MT HORNER-4A, 5, 7 AND 13
WELL INTERVENTION & DECOMMISSIONING

ENVIRONMENTAL BRIDGING DOCUMENT SUMMARY
PRODUCTION LICENCE 7 (L7)

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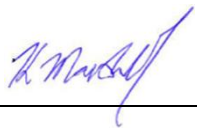
Approver	Kane Marshall **Managing Director**		25/10/19

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ACRONYMS

ADWR	Allanooka-Dongara Water Reserve
AER	Annual Environment Report
ALARP	As Low As Reasonably Practical
APPEA	Australian Petroleum Production and Exploration Association
BD	Bridging Document
CAWS	Country Areas Water Supply Act 1947
DAA	Department of Aboriginal Affairs
DMIRS	Department of Mines, Industry Regulation and Safety
DPAW	Department of Parks and Wildlife
DRF	Declared Rare Flora
DWER	Department of Water and Environment Regulation
EP	Environment Plan
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
FMP	Field Management Plan
HAZID	Hazard Identification
HSE	Health, Safety and Environment
JHA	Job Hazard Analysis
Key	Key Petroleum (Australia) Pty Ltd
L7	Production Licence L7
MHOF	Mount Horner Oil Field
MSDS	Material Safety Data Sheets
NGERA	National Greenhouse and Energy Reporting Act 2007
OSCP	Oil Spill Contingency Plan
PDWSA	Public Drinking Water Source Area
PFW	Produced Formation Water
PIC	Person in Charge
POSMC	Performance Objectives. Standards and Measurement Criteria
SES	State Emergency Services
WIC	Well Integrity Check
WIA	Well Intervention Activities
WMP	Well Management Plan

Record of Revision It is certified that the amendments listed below have been incorporated in this copy of the publication		
REV NO.	**SECTION**	**DESCRIPTION OF CHANGES**
0	N/A	Creation of Document
1	N/A	Re-issued to DMIRS

1. OVERVIEW

Key Petroleum (Australia) Pty Ltd ("Key" or "the Company") proposes to conduct well intervention activities ("WIA") as outlined in an Environmental Bridging Document ("BD") within Production Licence L7 ("L7"). Key operates L7 and the Mount Horner Oil Field ("MHOF"), located within L7.

The well intervention activities covered by this BD include:

- Mobilisation of equipment, personnel and supplies to the site;
- Decommissioning of Mount Horner-5, 7 and 13 wells;
- Installation of an additional cement plug and bridge plug in Mount Horner-4A;
- Removal of wellheads and cellar at each well location;
- Demobilisation of equipment, personnel and supplied from the site.

This BD interfaces with the previously approved Care and Maintenance Environment Plan ("EP") (Document number: L7/EPCM190212-KP, Revision 5) for MHOF.

The Operator is Key Petroleum (Australia) Pty Ltd who is a wholly owned subsidiary of Key Petroleum Limited. Their corporate office is located at Suite 8 331-335 Hay Street, Subiaco, 6008 Western Australia. Tel: +61 8 6389 0322, Fax: +61 8 6389 0697. Email: admin@keypetroleum.com.au. Further information on the company can be obtained from their website, www.keypetroleum.com.au.

2. LOCATION AND TENURE

Mount Horner Oil Field (MHOF) is located within the Production Licence L7 (Northern Perth Basin) approximately 350 km north of Perth and 20 km north east of Dongara (Figure 1). The Mount Horner Facility was originally constructed in 1982 and rebuilt in 2000 (after a fire). It was placed under care and maintenance in 2011.

MHOF includes wellheads, flow lines and a crude oil and produced formation water (PFW) separation and storage facility.

The MHOF is located on third party land, which is freehold and used for farming. The land is predominantly used for growing cereal crops. The areas surrounding Mt Horner consist of agricultural farms.

Access to the MHOF is via Tabletop Road (gravel) from the Midlands Road. A railway crossing (without barriers and signals) occurs close to the junction of Tabletop Road and Midlands Road.

MHOF was placed under care and maintenance in 2011.

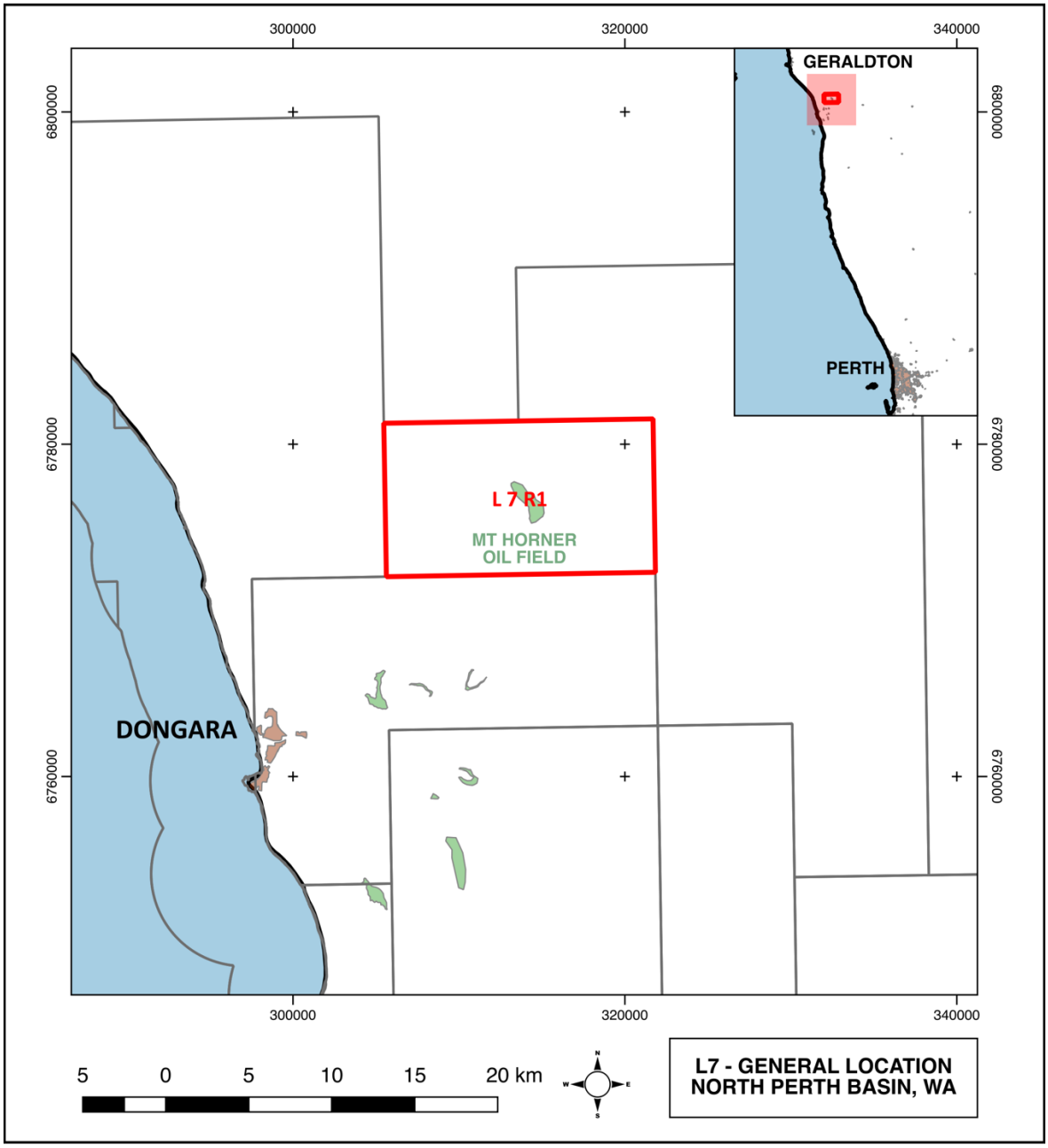

Figure 1: Location of L7 and Mount Horner Oil Field, Perth Basin, WA.

3. DESCRIPTION OF THE ACTIVITY

3.1 OVERVIEW

The well intervention activities covered by this BD include:

- Mobilisation of equipment, personnel and supplies to the site;
- Decommissioning of Mount Horner-5, 7 and 13 wells;
- Installation of an additional cement plug and bridge plug in Mount Horner-4A;
- Removal of wellheads and cellar at each well location;
- Demobilisation of equipment, personnel and supplied from the site.

Well Name	Latitude	Longitude
Mount Horner-4A	29°07'42.467"S	115°05'30.278"E
Mount Horner-5	29°07'31.667"S	115°05'22.358"E
Mount Horner-7	29°07'23.506"S	115°05'33.878"E
Mount Horner-13	29°07'05.012"S	115°04'54.102"E

Table 1. Location of wells affected by BD

The Chemical Disclosure Statement detailing all downhole chemicals proposed to be used for WIA under this BD are in Appendix A.

Material Safety Data Sheets ("MSDS") for all consumables that are proposed to be used under this BD are included in Appendix B.

The proposed decommissioning activities are scheduled to occur in November 2019, subject to equipment availability and regulatory approvals. The activities will be undertaken by up to eight (8) personnel and are estimated to take a total of six (6) days to complete. All work will be undertaken in daylight hours only.

For clarification, the scope of this BD does not involve full rehabilitation of each wellpad, which will occur within 12 months from the conclusion of the BD operations. Therefore, the only areas affected by this BD are each well listed in Table 1 and cutting of each wellhead.

3.2 WELL INTERVENTION ACTIVITIES

Well Intervention Activities ("WIA") are any operations carried out in an oil or gas well during, or at the end of its productive life, that alters the state of the well and or well geometry, provides well diagnostics or manages the production of the well. This BD details the WIA for the following wells:

- Mount Horner-4A;
- Mount Horner-5;
- Mount Horner-7; and
- Mount Horner-13.

Key has undertaken a detailed geological, geophysical, engineering and petrophysical evaluation of the MHOF and all wells. The results of this evaluation have identified the above wells for decommissioning or, in the case of Mount Horner-4A, additional installation of downhole equipment.

The objective of the decommissioning operations is to isolate the reservoir communication via the wellbore to the surface as well as any other zones that may be in communication with the well.

All WIA are undertaken in accordance with an approved Well Management Plan pursuant to the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015.

3.2.1 Mount Horner-4A

Mt Horner-04A is located approximately 21km North East of the township of Dongara, in Perth Basin, Western Australia.

The well was drilled and cased in January 1988 using Barrack Energy Equipment Rig #2 to a TD of 1,265mMDRT with final 216mm (8-1/2") hole section and cased with 178mm (7") production casing shoe set at 1,254.7mMDRT. This well has been a sucker rod pumped oil well since with Cattamarra Coal Measures "F-Sand" perforated at interval of 1,226.0 – 1,231.0mMDRT with 127mm (5") TCP.

In September 1994, the well was shut in due to non-economic production and the sucker rods and pump pulled.

In June 1995, the tubing was pulled out of hole and a mechanical suspension plug was installed at 1,223m MDRT with 10 loads of cement placed on top. This was confirmed by a wireline vendor but there are no reports confirming this.

On 10th February 2017, a drift run was conducted with a 1.85" gauge cutter and tagged PBTD at 1,209m MDRT.

TKM Wellhead Services carried out a Well Integrity Assessment of the MHOF wells from 20 to 21 June 2019. Pressure testing of the surface annulus and via the C Section 3" ball valve yielded a reading of 0 psi. Visual inspection through the open valve and presence of a suspension flange at B Section confirmed no tubing in the well.

The outline of the WIA activities for Mount Horner-4A is as follows:

STEP	OPERATIONS
1.00	**PHASE 1 – INTERVENTION WELLBORE OPERATIONS**
1.01	Well preparation
1.02	Run Wireline Cement Plug #1
1.03	Plug #2: Set Bridge Plug at 1130m MDRT

At the conclusion of the activity Mount Horner-4A will be suspended.

3.2.2 Mount Horner-5

The well was drilled and cased in February 1981 using Pacific Basin Exploration Pty Ltd to a TD of 1,819mMDRT with final 216mm (8-1/2") hole section and cased with 178mm (7") production casing shoe set at 1,816.1mMDRT.

In June 1986, a bridge plug was set at 1,186m MDRT on wireline after unsetting the RTTS packer and POOH with 2-7/8" EUE tubing. The plug was successfully pressure tested to 2,000psi. A new production test BHA was run with 5" TCP guns, 6 spf, 22.7g charges, 0 deg phasing on 2-7/8" J-55 tubing. The Cockleshell Gully formation was then perforated over the 1,159 – 1,162m MDRT interval.

In February 1997, the cement and bridge plug were drilled out and injectivity tests were conducted for the 1,339.5 – 1,341.5m MDRT and 1,396 – 1,397m MDRT intervals. A hesitation squeeze was then conducted over the 1,206 – 1,412m MDRT interval. The cement plug was then drilled out to 1,410m MDRT. Tubing and packer were RIH and the squeezed zones were successfully pressure tested. The 1,156 – 1,164m DMRT zone was perforated but had no injectivity to formation.

A plug was then set at 1,163m MDRT and a cement job was carried out through the perforations and up the casing.

On 10th February 2017, a drift run was conducted with a 1.85" gauge cutter and tagged PBTD at 1,119m MDRT.

TKM Wellhead Services carried out a Well Integrity Assessment of the MHOF wells from 20 to 21 June 2019. B Section annulus outlets are buried. Pressure testing via the C Section 3" ball valve above the tubing head yielded a reading of 0 psi. Visual inspection through the open valve confirmed no tubing in the well.

The outline of the WIA activities for Mount Horner-5 is as follows:

STEP	OPERATIONS
1.00	**PHASE 1 – DECOMMISSION WELLBORE OPERATIONS**
1.01	Well preparation
1.02	Rig up workover rig and nipple up Annular Preventer
1.03	Plug #2: Set Bridge Plug at 526m MDRT
1.04	Perforate beneath Surface Casing Shoe
1.05	Run in hole with cementing string, pump Cement Plug #2
1.06	Lay balanced surface plug (Cement Plug #3)
2.00	**PHASE 2 - WELLHEAD CUT**
2.01	Excavate wellhead.
2.02	Wellhead cut and removal.

At the conclusion of the activity Mount Horner-5 will be decommissioned.

3.2.3 Mount Horner-7

The well was drilled in April 1987 and reached a TD of 1,845m MDRT.

There is no production data available for Mt Horner-07 and it is believed the well was never on production.

In March 1989, an SGS was run with 2.25" drift and tagged fluid at 81.4m MDRT. The drift also tagged HUD at 1,229.0m MDRT. A PBU survey was then run in April 1989 with the gauges run to 1,227.4m MDRT and a water sample taken at the same depth.

In May 1995, a gauge cutter was run to 1,218.5m MDRT and the tubing was cut at 1,215m MDRT. There were plans to pull the completion and suspend the well with a bridge plug and cement.

The HUD was tagged at 1,193m MDRT on 11th of February 2017 with a 1.85" gauge cutter.

TKM Wellhead Services carried out a Well Integrity Assessment of the MHOF wells from 20 to 21 June 2019. The A Section is buried. Pressure testing via the C Section 3" ball valve above the tubing head and the Production Annulus ball valve yielded a reading of 0 psi. Both valves were opened to the atmosphere with no pressure observed. Visual inspection through the open TH valve confirmed no tubing in the well.

Consultation was undertaken with Adrian Halliday, confirming a tubing cut and pull occurred above the packer with a bridge plug and cement plug installed on top. The well is confirmed to be suspended.

The outline of the WIA activities for Mount Horner-7 is as follows:

STEP	OPERATIONS
1.00	**PHASE 1 – DECOMMISSION WELLBORE OPERATIONS**
1.01	Well preparation
1.02	Run Wireline Cement Plug #1
1.03	Plug #2: Set Bridge Plug at 242.6m MDRT
1.04	Rig up workover rig and nipple up Annular Preventer
1.05	Perforate beneath Surface Casing Shoe
1.06	Run in hole with cementing string, pump Cement Plug #2
1.07	Lay balanced surface plug (Cement Plug #3)
2.00	**PHASE 2 - WELLHEAD CUT**
2.01	Excavate wellhead.
2.02	Wellhead cut and removal.

At the conclusion of the activity Mount Horner-7 will be decommissioned.

3.2.4 Mount Horner-13

The well was drilled in February 1993 and reached a TD of 1,676m MDRT.

There is no production data available for Mt Horner-07 and it is believed the well was never on production.

In March 1993, the well was suspended because of low productivity.

A workover was carried out in April 1993. The completion was pulled, well re-perforated over the 1,349.0 – 1,350.5m MDRT interval and completion, pump and sucker rods re-run.

In May 1995, the rods and tubing were pulled out of hole. A restriction investigation was carried out and it was found that there was a casing restriction at 1,195m MDRT when RIH with 50mm (1.97") tapered pipe.

The HUD was tagged at 1,193m MDRT on 11th of February 2017 with a 1.85" gauge cutter.

TKM Wellhead Services carried out a Well Integrity Assessment of the MHOF wells from 20 to 21 June 2019. Needle valve seizes were observed and replaced on the tubing head and the SA surface annulus. Valves were changed. The 3" ball valve was opened and approximately 2-3 psi of pressure was observed, bleeding off immediately. A pressure gauge was rigged up on the SA surface annulus yielding a reading of 0 psi. Visual inspection inside the 3" ball valve confirmed no tubing is present and the well is confirmed to be suspended.

The outline of the WIA activities for Mount Horner-13 is as follows:

STEP	OPERATIONS
1.00	**PHASE 1 – DECOMMISSION WELLBORE OPERATIONS**
1.01	Well preparation
1.02	Run Wireline Cement Plug #1
1.03	Plug #2: Set Bridge Plug at 200m MDRT
1.04	Rig up workover rig and nipple up Annular Preventer
1.05	Perforate beneath Surface Casing Shoe
1.06	Run in hole with cementing string, pump Cement Plug #2
1.07	Lay balanced surface plug (Cement Plug #3)
2.00	**PHASE 2 - WELLHEAD CUT**
2.01	Excavate wellhead.
2.02	Wellhead cut and removal.

At the conclusion of the activity Mount Horner-13 will be decommissioned.

3.3 DECOMMISSIONING AND REHABILITATION

Key is assessing the viability for further development of MHOF and other parts of L7, which may contain commercial hydrocarbon accumulations that have not previously been tested.

Over time, as Key's assessment of MHOF continues, existing infrastructure (wells, flowlines, production facility, etc) may be decommissioned if they are classified by Key as end-of-life and no longer required for Key's development of MHOF. After decommissioning of infrastructure, the disturbed sites will be rehabilitated and restored as far as practicable to its original condition and in accordance with landowner expectations.

The site rehabilitation will continue until all completion criteria are achieved. Completion criteria differ for each site. On private lease, such as where MHOF is located, indicative completion criteria usually includes:

- No MHOF-related equipment and waste on site；

- Gravel sheeting material removed;
- Any stock piled topsoil respread;
- Stabilising agent applied to prevent erosion (as required); and
- Erected fencing removed.

The indicative timeframe for decommissioning of the MHOF well infrastructure associated with the wells decommissioned in this BD are in Table 2.

Table 2. Decommissioning timeline

Item	Asset	Activity	Indicative Timing
1	Mount Horner 5, 7, 13	Decommission wells	Q4 2019
2	Mount Horner 5, 7, 13	Cut well heads	Q4 2019
3	Mount Horner 5, 7, 13	Remove cellar and rehabilitate well pads and sumps	Q2 2020

4. DESCRIPTION OF THE ENVIRONMENT

This section is a review of the existing environment in the broader project area and surrounds, including the physical environment, biological environment, heritage and conservation environment and socioeconomic environment through the use of historical data and desktop research.

The MHOF location is within existing cleared land where there are no identified Cultural Heritage sites. There are no European Heritage sites, threatened flora or fauna or any direct impact on an ESA or EPP Lake within the MHOF location.

The MHOF is situated on gently sloping land 20 km north east of Dongara. The surrounding land use is predominantly used for sheep pasture. The nearest dwelling is a farmhouse 1.5 km to the northwest of the MHOF.

4.1 CLIMATE

The MHOF is located in L7 in the Perth Basin, situated approximately 350km north of Perth. The region has a Mediterranean-type climate characterised by seasonal patterns of hot, dry summers and mild, wet winters. The area is subject to high wind speeds, dust storms, lightning storms, high summer temperatures and low winter night temperatures. The nearest Bureau of Meteorology stations are at Geraldton and Mingenew.

Summer maximum temperatures are warm/hot with 9 or 10 days per month in January and February exceeding 35°C and about 3 days in each of these months exceeding 40°C. Winter maximum temperatures are generally mild and average about 20°C. Minimum temperatures range from an average of about 19°C in February to 9°C in.

Annual rainfall averages approximately 465 mm near the coast but tapers off to around 335 mm 100 km inland. Generally, 55% of annual rainfall occurs between April and September with the wetter months being June and July. Monthly rainfall ranges from 5 to 10 mm in December - January and 85 to 110 mm in June. During the summer months rain occurs rarely resulting in seasonal droughts, lasting approximately four months. Summer months may record scattered and irregular thunderstorm rain or the infrequent influence of a decaying tropical cyclone. Thunderstorm days total about 10-15 per annum.

The wind speeds average about 15-20 km/h at 9am and 3pm in the cooler months although in the October-March period average wind speeds increase from about 20 km/h at 9am to 25-30 km/h at 3pm as a result of the sea breeze. On and close to the coast the sea breeze is even stronger.

L7 lies at the southern edge of the cyclone belt and may be expected in the November-April each year.

Seismic activity in the area is considered very low as per AS1170 (Part 4). Tremors are occasionally felt in the area, but there has been no large seismic activity. There are no active faults in the area.

The area is occasionally affected by lightning strikes. These generally occur in the summer months.

A prohibited burning period (generally between October-April inclusive) occurs every summer season. Either side of this prohibited burning period is a prescribed burning period when permits are obtained from FESA on advice by the Irwin Shire Council.

4.2 LANDFORM AND SOILS

Generally, soils within the Perth Basin are light and sandy and well drained. Beard (1976) described the soils as “calcareous sand soils of minimal development”. The soils consist of calcareous and siliceous sand underlain by aeolianite, which is often exposed. Two broad soil-landscape systems are present in L7: the Tamala system (yellow, red and black sands on limestone) and the Irwin system (alluvial valley systems). The Tamala system is developed upon a series of low shore parallel dunes/hills located immediately inland of the Quindalup system. Soils comprise well-drained calcareous black sands, neutral reddish-brown sands and neutral yellow sands. The Irwin system occurs on level to gently inclined alluvial flats and terraces of the Irwin and Lockier Rivers. Soils comprise imperfectly drained alkaline grey clays and loamy gradational and duplex soils.

4.3 SURFACE AND GROUNDWATER SYSTEMS

The MHOF is situated in the Allanooka-Dongara Water Reserve ("ADWR"), which was proclaimed under the *Country Areas Water Supply Act 1947* and is classified as a Public Drinking Water Source Area ("PDWSA"). Two priority classifications have been designated to describe the ADWR PDWSA – Priority 1 and Priority 2. MHOF fall within the Priority 2 zone of the ADWR PDWSA.

The groundwater protection area is controlled via legislation that is applied by the Department of Water and Environment Regulation ("DWER"). The Allanooka Scheme is located in the ADWR and supplies water to Geraldton, Dongara, Port Denison, Walkaway, Narngulu, Eradu and Mullewa.

The ADWR lies over the Yarragadee Formation. This formation consists of inter-bedded sandstone, siltstone and shale. The beds are discontinuous and range from 2 to 30 metres in thickness, with an average of about 10 metres. The groundwater may be confined to varying degrees at depth beneath the water table because of the layered nature of the formation (Allen 1980). The depth to the water table in the Yarragadee aquifer system in the Allanooka Scheme ranges between approximately 12 to 85 m below ground level and averages 50 m below ground level.

The current borefield is situated approximately 6.5 kilometres north west of the MHOF. Future plans exist for additional monitoring bores to be installed to the west of MHOF. The nearest creek is 3 kilometres to the west of the field.

The area in which the MHOF is located is generally devoid of any significant permanent surface water features. The porous and permeable coastal limestone and dune systems tend to allow rainwater to infiltrate to the water table rather than running off the land surface, resulting in a lack of defined major watercourses in the area.

The most significant surface water features in the vicinity of the MHOF are the Irwin and Greenough Rivers. The Irwin River flows in an east-west direction, approximately 160km from Canna to Arurine Bay near Dongara. The Irwin River is approximately 13km south of the MHOF at its closest point (DEC, 2010a). The Greenough River lies approximately 20km north of the proposed exploration well site at its closest point. The Greenough River flows approximately 300km south-west from Jingemarra Station to Cape Burney, 9 km south of Geraldton (DEC, 2010a).

The nearest Proclaimed Surface Water Area as proclaimed under the Rights in Water and Irrigation Act (1914) is the Greenough River and Tributaries Proclaimed Surface Water Area, which is located approximately 25km north of the MHOF (DoW, 2010).

There are several small wetlands present within the Perth Basin. These wetlands are a surface expression of the relatively shallow water table that occurs in the northern parts of the Yarragadee Formation aquifer. The nearest wetland to the MHOF, Allanooka Swamp, is located approximately 9.5km to the north of the facility.

No direct physical impacts to rivers, creeks, springs, wetlands or soaks will occur as a result of the proposed BD activities.

4.4 VEGETATION AND FLORA

4.4.1 Flora

The area occupied by L7 is a primarily private property with patchy remnant vegetation. The cleared areas are pasture or cropland with few native species, over weeds and pasture species. Pasture and trees grow in the vicinity of the Oilfield.

Agricultural Protection Act (1976) Declared Plant Echium plantagineum (Patterson's Curse) occurs within permit area L7. Patterson's Curse has been listed under P1, where the movement of plants, seeds or contaminated machinery is prohibited.

A tree farm of Eucalyptus camaldulensis and Casurina obesa is established at MHOF (intentionally planted for PFW irrigation during operational activities).

A desktop flora and vegetation assessment, in the form of a literature review and database search, was conducted over the entire permit area L7, encompassing the MHOF. Consistent with EPA Guidance Statement 51 (EPA, 2004a), this level of assessment is considered adequate given that the land is located on freehold land and has been previously cleared.

The MHOF lies within the Irwin Botanical District of the South West Botanical Province (Beard, 1990) and the Lesueur Sandplain subregion of the Geraldton Sandplain bioregion as defined by IBRA (Desmond & Chant, 2001). The vegetation of the Geraldton Sandplain bioregion is broadly described as consisting of mainly proteaceous scrub heaths, rich in endemics, over a sandy, undulating, lateritic sandplain. Extensive York Gum and Jam Acacia woodlands occur on outwash plains associated drainage (Desmond & Chant, 2001).

Seventy-nine Priority Flora species, 42 DRF species, and one other species at risk (as gazetted under the *Wildlife Conservation Act 1950*) have been recorded within the Lesueur Sandplain subregion (Desmond & Chant, 2001).

Searches of the DPAW Threatened Flora Species Database and the Western Australian Herbarium Database (DEC, 2010b; DEC, 2010c) identified two DRF and two Priority Flora species surrounding the MHOF.

4.5 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

Ecological communities are naturally occurring biological assemblages associated with a particular type of habitat. At a national level, Threatened Ecological Communities (TECs) are protected under the EPBC Act and may be categorised into one of three sub-categories:

Critically endangered, if it is facing an extremely high risk of extinction in the wild in the immediate future;

Endangered, if it is not critically endangered and is facing a very high risk of extinction in the wild in the near future; and

Vulnerable, if it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

The Western Australian DPAW maintains a list of TECs which are further categorised into three subcategories which replicate those of the EPBC Act. Within the Western Australian classification, an ecological community will be listed as Vulnerable "when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future."

The DPAW also maintains a list of Priority Ecological Communities (PECs), categorised from Priority 1 through to Priority 4. PECs include potential TECs that do not meet survey criteria, or that are not adequately defined.

The MHOF does not overlap with any known occurrences of threatened or priority ecological communities, or their buffers (Desmond and Chant, 2001).

The MHOF is located on freehold land that has previously been cleared. There will be no clearing of native vegetation required for the CM program or when accessing the site. The CM program is not located within, or likely to impact, an ESA or DRF.

A search of the EPBC Act Protected Matters Database (DEWHA, 2010) identified no nationally threatened animals and plant species within L7.

No other matters of National Environmental Significance were identified within L7 and the CM program is not required to be referred for assessment under the EPBC Act.

4.6 ENVIRONMENTALLY SENSITIVE AREAS

The MHOF is located within the Lesueur Sandplain subregion, which consists mainly of dryland agriculture (69.34%). Conservation in the subregion is concentrated in western areas (Desmond and Chant, 2001), with the most significant conservation areas being south of Dongara.

The closest conservation area, the Burma Road Nature Reserve, is approximately 12km north of MHOF. The Burma Road Nature Reserve is vested with the Western Australian Conservation Commission and is classified as an 'A' class nature reserve for the conservation of flora and fauna.

The MHOF is not located within Commonwealth lands or reserves and will not impact on areas of conservation significance.

4.7 FAUNA

A fauna desktop assessment of the area surrounding the MHOF was conducted. The DPAW Threatened Fauna Database (DEC, 2010d), the DSEWPaC (formerly DEWHA), EPBC Act, Protected Matters Database, and other published documents were interrogated during the desktop survey. Consistent with EPA Guidance Statement 56 (EPA, 2004b), this level of survey is considered adequate given the lack of vegetation and therefore habitat within the proposed impact area, and also due to the fact that the scale and nature of impact associated with the CM program was assessed to be low.

A number of the species listed in the table are under pressure from feral animals either directly through predation (e.g. from foxes and cats) or indirectly through habitat destruction or alteration (e.g. by rabbits and goats).

Feral animals that are known to be present within the Lesueur Sandplain subregion include:

- Goats (*Capra hircus*);
- Rabbits (*Oryctolagus cuniculus*);
- Pigs (*Sus scrofa*);
- European Red Foxes (*Vulpes vulpes*);
- Rats (*Rattus rattus*); and
- Cats (*Felis catus*).

The area surrounding MHOF is farming land, and broad-acre cropping and sheep grazing predominate (Desmond & Chant, 2001).

Western Grey Kangaroos, which are widespread within the region, may also occur in the general vicinity of the facility.

4.8 SOCIAL ENVIRONMENT

MHOF is located within a sparsely populated region with limited settlement, transport or communications infrastructure. The region is relatively undeveloped, comprising of small coastal settlements that are economically dependent on fishing, agriculture, tourism, mining and natural gas production. The townships of Dongara and Port Denison to the south west are the largest population centres in the vicinity of MHOF. Dongara/Port Denison is a rock lobster fishing port and the region is the centre for Western Australia's rock lobster industry. There is one private landowner in permit area L7 directly affected by MHOF operation and commercial arrangements are in place. Land use within the surrounding region is pastoral, consisting of wheat, sheep and cattle farming, harvesting. Nomadic Aboriginal people no longer reside in the area, although some maintain their links to the area.

4.9 CULTURAL ENVIRONMENT

Field and desktop ethnographic surveys are carried out by the previous Operator) to determine if operations are likely to impact upon areas of cultural heritage significance. In December 1998, an archaeological investigation for aboriginal sites (Harris 1998) and an ethnographic survey (O'Connor 1998) were completed for the area associated with the Hakea Seismic Programme. This survey encompassed the MHOF.

The ethnographic survey involved the examination of the existing ethnographic databases, consultations and discussion with relevant Aboriginal persons and inspection of the survey area. The ethnographic survey established that there are no sites or places of significance to Aboriginal people in the MHOF area.

The archaeological survey of aboriginal sites involved an investigation of previous research in the area, analysis of the findings and recording of archaeological sites located. The archaeological investigation did not identify any archaeological sites in the MHOF area.

The MHOF does not operate near and will not impact on any registered sites.

4.10 ECONOMIC ENVIRONMENT

The significant economic activities in the region include oil, gas and mineral exploration and production, and broad hectare cropping and grazing activities. Other activities in the area include aquaculture and olive growth and production. Early settlement in the Dongara region was by pastoralists, however mining and agriculture are now important components of the regional economy.

4.11 AIR QUALITY AND NOISE

Air quality and noise emissions within L7 and surrounds are expected to be slightly above natural ambient levels due to pastoral and industrial activities. The ambient air quality and noise level in L7 is likely to be influenced by the following regional sources of air and noise emissions:

- Gypsum mining;
- Oil production facilities (Jingemia, Beharra, Hovea, Eremia, Xyris and Arrowsmith);
- CMS gas plant;
- Cockburn Cement plant;
- Rural plant and machinery use;
- Commercial and recreational vessels;
- Trains;
- Dongara Airport;
- Activities within the town of Dongara;
- Road traffic; and
- Wind-raised dust from bare sand dunes and cropping land.

These sources of emissions have a relatively low impact on the overall ambient air quality and noise levels in the area. The nearest sensitive receptors (landholder residences) are located at least 2000m from the MHOF.

The overall impact during the exploration drilling program is expected to be low given the distance to the nearest sensitive receptor, the use of noise suppressed machinery and the timing of works occurring between 7am and 6pm. Noise monitoring will be conducted weekly throughout the BD program and will also be undertaken should a noise complaint be received.

5. STAKEHOLDER CONSULTATION

The stakeholder consultation program will continue for the duration of the site activities program. The aim of the consultation program is to inform stakeholders and to identify any conflicts, concerns, management strategies and positive benefits.

Table 3 provides a summary of the stakeholder consultation that has been undertaken to date that are pertinent to the BD activities.

Key commits to ongoing consultation during the course of the proposed BD activities as necessary to ensure the pertinent stakeholders are aware of the commencement and cessation of activities and any key changes to the scope or schedule of the BD activities.

Table 3. Stakeholder Consultation Summary

Date	Stakeholder	Personnel	Method	Topic Covered	Outcomes
21-Feb-19	DMIRS	Director	EARS	Submission of EP Revision 5	Awaiting review

14-Mar-19	DMIRS	Director	Email	Notification of EP acceptance	Commence activities planning
11-Apr-19	DMIRS	Director	Email	Notification of activity commencement	Commence activity pending
18-Apr-19	Viridis	Director	Email	Notification of activity commencement	Commence activity pending
04-Jul-19	Viridis	Director	Telephone	Well assessment ongoing and identification of wells for P&A will be forthcoming at conclusion of work	Viridis request further updates as work concludes
30-Jul-19	Viridis	Director	Telephone	Identification of wells for P&A complete. Will focus on developing plans for MH-5, 7, 13. MH-4A will be further secured and remain suspended.	Viridis satisfied with results and requests notification if any crops are expected to be impacted. Key confirm no crops expected to be impacted as tracks exist to wells being worked on.
12-Sep-19	Viridis	Director	Telephone	Key endeavouring to submit regulatory documentation for well work with a view to commence works in October 2019	Viridis thanks Key for update and to be notified when it expects mobilisation to occur
27-Sep-19	DMIRS	Director	EARS	Submission of BD Revision 1	Awaiting review
24-Oct-19	DMIRS	Director	Email	Request for further information	Revision and resubmission by Key to occur

6. IMPLEMENTATION STRATEGY

Environmental management is an integral part of the Key CM activities to ensure that the environmental impacts and risks are reduced, and environmental management is undertaken.

The implementation strategy outlined in the accepted EP (Section 4 of EP) is applicable to the proposed activity. The aspects include:

- Systems, practices and procedures;
- Roles and responsibilities of personnel;
- Training and competencies;
- Monitoring, auditing, management of non-conformance and review;
- Emergency response (including oil spill contingency plan);
- Record keeping; and
- Reporting.

The WIA program will be managed in accordance with the commitments outlined in the Care and Maintenance Environment Plan (Document number: L7/EPCM190212-KP, Revision 5) for MHOF. For the purposed WIA; there are no additional risks or impacts above or beyond the accepted EP.

Appendix A: Chemical Disclosure Statement

Chemical Disclosure Statement

MOUNT HORNER WELL DECOMMISSIONING AND WORKOVER
Down-hole Chemical Disclosure Information (25/10/2019)

Project/Well	**Mount Horner-4A, 5, 7, 13**
System	**Inhibited Water**
Total Volume (All Wells)	**600 bbl (95,392.38 L)**
Total Volume Per Well	**MH-4A: 173 bbl (27,504.8 L), MH-5: 162 bbl (25,755.94 L), MH-7: 171 bbl (27,186.83 L), MH-13: 94 bbl (14,944.81 L)**

Product	Supplier Name	Purpose of Use	Ingredient	CAS Number	Maximum ingredient Concentration in Product (% weight of volume)	Maximum ingredient Concentration in total fluid used (%)	MSDS Provided	Ecotoxicity Information (summary)
Ancor 1	Newpark Drilling Fluids	Corrosion Inhibitor	Triethanolamine Water (Remainder)	102-71-6 7732-18-5	68-72% 32-28%	0.705%	Yes	Acute Toxicity: may be harmful if swallowed, in contact with skin and/or inhaled LD50 (ingestion): 2200 mg/kg (rabbit) LD50 (skin): > 20mL/kg (rabbit) TDLo (ingestion): 16 g/kg/64 weeks (mouse - cancer) Biodegradation/bioaccumulation: In soil and water triethanolamine will biodegrabe fairly raapidly following acclamation (half-life in the order of days to weeks)
Sodium sulphite	Newpark Drilling Fluids	Oxygen Scavenger	Sodium carbonate Sodium sulphite Sodium sulphate Water	497-19-8 7757-83-7 7757-82-6 7732-18-5	<0.1% >97% <2.5% <0.1%	0.021%	Yes	Acute toxicity: LD50 (ingestion) 820 mg/kg (mouse) LD50 (intraperitoneal) 950 mg/kg (mouse) LDLo (ingestion) 2825 mg/kg (rabbit) LDLo (intravenous) 400 mg/kg (cat) Biodegradation/bioaccumulation: this product is completely biodegradable. Sodium Sulphite is an oxygen scavenger when introduced to water. Bioaccumulation of this product has not been determined.
Idcide-20	Newpark Drilling Fluids	Biocide/Prevents bacterial contamination of the fluids and corrosion of casing	Tetrakis (Hydroxymethyl) Phosphonium Sulphate Water	55566-30-8 7732-18-5	18-25% 75-82%	0.14%	Yes	LD50 (Ingestion): 248 mg/kg (rat) TDLo (Ingestion): 650 mg/kg/13 weeks - intermittent (rat) Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment. Water (Remainder) 7732-18-5 75-82% http://www.inchem.org/documents/ehc/ehc/ehc218.htm
Water	Bore water from location	Base fluid	Water	7732-18-5	100%	99.134%	N/A	N/A Water returning to source

Inhibited Water System Chemical List

Chemicals Name	CAS Number	Mass Fraction (%)
Water	7732-18-5	99.46%
Triethanolamine	102-71-6	0.49%
Sodium carbonate	497-19-8	0.00002%
Sodium sulphite	7757-83-7	0.02%
Sodium sulphate	7757-82-6	0.0005%
Tetrakis (Hydroxymethyl) Phosphonium Sulphate	55566-30-8	0.03%
TOTAL		**100.00%**

MOUNT HORNER WELL DECOMMISSIONING AND WORKOVER
Down-hole Chemical Disclosure Information (25/10/2019)

Project/Well	**Mount Horner-4A, 5, 7, 13**
System	**Cement**
Total Volume (All Wells)	**70 bbl (11,129.01 L)**
Total Volume Per Well	**MH-4A: 2 bbl (317.97 L), MH-5: 16 bbl (2,543.8 L), MH-7: 19 bbl (3,020.76 L), MH-13: 33 bbl (5,246.48 L)**

Product	Supplier Name	Purpose of Use	Ingredient	CAS Number	Maximum ingredient Concentration in Product (% weight of volume)	Maximum ingredient Concentration in total fluid used (%)	MSDS Provided	Ecotoxicity Information (summary)
Class G HSR (Portland Cement)	Adelaide Cement Company	Cement for setting plugs to isolate reservoirs from surface and aquifers	Cement (taken from analogous MSDS) Tri-Calcium Silicate 40% Di-Clacium Silicate 30% Tetra-Calcium-Alumino-Ferrite 7.5% Calcium Sulfate 8% Tri-Calcium Aluminate 8% Calcium Carbonate 2.5% Magnesium Oxide 2% Calcium Oxide 0-0.02% Crystalline Silica 0-0.005%	 12168-85-3 10034-77-2 12068-35-8 7778-18-9 12042-78-3 1317-65-3 1309-48-4 1305-78-8 1408-60-7	 20-70 10-60 5-15 2-10 1-15 0-5 0-4 0-0.2 0-0.2	42.600%	Yes	Toxicity - Constituent 1 (60100%) 42.12% Yes Fish Toxicity LC50 (96h): 41.2 mg/L (Oreochromis niloticus) Toxicity - Constituent 2 (3060%) 96h LL0: 10,000 mg/L (Branchdanio rerio) Crustacean Toxicity 24h EL50: >10,000 mg/L (Daphnia magna) Na-Al silicates: Fish Toxicity 96h LL0: 10,000 mg/L (Branchdanioreriо); Algae Toxicity 72h NOEL:10,000 mg/L (Scenedesmus subspicatus) Source: IUCLID 2000 Addition of large amounts of cement to water may, however cause a rise in pH and may, therefore be toxic to aquatic life under certain circumstances. Toxicity - Constituent 3 (5%) LD50 (Ingestion): > 5000 mg/kg (rat) Toxicity - Constituent 4 (10%) TCLo (Inhalation): 194 g/m³/10 years intermittently (human) TDLo (Ingestion): 450 mg/kg/3 weeks intermittently (rat) Toxicity - Constituent 5 (5%) LD50 (Ingestion): 3160 mg/kg (rat). Chronic Toxicity: 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. Individuals with silicosis are predisposed to develop tuberculosis. Biodegradation/bioaccumulation: Biodegradation not applicable as cement is intended to remain long term in well and will be inert.
CD-31L	Baker Hughes	Dispersant	Sodium Napthalene Sulphonate Water	130-14-3 7732-18-5	20 80	1.120%	Yes	Toxicity- Constituent 1 (20%) LC50: 135 ppm for Daphnia Magna Straus waterflea LD50: 2000mg/kg(Rat) Biodegradation/bioaccumulation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. These products are sulfur oxides (SO2, SO3…), some metallic oxides. Water: (80%) Natural product
FP-9L	Baker Hughes	Antifoaming agent	Isononanol Water	27458-94-2 7732-18-5	60 40	0.340%	Yes	Toxicity- Constituent 1 (60%) Isononanol LD50 oral rat: 3950 mg/kg LC0 Rat(male/female): > 0.21 mg/l / 7 h / vapour LD50 Rat(male/female): > 4000 mg/kg dermal Biodegradation/bioaccumulation: Aerobic, Inoculum: Activated sludge Exposure time: 28 d Result: 79 % Readily biodegradable. Method: (CO_2; modif. Sturm test - 92/69/EEC part C.4-C) Bioconcentration factor (BCF): 15.2 Significant concentrations do not accumulate. The data are derived from the evaluations or test results achieved with similar products (conclusion by analogy). logKOC: 2.17 (Soil) Method: OECD TG 121 Water: (40%) Natural product

Product	Supplier Name	Purpose of Use	Ingredient	CAS Number	Maximum ingredient Concentration in Product (% weight of volume)	Maximum ingredient Concentration in total fluid used (%)	MSDS Provided	Ecotoxicity Information (summary)
R21L	Baker Hughes	Cement retardant	Sodium lignosulphonate Water	8061-51-6 7732-18-5	45 55	0.110%	Yes	Toxicity- Constituent 1 (45%) LD50 oral rat >4,000 mg/Kg LC50 Rainbow Trouts 7300 ppm/48 h LD50 oral rat >2,000 mg/Kg Biodegradation/bioaccumulation: Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability. Water: (55%) Natural product
Calcium Chloride	Newpark	Weighting Agent	Calcium Chloride Anhydrous Sodium Chloride Water	10043-52-4 7647-14-5 7732-18-5	94-97 1-5 1	0.090%	Yes	Acute Toxicity: CALCIUM CHLORIDE ANHYDROUS as an ingredient (10043-52-4): LD50 (Ingestion): 1000 mg/kg (rat) LD50 (Intraperitoneal): 210 mg/kg (mouse) LD50 (Intravenous): 42 mg/kg (mouse) LD50 (Subcutaneous): 823 mg/kg (mouse) LDLo (Ingestion): 1384 mg/kg (rabbit) LDLo (Intravenous): 150 mg/kg (guinea pig) LDLo (Subcutaneous): 249 mg/kg (cat) TDLo (Intravenous): 20 mg/kg/1 hour (woman) SODIUM CHLORIDE (7647-14-5): LC50 (Inhalation): > 42000 mg/m3/1 hour (rat) LD50 (Ingestion): 3000 mg/kg (rat) LD50 (Intraperitoneal): 2602 mg/kg (mouse) LD50 (Intravenous): 645 mg/kg (mouse) LD50 (Skin): > 10000 mg/kg (rabbit) LD50 (Subcutaneous): 3000 mg/kg (mouse) LDLo (Ingestion): 8000 mg/kg (rabbit) LDLo (Intravenous): 300 mg/kg (guinea pig) LDLo (Subcutaneous): 2160 mg/kg (guinea pig) TDLo (Ingestion): 12357 mg/kg (human) Biodegradation/bioaccumulation: Biodegradability does not pertain to inorganic substances. This product does not bioaccumulate.\
Water	Bore water from location	Base fluid	Water	7732-18-5	100%	55.740%	N/A	N/A Water returning to source

Cement System Chemical List

Chemicals Name	CAS Number	Mass Fraction (%)
Water	7732-18-5	56.83%
Portland Cement	65997-15-1	42.60%
Sodium Napthalene Sulphonate	130-14-3	0.224%
Isononanol	27458-94-2	0.204%
Sodium lignosulphonate	8061-51-6	0.050%
Calcium Chloride Anhydrous	10043-52-4	0.086%
Sodium Chloride	7647-14-5	0.003%
	TOTAL	**100.00%**

Appendix B: Material Safety Data Sheets

RHEOCHEM

MATERIAL SAFETY DATA SHEET

Product Name **ANCOR 1**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**RHEOCHEM LTD**
Address	11 Alacrity Place, Henderson, WA, AUSTRALIA, 6166
Telephone	+61 8 9410 8200
Fax	+61 8 9410 8299
Emergency	1800 127 406 (Australia); 011 64 3 3530199 (International)
Web Site	http://www.rheochem.com.au/
Synonym(s)	CORROSION INHIBITOR
Use(s)	BRINE • DRILLING FLUID ADDITIVE • OIL AND GAS INDUSTRY
SDS Date	28 Jan 2010

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R36 Irritating to eyes.

SAFETY PHRASES

S36 Wear suitable protective clothing.

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	None Allocated	**DG Class**	None Allocated	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	None Allocated		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
TRIETHANOLAMINE	C6-H15-N-O3	102-71-6	68-72%
WATER	H2O	7732-18-5	remainder

4. FIRST AID MEASURES

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use a Type A (Organic vapour) respirator or an Air-line respirator (in poorly ventilated areas). Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
Advice to Doctor	Treat symptomatically.
First Aid Facilities	Eye wash facilities and safety shower should be available.

5. FIRE FIGHTING MEASURES

Flammability Combustible. May evolve toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition.

Fire and Explosion Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

Extinguishing Dry agent, carbon dioxide, foam or water fog. Prevent contamination of drains or waterways.

Hazchem Code None Allocated

6. ACCIDENTAL RELEASE MEASURES

Spillage Contact emergency services where appropriate. Use personal protective equipment. Clear area of all unprotected personnel. Ventilate area where possible. Contain spillage, then cover / absorb spill with non-combustible absorbant material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. Prevent spill entering drains or waterways.

7. STORAGE AND HANDLING

Storage Store in a cool, dry, well ventilated area, removed from oxidising agents, acids, nitrites, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Store as a Class C1 Combustible Liquid (AS1940).

Handling Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Stds

Ingredient	Reference	TWA		STEL	
Triethanolamine	SWA (AUS)	--	5 mg/m^3	--	--

Biological Limits No biological limit allocated.

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE Wear splash-proof goggles, rubber or PVC gloves and coveralls. Where an inhalation risk exists, wear: a Type A (Organic vapour) respirator. If spraying, wear: a Type A-Class P1 (Organic gases/vapours and Particulate) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS LIQUID	**Solubility (water)**	SOLUBLE
Odour	SLIGHT ODOUR	**Specific Gravity**	1.1
pH	NOT AVAILABLE	**% Volatiles**	NOT AVAILABLE
Vapour Pressure	NOT AVAILABLE	**Flammability**	CLASS C1 COMBUSTIBLE
Vapour Density	NOT AVAILABLE	**Flash Point**	> 100°C
Boiling Point	NOT AVAILABLE	**Upper Explosion Limit**	NOT AVAILABLE
Melting Point	NOT AVAILABLE	**Lower Explosion Limit**	NOT AVAILABLE
Evaporation Rate	NOT AVAILABLE		
Autoignition Temperature	NOT AVAILABLE	**Decomposition Temperature**	NOT AVAILABLE
Partition Coefficient	NOT AVAILABLE	**Viscosity**	NOT AVAILABLE

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Material to Avoid	Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), nitrites, heat and ignition sources.
Hazardous Decomposition Products	May evolve toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition.
Hazardous Reactions	Hazardous polymerization is not expected to occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Slightly corrosive - irritant. This product has the potential to cause adverse health effects with over exposure. Use safe work practices to avoid eye or skin contact and inhalation. May cause sensitisation by skin contact. Chronic exposure may result in liver and kidney damage. Upon dilution, the potential for adverse health effects may be reduced.
Eye	Corrosive - irritant. Contact may result in irritation, lacrimation, pain, redness, corneal burns and possible permanent damage.
Inhalation	Slightly corrosive - irritant. Over exposure may result in irritation of the nose and throat, coughing, nausea and inflammation with breathing difficulties. Due to the low vapour pressure, an inhalation hazard is not anticipated with normal use.
Skin	Slightly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns. May cause sensitisation by skin contact.
Ingestion	Slightly corrosive. Ingestion may result in ulceration and burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea.
Toxicity Data	TRIETHANOLAMINE (102-71-6) LD50 (Ingestion): 2200 mg/kg (rabbit) LD50 (Intraperitoneal): 1450 mg/kg (mouse) LD50 (Skin): > 20 mL/kg (rabbit) TDLo (Ingestion): 16 g/kg/64 weeks (mouse - cancer)

12. ECOLOGICAL INFORMATION

Environment	In soil and water, triethanolamine will biodegrade fairly rapidly following acclamation (half-life in the order of days to weeks). In soil, residual triethanolamine may leach to groundwater. LC50 (shrimp): > 100 ppm.

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Reduce with sodium thiosulphate/ bisulphite (not strong reducing agent), acidify with 3M sulphuric acid. Scoop into a container of water and neutralise with soda ash. Absorb with sand or similar and dispose of to approved landfill site. Contact the manufacturer for additional information.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

Shipping Name	None Allocated				
UN No.	None Allocated	**DG Class**	None Allocated	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	None Allocated		

15. REGULATORY INFORMATION

Poison Schedule	Classified as a Schedule 5 (S5) Poison using the criteria in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).
AICS	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Additional Information	RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air

powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

ABBREVIATIONS:
ACGIH - American Conference of Industrial Hygienists.
ADG - Australian Dangerous Goods.
BEI - Biological Exposure Indice(s).
CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.
CNS - Central Nervous System.
EC No - European Community Number.
HSNO - Hazardous Substances and New Organisms.
IARC - International Agency for Research on Cancer.
mg/m³ - Milligrams per Cubic Metre.
NOS - Not Otherwise Specified.
pH - relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm - Parts Per Million.
RTECS - Registry of Toxic Effects of Chemical Substances.
STEL - Short Term Exposure Limit.
SWA - Safe Work Australia.
TWA - Time Weighted Average.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a Chem Alert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this Chem Alert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Report Status

This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared By

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SDS Date 28 Jan 2010

End of Report

RHEOCHEM
A Newpark Company

SAFETY DATA SHEET

Product Name **IDCIDE-20**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**RHEOCHEM LTD**
Address	11 Alacrity Place, Henderson, WA, AUSTRALIA, 6166
Telephone	+61 8 9410 8200
Fax	+61 8 9410 8299
Emergency	1800 127 406 (Australia); 011 64 3 3530199 (International)
Web Site	http://www.rheochem.com.au/
Synonym(s)	IDCIDE 20
Use(s)	BIOCIDE · DRILLING FLUID ADDITIVE · WATER TREATMENT
SDS Date	11 October 2012

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R36/38	Irritating to eyes and skin.
R43	May cause sensitisation by skin contact.

SAFETY PHRASES

S23	Do not breathe gas/fumes/vapour/spray (where applicable).
S24/25	Avoid contact with skin and eyes.
S36	Wear suitable protective clothing.

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN Number	None Allocated	**DG Class**	None Allocated
Packing Group	None Allocated	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	None Allocated		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM SULPHATE	CAS: 55566-30-8 EC: 259-709-0	Not Available	18 - 25%
WATER	CAS: 7732-18-5 EC: 231-791-2	Not Available	Remainder

4. FIRST AID MEASURES

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.

Advice to Doctor	Treat symptomatically.
First Aid Facilities	Eye wash facilities should be available.

5. FIRE FIGHTING MEASURES

Flammability	Non flammable. May evolve toxic gases if strongly heated. May evolve carbon oxides, sulphur oxides and phosphates when heated to decomposition.
Fire and Explosion	Treat as per requirements for surrounding fires. Evacuate area and contact emergency services. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.
Extinguishing	Use an extinguishing agent suitable for the surrounding fire.
Hazchem Code	None Allocated

6. ACCIDENTAL RELEASE MEASURES

Spillage	Contact emergency services where appropriate. Use personal protective equipment. Clear area of all unprotected personnel. Ventilate area where possible. Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

7. STORAGE AND HANDLING

Storage	Store in a cool, dry, well ventilated area, removed from oxidising agents, acids and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.
Handling	Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards	No exposure standard(s) allocated.
Biological Limits	No biological limit allocated.
Engineering Controls	Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

PPE

Eye / Face	Wear splash-proof goggles.
Hands	Wear PVC or rubber gloves.
Body	When using large quantities or where heavy contamination is likely, wear coveralls.
Respiratory	Where an inhalation risk exists, wear a Type A (Organic vapour) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS TO PALE YELLOW LIQUID
Odour	SLIGHT ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	> 100°C
Melting point	< 0°C
Evaporation rate	AS FOR WATER
pH	3.0 to 3.5

Vapour density	NOT AVAILABLE
Specific gravity	1.08
Solubility (water)	SOLUBLE
Vapour pressure	18 mm Hg @ 20°C
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
% Volatiles	> 60 % (Water)

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Material to Avoid	Incompatible with oxidising agents (eg. hypochlorites) and acids (eg. nitric acid).
Hazardous Decomposition Products	May evolve carbon oxides, sulphur oxides and phosphates when heated to decomposition.
Hazardous Reactions	Polymerization is not expected to occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Low to moderate toxicity - irritant. This product has the potential to cause adverse health effects with over exposure. Upon dilution, the potential for adverse health effects may be reduced.
Eye	Severe irritant. Contact may result in irritation, lacrimation, pain, redness and blurring or dimness of vision. Prolonged contact may result in corneal burns and possible permanent damage.
Inhalation	Low irritant. Over exposure to vapours may result in irritation of the nose and throat, with coughing. High level exposure may result in dizziness, nausea and headache. Due to the low vapour pressure, an inhalation hazard is not anticipated with normal use.
Skin	Irritant. Contact may result in irritation, redness, rash and dermatitis. Prolonged or repeated contact may result in burns. May be absorbed through skin with harmful effects. May cause sensitisation by skin contact.
Ingestion	Low to moderate toxicity. Ingestion may result in gastrointestinal irritation, nausea, vomiting, abdominal pain and diarrhoea.
Toxicity Data	TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM SULPHATE (55566-30-8) LD50 (ingestion) 248 mg/kg (rat) TDLo (ingestion) 650 mg/kg/13 weeks - intermittent (rat)

12. ECOLOGICAL INFORMATION

Environment	Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.
Ecotoxicity	75% TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM SULPHATE (55566-30-8): LC50 (Rainbow Trout) = 119 mg/L/96 hr LC50(Bluegill Sunfish) = 93 mg/L/ 96 hr EC50 (Daphnia Magna) = 19 mg/L/48 hr LC50 (Brown Shrimp) = 340 mg/L/96 hr LC50 (Mysid Shrimp) = 9.5 mg/L/96 hr LC50 (Sheepshead Minnow) = 94 mg/L/96 hr LC50 (Jevenile Plaice) = 86 mg/L/96 hr Waste Water management EC50 (Activated Sludge) = 24 mg/L/3 hr
Persistence/Degradability	This product is readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste Disposal	For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. For larger amounts, contact the manufacturer for additional information. Prevent contamination of drains or waterways as aquatic life may be threatened and environmental damage may result.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
UN Number	None Allocated	None Allocated	None Allocated
Proper Shipping Name	None Allocated	None Allocated	None Allocated
DG Class/ Division	None Allocated	None Allocated	None Allocated
Subsidiary Risk(s)	None Allocated	None Allocated	None Allocated
Packing Group	None Allocated	None Allocated	None Allocated
Hazchem Code	None Allocated		

15. REGULATORY INFORMATION

Poison Schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

Inventory Listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

16. OTHER INFORMATION

Additional Information

EXPOSURE CONTROL: If utilised in a closed system the potential for over exposure is reduced. If not used in a closed system, local exhaust ventilation is recommended to control exposure. Provide eye wash and safety shower in close proximity to points of potential exposure. Where the potential for an inhalation risk exists, an approved respirator may be required. Do not eat, store, consume food, tobacco or drink in areas where product is used.

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this ChemAlert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m^3	Milligrams per Cubic Metre
PEL	Permissible Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
TLV	Threshold Limit Value
TWA/OEL	Time Weighted Average or Occupational Exposure Limit

Revision History

Revision	Description
1.3	Standard SDS Review
1.2	Standard SDS Review
1.1	Standard SDS Review
1.0	Initial SDS creation

Report Status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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Web: www.rmt.com.au

Revision: 1.3
SDS Date: 11 October 2012

End of SDS

RHEOCHEM
A Newpark Company

SAFETY DATA SHEET

Product Name **SODIUM SULPHITE**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**RHEOCHEM LTD**
Address	11 Alacrity Place, Henderson, WA, AUSTRALIA, 6166
Telephone	+61 8 9410 8200
Fax	+61 8 9410 8299
Emergency	1800 127 406 (Australia); 011 64 3 3530199 (International)
Web Site	http://www.rheochem.com.au/
Synonym(s)	SODIUM SULFITE
Use(s)	ANTIOXIDANT · FOOD PRESERVATIVE · LABORATORY REAGENT · PAPER INDUSTRY · PHOTOGRAPHIC DEVELOPER · REDUCING AGENT · WATER TREATMENT
SDS Date	12 November 2012

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R31	Contact with acids liberates toxic gas.

SAFETY PHRASES

S25	Avoid contact with eyes.
S46	If swallowed, contact a doctor or Poisons Information Centre immediately and show container or label.

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN Number	None Allocated	**DG Class**	None Allocated
Packing Group	None Allocated	**Subsidiary Risk(s)**	None Allocated
Hazchem Code	None Allocated		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
SODIUM CARBONATE	CAS: 497-19-8 EC: 207-838-8	Xi;R36	<0.1%
SODIUM SULPHITE	CAS: 7757-83-7 EC: 231-821-4	Not Available	>97%
SODIUM SULPHATE	CAS: 7757-82-6 EC: 231-820-9	Not Available	<2.5%
WATER	CAS: 7732-18-5 EC: 231-791-2	Not Available	<0.1%

4. FIRST AID MEASURES

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.

Skin If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.

Ingestion For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). Urgent hospital treatment is likely to be needed. If swallowed, do not induce vomiting.

Advice to Doctor Treat symptomatically.

First Aid Facilities Eye wash facilities and safety shower are recommended.

5. FIRE FIGHTING MEASURES

Flammability Non flammable. May evolve toxic gases (sulphur oxides) when heated to decomposition.

Fire and Explosion Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire.

Extinguishing Use an extinguishing agent suitable for the surrounding fire.

Hazchem Code None Allocated

6. ACCIDENTAL RELEASE MEASURES

Spillage Contact emergency services where appropriate. Use personal protective equipment. Clear area of all unprotected personnel. Prevent spill entering drains or waterways. Contain spillage, then collect and place in suitable containers for reuse or disposal. Avoid generating dust.

7. STORAGE AND HANDLING

Storage Store in a cool, dry, well ventilated area, removed from oxidising agents, acids and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Also store removed from air and moisture.

Handling Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Sodium Carbonate (total dust)	SWA (AUS)	--	10	--	--

Biological Limits No biological limit allocated.

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

PPE

Eye / Face Wear dust-proof goggles.

Hands Wear PVC or rubber gloves.

Body When using large quantities or where heavy contamination is likely, wear coveralls.

Respiratory Where an inhalation risk exists, wear a Class P1 (Particulate) respirator. At high dust levels, wear a Full-face Class P3 (Particulate) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance WHITE CRYSTALLINE SOLID

Odour	ODOURLESS
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	9.0 to 10.5
Vapour density	NOT AVAILABLE
Specific gravity	2.6
Solubility (water)	SOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
% Volatiles	NOT AVAILABLE

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Material to Avoid	Incompatible with oxidising agents (eg. hypochlorites) and acids (eg. nitric acid). Sensitive to air and moisture.
Hazardous Decomposition Products	May evolve toxic gases (sulphur oxides) when heated to decomposition.
Hazardous Reactions	Polymerization is not expected to occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary

Low to moderate toxicity. This product has the potential to cause adverse health effects with over exposure. Use safe work practices to avoid eye or skin contact and inhalation. Some individuals are hypersensitive to sulphites and may experience respiratory problems following exposure. Individuals known to be hypersensitive or with existing respiratory problems (eg asthma) are advised to avoid exposure.

Eye

Low irritant. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and possible corneal damage.

Inhalation

Low irritant. Over exposure may result in mucous membrane irritation of the respiratory tract, with coughing. Some individuals are hypersensitive to sulphites, and may experience asthma like symptoms (wheezing and shortness of breath) immediately following exposure.

Skin

Low irritant. Contact may result in irritation, redness, rash and dermatitis.

Ingestion

Low to moderate toxicity. Ingestion may result in gastrointestinal irritation, nausea and vomiting. Well tolerated due to the oxidation of sulphites in the body to sulphates, however with large quantities sulphurous acid is formed. Some individuals may have an allergic reaction. The acute oral LD50 (male rat) is 3.56 g/kg/14 days.

Toxicity Data

SODIUM CARBONATE (497-19-8)

LC50 (inhalation)	800 mg/m³/2 hours (guinea pig)
LD50 (ingestion)	4090 mg/kg (rat)
LD50 (intraperitoneal)	117 mg/kg (mouse)
LD50 (subcutaneous)	2210 mg/kg (mouse)

SODIUM SULPHITE (7757-83-7)

LD50 (ingestion)	820 mg/kg (mouse)
LD50 (intraperitoneal)	950 mg/kg (mouse)
LD50 (intravenous)	175 mg/kg (mouse)
LDLo (ingestion)	2825 mg/kg (rabbit)
LDLo (intravenous)	400 mg/kg (cat)
LDLo (subcutaneous)	600 mg/kg (rabbit)

SODIUM SULPHATE (7757-82-6)

LD50 (ingestion)	5989 mg/kg (mouse)

SODIUM SULPHATE (7757-82-6)

LD50 (intravenous)	1220 mg/kg (rabbit)
LDLo (intravenous)	1220 mg/kg (mouse)
TDLo (ingestion)	14 g/kg (mouse - 8-12 days pregnant)
TDLo (subcutaneous)	806 mg/kg/26 weeks intermittently (mouse)

12. ECOLOGICAL INFORMATION

Environment Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Cover spill with soda ash or sodium bicarbonate. Mix and spray with water, may be effervescent. Wait until reaction is complete, scoop into a large beaker and cautiously add equal volume of sodium hypochlorite (reaction may be vigorous). Add more water, stir and allow to stand (~1hr). Dilute and neutralise. Absorb with sand/similar dispose of to an approved landfill site, or alternatively (for small amounts) flush to sewer with large excess of water.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
UN Number	None Allocated	None Allocated	None Allocated
Proper Shipping Name	None Allocated	None Allocated	None Allocated
DG Class/ Division	None Allocated	None Allocated	None Allocated
Subsidiary Risk(s)	None Allocated	None Allocated	None Allocated
Packing Group	None Allocated	None Allocated	None Allocated
Hazchem Code	None Allocated		

15. REGULATORY INFORMATION

Poison Schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

Inventory Listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

16. OTHER INFORMATION

Additional Information

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

WORKPLACE CONTROLS AND PRACTICES: Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this ChemAlert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m^3	Milligrams per Cubic Metre
PEL	Permissible Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
TLV	Threshold Limit Value
TWA/OEL	Time Weighted Average or Occupational Exposure Limit

Revision History

Revision	Description
1.2	Standard SDS Review Standard SDS Review
1.1	Standard SDS Review
1.0	Initial SDS creation

Report Status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared By

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Revision: 1.2
SDS Date: 12 November 2012

End of SDS

LAFARGE NORTH AMERICA

MSDS

Revised February 15, 2002

Material Safety Data Sheet

PRODUCT NAME: PORTLAND CEMENT

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Supplier

Name: Lafarge North America Inc.
Address: 12950 Worldgate Drive, Suite 500
Herndon, VA 20170
Telephone: 703-480-3600

Product Identifier

Hydraulic Cement, Oil Well Cement, White Cement, Portland Cement Type I, IA, II, IIA, II L.A., III, IIIA, IV, IVA, V, VA, 10, 20, 30, 40, 50, OWH, OWG Cement, OW Class G HSR

Note: This MSDS covers many products. Individual composition of hazardous constituents will vary.

WHMIS Classification: D2A, E

Emergency Telephone Numbers

Health & Transportation: CHEMTREC 1-800-424-9300 or 703-527-3887

2. INFORMATION ON COMPONENTS

Component Name	%	CAS No.
Tri-Calcium Silicate	20 - 70	12168-85-3
Di-Calcium Silicate	10 - 60	10034-77-2
Tetra-Calcium- Alumino-Ferrite	5 - 15	12068-35-8
Calcium Sulfate	2 - 10	Various
Tri-Calcium Aluminate	1 - 15	12042-78-3
Calcium Carbonate	0 - 5	1317-65-3
Magnesium Oxide	0 - 4	1309-48-4
Calcium Oxide	0 - 0.2	1305-78-8
Crystalline Silica	0 - 0.2	14808-60-7
Chromates	0 - 0.005	Various

Component Name	EXPOSURE LIMITS OSHA PEL TWA	ACGIH TLV TWA
Portland Cement (CAS 65997-15-1)*		
(Respirable Dust)	5 mg/m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Calcium Sulfate		
(Respirable Dust)	5 mg/m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Calcium Carbonate		
(Respirable dust)	5 mg/ m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Magnesium Oxide	15 mg/m^3	10 mg/m^3
Calcium Oxide	5 mg/m^3	2 mg/m^3
Crystalline Silica Quartz		0.05 mg/m^3
Quartz (Respirable)	10 mg/ m^3/ (%SiO_2+2)	
Quartz (Total Dust)	30 mg/ m^3/ (%SiO_2+2)	
Chromates	0.1 mg(CrO_3)/ m^3	0.05 mg(Cr)/m^3
Nuisance Dust		
(Respirable)	5 mg/m^3	3 mg/m^3
(Total / Inhalable)	15 mg/m^3	10 mg/m^3

*This value is for particulate matter containing no asbestos and < 1% crystalline silica.

3. HAZARD IDENTIFICATION

Emergency Overview

Solid; grey powder; odorless.

Potential Health Effects

INHALATION (acute): Breathing dust may cause nose, throat or lung irritation and choking. The described effect depends on the degree of exposure.

INHALATION (chronic): Prolonged or repeated exposure may cause lung injury including silicosis. This product may contain crystalline silica. Crystalline silica has been classified by IARC as a known human carcinogen. Some human studies indicate potential for lung cancer from crystalline silica exposure. Risk of injury depends on duration and level of exposure. Long term exposures which result in silicosis may result in additional health effects.

EYE CONTACT (acute/chronic): May cause eye irritation, severe burns and damage to cornea.

SKIN CONTACT (acute/chronic): May cause dry skin, redness, discomfort, irritation or severe burns. May produce allergic reaction potentially associated with hexavalent chromium. Thickening of the skin (scleroderma) may be associated with exposure to high levels of crystalline silica.

INGESTION (acute/chronic): Ingestion of large amounts may cause intestinal distress.

4. FIRST AID MEASURES

INHALATION: Move person to fresh air. Seek medical attention for discomfort.

EYE CONTACT: Rinse thoroughly with water. Seek medical attention for abrasions.

SKIN CONTACT: Wash with soap and water. Use moisturizing creams for irritated skin. Seek medical attention for burns.

INGESTION: Do not induce vomiting, but drink plenty of water. Seek medical attention for discomfort.

5. FIREFIGHTING MEASURES

Flashpoint and Method: None.
Flammable Limits: Not combustible.
Autoignition Temperature: None.
General Hazard: Avoid breathing dust.
Firefighting Instructions: Treat adjacent material.
Firefighting Equipment: This product is not a fire hazard. Self contained breathing apparatus is recommended to limit exposures to smoke from any combustion source.
Hazardous Combustion Products: None.

6. ACCIDENTAL RELEASE MEASURES

General: Wind blown dust may cause the hazards identified in Section 3. Remove spilled material to limit potential harm.
Land Spill Clean up spilled material.
Water Spill: Clean up spilled material.

7. HANDLING AND STORAGE

General: Avoid accidental release. Store dry and away from water.
Storage Temperature: Unlimited.
Storage Pressure: Unlimited.
Empty Containers: Dispose of containers in an approved landfill or incinerator.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Engineering Controls
Use exhaust ventilation to maintain dust levels below exposure limits in workplaces with poor ventilation and dusty conditions.
Personal Protection
RESPIRATORY PROTECTION: Under ordinary conditions no respiratory protection is required. Wear a NIOSH approved respirator when exposed to dust above exposure limits.
EYE PROTECTION: Wear glasses or safety goggles to prevent contact with eyes. Wearing contact lenses when using this product under dusty conditions is not recommended.
SKIN PROTECITON: Wear impervious gloves, shoes and protective clothing to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure:	Not measurable
Vapor Density:	Not measurable
Specific Gravity:	3.2
Solubility in Water:	Slight (0.1 - 1.0%)
Evaporation Rate:	Not measurable
pH (in water):	12 - 13
Boiling Point:	>1000º C
Freezing Point:	None, solid
Viscosity:	None, solid

10. STABILITY AND REACTIVITY

General: Product is stable but must be kept dry. Reacts with water forming polymerized silicates and calcium oxide.
Incompatible Materials and Conditions to Avoid: Must be kept dry. Dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Silicates react with powerful oxidizers such as fluorine, chlorine trifluoride and oxygen difluoride.
Hazardous Decomposition: None, powdered solid.

11. MSDS PREPARATION AND TOXICOLOGICAL INFORMATION

For detailed toxicological information contact:
Environment, Health & Safety and Public Affairs
Lafarge North America
12950 Worldgate Drive, Suite 500
Herndon, VA 20170
(703) 480-3600

12. ECOLOGICAL INFORMATION

For detailed ecological information: See Section 11 above.

13. DISPOSAL CONSIDERATIONS

Dispose in landfill in accordance with all applicable regulations. Any disposal practice must be in compliance with local, provincial, state and federal laws and regulations. Contact local environmental agency for specific rules.

14. REQUIRED TRANSPORT INFORMATION

Not a hazardous material for DOT or TDG shipping.

15. REGULATORY INFORMATION

This product has been classified ni accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

OSHA Hazard Communication Rule, 29 CFR 1910.1200:
This product is considered by OSHA to be a hazardous chemical and should be included in the employer's hazard communication program.

CERCLA/SUPERFUND, 40 CFR 117,302: Not listed.

SARA TITLE III, Sections 311-312 Hazard Category:
This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 and is considered a hazardous chemical and a delayed health hazard.

SARA Section 313 Information:
This product contains NONE of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Toxic Substance Control Act (TSCA):
Some constituents identified in this product are listed on the TSCA Inventory.

California Proposition 65:
CHRYSTALLINE SILICA (CAS - 14808-60-7) is considered to be a carcinogen by the state of California.

WHMIS Information
This product contains substances considered to be hazardous by Health Canada and is a controlled product. Consult local authorities for acceptable exposure limits. WHMIS http://www.hc-sc.gc.ca/whmis

16. OTHER INFORMATION

Abbreviations:

CAS No	Chemical Abstract Service number
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
ACGIH	American Conference of Governmental Industrial Hygienists
TLV	Threshold Limit Value
TWA	Time Weighted Average (8 hour)
CL	Ceiling Limit
mg/m^3	milligrams per cubic meter
IARC	International Agency for Research on Cancer
NIOSH	National Institute for Occupational Safety and Health
pH	negative log of hydrogen ion
>	greater than
DOT	U.S. Department of Transportation
TDG	Transportation of Dangerous Goods
CFR	Code for Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
SARA	Superfund Amendments and Reauthorization Act
WHMIS	Workplace Hazardous Materials Information System

Information in this MSDS is believed to be current and accurate at the time provided. It is the user's obligation to determine the conditions of safe use of this product.

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **CALCIUM CHLORIDE POWDER 94-97%**
Synonym(s) CALCIUM CHLORIDE ANHYDRATE

1.2 Uses and uses advised against

Use(s) CONCRETE CONDITIONER • DESICCANT • DUST CONTROL AGENT • FOOD ADDITIVE • INDUSTRIAL APPLICATIONS

1.3 Details of the supplier of the safety data sheet

Supplier name **NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD**
Address 11 Alacrity Place, Henderson, WA, Australia, 6166
Telephone +61 8 9410 8200
Fax +61 8 9410 8299
Email Not supplied
Website http://www.newpark.com

1.4 Emergency telephone number(s)

Emergency 1800 127 406 (Australia); +64 3 3530199 (International)

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Risk phrases

R36 Irritating to eyes.

Safety phrases

S22 Do not breathe dust.
S24 Avoid contact with skin.

Other Hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content
CALCIUM CHLORIDE ANHYDROUS	10043-52-4	233-140-8	94 - 97%
SODIUM CHLORIDE	7647-14-5	231-598-3	1 - 5%
WATER	7732-18-5	231-791-2	1%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
First aid facilities Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

Irritating to the eyes and skin.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

Product name **CALCIUM CHLORIDE POWDER 94-97%**

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve toxic gases (chlorides) when heated to decomposition.

5.3 Advice for firefighters

Treat as per requirements for surrounding fires. Evacuate area and contact emergency services. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

None allocated

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Clear area of all unprotected personnel. Contact emergency services where appropriate.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then collect and place in suitable containers for reuse or disposal. Avoid generating dust.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

No exposure standards have been entered for this product.

Biological limits No Biological Limit Value allocated.

8.2 Exposure controls

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain dust levels below the recommended exposure standard.

PPE

Product name **CALCIUM CHLORIDE POWDER 94-97%**

Eye/Face	Wear dust-proof goggles.
Hand	Wear PVC or rubber gloves.
Body	When using large quantities or where heavy contamination is likely, wear coveralls.
Respiratory	Where an inhalation risk exists, wear a Class P1 (Particulate) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	WHITE POWDER
Odour	ODOURLESS
Odour Threshold	NOT AVAILABLE
pH	7.0 to 9.0
Melting Point	772°C
Boiling Point	> 1600°C
Flash Point	NOT RELEVANT
Evaporation Rate	NOT RELEVANT
Flammability	NON FLAMMABLE
Upper Explosion Limit	NOT RELEVANT
Lower Explosion Limit	NOT RELEVANT
Vapour Pressure	NOT AVAILABLE
Vapour Density	NOT AVAILABLE
Solubility (water)	590 kg/m³ (Approximately)
Partition Coefficient	NOT AVAILABLE
Autoignition Temperature	NOT AVAILABLE
Decomposition Temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive Properties	NOT AVAILABLE
Oxidising Properties	NOT AVAILABLE
Specific Gravity	2.15

9.2 Other information

% Volatiles	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization is not expected to occur.

10.4 Conditions to avoid

Avoid contact with incompatible substances.

10.5 Incompatible materials

Incompatible with acids (e.g. nitric acid), methyl vinyl ether, zinc/ galvanised metals, bromine trifluoride, boron oxide and calcium oxide. May react exothermically with water (i.e. releasing heat).

10.6 Hazardous decomposition products

Product name **CALCIUM CHLORIDE POWDER 94-97%**

May evolve toxic gases (chlorides) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Based on available data, the classification criteria are not met. Toxicity Data available for the ingredients:
CALCIUM CHLORIDE ANHYDROUS (10043-52-4):
- LD50 (Ingestion): 1000 mg/kg (rat)
- LD50 (Intraperitoneal): 210 mg/kg (mouse)
- LD50 (Intravenous): 42 mg/kg (mouse)
- LD50 (Subcutaneous): 823 mg/kg (mouse)
- LDLo (Ingestion): 1384 mg/kg (rabbit)
- LDLo (Intravenous): 150 mg/kg (guinea pig)
- LDLo (Subcutaneous): 249 mg/kg (cat)
- TDLo (Intravenous): 20 mg/kg/1 hour (woman)

SODIUM CHLORIDE (7647-14-5):
- LC50 (Inhalation): > 42000 mg/m3/1 hour (rat)
- LD50 (Ingestion): 3000 mg/kg (rat)
- LD50 (Intraperitoneal): 2602 mg/kg (mouse)
- LD50 (Intravenous): 645 mg/kg (mouse)
- LD50 (Skin): > 10000 mg/kg (rabbit)
- LD50 (Subcutaneous): 3000 mg/kg (mouse)
- LDLo (Ingestion): 8000 mg/kg (rabbit)
- LDLo (Intravenous): 300 mg/kg (guinea pig)
- LDLo (Subcutaneous): 2160 mg/kg (guinea pig)
- TDLo (Ingestion): 12357 mg/kg (human)

Skin Not classified as a skin irritant. Contact may result in mechanical irritation, redness and rash.

Eye Irritating to the eyes. Contact may result in irritation, lacrimation, pain and redness.

Mutagenicity Insufficient data available to classify as a mutagen.

Carcinogenicity Insufficient data available to classify as a carcinogen.

Reproductive Insufficient data available to classify as a reproductive toxin.

STOT - single exposure Not classified as causing organ effects from single exposure.

STOT - repeated exposure Not classified as causing organ damage from repeated exposure.

Aspiration This product does not present an aspiration hazard.

Sensitisation Not classified as causing skin or respiratory sensitisation.

Product name **CALCIUM CHLORIDE POWDER 94-97%**

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

Biodegradability does not pertain to inorganic substances.

12.3 Bioaccumulative potential

This product does not bioaccumulate.

12.4 Mobility in soil

No information provided.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer/supplier for additional information (if required).

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE, IMDG OR IATA

	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	None Allocated	None Allocated	None Allocated
14.2 UN proper shipping name	None Allocated	None Allocated	None Allocated
14.3 Transport hazard classes			
DG Class	None Allocated	None Allocated	None Allocated
Subsidiary risk(s)	None Allocated	None Allocated	None Allocated
14.4 Packing group	None Allocated	None Allocated	None Allocated
14.5 Environmental hazards		None Allocated	
14.6 Special precautions for user			
Hazchem Code	None Allocated		

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Xi - Irritant

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

15.2 Chemical safety assessment

No information provided.

Product name **CALCIUM CHLORIDE POWDER 94-97%**

16. OTHER INFORMATION

Additional information

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status

This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

Product name **CALCIUM CHLORIDE POWDER 94-97%**

Prepared By

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Last Reviewed: 17 Apr 2015
Date Printed: 29 Jul 2016
Based on SDS dated: 17 Apr 2015

End of Report

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **CD-31LS**
Synonym(s) 100291 - ITEM NUMBER • 31L CD • 424011 - PRODUCT CODE • BHI CD-31L • CD 31L

1.2 Uses and uses advised against

Use(s) CEMENT ADDITIVE • DISPERSANT

1.3 Details of the supplier of the safety data sheet

Supplier name **BAKER HUGHES PRESSURE PUMPING**
Address 108 Poole st, Welshpool, WA, Australia, 6106
Telephone +61 8 9350 3800
Fax +61 8 9350 5453
Email Not supplied
Website http://www.bakerhughes.com

1.4 Emergency telephone number(s)

Emergency 1800 988 778

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Risk phrases

R36/38 Irritating to eyes and skin.

Safety phrases

S23 Do not breathe gas/fumes/vapour/spray (where applicable).
S24/25 Avoid contact with skin and eyes.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

Other Hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content
WATER	7732-18-5	231-791-2	Not Available
SODIUM NAPHTHALENE SULPHONATE	Not Available	Not Available	Not Available

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water.
Ingestion For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once).
First aid facilities Eye wash facilities should be available.

4.2 Most important symptoms and effects, both acute and delayed

No information provided.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

Product name **CD-31LS**

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve carbon oxides and hydrocarbons when heated to decomposition.

5.3 Advice for firefighters

Treat as per requirements for surrounding fires. Evacuate area and contact emergency services. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

None allocated

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from incompatible substances and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Store below 4.4°C.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

No exposure standards have been entered for this product.

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering Controls Avoid inhalation. Use in well ventilated areas.

PPE

Product name **CD-31LS**

Eye/Face	Wear splash-proof goggles.
Hand	Wear PVC or rubber gloves.
Body	When using large quantities or where heavy contamination is likely, wear coveralls.
Respiratory	No PPE specified.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	CLEAR DARK BROWN LIQUID
Odour	SLIGHT MOTH-BALL ODOUR
Odour Threshold	NOT AVAILABLE
pH	8 to 10
Melting Point	0°C (Approximately)
Boiling Point	NOT AVAILABLE
Flash Point	NOT RELEVANT
Evaporation Rate	AS FOR WATER
Flammability	NON FLAMMABLE
Upper Explosion Limit	NOT RELEVANT
Lower Explosion Limit	NOT RELEVANT
Vapour Pressure	18 mm Hg @ 20°C
Vapour Density	NOT AVAILABLE
Solubility (water)	SOLUBLE
Partition Coefficient	NOT AVAILABLE
Autoignition Temperature	NOT AVAILABLE
Decomposition Temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive Properties	NOT AVAILABLE
Oxidising Properties	NOT AVAILABLE
Specific Gravity	1.16 to 1.22

9.2 Other information

No information provided.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites) and acids (e.g. nitric acid).

10.6 Hazardous decomposition products

May evolve carbon oxides and hydrocarbons when heated to decomposition.

Product name **CD-31LS**

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.
Skin	Irritating to the skin. Contact may result in irritation, redness, rash and dermatitis.
Eye	Irritating to the eyes. Contact may result in irritation, lacrimation, pain and redness.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Not classified as causing organ damage from single exposure. However, over exposure may result in mild irritation of the nose and throat, with coughing.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not classified as causing aspiration.
Sensitisation	Not classified as causing skin or respiratory sensitisation.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. For large quantities, contact the manufacturer/supplier for additional information. Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE, IMDG OR IATA

Product name **CD-31LS**

	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	None Allocated	None Allocated	None Allocated
14.2 UN proper shipping name	None Allocated	None Allocated	None Allocated
14.3 Transport hazard classes			
DG Class	None Allocated	None Allocated	None Allocated
Subsidiary risk(s)	None Allocated	None Allocated	None Allocated
14.4 Packing group	None Allocated	None Allocated	None Allocated
14.5 Environmental hazards		None Allocated	
14.6 Special precautions for user			
Hazchem Code	None Allocated		

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Xi - Irritant

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

15.2 Chemical safety assessment

No information provided.

16. OTHER INFORMATION

Additional information HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).

Product name **CD-31LS**

ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status

This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this ChemAlert report, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this ChemAlert report.

Prepared By

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Last Reviewed: 26 Nov 2014
Date Printed: 03 Aug 2016
Based on SDS dated: 19 Feb 2014

End of Report

SAFETY DATA SHEET

Product Name **FP-9L**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**BAKER HUGHES PRESSURE PUMPING**
Address	108 Poole st , Welshpool , WA, AUSTRALIA, 6106
Telephone	+61 8 9350 3800
Fax	+61 8 9350 5453
Emergency	1800 988 778
Web Site	http://www.bakerhughes.com
Synonym(s)	BAKER HUGHES FP-9L • FP 9L
Use(s)	ANTIFOAMING AGENT
SDS Date	17 May 2011

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R36/37/38 Irritating to eyes, respiratory system and skin.

SAFETY PHRASES

S36/37 Wear suitable protective clothing and gloves.

S46 If swallowed, contact a doctor or Poisons Information Centre immediately and show container or label.

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	None Allocated	**DG Class**	None Allocated	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	None Allocated		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
ISONONANOL	C9-H20-O	27458-94-2	>60%

4. FIRST AID MEASURES

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
Advice to Doctor	Treat symptomatically.
First Aid Facilities	Eye wash facilities and safety shower should be available.

5. FIRE FIGHTING MEASURES

Flammability Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.

Fire and Explosion Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

Extinguishing Dry agent, carbon dioxide or foam. Prevent contamination of drains or waterways.

Hazchem Code None Allocated

6. ACCIDENTAL RELEASE MEASURES

Spillage Use personal protective equipment. Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. CAUTION: Spill site may be slippery.

7. STORAGE AND HANDLING

Storage Store in a cool, dry, well ventilated area, removed from oxidising agents, acids, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Large storage areas should have appropriate ventilation systems. Store as a Class C1 Combustible Liquid (AS1940).

Handling Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Stds No exposure standard(s) allocated.

Biological Limits No biological limit allocated.

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

PPE Wear splash-proof goggles and rubber or PVC gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Type A (Organic vapour) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	CLEAR COLOURLESS TO LIGHT AMBER COLOURED LIQUID	**Solubility (water)**	INSOLUBLE
Odour	MILD ODOUR	**Specific Gravity**	0.98 to 1.0
pH	NOT AVAILABLE	**% Volatiles**	NOT AVAILABLE
Vapour Pressure	NOT AVAILABLE	**Flammability**	CLASS C1 COMBUSTIBLE
Vapour Density	NOT AVAILABLE	**Flash Point**	105°C
Boiling Point	> 200°C	**Upper Explosion Limit**	6.0 %
Melting Point	NOT AVAILABLE	**Lower Explosion Limit**	0.9 %
Evaporation Rate	NOT AVAILABLE		
Autoignition Temperature	NOT AVAILABLE	**Decomposition Temperature**	NOT AVAILABLE
Partition Coefficient	NOT AVAILABLE	**Viscosity**	NOT AVAILABLE

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Material to Avoid	Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), heat and ignition sources.
Hazardous Decomposition Products	May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.
Hazardous Reactions	Polymerization is not expected to occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Low to moderate toxicity - irritant. This product has the potential to cause adverse health effects with over exposure. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in central nervous system (CNS) effects.
Eye	Irritant. Contact may result in irritation, lacrimation, pain, redness and conjunctivitis. May result in burns with prolonged contact.
Inhalation	Irritant. Over exposure may result in irritation of the nose and throat, coughing and headache. High level exposure may result in nausea, dizziness and drowsiness.
Skin	Irritant. Contact may result in drying and defatting of the skin, rash and dermatitis. May be absorbed through skin with harmful effects.
Ingestion	Low to moderate toxicity. Ingestion may result in nausea, vomiting, abdominal pain, diarrhoea, dizziness and drowsiness. Aspiration may result in chemical pneumonitis and pulmonary oedema.
Toxicity Data	No LD50 data available for this product.

12. ECOLOGICAL INFORMATION

Environment	Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

13. DISPOSAL CONSIDERATIONS

Waste Disposal	For small amounts absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer for additional information if larger amounts are involved. Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

Shipping Name	None Allocated				
UN No.	None Allocated	**DG Class**	None Allocated	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	None Allocated		

15. REGULATORY INFORMATION

Poison Schedule	A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).
AICS	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Additional Information

National Industrial Chemicals Notification and Assessment (NICNAS) Registration number: 2475.

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

WORK PRACTICES - SOLVENTS: Organic solvents may present both a health and flammability hazard. It is recommended that engineering controls should be adopted to reduce exposure where practicable (for example, if using indoors, ensure explosion proof extraction ventilation is available). Flammable or combustible liquids with

explosive limits have the potential for ignition from static discharge. Refer to AS 1020 (The control of undesirable static electricity) and AS 1940 (The storage and handling of flammable and combustible liquids) for control procedures.

ABBREVIATIONS:
ACGIH - American Conference of Industrial Hygienists.
ADG - Australian Dangerous Goods.
BEI - Biological Exposure Indice(s).
CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.
CNS - Central Nervous System.
EC No - European Community Number.
HSNO - Hazardous Substances and New Organisms.
IARC - International Agency for Research on Cancer.
mg/m³ - Milligrams per Cubic Metre.
NOS - Not Otherwise Specified.
pH - relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm - Parts Per Million.
RTECS - Registry of Toxic Effects of Chemical Substances.
STEL - Short Term Exposure Limit.
SWA - Safe Work Australia.
TWA - Time Weighted Average.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this ChemAlert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Report Status

This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared By

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SDS Date 17 May 2011

End of Report

SAFETY DATA SHEET

Product Name **R-21L**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**BAKER HUGHES PRESSURE PUMPING**
Address	108 Poole st , Welshpool , WA, AUSTRALIA, 6106
Telephone	+61 8 9350 3800
Fax	+61 8 9350 5453
Emergency	1800 988 778
Web Site	http://www.bakerhughes.com
Synonym(s)	21L R • 488066 - ITEM NUMBER • BJ SERVICES R-21L • R 21L
Use(s)	RETARDANT
SDS Date	31 May 2011

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	None Allocated	**DG Class**	None Allocated	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	None Allocated		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
WATER	H2O	7732-18-5	>60%
SODIUM LIGNOSULPHONATE	Not Available	Not Available	Not Available

4. FIRST AID MEASURES

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
Advice to Doctor	Treat symptomatically.
First Aid Facilities	Eye wash facilities should be available.

5. FIRE FIGHTING MEASURES

Flammability	Non flammable. May evolve toxic gases if strongly heated. May evolve carbon oxides and sulphur oxides when heated to decomposition.
Fire and Explosion	Treat as per requirements for Surrounding Fires: Evacuate area and contact emergency services. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

Extinguishing Prevent contamination of drains or waterways.

Hazchem Code None Allocated

6. ACCIDENTAL RELEASE MEASURES

Spillage Use personal protective equipment. Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. CAUTION: Spill site may be slippery.

7. STORAGE AND HANDLING

Storage Store in a cool, dry, well ventilated area, removed from oxidising agents, acids and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills.

Handling Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Stds No exposure standard(s) allocated.

Biological Limits No biological limit allocated.

Engineering Controls Avoid inhalation. Use in well ventilated areas.

PPE Wear splash-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	BROWN LIQUID	**Solubility (water)**	SOLUBLE
Odour	SLIGHT ODOUR	**Specific Gravity**	1.296
pH	9.5 to 10.5 (3% solution)	**% Volatiles**	NOT AVAILABLE
Vapour Pressure	NOT AVAILABLE	**Flammability**	NON FLAMMABLE
Vapour Density	1.21 (Air = 1)	**Flash Point**	NOT RELEVANT
Boiling Point	101.7°C	**Upper Explosion Limit**	NOT RELEVANT
Melting Point	-1.1°C	**Lower Explosion Limit**	NOT RELEVANT
Evaporation Rate	AS FOR WATER		
Autoignition Temperature	NOT AVAILABLE	**Decomposition Temperature**	NOT AVAILABLE
Partition Coefficient	NOT AVAILABLE	**Viscosity**	NOT AVAILABLE

10. STABILITY AND REACTIVITY

Chemical Stability Stable under recommended conditions of storage.

Conditions to Avoid Avoid heat, sparks, open flames and other ignition sources.

Material to Avoid Incompatible with oxidising agents and acids (eg. nitric acid).

Hazardous Decomposition Products May evolve carbon oxides and sulphur oxides when heated to decomposition.

Hazardous Reactions Polymerization is not expected to occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary Low toxicity - irritant. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in irritation.

Eye Irritant. Contact may result in irritation, lacrimation, pain, redness and conjunctivitis. May result in burns with prolonged contact.

Inhalation Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.

Skin Irritant. Contact may result in irritation, redness, rash and dermatitis. Prolonged or repeated contact may result in burns.

Ingestion Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation.

Toxicity Data No LD50 data available for this product.

12. ECOLOGICAL INFORMATION

Environment Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

13. DISPOSAL CONSIDERATIONS

Waste Disposal For small amounts absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer for additional information if larger amounts are involved. Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

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EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

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SDS Date 31 May 2011

End of Report