Thevenard Island Onshore Well Securement – TVI-1 Mechanical Isolation Bridging Document

Environment Plan Summary

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Contents

Tables

Figures

1.0 Introduction

Chevron Australia Pty Ltd (Chevron) is the proponent and nominated operator of the Thevenard Island (Thevenard Island) Joint Venture within the production licence L12 containing the Thevenard Island Well 1 (TVI-1) (Figure 1-1).

TVI-1 was originally drilled, plugged and abandoned in 1968 as no economically producible hydrocarbons were encountered (pursuant to Licence to Prospect LP-164H under the Petroleum Act 1936 (WA)). Surface gas seepage was detected in the vicinity of the well during environmental monitoring in 2014. As a result, there is a requirement to secure TVI-1.

A Bridging Document (the Plan) to the Thevenard Island Onshore Well Securement Environment Plan (ABU160500673) (TVI OWS EP) was prepared to include the TVI-1 mechanical isolation activity.

The Plan was developed for the purpose of:

- Defining the once off activity of the isolation of TVI-1;
- Identifying the potential environmental impacts and risks associated with TVI-1 mechanical isolation in addition to those impacts already identified in the TVI OWS EP; and
- Identifying the management strategies that will be implemented to reduce the potential impacts of the TVI-1 mechanical isolation activities on Thevenard Island to as low as reasonably practicable (ALARP) and to an acceptable level.

1.1 Scope

The scope of the Plan addresses the mechanical isolation of TVI-1.

1.2 Location

TVI-1 (Figure 1-1) is located on Production Licence L12 (L12), external to the 25 hectare (ha) site leased from the Department of Biodiversity, Conservation and Attractions (DBCA) (the 'CALM Act Lease'). Access to the TVI-1 site has been provided through agreement with DBCA as the managers of the Thevenard Island Reserve.

1.3 Timeframes

The activities are proposed to commence Quarter 3 2017 for an approximate duration of 10 days.

1.4 Nominated Operator Contact Details

Chevron Australia Pty Ltd (Chevron) is the proponent and the nominated operator for the Thevenard Island Joint Venture., which includes the following participants:

- Chevron Australia Pty Ltd
- Chevron (TAPL) Pty Ltd
- Santos Offshore Pty Ltd
- Mobil Australia Resources Company Pty Ltd.

Further information regarding Thevenard Island well securement activities can be obtained by contacting the Policy, Government and Public Affairs (PGPA) Operations Manager, contact details are listed in Table 1-1.

Table 1-1: Nominated Operator Contact Details

Company Name	Chevron Australia Pty Ltd
Contact Person	Graeme Harman
Business Address	GPO Box S1580, Perth WA 6845
Telephone Number	08 9216 4000
Email Address	ask@chevron.com

Figure 1-1: Thevenard Island TVI-1 Location and Site Plan

2.0 Description of the Petroleum Activity

The TVI-1 mechanical isolation scope will involve the installation of a surface mechanical isolation device at TVI-1. It is anticipated to take approximately 10 days to complete, requiring a workforce of approximately 8 people undertaking activities within daylight hours, unless there is an emergency situation that may require night works and lighting. The scope is proposed to commence in Quarter 3 2017.

The operation may be split into 2 phases with the site preparation and well clean-up being performed separately to the isolation device installation (Section 2.3).

2.1 Description of Infrastructure

TVI-1 (Figure 1-1) was an exploration well drilled by West Australian Petroleum Pty Ltd (WAPET) in March/April 1968 pursuant to Licence of Prospect Lp-164H (expired on 20 March 1969). As no economically producible hydrocarbons were encountered from the well, it was plugged and abandoned (at the time of drilling in April 1968) to the standard required at the time. Surface gas seepage was detected in the vicinity of the well, which is located within the area of current production licence L12, during environmental monitoring in 2014. Site investigations were undertaken in Q4 2016 to expose the TVI-1 casing and confirm the location of the well.

2.2 Operational Area

TVI-1 is located on L12 within the footprint defined under vegetation clearing permit CPS 7024/1 granted under Section 51E of the Environmental Protection Act 1986 (WA) (TVI-1 Footprint). The clearing permit provides for an access route to the TVI-1 well location and a maximum work area of 100 m x 100 m (Figure 1-1).

2.3 TVI-1 Well Mechanical Isolation Activity

TVI-1 mechanical isolation activities include:

- Site preparation - this will involve the removal of the fence around TVI-1 and the removal of the Ambi-sense monitoring system. An excavator will be used to excavate the area around the wellhead.
- Well clean up - the casing bores will be cleaned using a combination of hand and air powered tools. Casing strings may also be trimmed and cleaned in preparation for the installation of the mechanical isolation equipment. The preparation of the casing strings may involve using cutting tools. Cooling water (sea water or bore water) will be used for cooling throughout the cleaning of the casing bores and the cutting of the casing strings. Approximately 20m^3 of cooling water may be required, which be stored in Intermediate Bulk Containers (IBC).
- Mechanical isolation device installation – An isolation device will be welded in place once the well casing is prepared. The mechanical device will be lowered over the 8 5/8” casing and will isolate the will isolate the 11 ¾” x 8 5/8” annulus bore. a gate valve assembly with adaptor will be bolted to the lower isolation device effectively isolating the 8 5/8” casing bore. A resin may also be placed in the 8 5/8” casing bore to act as an additional barricade. The volume and constituents of the resin is provided in Appendix 1.
- Post mechanical isolation – once the mechanical isolation is welded in place, removal of the existing 55 gallon drum and cement attached to the 16 inch casing be undertaken using air driven and hand tools. X-rays will be taken of the TV-1 casing bore to determine the vertical extent of the cement in 8 5/8 by 11 ¾” annulus and this information will be used in future scopes of work. Once the activities are

complete the site will be restored, fenced and Ambisense remote monitoring system will be re-installed.

2.3.1 Logistics

2.3.1.1 Workforce and equipment

Equipment and personnel will be mobilised to island via combination of work boat and LCT, as described in the TVI OWS EP.

If the boat ramp hard stand is inaccessible due to sand accumulation, sand will be removed and stored in existing sand stockpile areas on the cement stabilised sand laydown with adequate buffer between the top of the beach and the stockpile.

2.3.1.2 Transportation on Thevenard Island

Personnel and equipment will be mobilised on TVI via utility vehicles and /or Polaris buggy. An excavator will also be mobilised for the works. Access to the TVI-1 site will occur through the CALM Act Lease and via an existing access track within the TVI-1 Footprint.

2.3.1.3 Waste Management

Small volumes of liquid (up to 2 litres) from the well will be decanted into larger ISO tanks stored on the island for future disposal.

Waste generated from abrasive blasting will be collected and stored on site in an appropriate waste receptacle prior to being disposed at the mainland by a licenced contractor and at a licenced waste facility.

Skips will be used for the storage of rubbish (cement, steel cuts, seals, plastic bags) and any contaminated soils. These will be removed from the island at the end of the activity and disposed at the mainland by a licenced contractor and at a licenced waste facility.

Based on previous work conducted at this site, no Naturally Occurring Radioactive Materials were encountered and are therefore not expected during this activity.

3.0 Description of the Environment

Thevenard Island is a Nature Conservation Reserve (Reserve No. 33174) vested in the Conservation and Parks Commission and managed by DBCA under the CALM Act. The reserve is primarily for the protection of seabird and shorebird populations utilising coastal habitats. Thevenard Island is also part of the Islands Exmouth Gulf and Rowley Shelf listed on the Register of the National Estate (No. 5/08/190/004) for the conservation value of their seabed, turtle nesting sites, and populations of small mammals on some islands.

3.1 Physical Environment

Thevenard Island is a low, relatively flat, vegetated mid shelf cay approximately 5 km long by 1 km wide. Thevenard Island covers an area of approximately 550 ha with an average height above sea level of 5 m Australian Height Datum (AHD). The surrounding shallow sea constitutes the continental shelf and comprises up to 250 m of lime cemented sand, grit, conglomeratic and coral reef deposits of Quaternary age, overlying Tertiary limestones of the Cape Range Group (LeProvost et al., 1987). No natural drainage patterns exist on TVI and rainfall infiltrates the sandy soils and directly recharges the shallow unconfined superficial groundwater. The unconfined groundwater aquifer is present within the Aeolian sands between 1 and 7 m (Golder 2011).

Water depths near the Thevenard Island marine facilities and offshore areas range from ~1 m to ~17 m (Fugro 2013). Around Thevenard Island, which forms part of the Rowley Shelf, sediments are mainly composed of sand particles, with the largest particles either medium or coarse sand (Oceanica 2013).

The benthic marine environment within the Thevenard Island area is broadly characterised by five intertidal and subtidal habitats (sandy beaches, intertidal limestone pavement, subtidal limestone pavement, coral communities, subtidal sand).

3.2 Biological Environment

The vegetation on Thevenard Island consists of four vegetation sub-formations that largely correspond to prevalent small-scale geomorphic units: the inland ridge system, fringing coastal foredunes, coastal plain towards the western end of Thevenard Island and disturbed or semi-disturbed ground (Astron Environmental, 2006). TVI-1 is located on the inland ridge system.

According to the DPaW Declared Rare and Priority Flora list for the Pilbara region, no Declared Rare Flora (DRF) species are known to occur on Thevenard Island; however, the Priority 3 flora species, *Carpobrotus sp. Thevenard Island* occurs on the island.

To date, 102 plant taxa have been identified on the CALM Act Lease and the DBCA Nature Reserve. Since operations commenced, 11 environmental weed species and 20 mainland native species have been recorded as introduced to Thevenard Island (Astron Environmental 2013a). Results from weed management and monitoring programs conducted in 2014-2015 recorded 12 weed species on the CALM Act Lease (Astron Environmental 2015).

The DBCA advised there is an occurrence of Priority Ecological Community (PEC) #24, previously recorded on Barrow Island. This PEC is further described as 'Coastal dune native tussock grassland dominated by *Whiteochloa airoides* (Priority 3)' and is located on the western side of Thevenard Island. A Priority 3 PEC is defined as a poorly known ecological community that do not meet adequacy of survey requirements and/or are not adequately defined.

The house mouse (*Mus domesticus*) and the Thevenard Island mouse (*Leggadina lakedownensis*) are the only two terrestrial mammal species found on Thevenard Island. The Thevenard Island mouse was recorded in 1985 (LeProvost et al. 1987), and the

house mouse is believed to have been anthropogenically introduced to Thevenard Island in approximately 1985 (Astron Environmental 2011).

A total of 76 bird species have been recorded during avifauna surveys on TVI between 1985 and 2013 (Astron Environmental, 2013). These bird species consist of resident and migratory bird species that utilise suitable habitats on Thevenard Island.

Five species of sea turtle occur in the waters of north-western WA, with Green Turtles (*Chelonia mydas*) particularly abundant in this region (Pendoley 1997). All five species are listed as Threatened and Migratory under the WA Wildlife Conservation Act 1950 and the Environmental Protection and Biological Conservation Act 1999.

Migrating humpback whales may be encountered in the offshore area of Thevenard Island between September and November, however the offshore area does not contain recognised migratory routes, known feeding, breeding or resting areas. Whale sharks are known to pass through and potentially feed in the offshore area of Thevenard Island while migrating to aggregation areas on the Ningaloo Coast. Dugongs are also likely to be present in the nearshore waters around Thevenard as seagrass around the island has been suggested to be important Dugong habitat (Preen et al. 2007).

3.3 Cultural Heritage

Thevenard Island is not within any Native Title area. A search of the Department of Planning, Lands and Heritage database indicated that there were no known registered Aboriginal heritage sites nor any other heritage places located within the area of the proposed works. In addition, excavation works for the TVI-1 well isolation activity will not go outside the previous TVI-1 works area of disturbance which was cleared with a member of the Thalanyji people present to confirm no cultural significant material was disturbed.

3.4 Socio-Economic Environment

The Pilbara coastal region is one of WA's largest resource development and industrial areas. Important industries include petroleum, iron ore export, salt production and aquaculture. A major shipping port is located at Dampier to facilitate exports from this region, as well as a number of smaller ports in the region.

Major commercial fisheries operate out of both Exmouth and Onslow. Exmouth also supports a growing tourism industry, primarily centred on the area's marine attractions. Recreational fishing charters regularly visit the waters around the offshore islands of the region during the winter tourist season.

4.0 Major Environmental Hazards and Controls

A workshop was held on 12 April 2017 to review the TVI-1 mechanical isolation activities against the activities, risk sources and the potential impacts assessed and detailed in the TVI OWS EP. The review considered what risks identified in the TVI OWS EP would apply to the TVI-1 mechanical isolation activities. The review included consideration of the environmental consequence, likelihood, and level of residual risk assigned to each risk source, and the performance objectives, standards and criteria to manage the level of risk to ALARP. The level of residual risk was determined using Chevron's Integrated Risk Prioritisation Matrix.

Table 4-1 summarises the major environmental hazards, consequences and control measures relevant to TVI-1 mechanical isolation.

No increases in residual risk (consequence or likelihood) were identified for the TVI-1 mechanical isolation activities in consideration of the activities, risk sources and potential impacts already documented as part of the TVI OWS EP for the below listed aspects.

- ground and seabed disturbance
- terrestrial and marine fauna interaction
- waste
- noise and vibration
- discharges to the subterranean and terrestrial environment
- introduction of Non-Indigenous Species and Offshore.
- ignition sources
- loss of containment of well, fuel container and sea/bore water container.
- emergency night works.

Table 4-1: Major Environmental Hazards and Controls

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Ground and Seabed Disturbance		
Movement of mobile equipment	• Ground and vegetation disturbance	• All personnel have completed site inductions which includes vehicle movements restricted to the CALM Act Lease and TVI-1 Footprint, designated roads and tracks. • All drivers are trained and certified.
Barge landing	• Seabed disturbance	• Loading and unloading of equipment from barges at Thevenard Island use the barge landing area to avoid environmental sensitivities.
Terrestrial and Marine Fauna Interaction		
Movement of vehicles and mobile equipment	• Terrestrial fauna injury / casualty • Nesting fauna disturbance / behavioural change	• All personnel have completed site inductions which includes fauna management measures, personnel access restrictions and speed restrictions on Thevenard Island (40 km / hr). • All drivers are certified in accordance with Chevron Motor Vehicle Safety Process. • Active bird nests will not be disturbed during TVI-1 mechanical isolation activities.
Seawater extraction for cooling water	Marine fauna injury /casualty	• Intake hose has screen to prevent fauna ingress. • Visual monitoring during extraction of seawater. • Risk assessment for seawater extraction as part of the Permit to Work system.
Sand clearing on barge landing hard stand	Casualties to marine turtles during breeding season	• Barge landing hard stand area will be demarcated to prevent disturbance to adjacent beach during turtle breeding season (Nov – April). • All sand removed from the barge landing area will be stockpiled within the laydown area providing a 2 metre buffer away from the beach / laydown interface during turtle nesting and hatching season (Nov – April)

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Waste		
Unplanned release of wastes during storage and transport	Contamination of terrestrial or marine environment	• All personnel have complete site induction which includes waste management requirements. • All waste is appropriately segregated and contained within covered and labelled receptacles. When removed from Thevenard Island it will be disposed of at a licensed waste disposal facility on the mainland. • Hazardous wastes will be placed in containers and stored in secondary containment prior to removal. • Visual inspections of ISO-tanks containing waste generated during the TVI-1 mechanical isolation activity will be undertaken before demobilising due to cyclone to ensure no potential for windblown debris. • Controlled wastes are disposed of at a licenced waste disposal facility, in accordance with Environmental Protection (Controlled Waste) Regulations 2004 • Contaminated soil from a chemical spill would be bagged and removed off–island for appropriate disposal. • If soils are contaminated with hydrocarbons during the TVI-1 mechanical isolation activity, the contaminated soil will be stored within the lined Terminal Tanks bund for inclusion in remediation and rehabilitation under the *Contaminated Sites Act 2003.*
Noise and Vibration		
Noise generated by heavy machinery	Behavioural disturbance to fauna	• Site inductions include vehicle speed limit of 40 km/hr on Thevenard Island. • Equipment is maintained in accordance with maintenance schedule. • TVI-1 mechanical isolation activities are restricted to daylight operations.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Discharges to the Subterranean and Terrestrial Environment		
Reduce risk of impact to subterranean fauna from downhole discharges	Chronic impacts to subterranean environment	• Target formations for downhole discharges are geologically isolated from the surface aquifer. • Chevron has provided DMIRS with a list of all chemicals and required parameters used downhole (see Appendix 1). • Chevron's Chemical Assessment Tool used to assess all chemicals / cementing additives used downhole prior to use to ensure chemicals will not result in an unacceptable impact to the environment.
Discharge of sea/bore water (cooling water) during hot works	Contamination of soil and impacts to vegetation	• Discharge of cooling water is undertaken at the cleared excavated area only. • All personnel have completed site inductions which includes environmental measures for discharge of cooling water at the cleared excavated area during cleaning, cutting and hot works.
Release of abrasive blasting debris		• Abrasive blasting will be undertaken within an abrasive blasting habitat. • Abrasive blasting discharges will be collected in appropriate waste receptacles and disposed of at a licenced waste facility on the mainland.
Introduction and Spread of Non-Indigenous Species		
Movement of personnel and mobile equipment	Terrestrial flora, fauna and ecological community disturbance	• All personnel have completed on site induction which includes an overview of quarantine requirements for Thevenard Island onshore and nearshore environment. • Equipment quarantine checks undertaken prior to travelling to Thevenard Island, as per Quarantine Management Plan. • All new barges contracted to support onshore well securement activities undergo inspection confirming current and certified antifouling coating. • Vehicle movements are restricted to existing roads and tracks within the approved CALM Act Lease and TVI-1 Footprint.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Ignition Source		
Presence of ignition sources causing fire	Terrestrial flora, fauna and ecological community disturbance	• All personnel have completed site inductions which includes smoking restrictions, Permit to Work system and emergency response procedures • Mobile equipment and vehicles will be restricted to the CALM Act Lease, TVI-1 Footprint, designated roads and tracks • Permit to work obtained prior to conducting any hot work • Vehicle fitted with fire extinguisher • Excavator used during the activity will include: ignition source protection including spark arrestors; overspeed protection; top mounted exhaust; external mounted fire extinguisher. • A specialist contractor will undertake the well casing hot works activity. • Incident reporting process records any fires that occur during TVI-1 mechanical isolation activities.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Hydrocarbon and Chemical Spills		
Uncontrolled release of well fluids and loss of containment from double skinned fuel container or sea/bore water container	• Contamination of groundwater • Contamination of soil • Impacts vegetation	• All personnel have completed site inductions, which includes spill response procedures and responsibilities. • Fuel will be stored in a double skinned tanker container and inspected for leaks during use. • Refuelling undertaken in accordance with Hazard Analysis, which includes the following safeguards: - Use of spill tray during refuelling - Monitoring of fuel tank levels to avoid overfilling - Spill response equipment on-site during refuelling operations - Any spills cleaned up immediately. • TVI-1 mechanical isolation activities are undertaken in accordance with DMIRS approved Well Management Plan. • Well clean up activities are conducted in accordance with documented procedure which includes visual monitoring to ensure no discharges to the environment. • A spill kit is maintained on-site during TVI-1 mechanical isolation activities. • Any leak / spill is to be cleaned up immediately. • Spill response will be undertaken in accordance with Section 7.3 of the Plan (ABU16050067) in the event of a spill. • The Operation and Scientific Monitoring Program (ABU130700448) is implemented in the event of an uncontrolled release from a well to monitor response effectiveness and potential environmental effects
		• The TVI-1 Mechanical Isolation Oil Spill Contingency Plan (Section 7.3 of the EP) is implemented in the event of an uncontrolled release from a well. • JSA for the activity will identify hazard related to loss of containment of cooling water and associated mitigations including: - Stored cooling water located on the cleared footprint away from the direct path of the excavator on site - Volumes of cooling water maintained onsite will be limited to the minimal volume required for the works and will not exceed 1,000 L.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Control Measures
Emergency Night Works		
Presence of night lighting	Disorientation and behavioural impacts to fauna	• No care and maintenance activities planned to occur at night • In the event emergency nightworks are required during turtle nesting or hatching season, lighting impacts shall be reduced as follows: o Use only the minimal amount of light for the minimal amount of time required to safely executed the emergency activities, o Shielded, directed away from the beach and directed on the work area only, o Where possible, lower-frequency light sources (i.e. red or orange) shall be used, and blue/white lights avoided, o Weekly inspection undertaken from the beach to assess light levels in the event emergency nightworks is required to continue for a period of time.

5.0 Implementation Strategy

The implementation strategy in the Plan identifies the systems, practices, and procedures used to ensure the environmental impacts and risks of the activities are continuously reduced to ALARP and the environmental performance outcomes and standards are met.

5.1 Roles and Responsibilities

Personnel with specific responsibilities under the Plan were included during the environmental risk assessment and internal review processes, or will be made aware of their role-specific responsibilities through the inductions.

All Chevron personnel and contractors associated with the TVI-1 mechanical isolation activities will undertake the required inductions prior to commencing work. Inductions include a Thevenard Island site induction prior to arriving on site. The induction is tailored to be relevant to the different work scopes and work locations, and includes the requirements outlined in the Plan.

5.2 Auditing and Inspections

Audits and inspections relevant to the TVI-1 mechanical isolation activities will include:

- Environment Plan Compliance Audits
- Environmental Inspections.

The environmental inspection includes, but is not limited to, the environmental performance standards / controls included in the Plan and in Table 4-1. The inspection will be completed during every campaign visit to Thevenard Island. Any corrective actions will be tracked to closure (with supporting evidence) and signed off as completed by the relevant Supervisor.

5.3 Reporting

The implementation strategy of the Plan outlines reporting specific to Thevenard Island onshore well securement activities, which includes:

- Environmental performance reporting (annually)
- Emissions and discharges reporting (quarterly)
- Recordable incident reporting (monthly)
- Reportable incident reporting (as required).

6.0 Stakeholder Consultation

Chevron has continued to liaise with relevant stakeholders to advise and consult on Thevenard Island Retirement Project activities including onshore well securement and TVI-1 mechanical isolation. Relevant stakeholders have been engaged in relation to TVI-1 mechanical isolation include:

- Department of Mines, Industry Regulation and Safety (DMIRS)
- Department of Biodiversity, Conservation and Attractions (DBCA)
- Mackerel Island Pty Ltd (MIPL).

Table 6-1 provides a summary of recent communications with stakeholders regarding the TVI-1 mechanical isolation activities.

Table 6-1: Stakeholder Consultation for Well Workover Activities

Stakeholder	Issues Discussed and Outcomes
DMIRS	Chevron liaised with DMIRS in meetings, via email and telephone conversations throughout March and April in regards to the TVI-1 mechanical isolation activities. DMIRS recommended a bridging document to the existing Onshore Well Securement Environment Plan.
DBCA	Chevron liaised with DBCA officers on various occasions during March 2017 via email and telephone conversations in regards to the scope of work, officer availability to review the Plan and confirmation of the lawful authority previously provided to access the TVI-1 Footprint. A meeting with DBCA was undertaken in May 2017 where a detailed overview of the scope of works was provided and discussions were held on the availability of an Environmental Officer from DBCA to review the Plan. A version of the Plan was provided for review on 25 May 2017.
MIPL	As neighbouring lease holders on Thevenard Island, Chevron are in regular contact with MIPL on upcoming activities planned to be conducted on Thevenard Island. The most recent communication occurred in May 2017 on Thevenard Island with a MIPL representative regarding Chevrons planned 2017 work scopes, including TVI-1 well isolation.

Appendix 1 Chemical Disclosure

System Details

OPERATOR:	Chevron Australia PTY LTD
PROJECT / WELL:	TVI
SYSTEM:	WellLock mix
TOTAL VOLUME OF SYSTEM:	3 litres

Product List Details

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info	MSDS
Mix water	Operator	Mix water	43.1541%	N/A	N/A
Barite	Halliburton	Weighting Agent	32.2159%	CONSTITUENT 1 (≤100%): Oral LD50: >5000 mg/kg (Rat) Oral LD50: >3000 mg/kg (Mouse) Inhalation LC50: >1.1 mg/L (Rat, Aerosal, 4h) (similar substance Freshwater Acute Algae Toxicity 72h EC50: > 61.1 mg/L (*Pseudokirchneriella subcapitata*) [ECHA]; Freshwater Acute Crustacean Toxicity 48h LC50: 14.5 mg/L (*Daphnia magna*) [ECHA] (similar substance); Freshwater Acute Fish Toxicity 96h LC50: > 3.5 mg/L (Danio rerio) [ECHA]; Bioaccumulation Fish BCF: 1.2-74.4 (*Lepomis macrochirus*) [ECHA]; Biodegradation: Substance is inorganic - biodegradation is not applicable. CONSTITUENT 2 (≤5%): LD50 Oral: >15000 mg/kg (human) Freshwater Acute Crustacean Toxicity 24h LL50: > 10000 mg/L (*Daphnia magna*) [Health Canada] (similar substance); Freshwater Acute Fish Toxicity 96h LL0: 10000 mg/L (*Danio rerio*) [Health Canada] (similar substance); Bioaccumulation: Substance is inorganic - bioaccumulation is not applicable. Biodegradation: Substance is inorganic - biodegradation is not applicable. Carcinogenicity: Classified as a human carcinogen (IARC Group 1)	Yes
SEM-8	Halliburton	Emulsifier	0.5695%	CONSTITUENT 1 (≤100%): Oral LD50: >2000 mg/kg (Rat) (Similar Substance) Dermal LD50: >2000 mg/kg (Rat) (Similar Substance) Marine Water Acute Algae Toxicity 72h EC50: 32 mg/L (*Selenastrum capricornutum*) [Madsen et al., 2002] (similar substance); Freshwater Acute Crustacean Toxicity 96h EC50: 1.17 mg/L (*Daphnia magna*) [Madsen et al., 2002] (similar substance); Freshwater Acute Fish Toxicity 96h LC50: 1-2.5 mg/L (*Salmo trutta*) [Madsen et al., 2002] (similar substance); Marine Water Biodegradation 28d: 61% [OSPAR]; CONSTITUENT 2 (≤30%): Oral LD50: 5840 mg/kg (Rat) Dermal LD50: 12870 mg/kg (Rabbit)	Yes

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info	MSDS
				Inhalation LC50: 72.6 mg/L (Rat) 4h Vapor Freshwater Acute Algae Toxicity 72h EC50: > 1000 mg/L (*Scenedesmus subspicatus*) [IUCLID]; Freshwater Acute Crustacean Toxicity 24h EC50: > 10000 mg/L (*Daphnia magna*) [ECHA]; Freshwater Acute Fish Toxicity 96h LC50: 9640 mg/L (*Pimephales promelas*) [ECHA]; Bioaccumulation Log Pow: 0.15 [IUCLID]; Freshwater Biodegradation 14d: 83% [HSDB]; CONSTITUENT 3 (≤30%): No Hazard - Product is naturally occurring CONSTITUENT 4 (≤1%): Oral LD50: 600 mg/kg (Rat) (Similar Substance) Dermal LD50: >2000 mg/kg (Rat) Similar Substance Freshwater Acute Algae Toxicity 96h EC50: 0.7 mg/L (*Selenastrum capricornutum*) [CCID] (similar substance); Freshwater Acute Crustacean Toxicity 48h EC50: 0.39 mg/L (*Ceriodaphnia* **dubia**) [CCID] (similar substance); Freshwater Acute Fish Toxicity 96h LC50: 1.4 mg/L (*Pimephales promelas*) [CCID] (similar substance); Bioaccumulation BCF: 12.7-237 [ECHA] (similar substance); Freshwater Biodegradation 28d: 72% [ECHA] (similar substance); No data available to indicate product or components present at greater than 0.1% are chronic health hazards	
PEN-5M	Halliburton	Cleaner	1.2179%	CONSTITUENT 1 (≤60%): LD50 Oral: 1400 mg/kg (Rat) LD50 Dermal 1.78 mL/kg (Rabbit) Algae Toxicity EC50 (72h): 0.5 mg/L (*Scenedesmus subspicatus*) (Similar substance) Fish Toxicity LC 50 (96h) 1.2 - 6.4 mg/L (*Brachydanio rerio*) (Similar substance) Invertebrates Toxicity EC50 (48h): 0.5 - 1.9 mg/L (Similar substance) Whole body BCF values of AEs in fish range from <5 to 233 New Zealand CCID cites algae study (*Selenastrum capricornutum*) EC50=0.7 mg/L from ECOTOX and daphnia study with EC50=0.39 mg/L from Warne, 1999. CONSTITUENT 2 (≤60%): Component is naturally occurring and not intrinsically hazardous CONSTITUENT 3 (≤30%): LD50 Oral: 4396 mg/kg (Rat) LD50 Dermal: 6280 mg/kg (Rat) LC50 Inhalation: 72.6 mg/L (Rat) 4h 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*); Chronic Effects: May contain ethylene oxide in the headspace of the drum. Ethylene oxide is a cancer and reproductive hazard.	Yes
TUNED SPACER III	Halliburton	Mud/Cement Spacer	4.8537%	CONSTITUENT 1 (≤30%): Oral LD50: 4566 mg/kg (Rabbit) Marine Water Acute Algae Toxicity 72h EC50: > 10000 mg/L (*Skeletonema costatum*) [Halliburton Funded Study]; Marine Water Acute Crustacean Toxicity 48h LC50: >	Yes

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info	MSDS
				10000 mg/L (*Acartia tonsa*) [Halliburton Funded Study]; Marine Water Acute Fish Toxicity 96h LC50: > 5600 mg/L (*Scophthalmus maximus*) [Halliburton Funded Study]; Constituent is a clay mineral of soil and therefore biodegradability and bioaccumulation are not applicable. CONSTITUENT 2 (≤10%): Oral LD50: >5000 mg/kg (Similar Substance) Inhalation LC0 >0.139 mg/L (Similar Substance) Dermal LC50: > 5000 mg/kg (Rabbit) Freshwater Acute Algae Toxicity 72h EC50: > 10000 mg/L (*Scenedesmus subspicatus*) [OECD SIDS] (similar substance); Freshwater Acute Crustacean Toxicity 24h EC50: > 10000 mg/L (*Daphnia magna*) [OECD SIDS] (similar substance); Freshwater Acute Fish Toxicity 72h LC50: > 10000 mg/L (*Cyprinus carpio*) [LOLI]; Bioaccumulation: Substance is inorganic - bioaccumulation is not applicable. Biodegradation: Substance is inorganic - biodegradation is not applicable. CONSTITUENT 3 (≤5%): Component is naturally occurring and not intrinsically hazardous. CONSTITUENT 4 (≤1%): Oral LD50: 5400 mg/kg (Rat) Dermal LD50: >2000 mg/kg Freshwater Acute Crustacean Toxicity 48h EC50: > 50 mg/L (*Daphnia magna*) [ECHA]; Freshwater Acute Fish Toxicity 96h LC50: > 100 mg/L (*Pimephales promelas*) [ECHA]; Freshwater Acute Plant Toxicity 72h EC50: 990 mg/L (*Lactuca sativa*) [ECHA]; Bioaccumulation BCF: 3.2 [ECHA]; Freshwater Biodegradation 28d: 97 % [ECHA]; CONSTITUENT 5 (≤100%): Oral LD50: >15000 mg/kg (Human) Freshwater Acute Crustacean Toxicity 24h LL50: > 10000 mg/L (*Daphnia magna*) [Health Canada] (similar substance); Freshwater Acute Fish Toxicity 96h LL0: 10000 mg/L (*Danio rerio*) [Health Canada] (similar substance); Bioaccumulation: Substance is inorganic - bioaccumulation is not applicable. Biodegradation: Substance is inorganic - biodegradation is not applicable. CONSTITUENT 6 (≤1%): Oral LD50: >15000 mg/kg (Human) (Similar Substance) Freshwater Acute Crustacean Toxicity 24h LL50: > 10000 mg/L (*Daphnia magna*) [Health Canada] (similar substance); Freshwater Acute Fish Toxicity 96h LL0: 10000 mg/L (*Danio rerio*) [Health Canada] (similar substance); Bioaccumulation: Substance is inorganic - bioaccumulation is not applicable. Biodegradation: Substance is inorganic - biodegradation is not applicable.	
WellLock A2	Halliburton	Accellerator	0.5812%	Oral LD50: 1000 mg/kg (Rat) Dermal LD50: 1280 mg/kg (Rabbit) Freshwater Acute Algae Toxicity 72h EC50: 84 mg/L (*Desmodesmus subspicatus*) [ECHA]; Marine Water Acute Crustacean Toxicity 48h LC50:	Yes

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info	MSDS
				238.81 mg/L (*Acartia tonsa*) [Halliburton Funded Study]; Marine Water Acute Fish Toxicity 96h Limit Test: 70.36 mg/L (*Scophthalmus maximus*) [Halliburton Funded Study]; Bioaccumulation Log Pow: 3.5 [Halliburton Funded Study]; Marine biodegradation 28d: 3% [Halliburton Funded Study]	
WellLock R1	Halliburton	Resin	8.6761%	COMPONENT 1 (≤ 1%): Oral LD50: 282 mg/kg (Rat) Dermal LD50: 515 mg/kg (Rat) Inhalation LD50: 3617 mg/L (1hr) Freshwater Acute Algae Toxicity 72 hr EC50: 15 mg/L (*Pseudokirchneriella subcapitata*) [ECHA]; Freshwater Acute Crustacean Toxicity 48h EC50: 23.9 mg/L (*Daphnia magna*) [ECHA]; Freshwater Acute Fish Toxicity 96h LC50: 10.6 mg/L (*Pimephales promelas*) [ECHA]; Bioaccumulation Log Pow: 0.42 [ECHA] COMPONENT 2 (≤ 30%): Oral LD50: 1660 mg/kg (Rat) Dermal LD50: 788 mg/kg (Rabbit) Inhalation LC50: 1030 ppm (Rat) 8h Freshwater Acute Algae Toxicity 96h EC50: 35 mg/L (*Pseudokirchneriella subcapitata*) [US EPA HPV]; Freshwater Acute Crustacean Toxicity 48h EC50: 3.9 mg/L (*Daphnia magna*) [US EPA HPV]; Freshwater Acute Fish Toxicity 96h LC50: 65 mg/L (*Salmo gairdneri*) [US EPA HPV]; Bioaccumulation BCF: 3 [HSDB]; Freshwater Biodegradation 28d: 25% [US EPA] COMPONENT 3 (≤ 100%): Oral LD50: 11400 mg/kg (Rat) Dermal LD50: >2350 mg/kg (Rabbit) Inhalation LC50: > Saturated Vapor Concentration (Rat) 5h Marine Water Acute Algae Toxicity 72 hr EC50 > 10000 (*Skeletonema costatum*) [Halliburton Funded Study]; Marine Water Acute Crustacean Toxicity 48 hr LC50 > 10000 mg/L (*Acartia tonsa*) [Halliburton Funded Study]; Marine Water Acute Fish Toxicity 96 hr Limit Test > 10000 mg/L (*Cyprinodon variegatus*) [Halliburton Funded Study]; Bioaccumulation Log Pow: 3.6 [Halliburton Funded Study]; Biodegradation 28d: 11% [Halliburton Funded Study]	Yes
WellLock R2	Halliburton	Resin	2.8900%	LD50 Oral: 218 mg/Kg (Rat) (Similar Substance) LD50 Dermal: >2000 mg/kg (Rat) (Similar Substance) LC50 Inhalation: >0.035 mg/L (Rat) 4h (Saturated) (Similar Substance) Freshwater Acute Crustacean Toxicity 48h EC50: 47 mg/L (*Daphnia magna*) (similar substance) [ECHA]; Freshwater Acute Fish Toxicity 96h LC50: 30 mg/L (*Oncorhynchus mykiss*) (similar substance) [ECHA]; Bioaccumulation Log Pow: 0.822 (similar substance) [ECHA]; Freshwater Biodegradation 28d: 47% (activated sludge) (similar substance) [ECHA]	Yes
WellLock H1	Halliburton	Hardener	3.3572%	Oral LD50: 472 mg/kg (Rat) Dermal LD50: 700 mg/kg (Rabbit) Freshwater Acute Algae Toxicity 72 h ErC50: 104 mg/L (*Desmodesmus subspicatus*) [ECHA];	Yes

Trade name	Supplier	Purpose	Product in system fluid (%)	Toxicity & Ecotoxicity Info	MSDS
				Freshwater Acute Crustacean Toxicity 48h EC50: 0.5 mg/L (*Daphnia magna*) [ECHA]; Freshwater Acute Fish Toxicity 48h LC50: 200 mg/L (*Leuciscus idus*) [ECHA]; Bioaccumulation BCF: 2.75 [ECHA]; Biodegradation 28d: 1% [ECHA]	
Musol E	Halliburton	Surfactant	2.4844%	Constituent 1 (≤100%) Oral LD50: 3739 mg/kg (Rat) Dermal LD50: 13000 mg/kg (Rabbit) Inhalation LC50 (1hr): 24 mg/L (Rat) Algae Toxicity EC50 (96h): >1000 mg/L (*Desmodesmus subspicatus*) Fish Toxicity LC50 (96h) > 6812 mg/L (*Leuciscius idus*) Crustacean toxicity LC50 (48hr): >23300 mg/L (*Daphnia magna*) Bioaccumulation: Log Pow: -0.437 BCF = 3.16 Calculated Biodegradation:96% @ 28d Constituent 2 (≤1%) Oral LD 50: 5710 mg/kg (Rat) Dermal LD50: 5660 mg/kg (Rabbit) Inhalation LC50 (4h): 553 mg/L Algae Toxicity EC50 (96h): 7153 mg/L (Green algae) Fish Toxicity LC50 (96h): 4998 mg/L (*Pimephales promelas*) Crustacean toxicity EC50 (48h) 19000 mg/L (*Daphnia magna*) Bioaccumulation: Log Kow = -0.45 BCF = 10 Biodegradation: Readily biodegradable (Similar Substance)	Yes
Total			**~100%**		

Chemical List

Chemicals within products in part 2	CAS Number	Mass Fraction (%)
Mix Water	NA	43.1541%
Barium Sulfate	7727-43-7	30.6051%
Bisphenol A / Epichlorohydrin resin	25068-38-6	7.8041%
Crystalline silica, quartz	14808-60-7	5.1055%
Diethyltoluenediamine	68479-98-1	3.3572%
Cyclohexanedimethanol diglydicyl ether	14228-73-0	2.8900%
1-Methoxy-2-propanol	107-98-2	2.4720%
Sepiolite	63800-37-3	0.9707%
Butyl glycidyl ether	2426-08-6	0.8676%
2,4,6 Tridimethylaminomethyl phenol	90-72-2	0.5812%
Water in Product	7732-18-5	0.5726%
Alcohols, C12-16, ethoxylated	68551-12-2	0.4872%
Isopropanol	67-63-0	0.3575%
Polyethylene glycol (C6-C10) alkyl ether, sulfate ammonium salt	68037-05-8	0.3417%
Diatomaceous earth	61790-53-2	0.2427%

Chemicals within products in part 2	CAS Number	Mass Fraction (%)
Crystalline silica, cristobalite	14464-46-1	0.0485%
Welan gum	72121-88-1	0.0485%
Citric acid	77-92-9	0.0485%
Alcohols, C6-10, ethoxylated	70879-83-3	0.0285%
2-methoxy-1-propanol	1589-47-5	0.0124%
Epichlorohydrin	106-89-8	0.0043%
	Total	**100.00**

SAFETY DATA SHEET
BARITE (ALL GRADES)

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product name BARITE (ALL GRADES)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Weighting agent.

1.3. Details of the supplier of the safety data sheet

Supplier
M-I Australia Pty Ltd
Level 11
251 Adelaide Terrace
Perth
WA 6000
T = 08 9440 2900

Manufacturer
M-I SWACO
A Schlumberger Company
Building 3, Oilphase Facility,
Woodlands Drive, Kirkhill Industrial Estate,
Dyce, Aberdeen AB21 0GW.
Scotland UK
T = +44 (0)1224-246600
F = +44 (0)1224-246699
E-mail = MBXMSDS-EH@miswaco.slb.com

1.4. Emergency telephone number

(24 Hour) Australia +61 2801 44558, Asia Pacific +65 3158 1074, China +86 10 5100 3039, Europe +44 (0) 1235 239 670, Middle East and Africa +44 (0) 1235 239 671, New Zealand +64 9929 1483, USA 001 281 561 1600.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical and Chemical Hazards	Not classified.
Human health	Not classified.
Environment	Not classified.

Classification (67/548/EEC) Not classified.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Human health

IARC Monographs, Vol 68, 1997, concludes that there is sufficient evidence that inhaled crystalline silica in the form of quartz or crystobalite from occupational sources causes cancer in humans. IARC classification Group 1. Because of quantity and composition, the health hazard is small.

2.2. Label elements

Label In Accordance With (EC) No. 1272/2008

No pictogram required.

2.3. Other hazards

Not Classified as PBT/vPvB by current EU criteria.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

BARITE (Ba(SO4))		60-100%
CAS-No.: 13462-86-7	EC No.: 236-664-5	
Classification (EC 1272/2008) Not classified.	Classification (67/548/EEC) Not classified.	

QUARTZ, CRYSTALLINE SILICA		5-10%
CAS-No.: 14808-60-7	EC No.: 238-878-4	
Classification (EC 1272/2008) STOT RE 2 - H373	Classification (67/548/EEC) Xn;R48/20.	

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Composition Comments

The data shown is in accordance with the latest EC Directives. Barite is a naturally occurring mineral. This product contains a small quantity of quartz, crystalline silica. Prolonged and repeated exposure to concentrations of crystalline silica exceeding the workplace exposure limit (WEL) may lead to chronic lung disease such as silicosis. Because of quantity and composition, the health hazard is small.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation

Move the exposed person to fresh air at once. If respiratory problems, artificial respiration/oxygen. Get medical attention if any discomfort continues.

Ingestion

Immediately give a couple of glasses of water or milk, provided the victim is fully conscious. Get medical attention if any discomfort continues.

Skin contact

Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention promptly if symptoms occur after washing.

Eye contact

Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation.

Irritation of nose, throat and airway.

Ingestion

May cause discomfort if swallowed.

Skin contact

Prolonged skin contact may cause redness and irritation.

Eye contact

May cause temporary eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Get medical attention if any discomfort continues.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Extinguishing media

Use fire-extinguishing media appropriate for surrounding materials.

5.2. Special hazards arising from the substance or mixture

Hazardous combustion products

When heated, vapours/gases hazardous to health may be formed.

Unusual Fire & Explosion Hazards

High concentrations of dust may form explosive mixture with air.

5.3. Advice for firefighters

Special Fire Fighting Procedures

Containers close to fire should be removed immediately or cooled with water.

Protective equipment for fire-fighters

Self contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3. Methods and material for containment and cleaning up

Avoid generation and spreading of dust. Shovel into dry containers. Cover and move the containers. Flush the area with water.

6.4. Reference to other sections

Wear protective clothing as described in Section 8 of this safety data sheet.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid inhalation of dust and contact with skin and eyes. Avoid handling which leads to dust formation.

7.2. Conditions for safe storage, including any incompatibilities

Store in tightly closed original container in a dry, cool and well-ventilated place.

7.3. Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Name	STD	TWA - 8 Hrs		STEL - 15 Min		Notes
QUARTZ, CRYSTALLINE SILICA	WEL		0,1 mg/m3			

WEL = Workplace Exposure Limit.

8.2. Exposure controls

Protective equipment

Process conditions

All chemical Personal Protective Equipment (PPE) should be selected based on an assessment of both the chemical hazard present and the risk of exposure to those hazards. The PPE recommendations below are based on an assessment of the chemical hazards associated with this product. Where this product is used in a mixture with other products or fluids, additional hazards may be created and as such further assessment of risk may be required. The risk of exposure and need of respiratory protection will vary from workplace to workplace and should be assessed by the user in each situation.

Engineering measures

Provide adequate general and local exhaust ventilation.

Respiratory equipment

Respiratory protection must be used if air contamination exceeds acceptable level. Dust filter P3 (for especially fine dust/powder).

Hand protection

For prolonged or repeated skin contact use suitable protective gloves. Rubber or plastic.

Eye protection

Wear approved chemical safety goggles where eye exposure is reasonably probable.

Other Protection

Wear appropriate clothing to prevent any possibility of skin contact. Provide eyewash station.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Powder, dust
Colour	Tan to Grey.
Odour	Odourless.
Solubility	Insoluble in water
Melting point (°C)	1580
Relative density	4.2 - 4.25 @ 20°C
Bulk Density	1920 - 2400 kg/m3

9.2. Other information

Not relevant

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

There are no known reactivity hazards associated with this product.

10.2. Chemical stability

Stable under normal temperature conditions and recommended use.

10.3. Possibility of hazardous reactions

Not known.

10.4. Conditions to avoid

Avoid wet and humid conditions.

10.5. Incompatible materials

Materials To Avoid

Not known.

10.6. Hazardous decomposition products

When heated, vapours/gases hazardous to health may be formed.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Aspiration hazard:

Not anticipated to present an aspiration hazard based on chemical structure.

Inhalation

Dust may irritate respiratory system or lungs.

Ingestion

May cause discomfort if swallowed.

Skin contact

Prolonged and frequent contact may cause redness and irritation.

Eye contact

Particles in the eyes may cause irritation and smarting.

Health Warnings

Prolonged and repeated exposure to concentrations of crystalline silica exceeding the workplace exposure limit (WEL) may lead to chronic lung disease such as silicosis. Because of quantity and composition, the health hazard is small.

Route of entry

Inhalation. Ingestion.

Target Organs

Respiratory system, lungs

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Contact M-I SWACO's QHSE Department for ecological information at env@miswaco.slb.com. OSPAR have defined this chemical as PLONOR. Barite is a naturally occurring mineral.

12.1. Toxicity

Acute Fish Toxicity

Not considered toxic to fish.

12.2. Persistence and degradability

Degradability

There are no data on the degradability of this product.

12.3. Bioaccumulative potential

Bioaccumulative potential

No data available on bioaccumulation.

12.4. Mobility in soil

Mobility:

The product is insoluble in water.

12.5. Results of PBT and vPvB assessment

Not Classified as PBT/vPvB by current EU criteria.

12.6. Other adverse effects

None known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Recover and reclaim or recycle, if practical. Dispose of waste and residues in accordance with local authority requirements.

SECTION 14: TRANSPORT INFORMATION

General The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Environmentally Hazardous Substance/Marine Pollutant

No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Uk Regulatory References

Chemicals (Hazard Information & Packaging) Regulations. Control of Substances Hazardous to Health Regulations 2002 (as amended) Workplace Exposure Limits EH40.

Guidance Notes

REACH. With respect to minerals, Article 2 § 7(b) and Annex V point 7 explicitily exempt from registration and evaluation "minerals which occur in nature, if they are not chemically modified." This product is exempt from registration.

EU Legislation

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, including amendments.

Water hazard classification

Not hazardous to Water.

New Zealand Hazard Classification

Not Classified.

HSNO Approval No.

Not required.

15.2. Chemical Safety Assessment

International Chemical Inventories

Contact REACH@miswaco.slb.com for REACH information. Complies with the following national/regional chemical inventory requirements: Australia (AICS), Canada (DSL / NDSL), China (IECSC), Europe (EINECS / ELINCS), Japan (METI / ENCS), Korea (TCCL / ECL), New Zealand (NZIoC), Phillipines (PICCS), United States (TSCA).

SECTION 16: OTHER INFORMATION

General information

HMIS Health -1 HMIS Flammability - 0 HMIS Physical Hazard - 0 E - Safety glasses, Gloves, Dust Respirator

Information Sources

Product information provided by the commercial vendor(s). Material Safety Data Sheet, Misc. manufacturers. LOLI. European Chemicals Bureau - ESIS (European Chemical Substances Information).

Revision Comments

General revision. Compiled or Revised by Ewan MacLeod

Issued By	Bill Cameron
Revision Date	22-May-2012
Revision	8
Supersedes date	24-Nov-2010
SDS No.	11207

Risk Phrases In Full

R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
NC	Not classified.

Hazard Statements In Full

H373	May cause damage to organs <<Organs>> through prolonged or repeated exposure.

Disclaimer

MSDS furnished independent of product sale. While every effort has been made to accurately describe this product, some of the data are obtained from sources beyond our direct supervision. We cannot make any assertions as to its reliability or completeness; therefore, user may rely only at user's risk. We have made no effort to censor or conceal deleterious aspects of this product. Since we cannot anticipate or control the conditions under which this information and product may be used, we make no guarantee that the precautions we have suggested will be adequate for all individuals and/or situations. It is the obligation of each user of this product to comply with the requirements of all applicable laws regarding use and disposal of this product. Additional information will be furnished upon request to assist the user; however, no warranty, either expressed or implied, nor liability of any nature with respect to this product or to the data herein is made or incurred hereunder.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **SEM-8™ EMULSIFIER**

Revision Date: 14-May-2013

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substance or Preparation

Product Trade Name:	SEM-8™ EMULSIFIER
Synonyms:	None
Chemical Family:	Ethoxylated alcohols Sulphate
UN Number:	, UN1993
Dangerous Goods Class:	3
Subsidiary Risk:	None
Hazchem Code:	3[Y]
Poisons Schedule:	None
Application:	Emulsifier

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substance	CAS Number	Percent	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA

2. COMPOSITION/INFORMATION ON INGREDIENTS

Polyethylene glycol (C6-C10) alkyl ether, sulphate ammonium salt	68037-05-8	60 - 100%	Not determined	Not determined	Not applicable
Isopropanol	67-63-0	10 - 30%	TWA: 400 ppm TWA: 983 mg/m^3 STEL: 500 ppm STEL: 1230 mg/m^3	STEL: 500 ppm STEL: 1230 mg/m^3 TWA: 400 ppm TWA: 983 mg/m^3	TWA: 200 ppm STEL: 400 ppm

Non-hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye, skin and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Repeated overexposure may cause liver and kidney effects. Flammable.

Risk Phrases

R10 Flammable.
R38 Irritating to skin.
R41 Risk of serious damage to eyes.
R 67 Vapours may cause drowsiness and dizziness.

HSNO Classification

3.1C Flammable Liquids - Medium hazard 6.3A Irritating to the skin 8.3A Corrosive to ocular tissue

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Do NOT induce vomiting. Give nothing by mouth.

Notes to Physician

Activated charcoal or gastric lavage may be advisable for significant ingestion.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Unsuitable Extinguishing Media

None known

Special Exposure Hazards

Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases. Vapours are heavier than air and may accumulate in low areas. Vapours may travel along the ground to be ignited at distant locations.

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures

Use Appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures	Prevent from entering sewers, waterways or low areas.
Procedure for Cleaning/Absorption	Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapours. Wash hands after use. Launder contaminated clothing before reuse. Ground containers when transferring from one container to another.
Storage Information	Store away from oxidisers. Keep from heat, sparks, and open flames. Keep container closed when not in use. Store in a dry location. Store in a cool well ventilated area. Product has a shelf life of 24 months

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended. Organic vapour respirator. In high concentrations, supplied air respirator or a self-contained breathing apparatus.
Hand Protection	Impervious rubber gloves. Nbr nitrile gloves. Neoprene gloves. Use Viton or 4H gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Colour:	Clear light yellow
Odour:	Alcohol
pH:	7.0-8.5 @ 5%
Specific Gravity @ 20 C (Water=1):	1.054
Density @ 20 C (kg/l):	1.054
Bulk Density @ 20 C (kg/l):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	-29
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	33.9
Flash Point Method:	SFCC ASTM D-3828
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapour Pressure @ 20 C (mmHg):	15.7
Vapour Density (Air=1):	> 1
Percent Volatiles:	12
Evaporation Rate (Butyl Acetate = 1):	< 1
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	71-79 (25C)
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	1.4
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerisation:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidisers. Strong alkalis
Hazardous Decomposition Products	Oxides of nitrogen. Oxides of sulphur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation. May cause skin defatting with prolonged exposure.

Eye Contact May cause severe eye irritation.

Ingestion Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhoea. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions. May affect the heart and cardiovascular system.

Aggravated Medical Conditions Skin disorders. Eye ailments.

Chronic Effects/Carcinogenicity Repeated overexposure may cause liver and kidney effects.

Other Information None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined.
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity:	Not determined

Genotoxicity: Not determined

Reproductive/Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability COD: 149 mg O2 per 100 ppm product

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 342 mg/l (Scophthalamus maximus)
Acute Crustaceans Toxicity: TLM48: 23.3 mg/l (Acartia tonsa)
Acute Algae Toxicity: EC50: 78 mg/l (Skeletonema costatum)

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

Contaminated Packaging Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

14. TRANSPORT INFORMATION

Land Transportation

ADR
1993,Flammable Liquid, N.O.S.,(Contains Isopropanol), 3, III

Air Transportation

ICAO/IATA
1993,Flammable Liquid, N.O.S.,, 3, III
(Contains Isopropanol)

Sea Transportation

IMDG
1993,Flammable Liquid, N.O.S.,(Contains Isopropanol), 3, III, (33.9 C)
EmS F-E, S-E

Other Shipping Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory	All components listed.
New Zealand Inventory of Chemicals	This product does not comply with NZIOC
US TSCA Inventory	All components listed.
EINECS Inventory	All components are listed on the inventory.

Classification Xi - Irritant.

Risk Phrases
R10 Flammable.
R38 Irritating to skin.
R41 Risk of serious damage to eyes.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases
S2 Keep out of reach of children.
S7 Keep container tightly closed.
S16 Keep away from sources of ignition - No Smoking.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S24/25 Avoid contact with skin and eyes.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS:
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Product Stewardship at 1-580-251-4335.

Disclaimer Statement This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **PEN-5M**

Revision Date: 11-Apr-2013

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name:	PEN-5M
Synonyms:	None
Chemical Family:	Blend
UN Number:	, UN1993
Dangerous Goods Class:	3
Subsidiary Risk:	None
Hazchem Code:	3[Y]
Poisons Schedule:	S5
Application:	Cleaner

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA

2. COMPOSITION/INFORMATION ON INGREDIENTS

Isopropanol	67-63-0	10 - 30%	TWA: 400 ppm TWA: 983 mg/m^3 STEL: 500 ppm STEL: 1230 mg/m^3	STEL: 500 ppm STEL: 1230 mg/m^3 TWA: 400 ppm TWA: 983 mg/m^3	TWA: 200 ppm STEL: 400 ppm

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Flammable.

Risk Phrases

R10 Flammable.
R22 Harmful if swallowed.
R38 Irritating to skin.
R41 Risk of serious damage to eyes.

HSNO Classification

Not Determined

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

Special Exposure Hazards

May be ignited by heat, sparks or flames. Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures

Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures

Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
Storage Information	Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use. Store between 40.5 F (4.7 C) and 120.5 F (49 C). Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless to Amber
Odor:	Alcohol
pH:	6.5 - 7.5
Specific Gravity @ 20 C (Water=1):	0.96
Density @ 20 C (kg/l):	0.96
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	80
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	25
Flash Point Method:	PMCC
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	33
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	58-60
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Miscible
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

Aggravated Medical Conditions Skin disorders. Eye ailments.

Chronic Effects/Carcinogenicity 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.

Other Information None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR

UN1993,Flammable Liquid, N.O.S.(Contains Isopropanol), 3, III

Air Transportation

ICAO/IATA

UN1993,Flammable Liquid, N.O.S., 3, III
(Contains Isopropanol)

Sea Transportation

IMDG

UN1993,Flammable Liquid, N.O.S.(Contains Isopropanol), 3, III, (25 C)
EmS F-E, S-E

Other Transportation Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory All components listed on inventory or are exempt.

New Zealand Inventory of Chemicals	All components listed on inventory or are exempt.
US TSCA Inventory	All components listed on inventory or are exempt.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Xi - Irritant.
Risk Phrases	R10 Flammable. R22 Harmful if swallowed. R38 Irritating to skin. R41 Risk of serious damage to eyes.
Safety Phrases	S2 Keep out of reach of children. S7 Keep container tightly closed. S16 Keep away from sources of ignition - No Smoking. S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S24/25 Avoid contact with skin and eyes.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **TUNED® SPACER III**

Revision Date: 04-Jan-2011

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
53-55 Bannister Road
Canning Vale
WA 6155
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: TUNED® SPACER III
Synonyms: None
Chemical Family: Blend
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None
Poisons Schedule: None
Application: Spacer

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	ACGIH TLV-TWA
Crystalline silica, cristobalite	14464-46-1	1 - 5%	0.1 mg/m^3	0.025 mg/m^3
Crystalline silica, quartz	14808-60-7	20-50	0.1 mg/m^3	0.025 mg/m^3

Total to 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

Hazard Ratings

Flammability:	0
Toxicty:	0
Body Contact:	0
Reactivity:	0
Chronic:	3

Scale: Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Treat symptomatically.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media All standard fire fighting media

Extinguishing media which must not be used for safety reasons None known.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Dark gray
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	2.51
Density @ 20 C (kg/l):	Not Determined
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined

Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory	All components listed.
US TSCA Inventory	All components listed on inventory or are exempt.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.
Risk Phrases	None
Safety Phrases	None

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WellLock H1**

Revision Date: 26-Nov-2012

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: WellLock H1
Synonyms: None
Chemical Family: Amine
UN Number: , UN2810
Dangerous Goods Class: 6.1
Subsidiary Risk: None
Hazchem Code: None
Poisons Schedule: None
Application: Curing Agent

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand OEL	ACGIH TLV-TWA
Diethyltoluenediamine	68479-98-1	60 - 100%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

May be absorbed through the skin. May cause allergic skin reaction. May be harmful if swallowed. May cause severe eye irritation. May cause skin irritation.

Risk Phrases

R36 Irritating to eyes.
R21/22 Harmful in contact with skin and if swallowed.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HSNO Classification

6.1C Acutely Toxic Substances
6.4A Substances that are irritating to the eye.
6.9A Substances that are toxic to human target organs or systems.
9.1A Substances that are very ecotoxic in the aquatic environment.
9.3B Substances that are ecotoxic to terrestrial invertebrates.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

Remove contaminated clothing and launder before reuse. In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Destroy or properly dispose of contaminated shoes.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

If swallowed, induce vomiting immediately by giving two glasses of water and sticking fingers down throat; never give anything to an unconscious person. Get medical attention.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical. Use water spray to cool fire exposed surfaces.

Extinguishing media which must not be used for safety reasons

None known.

Special Exposure Hazards

Product will not burn unless preheated. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures

Use appropriate protective equipment.

Environmental Precautionary Measures

Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Wash hands after use. Avoid breathing vapors.

Storage Information Store in a cool well ventilated area. Keep from excessive heat. Keep container closed when not in use. Store away from oxidizers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Organic vapor/acid gas respirator with a dust/mist filter.

Hand Protection Neoprene gloves. Nitrile gloves.

Skin Protection Butyl coated apron or clothing.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear
Odor:	Amine
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.02
Density @ 20 C (kg/l):	1.018
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	307
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	> 135
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	0.97 @ 126C/259F
Vapor Density (Air=1):	5.2
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid Keep away from heat, sparks and flame.

Incompatibility (Materials to Avoid) Strong oxidizers. Strong acids. Reducing agents. Violent, explosive reaction with sulfur trioxide, decaborane, silver perchlorate, triethenyl aluminum, and hydrogen in presence of nickel catalyst at temperatures above 200 C.

Hazardous Decomposition Products Oxides of nitrogen. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation May cause respiratory irritation.

Skin Contact May cause skin irritation. May be absorbed through the skin and contribute to the symptoms listed under ingestion. May cause an allergic skin reaction.

Eye Contact May cause severe eye irritation.

Ingestion Harmful if swallowed.

Aggravated Medical Conditions Diseases of the pancreas. Eye ailments. Skin disorders.

Chronic Effects/Carcinogenicity A two year feeding study in rats showed DETDA caused effects in the pancreas, liver, thyroid, and eyes. An increase in the number of tumors in the liver and thyroid of male rats and in the liver and possibly mammary gland of female rats was found.

Other Information None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity: May be highly toxic to aquatic life.

Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR

UN2810,Toxic Liquid, Organic, N.O.S.(Contains Diethyltoluenediamine), 6.1, III

Air Transportation

ICAO/IATA

UN2810,Toxic Liquid, Organic, N.O.S., 6.1, III
(Contains Diethyltoluenediamine)

Sea Transportation

IMDG

UN2810,Toxic Liquid, Organic, N.O.S.(Contains Diethyltoluenediamine), 6.1, III
EmS F-A, S-A

Other Transportation Information

Labels: Keep Away From Food

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory All components listed on inventory or are exempt.

New Zealand Inventory of Chemicals	All components listed on inventory or are exempt.
US TSCA Inventory	All components listed on inventory or are exempt.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Xn - Harmful. N - Dangerous For The Environment. Xi - Irritant.
Risk Phrases	R36 Irritating to eyes. R21/22 Harmful in contact with skin and if swallowed. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrases	S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28 After contact with skin, wash immediately with plenty of water S60 This material and/or its container must be disposed of as hazardous waste. S61 Avoid release to the environment. Refer to special instructions/Safety data sheets. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WellLock A2**

Revision Date: 26-Nov-2012

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: WellLock A2
Synonyms: None
Chemical Family: Not applicable
UN Number: , UN2735
Dangerous Goods Class: 8
Subsidiary Risk: None
Hazchem Code: None
Poisons Schedule: None
Application: Accelerator

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand OEL	ACGIH TLV-TWA
2,4,6 Tridimethylaminomethyl phenol	90-72-2	60 - 100%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye, skin, and respiratory burns. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. May cause allergic skin and respiratory reaction.

Risk Phrases

R22 Harmful if swallowed.
R36/38 Irritating to eyes and skin.

HSNO Classification

6.1D Acutely Toxic Substances
8.2C Substances that are corrosive to dermal tissue if exposed for greater than 1 hour.
8.3A Substances that are corrosive to ocular tissue,
9.3C Substances that are harmful to terrestrial vertebrates.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

Special Exposure Hazards

Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures

Use appropriate protective equipment.

Environmental Precautionary Measures

Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Wash hands after use. Launder contaminated clothing before reuse. Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Avoid breathing mist. Do NOT consume food, drink, or tobacco in contaminated areas.

Storage Information Store away from oxidizers. Store in a cool well ventilated area. Keep from excessive heat. Keep container closed when not in use. Store in a dry location. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator with a dust/mist filter.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Light yellow
Odor:	Amine
pH:	~11
Specific Gravity @ 20 C (Water=1):	0.97
Density @ 20 C (kg/l):	0.968
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	315
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	157
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	0.1
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Miscible
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	265.45
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Avoid contact with acids.
Incompatibility (Materials to Avoid)	Strong oxidizers. Reducing agents.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause chemical pneumonia. Causes severe respiratory burns. May cause allergic respiratory reaction.
Skin Contact	Causes severe skin irritation. May cause skin burns. May cause an allergic skin reaction.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Causes burns of the mouth, throat and stomach. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions.
Aggravated Medical Conditions	Eye ailments. Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 1200 mg/kg (Rat)
Dermal Toxicity:	LD50: 1200 mg/kg (Rat)
Inhalation Toxicity:	LC50: > 0.5 mg/l (Rat)
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 180-240 mg/l (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: TLM96: 750-1000 mg/l (Uca pugilator)
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR

UN2735,Amines, Liquid, Corrosive, N.O.S.(Contains Tris-2,4,6-(Dimethylaminomethyl) Phenol), 8, III

Air Transportation

ICAO/IATA

UN2735,Amines, Liquid, Corrosive, N.O.S., 8, III
(Contains Tris-2,4,6-(Dimethylaminomethyl) Phenol)

Sea Transportation

IMDG

UN2735,Amines, Liquid, Corrosive, N.O.S.(Contains Tris-2,4,6-(Dimethylaminomethyl) Phenol), 8, III
EmS F-A, S-B

Other Transportation Information

Labels: Corrosive

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory All components listed on inventory or are exempt.
New Zealand Inventory of Chemicals All components listed on inventory or are exempt.
US TSCA Inventory All components listed on inventory or are exempt.
EINECS Inventory This product, and all its components, complies with EINECS

Classification Xn - Harmful.

Risk Phrases R22 Harmful if swallowed.
R36/38 Irritating to eyes and skin.

Safety Phrases

S2 Keep out of reach of children.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28 After contact with skin, wash immediately with plenty of water

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WellLock R1**

Revision Date: 03-Oct-2013

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: WellLock R1
Synonyms: None
Chemical Family: Resin Blend
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None Allocated
Poisons Schedule: None Allocated
Application: Resin

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Bisphenol A / Epichlorohydrin resin	25068-38-6	60 - 100%	Not applicable	Not applicable	Not applicable

Butyl glycidyl ether	2426-08-6	10 - 30%	TWA: 25 ppm TWA: 133 mg/m^3	TWA: 25 ppm TWA: 133 mg/m^3	TWA: 3 ppm

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye, skin, and respiratory irritation. May be harmful if swallowed. May be absorbed through the skin. May cause allergic skin reaction. Combustible.

Risk Phrases

R43 May cause sensitization by skin contact.
R36/38 Irritating to eyes and skin.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HSNO Classification

3.1D Flammable Liquids - Low hazard
6.3A Irritating to the skin
6.4A Irritating to the eye
6.5B Contact sensitisers
6.6B Human mutagens
6.8B Human reproductive or developmental toxicants
6.9B Harmful to human target organs or systems
9.1B Ecotoxic in the aquatic environment

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media
Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons
None known.

Special Exposure Hazards

Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove. Isolate spill and stop leak where safe.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Avoid breathing mist. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.
Storage Information	Keep from heat, sparks, and open flames. Keep container closed when not in use. Store in a cool, dry location. Store in a well ventilated area. Store locked up. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Light yellow
Odor:	Characteristic
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.14
Density @ 20 C (kg/l):	1.14
Bulk Density @ 20 C (kg/M3):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	78
Flash Point Method:	PMCC
Autoignition Temperature (C):	Not Determined

Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid Keep away from heat, sparks and flame.

Incompatibility (Materials to Avoid) Strong acids. Strong alkalis.

Hazardous Decomposition Products Aldehydes. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Acute Toxicity

Product Information Under certain conditions of use, some of the product ingredients may cause the following:

Inhalation May cause respiratory irritation. Excessive inhalation causes headache, dizziness, nausea and incoordination.

Eye Contact May cause severe eye irritation.

Skin Contact May cause severe skin irritation. May cause an allergic skin reaction.

Ingestion May be harmful if swallowed.

Chronic Effects/Carcinogenicity This product contains a suspected carcinogen.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Bisphenol A / Epichlorohydrin resin	25068-38-6	11400 mg/kg (Rat) 13600 mg/kg (Rat) 15600 mg/kg (Mouse)	> 23500 mg/kg (Rabbit)	No data available
Butyl glycidyl ether	2426-08-6	1660 mg/kg (Rat) 2000 mg/kg (Rat)	2520 µL/kg (Rabbit) 2150 mg/kg (Rat)	LC50: 1030 ppm (Rat) 8 h LC50: > 670 ppm (Rat) 8 h

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Bisphenol A / Epichlorohydrin resin	25068-38-6	No information available	No information available	No information available	No information available
Butyl glycidyl ether	2426-08-6	No information available	No information available	No information available	No information available

12.2 Persistence and degradability
Not readily biodegradable

12.3 Bioaccumulative potential
No information available

12.4 Mobility in soil
No information available

12.5 Results of PBT and vPvB assessment
No information available.

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

Contaminated Packaging Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory	All components listed on inventory or are exempt.
New Zealand Inventory of Chemicals	All components listed on inventory or are exempt.
US TSCA Inventory	All components listed on inventory or are exempt.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Xi - Irritant.
Risk Phrases	R43 May cause sensitization by skin contact. R36/38 Irritating to eyes and skin. R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrases	S2 Keep out of reach of children. S28 After contact with skin, wash immediately with plenty of water S61 Avoid release to the environment. Refer to special instructions/Safety data sheets. S37/39 Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WellLock R2**

Revision Date: 24-May-2013

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: WellLock R2
Synonyms: None
Chemical Family: Resin
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None Allocated
Poisons Schedule: None Allocated
Application: Resin

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Cyclohexanedimethanol diglydicyl ether	14228-73-0	60 - 100%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview	May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. May cause allergic skin reaction.
Risk Phrases	R43 May cause sensitization by skin contact. R36/38 Irritating to eyes and skin. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
HSNO Classification	6.5B Contact sensitisers

4. FIRST AID MEASURES

Inhalation	If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.
Skin	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Extinguishing media which must not be used for safety reasons	None known.
Special Exposure Hazards	Product will not burn unless preheated. Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Wash hands after use. Launder contaminated clothing before reuse. Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

Storage Information Store away from alkalis. Store away from oxidizers. Store away from reducing agents. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.
In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear
Odor:	Mild
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.09
Density @ 20 C (kg/l):	1.088
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	Not Determined**Min:** > 148
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined**Min:** > 93
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	1
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid Keep away from heat, sparks and flame.

Incompatibility (Materials to Avoid) Strong acids. Strong alkalis. Mineral acids.

Hazardous Decomposition Products Carbon monoxide and carbon dioxide. Aldehydes.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Inhalation May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation. May cause an allergic skin reaction.

Eye Contact May cause eye irritation.

Ingestion Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.

Aggravated Medical Conditions Eye ailments. Skin disorders.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

Contaminated Packaging Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory All components listed on inventory or are exempt.
New Zealand Inventory of Chemicals All components listed on inventory or are exempt.
US TSCA Inventory All components listed on inventory or are exempt.
EINECS Inventory This product, and all its components, complies with EINECS

Classification	Xi - Irritant.
Risk Phrases	R43 May cause sensitization by skin contact. R36/38 Irritating to eyes and skin. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrases	S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37/39 Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **MUSOL E SOLVENT**

Revision Date: 06-Dec-2012

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name:	MUSOL E SOLVENT
Synonyms:	None
Chemical Family:	Glycol Ether
UN Number:	, UN3092
Dangerous Goods Class:	3
Subsidiary Risk:	None
Hazchem Code:	2[Y]E
Poisons Schedule:	None Allocated
Application:	Surfactant Solvent

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA

2. COMPOSITION/INFORMATION ON INGREDIENTS

1-Methoxy-2-propanol	107-98-2	60 - 100%	TWA: 100 ppm TWA: 369 mg/m^3 STEL: 150 ppm STEL: 553 mg/m^3	STEL: 150 ppm STEL: 553 mg/m^3 TWA: 100 ppm TWA: 369 mg/m^3	TWA: 100 ppm STEL: 150 ppm

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Flammable.

Risk Phrases R10 Flammable.

HSNO Classification Not Determined

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons None known.

Special Exposure Hazards May be ignited by heat, sparks or flames. Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.
Storage Information	Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use. May discolor mild steel. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless
Odor:	Ether
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.92
Density @ 20 C (kg/l):	0.918
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	117
Freezing Point/Range (C):	-95
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	31
Flash Point Method:	Not Determined
Autoignition Temperature (C):	277
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	3
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	12
Vapor Pressure @ 20 C (mmHg):	10.9
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	0.01

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight (g/mole): Not Determined
Decomposition Temperature (C): Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None anticipated

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May be absorbed through the skin and contribute to the symptoms listed under ingestion. May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion May cause abdominal pain, vomiting, nausea, and diarrhea. May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels.

Aggravated Medical Conditions Skin disorders. Eye ailments.

Chronic Effects/Carcinogenicity May cause testicular toxicity. May cause birth defects.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR

UN3092,1-Methoxy-2-Propanol Solution, 3, III

Air Transportation

ICAO/IATA

UN3092,1-Methoxy-2-Propanol Solution, 3, III

Sea Transportation

IMDG

UN3092,1-Methoxy-2-Propanol Solution, 3, III, (31.7 C)
EmS F-A, S-D

Other Transportation Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory All components listed on inventory or are exempt.
New Zealand Inventory of Chemicals This product does not comply with NZIOC
US TSCA Inventory All components listed on inventory or are exempt.

EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Not Classified
Risk Phrases	R10 Flammable.
Safety Phrases	S2 Keep out of reach of children. S24 Avoid contact with skin.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****