcium hydroxide Acute Fish Toxicity 96h LC50: 33.9 mg/L (Clarias gariepinus); Source: ECOTOX
			Lecithins	8002-43-5	1-5%		
			Sodium sulfate	7757-82-6	1-5%		
			Calcium hydroxide	1305-62-0	1-5%		
SCR-100L	Halliburton	Retarder (High Temp)	Acrylic acid polymer with sodium AMPS, sodium salt	37350-42-8	30-60%	NR	SCR-100L: Biodegradation(28 Days): 39% (OECD306) Acute Algae Toxicity 72h EC50: >3300 mg/L (Skeletonema costatum) Acute Crustacean Toxicity 48h LC50: >2000 mg/L (Acartia tonsa) 2-Bromo-2-(bromomethyl)pentane dinitrile: Acute Fish Toxicity 96h LC50: > 1000 mg/L (Scophthalmus maximus) Acute Fish Toxicity 96h LC50: 1.75 mg/L (Oncorhynchus mykiss); Acute Crustacean Toxicity 48h EC50: 2.2 mg/L (Daphnia magna); Source: ECOTOX FD&C Blue 1: Acute Fish Toxicity 96h LC50: 239 mg/L (Oncorhynchus gorbuscha); Acute Crustacean Toxicity 48h EC50: > 97 mg/L (Daphnia magna); Source: ECOTOX
			Water	7732-18-5	60-100%		
			2-Bromo-2-(bromomethyl)pentanedinitrile	35691-65-7	<0.1%		
			FD&C Blue 1	3844-45-9	<0.1%		
HR-25L	Halliburton	Retarder Intensifier (High	Tartaric acid	87-69-4	30 - 60%	NR	HR-25L:

[3] Maximum concentrations may vary based on site conditions and operational specifications.
[4] In accordance with the Department of Mines and Petroleum Information Sheet, "substances inserted 'down-hole' for well construction (e.g. well cement and lining) do not need to be reported as a percent per content." Therefore "**Maximum ingredient concentration (%) in total fluid used"** is not required to be provided for cementing products.

Trade Name	Supplier Name	Purpose of use	Component Name	CAS #	Maximum Component Concentration	Maximum ingredient concentration (%) in total fluid used[3]	Eco-toxicity information
		Temp)	Water	7732-18-5	60-100%		Log Pow: 0 - 4.7 (OECD 117) Biodegradation(28 Days): 77% (OECD 306) Algae: EC50(72h): 791.25 mg/L (Skeletonema costatum) Crustacean: LC50(48h): 3753.85 mg/L (Acartia tonsa) Fish: LC50(96h): 250 mg/L (Scophthalmus maximus juvenile)
NF-6	Halliburton	Defoamer	Monopropylene glycol monooleate	1330-80-9	5-10%	NR	Acute Fish Toxicity 96h LC50: >3200 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: 2500 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: 991.02 mg/L (Skeletonema costatum)
			Sorbitan, monopalmitate	26266-57-9	1-5%		Acute Fish Toxicity 96h LC50: >1800 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: >10000 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: 41 mg/L (Skeletonema costatum)
			Aluminum stearate	637-12-7	1-5%		Acute Fish Toxicity 96h LC50: >5600 mg/L (Scophthalmus maximus; Marine); Acute Crustacean Toxicity 48h LC50: 5085.71 mg/L (Acartia tonsa; Marine); Acute Algae Toxicity 72h EC50: 6488.87 mg/L (Skeletonema costatum; Marine)
			Water	7732-18-5	5-10%		No Hazard
			Rape oil	8002-13-9	60-100%		Acute Fish Toxicity 96h LC50: >5600 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: >10000 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: >3200 mg/L (Skeletonema costatum)
WellLife 734	Halliburton	Mechanical Properties Enhancer	Glass		60 - 100%	NR	Acute Crustaceans Toxicity:TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 10 ppb

Chemical Disclosure Details continued

Trade Name	Supplier Name	Purpose of use	Component Name	CAS #	Maximum Component Concentration	Maximum ingredient concentration (%) in total fluid used[5]	Eco-toxicity information
Additional Drilling Fluid Contingency Products (to be used in different fluid mixes as required)							
BARACARB	Halliburton	Bridging Agent	Calcium carbonate	471-34-1	60-100%	2.0	Acute Crustacean Toxicity TLM48: 2202 mg/L (Acartia tonsa); Acute Algae Toxicity EC50: 4310 mg/L (Skeletonema costatum)
			Crystalline silica, quartz	14808-60-7	0-1%		
BDF-427	Halliburton	Coagulant	Polyamine	42751-79-1	30-60%	.4	Acute Fish Toxicity LC50:(96 hour) >10 mg/L (Brachidanio rerio); Acute Crustacean Toxicity EC50(48 Hour): >10 mg/L (Daphnia magna)
			Water	7732-18-5	30-60%		
BDF-421	Halliburton	Flocculant	Polyacrylate	69418-26-4	60-100%	0.1	Acute Fish Toxicity LC50:(96 hour) 5-10 mg/L (Brachidanio rerio); Acute Crustacean Toxicity EC50: (48 hour) 20-50 mg/L (Daphnia magna)
			Water	7732-18-5	5-10%		
			Acrylamide	79-06-1	trace (<0.1)		
BARAKLEAN NS PLUS	Halliburton	Casing Cleaner	Modified carbohydrate	68515-73-1	60-100%	0.4	Acute Fish Toxicity 96h LC50: 96.64 mg/L (Scophthalmus maximus; Marine)
			Water	7732-18-5	30-60%		
BAROFIBRE	Halliburton	Lost Circulation	Plant material	Organic material N/a	60-100%	0.8	Acute Fish Toxicity LC50: 445 mg/L (Cyprinus carpio); Acute Crustacean Toxicity TLM48: 1875 mg/L (Daphnia magna)
Caustic Soda	Halliburton	pH Control	Sodium hydroxide	1310-73-2	60-100%	0.1	Acute Fish Toxicity TLM96: 730 mg/L (Oncorhynchus mykiss)
Citric Acid	Halliburton	pH Control	Citric Acid	77-92-9	60-100%	0.1	Acute Fish Toxicity 96h LC50: >440-760 mg/L (Leuciscus idus); Acute Crustacean Toxicity 72h EC50: 120 mg/L (Daphnia magna); Algae Toxicity 7d EC3: 640 mg/L (Scenedesmus quadricauda) Source: IUCLID 2000
DRIL-N-SLIDE	Halliburton	Lubricant	Fatty acid ester	135800-37-2	60-100%	2.0	Acute Crustacean Toxicity TLM96: > 10000 mg/L (Crangon crangon)
			Ethyl hexanol	104-76-7	0-1%		
Guar Gum	Halliburton	Viscosifier	Guar Gum	9000-30-0	60-100%	0.1	This component is a naturally-occurring substance. No ecotoxicity information was available in the IUCLID. Source: IUCLID 2000 Acute Crustacean Toxicity 48h LC50: 42 mg/L (Daphnia magna); Acute Fish Toxicity 96h LC50: 218 mg/L (Oncorhynchus mykiss); Source: ECOTOX
			Silica, amorphous	7631-86-9	1 - 5%		""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected." Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum); Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia); Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio); Source: IUCLID 2000
N-DRIL HT PLUS	Halliburton	Fluid Loss Additive	Modified Starch	58944-89-1	60-100%	1.6	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is derived from a naturally occurring substance; • Component is defined by USFDA as a "Generally Recognized As Safe (GRAS)" Substance; and • Component is considered not Persistent, Bioaccumulative, or Inherently Toxic, according to Environment Canada (Canada DSL).
N-PLEX	Halliburton	Lost Circulation	Sodium borate	1303-96-4	1-5%	0.1	Acute Fish Toxicity 72h LC50: 65 mg/L (Oncorhynchus mykiss); Acute Crustacean Toxicity 24h LD100: 10000 mg/L (Gammarus tigrinus) Source: Ecotox
			Sodium hydroxide	1310-73-2	1-5%		The inorganic substance has a high water solubility, and is not expected to bioconcentrate in organisms; "Biodegradation is not applicable." Algae toxicity (i.e. mortality) has been shown at pH >8.5. Concentration-based toxicity values were not available. Acute Fish Toxicity 96h LC50: 45.4 mg/L (Oncorhynchus mykiss); Source: IUCLID 2000
			Water	7732-18-5	60-100%		No hazard

[5] Maximum concentrations may vary based on site conditions and operational specifications.

QUIK-FREE	Halliburton	Spotting Fluid	Fatty acid ester	10024-47-2	30-60%	1.0	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Not Considered Hazardous to Water" (Water Classification Annex 1).
			Glycerine	56-81-5	30-60%		Acute Fish Toxicity 48h LC50: >10000 mg/L (Leuciscus idus melanotus); Acute Crustacean Toxicity 24h EC50: >500 mg/L (Daphnia magna); Source: IUCLID 2000
			Modified bentonite	71011-24-0	1-5%		Acute Fish Toxicity 96h LC50: >500 mg/L (Oncorhynchus mykiss); Acute Crustacean Toxicity 48h EC50: <500 mg/L (Daphnia magna); Source: OECD SIDS
			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	<1%		Acute Fish Toxicity 96h LL50: >1000 mg/L (Pimephales promelas); Acute Crustacean Toxicity 48h EL50: >1000 mg/L (Daphnia sp.); Acute Algae Toxicity 72h EL50: >1000 mg/L (Selenastrum capricornutum); Source: US EPA HPV
			Fatty acids ester	135800-37-2	<1%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Not Considered Hazardous to Water" (Water Classification Annex 1).
			Soybean oil	8001-22-7	<1%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Not Considered Hazardous to Water" (Water Classification Annex 1); • Component is considered not Persistent or Bioaccumulative, according to Environment Canada (Canada DSL); and • Component is defined in the EU under REACH Annex IV as a "Minimal Risk Compound".
			Lecithins	8002-43-5	<1%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is derived from a naturally occurring substance; • Component is defined by US FDA as a "Generally Recognized As Safe (GRAS) Substance"; • Component is defined by the USDA's National Organic Program as a "Substances Allowed as Ingredients in or on Organic Processed Products"; • Component is considered not Persistent or Bioaccumulative, according to Environment Canada (Canada DSL); and • Component is defined in the EU under REACH Annex IV as a "Minimal Risk Compound".
			Isopropanol	67-63-0	<0.1%		Acute Fish Toxicity 96h LC50: 9640 mg/L (Pimephales Promelas); Acute Crustacean Toxicity 48h LC50: 1400 mg/L (Crangon crangon); Acute Algae Toxicity 72h EC50: >1000 mg/L (Scenedesmus subspicatus);Source: IUCLID 2000.
			Water	7732-18-5	<0.1%		No hazard
			Ethylene glycol monobutyl ether	111-76-2	<0.1%		Acute Fish Toxicity 96h LC50: 1490 mg/L (Lepomis macrochirus); Acute Crustacean Toxicity 48h LC50: 600-1000 mg/: (Crangon crangon); Source: IUCLID 2000
			Diethylene glycol monobutyl ether	112-34-5	<0.1%		Acute Fish Toxicity 96h LC50: 1300 mg/L (Lepomis macrochirus); Acute Crustacean Toxicity 24h EC50:2300 mg/L (Daphnia magna); Source: ECOTOX
			Crystalline silica, quartz	14808-60-7	<0.1%		Biodegradation is "not applicable" for crystalline silica since it is inorganic. Concentration-based toxicity values were not available. Silica is a naturally occurring, insoluble component of soil. Silica plays an essential role in most plants and animals. Synthetic amorphous silica: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Crustacean Toxicity 24h EL50: >10000 mg/L (Daphnia magna); Na-Al silicates: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Algae Toxicity 72h NOEL:10000 mg/L (Scenedesmus subspicatus) Source: IUCLID 2000
			Quaternary Ammonium Compounds	61788-63-4	<0.1%		Acute Fish Toxicity 96h LC50: >1000 mg/L (Brachydanio rerio); Acute Crustacean Toxicity 48h EC50: 35.2 mg/L (Daphnia magna); Acute Algae Toxicity 72h EC50: 0.05 mg/L (Selenastrum capricornutum); Source: US EPA HPV

GELTONE V	Halliburton	Viscosifier	Modified bentonite	68953-58-2	60-100%	0.1	Acute Crustacean Toxicity 48h EC50: >100 mg/L (Daphnia magna); Acute Algae Toxicity 72h EC50: >1000 mg/L (Skeletonema costatum); Source: OECD SIDS
			Isopropanol	67-63-0	1-5%		Acute Fish Toxicity 96h LC50: 9640 mg/L (Pimephales Promelas); Acute Crustacean Toxicity 48h LC50: 1400 mg/L (Crangon crangon); Acute Algae Toxicity 72h EC50: >1000 mg/L (Scenedesmus subspicatus); Source: IUCLID 2000.
			Quaternary ammonium compounds	61788-63-4	0-1%		Acute Fish Toxicity 96h LC50: >1000 mg/L (Brachydanio rerio); Acute Crustacean Toxicity 48h EC50: 35.2 mg/L (Daphnia magna); Acute Algae Toxicity 72h EC50: 0.05 mg/L (Selenastrum capricornutum); Source: US EPA HPV
			Water	7732-18-5	1-5%		No hazard
			Crystalline silica, tridymite	15468-32-3	0-1%		Biodegradation is "not applicable" for crystalline silica since it is inorganic. Concentration-based toxicity values were not available. Silica is a naturally occurring, insoluble component of soil. Silica plays an essential role in most plants and animals. Synthetic amorphous silica: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Crustacean Toxicity 24h EL50: >10000 mg/L (Daphnia magna); Na-Al silicates: Acute Fish Toxicity 96h LL0: 10000 mg/L (Branchdanio rerio); Acute Algae Toxicity 72h NOEL:10000 mg/L (Scenedesmus subspicatus) Source: IUCLID 2000
			Crystalline silica, cristobalite	14464-46-1	0-1%		
			Crystalline silica, quartz	14808-60-7	1-5%		
Sodium Bicarbonate	Halliburton	pH Control	Sodium bicarbonate	144-55-8	60-100%	0.1	Acute Fish Toxicity 96h LC50: 7550 mg/L (Gambusia affinis); Acute Crustacean Toxicity 48h EC50: 2350 mg/L (Daphnia magna); Acute Algae Toxicity 5d EC50: 650 mg/L (Nitzschia linearis); Source: IUCLID 2000.
SOURSCAV	Halliburton	Hydrogen Sulfide Scavenger	Iron gluconate	299-29-6	60-100%	0.4	Acute Fish Toxicity 96h LC50: >1000 mg/L (Cyprinodon variegatus; Marine); Acute Algae Toxicity 72h EC50: 265.7 mg/L (Skeletonema costatum; Marine); Acute Crustacean Toxicity 48h EC50: 296.2 mg/L (Acartia tonsa; Marine)
STARCIDE	Halliburton	Bactericide	Oxazdidine	66204-44-2	60-100%	0.1	Acute Fish Toxicity LC50: 57.7 mg/L (Brachidanio rerio); Acute Crustacean Toxicity EC50: 37.9 mg/L (Daphnia magna); Acute Algae Toxicity IC50: 5.7 mg/L (Scenedesmus subspicatus)
STEELSEAL	Halliburton	Lost Circulation	Calcined petroleum coke	64743-05-1	60-100%	0.8	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is considered not Bioaccumulative or Inherently Toxic, according to Environment Canada (Canada DSL).
Sugar	Halliburton	Cement Retarder	Sucrose	57-50-1	60-100%	0.1	This chemical is considered of low priority for further work at the OECD, due to its intrinsic properties indicating a low hazard. Source: OECD SIDS Acute Fish Toxicity 24h Mortality: 60000 mg/L (Sander lucioperca) Source: ECOTOX
Therma-Thin	Halliburton	Thinner	Sodium polyacrylate	9003-04-7	60-100%	0.1	Acute Fish Toxicity LC50: 2390-6080 mg/L (Cyprinus carpio) Acute Crustacean Toxicity TLM96: 9400 mg/L (Crangon crangon)
			Water	7732-18-5	30-60%		

BARO-LUBE GOLD SEAL	Halliburton	Lubricant	Soybean oil	8001-22-7	60-100%	1.0	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Not considered Hazardous to Water" (Water Classification Annex 1); • Component is considered not Persistent or Bioaccumulative, according to Environment Canada (Canada DSL); and • Component is defined in the EU under REACH Annex IV as a "Minimal Risk Compound".
			Polypropylene glycol	25322-69-4	5-10%		Acute Fish Toxicity 96h LC50: 1700 mg/L (Lepomis macrochirus); Source: ECOTOX
			Methyloxirane polymer with oxirane, ether with 1,2,3-propanetriol	9082-00-2	1-5%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Hazard Class 1 - Low Hazard to Waters" (Water Classification Annex 2); • Component is considered not Persistent, Bioaccumulative, or Inherently Toxic according to Environment Canada (Canada DSL); and • The component exhibits low hazards to mammals: Oral Rat LD_{50} > 10 g/kg; Dermal LD_{50} Rabbit > 5g/kg.
			Dodecylbenzene sulfonic acid	27176-87-0	0-1%		Acute Fish Toxicity 96h LC50: 3.2-5.6 mg/L (Salmo gairdnei); Acute Crustacean Toxicity 48h LC50: 3.5 mg/L (Daphnia magna); Acute Algae Toxicity 72h EC50: 21.0 mg/L (Selenastrum capricornutum); Source: OECD SIDS
			Methyloxirane polymer with oxirane, ether with 1,2-propanediol	53637-25-5	1-5%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Hazard Class 1 - Low Hazard to Waters" (Water Classification Annex 2); and • Component is considered not Bioaccumulative or Inherently Toxic according to Environment Canada (Canada DSL).
			Polyoxylated Alkyl Phosphate Ester	68585-36-4	1-5%		No ecotoxicity data available in sources consulted. However, component is not Persistent or Bioaccumulative, according to Environment Canada (Canada DSL). Component is present at very low concentrations.
BAROLIFT	Halliburton	Suspending Agent	Polypropylene	9003-07-0	60 - 100%	0.1	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is approved by the US FDA for use as an "Indirect Food Additive"; and • Component is not Bioaccumulative or Inherently Toxic, according to Environment Canada (Canada DSL).
BARASIL S	Halliburton	Shale Inhibitor	Disodium monoxide	1313-59-3	10 - 30%	1.2	No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Hazard Class 1 - Low Hazard to Waters" (Water Classification Annex 2); and • Component is not Bioaccumulative or Inherently Toxic, according to Environment Canada (Canada DSL).
			Sodium silicate	1344-09-8	10 - 30%		Component is an inorganic substance with "No bioaccumulation potential"; "studies on biodegradation are not applicable. "Crustacean Toxicity 100h EC50: 247 mg/L (Daphnia magna); Acute Fish Toxicity 96h LC50: 301-478 mg/L (Lepomis macrochirus); Source: IUCLID 2000
			Water	7732-18-5	30-60%		No hazard
OXYGON	Halliburton	Oxygen Scavenger	Organic acid salt	6381-77-7	60 - 100%	0.1	Acute Fish Toxicity 96h NOEC: >32 mg/L (Scophthalmus maximus; Marine); Acute Crustacean Toxicity 48h LC50: 738.75 mg/L (Acartia tonsa; Marine); Acute Algae Toxicity 72h EC50: 1661.34mg/L (Skeletonema costatum; Marine)
Aluminum Chloride Solution	Halliburton	Additive	Aluminum Chloride Anhydrous	7446-70-0	10-30%	0.2	Acute Fish Toxicity 96h LC50: 27.1 mg/L (Gambusia affinis) Acute Crustacean Toxicity 48h EC50: 3.9 mg/L (Daphnia magna); Source: IUCLID 2000
			Water	7732-18-5	60-100%		No hazard
Ferric Sulfate	Halliburton	Cross linker	Ferric sulfate	10028-22-5	60 - 100%	0.2	Acute Fish Toxicity 96h LC50: 37.2 mg/L (Gambusia affinis); Source: IUCLID 2000
Aluminum Sulfate	Halliburton	Additive	Aluminum Sulfate	10043-01-3	60 - 100%	0.2	Acute Fish Toxicity 96h LC50: 37 mg/L (Gambusia affinis); Acute Crustacean Toxicity 15min EC50: 136 mg/L (Daphnia magna); Source: IUCLID 2000
Ferric Chloride	Halliburton	Cross linker	Ferric chloride	7705-08-0	30 - 60%	0.2	Acute Fish Toxicity 96h LC50: 75.6 mg/L (Gambusia affinis); Acute Crustacean Toxicity 48h EC50: 27.9 mg/L (Daphnia magna); Source: IUCLID 2000
			Water	7732-18-5	60 - 100%		No hazard

KWIK-SEAL	Halliburton	Lost Circulation	Wood fiber	Mixture (1757)	30-60%	0.8	This product is not expected to pose an ecological hazard as a result of its intended use. 96 h LC50 mysid shrimp, in standard drilling mud: >1,000,000 ppm suspended particulate phase Source: Kwik Seal NS FIne SDS UK
			Cellophane	9005-81-6	30-60%		
			Walnut hulls	Mixture (1756)	30-60%		
N-SQUEEZE	Halliburton	Lost Circulation	Wood fiber	Mixture (1757)	30-60%	0.2	This component is an organic substance , ecotoxicity information is unknown. However, environmental risks are expected to be low because: • Component is derived from a naturally occurring substance.
			Cellulose	9004-34-6	30-60%		Cellulose (CAS#: 9004-34-6) has "no known toxicity". Acute Fish Toxicity LC50: >100 mg/L; Acute Crustacean Toxicity EC50: >100 mg/L; Acute Algae Toxicity EC50: >100 mg/L; Source: IUCLID 2000
			Guar gum	9000-30-0	30-60%		This component is a naturally-occurring substance. No ecotoxicity information was available in the IUCLID. Source: IUCLID 2000 Acute Crustacean Toxicity 48h LC50: 42 mg/L (Daphnia magna); Acute Fish Toxicity 96h LC50: 218 mg/L (Oncorhynchus mykiss); Source: ECOTOX
NF-6	Halliburton	Defoamer	Monopropylene glycol monooleate	1330-80-9	5-10%	0.2	Acute Fish Toxicity 96h LC50: >3200 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: 2500 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: 991.02 mg/L (Skeletonema costatum)
			Sorbitan, monopalmitate	26266-57-9	1-5%		Acute Fish Toxicity 96h LC50: >1800 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: >10000 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: 41 mg/L (Skeletonema costatum)
			Aluminum stearate	637-12-7	1-5%		Acute Fish Toxicity 96h LC50: >5600 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: 5085.71 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: 6488.87 mg/L (Skeletonema costatum)
			Water	7732-18-5	5-10%		No hazard
			Rape oil	8002-13-9	60-100%		Acute Fish Toxicity 96h LC50: >5600 mg/L (Scophthalmus maximus); Acute Crustacean Toxicity 48h LC50: >10000 mg/L (Acartia tonsa); Acute Algae Toxicity 72h EC50: >3200 mg/L (Skeletonema costatum)
Aluminum Chlorohydrate	Halliburton	Coagulant for dewatering	Aluminum chlorohydrate	12042-91-0	10-30%	0.2	Acute Fish Toxicity 96h LC50: 100-500 mg/L (Brachydanio rerio); Source: IUCLID 2000
			Water	7732-18-5	60-100%		No hazard
Defoamer A[6]	Halliburton	Defoamer	2-Octanol	123-96-6	60-100%	0.1	Acute Fish Toxicity 96h LC50 75 mg/L (Oncorhynchus mykiss); Source: ECOTOX
			Water	7732-18-5	1-5%		No hazard
BARADEFOAM HP	Halliburton	Defoamer	Polypropylene glycol	25322-69-4	60 - 100%	0.1	Acute Fish Toxicity 96h LC50: 1700 mg/L (Lepomis macrochirus); Source: ECOTOX
			Methyloxirane polymer with oxirane, ether with 1,2,3-propanetriol	9082-00-2	10 - 30%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Hazard Class 1 - Low hazard to waters" (Water Classification Annex 2); • Component is considered not Persistent, Bioaccumulative, or Inherently Toxic, according to Environment Canada (Canada DSL); and • The component exhibits low hazards to mammals: Oral Rat LD_{50} > 10 g/kg; Dermal LD_{50} Rabbit > 5g/kg.
			Methyloxirane polymer with oxirane, ether with 1,2-propanediol	53637-25-5	10 - 30%		No ecotoxicity data available in sources consulted. However, environmental risks are expected to be low because: • Component is defined by Germany's Federal Environment Agency as "Hazard Class 1 - Low hazard to waters" (Water Classification Annex 2); and • Component is considered not Bioaccumulative or Inherently Toxic, according to Environment Canada (Canada DSL).

[6] This product is not imported but is acquired domestically in Australia.

BARAKLEAN DUAL	Halliburton	Solvent Cleaning Solution	Ethylene glycol monobutyl ether	111-76-2	30-60%	0.4	Acute Fish Toxicity 96h LC50: 1490 mg/L (Lepomis macrochirus); Acute Crustacean Toxicity 48h LC50: 600-1000 mg/: (Crangon crangon); Source: IUCLID 2000
			Water	7732-18-5	10 - 30%		No hazard
			Mixture of C9-C11 alcohol ethoxylate	68439-46-3	10 - 30%		Acute Fish Toxicity 96h LC50: 8.5 mg/L (Pimephales promelas); Acute Crustacean Toxicity 48h EC50: 2.686 mg/L (Daphnia magna);
			Citric Acid	77-92-9	1 - 5%		Acute Fish Toxicity 96h LC50: >440-760 mg/L (Leuciscus idus); Acute Crustacean Toxicity 72h EC50: 120 mg/L (Daphnia magna); Algae Toxicity 7d EC3: 640 mg/L (Scenedesmus quadricauda) Source: IUCLID 2000
			Aluminum sulfate	10043-01-3	0-1%		Acute Fish Toxicity 96h LC50: 37 mg/L (Gambusia affinis); Acute Crustacean Toxicity 15min EC50: 136 mg/L (Daphnia magna); Source: IUCLID 2000
SODA ASH	Halliburton	Buffer	Sodium carbonate	497-19-8	60-100%	0.1	Ecotoxicity - Freshwater Algae - Acute Toxicity Data Sodium carbonate 120 Hr EC50 Nitzschia: 242 mg/L Ecotoxicity - Freshwater Fish - Acute Toxicity Data Sodium carbonate 96 Hr LC50 Lepomis macrochirus: 300 mg/L [static]; 96 Hr LC50 Pimephales promelas: 310 - 1220 mg/L [static] Ecotoxicity - Water Flea - Acute Toxicity Data Sodium carbonate 48 Hr EC50 Daphnia magna: 265 mg/L
G-SEAL	M-I SWACO	Lost circulation material	GRAPHITE	7782-42-5	60-100%	10%	Acute Fish Toxicity Not considered toxic to fish. Mobility: The product is insoluble in water. Not Classified as PBT/vPvB by current EU criteria
G-SEAL PLUS	M-I SWACO	Lost circulation material	CARBON	7440-44-0	60-100%	10%	Not hazardous to Water. Graphite Acute Fish Toxicity Not considered toxic to fish. Mobility: The product is insoluble in water. Not Classified as PBT/vPvB by current EU criteria QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (Inhalation): 300 ug/m3/10 years (human) LDLo (Intratracheal): 200 mg/kg (rat) LDLo (Intravenous): 20 mg/kg (dog) TCLo (Inhalation): 16 000 000 particles/ft3/8 hours/17.9 years (human-fibrosis)
			GRAPHITE	7782-42-5	10-30%		
			QUARTZ, CRYSTALLINE SILICA	14808-60-7	<1%		
Circal (All Grades)	M-I SWACO	Weighting agent. Lost circulation material	Limestone ($CaCo_3$)	1317-65-3	>99%	5 %	Toxicity LC_{50} Fish 96 h > 10'000 mg/l LC_{50} Daphnia 49 h > 1000 mg/l LC_{50} Algae 72 h mg/l Persistence & degradability: Not readily degradable, except in acid conditions where it tends to have a neutralizing effect. Bioaccumulative potential: Calcium carbonate is a naturally occurring inorganic compound which has constituent elements that make up natural components of biological organisms. Mobility in soil: Calcium carbonate is practically insoluble except in acid conditions, and so presents a low soil mobility in most ground. Moreover it is commonly used as an effective soil conditioner and fertiliser
Safe-Carb (All Grade)	M-I SWACO	Weighting agent. Lost circulation material	CALCIUM CARBONATE	471-34-1	60-100%	5-11%	CALCIUM CARBONATE (471-34-1) LD50 (Ingestion): 6450 mg/kg (rat) QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (Inhalation): 300 ug/m3/10 years (human) LDLo (Intratracheal): 200 mg/kg (rat) LDLo (Intravenous): 20 mg/kg (dog) TCLo (Inhalation): 16 000 000 particles/ft3/8 hours/17.9 years (human-fibrosis) Acute Crustacean Toxicity TLM48: 2202 mg/L (Acartia tonsa); Acute Algae Toxicity EC50: 4310 mg/L (Skeletonema costatum)
			QUARTZ, CRYSTALLINE SILICA	14808-60-7	<1%		
FRAC ATTACK	M-I SWACO	Lost circulation material	CALCIUM OXIDE	1305-78-8	<10 %	23%	No Ecotocicity data available.
			CALCIUM HYDROXIDE	1305-62-0	<5%		

			CRISTOBALITE	14464-46-1	<5%		Toxicity data: CALCIUM HYDROXIDE (1305-62-0) LD50 (ingestion) 7300 mg/kg (mouse) CRISTOBALITE (14464-46-1) TCLo (inhalation) 16 mppcf/8hours/17.9 years (human-fibrosis) QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (Inhalation): 300 ug/m3/10 years (human) LDLo (Intratracheal): 200 mg/kg (rat) LDLo (Intravenous): 20 mg/kg (dog) TCLo (Inhalation): 16 000 000 particles/ft3/8 hours/17.9 years (human-fibrosis) CELLULOSE (9004-34-6) LC50 (inhalation) > 5800 mg/m³/4 hours (rat) LD50 (ingestion) > 5000 mg/kg (rat) LD50 (intraperitoneal) > 31600 mg/kg (rat) LD50 (skin) > 2000 mg/kg (rabbit) MAGNESIUM OXIDE (1309-48-4) TCLo (inhalation) 400 mg/kg (human)
			QUARTZ (SILICA CRYSTALLINE)	14808-60-7	<3%		
			2-PROPENENITRILE-1,3-BUTADIENE RUBBER	9003-18-3	<50%		
			NATURAL RUBBER	9006-04-6	<50%		
			POLYISOPRENE	9003-31-0	<50%		
			SBR ELASTOMERS	9003-55-8	<50%		
			CELLULOSE	9004-34-6	<30%		
			DIATOMACEOUS EARTH	61790-53-2	<15%		
			FULLERS EARTH	8031-18-3	<12%		
			MAGNESIUM OXIDE	1309-48-4	<2%		
Strata Vanguard	M-I SWACO	Fluid Additive	QUARTZ (SILICA CRYSTALLINE)	14808-60-7	<1%	<11%	Not expected to bioaccumulate No Ecotocicity data available Toxicity data QUARTZ (SILICA CRYSTALLINE) (14808607) LCLo (Inhalation): 300 ug/m3/10 years (human) LDLo (Intratracheal): 200 mg/kg (rat) LDLo (Intravenous): 20 mg/kg (dog) TCLo (Inhalation): 16 000 000 particles/ft3/8 hours/17.9 years (humanfibrosis) STEARIC ACID (57114) LD50 (Intravenous): 23 mg/kg (mouse) LD50 (Skin): > 5 g/kg (rabbit) LDLo (Ingestion): 4640 mg/kg (rat) SULPHUR (7704349) LC50 (Inhalation): 1660 mg/m3 (mammal) LDLo (Ingestion): 175 mg/kg (rabbit)
Drispac(R) Regular Polymer & Drispac(R) Superlo Polymer	Rheochem Ltd	Fluid Loss Additive	sodium carboxymethylcellulose	9004-32-4	98%	< 0.75%	**Acute Fish Toxicity** Golden orfe TLM96: > 500 mg/L () Oncorhynchus mykiss (rainbow trout) LC50 - 100 - 1,000 mg/l - 96 h Fresh Water Trout LC50 > 21,000 ppm/96hrs. Salt Water Stickel Back LC50 > 56,000 ppm/96hrs **Toxicity to aquatic invertebrates** Daphnia EC50 - 87.26 mg/l - 48 h
			Water	7732-18-5	<10%		
			Sodium Chloride	7647-14-5	<1.4%		
			Sodium Glycolate	2836-32-0	<0.7 %		
Flowzan® Biopolylmer	Rheochem Ltd	Rheology Modifier	xanthan gum	11138-66-2	60 – 100 % (90 % within MSDS)	<1%	Component is readily biodegradable; product is "non-hazardous". Source: IUCLID 2000 Acute Fish Toxicity 48h LC50: 320-560 mg/L (Oncorhynchus mykiss); Source: ECOTOX
			calcium stearate	1592-23-0	1-5%		TOXICOLOGICAL DATA LD50 (Oral) Rat >10gm/kg LD50 (Intraperitoneal) Rat >10gm/kg LC (Inhalation) Mammal (unspecified) >1241 mg/m3/4H Calcium Stearate is biodegradable and will not harm soil.
Soltex (Please note, Soltex was accepted via application 48011), and is included	Drilling Specialities Company	Shale inhibitor/encapsulator	Asphalt, oxidised, sulphonated, sodium salt OR Asphalt sulphonated, sodium salt	1394242-48-8 OR 68201-32-1	57.4 to 70.4	2%	Acute Toxicity Scophthalmus maximus LC50 (96 h): > 240 mg/L; Acartia tonsa LC50 (24 h): > 1000 mg/L; Skeletonema costatum (algae) EbC50 (72-hrs)= 240 mg/L Chronic Toxicity

here for completeness)			Causticized lignite	129521-66-0	12 to 18		May cause cancer. Causes damage to organs through prolonged or repeated exposure if swallowed. Biodegradation / bioaccumulation: 3-6% biodegrades after 28 days
			Sodium sulfite	7757-83-7	8.2 to 13.2		
			Sodium sulfate	7757-82-6	8.2 to 13.2		
			Crystalline Silica	14808-60-7	<1.0		
			n-Heptane	142-82-5	0.001		
Dextrid LTE	Halliburton	Filtration Control	Starch	9005-25-8	98-100%	<2%	Acute Toxicity: 96h LC50: 45.4 mg/L (Oncorhynchus mykiss) Chronic Toxicity: Repeated excessive ingestion may cause central nervous system effects. Repeated overexposure may cause liver and kidney effects. Biodegradation / bioaccumulation Supplier has indicated that this product is Biodegradable
			Tetrahydro-3,5-dimethyl-1,3,5-thiadiazine-2-thione	533-74-4	1%		
			Sodium Hydroxide	1310-73-2	1%		
Baracor-100	Halliburton	Corrosion Inhibitor	Nitrilotriacetic acid, trisodium salt monohydrate	5064-31-3	1%	1%	Acute Toxicity Oral Toxicity: LD50: 3500 mg/kg (Rat); Dermal Toxicity: LD50: > 3000 mg/kg (Rabbit); Acute Crustaceans Toxicity:TLM48: 402.5 mg/l (Daphnia magna) Chronic Toxicity Contains components which fall under NTP Classification 2 (Reasonably Anticipated to be a Human Carcinogen) and IARC Classification 2B (a Possible Human Carcinogen) Biodegradation / bioaccumulation BOD (28 day): 10% of COD
			Morpholine process residues	68909-77-3	29%		
			Methanol	67-56-1	25%		
			Water	7732-18-5	45%		
Omyacarb (All Grades)	Halliburton	Weighting agent. Lost circulation material	Limestone (CaCo3)	1317-65-3	>99%	55%	Acute Toxicity LC50 Fish 96 h > 10'000 mg/l; LC50 Daphnia 49 h > 1000 mg/l; LC50 Algae 72 h > 200 mg/l Chronic Toxicity Prolonged and repeated inhalation of excessive dust may permanently affect the respiratory system Biodegradation / bioaccumulation Not readily degradable, except in acid conditions where it tends to have a neutralizing effect

Chemical Disclosure Details continued

A. System Details	
OPERATOR:	Chevron Australia
PROJECT / WELL:	Gorgon Project: Barrow Island Drilling and Completion program
SYSTEM:	Tuned Spacer III
TOTAL VOLUME OF SYSTEM:	50 m^3 (Per well)

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info
Water	-	Mix Water	69.791%	No Hazard
Tuned Spacer III	Halliburton	Mud/CMT Spacer	8.618%	**Constituent 1 (≤30%)** Acute Toxicity Acute Algae Toxicity EC50 72h: >10,000 mg/L (Skeletonema costatum); Acute Crustacean Toxicity LC50 48 h: >10,000 mg/L (Acartia tonsa); Acute Fish Toxicity LC50 96h: 1254.44 mg/L (Salmo gairdneri); **Constituent 2 (≤10%)** Acute Toxicity Naturally Occurring Product; Natural form of Amorphous Silica (CAS #: 7631-86-9). Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum); Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia); Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio); Source: IUCLID 2000 **Constituent 3 (≤1%)** Acute Toxicity TLM96: > 750 mg/l (Pimephales promelas); TLM96: > 75000 ppm (Mysidopsis bahia) **Constituent 4 (≤1%)** Acute Toxicity Acute Fish Toxicity 96h LC50: 440 mg/L (Leuciscus idus); Acute Crustacean Toxicity 24h EC50: 85 mg/L (Daphnia magna). Biodegradation / bioaccumulation Biodegradation: Readily Biodegradable (98% degradation in 48 (OECD 302B)); Bioaccumulation: Not Bioaccumulative (based on Log Pow: -1.72) **Constituent 5 (≤100%)** Acute Toxicity Acute Algae Toxicity EC50(72h): 4714.85 mg/L (Skeletonema costatum); Acute Crustacean Toxicity LC50 48 hr: 7713.16 (Acartia tonsa); Acute Fish Toxicity LC50(96h): 508 mg/L (Danio rerio) (similar substance); Acute Invertebrates Toxicity LC50(48h): 731 mg/L (Daphnia magna) (similar substance); LC50(48h) 33.5 mg/L (Ceriodaphnia dubia) (similar substance). **Constituent 5 (≤100%)** Acute Toxicity Acute Algae Toxicity EC50(72h): 89 mg/L (biomass) (Scenedesmus subspicatus) (similar substance); Acute Fish Toxicity LC50(96h): 508 mg/L (Danio rerio) (similar substance); Acute Invertebrates Toxicity LC50(48h): 731 mg/L (Daphnia magna) (similar substance); LC50(48h) 33.5 mg/L (Ceriodaphnia dubia) (similar substance) Acute Crustacean Toxicity LC50 (96HR): 92500 MG/l (Nitocra spinipes). Chronic Toxicity (Product) Crystalline silica is a Group 1 carcinogen, respiratory (IARC). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).
Barite	Halliburton	Weighting Agent	20.251%	Acute Toxicity Acute Fish Toxicity 96hr LC50: 76000 mg/L (Oncorhynchus mykiss) EPA Ref #896; 48 hr LC50 >3594790 mg/L (Pimephales promelas) Report # BL8279; 48 hr LC50 >85556 mg/l (Daphnia Pulex) Reprot #BL8377; Bioassay testing where LC50/EC50: >100 mg/l Chronic Toxicity Crystalline silica is a Group 1 carcinogen, respiratory (IARC). Biodegradation / bioaccumulation Biodegradation N/a given inorganic and naturally occurring
SEM 8	Halliburton	Emulsifier	0.998%	Acute Toxicity Fish: TLM96: 342 mg/l (Scophthalamus maximus); Crustaceans:TLM48: 23.3 mg/l (Acartia tonsa); Algae: EC50: 78 mg/l (Skeletonema costatum). Source: IUCLID 2000 Chronic Toxicity Repeated overexposure may cause liver and kidney effects Biodegradation / bioaccumulation COD: 149 mg O2 per 100 ppm product

PEN 5M	Halliburton	Cleaner	0.342%	**Constituent 1 (<60%)** Acute Toxicity EC50 0.07mg/l (algae - Selenastrum capricornutum); EC50 0.39 mg/l (Daphnia), from Warne, 1999 Biodegradation / bioaccumulation BCF values of AEs in fish range from <5 to 233. Chronic Toxicity (Product) Repeated overexposure may cause liver and kidney effects. May contain ethylene oxide in the headspace of the drum. Ethylene oxide is a cancer and reproductive hazard. **Constituent 2 (<60 %)** No Hazard (Water) **Constituent 3** Acute Toxicity Fish: 96h LC50: 9640 mg/l (Pimephales promelas); Crustaceans: 48h LC50: 1400 mg/l (Crangon crangon); Algae: EC50: >1000 mg/l (Scenedesmus subspicatus)
		Total	100.00%	

C. Chemical List

Chemicals within products in Part B	CAS Number	Mass fraction(%)**
Water	7732-18-5	< 70%
Barite	13462-86-7	~ 20 %
Crystalline Silica, quartz	14808-60-7	< 9%
Sepiolite	63800-37-3	< 3%
Polyethylene glycol (C6-C10) alkyl ether, sulfate ammonium salt	68037-05-8	<1%
Diatomaceous earth (Natural form of amorphous silica)	61790-53-2	<1%
Whelan gum	72121-88-1	<0.5%
Crystalline Silica, cristobalite	14464-46-1	<0.5%
Isoproponol	67-63-0	<0.5%
Alcohols, C12-16, ethoxylated	68551-12-2	<0.5%
Isoproponol	67-63-0	<0.5%
Citric Acid	77-92-9	<0.1%
Alcohols, C6-10, ethoxylated	70879-83-3	<0.1%
Total		100%

**component concentrations are approximate

Chemical Disclosure Details continued

A. System Details	
OPERATOR:	Chevron Australia
PROJECT / WELL:	Gorgon Project: Barrow Island Drilling and Completions Program
SYSTEM:	High Performance Water Based Mud
TOTAL VOLUME OF SYSTEM:	3785.41 m^3

B. Product List

Trade name	Supplier	Purpose	Product in system fluid (%)*	Toxicity & Ecotoxicity Info
FLO-TROL	M-I SWACO	Fluid Loss Additive	0.33%	Acute Fish Toxicity Modified starch – naturally occurring, not considered toxic. According the US EPA starch has been verified to be of low concern based on experimental and modeled data. Chronic Toxicity Not classifiable as a Human Carcinogen as well (ACHIH A4) Biodegradation/Bioaccumulation: Not expect the bioaccumulate. Biodegradable
Citric Acid	M-I SWACO	pH Modifier	0.06%	Acute Toxicity: Fish LC50(96hr): 1516 mg/L (Lepomis macrochirus) Water flea EC50(72hr): 120 mg/L (Daphnia magna) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Biodegradation: readily (OECD 306)
KLA-STOP	M-I SWACO	Clay Control Agent	3.20%	Acute Toxicity: Fish LC50(96hr): > 752 mg/L (Scophthalmus maximus) Crustacean LC50(48hr): > 1001 mg/L (Arcartia tonsa) AlgaeEC50(72hr): 744 mg/L (Skeletonema costatum) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Log Pow: -0.38 (OECD 117) Biodegradation: 20% (OECD 306)
EMI-2009	M-I SWACO	Clay Control Agent	2.87%	Acute Toxicity: Fish LC50(96hr): > 1000 mg/L (Scophthalmus maximus) Crustacean LC50(48hr): 645 mg/L (Arcartia tonsa) AlgaeEC50(72hr): 695 mg/L (Skeletonema costatum) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Log Pow: 0 (OECD 117) Biodegradation: 10.7% (OECD 306)
SAFE-CIDE	M-I SWACO	Bactericide	0.01%	Acute Toxicity: Fish LC50(96hr): >300 mg/L (Scophthalmus maximus) Crustacean LC50(48hr): 178 mg/L (Arcartia tonsa) AlgaeEC50(72hr): 2.9 mg/L (Skeletonema costatum) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Log Pow: 0 (OECD 117) Biodegradation: 78% (OECD 306)

FLOWZAN	Drilling Specialties Company	Fluid Loss Additive	0.33%	**Xantham Gum** Acute Toxicity: Acute Fish Toxicity 48h LC50: 320-560 mg/L (Oncorhynchus mykiss); Source: ECOTOX Chronic Toxicity: Product contains no hazardous ingredients according to Globally Harmonized System of Classification and Labeling of Chemicals (GHS); this system is inclusive of ingredients which may cause chronic health hazards. Biodegradation/Bioaccumulation: Component is readily biodegradable **Calcium Stearate** Acute Toxicity: LD50 (Oral) Rat >10gm/kg LD50 (Intraperitoneal) Rat >10gm/kg LC (Inhalation) Mammal (unspecified) >1241 mg/m3/4H Chronic Toxicity: Product contains no hazardous ingredients according to Globally Harmonized System of Classification and Labeling of Chemicals (GHS); this system is inclusive of ingredients which may cause chronic health hazards. Biodegradation/Bioaccumulation: Biodegradable
IDCAP D	M-I SWACO	Clay Control Agent	0.62%	Acute Toxicity: Fish LC50(96hr): >1000 mg/L (Scophthalmus maximus) Crustacean LC50(48hr): 449 mg/L (Arcartia tonsa) AlgaeEC50(72hr): 639 mg/L (Skeletonema costatum) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Log Pow: -5.84-0.58 (OECD 117) Biodegradation: 0% (OECD 306)
POROSEAL	M-I SWACO	Fluid Loss Additive	3.22%	Acute Toxicity: Fish LC50(96hr): >211 mg/L (Cyprinodon variegatus) Crustacean LC50(48hr): 1038 mg/L (Arcartia tonsa) AlgaeEC50(72hr): 210 mg/L (Skeletonema costatum) Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/Bioaccumulation: Log Pow: < 0 (OECD 117) Biodegradation: 36% (OECD 306)
Barite	M-I SWACO	Weighting Agent	3.15%	Acute Toxicity Acute Fish Toxicity TLM96: 7500 mg/L (Oncorhynchus mykiss) Chronic Toxicity May contain small amounts of respirable crystalline silica, silica is a IARC Group 1 carcinogen Biodegradation / bioaccumulation N/a given inorganic and naturally occurring
Drispac SL	Drilling Specialties Company	Viscosifier and Fluid Loss Additive	0.33%	Acute Toxicity Golden orfe TLM96: > 500 mg/L () Oncorhynchus mykiss (rainbow trout) LC50 - 100 - 1,000 mg/l - 96 h Fresh Water Trout LC50 > 21,000 ppm/96hrs. Salt Water Stickel Back LC50 > 56,000 ppm/96hrs Daphnia EC50 - 87.26 mg/l - 48 h Chronic Toxicity Contains no hazardous ingredients according to Globally Harmonized System of Classification and Labeling of Chemicals (GHS); this system is inclusive of ingredients which may cause chronic health hazards. Biodegradation / bioaccumulation Expected to be biodegradable

Soda Ash	M-I SWACO	pH Modifier	0.06%	Acute Toxicity Ecotoxicity - Freshwater Algae - Acute Toxicity Data Sodium carbonate 120 Hr EC50 Nitzschia: 242 mg/L Ecotoxicity - Freshwater Fish - Acute Toxicity Data Sodium carbonate 96 Hr LC50 Lepomis macrochirus: 300 mg/L [static]; 96 Hr LC50 Pimephales promelas: 310 - 1220 mg/L [static] Ecotoxicity - Water Flea - Acute Toxicity Data Sodium carbonate 48 Hr EC50 Daphnia magna: 265 mg/L Chronic Toxicity No known carcinogenic properties or chronic impacts Biodegradation / bioaccumulation Biodegradation N/a given inorganic Not bioaccumulating
Calcium Carbonate	M-I SWACO	Bridging Agent	1.19%	Acute Toxicity LC50 Fish 96 h > 10'000 mg/l LC50 Daphnia 49 h > 1000 mg/l LC50 Algae 72 h > 200 mg/l Chronic Toxicity: May contain small amounts of respirable crystalline silica, silica is a IARC Group 1 carcinogen. Biodegradation / bioaccumulation N/a given inorganic and naturally occurring
Potassium Chloride	M-I SWACO	Clay Control Agent	3.17%	Acute Toxicity: Acute Crustacean Toxicity TLM96: 100-330 mg/L (Crangon crangon) Chronic Toxicity: Classified as Non-Hazardous according to the criteria of NOHSC: No known carcinogenic properties or chronic impacts Biodegradation / bioaccumulation: N/a given inorganic and naturally occurring
Water		Mix Water	81.4600%	No Hazard
*Given as % by volume		**Total**	100.00%	

C. Chemical List

Chemicals within products in Part B	CAS Number	Mass fraction (%)*,**
Water (Including Mix Water Supplied by Client)*	7732-18-5	~ 74%
Barium sulfate	7727-43-7	~ 12%
Potassium chloride	7447-40-7	~ 6%
Calcium carbonate	471-34-1	~ 3%
Polyoxypropylene diamine	9046-10-0	~ 2%
Carboxymethylcellulose sodium salt	9004-32-4	~ 1%
Starch, 2-hydroxyethyl ether, polymer with 1,3-butadiene and ethenylbenzene, graft	145565-30-6	~ 1%
Starch, 2-hydroxypropyl ether	9049-76-7	< 1%
Xanthan gum	11138-66-2	< 1%
Polyoxypropylene diamine salt	N/A	< 1%
Hydroxypropyl acetate, sodium acrylate, acrylic acid terpolymer	86864-96-2	< 1%
Sodium carbonate	497-19-8	< 1%
Citric acid	77-92-9	< 0.1%
Crystalline silica (impurity)	14808-60-7	< 0.1%
Octadecanoic acid, calcium salt	1592-23-0	< 0.1%

2, 2',2"-(Hexahydro-1,3,5-triazine-1,3,5-triyl) triethanol	4719-04-4	< 0.01%
3,3'-Methylenebis[5-methyloxazolidine]	66204-44-2	< 0.01%
Styrene, monomer	100-42-5	< 0.001%
GLYCINE, N,N-BIS[2-[BIS(CARBOXYMETHYL) AMINO]ETHYL]-, PENTASODIUM	140-01-2	< 0.001%
4-Vinylcyclohexene	100-40-3	< 0.001%
Glycine, N,N`-1,2-ethanediylbis[N-(carboxymethyl)-, tetrasodium salt	64-02-8	< 0.001%
Ethanolamine	141-43-5	< 0.001%
Acrylic acid	79-10-7	< 0.00001%
Butadiene-, 1,3	106-99-0	< 0.00001%
Total		100%

*Given as % by mass
**component concentrations are approximate

Chemical Disclosure Details continued

A. System Details	
OPERATOR:	Chevron Australia
PROJECT / WELL:	Gorgon Project: Barrow Island Drilling and Completions Program
SYSTEM:	Clay Stabilization
TOTAL VOLUME OF SYSTEM:	2,770 m^3

B. Product List

Trade name	Supplier	Purpose	Product in system fluid (%)*	Toxicity & Ecotoxicity Info
Water	-	Mix water	96.21%	No Hazard
DCA-16002	Halliburton	Clay Stabilizer	0.642%	CONSTITUENT 1 (≤60%): No Hazard (Water) CONSTITUENT 2 (≤60%): Acute Toxicity: Acute Algae Toxicity 72h IC50: >10,000-1,000,000 mg/L (Pseudokirchneriella subcapitata) Acute Invertebrates Toxicity 48h EC50: 10-100 mg/L (Daphnia magna) Acute Fish Toxicity 96h LC50: >10,000-1,000,000 mg/L (Danio rerio) Biodegradation / bioaccumulation: Bioaccumulation: Based on its structural properties, the this constituent is not biologically available. Biodegradation: Ratie BOD/ThBOD: 88% CONSTITUENT 3 (≤1%): Acute Toxicity: Acute Fish Toxicity 96h LC50: 1000 mg/L (Morone saxatilis) Acute Crustacean Toxicity 48h EC50: 402.6 mg/L (Daphnia magna) Algae Toxicity 96h EC50: 2430 mg/L (Navicula seminulum) Biodegradation / bioaccumulation: Biodegradation: Not Applicable (Inorganic) Bioaccumulation: Not Applicable (Inorganic) CONSTITUENT 4 (≤1%): Acute Toxicity: Acute Fish Toxicity 96h LC50: 120 mg/L (Gambusia affinis); Acute Crustacean Toxicity 48h LC50: 578 mg/L (Daphnia magna); Acute Algae Toxicity 120h EC50: 1900 mg/L (Nitzschia linearis); Biodegradation / bioaccumulation: Biodegradation: Not Applicable (Inorganic); Bioaccumulation: Not Applicable (Inorganic) CONSTITUENT 5 (≤0.1%): Acute Toxicity: Acute Algae Toxicity 72h EC50: 2.77 mg/L (Desmodesmus subspicatus); Acute Fish Toxicity 96h LC50: 121 mg/L (Lepomis macrochirus); Acute invertibrates Toxicity 24h EC50: 625 mg/L (Daphnia magnus); Acute Microornanism Toxicity 30m EC20: >1000 mg/L (activated sludge, industrial); Biodegradation / bioaccumulation: Birdegradation: 8% @ 28days (OECD 302B); Bioaccumulation: BCF: 1.8 (Lepomis macrochirus, juvenile) Chronic Toxicity (Product): No known carcinogenic properties or chronic impacts
Ammonium Chloride	Halliburton	Clay Stabilizer	3.15%	Acute Toxicity: Acute Algae Toxicity: EC50: 40-70 mg/l (Skeletonema costatum); EC50(10d): 90.4 mg/L (Navicula sp.); EC(10d): 26.8 mg/L (growth rate) (Navicula sp.); EC50(5d): 1300 mg/L (growth rate) (Chlorella vulgaris); Acute Fish Toxicity: LC50(96h): 275 mg/L (Cyprinus carpio); LC50(96h): 163 mg/L (Pimephales promelas); LC50(96h): 218 mg/L (Lepomis cyanellus); LC50(96h): 34 mg/L (Oncorhynchus mykiss); NOEC(28d): 11.8 mg/L (Pimephales promelas); Acute Microorganism Toxicity: EC50(30m): 1618 mg/L (activated sludge, domestic); Acute Invertebrate Toxicity: TLM96: 16 mg/l (Crangon crangon); EC50(48h): 101 mg/L (Daphnia magna); NOEC(21d): 14.6 mg/L (Daphnia magna) Biodegradation / bioaccumulation: Not Applicable (Inorganic)

				Chronic Toxicity No known carcinogenic properties or chronic impacts
XC24117 (contingency)	Baker Hughes	Biocide	0.09%	**Component 1 (10-30% concentration)** Acute Toxicity Static Acute Saltwater Toxicity - Species: *Acartia tonsa:* Lethal Concentration 50%, 48 hours 2.8 mg/L, No Observed Effect Concentration 0.5 mg/L. Species: *Skeletonema costatum:* Effective Concentration 50%, 72 hrs 0.35 mg/L. No Observed Effect Concentration 0.11 mg/L. Static Acute Renewal Saltwater Toxicity - Species: Sheepshead minnow: Lethal Concentration 50%, 96 hours 25 mg/L. No Observed Effect Concentration 12.5 mg/L. **Component 2 (1-5% concentration)** Acute toxicity Static Acute Freshwater Toxicity - Species: *Daphnia magna:* Lethal Concentration 50%, 48 hours 0.04 mg/L. No Observable Effect Concentration, 48 hs. Species: Fathead minnow: Lethal Concentration 50%, 96 hours 0.33 mg/L. No Observable Effect Concentration, 96 hrs 0.13 mg/L. Component 3 (0.1-1% concentration) Acute toxicity Species: rat: Lethal Concentration 50%, 14 days; 5,600 mg/kg bw. **Component 4 (30-60% concentration)** Acute toxicity Not applicable (water) **Product** Biodegradation / bioaccumulation (product): A freshwater OECD301D "Closed Bottle Study" was conducted on the finished product (XC24117). The 28 day percent biodegradation was 64%; the product is readily biodegradable. Chronic Toxicity (product) No known carcinogenic (R40, R45, R49), chronic (R33, R39, R48, R68), mutagenic (R46) or reproductive (R60, R61, R62, R63, R64) effects for this product.
XC24025 (contingency)	Baker Hughes	Biocide	0.09%	**Component 1 (10-30% concentration)** Acute Toxicity Saltwater Toxicity: Species: *Skeletonema costatum.* EC50, 72 hours 1.96 mg/L Static Acute Freshwater Toxicity: Species: Rainbow trout (*Oncorhynchus mykiss).* LC50, 96 hours 46.2 mg/L. Static Acute Renewal Saltwater Toxicity: Species: Mysid shrimp (*Americamysis bahia).* LC50, 96 hours 35.2 mg/L. Species: Inland silverside (*Menidia beryllina)* LC50 96 hours 79.3 mg/L. Static Acute Saltwater Toxicity: Species: *Acartia tonsa. LC50, 48 hours* 12.8 mg/L. Species: Sheepshead minnow *(Cyprinodon variegatus).* LC50%, 96 hours. 179 mg/L. **Component 2 (30-90% concentration)** Acute toxicity Not applicable (water) **Product** Biodegradation / bioaccumulation (product): Method: OECD306. Biodegradability 28 days: 73% (readily biodegradable) Log Pow: 1.14 Chronic Toxicity (product) No known carcinogenic (R40, R45, R49), chronic (R33, R39, R48, R68), mutagenic (R46) or reproductive (R60, R61, R62, R63, R64) effects for this product.
*Given as % by volume		**Total**	100.18%	

C. Chemical List

Chemical Name	CAS Number	Mass fraction (%)**
Customer Supplied Water	No CAS	~ 94.44%
Ammonium Chloride	12125-02-9	~ 4.72%
Polydimethyl diallyl ammonium chloride	26062-79-3	~ 0.412%

Water in Products	7732-18-5	~ 0.412%
Sodium Chloride	7647-14-5	~ 0.00687%
Sodium Sulfate	7757-82-6	~ 0.00687%
Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8	~ 0.000687%
Water in Products	7732-18-5	~ 0.14%
Gluteraldehyde	111-30-8	~ 0.0333%
C12-16 Alkylbenzyldimethylammonium chloride	6824-85-1	~ 0.00294%
Methanol	67-56-1	~ 0.00017%
Total		~ 100.18%*

*denotes contingency chemical, or figure affected by contingency chemical/s
**component concentrations are approximate

Chemical Disclosure Details continued

A. System Details	
OPERATOR:	Chevron Australia
PROJECT / WELL:	Gorgon Project: Barrow Island Drilling and Completions Program
SYSTEM:	Dewatering Chemicals
TOTAL VOLUME OF SYSTEM:	1500 m3

B. Product List

Trade name	Supplier	Purpose	Product in system fluid (%)*	Toxicity & Ecotoxicity Info
Water	-	Mix water	91.5%	No Hazard
Alcomer 24	BASF Australia Ltd	Dewatering	2%	**Ingredient 1 - [90 - 95%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 100 mg/l, Oncorhynchus mykiss (static); Daphnia toxicity: LC50 (48 h) > 100 mg/l, Daphnia magna Biodegradation / bioaccumulation: Biodegradation: Poorly biodegradable **Ingredient 2 - [< 5%]** Water – No Hazard **Ingredient 3 [< 2%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 6810 mg/L, Golden orfe; Daphnia toxicity: EC50 (24 h) > 10000 mg/l, Daphnia magna; Biodegradation / bioaccumulation: Biodegradation: DOC reduction: 96% after 16 d (Biodegradable) **Ingredient 4 [< 0.02%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 100 mg/L (calculated) Biodegradation / bioaccumulation: Biodegradation: Not readily biodegradable (by OECD criteria) **Ingredient 5 [< 0.02%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 100 < 150 mg/L, Golden orfe; Biodegradation / bioaccumulation: Biodegradation: DOC reduction: 10 - 70% after 18 d (Moderately/partially eliminated from water) Chronic Toxicity (Product): MSDS indicates potential to cause irritation to eyes, skin and respiratory system
Alcomer 115	BASF Australia Ltd	Dewatering	2%	**Ingredient 1 - [90 - 95%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 100 mg/l, Oncorhynchus mykiss (static); Daphnia toxicity: LC50 (48 h) > 100 mg/l, Daphnia magna; Biodegradation / bioaccumulation: Biodegradation: Poorly biodegradable **Ingredient 2 - [4%]** Water – No Hazard **Ingredient 3 [5%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 6810 mg/L, Golden orfe; Daphnia toxicity: EC50 (24 h) > 10000 mg/l, Daphnia magna Biodegradation / bioaccumulation: Biodegradation: DOC reduction: 96% after 16 d (Biodegradable) Chronic Toxicity (Product): MSDS states that based on the ingredients there is no suspicion of a carcinogenic effect in humans. MSDS indicates potential to cause irritation to eyes, skin and respiratory system
Alcomer 812	BASF Australia Ltd	Dewatering	2%	**Ingredient 1 - [90 - 95%]** Acute Toxicity: Fish toxicity: LC50 (96 h) 10 - 100 mg/l, Fish (static); Daphnia toxicity: EC50 (48 h) 10 - 100 mg/l, Daphnia magna Biodegradation / bioaccumulation: Biodegradation: not readily biodegradable **Ingredient 2 - [5 - 10%]** Water – No Hazard **Ingredient 3 [1 - 3 %]**

				Acute Toxicity: Fish toxicity: LC50 (96 h) ~ 230 mg/l, Golden orfe; Daphnia toxicity: EC50 (48 h) 46 mg/l, Daphnia magna; Algal toxicity: EC50 (72 h) 59 mg/l, Green algae Biodegradation / bioaccumulation: Biodegradation: BOD of the ThOD: 83% after 30 d (Biodegradable) Chronic Toxicity (Product): MSDS indicates potential to cause irritation to eyes, skin and respiratory system
Magnafloc LT25	BASF Australia Ltd	Dewatering	3.5%	**Ingredient 1 - [85 - 90%]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 100 mg/l, Oncorhynchus mykiss (static); Daphnia toxicity: LC50 (48 h) > 100 mg/l, Daphnia magna Biodegradation / bioaccumulation: Biodegradation: Poorly biodegradable **Ingredient 2 - [5 - 10 %]** Water – No Hazard **Ingredient 3 [1 - 5 %]** Acute Toxicity: Fish toxicity: LC50 (96 h) > 6810 mg/L, Golden orfe; Daphnia toxicity: EC50 (24 h) > 10000 mg/l, Daphnia magna Biodegradation / bioaccumulation: Biodegradation: DOC reduction: 96% after 16 d (Biodegradable) Chronic Toxicity (Product): MSDS indicates potential to cause irritation to eyes, skin and respiratory system
*Given as % by volume		**Total**	100.00%	

C. Chemical List

Chemical Name	**CAS Number**	**Mass fraction (%)****
2-Proponoic acid, sodium salt, polymer with 2-propenamide	25085-02-3	<8%
Water	7732-18-5	>90%
Urea	57-13-6	<1%
Imidodicarbonic diamide	108-19-0	<0.01%
Urea, reaction products with formaldehyde	68611-64-3	<0.01%
Ethanaminium, N,N,N-trimethyyl-2-[(1-oxo-2-propenyyl)oxy]-, chloride, polymer with 2-propenamide	69418-26-4	<2%
Adipic acid	124-04-9	<0.5%
Total		100%
**component concentrations are approximate		

Chemical Disclosure Details continued

A. System Details	
OPERATOR:	Chevron Australia
PROJECT / WELL:	Gorgon Project: Barrow Island Drilling and Completions Program
SYSTEM:	Inhibited Completion Fluids
TOTAL VOLUME OF SYSTEM:	1000 m3

B. Product List

Trade name	Supplier	Purpose	Product in system fluid (%)*	Toxicity & Ecotoxicity Info
Water	N/A	Base Fluid	~74	
SAFE-SCAV CA	MI SWACO	Oxygen Scavenger	<0.1%	Acute Toxicity: Inhalation of dust in high concentration may cause irritation of respiratory system. ***Eye contact*** *May cause slight irritation.* ***Skin contact*** *Prolonged contact may cause redness and irritation.* ***Ingestion*** *Ingestion may cause stomach discomfort.* LD50 Oral > 5 g/kg (Rat) Chronic Toxicity: Repeated or prolonged contact may cause allergic reactions in very susceptible persons. EcoToxicity: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. Biodegradation/Bioaccumulation: Not readily biodegradable. Does not bioaccumulate.
Potassium Chloride	M-I Swaco	Brine	~26	Acute Toxicity: = 2600 mg/kg LD50 Oral (Rat) Ecotoxicity: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. 1060 mg/L LC50 (Lepomis macrochirus) = 96 h 825 mg/L EC50 (Daphnia magna) = 48 h 2500 mg/L EC50 (Aquatic Plants) = 72 h Biodegradation/Bioaccumulation: Degradability not applicable- Inorganic material. Does not bioaccumulate.
CONQOR 303A	MI SWACO	Corrosion Inhibitor	<1	Acute Toxicity: = 5000 mg/kg LD50 Oral (Rat) > 2000 mg/kg LD50 Dermal Chronic Toxicity: May cause sensitization by skin contact Ecotoxicity: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. Algae: > 100 mg/L EC50 72h Fish: >100 mg/L LC50 96h Daphnia and other aquatic invertebrates: > 100 mg/L EC50 48h Biodegradation/Bioaccumulation: Product is biodegradable. No bioaccumulation expected due to high molecular weight.

NUOSEPT 78 / Safe Cide	TROY CORPORATION / Mi Swaco (Renaming of product by MI to NUOSPET 78)	Preservative	<0.05	Acute Toxicity: > 2000 mg/kg LD50 Dermal (Rat) 1009 to 3950 mg/kg LD50 Oral (Rat- female) Chronic Toxicity: Eyes (Rabbit) - Cornea opacity - 21 days - score 59 Skin (Rabbit) - mild irritant Skin (Mouse) - sensitizing Ecotoxicity: 10 - 100 mg/L Acute EC50 (Daphnia) 48 h 10 - 100 mg/L Acute LC50 (Fish) 96 h Biodegradation/Bioaccumulation: Product readily biodegradable. Low Potential to bioaccumulate.
SODA ASH	MI SWACO	pH Modifier	<0.1	Acute Toxicity: = 4090 mg/kg LD50 Oral (Rat) Ecotoxicity: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. 300 mg/L LC50(Lepomis macrochirus) = 96 h 310 - 1220 mg/L LC50 (Pimephales promelas) = 96 h 242 mg/L EC50 (Nitzschia) = 120 h 265 mg/L EC50 (Daphnia magna) = 48 h Biodegradation/Bioaccumulation: Not applicable - Inorganic chemical
*Given as % by volume		**Total**	100.00%	

C. Chemical List

Chemical Name	CAS Number	Mass fraction (%)**
Water (Including Mix Water Supplied by Client)*	-	~ 74
Potassium Chloride Brine	7447-40-7	~ 26
2-aminoethanol	141-43-5	< 0.01
Sodium carbonate	497-19-8	< 0.1
Hexahydro-1,3,5-tris(2-hydroxyethyl)-sym-triazine	4719-04-4	< 0.1
2,3-didehydro-3-O-sodio-D-erythro-hexono-1,4-lactone	6381-77-7	< 0.1
Ethanol, 2,2'-oxybis-, reaction products with ammonia, morpholine derivs. residues	68909-77-3	< 1
Total		100%
**component concentrations are approximate		