

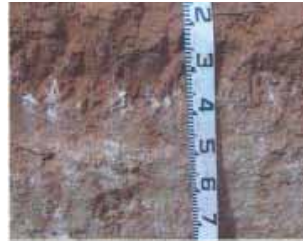
# WARRO JOINT VENTURE



## WARRO GAS FIELD

### Warro-5 and Warro-6 wells

## ENVIRONMENT PLAN SUMMARY DOCUMENT



9 July 2015

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## **B. ENVIRONMENT PLAN DETAIL**

### **1 INTRODUCTION**

#### **1.1 BACKGROUND**

The Warro Gas Field was discovered by West Australian Petroleum Pty Ltd (WAPET) in 1977 with the drilling of the Warro-1 and Warro-2 gas wells. Both these wells penetrated several hundred metres of gas saturated sands in the lower part of the Late Jurassic Yarragadee Formation in the Perth Basin. The gas contained within this area is known as a “tight gas play”, where the gas is held within low porosity and permeability sandstone and requires fracture stimulation before commercial flow rates are possible.

Latent became operator of the Warro project (on behalf of the Warro Joint Venture (WJV), comprising Latent Petroleum (Latent - Operator) and Alcoa Australia,) in 2007 and commenced a programme to drill, fracture stimulate and test up to five gas wells at Warro in the Shire of Dandaragan. To date, Latent has drilled, fracture stimulated and tested two of these ‘proof of concept wells’, Warro-3 and Warro-4, with both flowing gas to surface after fracture stimulation.

The WJV plan to drill a further two “proof of concept wells”, Warro-5 and Warro-6 to assist with this work.

#### **1.2 PURPOSE AND SCOPE OF THIS ENVIRONMENT PLAN SUMMARY DOCUMENT**

The objective of the Environmental Plan (EP) is to provide the WJV with approval to drill, fracture stimulate and test two gas wells, Warro-5 and Warro-6, in accordance with the *WA Petroleum and Geothermal Energy Resources (Environment) Regulations 2012* (Petroleum (Environment) Regulations).

The EP has been written to meet the following objectives:

- Provide a Project Description and set out the operational work to be done at Warro-5 and Warro-6
- Describe the existing environment at the well locations and in the surrounding region
- Identify and evaluate the environmental hazards and consequences associated with the proposal, assess the environmental risk levels, and apply management measures to ensure risks are kept to an acceptable level
- Describe the control measures (monitoring and reporting) that will be implemented to minimise the potential environmental impact of the proposal and ensure that the environmental objectives are achieved.
- Provide documentation for:
  - Implementation by Latent’s employees and contractors.
  - Regulatory authorities responsible for the environmental assessment and approval process.

The EP has been prepared in accordance with the Department of Mines and Petroleum (DMP) ‘Guidelines for the Preparation and Submission of an Environment Plan, Rev B, August 2012’.

#### **1.3 CONTACT DETAILS**

Stephen Keenihan  
Latent Petroleum Pty Ltd  
1008 Hay Street, Perth WA 6000

## 2 PROJECT DESCRIPTION

### 2.1 OVERVIEW

The Warro Gas Field is located approximately 200km north of Perth, 60km east of Jurien Bay and 55km north of the Dandaragan township. See Figure 1.

The DMP granted Retention Leases RL-6 and RL-7 in December 2014.

The project is located within RL-7 on Freehold Land (Lots 10323 and 10324). This freehold land is predominantly cleared agricultural land with isolated patches of native vegetation and the WJV has a lease with the landowners and an agreement in place for the proposed activity.

Warro-5 and Warro-6 wells are located >650m west and >540m north-west of the closest approaches of the Watheroo National Park respectively. The location of the Warro-5 and Warro-6 wells is presented in Figure 2 and the coordinates provided in Table 1.

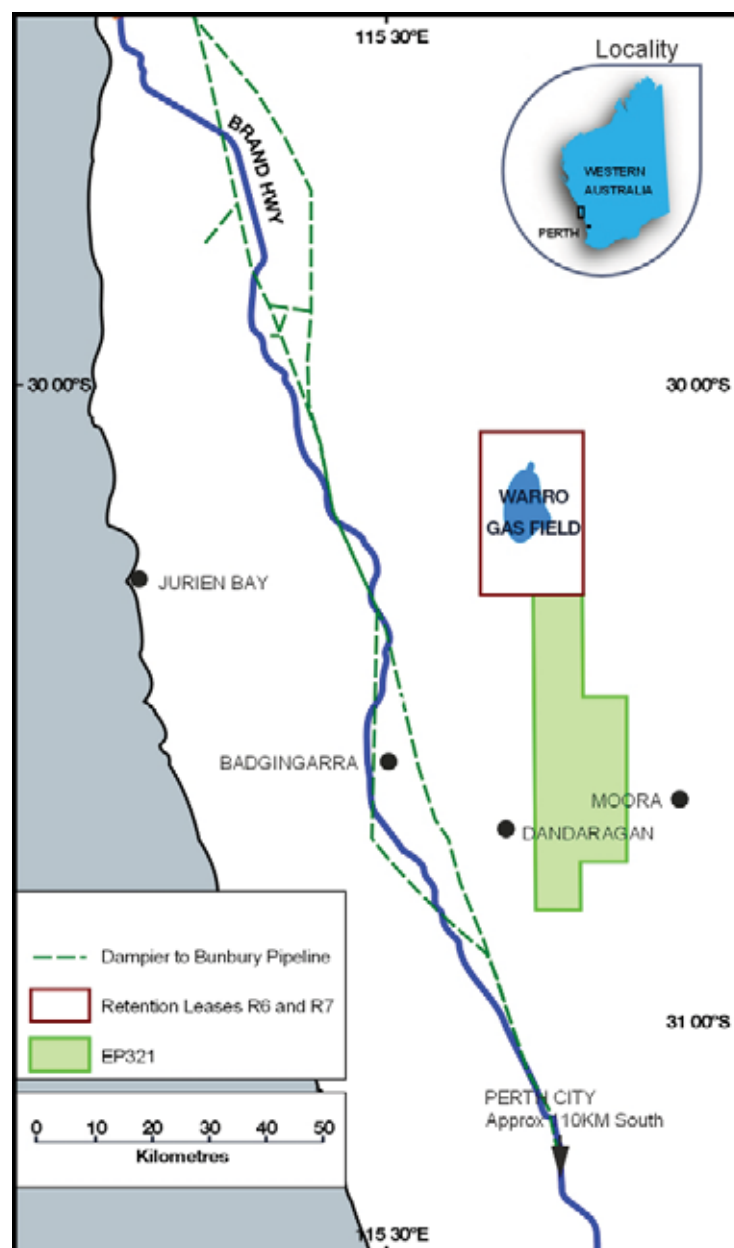


Figure 1 - Location of the Warro Gas Field

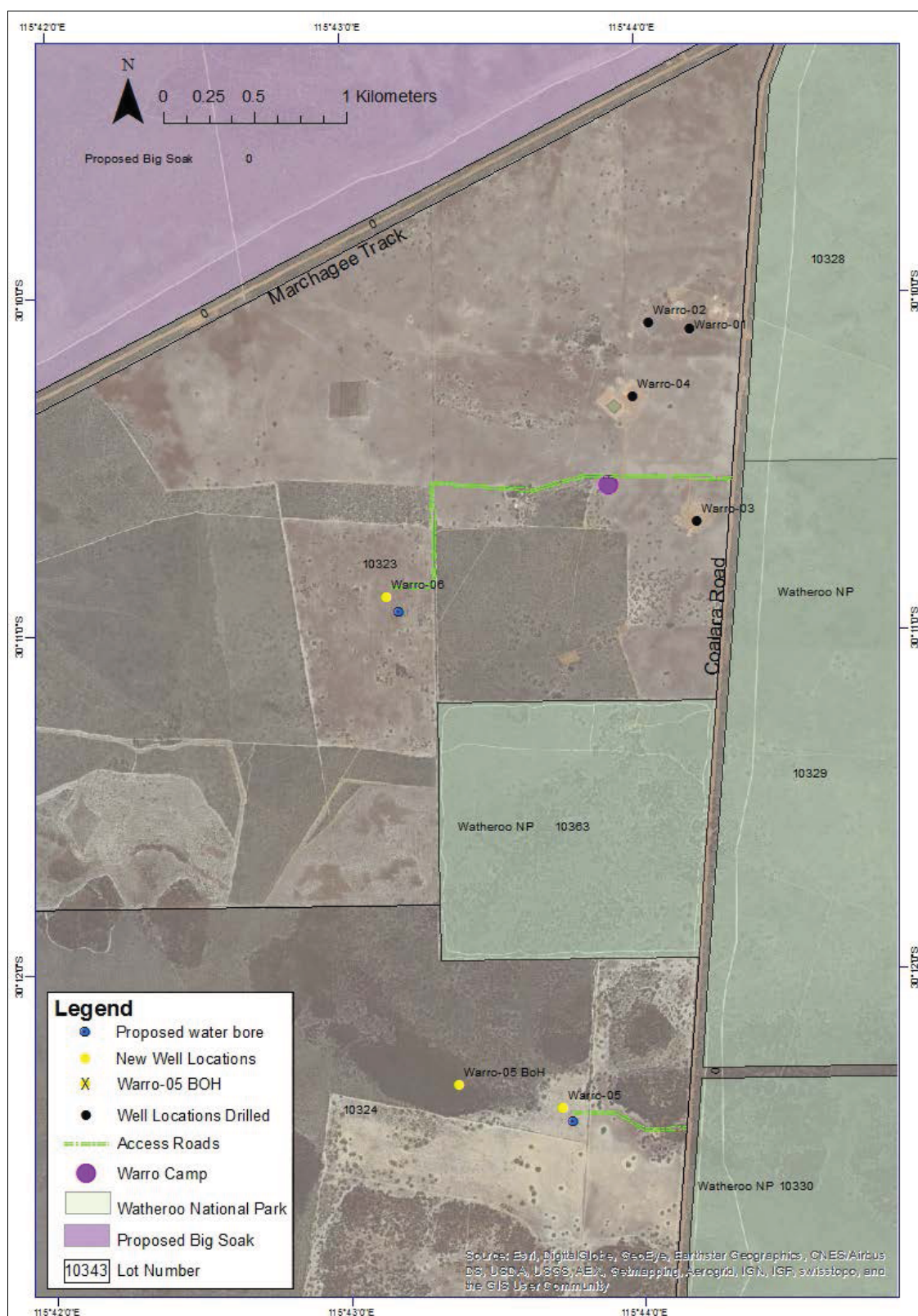


Figure 2 - Location of Proposed Wells

Well	Easting	Northing	Latitude	Longitude
Warro-05 – surface location	377642	6657615	30 12 24.51780S	115 43 43.54073E
Warro-05 – target (BoH - bottom of hole)	377078	6657735	30 12 20.41527S	115 43 22.50059E
Warro-06 – surface and target (vertical well)	376676	6660401	30 10 53.67501S	115 43 08.61386E

Table 1 - Proposed Well Location Coordinates

## **2.2 WELL PLANS**

Warro-5 and Warro-6 will be drilled with the same rig. As both wells have similar objectives, the geological prognoses, planned drilling, fracture stimulation and testing programmes will be identical. Depending on well results, the field activities are expected to take place over a 8-10 month period. Drilling activities will commence during July with stimulation and testing to follow immediately thereafter.

## **2.3 WELL OBJECTIVES**

Warro-5 and Warro-6 are exploration wells designed to evaluate the Late-Middle Jurassic sandstone reservoir target within the Yarragadee Formation. The objectives of Warro-5 and 6 are summarised in the following sections.

### **2.3.1 Geological Objectives**

- Penetrate the reservoir objectives to  $\pm 4,250$  and  $4,300$ m TVDRT (measured depth rotary table) in the Lower Yarragadee Formation in Warro-5 and Warro-6 respectively;
- Obtain sample cuttings and log data from the wellbore in order to evaluate the stratigraphy, presence of hydrocarbons and formation properties; and
- Provide a strategic data point for the further evaluation and obtain improved geologic understanding of RL7 and adjacent permits within the Perth Basin.

### **2.3.2 Drilling Objectives**

- Achieve all Health, Safety and Environment (HSE) targets during drilling operations;
- Achieve all geological objectives;
- Drill, case and cement the wells to total depth (TD) as per the Well Design, within estimated time and expenditure;
- Drill and evaluate the 216mm (8-1/2") hole interval whilst minimising borehole breakout and providing optimal hole conditions for setting the 140mm (5-1/2") production casing for the planned future fracture stimulation and completion operations.

### **2.3.3 Fracture Stimulation Objectives**

- Achieve all HSE targets during the stimulation operations;
- Successfully emplace up to six (6) fracture stimulation stages in each well as per the Fracture Stimulation Plan;
- Flow back the wells to recover fracture stimulation fluids and hold any such fluids in sealed storage areas;
- Ready the well for production testing.

### **2.3.4 Production Testing Objectives**

- Achieve all the HSE targets during the production testing operations;
- Run a velocity string from surface to the reservoir section;
- Install a pump based lifting device (Jet pump or similar) to assist with the removal of any formation water;
- Flow well for extended period (up to six (6) months) to establish the long term production capability of the reservoir units.

### **3 DRILLING, FRACTURE STIMULATION AND PRODUCTION TESTING PROGRAMME**

#### **3.1 OVERVIEW**

The Warro-5 and -6 wells will be drilled as predominantly vertical holes using conventional drilling techniques. They are expected to reach total depth of approximately 4250m and 4300m TVDRT respectively. As Warro-5 surface location is displaced from the subsurface target by approximately 500m, it will be drilled directionally towards the west at a low angle as an “s-shaped well”. The specific well designs will be subject to a formal Drilling Programme which will be approved by the DMP as part of Latent’s Application to Drill prior to operations commencing. A summary of the drilling approach is set out in the following sections.

#### **3.2 DRILLING**

##### **3.2.1 Mobilisation and Commissioning of Drilling Rig**

The drilling rig will be mobilised from the Dongara area and is expected to arrive in 50 trailer loads over a five to six day period and will be assembled on the prepared well site upon arrival.

As some of the loads will be oversize, the required permits shall be sourced, and, where necessary they will be accompanied by an appropriate escort.

The rig will be located on pre-prepared sites and will be rigged up and commissioned by the rig contractor in accordance with industry standards.

##### **3.2.2 Site Layout**

Prior to drilling, the following civil works will be undertaken to prepare each site:

- Undertake any upgrade works on the access tracks to the well site.
- Stockpiling vegetation and topsoil separately, to be used for rehabilitation. Topsoil will be stored away from operations outside the fenced site perimeter in low profile stockpiles (<2m) to facilitate rehabilitation upon completion of activities.
- Drilling a water bore and installing pumping infrastructure.
- Grading of work site, levelling of critical area around well site for drill rig, sheeting and compaction of heavy load bearing zone around well.
- Constructing the drill pad, including excavating the cellar, flare pit, water reserve pit (turkey nest), mud sump and checkshot pit (for seismic airgun).

The actual well pads will comprise a firm and level compacted pad for the rig and camp and will cover a total area of approximately 95m x 120m or 1.1 ha for each well. This will enable room for the drill rig and a small rig camp. This rig camp located at the drilling rig will accommodate senior supervisory personnel and specific persons who may be required at short notice for operational reasons. The total overall area utilised will be approximately 140m x 140m or 2 ha – this includes an external perimeter area and the areas of the sump and turkey’s nest.

The well sites are conducive to providing a firm and level surface for much of the intended use by grading the surface. However, at least part of the pads will require a consolidated surface to support intensive and heavy use. All gravel used in well and road construction will be sourced in-situ. For Warro-5, the surface material will be provided by gravel sourced from the landowner’s property and from material excavated during construction of the sump and turkey’s nest. For Warro-6 material will be taken from the previous drilling locations (i.e.



material from Warro-3 and Warro-4 sites) and material excavated during construction of the sump and turkey's nest. As no evidence of dieback or Declared Pests (weeds) have been recorded at the Project site these are not considered to be an issue. As the project is located on agricultural land it is expected that non-native species (i.e. pasture species) will be present.

The access tracks to the well site will consist of a sheeted road with a running surface approximately 5m wide, with a 1m shoulder on either side with the fence set back a further 2.5m.

All vehicles and equipment arriving on site will be required to adhere with the Project's weed hygiene control requirements, which stipulate that all vehicles and equipment shall be inspected and where necessary shall be cleaned to remove all biological contaminants prior to accessing the site.

The drilling rig will be rigged up over each gas well conductor hole and then drilling carried out in accordance to the approved Drilling Programme.

### **3.2.3 Baseline soil sampling**

Soil samples will be collected prior to commencement of drilling operations from selected areas within the well pad, including but not limited to:

- Base of the mud sump and turkey's nest
- Refuelling areas
- Chemical or hydrocarbon storage areas
- Flare pit

The samples will be comprehensively analysed by a NATA accredited laboratory and copies of the analysis provided to the landowners and appropriate regulatory body.

Once the activities have ceased and during rehabilitation of the site, the specified areas will be resampled to characterise the soil condition post operations.

### **3.2.4 Drilling**

The wells will be drilled using conventional drilling techniques. Latent propose to use Enerdrill Rig-3.

A proposed rig site layout is shown in Figure 3.

Excavations will be required at each well site for:

- Turkey's nest: outside perimeter ~53m x 53m x 3m depth
- Mud Sump/Flow Back Pond: outside perimeter ~61m x 33m x 3m depth
- Cellar for the location of the wellhead and conductor approximately 2.8 x 2.8m x 2.4m deep. It will be constructed either of poured concrete or steel plate.
- Checkshot pit used for locating an airgun for seismic checkshot logging: approximately 3m diameter x 4m deep, lined with a corrugated steel wall cemented in place and sealed on bottom with a liner or cement to prevent water leakage. The pit will be filled with water sourced from the water bore.
- A flare pit for well testing operations and emergency well control – 25m x 6m x 2m

The turkey's nest and mud sump will be lined with welded 1mm HDPE liner. The flare pit will also be lined with the same material but covered with soil to protect the liner from the flare.

1mm HDPE has been considered as suitable for this application following consideration of the project specifics – including the liners' purpose for a relatively short-term use (maximum 18-24 months), the location of the Sites (cleared agricultural land with no nearby dwellings, wetlands, or sources for drinking water), and the performance characteristics of the material that are required to prevent the vertical migration of potential contaminants - in this case water-based drilling fluids, drill cuttings, returned fracture fluids and formation water - into the underlying soils or the aquifer.

- Burst / Puncture Resistance / Flexibility
- Weathering Resistance
- Barrier Properties / Chemical Resistance
- Potable Water Certification

The 1mm HDPE liner is the preferred option in this case as the product is flexible, puncture resistant, resistant to UV exposure and suited for the temporary storage of water-based drilling muds and cuttings along with returned fracture fluids and formation water.

The proposed liner is Huikwang Huitex HD100. It is 1.0 mm in thickness with a permeability of 1 x 10<sup>-12</sup> cm/s tested in accordance with ASTM F1249.

The sump, turkey's nest, checkshot pit and flare pit will all be fenced. Egress points will be installed using a mixture of egress matting, wood or rope for fauna in each of the turkey nest and mud sump, and one each in the cellar and checkshot pit.

The flare pit bund will be built up to 2m above the surrounding ground and compacted to prevent erosion of the bund due to fast moving gas and unseparated liquids. The flare will be located a minimum of 45m away from the wellhead in accordance with regulation.

The size of the turkey's nest has been calculated to ensure that a sufficient volume of water can be held on site for continuous stimulation operations without the need for refilling.

The mud sump size has been calculated so that it has the capacity to hold all the ditch cuttings and mud/water generated during operations as well as receiving flow back fluids during the initial stage of the stimulation cleanup stage.

In all cases a minimum of 300mm of freeboard will be maintained in the turkey's nest and mud sump. Should any storage areas approach this limit, and this is only likely to occur during extended well testing operations, transfer between each storage area will take place and should this not be possible operations will be suspended until alternate arrangements have been approved by the DMP.

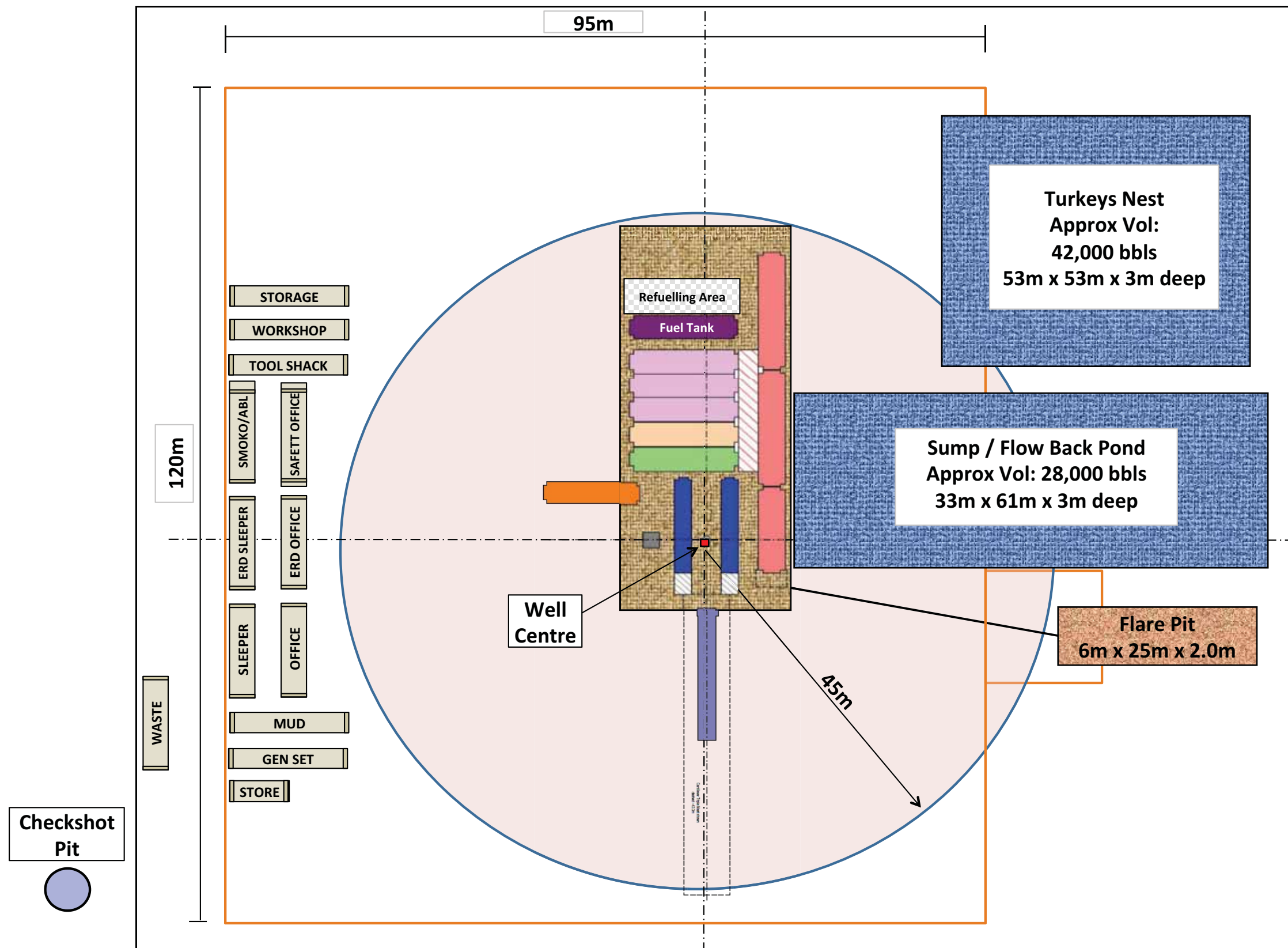


Figure 3 - Rig Pad Layout

### 3.2.5 Water supply

Water will be supplied from one new bore to be established at each location, with water for the main camp being supplied from the existing water bore located on Lot 10323, the Warro-03 water bore.

Licences from the DoW to construct these new bores has been obtained and the volume of water required will be within the existing groundwater licence allocation. The bores will be located within the overall well site footprint (4ha) and located to the southeast of the well locations. These water bores will be used both as a water supply and for groundwater monitoring to assess any potential impact on the Parmelia aquifer.

Once the water bores are in place, the water from each bore will be tested for water quality and flow capacity. As other bores in the area provide water of potable quality, it is expected that this will be the case for the new boreholes. If it is not adequate, fresh water for human consumption will be trucked to site.

The co-ordinates for the new water bores are detailed in Table 2.

Table 2 – Water Bore Coordinates  
(WGS\_1984\_UTM\_Zone\_50S meters)

Bore Name	Easting	Northing	Latitude	Longitude
5	377705.000	6657540.000	30 12 26.97660S	115 43 45.86529E
6	376751.655	6660324.108	30 10 56.20331S	115 43 11.38538E

### 3.2.6 Drilling and Cementing Fluids

The wells shall be drilled with a fully contained drilling fluid system. The drilling fluid for all hole sections will be a water-based system with additives to maintain primary well control and ensure hole stability and cleaning.

The drilling mud will be filtered and cleaned of drilled cuttings and sediment from the mud at surface. This is achieved by processing the returned fluid through a solids control system. This system utilises “shale shakers” to remove large debris, followed by de-sanders, de-silters, (and optional mud centrifuge) which work to clean the mud further by removing fines. Removed cuttings are placed directly into the drilling mud sump (i.e. there is no requirement to move cuttings with an excavator). A mud engineer periodically takes samples and measures various mud properties to ensure the mud’s drilling performance is maintained and as required by the agreed programme.

Recycling of mud limits the volume of water required to be taken from local groundwater bores and the non-invasive mud design limits fluid loss to surface formations protecting groundwater from potential contamination.

The wells will be completed with a brine solution of approximately 2% KCl and water with an oxygen scavenger. These materials are included under the mud system volume.

All substances used during drilling have been fully disclosed in accordance with Regulation 15(9) of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 (WA) and Chemical Disclosure Guideline as provided in Appendix 1. The Material Safety Data Sheets (MSDS) for the substances are provided in Appendix 2.

All chemicals will be stored in accordance with the MSDS in bunded areas which can contain 110% of the largest container or 25% of the total volume of stored material (whichever is greater) to contain any potential spills.

### **3.2.7 Noise**

Existing background noise at the sites is essentially natural with occasional vehicle noise associated with the nearby road and agricultural activities.

The rigsite mini camp will be arranged to reduce the noise impact from the drilling as far as is practicable and the main camp is > 1.25km from Warro-6 and > 4km from Warro-5. There are no permanent residents on Lot 10323 and Lot 10324, and the nearest inhabited residence is >4km from either well site.

Generators and other equipment (air conditioners, pumps, vehicles etc.) in use on the site will be fitted with appropriate noise reduction measures. These measures will include mufflers on internal combustion engines, sound absorbing insulation on noisy equipment, sound barriers around noisy equipment and limiting vehicle movements around the site where practicable.

Based on previous Warro wells any gas flow is expected to be low rate (< 2MMSCF/day) so flare noise will be less than encountered on typical conventional gas wells flowing at much higher rates.

### **3.2.8 End of Drilling Operations**

Once a flanged wellhead cap has been installed and the well has been made safe, all drilling related equipment will be removed from site.

## **3.3 FRACTURE STIMULATION**

Following well drilling, hydraulic fracturing will be carried out to stimulate gas flow. This involves the pumping of fluid into the reservoir at high pressure. The process involves the use of pumps and mixing equipment and monitoring equipment.

The well will be fractured in stages, with flow back occurring in one operation after all stages have been completed.

The materials to be pumped into the reservoir are not hazardous and comprise predominantly water (~95%), proppant (~4.5%) and chemicals (0.5%).

Each well is expected to require up to six fracture stages each of which will comprise approximately 100,000kg of proppant and 600,000 litres of fracture fluids resulting in total programme of approximately 600,000 kg of proppant and 3,600,000 litres of fluid per well. The total fracture simulation programme is therefore expected to use 1,200,000 kg of proppant and 7.2 million litres of fluid of which a total ~95% will be water with the remainder made up of proppant and chemicals as per the chemical disclosure information in Appendices 3 and 4.

The proppant is ceramic (refer to Appendices 3 and 4 for detail). If a different proppant is to be utilised, a revised chemical disclosure table and MSDS will be provided to the DMP for approval.

The primary chemicals used during stimulation other than proppant comprise guar gelling agent, crosslinker, borate crosslinker, oxidiser breaker, encapsulated breaker, clay stabiliser, temperature stabiliser, bactericide, delaying agent and surfactant.

While virtually all of the proppant will remain in the reservoir, the WJV expects 20-50% of the water and chemicals to be returned to surface during cleanup flows and subsequent testing. All initial flow-back material which returns to surface will be contained in the mud sump.

The final position and magnitude of the different fracture stimulation stages will be dictated by the well results.

The fracture stimulation programme is expected to last up to two weeks for each well (i.e. four weeks in total).

As with the drilling operations the camp will be arranged to reduce the noise from the fracture stimulation phase as far as is practicable.

Once the fracture stimulation has been completed, the well will undergo a cleanup flowback of fracture stimulation fluids. This phase is expected to last approximately one week. The objective of this phase is to recover the initial flush of fracture fluids from the borehole and commence gas production in preparation for long term production testing. While the rate and volume of liquid recovered during this phase will depend on reservoir conditions, previous experience suggests up to 15% of the fracture stimulation liquids could be returned during this initial flow. They could be diluted with some formation water.

The cleanup liquids will be placed in the mud sump as they will contain the highest concentration of fracture stimulation chemicals. In the unlikely event that the mud sump is unable to absorb the amount of liquid produced during this phase, the flow will be diverted to the lined turkey nest.

All substances to be used during fracture stimulation have been fully disclosed in accordance with Regulation 15(9) of the *Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 (WA)* and *Chemical Disclosure Guideline* as provided in Appendix 3. The MSDS for these chemicals is provided in Appendix 4.

The proposed chemicals are based on the planned drilling and hydraulic fracture stimulation operations. If any additional chemicals are to be utilised, the information will be provided to the DMP via submission of a bridging document.

During and immediately after the clean-up flow all equipment related to the fracture stimulation phase will be removed from site.

### **3.4 PRODUCTION TESTING**

An extended well test of the gas wells will be undertaken following fracturing and initial clean-up flows. If required, fluids may be displaced from the well bore with nitrogen to encourage sustained gas flow from the well. The quantity used will be dictated by the performance of the well, but it is expected that up to 48 hours of N<sub>2</sub> lift may be justified. This would amount to 30-50 KL of liquid N<sub>2</sub> depending on the rates applied. The well will be converted to a subsurface pump to remove water should N<sub>2</sub> lift prove inadequate. Nitrogen is an inert gas and considered environmentally non-hazardous. It is a common element in the universe and forms about 77% of the earth's atmosphere and as such is the most abundant pure element. A MSDS for nitrogen is included in Appendix 4.

The extended well test will involve allowing the gas to come to the surface in a controlled manner and disposing of it by flaring.

Latent's plan is to produce and flare gas from each well for up to an estimated 180 days each. The extent of this operation will depend on the results.

The period during which flaring will occur for Warro-5 and Warro-6 will depend on the timing of the drilling and fracture stimulation work but is estimated to be from Q3 2015 through to the end of Q1 2016 which is predominantly through the seasons of Winter, Spring and Summer. Exemptions will be sought and granted through Department of Fire and Emergency Services (DFES) for the period of the flaring under the *Bush Fires Act 1954*. Latent will comply with the requirements of the Shire of Dandaragan and Department of Fire and Emergency Services (DFES).

Gas will be burnt in the well flare pit. The flare pit bund will be built up to 2m above the surrounding ground and compacted to prevent erosion of the bund due to fast moving gas and unseparated liquids.

The flare will be located a minimum of 45m away from the wellhead in accordance with regulation.

As no vegetation is located within the vicinity of the flare pits, establishment of a firebreak is not required. However, Latent will clear any existing grass or crop in consultation with the landowner for a distance depending on the amount of fuel and conditions and also comply with any specific DFES permit exemption requirements.

Any fluids produced during well testing will be processed through a three-phase separator with water based fluids directed to the turkey nest. Whilst the experience of previous wells suggests it is highly unlikely, any hydrocarbon fluids that are produced will be collected in tanks. These tanks will be either approved road tankers or bunded tanks on the well pad. It is anticipated there will be little carry-over of liquid to flare.

In previous wells, gas has been accompanied by flows of formation water. While these next two wells have been positioned to avoid water ingress, the well planning assumes a worst case outcome that water rates similar to Warro-4 are encountered. In this outcome the wells could produce water at an average of approximately 300bwpd. Over a 180 day test the cumulative volume arriving at surface could exceed 100,000bbl or approximately 16,000 m<sup>3</sup>. We expect approximately 50 – 70% of this volume can be absorbed by the storage capacity at each site allowing for the turkeys nest to be near-empty at start of flowback and significant pan evaporation over the period of spring-summer when this phase is expected to occur. During the first 3 – 4 months of testing, should water flow rates reach or exceed our expectations, production testing may be curtailed before the Warro-5 and -6 wellsite storage capacities are reached until other alternate arrangements for water disposal are determined. This would be subject to separate approval by the DMP and could involve movement of water between the Warro-5 and Warro-6 sites or the utilisation of the Warro-4 turkey nest which has a capacity of 60,000 bbl or 9,500 m<sup>3</sup>. This unlikely case will require submission of an EP revision / Bridging Document for approval.

At the end of the testing phase, the degree of site restoration and the amount of equipment removed from site will depend on the well results. If commercially significant rates are achieved the wells may be prepared for long term production activities. In other circumstances they may be either be suspended or abandoned. In all cases, the next activity will be subject to further approval by the DMP.

### **3.5 VEHICULAR MOVEMENT**

#### **3.5.1 To Warro**

Vehicle transport to the project site will be via Coalara Road.

Access to the Warro-6 site will be via existing entrances which are of sufficient width. No additional clearing is required.

Access to Warro-5 is via an existing farm access track from Coalara Road as requested by the landowner. This track will be upgraded to give good visibility along Coalara Road for vehicles turning, entering or turning off, or entering on to, the public road from the site.

#### **3.5.2 Within site**

The access roads for the wells and camp access are presented in Figure 2.

In recognition of the inherent dangers on roads, it is planned to minimise the number of vehicles during operations. Normal operations would require four to six light vehicles in addition to a small bus for crew transportation from the main camp to the rig site. These vehicles will be mostly intra field.

During drilling operations an average of one truck per day to site will be required. These movements shall be along Coalara Road.

### **3.6 CAMP SITES**

A main camp will be used for the majority of personnel and is located in close proximity to the operations. A small camp will be located at the drilling rig to accommodate senior supervisory personnel and specific persons who may be required at short notice for operational reasons.

### **3.7 RESOURCE REQUIREMENTS**

The requirement for support facilities during the project construction phase will be minimal. During the operational phases the following resources requirements are expected:

#### **3.7.1 Electricity**

Electricity will be produced from portable diesel power generators which will be transported to site for the duration of well activities.

#### **3.7.2 Water**

Latent plan to construct one new water bore at each well location (two in total) to supply water during operations. Water licences to construct these new bores have already been obtained from the DoW, with the licence to abstract water ready to be issued once this EP is approved. The volume of water to be extracted for the Project is within the current Groundwater Licence allocation. Latent have a groundwater licence (GWL 172000(3)) for extraction of 60,000 KL/annum from Lot 10323 and has applied to have this extended to include the Holmes property (Lot 10324).

Water for the main camp will be obtained from the existing water bore located on Lot 10323, the Warro-03 water bore.



The average approximate water consumption rates are:

- Drilling operations per well – 3000 m<sup>3</sup> (total for duration of drilling)
- Stimulation operation per well – 5000 m<sup>3</sup> (total for duration of stimulation)
- Camp operation – 25 m<sup>3</sup>/day.
- Dust suppression - 3 m<sup>3</sup>/day.

Each well will consume a total of approximately 9500 m<sup>3</sup> of water.

### **3.7.3 Fuel**

The drilling rig uses a double skin 45,000L storage tank. A similar double skin on-site diesel tanker trailer will be set up for re-fuelling at the Well Site during hydraulic fracture stimulation and well test operations. All hydrocarbon storage and handling will be in accordance with AS 1940:2004.

A vehicle mounted diesel tank will be utilised for refuelling during site construction activities, Drilling, HFS and Well Test operations.

Diesel fuel will be delivered by mobile diesel tanker to the main rig tank which is a double-skin diesel fuel tank. A trailerised or skid-mounted fuel cell will distribute diesel to smaller stationary tanks (generators and lighting towers).

A drip tray will be used during all refuelling operations at the drill site. A spill kit is to be available on the construction refuelling vehicle and the drill site refuelling trailer.

Mobile equipment and vehicles will refuel at a bunded designated refuelling point (adjacent to the main fuel tank) on the drill pad.

### **3.7.4 Light**

As the operation will occur for consecutive 24 hour periods, portable lighting towers will be erected at the well sites to ensure a safe working environment.

## **3.8 FENCING**

Two styles of fencing will be used in the area of operations.

Fencing along the access roads and around the site perimeter will be the same design as the existing local fencing in similar applications.

Gates will be put in place to avoid trespass and also ensure safe containment of all areas.

Fencing around the sump, turkey nest, flare pit and checkshot pit will be for medium to heavy duty application and in addition there will be a second small mesh along the lower 30cm to prevent ingress by small animals.

## **3.9 WASTE**

Avon Waste have been contracted for waste management. They provide waste management and recycling services to various Local Governments / Shires in the area. The Jurien Bay licensed facility will be used for general waste. Other specific waste will be removed to a recycling or disposal facility with the appropriate license to accept that particular waste type.

### **3.9.1 Putrescible and Industrial Waste**

All putrescible waste will be collected and stored in sealed containers located at designated locations at the drill site and two camps. All waste material will be removed and disposed of offsite in licensed facilities appropriate to the waste classification.

Industrial wastes (i.e. wood, scrap steel and other metals, tyres, batteries, etc.) will be segregated where possible for recycling. They will be disposed or recycled at an approved facility.

### **3.9.2 Hydrocarbon waste**

All waste hydrocarbons (oils, oily rags, and hydrocarbon contaminated material) will be collected in bunded drums and removed to a licensed facility for disposal.

Any used gas bottles will be stored in accordance with the MSDS for collection by the supplier.

### **3.9.3 Hazardous Waste**

Hazardous waste shall be placed in labelled receptacles, stored in a bunded area and removed off site for disposal by a licensed contractor at a licensed facility in accordance with Landfill Waste Classification and Waste Definitions 1996 (as amended) (DEC 2009).

### **3.9.4 Sewage/Grey water**

Sewage and grey water will be collected in septic tanks already installed at the main camp from previous operations on Warro-3 and Warro-4. The sewage system with septic tanks / leach drain should not require emptying if working correctly as designed. However if the septic tanks are to be emptied in the event of some problem then a licensed contractor will pump them out and dispose of the waste at a licensed waste management facility.

The mini camps at the well site will have a self-contained Mobile ATU (Anaerobic Treatment Unit) to treat sewage and grey water, with the treated water being directed to a leach drain system.

## **3.10 CHEMICAL STORAGE**

Oil, fuel, and hazardous liquid chemicals are stored in the bunded chemical storage (self bunded pallets, double skinned tanks or chemical dangerous goods containers) area on the drill pad. All chemicals will be stored in accordance with the requirements of their relevant material safety data sheets (MSDS). MSDSs for each chemical used and stored onsite are held in the site office and also in the chemical storage area.

On site oil, and hazardous liquid chemicals will be stored in accordance with AS/NZ 1940:2004 and bunded to contain not less than 110% of the volume of the largest vessel and at least 25% of the total substance stored (where more than one storage is connected to a common compound, drainage tank or similar storage vessel).

Mixed classes of Dangerous Goods will be stored in accordance with AS3833:2007.

## **3.11 WORKFORCE MOVEMENT**

The crews for the activities will peak at approximately 50 - 55 people.

The majority of the workforce will be accommodated at the main camp site. Key operational personnel required for immediate response to emergencies or to oversee critical operations will remain onsite at the rig site camp with beds for up to eight persons.

Utilisation of shared vehicles and a crew change bus will minimise vehicle movement to and from the sites as much as practical, minimising local traffic and vehicle related safety and environment risks.

Driving will be managed in accordance with the Latent Driving Policy which prohibits off-road driving and driving at dusk or at night unless by dispensation granted by the Operations Superintendent.

### **3.12 PUBLIC SAFETY**

The well sites are situated on freehold land where access by the general public will not be permitted. Fencing will be installed along the access roads and around the site perimeter and the land owner will be made aware of operational requirements and safety procedures by Latent management.

Gates will be installed at the entry to the well sites.

Signs warning of restricted access and potential dangers will be erected on access tracks to the site. Fencing will remain around the drilling sump and wellhead following completion of drilling operations.

## **4 EXISTING ENVIRONMENT**

The Warro Project is located adjacent to the Watheroo National Park and Big Soak Reserve. Otherwise all land areas are agricultural most of which have been cleared. As described below, apart from the Watheroo National Park and Proposed Big Soak Plain Conservation Park (BSPCP) there are no other areas of Environmental Significance that can possibly be affected by activities at Warro.

No activities associated with Warro-5 and -6 will occur within the Park or Proposed BSPCP and, with the exception of the use of public roads, no activities will occur within 500m from either area.

### **4.1 CLIMATE**

The area has a Mediterranean climate featuring moist, mild winters and hot, dry summers.

The closest Bureau of Meteorology (BoM) station is Badgingarra, located approximately 20km southwest of the project area. Recordings at the Watheroo station ended in 1959.

The area is semi-arid and has an average annual rainfall of 543 mm. Most of the rain falls from May to August but the amount varies greatly both seasonally and annually. The highest daily recorded rainfall is 292.3 mm.

### **4.2 REGIONAL SETTING**

The project area is found within the Greenough Province. Most of this province consists of gently undulating plateau surfaces formed on laterite overlying Perth Basin sedimentary rocks.

There has been extensive agricultural development of sandplains on these plateau, especially in the northeast and southeast. The northern sandplain has low dunes and some relict drainage systems with long gentle slopes and alluvial surfaces (Tille, 2006).

The major towns occurring throughout the region include Lancelin, Dandaragan, Jurien Bay, Badgingarra, Eneabba and Leeman. The land use is predominantly broad acre agriculture interspersed with large areas of land set aside for conservation of the diverse flora for which much of the region is renowned (Department of Agriculture & Food, 2007).

### **4.3 SOIL AND LANDFORM**

The Dandaragan Plateau where the Warro Project is located is described as a gently undulating plateau with areas of sand plain and some laterite on Cretaceous sediments (Department of Agriculture & Food, 2007). Soils are formed in colluvium and weathered rock with deep sands with ironstone gravelly soils and loamy earths.

Yellow deep sands are most common and dominate the sandplains. Pale deep sands and gravelly pale deep sands are also present, with some red deep sands and yellow sandy earths. Deep sandy gravels, duplex sandy gravels and shallow gravels are found on broad crests in the southern sandplains. Red-brown hardpan shallow loams appear on the relict drainage systems in the northern sandplains (Tille, 2006).

The broad valleys, with their gently undulating landscapes, are mantled by windblown sands which may be several metres thick and have a weak podzol profile. In the lowest topographic positions the soil consists of almost white sand with no development of colour horizons (McArthur, 1991).

There are no sensitive soil types such as acid sulphate soils noted in the Project area. Examination of the Australian Soil Resource Information System (ASRIS, 2012 – which includes the Atlas of Australian Acid Sulfate Soils’) reveals the Project is located within an area where Acid Sulphate Soils have an ‘Extremely Low Probability of Occurrence’.

#### **4.4 BASELINE STUDIES**

Prior to the commencement of further drilling activities, the WJV is gathering environmental data for:

- Water resources
- Soil sampling before commencement of drilling activities
- Soil gas geochemistry
- Passive seismic activity.

##### **4.4.1 Soil Geochemistry**

The WJV recognises the importance of establishing the natural background levels of any hydrocarbon gases in the near surface and is working with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the University of Western Australia (UWA) to measure this parameter. A pilot study has recently been completed and did not detect any anomalous methane levels. While further work will be completed over a longer period to confirm this result, the finding reinforces the Rockwater Pty Ltd (2013) hydrogeological assessment that gases are being confined in the lower Yarragadee section despite the presence of faulting near the crest of the Warro anticline.

This work was the subject of an EP (EARS ID 47974) that was approved by the DMP on 30 June 2014.

##### **4.4.2 Passive Seismic**

The WJV has commenced a pilot study to establish to level of background seismicity in the area. Once the character events and the ambient noise levels are better understood, a more widespread grid of seismometers will be installed. Once in place, this grid will enable both the detection and location of seismic events to be determined. These devices will record seismic events from M0 and above.

The results will allow Latent to assess the potential for, and risks, during fracture stimulation.

This work was the subject of an EP (EARS ID 47974) that was approved by the DMP on 30 June 2014.

#### **4.5 SURFACE HYDROLOGY**

There is no surface water of significance within the project area.

The closest watercourses to the Project area are (Figure 4):

- Boothendarra Creek – 16km west of the Project
- Unnamed ephemeral drainage lines – 19km east of the Project
- Winjardie Creek – 22km southwest of the Project
- Hill River – 28km southwest of the Project.
- Bitter/Coomallo Pools - 39km west of the Project.

Riverine base flow and springs associated with the Leederville-Parmelia aquifer in the region, identified as potential Groundwater Dependent Ecosystems (GDE’s), are presented in Figure 5. A study into the hydrogeology of Groundwater Dependent Ecosystems (GDE’s) in the

Northern Perth Basin in 2005 (Rutherford et al 2005) looked at identification of areas where the depth to groundwater is less than 20m bgl (below ground level), which therefore have potential to support and sustain GDE's.

For the Yarragadee Aquifer, the depth to watertable, where unconfined, is generally greater than 20m except in discharge areas along the Irwin and Hill Rivers. These springs and rivers, potential GDE's, are located >28km from the Project.

The topography of the project is relatively flat with a gentle relief (10m difference from northern to southern extent) toward the southwest.

There are no lakes or swamps in the project area. The closest significant bodies of water in the region are:

- Lake Eganu – 24km northeast of the Project.
- Pinjarrega Lake – 20km northeast of the Project.

The closest potential GDE's relative to the project are (Figure 4 and Figure 5):

- Warro springs (10km southeast.);
- Niano waterhole (>12km southeast).

Both of these sites are located midslope and recharge is by direct infiltration of rainfall and associated runoff. They are a result of thin localised, perched aquifers creating a line of shallow soaks and wells tapping into the Quaternary Sands (Rutherford *et al* 2005). No impact on this system is anticipated.

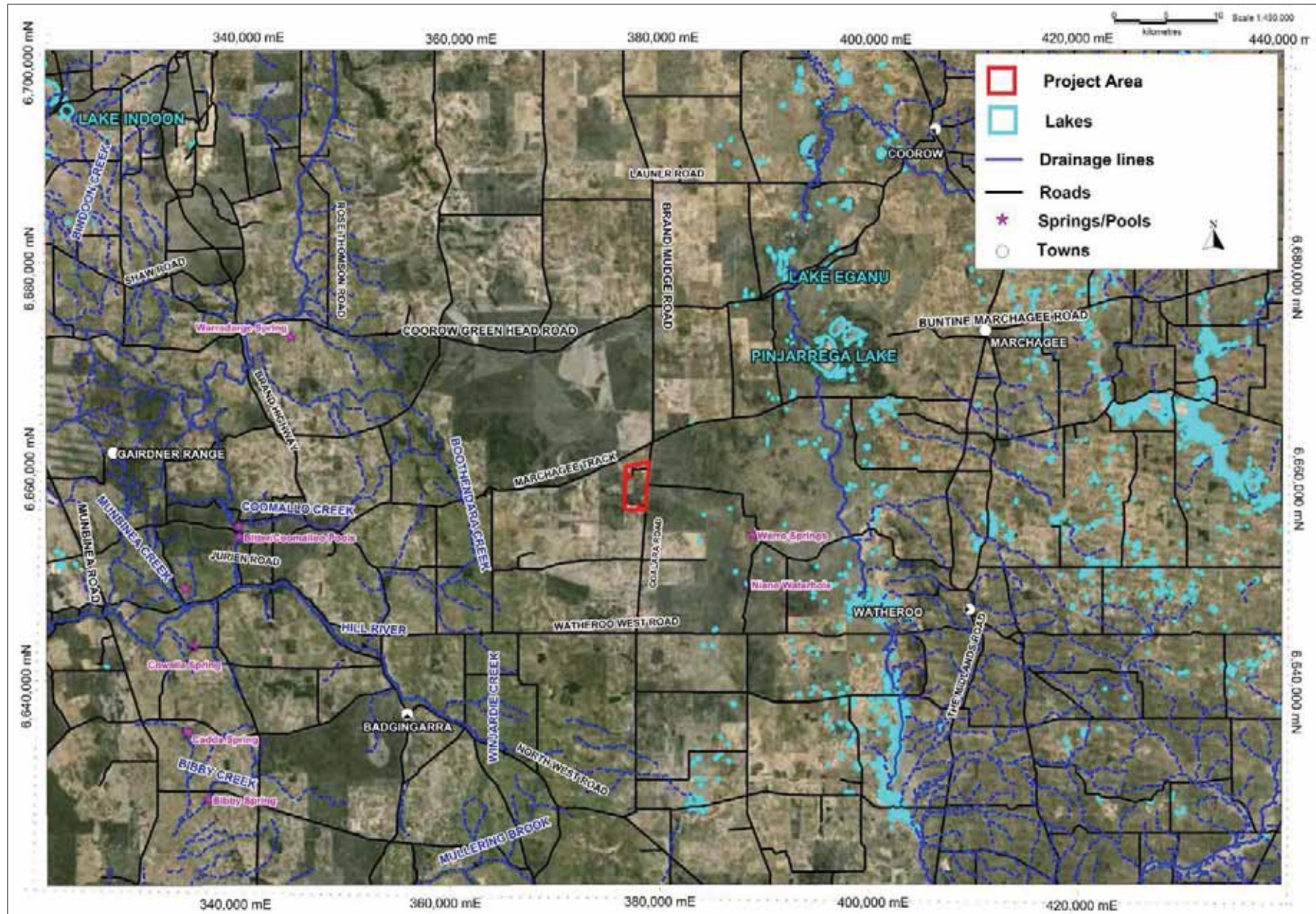


Figure 4 - Surface water courses in the region

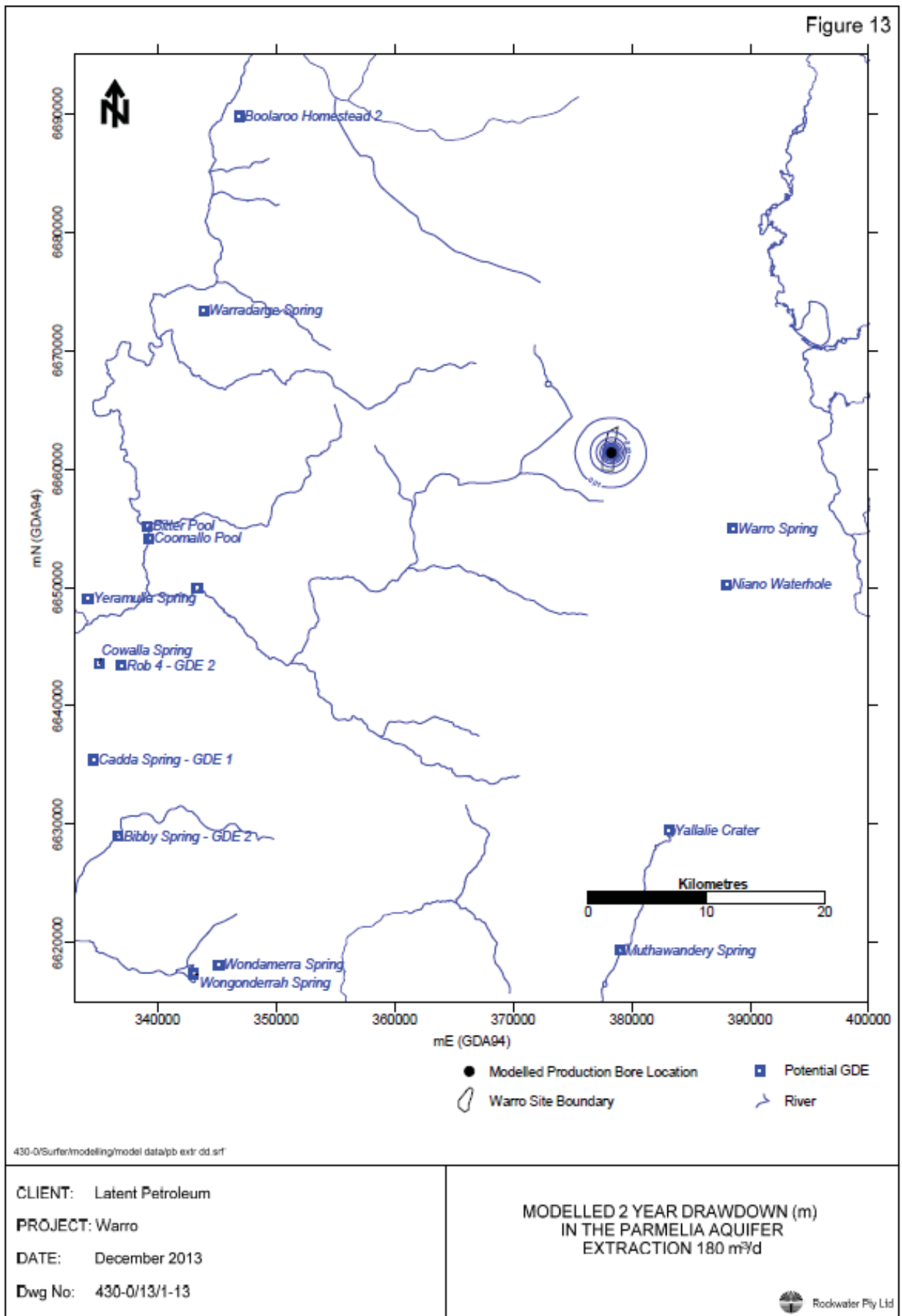


Figure 5 - Surface water courses and potential GDE's (from Rockwater 2013)



## 4.6 GROUNDWATER

### 4.6.1 Regional

The project is located within the Jurien Groundwater Area, over the Yarragadee Formation and Leederville Aquifer, which was previously included in the Parmelia-Leederville Aquifer. The Leederville Aquifer is located on the Swan Coastal Plain across the Gingin Anticline and is comprised of the Leederville Formation and Henley Sandstone (Northern Agricultural Catchments Council, 2002). The Yarragadee Formation contains the thickest and most extensive water system underlying the West Midlands Agricultural Region but in the Warro area and surrounding region it is too deep and saline to be considered a viable aquifer.

In 2013, the WJV commissioned Rockwater Pty Ltd (Rockwater) to carry out a review of the groundwater resources at Warro. The following information is taken from their report.

There are two aquifers identified in the Project area (Refer to Figure 6 and Figure 8)

- **Parmelia:** underlies the Dandaragan Plateau and extends from just south of Mingenew (where it pinches out), to near Coomberdale in the south; and from the western edge of the Dandaragan Plateau where the underlying Otorowiri Formation crops out, to the Darling Fault in the east. In the east, the Parmelia Group is overlain by the Leederville Formation, which together with the Parmelia Group forms the Leederville-Parmelia aquifer. The Darling Fault is taken to form an impermeable boundary on the eastern side of the Parmelia aquifer.
- **Yarragadee:** In the subsurface, the Yarragadee Formation extends from about 40km west of Warro where the base of the formation outcrops, to the Darling Fault in the east. At the well location, the Yarragadee Formation is approximately 3500m thick. Only the uppermost portion is considered a potential aquifer in the project area as the water salinities are too high and rock permeabilities too low to be a viable source of useable water. Where the Yarragadee approaches the surface, for example near Badgingarra (35km to SW), the unit is charged by surface inflows and provides potable water. The zone targeted by the Warro project begins at approximately 3750m below the surface but the depth of the target zone varies across the Warro structure. Although water bearing zone dominate the Yarragadee above the gas zone, any viable aquifer systems are separated from the gas zone by approximately 3000m. At Warro, compressional movement has formed an anticlinal structure which runs in a north-south direction and has uplifted the Yarragadee by approximately 500m so rocks are of lower permeability than would be expected given their present depth.

These aquifers are separated by the Otorowiri Formation, which forms an almost impermeable base to the Leederville-Parmelia aquifer (Rockwater 2013).

The Rockwater (2013) report details the characteristics of these aquifers which are summarised in Table 3. The gas zone targeted by the Warro wells is located 3000m below these aquifers.

Table 3 – Characteristics of the Aquifers

Aquifer	Element	Characteristics
Parmelia	Horizontal hydraulic conductivity	Balleau and Passmore (1972) calculated an average hydraulic conductivity of 4.7 m/d for the Leederville Formation and Parmelia Group at Agaton, and a value in the range 2 to 4 m/d is likely to be applicable in the Warro area.
	Vertical hydraulic conductivity	Calibration of a model in the Yandanooka area indicated vertical hydraulic conductivity of the Otorowiri Formation to range from $4 \times 10^{-7}$ m/d to $1 \times 10^{-5}$ m/d, which are very low values and indicate that that formation is essentially impermeable.
	Discharge	Groundwater discharges to a number of springs on the Dandaragan Scarp, north of the Warro area, on the western edge of the Dandaragan Plateau where the Parmelia aquifer wedges-out against outcropping Otorowiri Formation. These springs are recorded in Rutherford et. al. (2005). Although there are none recorded near Warro, some seepages and areas of evapotranspirative losses are likely to occur in areas where the elevation is around 220m AHD such as in the upper reaches of the Hill River. Flows in the Hill River generally only occur in the winter months, and so any spring flows to the river are small.
	Groundwater levels and flow	Groundwater levels measured in September 2012 show that the water table in the Parmelia Formation is relatively flat, as would be expected in a largely closed basin, although there are lower levels about 20km and 40km south of Warro as a result of high rates of groundwater extraction from the aquifer. Groundwater flow is to the south (Figure 7).
Yarragadee	Horizontal hydraulic conductivity	Estimates by Latent Petroleum based on porosities and salinity indicate water permeabilities decreasing from about 0.8 m/d at -1,400m AHD; to between 0.01 and 2.4 m/d to -2,300m AHD; and 0.0002 m/d at -3,300m AHD. In the gas target zone below -3,700m AHD, water permeability values are estimated to range from $2E^{-9}$ to $2E^{-8}$ m/d, based on gas permeability values measured for core from Warro-2.  In rocks with very low permeabilities as indicated for the Warro target zone, there is a phenomenon known as a “permeability jail” in the petroleum industry. The presence of both gas and water in rocks of such low permeability prevents either phase from moving.
	Vertical hydraulic conductivity	Laboratory measurements on cores from the gas target zone given above indicate values for both sandstone and claystone ranging from $2E^{-9}$ to $2E^{-8}$ m/d, i.e. they are almost impermeable. The impermeability of rocks in and overlying this zone is evidenced by the presence of the petroleum gas – the gas would not be there if the rocks had finite vertical permeability.
	Discharge	There is probably only minor local discharge from the formation, except by extraction. Heads in the aquifer are generally below the Hill River such as near bore WL8, and the presence of the Cadda Formation and Lower Jurassic to Triassic sediments to the west of bore WL10 (Figure 7) form a barrier to flow to the west. Rutherford et. al. (2005) record Bitter/Coomallo Pools in Coomallo Creek and springs in the Hill River west of Warro as being points of discharge from the Yarragadee Formation. Coomallo Creek is a tributary of the Hill River. The discharge is probably at low rates and mainly by evapotranspiration, as there are generally no flows recorded in the Hill River during summer months.
	Groundwater flow	Groundwater levels indicate that groundwater in the Yarragadee Formation is flowing to the north from the recharge area near the Hill River and bore WL8 (Figure 7).

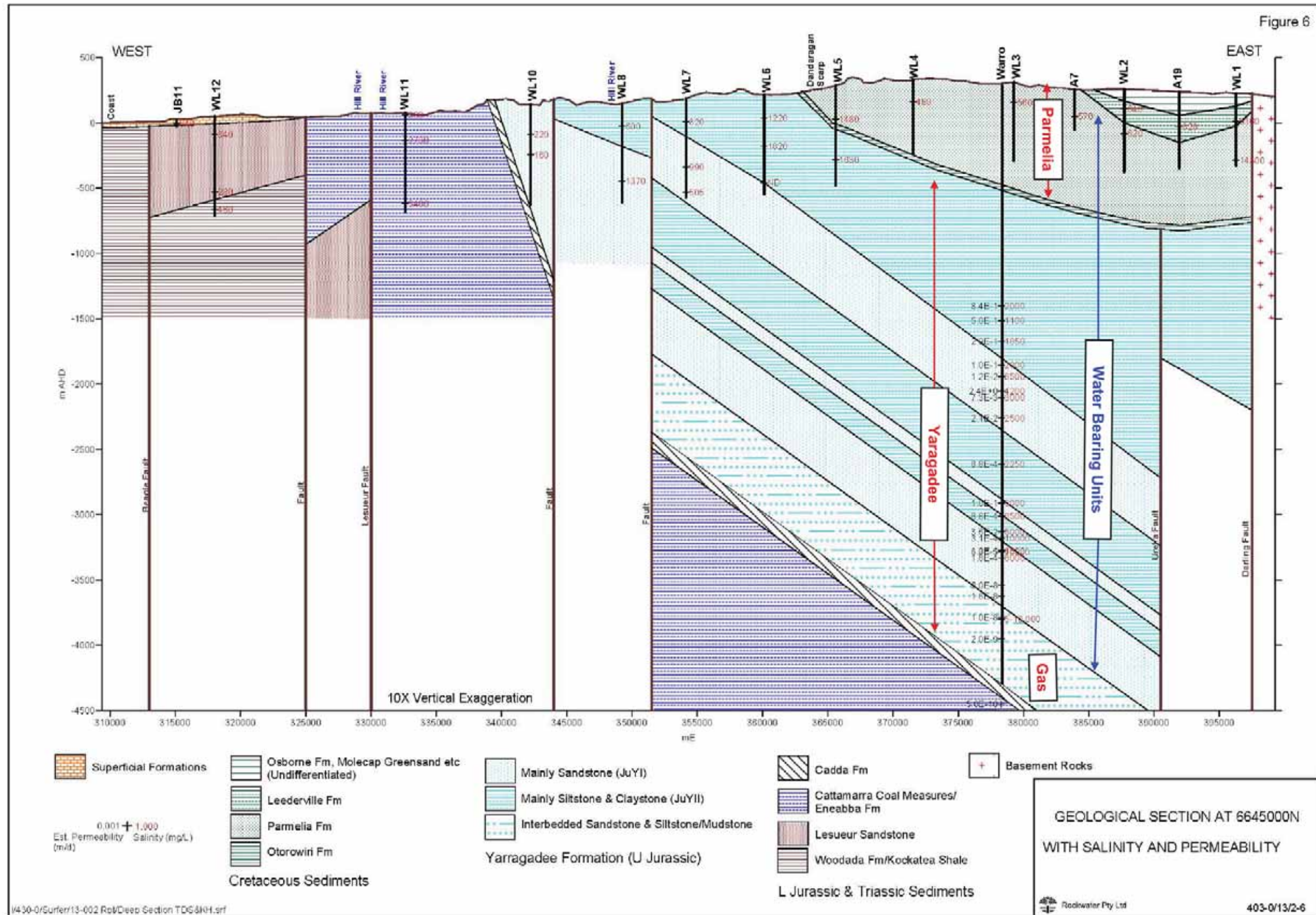


Figure 6 – Geology of the region showing Parmelia and Yarragadee aquifers in the Project area and salinity

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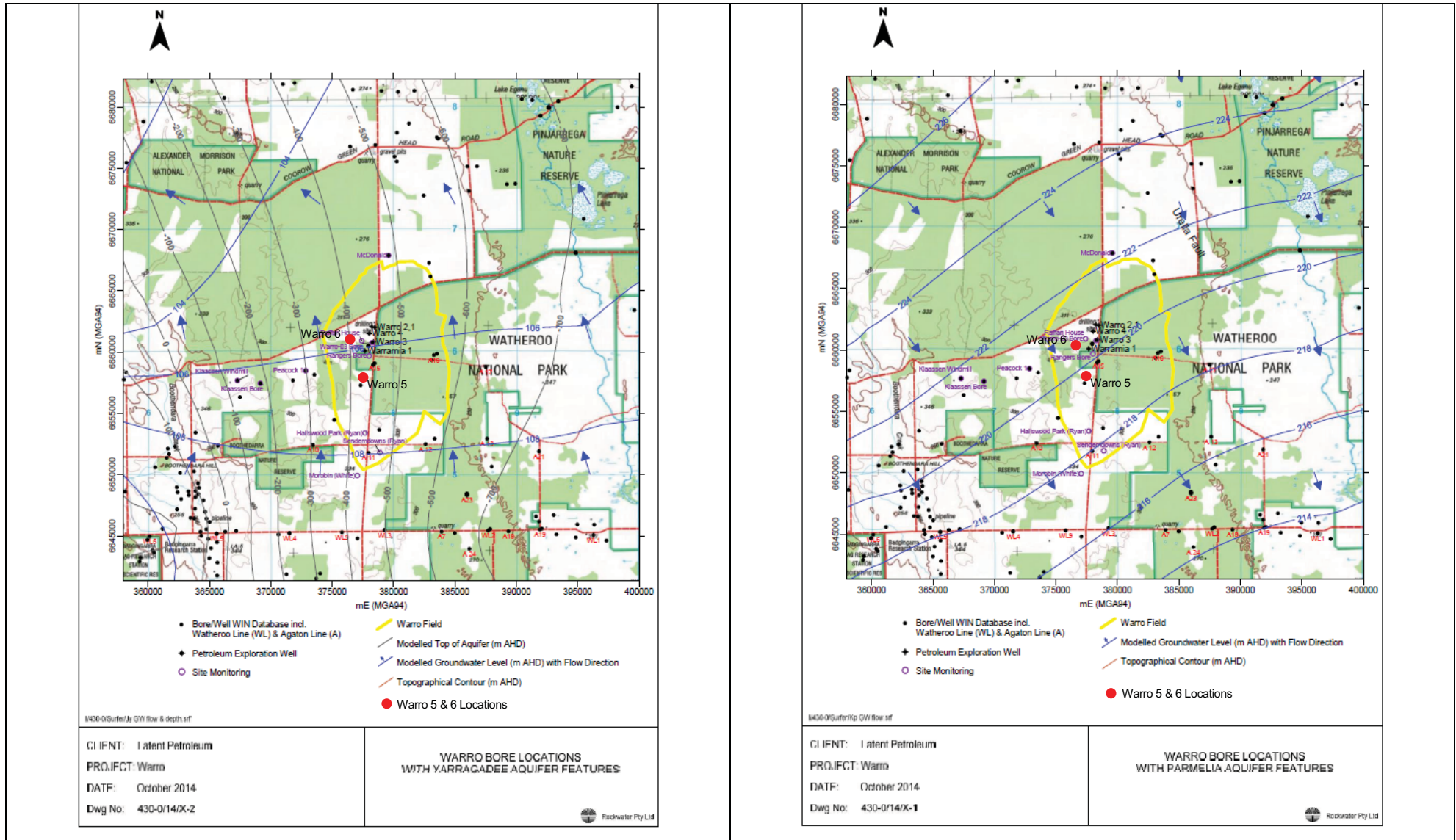


Figure 7 - Groundwater flow in the Parmelia (left) and Yarragadee (right) aquifers

## 4.6.2 Project Hydrogeology

### 4.6.2.1 Summary

The depth to the watertable in the project area and surrounding regions is approximately 60-80m.

The hydrogeology of the stratigraphy intersected by the Warro wells as outlined in Rockwater Pty Ltd (2013) is presented in Table 4 and Figure 8 and shows that there are strong, impermeable aquitards between the gas bearing zones (3-4km below ground surface) and the near surface aquifers. The flow direction of the shallow subsurface aquifers is towards the south (Parmelia) and to the north and west for the Yarragadee.

Table 4 - Summary of local stratigraphy (from Rockwater Pty Ltd 2013)

Period	Formation/Unit	Lithology	Hydrogeology	Max. Thickness (m)
Cretaceous	Parmelia Group	Sand, silt and clay	Aquifer	900
	Otorowiri Formation	Siltstone & claystone	Aquiclude	~100
Jurassic	Yarragadee Fm.	Sandstone, siltstone & claystone	Aquifer (upper part), aquiclude base	4,400
	Cadda Fm.	Shaley siltstone, silicified sandstone	Aquiclude	215
	Cattamarra C. M.	Shale, claystone, sandstone & coal	Not known	700

### 4.6.2.2 Impact on groundwater resources

In 2013, the WJV commissioned Rockwater Pty Ltd to carry out a review of the groundwater resources at Warro to assess the potential for deep Warro wells to have an impact on these resources.

As part of this work, a groundwater model was developed by Rockwater to determine the potential effects of planned operations on the groundwater flow system. The model is based on the regional GARAMS model, and was refined in the project area using local data.

The Warro project model was telescoped from the GARAMS regional model which was constructed by GHD for the DoW. It covers 9,900 km<sup>2</sup> compared to 30,000 km<sup>2</sup> for GARAMS. The model needed to be that large to include the only Yarragadee monitoring bores that had suitable water-level monitoring data for model calibration, namely the DoW monitoring bores on the Moora, Watheroo and Eneabba Lines. The western extent could have been reduced, but it was useful to include the base of the flow system (the ocean).

There is no local data available for the Yarragadee Formation, as the formation is very deep and the upper part is shaly and so not prospective for groundwater supplies.

The presence of faults does make calibration difficult, and so the calibration errors were greater than desirable. However, the scaled root mean square (SRMS) errors for 2012 water levels in the Yarragadee and Parmelia aquifers were 6.3% and 6.4%, respectively; and 4.5% or less for the nearby Watheroo Line bores. These compare to 10.3% for GARAMS, and calibration errors for the project model are probably similar to those achieved in the PRAMS (Perth regional) modelling.

In order to determine local impacts, a sub-set of the project model was used for the immediate Warro area. This involved dividing the project model cells which were 1,000 m by 1,000 m; into 100 m by 100 m cells in general, and 10 m by 10 m locally, over an area of 2 km east-west by 5 km north-south (10km<sup>2</sup>).

Three scenarios were modelled:

- Scenario 1 – Groundwater extraction from the Parmelia aquifer for the project water supply.

Groundwater extraction was simulated from a production bore screened in the Parmelia aquifer at the Warro site. The modelling results indicate that the drawdown after two years of extraction would be minimal with maximum drawdown at the extraction location calculated to be 0.36 m. The actual drawdown in the bore would be greater, depending on well efficiency. Drawdown of at least 0.01m is predicted to extend to about 2.5km from the site (Rockwater 2013).

- Scenario 2 – A hydraulic stimulation event in a deep (-3,900m AHD) section of the Yarragadee Formation.

Rockwater modelled a hydraulic stimulation event in a deep (-3,900m AHD) section of the Yarragadee Formation. The modelling results indicate that the effects of the hydraulic stimulation event would be very localised both laterally and vertically, and would have no impact on the upper groundwater flow system. It is calculated that it would take about 7,000 years for a molecule of water to travel through the modelled 100m hydraulically altered area within the deep Yarragadee Formation. Outside the hydraulically altered zone, and away from the area of residual (minor) groundwater level change, groundwater flow would be north-westward at a rate of 5.6 mm/million years (Rockwater 2013).

The calculated travel times for groundwater flow at the depth in the Yarragadee Formation proposed to be hydraulically stimulated was not given as a range as the calculated flow rate was extremely low outside of the stimulated area: velocity  $5.6E^{-9}$  m/annum (essentially zero).

In the case of a potential leak from a storage dam above the Parmelia aquifer the velocity was given as 420 m over 100 years, i.e. 4.2 m/year on average.

- Scenario 3 – Potential leakage from a storage dam into the Parmelia aquifer.

Any leakages from water storages would be localised and could be controlled and contained using a recovery bore or bores. Modelling results indicate that species 'X' would travel slowly in a south-easterly direction from the hypothetical leaky storage dam.

With the almost zero flow indicated deep in the Yarragadee Formation, Rockwater Pty Ltd consider a three-dimensional numerical model is not needed to assess the potential impacts of well development (pers comm. P.Wharton). The prime areas of concern are considered to be surface facilities and activities (i.e. groundwater extraction from the Parmelia), and potential leakage from storages. The model is considered suitable for assessing these parameters.

Rockwater supplemented the above work with a review targeting any impacts that might affect the water sourced from the Yarragadee for the township of Badgingarra. This work concluded that there was no potential for contamination (Rockwater 2014).

#### **4.6.2.3 Faults**

The assessment referred to the potential for faults to form preferred paths for groundwater flow. Seismic survey results show that there are some faults, particularly in the northern part of the Warro anticline. These faults might have higher permeability than the rocks they cut, but they are probably limited in length and are impermeable enough to have not enabled gas to escape from the reservoir (Rockwater Pty Ltd 2013).

The faults near Warro are of a wrenching type (Anderson, 1951) where fault blocks (and the faults themselves) are wedged in a compressional regime. Both quartz cementation and strong cataclasis have resulted in low permeability of the faults, with permeability

estimated to be about 0.002 to 0.004 millidarcys (mD) from 3,000 to 3,500m depth, and less than 0.0005mD (4E-7m/d) in the reservoir rocks.

Fracture stimulation could increase permeability of the faults, but test results indicate that the impacts of stimulation have an effective distance of about 40m, and will extend to no more than about 150m. The positions of faults are known, and at least for the initial tests, the test sites will be over 1km away from them. Also, the permeability required to release gas is much lower than that which would allow water flow, and so the degree of fracture stimulation can be controlled to prevent or minimise water flow (Rockwater Pty Ltd 2013).

As stated in Rockwater Pty Ltd (2013), “the modelling indicates that there will be no impact on the upper Yarragadee groundwater flow system from hydraulic stimulation provided the well integrity is maintained. Effects of groundwater extraction on the Parmelia aquifer are indicated to be minor and restricted to the project area. Similarly, any leakages from water storages would be localised and could be controlled and contained using recovery bore or bores”.

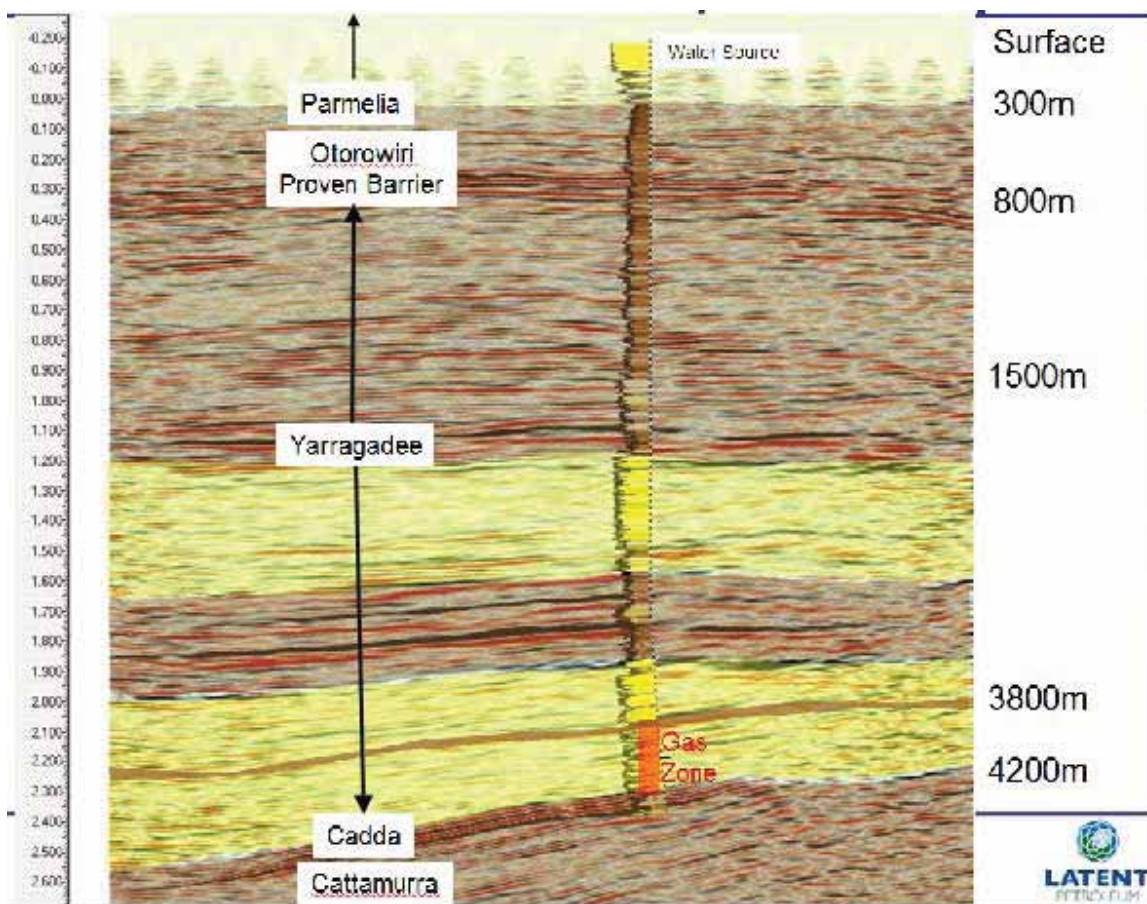


Figure 8 – Location of aquifers and aquitards in relation to the target area

#### 4.6.3 Water Quality

Baseline groundwater information from the largely potable Parmelia interval has been collected from the bore on the Raffan property since 2009 (prior to Warro-3) and Latent later developed a water monitoring program within the vicinity of the Warro drilling operations to monitor any potential impacts to the groundwater resulting from the well activities in 2011. Sampling and analyses of water from this bore and two other nearby bores (Ranger Bore and Main Camp – Figure 9) have been carried out on a six monthly basis since the drilling of Warro-03 in 2009.

No changes in water quality were recorded during previous operations or since. Although Rockwater’s study indicate there is expected to be no impact to groundwater (assuming well

integrity is maintained), Latent has established an extensive baseline groundwater sampling program to ensure they can detect any potential impacts to the groundwater resulting from the proposed gas wells.

Latent will continue to monitor water quality in the vicinity of the Warro drilling operations and has recently commenced a wider sampling programme from all available water bores within a 10km of the field to confirm that the proposed activities have no impact on local groundwater users. These bores are located west, north and south of the Warro-5 and Warro-6 (Figure 9).

Latent have liaised with the Chem Centre regarding the water analysis work being undertaken by Latent at Warro. For the chemicals being used in the fluids during drilling and fracture stimulation operations (chemical disclosure tables were provided) the Chem Centre stated that *“we believe that regularly carrying out the suite of analysis proposed would be enough to detect a significant spill/discharge of these fluids, provided an appropriate baseline (including temporal variation) is established”*.

Latent is cognisant that the DoW are interested in the potential for deeper aquifers to be utilised as a groundwater resource, The deeper Yarragadee sands (below ~2000m) are not considered a water resource because of the depth and quality of the groundwater. The sands themselves are low permeability and the groundwater within them varies from 2,000-10,000ppm TDS (based on Rw data from electric logs).

#### **4.6.4 Groundwater Users**

The Project is located within the Dinner Hill Sub-Area of the Jurien Groundwater Area. The Morrison Sub-Area of the Arrowsmith Groundwater Area is located immediately north of Marchagee Track.

There is no Public Drinking Water Source Areas (PDWSA) within the Project area.

The closest PDSWA are the Badgingarra Water Reserve and Watheroo Water Reserve, which are located 29km southwest and 27km west of the Project respectively.

Rockwater Pty Ltd (2014) assessed the potential for the Badgingarra water supply to be impacted by aquifer stimulation at the Warro project. The assessment found there is no potential for any contaminants that could be introduced in the reservoir at more than four kilometres depth, reaching the Badgingarra bores. Groundwater flow in the upper part of the Yarragadee Formation at Warro is indicated to be to the north and north-west, i.e. away from Badgingarra (Rockwater 2014).

There are a number of local bores (Figure 9). There are three existing groundwater licences in the local area in addition to GWL172000(3) on Lot 10323:

- GWL 150359 - 8km west (Klassen)
- GWL 168307 – 14.2km south of the Project area
- GWL 150359 – 15km southwest of the Project area (located on property immediately west of Morobin (White)).

Latent has commenced groundwater monitoring at the Klassen and Morobin bores (Figure 9). The groundwater proposed to be abstracted is within the existing GWL entitlement, thus, the Project will not limit or reduce the extent of available groundwater.



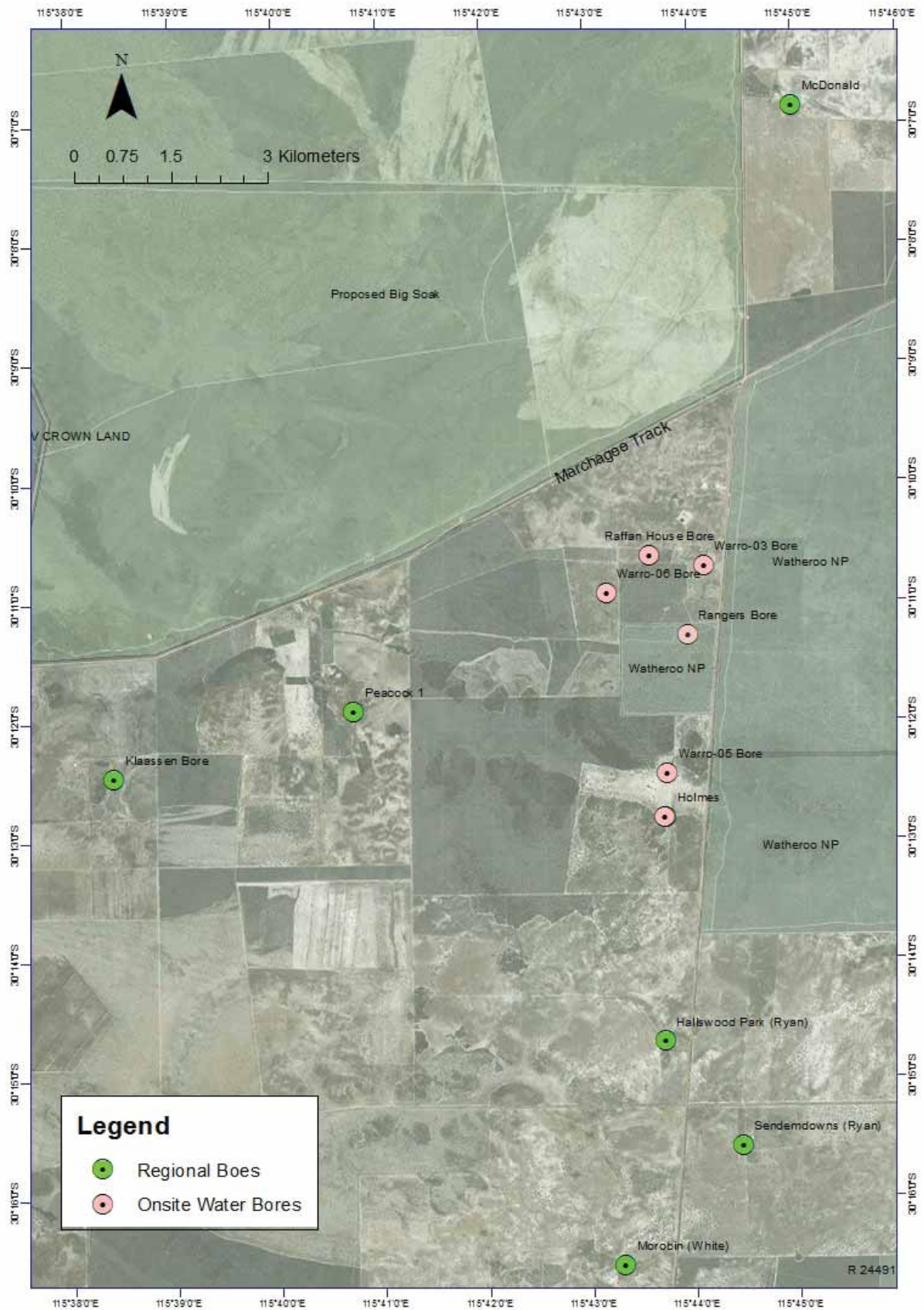


Figure 9 - Location of local bores sampled

## 4.7 VEGETATION & FLORA

### 4.7.1 Vegetation and Flora

The proposed wells are situated on Lot 10323 and Lot 10324 which comprises largely cleared freehold agricultural land. The area has been cleared for farming and subject to grazing.

Latent has undertaken a significant amount of vegetation and flora work in the local area, largely related to the Warro 3D seismic area which encompasses the Project area. This work includes:

- An initial flora survey to collect flowering material from the different vegetation groups was undertaken by Botanica Consulting (BC) in conjunction with Keith Lindbeck & Associates (KLA) on 13 - 17 November 2007. Approximately 40km of the receiver lines in the different vegetation groups in Watheroo National Park were walked and vegetation and flora identified and recorded.
- Vegetation survey conducted by BC on 5 - 7 December 2007 in conjunction with Don Williams, to identify the major vegetation groups within the entire extent of the proposed seismic survey area (in and outside the National Park).
- Relevés undertaken by Don Williams of the different vegetation groups within the seismic survey area from April- July 2008.
- Establishment of 32 10 x 10m quadrats within different vegetation groups in the seismic survey area undertaken by Don Williams, BC and Cate Tausse (with assistance from KLA) on 5-9 September 2008.
- Ground truthing of additional areas (via transects across different vegetation units) on 23-24 September 2008 by Don Williams and KLA. Vegetation types and records of Priority flora encountered were recorded.
- Vegetation and flora survey undertaken on 10-14 August 2009. This involved the establishment of an additional four quadrats and walking of transects (relevés recorded) in the eastern project area for the Warro 3D seismic area. Vegetation types and records of Priority flora encountered were recorded.
- In accordance with EPA Ministerial Statement (MS) 849, an assessment of the Warro 3D seismic lines located within areas of native vegetation was undertaken by qualified botanists (and zoologist) from 17 January – 4 February 2011 with a total of 324.24km walked.
- In accordance with Condition 11.4 of MS 849 and the Proposed Rehabilitation Monitoring Program (KLA 2010), vegetation monitoring has been undertaken annually since 2011 involving the assessment of 40 transects, 20 on rolled seismic lines and 20 on parallel transects in undisturbed vegetation.

No Declared Rare Flora (DRF) was recorded during these surveys.

Eighteen Priority flora species have been recorded in the survey work undertaken to date in the surrounding native vegetation (Table 5).

The three records of Priority 1 and 2 flora species identified during previous flora surveys were located outside of Lots 10323 and 10324 at distances >3 km from the well locations. Priority 3 and 4 flora species in the local area are common (Figure 10).

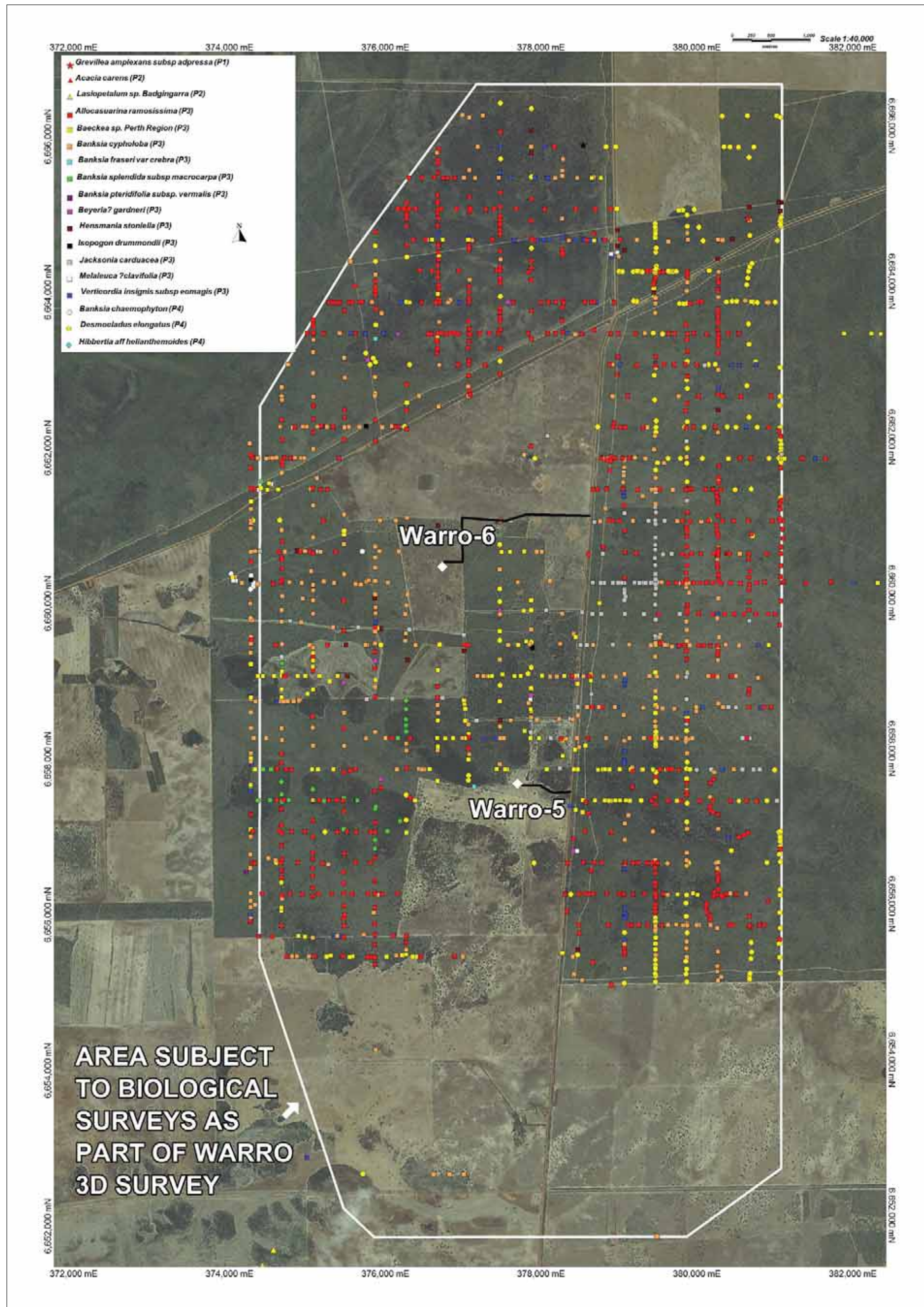


Figure 10 - Priority flora recorded in the Project area

Table 5 - Priority flora recorded during the Warro 3D survey work and numbers recorded during line survey

Species	Cons Code
<i>Grevillea amplexans subs adpressa</i>	P1
<i>Acacia carens</i>	P2
<i>Lasiopetalum sp Badgingarra</i>	P2
<i>Allocasuarina ramosissima</i>	P3
<i>Baeckea sp. Perth Region*</i>	P3
<i>Banksia cypholoba*</i>	P3
<i>Banksia fraseri var crebra</i>	P3
<i>Banksia splendida subsp macrocarpa*</i>	P3
<i>Banksia pteridifolia subsp. vernalis</i>	P3
<i>Beyeria ?gardneri*</i>	P3
<i>Hensmania stoniella</i>	P3
<i>Isopogon drummondii</i>	P3
<i>Jacksonia carduacea</i>	P3
<i>Melaleuca ?clavifolia</i>	P3
<i>Verticordia insignis subsp eomagis</i>	P3
<i>Banksia chamaephyton</i>	P4
<i>Desmocladus elongatus</i>	P4
<i>Hibbertia aff. helianthemoides</i>	P4

#### 4.7.2 Weed Species

During flora surveys undertaken as part of the Warro 3D seismic survey, non-native species were recorded on agricultural land (including degraded remnant vegetation areas not part of this project). These are presented in Table 6 - Weed species recorded on agricultural land

No Declared Pests, as listed by the Department of Agriculture and Food (2013) in accordance with Section 22 of the *Biosecurity and Agriculture Management Act 2007* are located in the proposal area.

#### 4.7.3 Dieback

Dieback (*Phytophthora spp*) is a soil borne water mould that continually spreads by root to root growth amongst host plants and through the dispersal of zoospores in free-flowing water. Native animals, and humans, including vehicles and machinery, also transport *Phytophthora spp*.

Assessments of the surrounding native vegetation by NPC Consulting in 2012, 2013 and 2014 to assess the occurrence of dieback involved visual assessment of vegetation health, testing of plant tissue and soil sampling. No evidence of the presence of *Phytophthora spp*. (dieback) has been recorded in the local area during these assessments.

Table 6 - Weed species recorded on agricultural land

SPECIES	COMMON NAME
<i>Arctotheca calendula</i>	Cape Weed
<i>Avena barbata</i>	Wild oats
<i>Brassica tournefortii</i>	Wild turnip
<i>Bromus alopecuroides</i>	Brome grass
<i>Brachiaria decumbens</i>	Signal Grass
<i>Chamaecytisus palmensis</i>	Tagasaste
<i>Cucumis myriocarpus*</i>	Prickly paddy melon
<i>Erodium botrys</i>	Erodium, Storksbill
<i>Hordeum leporinum</i>	Barley grass
<i>Hypochaeris glabra</i>	Smooth Catsear
<i>Lupinus cosentinii</i>	W.A. Lupin
<i>Malva parviflora</i>	Mallow
<i>Ornithopus sativus</i>	Serradella
<i>Raphanus raphanistrum</i>	Wild radish
<i>Tripteris clandestina</i>	Stinking roger
<i>Trifolium subterraneum</i>	Subterranean clover
<i>Ursinia anthemoides</i>	Ursinia

## 4.8 FAUNA

A Level 1 fauna assessment of the area encompassing the Warro gas wells was undertaken by Dr Vi Saffer (Keith Lindbeck & Associates (KLA)) in February and April 2008.

No native fauna (apart from macropods) have been sighted on Lot 10323 or Lot 10324 as it is located on cleared freehold agricultural land and used mainly for cropping and sheep grazing.

Subsequent fauna assessments were undertaken in the surrounding areas of native vegetation as part of the Warro 3D seismic Survey (KLA 2009b). There was no evidence of significant fauna or fauna habitat during the line survey.

The proposal area is located near a portion of the Watheroo National Park that contains a small breeding population (6-10 breeding pairs) of Carnaby's Black-Cockatoo during the breeding season (approx. July – Feb) and provides foraging habitat (Johnstone & Kirkby 2008). The project will not have any impact on this species as the project does not impact breeding habitat – breeding habitat is contained in different vegetation groups.

The White Bellied Sea Eagle, Rainbow Bee-eater, Great (White) Egret, Cattle Egret and the Fork-tailed swift were recorded as potential migratory species from the desktop EPBC search of the region. The Great Egret has been recorded in the region on the Birds Australia database. This species prefers shallow freshwater and saltwater and rarely dry pastures (Johnstone & Storr, 2004).

The project is not expected to have any impact on fauna of conservation significance.

## 4.9 SOCIAL ENVIRONMENT

### 4.9.1 Aboriginal Heritage

A search of the Department of Aboriginal Affairs (DAA) system revealed there are no recorded sites of Aboriginal significance at the gas wells sites.

An Aboriginal survey was undertaken at the project in late September 2008. An Aboriginal artefact was recorded within the leased property of the project. The well sites and associated infrastructure are not located within this area.

Latent will not disturb the site and will ensure that all personnel will be inducted on arrival to the Project site about areas of cultural significance as identified and will be instructed to remain clear of this area. The cultural impact presentation will be printed (hard copy) and provided in the “Smoko” room on site.

#### **4.9.2 European Land Use**

No areas of European heritage significance were identified at the gas wells and camp site.

The project is located on predominantly cleared farmland and evidence of previous gas exploration and farming activities remain on site. There are no inhabited residence within the two leased properties. The nearest inhabited residence is located more than 4km from the drilling sites.

#### **4.9.3 Socioeconomic Environment**

The area is used for wheat farming and sheep husbandry. There are no occupied dwellings within four kilometres of the proposed sampling work thus no disturbance to local residents is expected.

There are no socio-economic impacts in the short term although the WJV expect the community at large will draw comfort that such baseline surveys are being carried out, especially at this stage of the overall project.

### **4.10 ADJACENT CONSERVATION AREAS TO PROJECT**

The closest conservation areas to the proposed gas wells are (Figure 11):

- Watheroo National Park – 540m southeast of Warro-6 and 650m km east of Warro-5.
- Big Soak Plain (Proposed) Conservation Park – 1.8km north of the Project area.

With the exception of Watheroo National Park, the closest ESA (excluding occurrences of DRF) is Alexander Morrison National Park which is located >15km northwest of the Project. The Boothendarra Nature Reserve is located approximately 6km southwest of the Project.

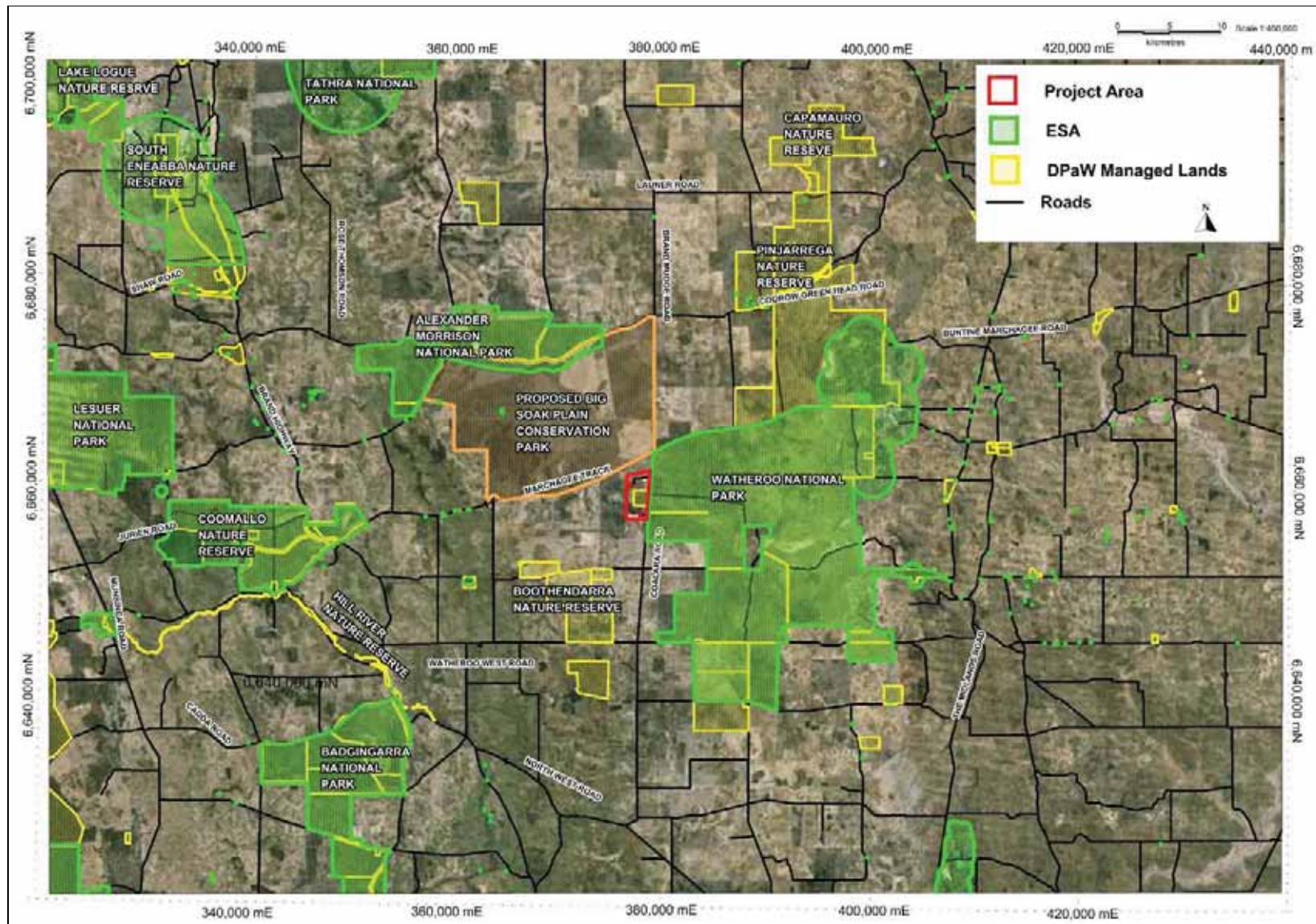


Figure 11 – Location of ESA's in the region

## 5 IDENTIFICATION OF ENVIRONMENTAL IMPACTS

A formal environmental risk assessment (ENVID) was undertaken as part of the original EMP for five gas wells submitted to the DMP in 2008 and 2011 (revised). This ENVID was undertaken on 30 June 2008 and involved personnel from Latent Petroleum, Keith Lindbeck & Associates and IPS Australasia.

As the work proposed in this EP is consistent with that previously approved in the original EMP, an additional formal ENVID was not conducted. Following restructure of the original risk assessment table (from the 2011 EMP) to fit the current risk assessment methodology, an 'informal ENVID' was undertaken by Latent, Clark Lindbeck & Associates Pty Ltd (CLA) and Aztech using past experience, literature reviews and consideration of the environmental values of the areas (based on extensive environmental impact assessment of the area undertaken for the 3D seismic survey). This assessment was undertaken on 1 June 2014 in accordance with AS/NZS ISO 31000: 2009 Risk Management – Principles and Guidelines and Australian Standard HB 203:2012 Environmental Risk Management.

The initial phase of identifying the environmental impacts was to identify the key project activities and the sources of risk associated with these activities.

A scoping matrix was developed to identify likely interactions between the project activities and the resources/receptors within the receiving environment and whether potential significant impacts could result. This methodology is consistent with that used recently by other operators in the Peth Basin. The scoping matrix is presented in Table 8 and identified 137 interactions with the following breakdown:

- 8 interactions were deemed positive.
- 48 interactions were deemed not significant.
- 78 interactions were considered potentially significant.
- 3 interactions were considered significant.

The scoping matrix was used to identify potential interactions between the Project and the receptors in the environment and identify any key issues or further actions required. The likely interactions identified during this scoping exercise were further assessed as part of the 'informal' ENVID with the objectives to:

- Identify and rank inherent risk of identified hazards in accordance with the risk matrices provided in Appendix 5.
- Likelihood of the given consequence occurring was assessed with no controls in place.
- Proposed controls including proposed treatments or action plans were identified.
- An assessment of the residual risk with the proposed controls in place.

Table 9 presents the result of the risk assessment. Both environmental and social consequences in the same aspect/hazard and the resulting risk assessment is based on the worst case scenario/receptor. For the majority of aspects/hazards this relates directly to physical or biological receptors.



Table 7 - Summary of Key Project Activities and Sources of Risk

<b>PROJECT ACTIVITY</b>	<b>SOURCE OF RISK</b>
Site Preparation	Clearing*and earthworks
Drilling	Mobilisation and Demobilisation of Rig
	Operations of Rig (power/water resources, waste management)
	Disposal of drilling fluids
Fracture Stimulation	Mobilisation and Demobilisation
	Operations and camp
	Perforating, hydraulic fracture stimulation and flowback
Extended well test	Mobilisation and Demobilisation
	Well test operations and camp
	Flowback and other activity equipment
Rehabilitation	Earthworks
Accidental Event / Emergency	Vehicle Accident
	Fauna Incident
	Well blowout
	Surface or Subsurface loss of containment during fracture stimulation
	Surface or Subsurface loss of containment (diesel, fluid)
	Emergency venting/flaring
	Bushfire
	Non-controlled third party access to site
	Fracture stimulation activities resulting in localised seismic event

\* Clearing at well sites refers to removal of grasses/legumes with some surface soil disturbance



Table 9 - Risk Assessment Matrix with Cause and Management Control

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard	Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk			
							Consequence Likelihood of Consequence	Inherent Risk Level	Consequence		Likelihood of Consequence	Residual Risk Level		
<b>Site preparation</b>														
<b>Clearing and Earthworks</b>	R1	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public	Establishing well sites	Air pollution (particulates)	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Proposal is located on cleared agricultural land and access to site is via existing designated tracks. All vehicles will be restricted to the existing and designated tracks. Water spray on soil and /or access track as required.	1	D	Low (L-24)
	R2	Air Emission	Localised generation of air emissions	1) Air quality	Operation of vehicles and equipment	Generation of GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes.	1	D	Low (L-24)
	R3	Noise Emission	Localised generation of noise	1) Noise levels 2) Tourism, landowner & public 3) Terrestrial fauna 4) Listed Species	Establishing well sites	Disturbance of localised fauna	Increase of noise beyond background levels, creating disturbance to landowner and users of national park	1	C	Low (L-22)	No permanent residents on Lot 10323 or 10324. Well sites are located >580m and 1km from the WNP. All residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R4	Physical Presence	Trigger of stakeholder concern and regulatory requirements	1) National Park 2) Tourism, landowner & public	No control of project activities.	Regulatory scrutiny and trigger of various regulatory requirements	Stakeholder pressures (tourism and national park)	2	D	Low (L-21)	Wells are located on cleared agricultural land and are located >500m from the WNP. All activities will be undertaken in accordance with the EP. Project referred by a third party in 2011 – EPA decision "Not assessed – public advice given". Project is consistent with that assessed by the EPA.	2	E	Low (L-23)
	R5	Physical Presence	Change in landform, loss of topsoil	1) Soil and landforms 2) Tourism, landowner & public 3) Terrestrial flora	Establishment of pad and associated infrastructure	Increased risk of erosion	Visual impacts (amenity) to landowner	1	C	Low (L-22)	Project is located on cleared agricultural land. Prior to pad construction activities commencing, the well sites will be marked out to ensure only the required area is disturbed. All surface soil will be collected and stockpiled at locations that minimise erosion from rainfall and wind. The well sites will be rehabilitated at completion.	1	D	Low (L-24)
	R6	Physical Presence	Removal of native vegetation and potential fauna habitat	1) Terrestrial flora 2) Terrestrial fauna 3) Listed species	Clearing of pad and associated infrastructure	Loss of native vegetation and habitat	Visual impacts (amenity) to landowner and users of national park	2	D	Low (L-21)	Wells are located on private cleared farmland. All vehicles will be restricted to the existing and designated tracks to avoid the potential for off road driving which could impact roadside vegetation or isolated trees. All staff will be advised that off-road driving is prohibited. Rehabilitation commitments to original state or as per agreement with the landowner.	2	E	Low (L-23)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R7	Physical Presence	Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area	Visual impacts (amenity) to landowner	1	C	Low (L-22)	Ensure all vehicles and equipment has been cleaned down prior to arrival at site.  Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site.  All staff will be advised of potential weed species during the induction process and advised to report any incidence of weed establishment.	1	D	Low (L-24)
<b>Drilling</b>														
Drilling Mobilisation and Demobilisation	R8	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public 3) Landscape & visual	Movement of vehicles to project sites.		Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Proposal is located on cleared agricultural land and access to site is via existing designated tracks.  The contractor will be required to control dust with the use of a water carts.  Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.  Residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R9	Air Emission	Localised generation of air emissions	1) Air quality	Operation of vehicles and equipment	Generation of GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes.	1	C	Low (L-22)
	R10	Noise Emission	Localised generation of noise	1) Noise levels 2) Tourism, landowner & public 3) Terrestrial fauna 4) Listed Species	Set up of drill rig	Disturbance of local residents or localised fauna	Increase of noise beyond background levels, creating disturbance to landowner and users of national park	1	C	Low (L-22)	No permanent residents on Lot 10323 or 10324.  Well sites are located >580m and 1km from the WNP. Noise at this distance assessed to be minimal impact.  Residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R11	Physical Presence	Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area		1	C	Low (L-22)	Ensure all vehicles and equipment has been cleaned down prior to arrival at site.  Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site.  All staff will be advised of potential weed species during the induction process and advised to report any incidence of weed establishment.  Regular assessment of the well sites area and road for the establishment of noxious weed species and 'Declared Pests' during well activities and following rehabilitation.  Eradication of noxious weeds and Declared Pests as required following approved control mechanisms in consultation with Department of Agriculture and Food.  Ongoing monitoring and auditing of well areas for two years reducing the risk of weed establishment and spread.	1	D	Low (L-24)
Operations of Rig & camp	R12	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public	Dust generated during drilling operations.	Air pollution (particulates)	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Water truck to be available for dust suppression on well site if required.  Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.	1	D	Low (L-24)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R13	Air Emission	Localised generation of air emissions	1) Air quality	Operation of vehicles and equipment	Generation of GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes. Equipment such as generators, compressors, blow out preventers and other pressure related facilities will be maintained in good working order. All other equipment and vehicles will be serviced regularly.	1	C	Low (L-22)
	R14	Air Emission	Localised generation of air emissions	1) Air quality	Venting of hydrocarbons to atmosphere if hydrocarbon formations intersected in drilling	Generation of GHG and other emissions		1	C	Low (L-22)	Venting/flaring only undertaken in an emergency during drilling. Drill rig has safety control systems. A hydrocarbon gas detection system will be provided for all areas where major gas leakage and/ or gas accumulation may occur. Gas detection will be monitored at all times by mudloggers during drilling activities. An emergency response procedure has been developed in the event of any gas emission.	1	D	Low (L-24)
	R15	Noise Emission	Localised generation of noise	1) Noise levels 2) Tourism, landowner & public 3) Terrestrial fauna 4) Listed Species	Noise during drilling activities.	Disturbance of local residents or localised fauna	Increase of noise beyond background levels, creating disturbance to landowner and users of national park	1	C	Low (L-22)	Drilling activities are located on cleared agricultural land. Drilling is located several kilometres from landowner's permanent residence. Carnaby's Cockatoo breeding habitat is located approx. 1km away from well sites. Noise at this distance assessed to be minimal impact.	1	D	Low (L-24)
	R16	Light Emissions	Localised generation of light	1) Tourism, landowner & public 2) Terrestrial fauna 3) Listed Species	Light during drilling activities.	Disturbance of local residents or localised fauna	Disturbance to local landowner.	1	C	Low (L-22)	Well sites are located several kilometres from nearest permanent residence. No permanent residents on Lot 10323 or 10324. Well sites are located >580m and 1km from the WNP. Local residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R17	Waste Disposal	Generation and disposal of putrescible and non-hazardous waste Increase in feral animals	1) Waste disposal 2) Tourism, landowner & Public 3) Terrestrial fauna 4) Listed species	Inappropriate disposal of waste material.	Windblown or visible waste. Increased predation on native animals in local area.	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	All well sites, equipment and vehicles will have sealed waste collection bins. All putrescible waste will be collected and stored in sealed containers located at designated locations at the drill site and two camps and disposed of offsite at appropriately licensed facilities. All mobile equipment will be contained in sealed receptacles for rubbish disposal. Industrial waste will be disposed of in accordance with the regulatory requirements at appropriately licensed facilities. Paper, metal, steel and oil will be stored onsite in bins or tanks before being removed from site by a licensed waste removal operator and disposed of at appropriately licensed facilities.. Waste skips will be provided and maintained at the sites with a licensed contractor employed to dispose of the waste at appropriately licensed facilities Removal of all waste offsite regularly during well activities and at the completion of activities.	1	D	Low (L-24)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R18	Waste Disposal	Disposal of hydrocarbon wastes (oil, grease, HC contaminated rags etc)	1) Waste disposal 2) Tourism, landowner & Public 3) Soils and landforms 4) Groundwater	Inappropriate disposal of waste material.	HC material remains at site and provides source of contamination.		1	C	Low (L-22)	All HC material will be disposed of in designated bins and disposed of to a licensed facility.  Contaminated fluids and hydrocarbon liquids will be collected and trucked from the site for disposal by a licensed operator at appropriately licensed facilities.	1	D	Low (L-24)
	R19	Waste Disposal	Management and Disposal of sewage	1) Soil and landforms 2) Groundwater	Inappropriate disposal of waste material.	Release to environment resulting in contamination of local soil and groundwater		1	C	Low (L-22)	Sewage and grey water will be collected in septic tanks at the main camp and an ATU will be utilised at the drill camp.	1	C	Low (L-22)
	R20	Use of resources	Extraction of groundwater	1) Groundwater 2) Tourism, landowner & public	Groundwater extraction required for well activities is in excess of that proposed.	Reduction in groundwater available to surrounding local users.	Ongoing reputational impacts	1	C	Low (L-22)	Groundwater will be obtained from existing licensed bores and two new bores in accordance with a GWL.  In the event additional abstraction bores are constructed, additional GWL will be obtained.  The duration of the well activities and volume of water required will not significantly reduce that locally available to other users.	1	D	Low (L-24)
	R21**	Physical presence Drilling fluids Muds and cuttings	Spill or loss of containment results in a significant release (> 100L) of drilling fluids outside of bunding or affected ground area > 100m <sup>2</sup>	1) Soil and landforms 2) Groundwater 3) Surface water	Malfunction in equipment Rupture in chemical / drilling fluid storage vessels.	Contamination of local soil, surface water and groundwater  Reduction in groundwater quality.	Ongoing reputational impacts	3	D	Moderate (M-17)	Storage of all drilling fluids and hydrocarbons in accordance with the MSDS or portable drip/collector trays which can contain 110% of the largest container or 25% of the total volume of stored material (whatever is greater) to contain any potential spills.  Emergency Response Plan & Oil Spill Contingency Plan in place. Spill kits will be present.  Mud sump will be lined with 1mm HDPE (10 <sup>-12</sup> cm/s infiltration rate).	2	E	Low (L-22)
	R22**	Muds and cuttings	Overflow of sump/turkeys nest	1) Soil and landforms 2) Groundwater 3) Surface water	Rainfall event resulting in overflow of sump/turkeys nest	Contamination of local soil and groundwater	Ongoing reputational impacts	3	D	Moderate (M-17)	Regular inspections of sump and turkeys nest to ensure adequate freeboard is maintained.  Both the sump and turkey's nest have been designed with the excess capacity above the volume expected to be encountered.  A 300mm freeboard will be maintained.  In the unlikely event the sump/turkey's nest at an individual well location reaches near capacity, Latent has identified as a contingency the possibility to transport water to alternate turkey's nests at Warro-4, Warro-5 or Warro-6 (whichever is applicable). This option will require additional approval from the DMP. If transfer between each storage area is not possible, operations will be suspended until alternate arrangements have been approved.  Sumps and Turkey's nests are located away from areas of native vegetation.	2	E	Low (L-22)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R23	Physical presence Fuel Chemicals	Minor Spill/leak of hydrocarbons / chemicals (<100L)	1) Soil and landforms 2) Groundwater 3) Surface water	Diesel, oils and grease in equipment and vehicles.  Diesel, oil and grease spillage during transfers (including refuelling).  Leak from storage drum (44 gallon)	Contamination of local soil and groundwater	Ongoing reputational impacts	1	C	Low (L-22)	Spill kits to be made available. Clean up all spills when they occur. Use absorbent materials under machinery which is likely to leak oil.  All hydrocarbons /chemicals and stored in appropriately bunded areas or on drip trays to contain spills.  Regular maintenance of equipment.  A drip tray will be used during all refuelling operations at the drill site. A spill kit is to be available on the construction refuelling vehicle and the drill site refuelling trailer.  Mobile equipment and vehicles will refuel at a bunded designated refuelling point (adjacent to the main fuel tank) on the drill pad.  Refueling in accordance with Environmental Procedure 7.0	1	D	Low (L-24)
	R24	Physical Presence	Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area		1	C	Low (L-22)	Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site.	1	D	Low (L-24)
Disposal of drilling fluids/muds	R25	Muds & Cuttings	Disposal of groundwater/muds encountered/generated during drilling to surrounds	1) Soil and landforms 2) Groundwater 3) Surface water	Release of water encountered during drilling to the surrounds.	Localised change in soil properties or reduction in groundwater quality.	Contamination of land impacting crops and livestock.	2	D	Low (L-21)	Wells are located on cleared agricultural land.  Any water and muds encountered/generated during drilling will be contained within a lined sump.  No surface water bodies or drainage areas in vicinity of project.	1	D	Low (L-24)
	R26	Waste	Generation of excess cement	1) Soil and landforms	Overflow of cement on surface	Change in soil properties.		1	C	Low (L-22)	Excess cement pumped to lined mud sump.	1	D	Low (L-24)
<b>Hydraulic Fracture Stimulation</b>														
Mobilisation & Demobilisation	Refer R8-R11													
Operations of frac and camp	R27	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public 3) Landscape & visual	Vehicle movement.		Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Proposal is located on cleared agricultural land and access to site is via existing designated tracks.  Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.	1	D	Low (L-24)
	R28	Air Emission	Localised generation of air emissions	1) Air quality	Operation of vehicles	GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes.  Equipment such as generators, compressors, blow out preventers and other pressure related facilities will be maintained in good working order. All other equipment and vehicles will be serviced regularly.	1	D	Low (L-22)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R29	Light Emissions	Localised generation of light	1) Tourism, landowner & public 2) Terrestrial fauna 3) Listed Species	Light during drilling activities.	Disturbance of local residents or localised fauna	Disturbance to local landowner.	1	C	Low (L-22)	Drilling is located several kilometres from landowner's permanent residence. No permanent residents on Lot 10323 or 10324. Well sites are located >580m and 1km from the WNP.	1	D	Low (L-24)
	R30	Waste Disposal	Generation and disposal of putrescible and non-hazardous waste Increase in feral animals	1) Waste disposal 2) Tourism, landowner & Public 3) Terrestrial fauna 4) Listed species	Inappropriate disposal of waste material.	Windblown or visible waste. Increased predation on native animals in local area.	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	All well sites, equipment and vehicles will have sealed waste collection bins. Removal of all waste offsite regularly during well activities and at the completion of activities and disposal at appropriately licensed facilities. All putrescible waste will be collected and stored in sealed containers located at designated locations at the drill site and two camps and disposed of offsite at appropriately licensed facilities. Industrial waste will be disposed of in accordance with the regulatory requirements at a licensed site.. Paper, metal, steel and oil will be stored onsite in bins or tanks before being removed from site by a licensed waste removal operator and disposed of at appropriately licensed facilities . Waste skips will be provided and maintained at the sites with a licensed contractor employed to dispose of the waste at appropriately licensed facilities.	1	D	Low (L-24)
	R31	Waste Disposal	Disposal of hydrocarbon wastes (oil, grease, HC contaminated rags etc)	1)Waste disposal 2) Tourism, landowner & public	Inappropriate disposal of waste material.	HC material remains at site and provides source contamination.		1	C	Low (L-22)	All HC material will be disposed of in designated bins and disposed of at an appropriate licensed facility. Contaminated fluids and hydrocarbon liquids will be collected and trucked from the site for disposal by a licensed operator at appropriately licensed facilities.	1	D	Low (L-24)
	R32	Waste Disposal	Management and Disposal of sewage	1) Soil and landforms 2) Groundwater	Inappropriate disposal of waste material.	Release to environment resulting in contamination of local soil and groundwater		1	C	Low (L-22)	Sewage and grey water will be collected in septic tanks at the main camp and an ATU will be utilised at the drill camp.	1	D	Low (L-24)
	R33	Use of resources	Extraction of groundwater	1) Groundwater 2) Tourism, landowner & public	Groundwater extraction required for well activities in in excess of that proposed.	Reduction in groundwater available to surrounding local users.	Ongoing reputational impacts	1	C	Low (L-22)	Groundwater will be obtained from existing licensed bores and new bores in accordance with a GWL. In the event additional abstraction bores are constructed, additional GWL will be obtained. The duration of the well activities and volume of water required will not significantly reduce that locally available to other users.	1	D	Low (L-24)



Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R34	Physical Presence	Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area		1	C	Low (L-22)	<p>Ensure all vehicles and equipment has been cleaned down prior to arrival at site.</p> <p>Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site.</p> <p>All staff will be advised of potential weed species during the induction process and advised to report any incidence of weed establishment.</p> <p>Regular assessment of the well sites area and road for the establishment of noxious weed species and 'Declared Pests' during well activities and following rehabilitation.</p> <p>Eradication of noxious weeds and Declared Pests as required following approved control mechanisms in consultation with Department of Agriculture and Food.</p> <p>Ongoing monitoring and auditing of well areas for two years reducing the risk of weed establishment and spread.</p>	1	D	Low (L-24)
	R35**	Physical presence Fracturing fluids	Spill or loss of containment results in a significant release (> 100L) outside of bunding or affected ground area > 100m <sup>2</sup>	1) Soil and landforms 2) Groundwater 3) Surface water	Malfunction in equipment. Inadequate storage/containment structures.	Contamination of local soil, surface water and groundwater  Reduction in groundwater quality.	Ongoing reputational impacts	3	D	Moderate (M-17)	<p>Storage of all fracture fluids and hydrocarbons in accordance with MSDS or portable drip/collector trays which can contain 110% of the largest container or 25% of the total volume of stored material (whatever is greater) to contain any potential spills.</p> <p>Emergency Response Plan &amp; Oil Spill Contingency Plan in place. Spill kits will be present.</p>	2	E	Low (L-22)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard	Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk			
							Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level	
Flowback	R36**	Fracturing fluids	Fracturing fluids returned to the surface during flowback are released	1) Soil and landforms 2) Groundwater 3) Surface water 4) Tourism, landowner & public 5) Financial loss	Malfunction in equipment.  Inadequate storage/containment structures.  Chemicals in fracing fluids which are returned to the surface during flowback released	Contamination of soil and groundwater. Reduction in groundwater quality.	Ongoing reputation impacts Reduction in ability to farm and land value.	3	D	Moderate (M-17)	Returned fluids separated then directed to lined mud sump.  Routine well control procedures including pressure control (chokes, redundant flowback line, contingency measures).  Verification of equipment integrity required to be provided by the contractor prior to activities commencing.  Contractor to pressure test all equipment prior to the commencement of fracture stimulation operations.  Double isolation barriers on fracture stimulation equipment.  Certified flowback equipment and contractor flowback procedures followed.  The capacity of the turkey's nest and mud sump has been designed with contingency in the event of excess flowback.  All initial flow-back material which returns to surface will be contained in the mud sump. In the unlikely event that the mud sump is unable to absorb the amount of liquid produced during this phase, the flow will be diverted to the turkey nest. Both are lined.  Regular inspections of sump and turkeys nest to ensure adequate freeboard is maintained.  Should any storage areas approach their limit, transfer between each storage area will take place and should this not be possible operations will be suspended until alternate arrangements have been approved.  Oil Spill (also used for chemical) contingency plan developed.  Continuation of groundwater monitoring program. Monitoring bores located downstream of groundwater flow.	2	D	Low (L-21)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R37**	Fracking fluids	Contamination by fracking chemicals	1) Groundwater 2) Tourism, landowner & public 3) Financial loss	Chemicals in fracking fluids move with water from production zone into overlying Parmelia and Yarragadee Formations as a result of loss of well integrity or uncontrolled fracture propagation.	Contamination of deeper groundwater aquifers through fault  Reduction in groundwater quality.	Ongoing reputation impacts	3	D	Moderate (M-17)	Modelling results (Rockwater) indicate that there will be no impact on the upper groundwater flow system.  Continuation of groundwater (Parmelia) monitoring program. Monitoring bores located downstream of groundwater flow.  Well Design in accordance with approved Drilling Programme with several strings of steel casing cemented in place  Real time surface monitoring of anomalous pressure changes during fracture stimulation operations and rapid shutdown of pumping procedure in the event of well integrity breaches.  Routine well control procedures including pressure control (chokes, redundant flowback line, contingency measures).  Verification of equipment integrity required to be provided by the contractor prior to activities commencing.  Contractor to pressure test all equipment prior to the commencement of fracture stimulation operations.  Double isolation barriers on fracture stimulation equipment.  Certified flowback equipment and contractor flowback procedures followed.  Have both remote and manual emergency shut-down valves.  Double barrier philosophy. Have options to release pressurised frac fluid to vent / flare pit.	2	E	Low (L-23)
<b>Production testing</b>														
<b>Mobilisation and Demobilisation</b>	Refer R8-R11													
<b>Well testing and camp</b>	R38	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public 3) Landscape & visual	Operation of vehicles		Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Proposal is located on cleared agricultural land and access to site is via existing designated tracks.  Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.  The contractor will be required to control dust with the use of a water carts.	1	D	Low (L-24)
	R39	Air Emission	Localised generation of air emissions	1) Air quality	Well testing equipment and flaring	GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes.  Equipment such as generators, compressors, blow out preventers and other pressure related facilities will be maintained in good working order. All other equipment and vehicles will be serviced regularly  Pilot light to ensure continuous burning.	1	D	Low (L-22)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R40	Light Emissions	Localised generation of light	1) Tourism, landowner & public 2) Terrestrial fauna 3) Listed Species	Light during well activities (including flaring).	Disturbance of local residents or localised fauna	Disturbance to local landowner.	1	C	Low (L-22)	Well sites are located several kilometres from landowner's permanent residence. No permanent residents on Lot 10323 or 10324. Well sites are located >580m and 1km from the WNP. Residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R41	Noise Emission	Localised generation of noise	1) Noise levels 2) Tourism, landowner & public 3) Terrestrial fauna 4) Listed Species	Noise created during flaring.	Disturbance of localised fauna.	Increase of noise beyond background levels, creating disturbance to landowner and users of national park.	1	C	Low (L-22)	Based on previous Warro wells any gas flow is expected to be low rate (< 2MMSCF/day) so flare noise will be less than encountered on typical conventional gas wells flowing at much higher rates. Well sites are located several kilometres from landowner's permanent residence. No permanent residents on Lot 10323 or 10324. Well sites are located >580m and 1km from the WNP. Noise generated from flaring has been calculated 500m from the well (buffer to WNP) at 51 dbA – this is equivalent to conversational speech at 1m. Carnaby's Cockatoo breeding habitat is located >1km away from well sites. Residents will be kept informed of Latent's activities.	1	D	Low (L-24)
	R42	Waste Disposal	Generation and disposal of putrescible and non-hazardous waste  Increase in feral animals	Waste disposal 2) Tourism, landowner & Public 3) Terrestrial fauna 4) Listed species	Inappropriate disposal of waste material.	Windblown or visible waste.  Increased predation on native animals in local area.	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	All well sites, equipment and vehicles will have sealed waste collection bins. All putrescible waste will be collected and stored in sealed containers located at designated locations at the drill site and two camps and disposed of offsite at appropriately licensed facilities. All mobile equipment will be contained in sealed receptacles for rubbish disposal. Industrial waste will be disposed at appropriately licensed facilities.. Paper, metal, steel and oil will be stored onsite in bins or tanks before being removed from site by a licensed waste removal operator and disposed of at appropriately licensed facilities. Waste skips will be provided and maintained at the sites with a licensed contractor employed to dispose of the waste at appropriately licensed facilities Removal of all waste offsite regularly during well activities and at the completion of activities.	1	D	Low (L-24)
	R43	Waste Disposal	Disposal of hydrocarbon wastes (oil, grease, HC contaminated rags etc)	Waste disposal 2) Tourism, landowner & public	Inappropriate disposal of waste material.	HC material remains at site and provides source of contamination.		1	C	Low (L-22)	All HC material will be disposed of in designated bins and disposed of to a licensed facility.  Contaminated fluids and hydrocarbon liquids will be collected and trucked from the site for disposal by a licensed operator at appropriately licensed facilities.	1	D	Low (L-24)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R44	Waste Disposal	Management and Disposal of sewage	1) Soil and landforms 2) Groundwater	Inappropriate disposal of waste material.	Contamination of local soil and groundwater		1	C	Low (L-22)	Sewage and grey water will be collected in septic tanks at the main camp and an ATU will be utilised at the drill camp.	1	D	Low (L-24)
	R45	Use of resources	Extraction of groundwater	1) Groundwater 2) Tourism, landowner & public	Groundwater extraction required for well activities is in excess of that proposed.	Reduction in groundwater available to surrounding local users.	Ongoing reputational impacts	1	C	Low (L-22)	Groundwater will be obtained from existing licensed bores and new bores in accordance with existing GWL.  In the event additional abstraction bores are constructed, additional GWL will be obtained. The duration of the well activities and volume of water required will not significantly reduce that locally available to other users.	1	D	Low (L-24)
	R46**	Physical presence Drilling fluids	Spill or loss of containment results in a significant release (> 100L) outside of bunding or affected ground area > 100m <sup>2</sup>	1) Soil and landforms 2) Groundwater 3) Surface water	Malfunction in equipment	Contamination of local soil, surface water and groundwater  Reduction in groundwater quality.	Ongoing reputational impacts	3	D	Moderate (M-17)	Storage of all drilling fluids and hydrocarbons in accordance with MSDS or portable drip/collector trays which can contain 110% of the largest container or 25% of the total volume of stored material (whatever is greater) to contain any potential spills..  Emergency Response Plan & Oil Spill Contingency Plan in place. Spill kits will be present.  Mud sump will be lined with 1mm HDPE (10 <sup>-12</sup> cm/s infiltration rate)	2	E	Low (L-22)
	R47**	Muds and cuttings	Overflow of sump/turkeys nest	1) Soil and landforms 2) Groundwater 3) Surface water	Rainfall event resulting in overflow of sump/turkeys nest	Contamination of local soil and groundwater	Ongoing reputational impacts	3	D	Moderate (M-17)	Regular inspections of sump and turkeys nest to ensure adequate freeboard is maintained.  Sump and turkey's nest have been designed to hold excess capacity as contingency to the volume expected to be encountered.  In the unlikely event the sump/turkey's nest at an individual well location reaches near capacity, Latent has identified as a contingency the possibility to transport water to alternate turkey's nests at Warro-4, Warro-5 or Warro-6 (whichever is applicable). This option will require additional prior approval by the DMP. If transfer between each storage area is not possible, operations will be suspended until alternate arrangements have been approved.  Regular inspections of sump and turkeys nest to ensure adequate freeboard is maintained.  Sump is located away from areas of native vegetation.	2	E	Low (L-22)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R48	Physical presence Chemicals Fuel	Minor Spill/leak of hydrocarbons /chemicals (< 100L)	1) Soil and landforms 2) Groundwater 3) Surface water	Diesel, oils and grease in equipment and vehicles.  Diesel, oil and grease spillage during transfers (including refuelling).  Leak from storage drum (44 gallon)	Contamination of local soil and groundwater	Ongoing reputational impacts	1	C	Low (L-22)	Spill kits to be made available. Clean up all spills when they occur. Use absorbent materials under machinery which is likely to leak oil.  All hydrocarbons /chemicals and stored in appropriately bunded areas or on drip trays to contain spills.  Regular maintenance of equipment.  A drip tray will be used during all refuelling operations at the drill site. A spill kit is to be available on the construction refuelling vehicle and the drill site refuelling trailer.  Mobile equipment and vehicles will refuel at a bunded designated refuelling point (adjacent to the main fuel tank) on the drill pad.	1	D	Low (L-24)
	R49	Physical Presence	Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area		1	C	Low (L-22)	Ensure all vehicles and equipment has been cleaned down prior to arrival at site.  Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site.  All staff will be advised of potential weed species during the induction process and advised to report any incidence of weed establishment.  Regular assessment of the well sites area and road for the establishment of noxious weed species and 'Declared Pests' during well activities and following rehabilitation.  Eradication of noxious weeds and Declared Pests as required following approved control mechanisms in consultation with Department of Agriculture and Food.  Ongoing monitoring and auditing of well areas for two years reducing the risk of weed establishment and spread.	1	D	Low (L-24)
<b>Rehabilitation</b>														
Earthworks	R50	Air Emission	Localised generation of dust	1) Air quality 2) Tourism, landowner & public	Removal of infrastructure. Rehabilitation works on well site.	Air pollution (particulates)	Visual impacts (amenity) to landowner and users of national park	1	C	Low (L-22)	Water spray on soil and /or access track as required.  Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.	1	D	Low (L-24)
	R51	Air Emission	Localised generation of air emissions	1) Air quality	Operation of vehicles and equipment	Generation of GHG and other emissions		1	C	Low (L-22)	Use of Vehicles and equipment that is regularly maintained - no visible exhaust fumes.	1	D	Low (L-24)
	R52	Noise Emission	Localised generation of noise	1) Noise levels 2) Tourism, landowner & public 3) Terrestrial fauna 4) Listed Species	Works to rehabilitate well sites	Disturbance of localised fauna	Increase of noise beyond background levels, creating disturbance to landowner and users of national park	1	C	Low (L-22)	Rehabilitation works will be of short duration and be undertaken during the day.  No permanent residents on Lot 10323 and Lot 10324.	1	D	Low (L-24)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard	Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
							Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
	R53	Waste disposal Localised contamination of soil and groundwater	1) Soil and landforms 2) Groundwater	In-situ disposal of drill muds and cuttings.	Reduction in soil viability and groundwater quality.		1	C	Low (L-22)	When the mud sump has dried the liner will be removed and the underlying soil will be sampled to assess the presence of any contaminating materials. If sampling reveals the presence of contaminants, the material will be removed and disposed of offsite at an appropriately licensed facility. If the material is benign the walls will be pushed in and stockpiled soil spread over the disturbed area.	1	D	Low (L-24)
	R54	Physical presence Erosion and loss of surface soils	1) Soil and landforms	Reworking of areas for rehabilitation resulting in wind and water erosion.	Loss of surface soil. Reduction in success of rehabilitation program.		1	C	Low (L-22)	Following removal of all surface infrastructure, the area will reinstated to the natural contour. Install erosion control measures where warranted. Assessment of sites during external audits following completion of well activities for evidence of erosion.	1	D	Low (L-24)
	R55	Physical presence Introduction of weeds/disease	1) National Park 2) Terrestrial flora	Vehicle movement to site from areas of weed/disease	Introduction of noxious weed species or Declared Pests to the area		1	C	Low (L-22)	Ensure all vehicles and equipment has been cleaned down prior to arrival at site. Inspection of all vehicles/equipment coming to site and completion and submission of 'Hygiene Declaration' prior to commencement of journey to site. Eradication of noxious weeds and Declared Pests as required following approved control mechanisms in consultation with Department of Agriculture and Food. Ongoing monitoring and auditing of well areas for two years reducing the risk of weed establishment and spread.	1	D	Low (L-24)
<b>Accidental Event/Emergency</b>													
Fauna incident	R56	Vehicle Accident Vehicle hitting animal (as part of Project)	1) Local fauna 2) Threatened ecological species	During all phases of the project, travel to site	Injury or death to threatened or migratory species		2	D	Low (L-21)	Driving will be managed in accordance with the Latent Driving Policy which prohibits off-road driving and driving at dusk or at night. Staff educated to be alert for wildlife (especially at night). Latent has operation site specific Emergency Response Plan (ERP). Adherence to speed limits as per Latent Driving Policy. Utilisation of shared vehicles and a crew change bus will minimise vehicle movement to and from the sites.	1	D	Low (L-24)
Vehicle accident	R57**	Vehicle Accident Increased risk to public safety (road users)	1) Public Health & Safety	During all phases of the project, travel to site	Accident resulting in property damage, death or injury (attributable to operation)		4	D	High H-12	Adherence to Latent Driving Policy to avoid driving during dusk hours. Latent has a site specific Emergency Response Plan (ERP). Other mitigation / prevention measures include but not limited to (a) fatigue management guideline, (b) Fit for work policy. Adherence to speed limits as per Latent Driving Policy	4	E	High H-16

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
Surface or subsurface loss of containment during hydraulic fracture stimulation	R58*	Drilling fluids Muds and cuttings	Well integrity impacted. Impacts to water bore/groundwater	1) Groundwater	Well not constructed in accordance with design. Fracking impacts integrity of existing water bore	Contamination of local soil and groundwater. Reduction in groundwater quality.	Ongoing reputational impacts Impact on ability to get other licenses to operate	3	D	Moderate (M-17)	Rockwater has undertaken an hydrogeological assessment. Detailed baseline groundwater data has been obtained. Continuation of groundwater monitoring program. Monitoring bores located downstream of groundwater flow. Have both remote and manual emergency shut-down valves. Double barrier philosophy. Have options to release pressurised frac fluid to vent / flare pit. Well Design in accordance with approved Drilling Programme with several strings of steel casing cemented in place Continuous well pressure monitoring during operation to enable shut down in event of well integrity breach.	2	E	Low (L-23)
Surface loss of containment (drilling fluids, diesel, water)	R59**	Physical presence Drilling fluids Muds and cuttings	Spill or loss of containment results in a significant release (> 100L) outside of bunding or affected ground area > 100m <sup>2</sup>	1) Soil and landforms 2) Groundwater 3) Surface water	Rainfall event resulting in overflow of sump/pit Malfunction in equipment Poor management of bulk diesel storage Rupture of tanks Burst hose during transfer of fluids/chemicals Human error	Contamination of local soil and groundwater	Ongoing reputational impacts Impact on ability to get other licenses to operate	3	D	Moderate (M-17)	Lined mud sump. Storage of all drilling fluids, chemicals and hydrocarbons in suitably bunded areas in accordance with MSDS. ERP & Oil Spill Contingency Plan in place. Spill kits will be located onsite for post incident control, containment & fast clean up. In the unlikely event the sump/turkey's nest at an individual well location reaches near capacity, Latent has identified as a contingency the possibility to transport water to alternate turkey's nests at Warro-4, Warro-5 or Warro-6 (whichever is applicable). This option will require additional prior approval. If transfer between each storage area is not possible, operations will be suspended until alternate arrangements have been approved. Any fluids produced during well testing will be processed through a three-phase separator with water based fluids directed to the turkey nest. Whilst the experience of previous wells suggests it is highly unlikely, any hydrocarbon fluids that are produced will be collected in tanks. These tanks will be either approved road tankers or bunded tanks on the well pad. It is anticipated there will be little carryover of liquid to flare.	2	E	Low (L-23)
Emergency venting/flaring	R60	Air Noise	Release of hydrocarbons to atmosphere during drilling and/ or well testing	1) Air Quality 2) Tourism, landowner & public 3) Visual	Over pressure of formation during drilling requiring flaring or venting of gas	Localised air quality impacts and emissions of GHG	Increase of noise and light beyond Background levels, creating disturbance to landowner and users of national park	2	C	Moderate (M-18)	Venting and flaring of hydrocarbons only during an emergency while drilling is in progress or during the initial frac fluid flowback period.	2	E	Low (L-23)



Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard	Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
							Consequence Likelihood of Consequence	Inherent Risk Level	Consequence		Likelihood of Consequence	Residual Risk Level	
Bushfire	R61**	Uncontrolled fire due to on-site activities during summer months	1) National Park 2) Terrestrial flora 3) Terrestrial fauna 4) Listed species 5) Tourism, landowner & public 6) Financial loss 7) Public health & safety	Ignition source during project	Uncontrolled fire in national park and farm land resulting in widespread ecological damage	Loss of property  Ongoing reputational impacts  Impact on ability to get other licenses to operate	4	D	High (H-12)	Local authorities' restrictions on activities during severe fire hazard days will be observed.  Practical fire training will be implemented for selected staff and contractors as appropriate.  Fire extinguishers on all vehicles and at gas well sites.  Designated primary and secondary escape routes and muster points.  A fast attack vehicle containing a light water tanker (550 L) and pump will be available on-site (particularly during flaring).  Flare pit lined with non-flammable material and be free of organic material at a minimum distance of 45m from nearest structure.  Emergency Response Plan details procedures in the event of a fire.  Liaison with DFES.  Gas detectors installed.	4	E	High (H-16)
Non-controlled access to site (Third Party and Fauna)	R62	Muds and Cuttings Local fauna and livestock entering sump	1) Tourism & landowner 2) Terrestrial fauna 3) Listed species 4) Financial loss	Use of sump by fauna	Death of fauna and or threatened or migratory species	Death of livestock and resultant financial impact to landowner	2	C	Moderate (M-18)	Freehold land is fenced off.  Turkeys nest, mud sump and flare pit will be fenced.  Multiple egress points will be installed using a mixture of egress matting, wood or rope for fauna in each of the turkey nest and mud sump, and one each in the cellar and checkshot pit.	1	D	Low (L-24)
	R63**	Muds and Cuttings Person entering mud pits	1) Public health & safety	Use of mud pits.		Death or injury of individual.	4	D	High (H-12)	Entry to site restricted to approved personnel only. Fencing will be installed along the access roads and around the site perimeter .  Gates will be put in place to avoid trespass and also ensure safe containment of all areas.  Signage will be installed restricting entry to the site to Project personnel only.  Mud sump, turkeys nest fenced off.  Multiple egress points will be installed using a mixture of egress matting, wood or rope in turkey's nest and mud sump.	4	E	High (H-16)

Activity (Source of risk)	Ref & prelim risk	Aspect/Hazard		Receptor	Cause	Potential Environment Impact/ Consequence	Potential Reputation Impact/ Consequence	Inherent Risk			Control to be implemented	Residual Risk		
								Consequence	Likelihood of Consequence	Inherent Risk Level		Consequence	Likelihood of Consequence	Residual Risk Level
Well Blowout	R64**	Physical Presence Air Noise Light Waste disposal Socioeconomic	Well blow out, including fire and collapse of soil around drilling pad	1) Air quality 2) Noise 3) Light 4) Soil and landforms 5) Groundwater 6) National Park 7) Terrestrial flora 8) Terrestrial fauna 9) Listed species 10) Fire 11) Tourism, landowner & public 12) Landscape & visual 13) Financial loss 14) Public utilities and services	Safety measures fail.	Contamination of local environment, and impacts to flora and fauna  Air, noise and light emissions  Fire risk for private land and National Park	Ongoing reputational impacts  Impact on ability to get other licenses to operate	3	D	High (H-16)	Use Blow Out Preventer, double barriers philosophy  Engineer onsite to monitor cuttings & returns & detect early sign of a gas kick or lost circulation to thief zone.  Known reservoir pressure that follows a normal pressure gradient & control well with appropriate drilling fluid mud weight for overbalance drilling.  Drilling Contractor well control procedures and rig crew training  Well control drills.	2	E	Low (L-23)
Fracturing activities resulting in localised seismic event	R65**	Physical Presence Socioeconomic	Increase in frequency of seismic activity.	1) Financial loss 2) Public utilities and services	Fracking activities		Damage to property and disruption to public utilities and services.	3	D	Moderate (M-17)	Baseline seismic work has commenced by Latent to provide data on the natural seismicity of the area. Seismic stations will be monitored continuously and operations stopped if earthquake activity associated with the Warro structure is recorded.	2	E	Low (L-23)

\*\* Identifies a Reportable incident

## **6 MANAGEMENT CONTROL**

### **6.1 OVERVIEW**

The following sections outlines the environment management measures and implementation strategies to ensure the risks identified during the risk assessment are managed to As Low As Reasonably Practicable (ALARP).

### **6.2 SOILS AND LANDFORM**

Prior to pad construction activities commencing, the well sites will be marked out to ensure only the required area is disturbed.

All surface soil will be collected and stockpiled at locations that minimise erosion from rainfall and wind.

All work will be limited to the well sites and extra work/turn around areas will be clearly marked.

Following rehabilitation, remedial action will be undertaken at sites showing signs of erosion, which do not show recovery after seasonal rains. Site specific erosion control measures will be implemented at sites showing evidence of erosion. These may include contour banks, drainage diversion and earthworks.

Soil samples will be collected prior to commencement of drilling operations from selected areas around the site.

Once the activities have ceased and during rehabilitation of the site, the specified areas will be resampled to characterise the soil condition post operations.

Environmental management measures to protect groundwater detailed in Section 6.3, will also reduce the potential impact on soils to ALARP.

### **6.3 GROUNDWATER**

Water required for drilling will be sourced from the new water bore to be constructed at each well. A water licence to construct water bores has been obtained from the DoW. The existing Licence to Extract Water (GWL 172000(3)) will be extended to cover the new bore located on Lot 10324 after approval of this document. Water abstraction rates will be recorded during the project. Extracted groundwater will be monitored as required by the DoW licence.

Low toxicity, water-based drilling fluids will be used during drilling. Drilling will be undertaken with a new rig which will be inspected prior to ensure it has efficient solids control equipment and that all pumps and collections systems are operating efficiently and are free of leaks.

Any fluids produced during well testing will be processed through a three-phase separator with water based fluids directed to the turkey nest. Whilst the experience of previous wells suggests it is highly unlikely, any hydrocarbon fluids that are produced will be collected in tanks. These tanks will be either approved road tankers or bunded tanks on the well pad. It is anticipated there will be little carryover of liquid to flare.

The well shall be drilled with a closed drilling fluid system so that all drilling fluids returned from the well are directed through the pits and recycled again.

All drill cuttings and water generated will be contained within a lined mud sump.

All chemicals and other substances to be used down hole during the work activities are disclosed in accordance with Regulation 15(9) of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 (WA) and Chemical Disclosure Guideline.

All Drilling and fracture fluids will be stored in bunded facilities in accordance with the MSDS. Bunding will be 110% of the largest container or 25% of the total volume of stored material (whatever is greater).

Hydrocarbons will be stored as per AS1940:2004.

Corrosive products (Class 8 Dangerous Goods) will be stored as per AS3780.

The Storage and Handling of Mixed Classes of Dangerous Goods DGs), in Packages and Intermediate Bulk Containers (IBCs).in accordance with AS3833.

Spill kits will be available at well site and on vehicles.

Storage of waste in sealed containers. Wastes will be collected and disposed of offsite to an appropriately licensed facility.

Mobile equipment and vehicles will refuel at a bunded designated refuelling point (adjacent to the main fuel tank) on the drill pad. A drip tray will be used during all refuelling operations at the drill site. A spill kit is to be available on the construction refuelling vehicle and the drill site re-fuelling trailer.

Latent will undertake water bore monitoring within the vicinity of the Warro drilling sites to monitor the potential impacts to groundwater quality resulting from the Warro drilling and fracturing operations.

During well testing the initial flowback will be directed into the lined sump. When testing shows that formation water is being encountered, it will be directed into the turkeys nest. Both the sump and turkey's nest have been designed with excess capacity above the volume expected to be encountered. In the unlikely event the sump/turkey's nest at an individual well location reaches near capacity, Latent has identified as a contingency the possibility to transport water to alternate turkey's nests at Warro-4, Warro-5 or Warro-6 (whichever is applicable). This option will require additional prior approval by the DMP. If transfer between each storage area is not possible, operations will be suspended until alternate arrangements have been approved. This is only likely to occur during extended well testing operations

Once the water bores at each well are in place, the water from each bore will be tested for water quality and flow capacity. As other bores in the area provide water of potable quality, it is expected that this will be the case for the new boreholes. If it is not adequate, fresh water for human consumption will be trucked to site.

## **6.4 SURFACE WATER**

The environmental management measures and implementation strategy outlined in Section 6.3 'Groundwater' also apply directly to surface water to ensure the potential risks are ALARP.

Installation of a drainage trench at Warro-5 on the northern side of the access road and site to prevent erosion from surface water flow from the north.

## **6.5 VEGETATION**

### **6.5.1 Vegetation & Flora**

Clearly mark out well site prior to site preparation.

Site induction will advise staff of the high biodiversity of the surrounding vegetation and the occurrence of Priority flora in the region.

### **6.5.2 Weed/Disease**

Vehicles and equipment will be arriving from the contractor's yard, or, from sites known to be free of weeds and dieback.

All vehicles and equipment will be clean at the point of origin prior to travelling to site. A Hygiene Declaration will be required by the Wellsite Manager prior to the commencement of a journey to site to ensure this requirement is fulfilled.

Neither well location has any noxious or declared weed infestations. Latent will continue to work with the property owner and adhere to its Environmental Plan requirements to ensure this remains the case.

All fill will be sourced from existing borrow pits on site. As no evidence of dieback or Declared Pests (weeds) have been recorded at the Project the fill will not contain either of these. Given the project's location on agricultural land it is expected that non-native species (i.e. pasture species) will be present.

Latent recognises that disturbed areas are highly susceptible to new weed invasion, and as such, will implement the following management measures:

- Liaison with the property owner.
- Restriction of vehicular access to designated tracks.
- Ensure vehicles and equipment that access the project site are free from soil and vegetation prior to arrival.
- Eradication of declared Pests where necessary following approved control mechanisms in consultation with Department of Agriculture and Food.
- All staff will be advised of potential weed species during the induction process and advised to report any incidence of weed establishment.
- Regular monitoring/maintenance of the well sites area and road for the establishment of weed species during well activities.

## **6.6 FAUNA**

The environmental management measures outlined in Section 6.5.1 for vegetation and flora will also reduce the potential impact to fauna.

The sump, turkey's nest, checkshot pit and flare pit will all be fenced to prevent large native animals and stock from entering these areas.

Multiple egress points will be installed using a mixture of egress matting, wood or rope for fauna in each of the turkey nest and mud sump, and one each in the cellar and checkshot pit.

Speed limits will be enforced at the project site in accordance with the Latent Driving Policy (10 km/h).

All putrescible waste will be collected and stored in sealed containers located at designated locations at the drill site and two camps and disposed of offsite at appropriately licensed facilities. All mobile equipment will contain sealed receptacles for rubbish disposal.

## 6.7 FIRE

Drilling and testing of the gas wells will be carried out in areas clear of vegetation.

The drilling, stimulation and flow testing contractors each have their own Safety Management System and Latent have developed Bridging documents to these for each phase of the well activities.

The site and access roads will be sheeted with gravel material, with no vehicles required or authorised to leave these sheeted areas.

The rig has fire extinguishers installed and maintained at specified locations around the Site.

The following preventative actions will be undertaken to minimise the risk of fire:

- Personnel will be informed of burning restrictions, fire prevention, fire-fighting equipment and procedures.
- Local authorities' restrictions on activities during severe fire hazard days will be observed
- Flammable material will be cleared from the main camp and working area of the well sites.
- Welding and grinding guards will be installed where appropriate.
- Fire extinguishers will be provided in vehicles, at drill sites and strategic locations.
- A fast attack vehicle containing a light water tank (550 L) and pump will be available on-site.
- Appropriately trained staff will be present on site at all times to operate the portable fire-fighting equipment.
- A buffer distance will be implemented between welding/grinding activities and combustible materials.
- Emergency contact numbers will be available at the rig site office.
- Maintain good housekeeping practices within and around the sites, ensuring that all combustible rubbish is disposed of appropriately;
- Prior to any machinery maintenance, the immediate area will be cleared of flammable materials;
- No smoking allowed on Site apart from in designated smoking areas; and
- No smoking allowed when walking on the access roads between the camp and rig sites.

The flare pit will be lined with non-flammable material and be free of organic material. The flare will be located a minimum of 45m away from the wellhead by regulation and a minimum of 45m away from vegetation. Any existing grasses or crops surrounding will be cleared in consultation with the landowner at an adequate distance to be discussed with DFES. The fast attack fire vehicle (550L tank) will be present during any flaring operations.

All adjoining landowners will be notified twenty-four hours prior to commencement of flaring. DFES, the Shire and relevant parties will be notified prior to commencement of flaring.

The period of during which flaring will occur for Warro-5 and Warro-6 will depend on the timing of the drilling and fracture stimulation work but is estimated to be from Q3 2015 through to the end of Q1 2016 which is predominantly through the seasons of Winter, Spring and Summer. Exemptions will be sought and granted through DFES for the period of the flaring under the *Bush Fires Act 1954*. Latent will comply with the requirements of the Shire of Dandaragan and Department of Fire and Emergency Services (DFES).

The flare pit bund will be built up to 2m above the surrounding ground and compacted to prevent erosion of the bund due to fast moving gas and unseparated liquids.

The Emergency Response Plan will detail the procedures to be followed in the event of a fire.

## **6.8 NOISE**

All drilling operations will comply with the noise regulations under the Environmental Protection Act (Noise) Regulations 1997.

The rigsite mini-camp will be arranged to reduce the noise impact from the drilling.

Generators and other equipment (air conditioners, pumps, vehicles etc.) in use on the site will be fitted with appropriate noise reduction measures. These measures will include mufflers on internal combustion engines, sound absorbing insulation on noisy equipment, sound barriers around noisy equipment and limiting vehicle movements around the site where practicable.

Latent have been liaising with the relevant landowners and informed them of the proposed works. This liaison will be ongoing.

## **6.9 AIR EMISSIONS**

The majority of vehicle and equipment movement will be undertaken on cleared farmland.

The contractor will be required to control dust with the use of a water carts. The water will be sourced from the bores on each site.

Problem "bulldust" areas on the well sites will be stripped and windrowed at the edge of each well and the gravel sub-base watered to provide a firm base. Rehabilitation will include the respreading of stockpiled material.

Speed restrictions will be enforced in the work area to reduce the occurrence of dust and the road upgraded as required.

Equipment such as generators, compressors, blow out preventers and other pressure related facilities will be maintained in good working order. All other equipment and vehicles will be serviced regularly.

A hydrocarbon gas detection system will be provided for all areas where major gas leakage and/ or gas accumulation may occur. Complete coverage will be provided for the areas experiencing the highest statistical frequency of gas leaks. Detection of gas will cause an alarm only.

Gas detection will be monitored at all times by mudloggers during drilling activities.

The rig will have hydrogen sulphide sensors which, when triggered, will sound a loud audible alarm. An emergency response procedure has been developed in the event of any gas emission.

## **6.10 LIGHT EMISSIONS**

Security and safety lighting will be directed inwards to the well site and light levels at the perimeter of the well site are expected to be very low (ambient levels).

Lighting intensity from flare will attenuate over a short distance at ground level and will only be visible in the sky vision.

Local residents will be kept informed of Latent's activities.

## 6.11 HERITAGE

Personnel restricted to project area only.

Induction will include a section on the importance of protecting heritage values and the location of the Aboriginal artefact and personnel will be instructed to remain clear of this area.

The cultural impact presentation will be printed (hard copy) and provided in the “Smoko” room on site.

## 6.12 SEISMIC DISTURBANCES

Latent has installed a seismometer near Warro-3 and this will continue to be used to monitor natural earthquake events. Latent is also working with seismic contractors to develop a means to use surface and shallow (~100m below surface) geophones to provide additional data on natural earthquakes and also events associated with fracture stimulation. This work is at an early stage but it is hoped that it will have progressed to a stage where experimental work can be carried out during the Warro-5 and -6 project.

## 6.13 REHABILITATION

All infrastructure and rubbish will be removed from the site on completion of that phase of the program i.e. drilling, fracture stimulation, or extended well test.

Following completion of well test activities a decision will be made on keeping the well for future activities or if it will be plugged and abandoned.

Where it will not be used it will be plugged and abandoned, marked and fenced in accordance with the *Schedule of Onshore Petroleum Exploration and Production Requirements – 1991*. The cellar will be removed and backfilled. An abandonment plaque will be posted in accordance with the *Schedule of Onshore Petroleum Exploration and Production Requirements - 1991*.

The water within the mud sump (and turkey’s nest) will be allowed to evaporate and then soil testing will be undertaken of the material in the mud sump and flare pit to determine an appropriate method of disposal for the retained material.

If the soils analyses reveal the material is contaminated, the material at the base of the mud sump and flare pit will be removed from site to an appropriate licensed facility for treatment or disposal in accordance with the Landfill Waste Classification and Waste Definitions 1996 (as amended) (DEC 2009).

The liner will then be removed from the mud sump, flare pit and turkey’s nest and sampling of the soil underneath the liner will be undertaken (as per above). If the material is revealed to be potentially contaminated, further assessment will be undertaken to define the extent of the contamination.

In all cases, validation soil sampling will be undertaken to ensure all material is excavated, or, that material remaining in situ contains no residual contaminants at levels exceeding the adopted guidelines. Dependent upon the results one or more of the following actions would be undertaken:

- Excavation of the mud sump in part or whole, removing contaminated material for disposal within a licensed landfill facility in accordance with the Landfill Waste Classification and Waste Definitions 1996 (as amended) (DEC 2009),
- Uncontaminated cuttings remain on site and are turned into the ground during rehabilitation of the excavations.



- Validation soil sampling by a third party to ensure all material is excavated and no residual contaminants remain above the adopted guidelines.

Once the activities have ceased and prior to rehabilitation of the site, the specified areas (refuelling areas, chemical/ hydrocarbon storage areas, turkey's nest and well pad) will be resampled to characterise the soil condition post operations. Any contaminated material identified will be removed in the same manner as described for the mud sump and flare pit.

Once the well is abandoned, and with removal of any identified contaminated material, all excavations (turkey's nest, mud sump, flare pit, checkshot pit) will be backfilled and reshaped and the entire well site will be recontoured and road gravel and sheeting materials at the drill pad will be removed.

In summary, the rehabilitation works will involve:

- Removal of all infrastructure, related equipment and waste from site
- Gravel/marl sheeting material removed
- Water within the mud sump and turkey's nest will be allowed to dry out.
- Sampling of material contained within the mud sump and flare pit to determine suitable disposal method as described above
- Removal of liners from the mud sump, turkey's nest, flare pit and checkshot pit or chemical/hydrocarbon storage area and disposal at suitably licensed waste facility
- Excavations pushed in and reshaped (pending results of soil sampling as described above)
- Disturbed areas at the well sites will be ripped to reduce compaction and recontoured to match the surrounding landform
- Any stockpiled subsoil and then topsoil will be respread over the area
- Erected fencing removed
- Warning signs will be erected at the site entrance from Coalara Road.

In the land Access Agreement with the Land Holder, Latent has agreed that when developing and implementing the Rehabilitation Plan, Latent will consult with the Land Holder about the rehabilitation program to be incorporated in the Rehabilitation Plan. For example, Latent will consult with the Land Holder to determine whether the Land Holder desires to make use of any improvements placed on the Land (eg. access tracks, fences) and if the Land Holder gives notice in writing of its desire to make use of any such improvement Latent will seek DMP approvals for such improvements to remain.

Well site rehabilitation is not complete until the completion criteria stated within the site specific Rehabilitation Plan are achieved and the site is handed back to the landowner.

- Remediation of the site will be in accordance with a site Rehabilitation Plan. The Rehabilitation Plan will further outline the specific completion criteria for the site based on regulatory requirements and the landowner agreement.
- A Rehabilitation Plan will be submitted within six months of completion of activities on the well and once it is decided that the well is to be abandoned and an appropriate Well Management Plan has been approved by the DMP
- Site rehabilitation progress will be monitored until the completion criteria are achieved.

## **7 IMPLEMENTATION STRATEGY**

### **7.1 SYSTEMS, PRACTICES AND PROCEDURES**

Section 6 outlined the Management Controls to be implemented to ensure the Project has no adverse impact to the environment.

The following Latent environmental procedures have been developed and will continue to be implemented during all activities:

- Environmental Procedure 1.0 – Surface Disturbance
- Environmental Procedure 2.0 – Vegetation Management
- Environmental Procedure 3.0 – Weed Management
- Environmental Procedure 4.0 – Fire Management
- Environmental Procedure 5.0 – Water Management
- Environmental Procedure 6.0 – Waste Management
- Environmental Procedure 7.0 – Chemical & Hydrocarbon Management
- Environmental Procedure 8.0 – Environmental Incident Reporting
- Environmental Procedure 9.0 – Statutory Reporting
- Environmental Procedure 10.0 – Drill Rig Decommissioning and Site Rehabilitation
- Environmental Procedure 11.0 – Auditing
- Environmental Procedure 12.0 – Environmental Induction and Awareness
- Environmental Procedure 13.0 – Monitoring.
- Environmental Procedure 14.0 – Verification of Work Completed.

### **7.2 ROLES AND RESPONSIBILITIES OF PERSONNEL**

Latent, as the license holder, has overall responsibility for the execution of all activities and Well Operations as approved by the DMP.

During each different phase of the project the Lead Contractor on site will vary. For drilling it will be the Drilling Rig contractor, for fracture stimulation and flowback it will be the HFS contractor, and for extended well test it will be the Well Test contractor.

Latent will develop and submit to the DMP for approval a Safety Management System Bridging document that demonstrates that the HSE Management Systems of Latent and the Lead Contractor are comprehensive and enable activities to be managed to ALARP, and to identify which is applicable in cases of actual or potential overlap.

### **7.3 TRAINING AND COMPETENCIES**

Latent ensure their personnel have appropriate qualifications, competencies and training during the recruitment process. Records of qualifications, competencies and training are maintained in personnel files.

Latent ensure that contractor personnel involved in their operations have appropriate qualifications, competencies and training when reviewing tenders to award contracts.

All personnel involved in this Project are appropriately trained and hold the relevant certification for their role. In addition and where required, job specific training is conducted prior to the commencement of the work activities.

### **7.3.1 Qualifications, Certifications & Licensing**

Latent and their contractors shall comply with the training requirements described within their own management systems. In addition, the following certification or licensing is required as a minimum by Latent:

- vehicle drivers' license requirements in accordance with Western Australian Law;
- crane and forklift operators, riggers and doggers to be suitably certified; and
- Latent's Operations Superintendent and Wellsite Manager, and the relevant Lead Contractor key personnel (Rig Manager, Driller, Assistant Driller, Well Test Supervisor) are to hold current Well Control Certificates.

### **7.3.2 General Safety Training**

Prior to arrival, personnel working at the Well Site are required to have undergone training or induction in the following Latent or contractor-specific systems, as is relevant to their specific role:

- Hazard Identification
- Permit to Work
- First Aid
- Fire Fighting
- Emergency & Spill Response
- Working at Height
- Gas Detection
- Confined Space Entry
- Well Control / Pressure Control Equipment

### **7.3.3 Training Records**

Latent and their contractors will maintain systems which record all personnel inductions and training competencies to demonstrate relevant HSE competencies, including those required by legislation.

Training records shall be available for review by Latent and regulatory bodies.

### **7.3.4 Inductions**

All of the workforce, both staff and contractors, will be given comprehensive safety, occupational health, fire education and environmental inductions prior to commencing well construction, stimulation and flow testing with records of the inductions maintained.

The induction will include, but is not limited to, the following:

- The need for preserving the local environment.
- The preservation of remnant native vegetation will be included in the planning of activities such as movement of earth moving machinery, fire prevention and the control and handling of saline water.
- Restriction of all access to the approved project area.

- The need to be alert for the presence of native fauna on the roads, particularly at night.
- To prevent weed and soil pathogen spread, completion of the Hygiene Declaration forms prior to vehicles or equipment being allowed to enter the site.
- Cultural heritage management.
- Bushfire management.
- Traffic and access.
- Noise.
- Chemical storage and handling.
- Emergency and Spill response.
- Waste management.
- Protecting the amenity of landowners.
- Management systems.
- Reporting requirements.
- Commitments of this EP.

A notice board will be established to inform personnel of relevant environmental information. The notice boards will be refreshed periodically with up to date information, as it becomes available.

Communications of environmental issues requiring action will be made through:

- Daily Prestart meetings;
- Weekly Toolbox meetings;
- Audit report findings and actions;
- Observations recorded during the daily inspection;
- Weekly HSE Inspections.

These daily safety meetings and regular tool box meetings will be held to provide information briefs and encourage employee feedback.

#### **7.4 MONITORING, AUDITING, MANAGEMENT OF NON-CONFORMANCE AND REVIEW**

Environmental performance is measured against the objectives and commitments set out in this EP. The monitoring program reflects these objectives and commitments, describing the information necessary to produce systematic, comprehensive and informative reports on environmental performance.

Performance assessments are based on the monitoring program data and provide the basis for information to the public, technical environmental reports to regulators, and feedback for review of environmental management plans.

With the progressive change from regulatory inspections towards self-management and independent auditing, emphasis will be placed on internal review at Latent. This internal environmental performance evaluation will be based on the results of inspections and monitoring programs.

During operations, Latent has full time representation at the well site – the Latent Wellsite Manager. This person is required to monitor all activities and ensure they are carried out in conformance with all the various operational plans and approvals. Latent receives daily reports from the various Lead Contractors as well as the Latent Wellsite Manager. These reports outline all operational events and any environmental or safety issues. They are provided each morning for discussion at a daily morning meeting which the operator

chairs. In addition, there is a verbal update provided each afternoon. Any significant incidents are reported immediately to be acted upon.

The objective is to self-manage the operations and be pro-active and open in presenting the performance in environmental management. This will be enhanced by the use of external (independent) environmental audits.

#### **7.4.1 External Auditing and Checking**

Environmental audits will be conducted by independent qualified consultants. The audits are utilised to monitor compliance of operations with the commitments in this EP, with Company policies, to assess impact predictions and the effectiveness of the environmental management program.

It is anticipated that external audits will be undertaken:

- Once during drilling activities of each well
- Completion of rehabilitation of the sites.

The Project Manager will co-ordinate the preparation of terms of reference for such audits, and liaises with relevant consultants and staff to facilitate the conduct of such audits.

#### **7.4.2 Internal Auditing and Checking**

The Wellsite Manager or his delegate will inspect the site on a daily basis.

Weekly inspections will be carried out of the well and camp that will encompass both environmental and safety elements. The Wellsite Manager reports all operational, technical and environmental issues to the Operations Superintendent. The Latent Operations Superintendent is responsible for reporting all operational, technical and environmental issues to Latent management through daily reporting formats. Latent management will review the daily reports and identify, in conjunction with site personnel, any issues where further action is required.

An incident reporting system will be used as a means of identifying and rectifying existing or potential environmental (and safety) issues.

Checks to be undertaken by the Wellsite Manager will include:

- Maintenance of fencing around the well sites.
- Limiting vehicle speeds.
- Dust – use of water carts as required.
- Ensuring all vehicles and machinery are serviced regularly and in good working order.
- Ensuring all vehicles park in designated areas.
- Maintain regular waste collection services.
- Ensure hazardous materials and hydrocarbons are being stored and disposed of appropriately.
- Ensure spill kits are available at designated locations and that they are complete.
- Inspection of site to ensure no windblown litter.
- Inspection of site to ensure no noxious weed or 'Declared Pest' establishment in areas disturbed by the operation.

The Operations Superintendent and Wellsite Manager prepare the content of awareness information briefs for supervisors to present to the work force at weekly "tool box" meetings. When necessary, the Wellsite Manager will attend toolbox and safety meetings to present

specific or important information briefs in person and encourage feedback. Information briefs on specific issues will also be pinned to bulletin boards and / or circulated around the site.

Latent has developed a 'Well Handover Certificate' which will be completed by the Wellsite Manager when the drilling department has completed its function and hands the well to the Latent team responsible for the next phase of activities (eg. fracture stimulation and flowback, well test, well intervention, well production) personnel. The certificate will confirm that all material and equipment has been removed.

A minimum of one internal environmental review will be undertaken during the activities by Latent Petroleum staff to review and ensure compliance with the commitments outlined in this EP.

### 7.4.3 DMP Audits

DMP may undertake audits to ensure all the commitments made in this EP are in compliance.

### 7.4.4 Monitoring

Monitoring is summarised below. Monitoring with regard to natural seismic and soils gases was summarised in Section 4.4. Further detail can be sought from the approved EP for these activities (EARS ID 47974).

All monitoring records will be kept in the site office (refer to Section 7.6).

#### 7.4.4.1 Groundwater

Groundwater sampling and analyses will be undertaken in accordance with the criteria and methodology outlined in the Latent Water and Sampling Process.

Groundwater monitoring will be undertaken at the following bores (Figure 9):

- Monitoring bores to be located immediately southeast of the well sites, down gradient of the subsurface flow – one at each well (Warro-5 bore, Warro-6 bore) Table 10 and Figure 7).
- Three existing bores (Ranger Bore, Raffan Bore, Warro-3 bore) – sampling commenced in 2009.
- Seven local bores located north, south and west of the proposed well sites – determine any changes in the local groundwater – sampling commenced July 2014. This number includes the newly constructed Holmes bore located on Lot 10324.

Baseline samples will be collected from the Warro-5 and Warro-6 bores prior to the commencement of drilling.

The frequency of groundwater sampling to be undertaken is summarised in Table 10. Groundwater sampling will continue for a minimum period of two years following completion of extended well testing.

The following Table 10 indicates the distance of the Warro-5 and Warro-6 wells from each monitoring borehole.

Table 10 – Water Bore Monitoring Frequency and distance from Warro-5 and Warro-6

	Distance from Warro-5	Distance from Warro-6	Frequency of Monitoring
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<b>Onsite Water Bores</b>			
Warro-5 bore	~100m SE from centre of pad	3.05km	Monthly during operations, 6-monthly thereafter
Warro-6 Bore	2.84km	~100m SE from centre of pad	Monthly during operations, 6-monthly thereafter
Warro-3	3.3km	1.5km	Monthly during operations, 6-monthly thereafter
Raffan Bore	3.4km	0.86km	6-monthly (Jan & July)
Holmes Bore	0.66km	3.5km	6-monthly (Jan & July)
<b>Regional Water Bores</b>			
Ranger Bore <sup>1</sup>	2.2 km	1.4km	6-monthly (Jan & July)
Peacock Bore	4.95km	4.3km	Annually
Klassen Bore	8.56km	8.13km	Annually
McDonald Bore	10.5km	8.1km	Annually
Sendemdowns	5.9km	8.8km	Annually
Hallswood Park Bore	4.15km	7 km	Annually
Morobin Bore	7.6km	10.4km	Annually

Table 11 lists the analytes to be measured in groundwater for which the Chem Centre has confirmed are suitable (Table 11).

Latent has stored frozen water sample from the three existing bores (Ranger Bore, Raffan Bore, Warro-3 bore) in close proximity and will add sample from the new bores to this set of samples. These samples will be held for at least five years at Chem Centre in a controlled environment for future analysis and comparison purposes.

Groundwater abstraction rates will be recorded during the project and will be monitored as required by the DoW licence.

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<sup>1</sup> The Ranger Bore falls within the same monitoring frequency as the On Site bores due to its proximity to the project.

Table 11 – Analytes assessed in groundwater by Latent

Analyte	Method Code	Limit of Reporting	Unit
Alkalinity, total	iALK1WATI	1	mg/L
Aluminium	iMET1WCICP	0.005	mg/L
Arsenic	iMET1WCMS	0.001	mg/L
Barium	iMET1WCICP	0.002	mg/L
Bicarbonate	iALK1WATI	1	mg/L
Boron	iMET1WCICP	0.02	mg/L
Cadmium	iMET1WCMS	0.0001	mg/L
Calcium	iMET1WCICP	0.1	mg/L
Carbonate	iALK1WATI	1	mg/L
Chloride	iCO1WCDA	1	mg/L
Chromium	iMET1WCICP	0.001	mg/L
Cobalt	iMET1WCICP	0.005	mg/L
Copper	iMET1WCICP	0.002	mg/L
Electrical Conductivity	iEC1WZSE	0.2	mS/m
Hardness, total	iHTOT2WACA	1	mg/L
Iron	iMET1WCICP	0.005	mg/L
Lead	iMET1WCMS	0.0001	mg/L
Magnesium	iMET1WCICP	0.1	mg/L
Manganese	iMET1WCICP	0.001	mg/L
Molybdenum	iMET1WCMS	0.001	mg/L
Nickel	iMET1WCMS	0.001	mg/L
Nitrate	iNTA1WFIA	0.05	mg/L
pH	iPH1WASE	0.1	
Potassium	iMET1WCICP	0.1	mg/L
Sodium	iMET1WCICP	0.1	mg/L
Sulphate (from S)	iMET1WCICP	0.1	mg/L
TDS (calculated)	iSOL1WDCA	5	mg/L
Vanadium	iMET1WCICP	0.005	mg/L
Zinc	iMET1WCICP	0.005	mg/L
Methane	ORG513D	0.01	mg/L
TRH >C10-C16	ORG007W	50	µg/L
TRH >C16-C34	ORG007W	100	µg/L
TRH >C34-C40	ORG007W	100	µg/L
TRH C6-C10	ORG007WLiq	25	µg/L
Total TRHs	ORG007WLiqC	275	µg/L
Acenaphthene	ORG100W	1	µg/L
Acenaphthylene	ORG100W	1	µg/L
Anthracene	ORG100W	1	µg/L
Benz(a)anthracene	ORG100W	1	µg/L
Benzo(a)pyrene	ORG100W	1	µg/L
Benzo(b)fluoranthene	ORG100W	1	µg/L
Benzo(g,h,i)perylene	ORG100W	1	µg/L
Benzo(k)fluoranthene	ORG100W	1	µg/L
Chrysene	ORG100W	1	µg/L
Dibenzo(a,h)anthracene	ORG100W	1	µg/L
Fluoranthene	ORG100W	1	µg/L
Fluorene	ORG100W	1	µg/L
Indeno(1,2,3-cd)pyrene	ORG100W	1	µg/L
Naphthalene	ORG100W	1	µg/L
Phenanthrene	ORG100W	1	µg/L
Pyrene	ORG100W	1	µg/L



#### **7.4.4.2 Seismic Monitoring**

Latent has installed a seismometer near Warro-3 and this will continue to be used to monitor natural earthquake event. Latent is also working with seismic contractors to develop a means to use surface and shallow (~100m below surface) geophones to provide additional data on natural earthquakes and also events associated with fracture stimulation. This work is at an early stage but it is hope that it will have progressed to a stage where experimental work can be carried out during the Warro-5 and 6 project.

Seismic stations will be monitored continuously and operations stopped if earthquake activity associated with the Warro structure is recorded.

#### **7.4.4.3 Air and Soil Monitoring**

Following the results of the initial work with the CSIRO and UWA, Latent is working with these groups and other Perth Basin operators to develop a consistent basin-wide monitoring system. It is hoped this will be in place by midyear.

Latent will take soil and air samples at each well location prior to the commencement of any field works and these will be held in a controlled environment at Chem Centre for future analysis and comparison purposes.

#### **7.4.4.4 Potable Water**

Potable water sampling and analysis (in accordance with Department of Health standards) will be undertaken monthly to ensure that the potable water is of a standard suitable for human consumption in accordance with the 'Guidelines for the Microbiological Assessment of Drinking Water' (Department of Health WA 2008).

Water samples will be delivered to a NATA certified commercial testing laboratory and analysed for the following:

- Faecal streptococci (CFU/100ml).
- Total coliforms (CFU/100ml).
- Thermotolerant coliforms (CFU/100ml).
- Heterotrophic Plate Count of coliforms (CFU/100ml).

#### **7.4.4.5 Turkey's Nest / Mud Sump**

The turkey's nest and mud sump will be inspected daily to ensure adequate freeboard (> 0.3m) is maintained. In the unlikely event an individual well liquid storage capacity is approached, Latent has identified as a contingency the possibility for excess water to be transported to the turkey's nests at other well locations (Warro-4 or Warro-5 / Warro-6 whichever is applicable), If this movement of water is required, separate prior approval will be sought from the DMP.

#### **7.4.4.6 Weeds**

The well sites will be regularly inspected during operations for establishment of noxious weeds or 'Declared Pest' species during site activities by site personnel and by the agricultural landowner.

An assessment for the presence of noxious weed species and 'Declared Pests' will be undertaken at:

- Completion of extended well testing activities.
- Completion of rehabilitation activities

- Six months after completion of rehabilitation activities.
- Two years after completion of rehabilitation activities.

The sites will be inspected by Mr Don Williams, an experienced botanist who undertook the botanical work for the Warro 3D Seismic Survey. Mr Williams is a local landholder who is regularly commissioned by DPaW to undertake biological surveys in the region and is familiar with the significant/problem weed species in this area.

The weed assessment will target the following species (based on advice from Mr Williams):

#### Perennials

- South African love grass (*Eragrostis curvula*)
- Mulla mulla (*Ptilotus polystachyus*)
- Afghan thistle (*Solanum hoplopetalum*)

#### Annuals

- Prickly Paddy melon (*Cucumis myriocarpus*).
- Paterson's curse (*Echium plantagineum*)
- Double-gee (*Emex australis*).

This list is not considered exhaustive and identification of problem weed species will be undertaken during the weed assessments by Mr Williams, based on his experience as an agricultural land holder and his botanical work in the local region and at the project site.

#### **7.4.4.7 Dieback**

As the project is located on cleared agricultural land, no dieback monitoring is proposed. Dieback can only be assessed in areas that contain dieback indicator species (i.e. native flora species).

#### **7.4.4.8 Rehabilitation Monitoring**

Rehabilitation monitoring will be undertaken in conjunction with the external audit to assess the success of the rehabilitation program and the fulfilment of the completion criteria. It will be undertaken at the following frequencies:

- Completion of rehabilitation activities.
- Six months after completion of rehabilitation activities.
- Two years after completion of rehabilitation activities.

Dependent on the results of the rehabilitation monitoring (i.e. fulfilment of completion criteria after two years), further monitoring may be undertaken. Rehabilitation monitoring will be further described in the Rehabilitation Plan.

### **7.5 NON-CONFORMANCE, CORRECTIVE AND PREVENTATIVE ACTION**

Management personnel will review all audit findings, non-conformances and weekly reports. Management will also sign off on all reported incidents.

## **7.6 RECORD KEEPING**

The Latent Wellsite Manager will keep a record of people on site and a log of project progress.

Other records to be kept by the Wellsite Manager are:

- Induction records
- Monitoring and emission records
- Waste disposal records
- Completed 'Hygiene Declaration' forms
- Hazardous goods manifests
- Non-compliances and corrective action records
- Reportable and recordable incidents.
- Internal audit and inspection records.
- All records (including monitoring) will be kept in files in the site office and then transferred to the Perth office at conclusion of site activities.

These records will be kept for a period of five years.

## **7.7 REFERENCE MATERIAL**

Copies of the Environmental Policy, Environmental Plan, Emergency Response Plan, Oil Spill Contingency Plan, Drilling or Well Intervention Programme, and all MSDS will be held at the site office and will be available to all personnel. Emergency Response

## **8 EMERGENCY RESPONSE PLAN**

An Emergency Response Plan will be developed by Latent which covers the actions, responsibilities and outside agencies involved in the event of an emergency.

The emergency response procedure will involve the following priorities for action:

- Protection of human health and safety;
- Protect and minimise the effect to the health and safety of animals;
- Contain the spread of spilled material;
- Neutralise and render safe any noxious or hazardous materials; and
- Commence clean-up activities and site remediation.

By their very nature, emergency response procedures deal with events either not foreseen or almost totally unlikely. It is necessary therefore to plan for worst case scenarios or adopt general procedures, as normally anything that can be covered by a specific plan is not an emergency. It is important to recognise that any crisis may have serious impacts well beyond the individual operation immediately involved and which may affect the WJV, or Latent as a corporate entity.

A Crisis Management Plan has also been developed by Latent that outlines the procedures and actions to be followed in the event of a major crisis.

### **8.1 OIL SPILL CONTINGENCY PLAN**

#### **8.1.1 Overview**

Latent has developed an Oil Spill Contingency Plan (OSCP) – refer document WJV-HSE-PL-02.

As the Project does not involve generation of liquid hydrocarbons the OSCP addresses the management measures associated with spills resulting from leaks or breaches in containment structures and equipment resulting from:

- Malfunction in equipment
- Leak/breach from containment structures / bunding
- Leak/breach from storage vessels
- Overflow of tanks
- Burst hoses
- Human error.

All Latent personnel and contractors will be equipped and trained to respond to the potential incidents outlined in the OSCP.

Latent will ensure that the equipment required in the event of a spill is available and this is detailed in the OSCP.

The responsibilities and response strategies are summarised in the OSCP.

## 9 REPORTING

### 9.1 INTERNAL REPORTING

All staff associated with gas well activities will be required to report all incidents that are considered to breach the Latent EP and/or threaten the environment. These incidents may be reported by both internal and external parties and may occur on or off-site.

### 9.2 EXTERNAL REPORTING

#### 9.2.1 Routine Reporting

All reporting will be undertaken in accordance with the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 and the auditing and reporting requirements outlined in 'Auditing and Reporting Requirements for Petroleum Activities in WA, DMP, October 2012'.

#### 9.2.2 Incident Reporting

Reportable incidents will be telephoned to the DMP Petroleum Environment Incident Reporting number 0419 960 621 within two (2) hours of the incident.

Reports on all reportable incidents will be submitted by email within three days of the incident to [petroleum.environment@dmp.wa.gov.au](mailto:petroleum.environment@dmp.wa.gov.au).

A close out report will also be forwarded to DMP on completion of remedial works for any reportable incident.

Latent will submit monthly recordable incident reports to the DMP before the 15th of the following month (to [petroleum.environment@dmp.wa.gov.au](mailto:petroleum.environment@dmp.wa.gov.au)).

#### 9.2.3 Emissions and Discharges

In accordance with Regulation 34 of the PGER (E) Regulations, Latent will report to the DMP on a three monthly basis the estimated emissions and discharges to the environment as a result of the project. This reporting will commence immediately upon beginning the project and will continue until completion of the project. Reports will be lodged within 15 days of the end of each three (3) month period and will be forwarded to [petroleum.environment@dmp.wa.gov.au](mailto:petroleum.environment@dmp.wa.gov.au). The report will include the results of all monitoring undertaken.

## 10 CONSULTATION

During previous drilling campaigns (Warro-3 and Warro-4) Latent carried out an extensive and thorough consultation with both local and Perth based stakeholders.

As the timing of the 2015 drilling campaign has only recently been confirmed, Latent is in the process of re-establishing communication with the relevant stakeholders. Latent has commenced an extensive community consultation process which will be expanded during 2015. This consultation is being undertaken at various levels from one-on-one meetings with individuals, to working cooperatively with Perth Basin Operators Group and the APPEA. Recent consultation in the region includes:

- Community Site Visits
- Community Information Pamphlets
- Attendance at Community Meetings
- Liaison with Community Groups
- Liaison with local Shires

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- Liaison with stakeholder landowners
- Successful relationship negotiation with traditional owners.

The most recent community consultation is outlined in Table 12. The following issues were discussed:

- Traffic increase on roads during operations
- Fire control and level of activity during fire ban periods
- Explanation of how Latent know where fracs go and how they are controls
- How is the water protected
- How Latent get gas from the field to our farms
- What could it mean to our community if the project goes ahead – jobs, schools, training – not relevant for this EP.

The importance of demonstrating that the water supply would be protected was clear during these discussions and the results of the hydrogeological assessment undertaken by Rockwater (2013; 2014) show there will be no impact to the groundwater.

Latent has a Stakeholder Liaison Officer who lives in the local area and will continue to undertake, extensive landowner consultation to manage any potential impacts to the landholders or land. Latent is aware of the landholders' preferences and will ensure all field staff are duly informed. For example, all staff will be notified during the induction process of the importance of gate management to ensure all stock is contained.

Current Land Access Agreements are in place with James Raffan (Warro-6). and J Holmes (Warro-5).

Table 12 – Stakeholder consultation undertaken to date

Date	Attendee	Topic/	Issues raised/ discussed
18/7/13	Department of Water	Annual Monitoring Data for GWL172000(3)	Submission by Email
9/6/14	Department of Water	Water Bores in vicinity of Project for wider testing.	None
11/9/14	EPA	Overview of proposal. EPA identified the Project had been assessed in 2011 (5 wells at >3500m depth) and advised they can not assess a project twice.	None
19/9/14	DMP	Presentation of project.	Need to comply with new regulations and be thorough with chemical disclosure
Oct 14	Sandpaper, Local Badgingarra Newspaper	Article – “Fractious Times”	N/A
13/11/14	Landowner	Initial meeting to discuss land access and lease agreement.	None
13/11/14	WA Farmers Federation	Presentation of project.	Land access issues – farmer right to Veto

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<b>Date</b>	<b>Attendee</b>	<b>Topic/</b>	<b>Issues raised/ discussed</b>
25/11/14	DMP	Clarification of additional information requested for the Warro-5 and Warro-6 EP.	Risk assessment processes and reporting
26/11/14	Member for Moore	Presentation of project.	Protection of aquifers and land access issues
26/11/14	Chairman Chamber of Commerce	Phone only; Update on project and arranging time to meet during next visit	Protection of aquifers and local content
26/11/14	Landowner	Presentation of project.	Protection of aquifers
27/11/14	CEO, Coorow Shire	Presentation of project.	Need to keep the community informed
27/11/14	Presentation to Council meeting of Shire of Dandaragan	Presentation of Project	Local content, water protection, road useage
27/11/14	Discussions with CEO and Deputy CEO of Dandaragan Shire	Explanation of project schedule and expected timetable for requests	Gain understanding of local Government approval timeframe
28/11/14	Landowner	Inspection of proposed well site.	Clarification of access route
28/11/14	Landowner	Inspection of proposed well site.	Clarification of access route and well location, desire for new water supply
14/1/15	Dept. Parks & Wildlife	Offer of project update. Offer delinked by DPaW.	None
2/2/15	Department of Water Regional – Geraldton	Email exchanges on requirements for water bore construction and licencing within project area.	None
5/2/15	Department of Water Regional – Geraldton	Submission of Application to construct water bores.	No issues raised to date.
9/2/15	Shire of Dandaragan	Camp Applications Submitted	No issues raised to date.
20/2/15	Focus Group, Badgingarra	Meeting with a small selection of local community members to promote discussion and provide information and address concerns.	Community Awareness No issues raised.
6/3/15	Landowner	Discussion towards finalisation of lease agreement.	No issues raised.
9/3/15	Shire of Dandaragan	Mini Camp Applications Submitted.	No issues raised to date.
2/4/15 & 16/4/15	Department of Water	Presentations on Warro water monitoring programme and introduction to CSIRO baseline Monitoring project	Strong interest in work and expressed interest to contribute information and knowhow
9/4/15	Carnamah Farmer's Forum	Presentation on Warro project and in particular monitoring	Protection of water resources, quality of

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Date	Attendee	Topic/	Issues raised/ discussed
		work	DMP supervision, etc.
17/4/15	Department of Mines and Petroleum	Presentations on Warro water monitoring programme and introduction to CSIRO baseline Monitoring project	Strong interest in work and expressed interest to contribute information and knowhow
14/5/15	DPaW	Contacted them to confirm arrangements for any incident involving animals / wildlife	Thanked us for the contact and said that if any such incident then simply phone the DPaW telephone number listed and they would provide advice.
8/5/15	Department. of Water	Meeting with Program Manager, Regional Manager, Regional Hydrogeologist from the Mid West and Gascoyne Division and a representative from Water Source Protection Planning	High interest in work and continuation of monitoring.



## **Appendix 1 – Drilling & Cementing Chemicals**

## **Drilling**

DMP CHEMICAL DISCLOSURE REPORTING

A. SYSTEM DETAILS:

OPERATOR:	Latent Petroleum
PROJECT/WELL:	Warro - 5 & -6
SYSTEM:	Drilling Fluid System
TOTAL VOLUME OF SYSTEM (L):	3,525,292 Lts (Warro-5 = 1,778,654 Lts, Warro-6 = 1,746,638 Lts)

\* 30% Contingency.

Note: MSDS provided are from Rheochem, Rheochem is the entity under which NewPark used to trade.

B. PRODUCT LIST:

Product Name	Supplier	Purpose	Toxicity & Ecotoxicity Information	% Product in system	MSDS Attached
Water	N/A	Base Fluid	Bore water sourced onsite - Natural Product	69.72%	N
Barite / Rheobar	Newpark	Weighting Agent	<p>Low toxicity. Under normal conditions of use, adverse health effects are not anticipated.</p> <p><b>Toxicity Data:</b>                      Toxicity data available for ingredient:                      QUARTZ (SILICA CRYSTALLINE) (14808-60-7)                      LCLo (inhalation) 300 ug/m<sup>3</sup>/10 years (human)                      TCLo (inhalation) 16 000 000 particles/ft3/8 hours/17.9 years (human-fibrosis)  <b>Aquatic toxicity:</b>                      Fish Toxicity LC50 (Rainbow trout) &gt; 7500 ppm/96hrs.                      LC50 (Fresh Water Trout) &gt; 21,000 ppm/96hrs.                      LC50 (Salt Water Stickel Back) &gt; 56,000 ppm/96hrs.</p> <p><b>Biodegradation/bioaccumulation:</b>                      Barium sulphate (major ingredient of barite (60-100%) is insoluble in water and not biodegradable.                      Not expected to bioaccumulate.                      This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities.</p>	14.10%	Y
Bentonite / Rheoben	Newpark	Viscosifier	<p>The main component/s of this product are not anticipated to cause any adverse effects to plants or animals.</p> <p><b>Toxicity Data:</b>                      Toxicity data available for ingredient:                      QUARTZ (SILICA CRYSTALLINE) (14808-60-7)                      LCLo (inhalation) 300 ug/m<sup>3</sup>/10 years (human)                      TCLo (inhalation) 16 000 000 particles/ft3/8 hours/17.9 years (human-fibrosis)                      BENTONITE (1302-78-9)                      LD50 (intravenous) 35 mg/kg (rat)                      LD50 (oral): &gt;2000mg/kg (rat)                      LDLo (intravenous) 10 mg/kg (dog)                      Inhalation LC 50: &gt;5.27 mg/L, 4hr (rat)</p> <p><b>Ecotoxicity Data:</b>                      Bentonite (1302-78-9)                      EC50 Daphnia &gt; 100 mg/l, 48 hours                      EC50 Freshwater algae &gt; 100 mg/l, 72 hours                      LC50 Freshwater fish 16000 mg/l, 96 hours                      LC 50 Marine water fish 2800 - 3200 mg/l, 24 hours                      EC50 Coon stripe shrimp (Pandalus danae) 24.8 mg/l, 96 hours                      EC 50 Dungeness or edible crab (Cancer magister) 81.6 mg/l, 96 hours                      LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss) 19000 mg/l, 96 hours  <b>Persistence and degradability:</b> Not relevant for inorganic substances  <b>Mobility:</b> Low water solubility, expected to sink and migrate into the sediment. Expected to partition to sediment and wastewater solids.  <b>Bioaccumulation:</b> Will not bio-accumulate.  <b>Other adverse effects:</b> No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.</p>	6.10%	Y
Potassium Chloride	Newpark	Shale swelling inhibition (smectite & illite clays)	<p><b>Acute Toxicity:</b>                      LD50 (Ingestion): 1500 mg/kg (mouse)                      LD50 (Intraperitoneal): 620 mg/kg (mouse)                      LD50 (Intravenous): 117 mg/kg (mouse)                      LDLo(Ingestion): 20 mg/kg (man)                      LDLo (Intraperitoneal):900 mg/kg (guinea pig)                      LDLo (Intravenous): 77 mg/kg (guinea pig)                      LDLo (Subcutaneous): 2120 mg/kg (frog)                      TDLo(Ingestion): 60 mg/kg/days (woman)</p> <p><b>Ecotoxicity Data:</b>                      In short-term acute toxicity tests with fish, daphnia and algae the following results were found (lowest test result values):                      Ictalurus punctulus 48h-LC50 = 720 mg/l; Daphnia magna: 48h-LC50 = 177 mg/l; Nitzschia linearis: 120 h-EC50 = 1337 mg/l. A chronic reproductive test with the invertebrate Daphnia magna gave a LOEC of 101 mg/l. All the studies compiled on the acute and chronic aquatic toxicity were &gt; 100 mg/L. Thus it is concluded that KCl is not hazardous to freshwater organisms. Taking into considerations the background concentrations of KCl in seawater (380 mg/l K+ and 19,000 mg/l Cl-), it is concluded that there is no reason for further investigations of KCl on marine species. The low concern for the environment is supported by the absence of a bioaccumulation potential for the substance.  <b>Biodegradation/Bioaccumulation:</b>                      Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.                      Mobile in Soil: No impact if small amount is released to the soil.  <a href="http://www.inchem.org/documents/sids/sids/KCHLORIDE.pdf">http://www.inchem.org/documents/sids/sids/KCHLORIDE.pdf</a></p>	2.73%	Y
Limestone LSC/80	Newpark	Bridging & Weighting Agent	<p>Calcium carbonate occurs naturally in a wide variety of substances including limestone, marble and egg shells. It is not anticipated to cause adverse environmental effects.</p> <p><b>Acute Toxicity:</b>                      LD50 (Ingestion): 6450 mg/kg (rat)</p> <p><b>Biodegradation/Bioaccumulation:</b>                      Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p>	1.12%	Y

Omycarb 40 (Trade Name of Calcium Carbonate)	Newpark	Bridging & Weighting Agent	<p>This product is expected to be of low toxicity. Based on available data, the classification criteria are not met.</p> <p><u>Acute Toxicity:</u> LD50 (Ingestion) = 6450 mg/kg (rat).</p> <p>Calcium carbonate occurs naturally in a wide variety of substances including limestone, marble and egg shells. It is not anticipated to cause adverse environmental effects.</p> <p><u>Biodegradation/Bioaccumulation:</u> Dissolved calcium carbonate dissociates into calcium and carbonate ions. Calcium ions will be assimilated by living organisms in the water and the carbonate will become part of the carbon cycle.</p> <p>This product does not bioaccumulate</p>	1.12%	Y
Sodium Chloride	Newpark	Weighting Agent	<p><u>Acute Toxicity:</u> LC50 (Inhalation): &gt; 42000 mg/m3/1 hour (rat) LD50 (Ingestion): 3000 mg/kg (rat) LD50 (Skin): &gt; 10000 mg/kg (rabbit)</p> <p><u>Ecotoxicity:</u> LC50 (water flea) is 2122 mg/L/48 hours; LC50 (fathead minnow) is 6.57 g/L/96 hours. This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate</p> <p><u>Biodegradation/Bioaccumulation:</u> Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p>	2.55%	Y
Xanthan Gum (P)	Newpark	Vicosifier	<p><u>Acute Toxicity:</u> LD50 (oral) &gt; 1000 mg/kg (mouse) LD50 (oral) &gt; 45,000 mg/kg (rat) LD50 (oral) &gt; 20,000 mg/kg (dog) LD50 (intraperitoneal): &gt; 50 mg/kg (mouse) LD50 (intravenous): 100-250 mg/kg (mouse)</p> <p>This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.</p>	0.37%	Y
Rheopac LV / Drispac LV	Newpark	Fluid Loss	<p><u>Acute Toxicity:</u> Toxicity data available for ingredients: SODIUM CARBOXYMETHYL CELLULOSE (9004-32-4) LD50 (Ingestion): 16000 mg/kg (guinea pig) LD50 (Skin): &gt; 2000 mg/kg (rabbit) TDLo (Ingestion): 140 mg/kg (rat) SODIUM CHLORIDE (7647-14-5) LC50 (Inhalation): &gt; 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): &gt; 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) SODIUM GLYCOLATE (2836-32-0) LD50 (Ingestion): 6700 mg/kg (mouse) LDLo (Ingestion): 500 mg/kg (cat)</p> <p><u>Ecotoxicity:</u> LC50 (Fresh Water Trout) &gt; 21,000 ppm/96hrs. LC50 (Salt Water Stickel Back) &gt; 56,000 ppm/96hrs. This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.</p>	0.50%	Y
JK-161 LV	Newpark	Encapsulating Agent - provides shale inhibition	<p>Low toxicity. Use safe work practices to avoid eye or skin contact and inhalation. This product may contain trace amounts of residual acrylamide, which is classified as a probable human carcinogen (IARC Group 2A). However, due to the very low levels present, adverse health effects are not anticipated with normal use.</p> <p><u>Acute toxicity:</u> LD50 rat (oral): &gt; 2,000 mg/kg (OECD Guideline 401)</p> <p><u>Ecotoxicity:</u> (10000 ppm test concentration) (EPA-821-R-02-012) Mysidopsis bahia = 48hr LC50 = 16.2 mg/L. Menidia beryllina = 48hr LC50 = 34.2 mg/L. Scophthalmus Maximus = 96hr LC50 &gt; 1000 mg/L. Skeletonema costatum = 72hr EC50 = 393 mg/L [NOEC = 118 mg/L] Acartia tonsa = 48 hr EC50 = 393 mg/L [NOEC = 112 mg/L] Corophium Volutator = 10 Day LC50 = 9338 mg/Kg [NOEC = 1000 mg/Kg]</p> <p><u>Persistence and degradability</u> Not readily biodegradable (by OECD criteria).</p> <p><u>Bioaccumulation:</u> Assessment bioaccumulation potential: Based on its structural properties, the polymer is not biologically available. Accumulation in organisms is not to be expected.</p>	0.37%	Y

Ildicide-20	Newpark	Biocide/Prevents bacterial contamination of the mud	<p><u>Toxicity:</u> Toxicity data available for ingredient: TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM SULPHATE (55566-30-8) LD50 (ingestion) 248 mg/kg (rat) TDLo (ingestion) 650 mg/kg/13 weeks - intermittent (rat)</p> <p><u>Ecotoxicity:</u> 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</p> <p><u>Persistence and degradability:</u> This product is readily biodegradable.  <a href="http://www.inchem.org/documents/ehc/ehc/ehc218.htm">http://www.inchem.org/documents/ehc/ehc/ehc218.htm</a></p>	0.09%	
Caustic Soda	Newpark	pH control-prevents bacteria & corrosion.	<p>Toxicity Data: Toxicity Data available for the ingredients: SODIUM HYDROXIDE (1310-73-2): LD50 (Intraperitoneal): 40 mg/kg (mouse) LDLo (Ingestion): 1.57 mg/kg (human) SILICA, AMORPHOUS (7631-86-9): LD50 (ingestion): 3160 mg/kg (rat)</p> <p>Biodegradation/Bioaccumulation: Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p> <p>WATER: If released to waterways, alkaline products may change the pH of the waterway. Fish will die if the pH reaches 10-11 (goldfish 10.9, bluegill 10.5). SOIL: May leach to groundwater with toxic effects on aquatic life as above. ATMOSPHERE: Not expected to reside in the atmosphere. Drops or particles released to atmosphere should be removed by gravity and/or be rained out.</p>	0.03%	Y
Sodium Sulphite	Newpark	Oxygen Scavenger	<p><u>Acute Toxicity:</u> 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)</p> <p>SODIUM CARBONATE (497-19-8) LC50 (inhalation) 800 mg/m<sup>3</sup>/2 hours (guinea pig) LD50 (ingestion) 4090 mg/kg (rat) LD50 (intraperitoneal) 117 mg/kg (mouse) LD50 (subcutaneous) 2210 mg/kg (mouse)</p> <p>SODIUM SULPHATE (7757-82-6) LD50 (ingestion) 5989 mg/kg (mouse) 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)</p> <p>Biodegradation/Bioaccumulation: Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p> <p>OCNS category and registration number E - 26232</p>	0.02%	Y
Soda Ash	Newpark	pH / Hardness control	<p><u>Toxicity:</u> LD50 (Ingestion): 4090 mg/kg (rat) LC50 (Inhalation): 800 mg/m<sup>3</sup>/2 hours (guinea pig) LD50 (Intraperitoneal): 117 mg/kg (mouse) LD50 (Subcutaneous): 2210 mg/kg (mouse)</p> <p><u>Ecotoxicity:</u> Fishes, Lepomis macrochirus, LC50, 96 h, 300 mg/l Crustaceans, Ceriodaphnia dubia, EC50, 48 h, 200 - 227 mg/l</p> <p><u>Biodegradation/Bioaccumulation:</u> Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p> <p>WATER: If released to waterways, alkaline products may change the pH of the waterway. Fish will die if the pH reaches 10-11 (goldfish 10.9, bluegill 10.5). SOIL: May leach to groundwater with toxic effects on aquatic life as above. ATMOSPHERE: Not expected to reside in the atmosphere. Drops or particles released to atmosphere should be removed by gravity and/or be rained out.</p> <p>OCNS category and registration number E - 26180</p>	0.06%	Y

Sodium Bicarbonate	Newpark	pH Buffer, Contamination Treatment	<p><u>Acute Toxicity:</u> LD50 (Ingestion): 3360 mg/kg (mouse) LC50 (inhalation): 4.74 mg/L (rat)</p> <p><u>Ecotoxicity:</u> Fishes, <i>Lepomis macrochirus</i>, LC50, 96 h, 300 mg/l Crustaceans, <i>Ceriodaphnia dubia</i>, EC50, 48 h, 200 - 227 mg/l</p> <p><u>Ecotoxicity Data:</u> LC50 (<i>Oncorhynchus mykiss</i>), 96 h, 7.700 mg/l LC50 (<i>Lepomis macrochirus</i>), 96 h, 7.100 mg/l EC50 (Crustaceans, <i>Daphnia magna</i>) 48 h, 4.100 mg/l LOEC (Crustaceans, <i>Daphnia magna</i>) 48 h, 3.100 mg/l</p> <p><u>Biodegradation/Bioaccumulation:</u> Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p> <p>This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.</p> <p>OCNS category and registration number E - 26175</p>	0.04%	Y
Ancor 1	Newpark	Corrosion inhibitor	<p><u>Acute Toxicity:</u> Toxicity data available for ingredient: Toxicity Data TRIETHANOLAMINE (102-71-6) LD50 (Ingestion): 2200 mg/kg (rabbit) LD50 (Intraperitoneal): 1450 mg/kg (mouse) LD50 (Skin): &gt; 20 mL/kg (rabbit) TDL0 (Ingestion): 16 g/kg/64 weeks (mouse - cancer)</p> <p><u>Ecotoxicity</u> LC50 (shrimp): &gt; 100 ppm.</p> <p>In soil and water, triethanolamine will biodegrade fairly rapidly following acclimation (half-life in the order of days to weeks). In soil, residual triethanolamine may leach to groundwater. Not expected to bioaccumulate.</p>	0.75%	Y
Citric Acid	Newpark	pH Buffer	<p><u>Acute Toxicity:</u> LD50 (Ingestion): 3000 mg/kg (rat) LD50 (Intraperitoneal): 290 mg/kg (rat) LD50 (Intravenous): 42 mg/kg (mouse) LDLo (Ingestion): 7000 mg/kg (rabbit)</p> <p><u>Ecotoxicity:</u> LC50 (<i>Leuciscus idus melanotus</i>): 440 mg/L - 48 h LC 50 <i>Daphnia magna</i> (Water flea) - 1.535 mg/L - 24 h</p> <p><u>Biodegradation/Bioaccumulation:</u> Readily Biodegradability. Does not bioaccumulate.</p> <p>If citric acid is released to water, it is expected to biodegrade rapidly. May be toxic to fish at moderately high levels (120 ppm is fatal to daphnia; 894 ppm with pH 4 is fatal to goldfish) due to acidic nature. Fairly high biological oxygen demand (BOD) which may cause oxygen depletion in large spills. Citric acid occurs naturally in many plants.</p>	0.04%	Y
Magnesium Oxide	Newpark	pH Indicator / temperature stabiliser	<p><u>Acute Toxicity:</u> Toxicity Data SILICA, AMORPHOUS (7631-86-9) LD50 (Ingestion): 3160 mg/kg (rat). Health Hazard Summary Low toxicity - irritant. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in irritation. <i>Magnesium Oxide</i> TCLo (inhalation) 400 mg/kg (human). Eye Irritant. Contact may result in irritation, lacrimation, pain and redness. Inhalation 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. Ingestion Low toxicity. Ingestion may result in gastrointestinal irritation, nausea, vomiting, abdominal pain and diarrhoea.</p> <p><u>Biodegradation/bioaccumulation:</u> Not expected to Biodegrade as it is inorganic ore.</p>	0.28%	Y

Defoam-A (I)	Newpark	Defaomer suitable for High Temperatures	<p>May be harmful - 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.</p> <p><u>Acute Toxicity:</u>  Main ingredient Octan-2-OL (&gt;98%);  Oral, mouse: LD50 = 300 mg/kg;  Oral, rabbit: LD50 = 9300 mg/kg;  Oral, rat: LD50 = 200 mg/kg;  Water accounts for the remaining &lt;2% of the product.</p> <p><u>Biodegradation/Bioaccumulation:</u>  Aliphatic hydrocarbons behave differently in the environment depending on their size. WATER: Light aliphatics volatilise rapidly from water (half life - few hours). Bioconcentration should not be significant. SOIL: Light aliphatics biodegrade quickly in soil and water, heavy aliphatics biodegrade very slowly. ATMOSPHERE: Vapour-phase aliphatics will degrade by reaction with hydroxyl radicals. The manufacturer reports that this product is &gt; 80% biodegradable.</p>	0.04%	Y
Fracseal Fine	Newpark	Prevent lost circulation	<p>This product is expected to be of low toxicity. Under normal conditions of use, adverse health effects are not anticipated</p> <p>Oral LD50 (rat) is &gt; 5000 mg/m3.  Dermal LD50 (rabbit) is &gt; 2000 mg/m3.  LC50 (rat) is 510 mg/m<sup>3</sup>/2 hours.</p>	1.12%	
Calcium Chloride (94%) Powder	Newpark	Weighting Agent	<p>Based on available data, the classification criteria are not met. Toxicity Data available for the ingredients:</p> <p><u>Acute Toxicity:</u>  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)</p> <p>SODIUM CHLORIDE (7647-14-5)  LC50 (Inhalation): &gt; 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): &gt; 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)</p> <p><u>Biodegradation/Bioaccumulation:</u>  Biodegradability does not pertain to inorganic substances. Does not bioaccumulate.</p>	1.12%	Y
Pipefree M	Newpark	Agent to free differentially stuck pipe	<p><u>Toxicity Data:</u>  Toxicity data available for ingredient:  ETHYLENE GLYCOL (107-21-1)  LC50 (inhalation) 10 876 mg/kg (rat)  LD50 (ingestion) 1650 mg/kg (cat)  LD50 (skin) 9530 ug/kg (rabbit)  LDLo (ingestion) 398 mg/kg (human)  TCLo (inhalation) 10,000 mg/m<sup>3</sup> (human - cough)  TDLo (ingestion) 5500 mg/kg (child - anaesthesia)</p> <p>Ethylene glycol will mainly exist in the vapour phase in the ambient atmosphere where it will be degraded by reaction with hydroxyl radicals. Expected to be very highly mobile in soil. Not anticipated to volatilise from moist soil or water surfaces. Biodegradation in both soil and water is expected to be a major fate process for this compound. Not expected to bioconcentrate in aquatic organisms.</p> <p>Ecotoxicity LC50 (Aquatic species): &gt;100mg/L/96hrs. Non hazardous to aquatic organisms.</p> <p>Safework Australia Exposure Standards:  <a href="http://hsis.ascc.gov.au/DocumentationES.aspx?ID=722">http://hsis.ascc.gov.au/DocumentationES.aspx?ID=722</a>  <a href="http://hsis.ascc.gov.au/DocumentationES.aspx?ID=271">http://hsis.ascc.gov.au/DocumentationES.aspx?ID=271</a></p> <p>CICADS Available:  <a href="http://inchemsearch.ccohs.ca/inchem/jsp/search/search.jsp?inchemcasreg=1&amp;Coll=inchemall&amp;serverSpec=charlie.ccohs.ca%3A9900&amp;QueryText1=107-21-1&amp;QueryText2=&amp;Search.x=52&amp;Search.y=10">http://inchemsearch.ccohs.ca/inchem/jsp/search/search.jsp?inchemcasreg=1&amp;Coll=inchemall&amp;serverSpec=charlie.ccohs.ca%3A9900&amp;QueryText1=107-21-1&amp;QueryText2=&amp;Search.x=52&amp;Search.y=10</a></p>	3.00%	Y

Strata-Vanguard	Newpark	Bridging Agent	<p><b>Toxicity Data:</b>  Toxicity data available for ingredient:  CRISTOBALITE (14464-46-1)  TCLo (inhalation) 16 mppcf/8hours/17.9 years (human-fibrosis)  QUARTZ (SILICA CRYSTALLINE) (14808-60-7)  LCLo (inhalation) 300 ug/m<sup>3</sup>/10 years (human)  TCLo (inhalation) 16 000 000 particles/ft<sup>3</sup>/8 hours/17.9 years (human-fibrosis)  CELLULOSE (9004-34-6)  LC50 (inhalation) &gt; 5800 mg/m<sup>3</sup>/4 hours (rat)  LD50 (ingestion) &gt; 5000 mg/kg (rat)  LD50 (intraperitoneal) &gt; 31600 mg/kg (rat)  LD50 (skin) &gt; 2000 mg/kg (rabbit)  POLYETHYLENE (9002-88-4)  LDLo (ingestion) 3000 mg/kg (rat)  MAGNESIUM OXIDE (1309-48-4)  TCLo (inhalation) 400 mg/kg (human)</p> <p>This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate. This product has low mobility in soil.</p>	1.12%	Y
Barite / Rheobar	Newpark	As above	As above	3.85%	Y
Frac Attack	Newpark	Prevent lost circulation	<p><i>Calcium Oxide (1305-78-8) as an ingredient (&lt;10%)</i>  LD50 3059 mg/kg (Mouse/Intraperitoneal)  <i>Calcium Hydroxide (1305-62-0) as an ingredient (&lt;5%)</i>  LD50 (ingestion) 7300 mg/kg (mouse)  <i>Cristobalite (14464-46-1) as an ingredient (&lt;5%)</i>  TCLo (inhalation) 16 mppcf/8hours/17.9 years (human-fibrosis)  <i>Quartz (Silica Crystalline) (14808-60-7) as an ingredient (&lt;3%)</i>  LCLo (inhalation) 300 ug/m<sup>3</sup>/10 years (human)  TCLo (inhalation) 16 000 000 particles/ft<sup>3</sup>/8 hours/17.9 years (human-fibrosis)  <i>2-Propenenitrile-1,3- Butadiene Rubber as an ingredient (&lt;50%)</i>  LC50 (96 h): &gt;100 mg/L (Oncorhynchus mykiss)  LC50 (48 h): &gt;100 mg/L (Daphnia Magna)  LC50 (48 h): &gt;100 mg/L (Scenedesmus quadricauda)  <i>Natural Rubber as an ingredient is a natural product (&lt;50%)</i>  It is not anticipated to cause adverse environmental effects.  <i>Polyisoprene as an ingredient (&lt;50%)</i>  General-purpose rubber used to replace natural rubber  Acute Oral LD50 : &gt;2000mg/kg (Rat, LIR-30)  Acute Dermal Irritation ( Rabbit ) : Negative ( LIR-30 )  Acute Inhalation LC50 : Not Available  <i>SBR Elastomers as an ingredient (&lt;50%)</i>  LD50 (Oral) &gt;5000 mg/kg (rat)  LD50 (skin) &gt;20000 mg/kg (rat)  LD50 (inhalation) &gt;20000 mg/kg (rat)  <i>Cellulose (9004-34-6) as an ingredient is a natural product (&lt;30%)</i>  LC50 (inhalation) &gt; 5800 mg/m<sup>3</sup>/4 hours (rat)  LD50 (ingestion) &gt; 5000 mg/kg (rat)  LD50 (intraperitoneal) &gt; 31600 mg/kg (rat)  LD50 (skin) &gt; 2000 mg/kg (rabbit).  <i>Diatomaceous earth, Flux calcined as an ingredient (&lt;15%)</i>  <i>Diatomaceous earth, Flux calcined as an ingredient (&lt;15%)</i>  LCLo (inhalation) 300 ug/m<sup>3</sup>/10 years (human)  TCLo (inhalation) 16 000 000 particles/ft<sup>3</sup>/8 hours/17.9 years (human-fibrosis).  <i>Fullers earth (Bentonite) as an ingredient (&lt;10%)</i>  Fish Toxicity 96h LC50: 8-19 g/L (Salmo gairdneri).  <i>Magnesium Oxide (1309-48-4) as an ingredient (&lt;2%)</i>  TCLo (inhalation) 400 mg/kg (human).</p> <p><b>Biodegradation/bioaccumulation:</b>  This product is not expected to bioaccumulate.</p>	1.12%	Y



Citric Acid	Newpark	As above	As above	0.04%	Y
Potassium Chloride	Newpark	As above	As above	6.00%	Y
AVAPERM NF	Newpark	Prevent swelling clays by blocking the site for water hydration.	<p><u>Acute Toxicity:</u> LD50 (rat, oral) = &gt;500 &gt;1000 mg/kg* *Based on components Skeletonema costatum (Algae tox test) EC50, 54,4mg/l Acartia tonsa (Crustacea tox test) LC50, mg/l, 52,4mg/l Scophthalmus maximus juvenile (Fish tox test) LC50, &gt;51,0 mg/l</p> <p><u>Biodegradation/bioaccumulation:</u> Biodegradation Seawater test OECD 306, 75%. Bioaccumulation OECD 117, Log Pow ≤ 1,36 (0,44 weighted average) An equivalent product to AVAPERM NF has been registered on the CEFAS Offshore Chemical Notification Scheme with a 'Gold' rating &amp; Registration # 24780</p>	1.12%	Y
Starch B/Dynastar	Newpark	Fluid Loss	<p><u>Acute Toxicity:</u> Toxic to microorganisms above 0.3 ppm (as formaldehyde). Biological oxygen demand (BOD): 37-47%, 5 days (High). May cause oxygen depletion in aquatic systems. WATER: Aquatic toxicity: 32 ppm/24 hr/catfish/fresh water; 100-300 ppm/48 hr/flounder/salt water.</p> <p><u>Biodegradation/bioaccumulation:</u> Not expected to bio concentrate. Paraformaldehyde dissolves slowly in cold water to produces formaldehyde. Biodegradable.</p>	0.50%	Y
SAPP	Newpark	Deflocculate or disperse bentonite muds or fluids with high levels of low gravity solids.	<p><u>Acute Toxicity:</u> Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation. Ingestion of large quantities may also result in serious disturbances in calcium metabolism.</p> <p>LD50 (Ingestion): 2650 mg/kg (mouse) LD50 (Intraperitoneal): 1 g/kg (mouse) LD50 (Intravenous): 59 mg/kg (mouse) LD50 (Subcutaneous): 480 mg/kg (mouse)</p> <p><u>Biodegradation/Bioaccumulation:</u> Biodegradability does not pertain to inorganic substances. Does not bioaccumulate. OCNS category (actual or equivalent chemical) and Registration number. E-2449</p>	0.04%	Y
Circal 60/16	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
Circal 1000	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
Ciacal Y	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
Omyacarb 2	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
Omyacarb 8	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
Omyacarb 20	Newpark	Bridging agent & loss circulation material	As per Omyacarb 40	1.12%	Y
JK 261	Newpark	Encapsulating Agent - provides shale inhibition	As per JK 161 LV	0.12%	Y
JK-161 LV	Newpark	As above	As above	0.12%	Y
QUICKSEAL F / M / C	Newpark	Lost circulation material	<p>This product is expected to be of low toxicity. Under normal conditions of use, adverse health effects are not anticipated</p> <p><u>Acute Toxicity:</u> Acute Oral Toxicity: LD50 (oral) &gt; 5000 mg/kg (rats). Acute Dermal Toxicity: LD50 (dermal) &gt; 2000 mg/kg (rats). Acute Inhalation Toxicity: LC50 (Inhalation) = 5800 mg/m3/4hrs (rat).</p> <p>Low toxicity to aquatic organisms. This product is readily biodegradable. This product is not expected to bioaccumulate.</p>	1.12%	Y
<b>TOTAL</b>				<b>127.15%</b>	<b>*</b>

\* Shaded products are contingent.

C. CHEMICAL LIST:

Ingredients (ie: Chemicals within Drilling Fluids)	CAS Number	Mass
Water	7732-18-5	71.04%
Bentonite	1302-78-9	5.98%
Potassium Chloride	7447-40-7	2.73%
Calcium Carbonate	471-34-1	2.22%
Sodium Chloride	7647-14-5	2.56%
Barium Sulphate	7727-43-7	12.69%
Sodium Carboxymethyl Cellulose	9004-32-4	0.44%
Xanthan Gum	11138-66-2	0.37%
Acrylamide, Sodium Acrylate Copolymer	25987-30-8	0.37%
Quartz (Silica Crystalline)	14808-60-7	0.85%
Sodium Hydroxide	1310-73-2	0.03%
Sodium Carbonate	497-19-8	0.06%
Sodium Sulphite	7757-83-7	0.02%
Sodium Sulphate	7757-82-6	0.04%
Sodium Bicarbonate	144-55-8	0.02%
Citric Acid, Anhydrous	77-92-9	0.04%
Sodium Glycolate	2836-32-0	0.001%
Silica Amorphous	7631-86-9	0.001%
Tetrakis (Hydroxymethyl) Phosphonium Sulphate	55566-30-8	0.018%
Triethanolamine	102-71-6	0.525%
<b>TOTAL</b>		<b>100.00%</b>
Cellulose	9004-34-6	2.58%
Calcium Chloride	10043-52-4	1.55%
Sodium Chloride	7647-14-5	0.06%
Ethylene Glycol	107-21-1	3.00%
Barium Sulphate	7727-43-7	3.47%
Citric Acid	77-92-9	0.14%
CRISTOBALITE	14464-46-1	0.04%
Quartz (Silica Crystalline)	14808-60-7	0.03%
2-Propenenitrile, polymer with 1,3-butadiene Rubber	9003-18-3	0.60%
Natural Rubber	9006-04-6	0.34%
Polysoprene	9003-31-0	0.29%
Rubber - SBR elastomers (derived from recycled automotive tyres)	9003-55-8	0.31%
Diatomaceous Earth	68855-54-9	0.18%
Fuller's earth	8031-18-3	0.13%
Calcium Carbonate	1317-65-3	6.88%
Polyethylene	9002-88-4	0.03%
Magnesium Oxide	1309-48-4	0.01%
CRISTOBALITE	14464-46-1	0.03%
Calcium Oxide	1305-78-8	0.03%
Silica Amorphous	7631-86-9	0.03%
Calcium Hydroxide	1305-62-0	0.02%
Potassium Chloride	7447-40-7	6.08%
Hexanedinitrile	628-73-9	0.45%
Hydrochloric acid	7647-01-0	0.06%
STARCH	9005-25-8	0.49%
DAZOMET (ISO)[TETRAHYDRO-3,5-DIMETHYL-1,3,5-THIADIAZINE-2-THIONE]	533-74-4	0.01%
Disodium Pyrophosphate	7758-16-9	0.04%
Acrylamide, Sodium Acrylate Copolymer	25987-30-8	0.24%
Octan-2-ol	123-96-6	0.04%
<b>TOTAL Contingency Chemicals</b>		<b>27.15%</b>

\* Shaded products are contingent.

Note: MSDS provided are from Rheochem, Rheochem is the entity under which NewPark used to trade.

NOTE:- NC - not classified as Hazardous

## **Cementing**

**340mm (13 3/8") Cement Job**

**A. SYSTEM DETAILS:**

OPERATOR:	Latent Petroleum		
WELLS:	Warro-5&6		
SYSTEM:	Class G Slurry	Warro - 5 Vol (m <sup>3</sup> ):	147
TOTAL VOLUME OF SYSTEM (m <sup>3</sup> ):	289	Warro - 6 Vol (m <sup>3</sup> ):	142

**B. PRODUCT LIST:**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Fresh water	Bore water sourced onsite	Mix water	10.274%	Bore water sourced onsite - Natural Product	N/A
Cement- Class G	Halliburton	Cement	61.228%	<p>CONSTITUENT 1 (≤100%):</p> <p>After hardening with water or moisture, cement presents no ecotoxicity risks. (Source: IUCLID 2000)</p> <p>Static Acute Aquatic Toxicity- Freshwater and Marine Fish:- 96 hour LC50: &gt;1,500 mg/L</p> <p>Static Acute Aquatic Toxicity -Freshwater and Marine Invertebrates:- 48 hour LC50: &gt;1,000 mg/L</p> <p>Static Acute Aquatic Toxicity - Freshwater and Marine Algae:- 72 hour EC50: &gt;1,000 mg/L</p> <p>Partition Coefficient, n-Octanol/Water: Not Applicable for inorganics</p> <p>Oxygen Demand, Chemical Oxygen Demand: Not Applicable for inorganics</p> <p>Biodegradability, Seawater – Indigenous microbes: Not Applicable for inorganics</p> <p>CONSTITUENT 2 (≤10%):</p> <p>Carcinogenicity: Classified as a human carcinogen (IARC Group 1)</p>	Yes
Econolite Liquid	Halliburton	Cement Additive Stabiliser	9.132%	<p>CONSTITUENT 1 (≤60%):</p> <p>Crustacean Toxicity 100h EC50: 247 mg/L (Daphnia magna);</p> <p>Acute Fish Toxicity 96h LC50: 301-478 mg/L (Lepomis macrochirus);</p> <p>LD50:2000-3000 mg/kg (Rat)</p> <p>Component is an inorganic substance with "No bioaccumulation potential"; "studies on biodegradation are not applicable."</p> <p>Source: IUCLID 2000 PLONOR</p> <p>Bioassay testing where LC50/ EC50: &gt;100mg/L Readily biodegradable</p> <p>CONSTITUENT 2 (≤100%):</p> <p>Natural Product (Water)</p>	Yes
Gascon 469	Halliburton	Cement Additive Stabiliser	8.371%	<p>CONSTITUENT 1 (≤1%):</p> <p>The inorganic substance has a high water solubility, and is not expected to bioconcentrate in organisms; "Biodegradation is not applicable."</p> <p>Algae toxicity (i.e. mortality) has been shown at pH &gt;8.5. Concentration-based toxicity values were not available.</p> <p>Acute Fish Toxicity 96h LC50: 45.4 mg/L (Oncorhynchus mykiss);</p> <p>Source: IUCLID 2000</p> <p>Included on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment</p> <p>CONSTITUENT 2 (≤60%):</p> <p>""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected."</p> <p>Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum);</p> <p>Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia);</p> <p>Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio);</p> <p>Source: IUCLID 2000</p> <p>PLONOR</p> <p>CONSTITUENT 3 (≤100%):</p> <p>Natural Product (water)</p>	Yes
HR-6L	Halliburton	Cement Retarder	1.3150%	<p><u>Acute Toxicity</u></p> <p>Retarder Algae Toxicity EC50 (72h): 301 mg/L (Skeletonema costatum)</p> <p>Fish Toxicity LC50 (48h): &gt;100 mg/L (Scophthalmus maximus) (juvenile turbot)</p> <p>Crustacean Toxicity LC50 (48h): 1261 mg/L (Acartia tonsa)</p> <p><u>Chronic Toxicity:</u></p> <p>No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u></p> <p>Slowly biodegradable</p>	Yes

**B. PRODUCT LIST: cont'd**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
CFR-3L	Halliburton	Friction Reducer	0.9540%	<p>CFR-3L is CFR-3 in solution</p> <p><u>Acute Toxicity:</u>  Retarder Algae Toxicity EC50 (72h): &gt;100 mg/L (Skeletonema costatum) [Halliburton Funded Study]  Fish Toxicity LC50 (48h): 7478 mg/L (Aphyosemion bivittatum) [SKW Trostberg]  Crustacean Toxicity LC50 (48h): 1687 mg/L (Acartia tonsa) [Halliburton Funded Study]</p> <p><u>Chronic Toxicity:</u>  No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>  Slowly biodegradable  Bioaccumulation Log Pow: &lt; 0 [Halliburton Funded Study];  Marine Water Biodegradation 28d: 0% [Halliburton Funded Study];  CHARM Category - GOLD</p>	Yes
Halad-413L	Halliburton	Fluid Loss Additive	7.1750%	<p><u>Acute Toxicity:</u>  Oral Toxicity LD50: &gt; 5,000 mg/kg (Rat)  Dermal Toxicity LD50: &gt; 2,000 mg/kg (Rabbit)  <i>Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated as an ingredient (10-30%)</i>  Algae Toxicity EC50 (72h): 1,102 mg/L (Skeletonema costatum)  Crustacean Toxicity LC50 (48h): &gt;2,000 mg/L (Acartia tonsa) Fish Toxicity LC50 (96h): &gt;1,000 mg/L (Scophthalmus maximus) (juvenile turbot)  Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>  No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>  Slowly biodegradable.  Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated As an ingredient (10-30%)  Log Pow: &lt;0 (OECD 117)  Biodegradation (28 Days): 6.1% (OECD 306)</p>	Yes
NF-6	Halliburton	Reduces air entrainment into cement slurry	0.1510%	<p><u>Acute Toxicity:</u>  Not determined for Fish, Crustaceans and Algae as a complete mix.  <i>Rape oil as an ingredient (60-100%)</i>  Oral Toxicity LD50: &gt;5,000 mg/kg (Rat)  Dermal Toxicity LD50: &gt;5,000 mg/kg (Rabbit)  Fish Toxicity LC50: &gt;5,600 mg/L  Algae Toxicity EC50: &gt;3,200 mg/L  <i>Monopropylene glycol monooleate as an ingredient (5-10%)</i>  Fish Toxicity LC50: 3,200 mg/L  Algae Toxicity EC50: 990 mg/L  <i>Sorbitan, monopalmitate as an ingredient (1-5%)</i>  Fish Toxicity LC50: &gt;,1800 mg/L  Algae Toxicity EC50: 41 mg/L  <i>Aluminium stearate as an ingredient (1-5%)</i>  Fish Toxicity LC50: &gt;5,600 mg/L EC50: 6,500 mg/L  Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>  No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>  Readily biodegradable. Low bioaccumulation potential due to rapid degradation.</p>	Yes

**B. PRODUCT LIST: cont'd**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
D-AIR 3000L	Halliburton	Defoamer	0.1752%	<p>CONSTITUENT 1 (≤100%):                      Acute Algae Toxicity 96h EC50 : 22 mg/L (Pseudokirchneriella subcapitata)                      Acute Fish Toxicity Data 96h LC50 : &gt;1000 mg/L (Salmo gairdneri)                      Acute Crustacean Toxicity 48h EC50: 480 mg/L (Daphnia magna)</p> <p>CONSTITUENT 2 (≤60%):                      Marine Water Acute Algae Toxicity 72h EC50: 426 mg/L (Skeletonema costatum) [OSPAR];                      Marine Water Acute Crustacean Toxicity 48h EC50: 433.2 mg/L (Acartia tonsa) [OSPAR];                      Marine Water Acute Fish Toxicity 96h LC50: &gt; 1000 mg/L (Scophthalmus maximus) [Halliburton Funded Study];                      Bioaccumulation Log Pow: 5.06 [Halliburton Funded Study];</p> <p>CONSTITUENT 3 (≤30%):                      Component is a synthetic surface modified Amorphous Silica (CAS #: 7631 86-9); Fish and Invertebrate toxicity testing with Amorphous Silica have shown low hazard for this component.                      Source: OECD SIDS</p> <p>D-AIR 300L:                      Oral Toxicity: LD50: &gt;5000 mg/kg (Rat)                      Dermal Toxicity: LD50: &gt;2000 mg/kg (Rat)                      Readily Biodegradable (28days): 77-81%</p>	Yes
WellLife 734	Halliburton	Cement Enhancer	1.2250%	<p>Product is an inert, man-made substance and not intrinsically hazardous.  <u>Ecotoxicological Information:</u>                      Acute Crustacean Toxicity: TLM96: &gt; 1,000,000 ppm (Mysidopsis bahia)</p> <p><u>Biodegradation:</u>                      Not Biodegradable                      CHARM Category: GOLD</p>	
<b>total</b>			<b>100.00%</b>		

**C. CHEMICAL LIST**

Chemicals within products in Part B	CAS number	Maximum Mass fraction in System (%)
Mix Water	NA	9.755069%
Portland cement	65997-15-1	51.733861%
Water in Product	7732-18-5	22.620300%
Sodium silicate	1344-09-8	4.607210%
Silica, amorphous - fumed	7631-86-9	4.223276%
Crystalline silica, quartz	14808-60-7	2.574193%
Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated	473268-27-8	1.809939%
Glass, oxide	65997-17-3	1.030047%
Sodium Lignosulfonate	8061-51-6	0.663434%
Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	0.481305%
Alkenes, C15-C18	93762-80-2	0.147281%
Rape Oil	8002-13-9	0.126969%
Polypropylene glycol	25322-69-4	0.088368%
Sodium hydroxide	1310-73-2	0.070388%
Silica, amorphous precipitated	67762-90-7	0.044184%
Monopropylene glycol monooleate	1330-80-9	0.012697%
Sorbitan, monopalmitate	26266-57-9	0.006348%
Aluminium stearate	637-12-7	0.006348%
<b>Total</b>		<b>100.00%</b>

**244mm (9 5/8") Cement Job**

**A. SYSTEM DETAILS:**

OPERATOR:	Latent Petroleum		
WELLS:	Warro-5&6		
SYSTEM:	Class HTB Slurry	Warro - 5 Vol (m <sup>3</sup> ):	52
TOTAL VOLUME OF SYSTEM (m <sup>3</sup> ):	103	Warro - 6 Vol (m <sup>3</sup> ):	51

**B. PRODUCT LIST:**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Fresh water	Bore water sourced onsite	Mix water	9.755%	Bore water sourced onsite - Natural Product	N/A
Cement- Class G + 35% SSA-1	Halliburton	Cement	61.355%	<p><b>CONSTITUENT 1 (≤100%):</b></p> <p>After hardening with water or moister, cement presents no ecotoxicity risks. (Source: IUCLID 2000)                      Static Acute Aquatic Toxicity- Freshwater and Marine Fish:- 96 hour LC50: &gt;1,500 mg/L                      Static Acute Aquatic Toxicity -Freshwater and Marine Invertebrates:- 48 hour LC50: &gt;1,000 mg/L                      Static Acute Aquatic Toxicity - Freshwater and Marine Algae:- 72 hour EC50: &gt;1,000 mg/L                      Partition Coefficient, n-Octanol/Water: Not Applicable for inorganics                      Oxygen Demand, Chemical Oxygen Demand: Not Applicable for inorganics                      Biodegradability, Seawater – Indigenous microbes: Not Applicable for inorganics</p> <p><b>CONSTITUENT 2 (≤100%):</b></p> <p>Carcinogenicity: Classified as a human carcinogen (IARC Group 1)</p>	Yes
Gascon 469	Halliburton	Cement Additive Stabiliser	6.2137%	<p><b>CONSTITUENT 1 (≤1%):</b></p> <p>The inorganic substance has a high water solubility, and is not expected to bioconcentrate in organisms; "Biodegradation is not applicable."                      Algae toxicity (i.e. mortality) has been shown at pH &gt;8.5. Concentration-based toxicity values were not available.                      Acute Fish Toxicity 96h LC50: 45.4 mg/L (Oncorhynchus mykiss);                      Source: IUCLID 2000                      Included on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment</p> <p><b>CONSTITUENT 2 (≤60%):</b></p> <p>"SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface." Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected."                      Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum);                      Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia);                      Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio);                      Source: IUCLID 2000                      PLONOR</p> <p><b>CONSTITUENT 3 (≤100%):</b></p> <p>Natural Product (water)                      Gascon 469:                      OCNS Group: E</p>	Yes
CFR-3L	Halliburton	Friction Reducer	0.7081%	<p>CFR-3L is CFR-3 in solution</p> <p><b>Acute Toxicity:</b>                      Retarder Algae Toxicity EC50 (72h): &gt;100 mg/L (Skeletonema costatum) [Halliburton Funded Study]                      Fish Toxicity LC50 (48h): 7478 mg/L (Aphyosemion bivittatum) [SKW Trostberg]                      Crustacean Toxicity LC50 (48h): 1687 mg/L (Acartia tonsa) [Halliburton Funded Study]</p> <p><b>Chronic Toxicity:</b>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><b>Biodegradation/bioaccumulation:</b>                      Slowly biodegradable                      Bioaccumulation Log Pow: &lt; 0 [Halliburton Funded Study];                      Marine Water Biodegradation 28d: 0% [Halliburton Funded Study];                      CHARM Category - GOLD</p>	Yes

**B. PRODUCT LIST: cont'd**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Halad-413L	Halliburton	Fluid Loss Additive	5.32610%	<p><u>Acute Toxicity:</u>                      Oral Toxicity LD50: &gt; 5,000 mg/kg (Rat)                      Dermal Toxicity LD50: &gt; 2,000 mg/kg (Rabbit)                      Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated as an ingredient (10-30%)                      Algae Toxicity EC50 (72h): 1,102 mg/L (Skeletonema costatum)                      Crustacean Toxicity LC50 (48h): &gt;2,000 mg/L (Acartia tonsa) Fish Toxicity LC50 (96h): &gt;1,000 mg/L (Scophthalmus maximus) (juvenile turbot)                      Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Slowly biodegradable.                      Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated As an ingredient (10-30%)                      Log Pow: &lt;0 (OECD 117)                      Biodegradation (28 Days): 6.1% (OECD 306)</p>	Yes
SCR-100L	Halliburton	Cement Retarder	1.1701%	<p><u>Acute Toxicity:</u>                      Acrylic acid polymer with Sodium AMPS, sodium salt as an ingredient (60-100%):                      Algae EC50(72h): &gt;3300mg/L (Skeletonema costatum) Crustacean LC50(48h): &gt;2000mg/L (Acartia tonsa)                      Fish LC50(96h): &gt;1000mg/L (Scophthalmus maximus juvenile)                      2-Bromo-2- (bromomethyl) pentanedinitrile as an ingredient(&lt;0.1%):                      LD50 Rat (male) oral 0.77 g/kg.                      FD&amp;C Blue 1 as an ingredient (0.1%)                      Rat LD50 (oral) &gt;5000 mg/kg.                      Water makes up the remainder of the product at percentages less than 100%.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Acrylic acid polymer with Sodium AMPS, sodium salt (60-100%) as an ingredient:                      Biodegradation (28 days): 39% (OECD306);                      CHARM Category: GOLD</p>	Yes
NF-6	Halliburton	Reduces air entrainment into cement slurry	0.1121%	<p><u>Acute Toxicity:</u>                      Not determined for Fish, Crustaceans and Algae as a complete mix.                      Rape oil as an ingredient (60-100%)                      Oral Toxicity LD50: &gt;5,000 mg/kg (Rat)                      Dermal Toxicity LD50: &gt;5,000 mg/kg (Rabbit)                      Fish Toxicity LC50: &gt;5,600 mg/L                      Algae Toxicity EC50: &gt;3,200 mg/L                      Monopropylene glycol monooleate as an ingredient (5-10%)                      Fish Toxicity LC50: 3,200 mg/L                      Algae Toxicity EC50: 990 mg/L                      Sorbitan, monopalmitate as an ingredient (1-5%)                      Fish Toxicity LC50: &gt;,1800 mg/L                      Algae Toxicity EC50: 41 mg/L                      Aluminium stearate as an ingredient (1-5%)                      Fish Toxicity LC50: &gt;5,600 mg/L EC50: 6,500 mg/L                      Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Readily biodegradable. Low bioaccumulation potential due to rapid degradation.</p>	Yes



B. PRODUCT LIST: cont'd					
Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
SILICALITE LIQUID	Halliburton	Light weight cement additive	13.9204%	CONSTITUENT 1 (≤60%): <p>""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected."            Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum);            Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia);            Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio);            Source: IUCLID 2000</p>	Yes
				CONSTITUENT 2 (≤60%): Natural Product (water)	
				CONSTITUENT 3 (≤1%): LC50(96h): > 1000 mg/L (Brachydanio rerio)LC50(24h): >1000 mg/L (Daphn	
				OCNS Group: E	
WellLife 734	Halliburton	Cement Enhancer	0.9090%	Product is an inert, man-made substance and not intrinsically hazardous. <u>Ecotoxicological Information:</u> Acute Crustacean Toxicity: TLM96: > 1,000,000 ppm (Mysidopsis bahia) <u>Biodegradation:</u> Not Biodegradable CHARM Category: GOLD	
HR-25L	Halliburton	Cement Retarder	0.5309%	<u>Acute Toxicity:</u> Algae: EC50(72h): 791.25 mg/L (Skeletonema costatum) Crustacean: LC50(48h): 3753.85 mg/L (Acartia tonsa) Fish: LC50(96h): 250 mg/L (Scophthalmus maximus juvenile) <u>Biodegradation/bioaccumulation:</u> Log Pow: 0 - 4.7 (OECD 117) Biodegradation(28 Days): 77% (OECD 306) CHARM Category: GOLD	Yes
<b>total</b>			<b>100.00%</b>		

C. CHEMICAL LIST		
Chemicals within products in Part B	CAS number	Maximum Mass fraction in System (%)
Water	NA	9.7551%
Portland cement	65997-15-1	36.1240%
Water in Product	7732-18-5	19.9540%
Crystalline silica, quartz	14808-60-7	19.4514%
Silica, amorphous	7732-18-5	7.5655%
Silica, amorphous - fumed	7631-86-9	3.3770%
Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated	473268-27-8	1.4473%
Glass, oxide	7440-44-0	0.8233%
Acrylic acid polymer with sodium AMPS, sodium salt	37350-42-8	0.6359%
Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	0.3848%
Tartaric acid	7732-18-5	0.2885%
Rape Oil	7783-20-2	0.1015%
Sodium hydroxide	1310-73-2	0.05628%
Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	0.01261%
Monopropylene glycol monooleate	26266-57-9	0.01015%
Sorbitan, monopalmitate	637-12-7	0.005077%
Aluminium stearate	7732-18-5	0.005077%
FD&C Blue 1	1330-80-9	0.001060%
2-Bromo-2-(bromomethyl)pentanedinitrile	35691-65-7	0.001060%
<b>Total</b>		<b>100.000%</b>

**140mm (5½") Cement Job**

**A. SYSTEM DETAILS:**

OPERATOR:	Latent Petroleum		
WELLS:	Warro-5&6		
SYSTEM:	Class HTB Slurry	Warro - 5 Vol (m <sup>3</sup> ):	14
TOTAL VOLUME OF SYSTEM (m <sup>3</sup> ):	28	Warro - 6 Vol (m <sup>3</sup> ):	14

**B. PRODUCT LIST:**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Fresh water	Bore water sourced onsite	Mix water	9.755%	Bore water sourced onsite - Natural Product	N/A
Cement- Class G + 35% SSA-1	Halliburton	Cement	61.355%	<p>CONSTITUENT 1 (≤100%):</p> <p>After hardening with water or moister, cement presents no ecotoxicity risks. (Source: IUCLID 2000)</p> <p>Static Acute Aquatic Toxicity- Freshwater and Marine Fish:- 96 hour LC50: &gt;1,500 mg/L</p> <p>Static Acute Aquatic Toxicity -Freshwater and Marine Invertebrates:- 48 hour LC50: &gt;1,000 mg/L</p> <p>Static Acute Aquatic Toxicity - Freshwater and Marine Algae- 72 hour EC50: &gt;1,000 mg/L</p> <p>Partition Coefficient, n-Octanol/Water: Not Applicable for inorganics</p> <p>Oxygen Demand, Chemical Oxygen Demand: Not Applicable for inorganics</p> <p>Biodegradability, Seawater – Indigenous microbes: Not Applicable for inorganics</p> <p>CONSTITUENT 2 (≤100%):</p> <p>Carcinogenicity: Classified as a human carcinogen (IARC Group 1)</p>	Yes
Gascon 469	Halliburton	Cement Additive Stabiliser	6.2137%	<p>CONSTITUENT 1 (≤1%):</p> <p>The inorganic substance has a high water solubility, and is not expected to bioconcentrate in organisms; "Biodegradation is not applicable."</p> <p>Algae toxicity (i.e. mortality) has been shown at pH &gt;8.5. Concentration-based toxicity values were not available.</p> <p>Acute Fish Toxicity 96h LC50: 45.4 mg/L (Oncorhynchus mykiss); Source: IUCLID 2000</p> <p>Included on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment</p> <p>CONSTITUENT 2 (≤60%):</p> <p>""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected."</p> <p>Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum);</p> <p>Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia);</p> <p>Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio);</p> <p>Source: IUCLID 2000</p> <p>PLONOR</p> <p>CONSTITUENT 3 (≤100%):</p> <p>Natural Product (water)</p> <p>Gascon 469:</p> <p>OCSN Group: E</p>	Yes
CFR-3L	Halliburton	Friction Reducer	0.7081%	<p>CFR-3L is CFR-3 in solution</p> <p><u>Acute Toxicity :</u></p> <p>Retarder Algae Toxicity EC50 (72h): &gt;100 mg/L (Skeletonema costatum) [Halliburton Funded Study]</p> <p>Fish Toxicity LC50 (48h): 7478 mg/L (Aphyosemion bivittatum) [SKW Trostberg]</p> <p>Crustacean Toxicity LC50 (48h): 1687 mg/L (Acartia tonsa) [Halliburton Funded Study]</p> <p><u>Chronic Toxicity:</u></p> <p>No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u></p> <p>Slowly biodegradable</p> <p>Bioaccumulation Log Pow: &lt; 0 [Halliburton Funded Study];</p> <p>Marine Water Biodegradation 28d: 0% [Halliburton Funded Study];</p> <p>CHARM Category - GOLD</p>	Yes

**B. PRODUCT LIST: cont'd**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Halad-413L	Halliburton	Fluid Loss Additive	5.32610%	<p><u>Acute Toxicity:</u>                      Oral Toxicity LD50: &gt; 5,000 mg/kg (Rat)                      Dermal Toxicity LD50: &gt; 2,000 mg/kg (Rabbit)  <i>Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated as an ingredient (10-30%)</i>                      Algae Toxicity EC50 (72h): 1,102 mg/L (Skeletonema costatum)                      Crustacean Toxicity LC50 (48h): &gt;2,000 mg/L (Acartia tonsa) Fish Toxicity LC50 (96h): &gt;1,000 mg/L (Scophthalmus maximus) (juvenile turbot)                      Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Slowly biodegradable.                      Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated As an ingredient (10-30%)                      Log Pow: &lt;0 (OECD 117)                      Biodegradation (28 Days): 6.1% (OECD 306)</p>	Yes
SCR-100L	Halliburton	Cement Retarder	1.1701%	<p><u>Acute Toxicity:</u>  <i>Acrylic acid polymer with Sodium AMPS, sodium salt as an ingredient (60-100%):</i>                      Algae EC50(72h): &gt;3300mg/L (Skeletonema costatum) Crustacean LC50(48h): &gt;2000mg/L (Acartia tonsa)                      Fish LC50(96h): &gt;1000mg/L (Scophthalmus maximus juvenile)  <i>2-Bromo-2- (bromomethyl) pentanedinitrile as an ingredient (&lt;0.1%):</i>                      LD50 Rat (male) oral 0.77 g/kg.  <i>FD&amp;C Blue 1 as an ingredient (0.1%)</i>                      Rat LD50 (oral) &gt;5000 mg/kg.                      Water makes up the remainder of the product at percentages less than 100%.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Acrylic acid polymer with Sodium AMPS, sodium salt (60-100%) as an ingredient:                      Biodegradation (28 days): 39% (OECD306);                      CHARM Category: GOLD</p>	Yes
NF-6	Halliburton	Reduces air entrainment into cement slurry	0.1121%	<p><u>Acute Toxicity:</u>                      Not determined for Fish, Crustaceans and Algae as a complete mix.  <i>Rape oil as an ingredient (60-100%)</i>                      Oral Toxicity LD50: &gt;5,000 mg/kg (Rat)                      Dermal Toxicity LD50: &gt;5,000 mg/kg (Rabbit)                      Fish Toxicity LC50: &gt;5,600 mg/L                      Algae Toxicity EC50: &gt;3,200 mg/L  <i>Monopropylene glycol monooleate as an ingredient (5-10%)</i>                      Fish Toxicity LC50: 3,200 mg/L                      Algae Toxicity EC50: 990 mg/L  <i>Sorbitan, monopalmitate as an ingredient (1-5%)</i>                      Fish Toxicity LC50: &gt;,1800 mg/L                      Algae Toxicity EC50: 41 mg/L  <i>Aluminium stearate as an ingredient (1-5%)</i>                      Fish Toxicity LC50: &gt;5,600 mg/L EC50: 6,500 mg/L                      Water makes up the remainder of this product.</p> <p><u>Chronic Toxicity:</u>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><u>Biodegradation/bioaccumulation:</u>                      Readily biodegradable. Low bioaccumulation potential due to rapid degradation.</p>	Yes

B. PRODUCT LIST: cont'd					
Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
SILICALITE LIQUID	Halliburton	Light weight cement additive	13.9204%	<p>CONSTITUENT 1 (≤60%):</p> <p>""SiO2" is a stable substance. In the environment it occurs in different modifications and it is one of the most abundant materials on the Earth's surface."" Biodegradability is "not applicable" for silica since it is inorganic. Additionally, "bioaccumulation is not expected."</p> <p>Acute Algae Toxicity 72h EC50: 440 mg/L (Selenastrum capricornutum); Acute Crustacean Toxicity 48h EC50: 7600 mg/L (Ceriodaphnia dubia); Acute Fish Toxicity 96h LC50 5000 mg/L (Brachydanio rerio); Source: IUCLID 2000</p> <p>CONSTITUENT 2 (≤60%):</p> <p>Natural Product (water)</p> <p>CONSTITUENT 3 (≤1%):</p> <p>LC50(96h): &gt; 1000 mg/L (Brachydanio rerio)LC50(24h): &gt;1000 mg/L (Daphn SILICALITE LIQUID OCNS Group: E</p>	Yes
WellLife 734	Halliburton	Cement Enhancer	0.9090%	<p>Product is an inert, man-made substance and not intrinsically hazardous.</p> <p><u>Ecotoxicological Information:</u> Acute Crustacean Toxicity: TLM96: &gt; 1,000,000 ppm (Mysidopsis bahia)</p> <p><u>Biodegradation:</u> Not Biodegradable CHARM Category: GOLD</p>	
HR-25L	Halliburton	Cement Retarder	0.5309%	<p><u>Acute Toxicity:</u> Algae: EC50(72h): 791.25 mg/L (Skeletonema costatum) Crustacean: LC50(48h): 3753.85 mg/L (Acartia tonsa) Fish: LC50(96h): 250 mg/L (Scophthalmus maximus juvenile)</p> <p><u>Biodegradation/bioaccumulation:</u> Log Pow: 0 - 4.7 (OECD 117) Biodegradation(28 Days): 77% (OECD 306) CHARM Category: GOLD</p>	Yes
<b>Total</b>			<b>100.00%</b>		

C. CHEMICAL LIST		
Chemicals within products in Part B	CAS number	Maximum Mass fraction in System (%)
Water	NA	9.7551%
Portland cement	65997-15-1	36.1240%
Water in Product	7732-18-5	19.9540%
Crystalline silica, quartz	14808-60-7	19.4514%
Silica, amorphous	7732-18-5	7.5655%
Silica, amorphous - fumed	7631-86-9	3.3770%
Humic acids, sodium salts, polymers with N,N-dimethyl-2-propenamide, sodium 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-1-propanesulfonate (1:1) and 2-propenenitrile, sodium bisulfite-terminated	473268-27-8	1.4473%
Glass, oxide	7440-44-0	0.8233%
Acrylic acid polymer with sodium AMPS, sodium salt	37350-42-8	0.6359%
Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	0.3848%
Tartaric acid	7732-18-5	0.2885%
Rape Oil	7783-20-2	0.1015%
Sodium hydroxide	1310-73-2	0.05628%
Sulfurous acid, monosodium salt, polymer with formaldehyde and acetone	40104-76-5	0.01261%
Monopropylene glycol monooleate	26266-57-9	0.01015%
Sorbitan, monopalmitate	637-12-7	0.005077%
Aluminium stearate	7732-18-5	0.005077%
FD&C Blue 1	1330-80-9	0.001060%
2-Bromo-2-(bromomethyl)pentanedinitrile	35691-65-7	0.001060%
<b>Total</b>		<b>100.000%</b>

**Tuned Spacer (12.7m3 pumped before each cement job)**

**A. SYSTEM DETAILS:**

OPERATOR:	Latent Petroleum		
WELLS:	Warro-5&6		
SYSTEM:	Tuned Spacer E+	Warro - 5 Vol (m <sup>3</sup> ):	38
TOTAL VOLUME OF SYSTEM (m <sup>3</sup> ):	76	Warro - 6 Vol (m <sup>3</sup> ):	38

**B. PRODUCT LIST:**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
Fresh water	Bore water sourced onsite	Mix water	99.23%	Bore water sourced onsite - Natural Product	N/A
Econolite Liquid	Halliburton	Cement Additive Stabiliser	0.4427%	<p><b>CONSTITUENT 1 (≤60%):</b>                      Crustacean Toxicity 100h EC50: 247 mg/L (Daphnia magna);                      Acute Fish Toxicity 96h LC50: 301-478 mg/L (Lepomis macrochirus);                      LD50:2000-3000 mg/kg (Rat)                      Component is an inorganic substance with "No bioaccumulation potential"; "studies on biodegradation are not applicable."                      Source: IUCLID 2000 PLONOR                      Bioassay testing where LC50/ EC50: &gt;100mg/L Readily biodegradable</p> <p><b>CONSTITUENT 2 (≤100%):</b>                      Natural Product (Water)</p>	Yes
NF-6	Halliburton	Reduces air entrainment into cement slurry	0.0006973%	<p><b>Acute Toxicity:</b>                      Not determined for Fish, Crustaceans and Algae as a complete mix.  <i>Rape oil as an ingredient (60-100%)</i>                      Oral Toxicity LD50: &gt;5,000 mg/kg (Rat)                      Dermal Toxicity LD50: &gt;5,000 mg/kg (Rabbit)                      Fish Toxicity LC50: &gt;5,600 mg/L                      Algae Toxicity EC50: &gt;3,200 mg/L  <i>Monopropylene glycol monooleate as an ingredient (5-10%)</i>                      Fish Toxicity LC50: 3,200 mg/L                      Algae Toxicity EC50: 990 mg/L  <i>Sorbitan, monopalmitate as an ingredient (1-5%)</i>                      Fish Toxicity LC50: &gt;,1800 mg/L                      Algae Toxicity EC50: 41 mg/L  <i>Aluminium stearate as an ingredient (1-5%)</i>                      Fish Toxicity LC50: &gt;5,600 mg/L EC50: 6,500 mg/L                      Water makes up the remainder of this product.</p> <p><b>Chronic Toxicity:</b>                      No data available to indicate product or components present at greater than 1% are chronic health hazards.</p> <p><b>Biodegradation/bioaccumulation:</b>                      Readily biodegradable. Low bioaccumulation potential due to rapid degradation.</p>	Yes
Barite	Halliburton	Weighting Agent	0.2901%	<p>Acute Fish Toxicity 96hr LC50 76000mg/L @ 96 hr Species Oncorhynchus mykiss EPA Ref# 869                      48hr LC50 &gt;30lb/gal (&gt;3594790mg/L) Report no BL8279 Species Pimephales promelas (fish)                      48hr LC50 &gt;30lb/bbl (&gt;85556mg/L) Report BL8377 Species Daphnia pulex (Water Flea – crustacean)                      Bioassay testing where LC50/EC50: &gt;100 mg/L                      Oral Toxicity: LD50: &gt;15000 mg/kg (Rat)                      Barium sulphate (major ingredient of barite (60-100%) is insoluble in water and not biodegradable.                      Not expected to bioaccumulate.                      This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities.                      OCNS Group: E</p>	Yes

**B. PRODUCT LIST: cont'd**

Trade name	Supplier	Purpose	Product in system fluid (mass %)	Toxicity & Ecotoxicity Info	MSDS Attached
TUNED SPACER E+	Halliburton	Mud/Cement Spacer	0.03608%	<p><u>Acute Toxicity:</u>  <i>Bentonite as an ingredient (60-100%)</i>                      Oral Toxicity LD50: 5,000 mg/kg (Rat)                      Fish Toxicity (Marine) 96h LC50: 8-19 g/L (Salmo gairdneri )                      Fish Toxicity TLM96: 10,000 ppm (Oncorhynchus mykiss)  <i>Crystalline silica, quartz as an ingredient (1-5%)</i>                      Oral Toxicity LD50: 500 mg/kg (Rat)                      Fish Toxicity LC50: &gt;10,000 mg/l                      Algae Toxicity EC50: &gt;5,000 mg/l  <i>Crystalline silica, cristobalite as an ingredient (0-1%)</i>                      As for Crystalline silica, quartz.  <i>Crystalline silica, tridymite as an ingredient (0-1%)</i>                      As for Crystalline silica, quartz.  <i>Sodium Lignosulfonate as an ingredient (10-30%)</i>                      Oral Toxicity LD50 Rat: &gt;6,000 mg/kg  <i>Welan gum as an ingredient (5-10%)</i>                      Fish Toxicity LC50: &gt;750 mg/l                      Algae Toxicity EC50: 1240 mg/l</p> <p><u>Chronic Toxicity:</u>                      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. Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1- carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A-possible carcinogen to humans).</p> <p><u>Biodegradation/bioaccumulation:</u>                      Silica is a naturally occurring, insoluble component of soil. Biodegradation is "not applicable" for crystalline silica since it is inorganic. Concentration-based toxicity values were not available.</p>	Yes
<b>total</b>			<b>100.00%</b>		

**C. CHEMICAL LIST**

Chemicals within products in Part B	CAS number	Maximum Mass fraction in System (%)
Water	NA	99.23%
Water in Product	7732-18-5	0.3240%
Barite	13462-86-7	0.2123%
Sodium silicate	1344-09-8	0.1944%
Bentonite	1302-78-9	0.02640%
Sodium Lignosulfonate	8061-51-6	0.007921%
Welan gum	72121-88-1	0.002640%
Crystalline silica, quartz	14808-60-7	0.0007921%
Rape Oil	8002-13-9	0.0005103%
Crystalline silica, tridymite	15468-32-3	0.0002640%
Crystalline silica, cristobalite	14464-46-1	0.0002640%
Monopropylene glycol monooleate	1330-80-9	0.00005103%
Sorbitan, monopalmitate	26266-57-9	0.00002551%
Aluminium stearate	637-12-7	0.00002551%
	<b>Total</b>	<b>100.00%</b>

**Appendix 2 - Drilling & Cementing Chemicals  
MSDS's**

## **Drilling**



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

<b>Flammability</b>	Combustible. May evolve toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Dry agent, carbon dioxide, foam or water fog. Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	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.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	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).
<b>Handling</b>	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 <sup>3</sup>	--	--

**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

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

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## 10. STABILITY AND REACTIVITY

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

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	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.
<b>Eye</b>	Corrosive - irritant. Contact may result in irritation, lacrimation, pain, redness, corneal burns and possible permanent damage.
<b>Inhalation</b>	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.
<b>Skin</b>	Slightly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns. May cause sensitisation by skin contact.
<b>Ingestion</b>	Slightly corrosive. Ingestion may result in ulceration and burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea.
<b>Toxicity Data</b>	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)

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	In soil and water, triethanolamine will biodegrade fairly rapidly following acclimation (half-life in the order of days to weeks). In soil, residual triethanolamine may leach to groundwater. LC50 (shrimp): > 100 ppm.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	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.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	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
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**Product Name**     **ANCOR 1**

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 Indices(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/m<sup>3</sup> - 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**

Risk Management Technologies  
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Western Australia 6005  
Phone: +61 8 9322 1711  
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Email: info@rmt.com.au  
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**SDS Date** 28 Jan 2010

**End of Report**

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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 1.1 Product identifier

**Product name** AVAPERM NF  
**Synonym(s)** F003132 - SDS CODE

### 1.2 Uses and uses advised against

**Use(s)** INHIBITOR IN DRILLING FLUIDS

### 1.3 Details of the supplier of the safety data sheet

**Supplier name** NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD  
**Address** 11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**Telephone** +61 8 9410 8200  
**Fax** +61 8 9410 8299  
**Website** [www.newpark.com](http://www.newpark.com)

### 1.4 Emergency telephone number(s)

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

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## 2. HAZARDS IDENTIFICATION

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### 2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**GHS classification** Acute Toxicity: Oral: Category 4  
Acute Toxicity: Skin: Category 4  
Skin Corrosion/Irritation: Category 2  
Serious Eye Damage / Eye Irritation: Category 2A  
Specific Target Organ Systemic Toxicity (Single Exposure): Category 3

### 2.2 Label elements

**Signal word** WARNING

**Pictograms**



### Hazard statement(s)

H302 Harmful if swallowed.  
H312 Harmful in contact with skin.  
H315 Causes skin irritation.  
H319 Causes serious eye irritation.  
H335 May cause respiratory irritation.

### Prevention statement(s)

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.  
P264 Wash thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well-ventilated area.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.

**PRODUCT NAME AVAPERM NF****Response statement(s)**

P301 + P312 IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell.  
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P321 Specific treatment is advised - see first aid instructions.  
P330 Rinse mouth.  
P332 + P337 + P313 If skin or eye irritation occurs: Get medical advice/ attention.  
P362 Take off contaminated clothing and wash before re-use.

**Storage statement(s)**

P403 + P233 Store in a well-ventilated place. Keep container tightly closed (applies if the substance is volatile so as to generate a hazardous atmosphere).  
P405 Store locked up.

**Disposal statement(s)**

P501 Dispose of contents/container in accordance with relevant regulations.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

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**3.1 Substances / Mixtures**

Ingredient	Identification	Classification	Content
HYDROGENATED HEXANEDINITRILE CHLORIDE	Not Available		35 to 70%
WATER	CAS: 7732-18-5 EC: 231-791-2		30 to 65%

**Ingredient Notes**

This product is mixture of 30-50% Hexanedinitrile, 5-20% Hydrochloric acid (as pH corrector) and water. Hydrochloric acid is used to neutralise hexanedinitrile to become the salt with slightly alkali (pH 9-11).

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**4. FIRST AID MEASURES**

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**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).

**First aid facilities** Eye wash facilities and safety shower are recommended.

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

See Section 11 for more detailed information on health effects and symptoms.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**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 (carbon/ nitrogen oxides, hydrocarbons) when heated to decomposition.

### **5.3 Advice for firefighters**

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.

### **5.4 Hazchem code**

None allocated.

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## **6. ACCIDENTAL RELEASE MEASURES**

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### **6.1 Personal precautions, protective equipment and emergency procedures**

Wear Personal Protective Equipment (PPE) as detailed in Section 8 of this SDS. Clear area of all unprotected personnel. Ventilate area where possible. 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 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.

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## **7. HANDLING AND STORAGE**

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### **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. Check regularly for leaks or spills.

### **7.3 Specific end use(s)**

No information provided.

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## **8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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### **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. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

#### **PPE**

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



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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### 9.1 Information on basic physical and chemical properties

Appearance	LIQUID
Odour	PUNGENT ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	100°C (Approximately)
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	9 to 10
Vapour density	NOT AVAILABLE
Specific gravity	1.00 to 1.10
Solubility (water)	SOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

### 9.2 Other information

% Volatiles	NOT AVAILABLE
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## 10. STABILITY AND REACTIVITY

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### 10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

### 10.2 Chemical stability

Stable under recommended conditions of storage.

### 10.3 Possibility of hazardous reactions

Hazardous polymerization is not expected to occur.

### 10.4 Conditions to avoid

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

### 10.5 Incompatible materials

Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), nitrites, heat and ignition sources. Incompatible with Isocyanates, aldehydes, ketones, anhydrides, phenols, nitrates, halogenated compounds.

### 10.6 Hazardous decomposition products

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

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## 11. TOXICOLOGICAL INFORMATION

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### 11.1 Information on toxicological effects

<b>Health hazard summary</b>	Harmful - 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 irritation to the eyes, skin and respiratory system.
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Irritant. Over exposure to vapours may result in respiratory irritation, nausea, dizziness and headache. High level exposure may result in drowsiness and breathing difficulties.
<b>Skin</b>	Irritant. Contact may result in drying and defatting of the skin, rash and dermatitis.
<b>Ingestion</b>	Harmful. Ingestion may result in gastrointestinal irritation, nausea, vomiting, abdominal pain, diarrhoea, headache, dizziness and drowsiness with large quantities.
<b>Toxicity data</b>	No LD50 data available for this product.



## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

This product is registered on Offshore Chemical Notification Scheme Gold, Gold, Gold for HQ Band 17.5", 12.25" and 8.5" respectively.

### 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 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 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, IMDG OR IATA

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
<b>14.1 UN number</b>	None Allocated	None Allocated	None Allocated
<b>14.2 UN proper shipping name</b>	None Allocated	None Allocated	None Allocated
<b>14.3 Transport hazard classes</b>			
<b>DG class</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary risk(s)</b>	None Allocated	None Allocated	None Allocated
<b>14.4 Packing group</b>	None Allocated	None Allocated	None Allocated
<b>14.5 Environmental hazards</b>	None Allocated		
<b>14.6 Special precautions for user</b>			
<b>Hazchem code</b>	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
Xn	Harmful

**Risk phrases**

R21/22	Harmful in contact with skin and if swallowed.
R36/37/38	Irritating to eyes, respiratory system and skin.

**Safety phrases**

S1/2	Keep locked up and out of reach of children.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S45	In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

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

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## 16. OTHER INFORMATION

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### Additional information

The manufacturer indicates the product is mixture of 30-50% Hexanedinitrile, 5-20% Hydrochloric acid (as pH corrector) and water. Hydrochloric acid is used to neutralise hexanedinitrile to become the salt with slightly alkali (pH 9-11).

AMINE: CAUTION THIS PRODUCT CONTAINS AN AMINE. DO NOT ADD NITRITES or other NITROSATING AGENTS to this product due to the potential for NITROSAMINE formation. Nitrosamines are potent carcinogens and some have been shown to cause severe acute (heart, brain, blood, liver - kidney) damage as well as chronic effects (reproductive effects, liver - lung and kidney tumours).

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.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGE (TWA) or WES (WORKPLACE EXPOSURE STANDARD) (NZ): 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).

#### 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.

#### 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.

**PRODUCT NAME AVAPERM NF****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
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
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
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

**Revision history**

Revision	Description
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**  
**SDS date: 08 April 2014**

**[ End of SDS ]**

**SAFETY DATA SHEET**Product Name **BARITE****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)** BARIUM SULPHATE · RHEOCHEM BARITE, RHEOBAR  
**Use(s)** DRILLING FLUID ADDITIVE · WEIGHTING AGENT  
**SDS Date** 07 September 2012

**2. HAZARDS IDENTIFICATION**

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**RISK PHRASES**

None allocated

**SAFETY PHRASES**

None allocated

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

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	None Allocated		

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Identification	Classification	Content
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	<3%
BARIUM SULPHATE	CAS: 7727-43-7 EC: 231-784-4	Not Available	>89%

**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).

**Advice to Doctor** Treat symptomatically.

**First Aid Facilities** Eye wash facilities should be available.

## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Non flammable. May evolve toxic gases (sulphur oxides) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	If spilt (bulk), 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.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Barium sulphate	SWA (AUS)	--	10	--	--
Silica, Crystalline Quartz	SWA (AUS)	--	0.1	--	--

<b>Biological Limits</b>	No Biological Limit Value allocated.
<b>Engineering Controls</b>	Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

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



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	OFF-WHITE POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	NOT RELEVANT
<b>Melting point</b>	> 1300°C
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	8.2 (20% Slurry)
<b>Vapour density</b>	NOT AVAILABLE

**Product Name**      **BARITE**

<b>Specific gravity</b>	4.20
<b>Solubility (water)</b>	INSOLUBLE
<b>Vapour pressure</b>	NOT RELEVANT
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Partition coefficient</b>	NOT AVAILABLE
<b>% Volatiles</b>	NOT AVAILABLE

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**10. STABILITY AND REACTIVITY**

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<b>Chemical Stability</b>	Stable under recommended conditions of storage.
<b>Conditions to Avoid</b>	Avoid heat, sparks, open flames and other ignition sources.
<b>Material to Avoid</b>	Compatible with most commonly used materials.
<b>Hazardous Decomposition Products</b>	May evolve toxic gases (sulphur oxides) when heated to decomposition.
<b>Hazardous Reactions</b>	Polymerization is not expected to occur.

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	Low toxicity. Under normal conditions of use, adverse health effects are not anticipated. Chronic exposure to crystalline silica may result in lung fibrosis (silicosis). However, due to the low levels of crystalline silica, chronic health effects are not anticipated with normal use. Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Eye</b>	Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Irritant. Over exposure to dust may result in mucous membrane irritation of the respiratory tract. Chronic exposure to crystalline silica may result in silicosis (lung fibrosis). Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Skin</b>	Low irritant. Prolonged or repeated exposure to dust may result in irritation and dermatitis.
<b>Ingestion</b>	Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation.
<b>Toxicity Data</b>	QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (inhalation)                      300 ug/m <sup>3</sup> /10 years (human) TCLo (inhalation)                      16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis)

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**12. ECOLOGICAL INFORMATION**

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<b>Environment</b>	This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Fish toxicity: LC50 (Rainbow trout) = 7500 ppm/96 hour.
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**13. DISPOSAL CONSIDERATIONS**

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<b>Waste Disposal</b>	Dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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

	<b>LAND TRANSPORT (ADG)</b>	<b>SEA TRANSPORT (IMDG / IMO)</b>	<b>AIR TRANSPORT (IATA / ICAO)</b>
<b>UN Number</b>	None Allocated	None Allocated	None Allocated
<b>Proper Shipping Name</b>	None Allocated	None Allocated	None Allocated
<b>DG Class/ Division</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary Risk(s)</b>	None Allocated	None Allocated	None Allocated

**Product Name**      **BARITE**

**Packing Group**    None Allocated    None Allocated    None Allocated  
**Hazchem Code**    None Allocated

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## 15. REGULATORY INFORMATION

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**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.

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## 16. OTHER INFORMATION

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**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.

**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 <sup>3</sup>	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
1.1	Standard SDS Review
1.0	Initial SDS creation

**Product Name**      **BARITE**

**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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**Revision:** 1.1  
**SDS Date:** 07 September 2012

**End of SDS**



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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 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 product

**Supplier name**       **NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD**  
**Address**             **11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA**  
**Telephone**         **+61 8 9410 8200**  
**Fax**                 **+61 8 9410 8299**  
**Website**            **[www.newpark.com](http://www.newpark.com)**

### 1.4 Emergency telephone number(s)

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

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## 2. HAZARDS IDENTIFICATION

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### 2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO AUSTRALIAN WHS REGULATIONS

**GHS classification(s)**   **Serious Eye Damage / Eye Irritation: Category 2A**

### 2.2 Label elements

**Signal word**            **WARNING**

**Pictogram(s)**



### Hazard statement(s)

H319                    Causes serious eye irritation.

### Prevention statement(s)

P264                    Wash thoroughly after handling.  
P280                    Wear protective gloves/protective clothing/eye protection/face protection.

### Response statement(s)

P305 + P351 + P338   **IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.**  
P337 + P313            **If eye irritation persists: Get medical advice/attention.**

### Storage statement(s)

None allocated.

### Disposal statement(s)

None allocated.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

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**3.1 Substances / Mixtures**

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

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**4. FIRST AID MEASURES**

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**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.

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**5. FIRE FIGHTING MEASURES**

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**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.

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**6. ACCIDENTAL RELEASE MEASURES**

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**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

<b>Eye / Face</b>	Wear dust-proof goggles.
<b>Hands</b>	Wear PVC or rubber gloves.
<b>Body</b>	When using large quantities or where heavy contamination is likely, wear coveralls.
<b>Respiratory</b>	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

<b>Appearance</b>	WHITE POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	> 1600°C
<b>Melting point</b>	772°C
<b>Evaporation rate</b>	NOT RELEVANT
<b>pH</b>	7.0 to 9.0
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	2.15
<b>Solubility (water)</b>	590 kg/m <sup>3</sup> (Approximately)
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE

**9.2 Other information**

% Volatiles

NOT AVAILABLE

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**10. STABILITY AND REACTIVITY**

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**10.1 Reactivity**

Carefully review all information provided 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**

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

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**11. TOXICOLOGICAL INFORMATION**

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**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/m<sup>3</sup>/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.

**Sensitization** This product is not known to be a skin or respiratory sensitiser.

**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 effects from repeated exposure.

**Aspiration** This product does not present an aspiration hazard.

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**12. ECOLOGICAL INFORMATION**

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**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 Other adverse effects**

No information provided.

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**13. DISPOSAL CONSIDERATIONS**

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**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.

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**14. TRANSPORT INFORMATION**

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

	<b>LAND TRANSPORT (ADG)</b>	<b>SEA TRANSPORT (IMDG / IMO)</b>	<b>AIR TRANSPORT (IATA / ICAO)</b>
<b>14.1 UN Number</b>	None Allocated	None Allocated	None Allocated
<b>14.2 Proper Shipping Name</b>	None Allocated	None Allocated	None Allocated
<b>14.3 Transport hazard class</b>	None Allocated	None Allocated	None Allocated
<b>14.4 Packing Group</b>	None Allocated	None Allocated	None Allocated

**14.5 Environmental hazards**    No information provided

**14.6 Special precautions for user**

**Hazchem code**            None Allocated

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**15. REGULATORY INFORMATION**

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**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**      Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

**Hazard codes**        Xi            Irritant

**Risk phrases**        R36        Irritating to eyes.

**Safety phrases**      S22        Do not breathe dust.  
S24        Avoid contact with skin.

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

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**16. OTHER INFORMATION**

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**PRODUCT NAME    CALCIUM CHLORIDE POWDER 94-97%****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.

**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.

**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
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/m <sup>3</sup>	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 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.

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**Prepared by**

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[ End of SDS ]

Product Name **CAUSTIC SODA****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)** CAUSTIC SODA • SODA LYE • SODIUM HYDROXIDE SOLID  
**Use(s)** MANUFACTURE OF CHEMICALS • REAGENT • SCRUBBING AGENT  
**SDS Date** 01 Nov 2010

**2. HAZARDS IDENTIFICATION**

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**RISK PHRASES**

R35 Causes severe burns.

**SAFETY PHRASES**

S1/2 Keep locked up and out of reach of children.

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S37/39 Wear suitable gloves and eye/face protection.

S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

**UN No.** 1823                      **DG Class** 8                      **Subsidiary Risk(s)** None Allocated  
**Packing Group** II                      **Hazchem Code** 2X

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Formula	CAS No.	Content
SODIUM HYDROXIDE	Na-OH	1310-73-2	>98%
SILICA, AMORPHOUS	Si-O2	7631-86-9	0.0030%

**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 an Air-line respirator where an inhalation risk exists. 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.

## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Non flammable. May evolve toxic gases if strongly heated. May evolve flammable hydrogen gas in contact with some metals.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	2X

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	If spilt (bulk), notify local authorities where appropriate. Collect and reuse where possible. Use personal protective equipment. Contain spillage, then collect and place in suitable containers for disposal. Clean spill site with soap solution.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from oxidising agents, acids, metals, 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. Large storage areas should have appropriate ventilation systems. It is recommended that the storage temperature be maintained between 15 and 25°C. Unsuitable storage containers: aluminium, tin or zinc.
<b>Handling</b>	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	
Fumed silica (respirable dust)	SWA (AUS)	--	2 mg/m3	--	--
Sodium hydroxide (peak limitation)	SWA (AUS)	--	2 mg/m3	--	--

**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 dust levels below the recommended exposure standard.

**PPE** Wear dust-proof goggles, a PVC apron, rubber boots, rubber or PVC gloves, a faceshield and coveralls. At high dust levels, wear: a Full-face Class P3 (Particulate) or an Air-line respirator. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE DELIQUESCENT PEARLS	<b>Solubility (water)</b>	1110 kg/m3 @ 20°C
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	2.12
<b>pH</b>	13.5 (1 % solution)	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	1390°C	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	318°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	NOT AVAILABLE		



## 10. STABILITY AND REACTIVITY

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

## 11. TOXICOLOGICAL INFORMATION

<b>Health Hazard Summary</b>	Highly corrosive. This product has the potential to cause serious adverse health effects. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in severe burns with corrosive tissue damage. Upon dilution, the potential for corrosive effects may be reduced.
<b>Eye</b>	Highly corrosive. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and corneal burns with possible permanent damage.
<b>Inhalation</b>	Corrosive. Over exposure to dust may result in mucous membrane irritation of the respiratory tract, coughing and bronchitis. High level exposure may result in intense thirst, ulceration, lung tissue damage, chemical pneumonitis and pulmonary oedema. Effects may be delayed.
<b>Skin</b>	Corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns. Effects may be delayed.
<b>Ingestion</b>	Highly corrosive - toxic. Ingestion may result in burns to the mouth and throat, nausea, vomiting, ulceration of the gastrointestinal tract, oedema, rapid pulse, shock, unconsciousness, convulsions and death.
<b>Toxicity Data</b>	SODIUM HYDROXIDE (1310-73-2) LD50 (Intraperitoneal): 40 mg/kg (mouse) LDLo (Ingestion): 1.57 mg/kg (human) SILICA, AMORPHOUS (7631-86-9) LD50 (Ingestion): 3160 mg/kg (rat)

## 12. ECOLOGICAL INFORMATION

<b>Environment</b>	WATER: If released to waterways, alkaline products may change the pH of the waterway. Fish will die if the pH reaches 10-11 (goldfish 10.9, bluegill 10.5). SOIL: May leach to groundwater with toxic effects on aquatic life as above. ATMOSPHERE: Not expected to reside in the atmosphere. Drops or particles released to atmosphere should be removed by gravity and/or be rained out.
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## 13. DISPOSAL CONSIDERATIONS

<b>Waste Disposal</b>	Add to large quantity of water and neutralise (to pH 6-8) by SLOW addition of 6 mol/L hydrochloric acid (HCl). Discharge neutral solutions to drain or sewer with excess water. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

## 14. TRANSPORT INFORMATION



CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

<b>Shipping Name</b>	SODIUM HYDROXIDE, SOLID			<b>Subsidiary Risk(s)</b>	None Allocated
<b>UN No.</b>	1823	<b>DG Class</b>	8	<b>GTEPG</b>	8A1
<b>Packing Group</b>	II	<b>Hazchem Code</b>	2X		

**Product Name** CAUSTIC SODA

**IATA**

**Shipping Name** SODIUM HYDROXIDE, SOLID  
**UN No.** 1823 **DG Class** 8 **Subsidiary Risk(s)** None Allocated  
**Packing Group** II

**IMDG**

**Shipping Name** SODIUM HYDROXIDE, SOLID  
**UN No.** 1823 **DG Class** 8 **Subsidiary Risk(s)** None Allocated  
**Packing Group** II

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**15. REGULATORY INFORMATION**

**Poison Schedule** Classified as a Schedule 6 (S6) 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).

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**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.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGE (TWA) or WES (WORKPLACE EXPOSURE STANDARD) (NZ): 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).

ABBREVIATIONS:

ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.  
BEI - Biological Exposure Indices(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/m<sup>3</sup> - 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

**Product Name CAUSTIC SODA**

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** Risk Management Technologies  
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Western Australia 6005  
Phone: +61 8 9322 1711  
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Email: info@rmt.com.au  
Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

---

**1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER**


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**1.1 Product identifier**

**Product name** CIRCAL  
**Synonym(s)** CALCIUM CARBONATE • LIMESTONE • MARBLE • OMYACARB • RHEOCARB

**1.2 Uses and uses advised against**

**Use(s)** DRILLING FLUID ADDITIVE • WEIGHTING AGENT

**1.3 Details of the supplier of the product**

**Supplier name** NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD  
**Address** 11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**Telephone** +61 8 9410 8200  
**Fax** +61 8 9410 8299  
**Website** [www.newpark.com](http://www.newpark.com)

**1.4 Emergency telephone number(s)**

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

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**2. HAZARDS IDENTIFICATION**


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**2.1 Classification of the substance or mixture**

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**2.2 Label elements**

No signal word, pictograms, hazard or precautionary statements have been allocated.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**


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**3.1 Substances / Mixtures**

Ingredient	Identification	Classification		Content
		GHS	Risk	
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	Not Available	<1%
CALCIUM CARBONATE	CAS: 471-34-1 EC: 207-439-9	Not Available	Not Available	>96%

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**4. FIRST AID MEASURES**


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**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). If swallowed, do not induce vomiting.

**PRODUCT NAME CIRCAL**

**First aid facilities** No information provided.

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

See Section 11 for more detailed information on health effects and symptoms.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**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 if strongly heated.

**5.3 Advice for firefighters**

No fire or explosion hazard exists.

**5.4 Hazchem code**

None allocated.

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**6. ACCIDENTAL RELEASE MEASURES**

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**6.1 Personal precautions, protective equipment and emergency procedures**

Wear Personal Protective Equipment (PPE) as detailed in Section 8.

**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.

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**7. HANDLING AND STORAGE**

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**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.

**7.3 Specific end use(s)**

No information provided.

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**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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**8.1 Control parameters**

**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Calcium carbonate	SWA (AUS)	--	10	--	--
Quartz (respirable dust)	SWA (AUS)	--	0.1	--	--

**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**

- Eye / Face** Wear dust-proof goggles.
- Hands** When using large quantities or where heavy contamination is likely, 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.



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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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**9.1 Information on basic physical and chemical properties**

<b>Appearance</b>	OFF-WHITE POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	NOT AVAILABLE
<b>Melting point</b>	825°C
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	9
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	2.7
<b>Solubility (water)</b>	INSOLUBLE
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	840°C
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE

**9.2 Other information**

<b>% Volatiles</b>	NOT AVAILABLE
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**10. STABILITY AND REACTIVITY**

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**10.1 Reactivity**

Carefully review all information provided 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 acids (eg. nitric acid), fluorine, aluminium (hot) and ammonium salts. Incompatible with oxidising agents (eg. hypochlorites).

**10.6 Hazardous decomposition products**

May evolve toxic gases if heated to decomposition.

**11. TOXICOLOGICAL INFORMATION**

**11.1 Information on toxicological effects**

<b>Acute toxicity</b>	This product is expected to be of low toxicity. Based on available data, the classification criteria are not met. LD50 (Ingestion) = 6450 mg/kg (rat).
<b>Skin</b>	Not classified as a skin irritant. Contact may result in mild irritation, redness and rash.
<b>Eye</b>	Not classified as an eye irritant. Contact may cause discomfort, lacrimation and redness.
<b>Sensitization</b>	This product is not known to be a skin or respiratory sensitiser.
<b>Mutagenicity</b>	Insufficient data available to classify as a mutagen.
<b>Carcinogenicity</b>	Insufficient data available to classify as a carcinogen.
<b>Reproductive</b>	Insufficient data available to classify as a reproductive toxin.
<b>STOT – single exposure</b>	Not classified as causing organ effects from single exposure.
<b>STOT – repeated exposure</b>	Not classified as causing organ effects from repeated exposure. Chronic exposure to respirable silica may result in pulmonary fibrosis (silicosis). However, given the low levels present, over exposure is not anticipated.
<b>Aspiration</b>	This product does not present an aspiration hazard.

**12. ECOLOGICAL INFORMATION**

**12.1 Toxicity**

Calcium carbonate occurs naturally in a wide variety of substances including limestone, marble and egg shells. It is not anticipated to cause adverse environmental effects.

**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 Other adverse effects**

Avoid contaminating waterways.

**13. DISPOSAL CONSIDERATIONS**

**13.1 Waste treatment methods**

<b>Waste disposal</b>	Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is required.
<b>Legislation</b>	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)
<b>14.1 UN Number</b>	None Allocated	None Allocated	None Allocated
<b>14.2 Proper Shipping Name</b>	None Allocated	None Allocated	None Allocated
<b>14.3 Transport hazard class</b>	None Allocated	None Allocated	None Allocated
<b>14.4 Packing Group</b>	None Allocated	None Allocated	None Allocated

**14.5 Environmental hazards** No information provided

**14.6 Special precautions for user**

Hazchem code None Allocated

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## 15. REGULATORY INFORMATION

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**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** Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

**Hazard codes** None allocated.

**Risk phrases** None allocated.

**Safety phrases** None allocated.

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

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## 16. OTHER INFORMATION

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**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.

**EXPOSURE CONTROL:** If utilized 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.

**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.

**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.



**PRODUCT NAME CIRCAL****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
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
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
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

**Revision history**

Revision	Description
2.0	Converted to GHS.
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.

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**Prepared by**

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Web: www.rmt.com.au.

**Revision:** 2  
**SDS date:** 19 August 2014

**[ End of SDS ]**

## MATERIAL SAFETY DATA SHEET

Product Name **CITRIC ACID****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)** 2-HYDROXY-1,2,3-PROPANETRICARBOXYLIC ACID • CITRIC ACID ANHYDROUS • CITRIC ACID MONOHYDRATE

**Use(s)** INDUSTRIAL APPLICATIONS

**SDS Date** 01 Nov 2010

**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**

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S37/39 Wear suitable gloves and eye/face protection.

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
CITRIC ACID, ANHYDROUS	C6-H8-O7	77-92-9	>99%
WATER	H2O	7732-18-5	<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). If swallowed, do not induce vomiting.**Advice to Doctor** Treat symptomatically.

Product Name **CITRIC ACID**

## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Dry agent, carbon dioxide, foam or water fog. Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	If spilt (bulk), use personal protective equipment. Ventilate area where possible. Contain spillage, then collect and place in suitable containers for disposal. Avoid generating dust.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from moisture, oxidising agents and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.
<b>Handling</b>	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

<b>Exposure Stds</b>	No exposure standard(s) allocated.
<b>Biological Limits</b>	No Biological Limit Value allocated.
<b>Engineering Controls</b>	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.
<b>PPE</b>	Wear dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. At high dust levels, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE CRYSTALLINE POWDER	<b>Solubility (water)</b>	1330 kg/m <sup>3</sup> @ 20°C
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	1.665
<b>pH</b>	2.2 (0.1M Solution)	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	COMBUSTIBLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	174°C
<b>Boiling Point</b>	175°C (Decomposes)	<b>Upper Explosion Limit</b>	NOT AVAILABLE
<b>Melting Point</b>	153°C	<b>Lower Explosion Limit</b>	NOT AVAILABLE
<b>Evaporation Rate</b>	NOT AVAILABLE		
<b>Autoignition Temperature</b>	345°C		

## 10. STABILITY AND REACTIVITY

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

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity - slightly corrosive. Citric acid is not anticipated to present adverse health effects in industrial applications. Use safe work practices to avoid eye or skin contact and inhalation. Citric acid has the potential to cause allergic effects.
<b>Eye</b>	Slightly corrosive - irritant. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and possible burns.
<b>Inhalation</b>	Irritant. Over exposure to dust may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Slightly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns. May cause sensitisation by skin contact.
<b>Ingestion</b>	Slightly corrosive. Ingestion may result in ulceration and burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea.
<b>Toxicity Data</b>	CITRIC ACID, ANHYDROUS (77-92-9) LD50 (Ingestion): 3000 mg/kg (rat) LD50 (Intraperitoneal): 290 mg/kg (rat) LD50 (Intravenous): 42 mg/kg (mouse) LDLo (Ingestion): 7000 mg/kg (rabbit)

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	WATER: If citric acid is released to water, it is expected to biodegrade rapidly. May be toxic to fish at moderately high levels (120 ppm is fatal to daphnia; 894 ppm with pH 4 is fatal to goldfish) due to acidic nature. Fairly high biological oxygen demand (BOD) which may cause oxygen depletion in large spills. Citric acid occurs naturally in many plants.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Neutralise with lime, anion exchanger or similar. For small amounts absorb with sand or similar and dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

---

<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

---

## 16. OTHER INFORMATION

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<b>Additional Information</b>	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).
-------------------------------	---

### ABBREVIATIONS:

ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.  
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CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.  
CNS - Central Nervous System.  
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IARC - International Agency for Research on Cancer.  
mg/m<sup>3</sup> - 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).

**Product Name****CITRIC ACID**

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.

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**Report Status**

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**Prepared By**

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Email: info@rmt.com.au  
Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

**Product Name** DEFOAM A (I)**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)** DEFOAM-A (I)  
**Use(s)** COMPLETION FLUID · DRILLING FLUID  
**SDS Date** 12 November 2012

**2. HAZARDS IDENTIFICATION****CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA****RISK PHRASES**

R36/37/38 Irritating to eyes, respiratory system and skin.  
R67 Vapours may cause drowsiness and dizziness.

**SAFETY PHRASES**

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice  
S36 Wear suitable protective clothing.

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

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	None Allocated		

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Identification	Classification	Content
OCTAN-2-OL	CAS: 123-96-6 EC: 204-667-0	Not Available	>98%
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.

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## 5. FIRE FIGHTING MEASURES

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<b>Flammability</b>	Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Dry agent, carbon dioxide or foam. Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

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## 6. ACCIDENTAL RELEASE MEASURES

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<b>Spillage</b>	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. Eliminate all ignition sources.
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## 7. STORAGE AND HANDLING

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<b>Storage</b>	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).
<b>Handling</b>	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.

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

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



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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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<b>Appearance</b>	CLEAR LIQUID
<b>Odour</b>	SLIGHT ODOUR
<b>Flammability</b>	CLASS C1 COMBUSTIBLE
<b>Flash point</b>	88°C (cc)
<b>Boiling point</b>	180°C
<b>Melting point</b>	-39°C
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	NOT AVAILABLE
<b>Vapour density</b>	4.5 (Air = 1)
<b>Specific gravity</b>	0.87
<b>Solubility (water)</b>	SOLUBLE

**Product Name**      **DEFOAM A (I)**

Vapour pressure	1 mm Hg @ 33°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	100 %

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**10. STABILITY AND REACTIVITY**

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

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	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.
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	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.
<b>Skin</b>	Irritant. Contact may result in drying and defatting of the skin, rash and dermatitis.
<b>Ingestion</b>	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.
<b>Toxicity Data</b>	No LD50 data available for this product.

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**12. ECOLOGICAL INFORMATION**

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<b>Environment</b>	Aliphatic hydrocarbons behave differently in the environment depending on their size. WATER: Light aliphatics volatilise rapidly from water (half life - few hours). Bioconcentration should not be significant. SOIL: Light aliphatics biodegrade quickly in soil and water, heavy aliphatics biodegrade very slowly. ATMOSPHERE: Vapour-phase aliphatics will degrade by reaction with hydroxyl radicals.
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**13. DISPOSAL CONSIDERATIONS**

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<b>Waste Disposal</b>	Incinerate where available. For small amounts absorb with sand, vermiculite or similar and dispose of to approved landfill site.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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

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



**Product Name** DEFOAM A (I)

**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.  
**EUROPE: EINECS (European Inventory of Existing Chemical Substances)**  
All components are listed on EINECS, 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.

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.

### 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 <sup>3</sup>	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
1.1	Standard SDS Review
1.0	Initial SDS Creation.

**Product Name**      **DEFOAM A (I)**

**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**

## SAFETY DATA SHEET

**Product Name**      **FRAC ATTACK**

### 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Supplier name**                      **RHEOCHEM LTD**  
**Address**                                11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**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)**                            FRAC-ATTACK  
**Use(s)**                                    LOST CIRCULATION MATERIAL  
**SDS date**                                11 July 2013

### 2. HAZARDS IDENTIFICATION

**CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA**

**RISK PHRASES**

R34                                        Causes burns.

**SAFETY PHRASES**

S26                                        In case of contact with eyes, rinse immediately with plenty of water and seek medical advice  
 S36/37/39                                Wear suitable protective clothing, gloves and eye/face protection.  
 S45                                        In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

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

<b>UN number</b>	None Allocated	<b>DG class</b>	None Allocated
<b>Packing group</b>	None Allocated	<b>Subsidiary risk(s)</b>	None Allocated
<b>Hazchem code</b>	None Allocated		

### 3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
CALCIUM OXIDE	CAS: 1305-78-8 EC: 215-138-9	Xi;R37/38 Xi;R41	<10%
CALCIUM HYDROXIDE	CAS: 1305-62-0 EC: 215-137-3	C;R34	<5%
CRISTOBALITE	CAS: 14464-46-1 EC: 238-455-4	Not Available	<5%
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	<3%
2-PROPENENITRILE-1,3-BUTADIENE RUBBER	CAS: 9003-18-3 EC: 618-357-1	Not Available	<50%
NATURAL RUBBER	CAS: 9006-04-6 EC: 232-689-0	Not Available	<50%
POLYISOPRENE	CAS: 9003-31-0 EC: 618-362-9	Not Available	<50%

**Product Name      FRAC ATTACK**

SBR ELASTOMERS	CAS: 9003-55-8 EC: 618-370-2	Not Available	<50%
CELLULOSE	CAS: 9004-34-6 EC: 232-674-9	Not Available	<30%
DIATOMACEOUS EARTH	CAS: 61790-53-2 EC: 612-383-7	Not Available	<15%
FULLERS EARTH	CAS: 8031-18-3 EC: 617-052-0	Not Available	<12%
MAGNESIUM OXIDE	CAS: 1309-48-4 EC: 215-171-9	Not Available	<2%

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**4. FIRST AID MEASURES**

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<b>Eye</b>	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.
<b>Inhalation</b>	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
<b>Skin</b>	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.
<b>Ingestion</b>	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once).
<b>Advice to doctor</b>	Treat symptomatically.
<b>First aid facilities</b>	Eye wash facilities should be available.

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**5. FIRE FIGHTING MEASURES**

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<b>Flammability</b>	Non flammable. May evolve toxic gases if strongly heated. May evolve calcium oxides when heated to decomposition.
<b>Fire and explosion</b>	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.
<b>Extinguishing</b>	Use an extinguishing agent suitable for the surrounding fire.
<b>Hazchem code</b>	None Allocated

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**6. ACCIDENTAL RELEASE MEASURES**

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<b>Personal precautions</b>	Wear Personal Protective Equipment (PPE) as detailed in Section 8 of this SDS. Clear area of all unprotected personnel. Contact emergency services where appropriate.
<b>Environmental precautions</b>	Prevent product from entering drains and waterways.
<b>Methods of cleaning up</b>	Contain spillage, then collect and place in suitable containers for reuse or disposal. Avoid generating dust.
<b>References</b>	See Sections 8 and 13 for exposure controls and disposal.

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**7. STORAGE AND HANDLING**

---

<b>Storage</b>	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. Check regularly for leaks or spills.
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Calcium hydroxide	SWA (AUS)	--	5	--	--
Calcium oxide	SWA (AUS)	--	2	--	--
Cellulose (paper fibre) (a)	SWA (AUS)	--	10	--	--
Cristobalite	SWA (AUS)	--	0.1	--	--
Diatomaceous earth (uncalcined) (a)	SWA (AUS)	--	10	--	--
Magnesium oxide (fume)	SWA (AUS)	--	10	--	--
Silica, Crystalline Quartz	SWA (AUS)	--	0.1	--	--

**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 dust levels below the recommended exposure standard.

**PPE****Eye / Face**

Wear dust-proof goggles.

**Hands**

Wear PVC or rubber gloves.

**Body**

Wear coveralls.

**Respiratory**

Where an inhalation risk exists, wear a Class P1 (Particulate) respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance</b>	BROWN/GREY POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	NOT RELEVANT
<b>Melting point</b>	NOT AVAILABLE
<b>Evaporation rate</b>	NON VOLATILE
<b>pH</b>	ALKALINE
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	2.10
<b>Solubility (water)</b>	NEGLIGIBLE
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE
<b>% Volatiles</b>	NOT RELEVANT

**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). Other material to

**Product Name**      **FRAC ATTACK**

avoid includes Fluorine, Oxygen Difluoride, Chlorine, Trifluoride and Hydrofluoric Acid.

**Hazardous Decomposition Products**      May evolve calcium oxides when heated to decomposition.**Hazardous Reactions**      Polymerization will not occur.

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	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. Over exposure may result in irritation and possible tissue damage. Chronic exposure to crystalline silica may cause lung fibrosis (silicosis), however due to the low levels of crystalline silica in this product, chronic health effects are not anticipated with normal use. Crystalline silica is classified as carcinogenic to humans (IARC Group 1).	
<b>Eye</b>	Slightly corrosive - irritant. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and possible burns.	
<b>Inhalation</b>	Slightly corrosive - irritant. Over exposure may result in irritation of the nose and throat, with coughing.	
<b>Skin</b>	Slightly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns.	
<b>Ingestion</b>	Slightly corrosive. Ingestion may result in ulceration and burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea.	
<b>Toxicity data</b>	CALCIUM HYDROXIDE (1305-62-0) LD50 (ingestion)                      7300 mg/kg (mouse)	
	CRISTOBALITE (14464-46-1) TCLo (inhalation)                      16 mppcf/8hours/17.9 years (human-fibrosis)	
	QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (inhalation)                      300 ug/m <sup>3</sup> /10 years (human) TCLo (inhalation)                      16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis)	
	CELLULOSE (9004-34-6) LC50 (inhalation)                      > 5800 mg/m <sup>3</sup> /4 hours (rat) LD50 (ingestion)                      > 5000 mg/kg (rat) LD50 (intraperitoneal)                      > 31600 mg/kg (rat) LD50 (skin)                              > 2000 mg/kg (rabbit)	
	MAGNESIUM OXIDE (1309-48-4) TCLo (inhalation)                      400 mg/kg (human)	

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**12. ECOLOGICAL INFORMATION**

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<b>Toxicity</b>	No information provided.
<b>Persistence and degradability</b>	No information provided.
<b>Bioaccumulative potential</b>	No information provided.
<b>Mobility in soil</b>	No information provided.
<b>Other adverse effects</b>	The manufacturer reports that this product is harmful to aquatic life.

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**13. DISPOSAL CONSIDERATIONS**

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<b>Waste disposal</b>	Collect without generating dust. Place in clean, sealed containers and dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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**NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE****LAND TRANSPORT  
(ADG)****SEA TRANSPORT  
(IMDG / IMO)****AIR TRANSPORT  
(IATA / ICAO)**

**Product Name**      **FRAC ATTACK**

<b>UN number</b>	None Allocated	None Allocated	None Allocated
<b>Proper shipping name</b>	None Allocated	None Allocated	None Allocated
<b>DG class/ Division</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary risk(s)</b>	None Allocated	None Allocated	None Allocated
<b>Packing group</b>	None Allocated	None Allocated	None Allocated
<b>Hazchem code</b>	None Allocated		

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**15. REGULATORY INFORMATION**

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<b>Poison schedule</b>	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).
<b>Inventory Listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> All components are listed on AICS, or are exempt.

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**16. OTHER INFORMATION**

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**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.

**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.

**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 <sup>3</sup>	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
1.5	Standard SDS Review
1.4	Standard SDS Review.
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.

**Prepared by**

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Web: www.rmt.com.au.

**Revision:** 1.5  
**SDS Date:** 11 July 2013

**End of SDS**



**Product Name** FRASCSEAL FINE, MEDIUM**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)** FINE FRACSEAL  
**Use(s)** DRILLING FLUID ADDITIVE  
**SDS Date** 23 November 2012

**2. HAZARDS IDENTIFICATION**

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**RISK PHRASES**

None allocated

**SAFETY PHRASES**

None allocated

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

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	None Allocated		

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Identification	Classification	Content
CELLULOSE	CAS: 9004-34-6 EC: 232-674-9	Not Available	100%

**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** Exposure is considered unlikely. Skin irritation is not anticipated.

**Ingestion** For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). Due to product form and application, ingestion is considered unlikely.

**Advice to Doctor** Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

**Flammability** Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition. Finely divided dust may form explosive mixtures with air.

**Product Name** FRASCSEAL FINE, MEDIUM

**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** If spilt (bulk), use personal protective equipment. Moisten with water to prevent a dust hazard and place in sealable containers for disposal.

## 7. STORAGE AND HANDLING

**Storage** Store in a cool, dry, well ventilated area, removed from alkalis, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for damage to containers.

**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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Cellulose (paper fibre) (a)	SWA (AUS)	--	10	--	--

**Biological Limits** No biological limit allocated.

**Engineering Controls** Avoid inhalation. Use in well ventilated areas. Maintain dust levels below the recommended exposure standard.

### PPE

**Eye / Face** When using large quantities or where heavy contamination is likely, 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.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance** YELLOW TO BROWN SOLID

**Odour** ODOURLESS

**Flammability** COMBUSTIBLE

**Flash point** NOT AVAILABLE

**Boiling point** NOT AVAILABLE

**Melting point** 500°C to 518°C

**Evaporation rate** NOT AVAILABLE

**pH** 6.5 to 7.5

**Vapour density** NOT AVAILABLE

**Specific gravity** 0.9

**Solubility (water)** INSOLUBLE

**Vapour pressure** NOT AVAILABLE

**Upper explosion limit** NOT AVAILABLE

**Product Name** FRASCSEAL FINE, MEDIUM

**Lower explosion limit**  
**Autoignition temperature** NOT AVAILABLE  
**Decomposition temperature** NOT AVAILABLE  
**Viscosity** NOT AVAILABLE  
**Partition coefficient** NOT AVAILABLE  
**% Volatiles** NOT AVAILABLE

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## 10. STABILITY AND REACTIVITY

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**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).  
**Hazardous Decomposition Products** May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.  
**Hazardous Reactions** Polymerization is not expected to occur.

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## 11. TOXICOLOGICAL INFORMATION

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**Health Hazard Summary** Low toxicity. Under normal conditions of use, adverse health effects are not anticipated. However, if dust is generated, over exposure may result in irritation of the eyes, nose, throat and skin.  
**Eye** Low irritant. Contact with dust may result in slight eye irritation.  
**Inhalation** Low irritant. Over exposure to dust may result in irritation of the nose and throat, with coughing. LC50 (rat) is 510 mg/m<sup>3</sup>/2 hours.  
**Skin** Low irritant. Prolonged or repeated exposure to dust may result in irritation and dermatitis. Dermal LD50 (rabbit) is > 2000 mg/kg.  
**Ingestion** Ingestion is considered unlikely due to product form. Oral LD50 (rat) is > 5000 mg/kg.  
**Toxicity Data** CELLULOSE (9004-34-6)  
LC50 (inhalation) > 5800 mg/m<sup>3</sup>/4 hours (rat)  
LD50 (ingestion) > 5000 mg/kg (rat)  
LD50 (intraperitoneal) > 31600 mg/kg (rat)  
LD50 (skin) > 2000 mg/kg (rabbit)

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## 12. ECOLOGICAL INFORMATION

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**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.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal** Reuse where possible. No special precautions are required for this product.  
**Legislation** Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

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

**15. REGULATORY INFORMATION**

<b>Poison Schedule</b>	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)
<b>Inventory Listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> All components are listed on AICS, or are exempt.

**16. OTHER INFORMATION**

**Additional Information** COMBUSTIBLE - EXPLOSIVE CARBONACEOUS DUST: Carbonaceous/organic dusts have the potential, with dispersion, to present an explosion hazard if an ignition source exists. All equipment used to handle, transfer or store this product **MUST BE** cleaned thoroughly prior to cutting, welding, drilling or exposure to any other form of heat or ignition sources. If bulk stored, containers should be ventilated on a routine basis to avoid vapour accumulation (where applicable, eg for flocculants).

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.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGE (TWA) or WES (WORKPLACE EXPOSURE STANDARD) (NZ): 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).

**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.

<b>Abbreviations</b>	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 <sup>3</sup>	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
2.0	Standard SDS Review
1.0	Initial SDS creation

**Product Name**      **FRASCSEAL FINE, MEDIUM**

**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**                      Risk Management Technologies  
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**Revision:** 2  
**SDS Date:** 23 November 2012

**End of SDS**

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)** BIOCIDES · 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

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	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.

**Product Name** IDCIDE-20

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

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## 5. FIRE FIGHTING MEASURES

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**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

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## 6. ACCIDENTAL RELEASE MEASURES

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**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.

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## 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

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**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.



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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**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

**Product Name IDCIDE-20**

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)

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**10. STABILITY AND REACTIVITY**

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

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	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.
<b>Eye</b>	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.
<b>Inhalation</b>	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.
<b>Skin</b>	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.
<b>Ingestion</b>	Low to moderate toxicity. Ingestion may result in gastrointestinal irritation, nausea, vomiting, abdominal pain and diarrhoea.
<b>Toxicity Data</b>	TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM SULPHATE (55566-30-8) LD50 (ingestion) 248 mg/kg (rat) TDLo (ingestion) 650 mg/kg/13 weeks - intermittent (rat)

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**12. ECOLOGICAL INFORMATION**

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<b>Environment</b>	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.
<b>Ecotoxicity</b>	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
<b>Persistence/Degradability</b>	This product is readily biodegradable.

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**13. DISPOSAL CONSIDERATIONS**

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<b>Waste Disposal</b>	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.
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## 14. TRANSPORT INFORMATION

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

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

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## 15. REGULATORY INFORMATION

---

<b>Poison Schedule</b>	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)
<b>Inventory Listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> All components are listed on AICS, or are exempt.

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	<p><b>EXPOSURE CONTROL:</b> 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.</p> <p><b>RESPIRATORS:</b> 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.</p> <p><b>PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:</b> 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.</p> <p><b>HEALTH EFFECTS FROM EXPOSURE:</b> 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.</p>
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**Product Name**      **IDCIDE-20**

<b>Abbreviations</b>	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 <sup>3</sup>	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.

**Prepared By**

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**Revision:** 1.3  
**SDS Date:** 11 October 2012

**End of SDS**

## MATERIAL SAFETY DATA SHEET

Product Name **JK-161 LV****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)** JK - 161 LV • RHEOCHEM JK-161 LV  
**Use(s)** ENCAPSULATING AGENT • HIGH PERFORMANCE WBM  
**SDS Date** 01 Nov 2010

**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
ACRYLAMIDE, SODIUM ACRYLATE COPOLYMER	(C3-H5-N-O.C3-H4-O2.Na) <sub>x</sub>	25085-02-3	>90%

**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.

**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** Non flammable. May evolve toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition. May evolve toxic nitrogen oxides and carbon 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. 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** 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.

**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 Value allocated.

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

**PPE** Wear dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE GRANULAR SOLID	<b>Solubility (water)</b>	10 g/L
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	0.8
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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 toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition. May evolve toxic nitrogen oxides and carbon oxides when heated to decomposition.

**Hazardous Reactions** Polymerization is not expected to occur.

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity. Use safe work practices to avoid eye or skin contact and inhalation. This product may contain trace amounts of residual acrylamide, which is classified as a probable human carcinogen (IARC Group 2A). However, due to the very low levels present, adverse health effects are not anticipated with normal use.
<b>Eye</b>	Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Low irritant. Prolonged or repeated contact may result in mild irritation, rash and dermatitis. Allergic reactions are possible.
<b>Ingestion</b>	Low toxicity. Ingestion is considered unlikely due to product form. However, ingestion via hand-mouth transfer may result in gastrointestinal irritation, nausea and vomiting. Maintain good personal hygiene standards.
<b>Toxicity Data</b>	No LD50 data available for this product.

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	(10000 ppm test concentration) (EPA-821-R-02-012) Mysidopsis bahia = 48hr LC50 = 16.2 mg/L. Menidia beryllina = 48hr LC50 = 34.2 mg/L. Scophthalmus Maximus = 96hr LC50 > 1000 mg/L. Skeletonemia costatum = 72hr EC50 = 393 mg/L [NOEC = 118 mg/L] Acartia tonsa = 48 hr EC50 = 393 mg/L [NOEC = 112 mg/L] Corophium Volutator = 10 Day LC50 = 9338 mg/Kg [NOEC = 1000 mg/Kg]
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	ACRYLIC - ACRYLAMIDE RESINS These resins are generally of low toxicity. Toxicity increases with presence of significant concentrations of acrylic - acrylamide monomers. These monomers have been linked with the development of skin sensitisation.
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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/m<sup>3</sup> - Milligrams per Cubic Metre.  
NOS - Not Otherwise Specified.

**Product Name JK-161 LV**

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**

Risk Management Technologies  
5 Ventnor Ave, West Perth  
Western Australia 6005  
Phone: +61 8 9322 1711  
Fax: +61 8 9322 1794  
Email: info@rmt.com.au  
Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

## MATERIAL SAFETY DATA SHEET

Product Name **JK-261****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)** JK 261 • JK261  
**Use(s)** DRILLING FLUID ADDITIVE  
**SDS Date** 01 Nov 2010

**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
ACRYLATE - ACRYLAMIDE COPOLYMER	Not Available	Not Available	>90%

**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.

**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** Non flammable. 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** 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. 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.

**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 Value allocated.

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

**PPE** Wear dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE GRANULAR SOLID	<b>Solubility (water)</b>	10 g/L
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	0.8
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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 toxic gases (carbon/ nitrogen oxides, amines, ammonia, hydrocarbons) when heated to decomposition.

**Hazardous Reactions** Polymerization is not expected to occur.



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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity. Use safe work practices to avoid eye or skin contact and inhalation. This product may contain trace amounts of residual acrylamide, which is classified as a probable human carcinogen (IARC Group 2A). However, due to the very low levels present, adverse health effects are not anticipated with normal use.
<b>Eye</b>	Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Low irritant. Prolonged or repeated contact may result in mild irritation, rash and dermatitis.
<b>Ingestion</b>	Low toxicity. Ingestion is considered unlikely due to product form. However, ingestion via hand-mouth transfer may result in gastrointestinal irritation, nausea and vomiting. Maintain good personal hygiene standards.
<b>Toxicity Data</b>	No LD50 data available for this product.

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	(10000 ppm test concentration) (EPA-821-R-02-012) Mysidopsis bahia = 48hr LC50 = 16.2 mg/L. Menidia beryllina = 48hr LC50 = 34.2 mg/L. Scophthalmus Maximus = 96hr LC50 > 1000 mg/L. Skeletonemia costatum = 72hr EC50 = 393 mg/L [NOEC = 118 mg/L] Acartia tonsa = 48 hr EC50 = 393 mg/L [NOEC = 112 mg/L] Corophium Volutator = 10 Day LC50 = 9338 mg/Kg [NOEC = 1000 mg/Kg]
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	ACRYLIC - ACRYLAMIDE RESINS These resins are generally of low toxicity. Toxicity increases with presence of significant concentrations of acrylic - acrylamide monomers. These monomers have been linked with the development of skin sensitisation.
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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/m<sup>3</sup> - 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).

**Product Name JK-261**

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**

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**Prepared By**

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Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

Product Name **LIMESTONE LSC****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)** CALCIUM CARBONATE • LIMESTONE LSC • RHEOCHEM STONEDUST • STONE DUST  
**Use(s)** BRIDGING AGENT • WEIGHTING AGENT  
**SDS Date** 23 Dec 2010

**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
QUARTZ (SILICA CRYSTALLINE)	Si-O2	14808-60-7	<1%
CALCIUM CARBONATE	Ca-C-O3	471-34-1	>96%

**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.

**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.

**5. FIRE FIGHTING MEASURES**

**Flammability** Non flammable. May evolve toxic gases if strongly heated.

**Fire and Explosion** No fire or explosion hazard exists.

**Extinguishing** Prevent contamination of drains or waterways.

**Hazchem Code** None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage** If spilt (bulk), use personal protective equipment. Contain spillage, then cover / absorb spill with non-combustible absorbant 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 fluorine, acids, aluminium, ammonium salts 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 Stds

Ingredient	Reference	TWA		STEL	
Calcium carbonate	SWA (AUS)	--	10 mg/m <sup>3</sup>	--	--
Silica, Crystalline Quartz	SWA (AUS)	--	0.1 mg/m <sup>3</sup>	--	--

**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 dust levels below the recommended exposure standard.

**PPE** Wear dust-proof goggles and a Class P3 (Particulate) respirator. When using large quantities or where heavy contamination is likely, wear: rubber or PVC gloves and coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	OFF-WHITE POWDER	<b>Solubility (water)</b>	INSOLUBLE
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	2.7
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	825°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	NOT AVAILABLE	<b>Decomposition Temperature</b>	NOT AVAILABLE
<b>Autoignition Temperature</b>	NOT AVAILABLE	<b>Viscosity</b>	NOT AVAILABLE
<b>Partition Coefficient</b>	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 acids (eg. nitric acid), fluorine, aluminium (hot) and ammonium salts.

**Hazardous Decomposition Products** May evolve toxic gases if heated to decomposition.

**Hazardous Reactions** Polymerization will not occur.

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity - irritant. Use safe work practices to avoid eye or skin contact and inhalation. Crystalline silica is classified as carcinogenic to humans (IARC Group 1). Chronic exposure to crystalline silica may result in lung fibrosis (silicosis). However, due to the low levels present, chronic health effects are not anticipated with normal use.
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	High chronic toxicity - irritant. Over exposure to dust may result in mucous membrane irritation of the respiratory tract. Chronic exposure to crystalline silica may result in silicosis (lung fibrosis). Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Skin</b>	Irritant. Contact may result in irritation, redness, pain and rash.
<b>Ingestion</b>	Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation.
<b>Toxicity Data</b>	QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (Inhalation): 300 ug/m <sup>3</sup> /10 years (human) LDLo (Intratracheal): 200 mg/kg (rat) LDLo (Intravenous): 20 mg/kg (dog) TCLo (Inhalation): 16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis) CALCIUM CARBONATE (471-34-1) LD50 (Ingestion): 6450 mg/kg (rat)

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	Calcium carbonate occurs naturally in a wide variety of substances including limestone, marble and egg shells. It is not anticipated to cause adverse environmental effects.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is required.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	<p>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.</p> <p>EXPOSURE CONTROL: If utilized 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.</p> <p>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.</p>
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**Product Name**      **LIMESTONE LSC**

EC No - European Community Number.  
HSNO - Hazardous Substances and New Organisms.  
IARC - International Agency for Research on Cancer.  
mg/m<sup>3</sup> - 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**

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**Prepared By**

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Email: info@rmt.com.au  
Web: www.rmt.com.au

**SDS Date** 23 Dec 2010

**End of Report**

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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 1.1 Product identifier

**Product name**            **MAGNESIUM OXIDE**  
**Synonym(s)**            CALCINED MAGNESIA • MAGNESIA • MAGOXI16 / 27 - PRODUCT CODE

### 1.2 Uses and uses advised against

**Use(s)**                    DRILLING FLUID ADDITIVE • PH INDICATOR

### 1.3 Details of the supplier of the product

**Supplier name**        **NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD**  
**Address**                11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**Telephone**            +61 8 9410 8200  
**Fax**                     +61 8 9410 8299  
**Website**                [www.newpark.com](http://www.newpark.com)

### 1.4 Emergency telephone number(s)

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

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## 2. HAZARDS IDENTIFICATION

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### 2.1 Classification of the substance or mixture

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

### 2.2 Label elements

No signal word, pictograms, hazard or precautionary statements have been allocated.

### 2.3 Other hazards

No information provided.

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## 3. COMPOSITION/ INFORMATION ON INGREDIENTS

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### 3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
CALCIUM OXIDE	1305-78-8	215-138-9	<3.5%
MAGNESIUM OXIDE	1309-48-4	215-171-9	>94%
SILICA, AMORPHOUS	7631-86-9	231-545-4	<2.5%

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## 4. FIRST AID MEASURES

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### 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.

**PRODUCT NAME    MAGNESIUM OXIDE**

**First aid facilities**      Eye wash facilities and safety shower should be available.

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

See Section 11 for more detailed information on health effects and symptoms.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING 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 magnesium oxides 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.

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**6. ACCIDENTAL RELEASE MEASURES**

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**6.1 Personal precautions, protective equipment and emergency procedures**

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

**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 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 and foodstuffs. Ensure product is adequately labelled, protected from physical damage and sealed when not in use.

**7.3 Specific end use(s)**

No information provided.

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**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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**8.1 Control parameters**

**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Calcium oxide	SWA (AUS)	--	2	--	--
Fumed silica (respirable dust)	SWA (AUS)	--	2	--	--
Magnesium oxide (fume)	SWA (AUS)	--	10	--	--



**PRODUCT NAME    MAGNESIUM OXIDE**

**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. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

**PPE**

- Eye / Face**            Wear dust-proof goggles.
- Hands**                Wear PVC or rubber gloves.
- Body**                 Not required under normal conditions of use.
- Respiratory**        Where an inhalation risk exists, wear a Class P1 (Particulate) respirator.



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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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**9.1 Information on basic physical and chemical properties**

<b>Appearance</b>	WHITE GRANULES
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	3600°C
<b>Melting point</b>	2800°C
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	NOT AVAILABLE
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	3.6 - 3.7
<b>Solubility (water)</b>	SLIGHTLY SOLUBLE
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE

**9.2 Other information**

<b>% Volatiles</b>	0 %
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**10. STABILITY AND REACTIVITY**

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**10.1 Reactivity**

Carefully review all information provided 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 heat, sparks, open flames and other ignition sources.

**10.5 Incompatible materials**

Incompatible (violently) with interhalogens (e.g. bromine pentafluoride, chlorine trifluoride) and phosphorus pentachloride. May ignite or explode when heated with aluminium powder. Also incompatible with acids (e.g. nitric acid) and dampness as material hydrates.

**10.6 Hazardous decomposition products**

May evolve magnesium oxides when heated to decomposition.

---

**11. TOXICOLOGICAL INFORMATION**

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**11.1 Information on toxicological effects**

<b>Acute toxicity</b>	This product is expected to be of low toxicity. Based on available data, the classification criteria are not met.
<b>Skin</b>	Contact may result in irritation, redness, rash and dermatitis.
<b>Eye</b>	Contact may result in irritation, lacrimation, pain and redness.
<b>Sensitization</b>	This product is not classified as causing skin or respiratory sensitisation.
<b>Mutagenicity</b>	This product is not classified as a mutagen.
<b>Carcinogenicity</b>	This product is not classified as a carcinogen.
<b>Reproductive</b>	This product is not classified as a reproductive toxin.
<b>STOT – single exposure</b>	Not classified as causing organ effects from single exposure.
<b>STOT – repeated exposure</b>	Not classified as causing organ effects from repeated exposure.
<b>Aspiration</b>	Not relevant.

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**12. ECOLOGICAL INFORMATION**

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**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 Other adverse effects**

No information provided.

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**13. DISPOSAL CONSIDERATIONS**

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**13.1 Waste treatment methods**

<b>Waste disposal</b>	For small amounts, cover with moist sand, vermiculite or similar to avoid dust hazard and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required).
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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

**PRODUCT NAME    MAGNESIUM OXIDE**

	<b>LAND TRANSPORT (ADG)</b>	<b>SEA TRANSPORT (IMDG / IMO)</b>	<b>AIR TRANSPORT (IATA / ICAO)</b>
<b>14.1 UN Number</b>	None Allocated	None Allocated	None Allocated
<b>14.2 Proper Shipping Name</b>	None Allocated	None Allocated	None Allocated
<b>14.3 Transport hazard class</b>	None Allocated	None Allocated	None Allocated
<b>14.4 Packing Group</b>	None Allocated	None Allocated	None Allocated

**14.5 Environmental hazards**    No information provided

**14.6 Special precautions for user**

**Hazchem code**                    None Allocated

---

**15. REGULATORY INFORMATION**

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**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**            Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

**Hazard codes**                None allocated.

**Risk phrases**                None allocated.

**Safety phrases**              None allocated.

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

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**16. OTHER INFORMATION**

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**Additional information**        **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).

**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 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.

**PRODUCT NAME    MAGNESIUM OXIDE****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
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	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

**Revision history**

Revision	Description
2.0	Converted to GHS.
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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Email: info@rmt.com.au  
Web: www.rmt.com.au.

**Revision:** 2  
**SDS date:** 29 January 2015

**[ End of SDS ]**

## MATERIAL SAFETY DATA SHEET

Product Name **SALT****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)** FLOSSY SALT • HALITE • NACL • SALT • SODIUM CHLORIDE  
**Use(s)** CHLORIDE SOURCE • DRILLING FLUID ADDITIVE  
**SDS Date** 01 Nov 2010

**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
SODIUM CHLORIDE	Na-Cl	7647-14-5	>98%
INORGANIC SALTS	Not Available	Not Available	<0.8%
WATER	H2O	7732-18-5	<0.8%

**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** Due to product form / nature of use, an inhalation hazard is not anticipated.

**Skin** Exposure is considered unlikely. Skin irritation is not anticipated.

**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.

**5. FIRE FIGHTING MEASURES**

**Flammability** Non flammable.

**Fire and Explosion** No fire or explosion hazard exists.

**Extinguishing** Prevent contamination of drains or waterways.

**Hazchem Code** None Allocated

Product Name **SALT**

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage** If spilt/ packages damaged, collect for later disposal or reuse.

## 7. STORAGE AND HANDLING

**Storage** Store in a cool, dry, well ventilated area, removed from oxidising agents, 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.

**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** Personal Protective Equipment is not required under normal conditions of use. When using large quantities or where heavy contamination is likely, wear: dust-proof goggles and rubber or PVC gloves. At high dust levels, wear: a Class P1 (Particulate) respirator.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	TRANSLUCENT TO WHITE GRANULES OR POWDER	<b>Solubility (water)</b>	357 g/L
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	2.163
<b>pH</b>	7 (1% Solution)	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	1413°C	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	801°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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). Avoid contact with strong oxidising agents, bromium trifluoride, lithium and acids.

**Hazardous Decomposition Products** May evolve toxic gases if heated to decomposition.

**Hazardous Reactions** Polymerization is not expected to occur.

## 11. TOXICOLOGICAL INFORMATION

**Health Hazard Summary** Non toxic. Under normal conditions of use, adverse health effects are not anticipated. This product is used in trace amounts as a food additive, however the concentrated product is not suitable for ingestion.

**Eye** Low irritant. Contact may result in irritation, lacrimation and redness.

**Inhalation** Low irritant. Over exposure to dust may result in irritation of the nose and throat, coughing, nausea and headache.

**Skin** Low irritant. Prolonged or repeated contact may result in mild irritation.

**Ingestion** Non toxic when used as a food additive. However, the concentrate should not be consumed undiluted. Ingestion may result in gastrointestinal irritation, nausea and vomiting.

**Toxicity Data** SODIUM CHLORIDE (7647-14-5)  
LC50 (Inhalation): > 42000 mg/m<sup>3</sup>/1 hour (rat)  
LD50 (Ingestion): 3000 mg/kg (rat)  
LD50 (Intraperitoneal): 2602 mg/kg (mouse)

**Product Name SALT**

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)

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**12. ECOLOGICAL INFORMATION**

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**Environment** This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.

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**13. DISPOSAL CONSIDERATIONS**

---

**Waste Disposal** No special precautions are required for the disposal of this product.

**Legislation** Dispose of in accordance with relevant local legislation.

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**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

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**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** ABBREVIATIONS:  
ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.  
BEI - Biological Exposure Indices(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/m<sup>3</sup> - 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').

**Product Name**     **SALT**

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**     Risk Management Technologies  
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**SDS Date** 01 Nov 2010

**End of Report**



**SAFETY DATA SHEET**Product Name **OMYACARB****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)** AGRICULTURAL LIME · CALCIUM CARBONATE · CHALK · LIMESTONE · OMYACARB 10 · OMYACARB 2 · OMYACARB 20 · OMYACARB 40  
**Use(s)** BRIDGING AGENT · DRILLING FLUID ADDITIVE · WEIGHTING AGENT  
**SDS Date** 08 May 2012

**2. HAZARDS IDENTIFICATION**

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

## RISK PHRASES

None allocated

## SAFETY PHRASES

None allocated

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

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	None Allocated		

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Identification	Classification	Content
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	<1%
LIMESTONE	CAS: 1317-65-3 EC: 215-279-6	Not Available	>96%

**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.

**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.

**5. FIRE FIGHTING MEASURES**

<b>Flammability</b>	Non flammable. May evolve toxic gases if strongly heated.
<b>Fire and Explosion</b>	No fire or explosion hazard exists.
<b>Extinguishing</b>	Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

**6. ACCIDENTAL RELEASE MEASURES**

<b>Spillage</b>	If spilt (bulk), 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.
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**7. STORAGE AND HANDLING**

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from fluorine, acids, aluminium, ammonium salts and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Calcium carbonate	SWA (AUS)	--	10	--	--
Silica, Crystalline Quartz	SWA (AUS)	--	0.1	--	--

<b>Biological Limits</b>	No biological limit allocated.
<b>Engineering Controls</b>	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.
<b>PPE</b>	
<b>Eye / Face</b>	Wear dust-proof goggles.
<b>Hands</b>	When using large quantities or where heavy contamination is likely, wear PVC or rubber gloves.
<b>Body</b>	When using large quantities or where heavy contamination is likely, wear coveralls.
<b>Respiratory</b>	Where an inhalation risk exists, wear a Class P1 (Particulate) respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance</b>	OFF-WHITE POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	NOT AVAILABLE
<b>Melting point</b>	825°C
<b>Evaporation rate</b>	NOT RELEVANT
<b>pH</b>	NOT RELEVANT
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	2.7
<b>Solubility (water)</b>	INSOLUBLE

**Product Name OMYACARB**

Vapour pressure	NOT RELEVANT
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 RELEVANT

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**10. STABILITY AND REACTIVITY**

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<b>Chemical Stability</b>	Stable under recommended conditions of storage.
<b>Conditions to Avoid</b>	Avoid heat, sparks, open flames and other ignition sources.
<b>Material to Avoid</b>	Incompatible with acids (eg. nitric acid), fluorine, aluminium (hot) and ammonium salts.
<b>Hazardous Decomposition Products</b>	May evolve toxic gases if heated to decomposition.
<b>Hazardous Reactions</b>	Polymerization will not occur.

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	Low toxicity - irritant. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in irritation. Chronic exposure to crystalline silica may cause lung fibrosis (silicosis), however due to the low levels of crystalline silica in this product, chronic health effects are not anticipated with normal use. Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Irritant. Contact may result in irritation, redness, pain and rash.
<b>Ingestion</b>	Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation.
<b>Toxicity Data</b>	QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (inhalation) 300 ug/m <sup>3</sup> /10 years (human) TCLo (inhalation) 16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis)

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**12. ECOLOGICAL INFORMATION**

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<b>Environment</b>	Calcium carbonate occurs naturally in a wide variety of substances including limestone, marble and egg shells. It is not anticipated to cause adverse environmental effects.
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**13. DISPOSAL CONSIDERATIONS**

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<b>Waste Disposal</b>	Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is required.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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

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

**15. REGULATORY INFORMATION**

<b>Poison Schedule</b>	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)
<b>Inventory Listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> 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.

**EXPOSURE CONTROL:** If utilized 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.

**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.

<b>Abbreviations</b>	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
	mg/m <sup>3</sup>	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
1.0	Initial SDS Creation

**Product Name**      **OMYACARB**

**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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**Revision:** 1  
**SDS Date:** 08 May 2012

**End of SDS**

Product Name **PIPE FREE M**

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Supplier name** RHEOCHEM LTD  
**Address** 11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**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)** PIPEFREE M  
**Use(s)** ANTIFREEZE • BRAKE FLUID • FOAM • HEAT TRANSFER AGENT • HUMECTANT • LEATHER INDUSTRY • PAINT • SOLVENT • TEXTILE CHEMICAL  
**SDS date** 29 January 2013

## 2. HAZARDS IDENTIFICATION

**CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA**

**RISK PHRASES**

R22 Harmful if swallowed.

**SAFETY PHRASES**

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**

<b>UN number</b>	None Allocated	<b>DG class</b>	None Allocated
<b>Packing group</b>	None Allocated	<b>Subsidiary risk(s)</b>	None Allocated
<b>Hazchem code</b>	None Allocated		

## 3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
ETHYLENE GLYCOL	CAS: 107-21-1 EC: 203-473-3	Xn;R22	100%

## 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).

**Advice to doctor** Treat symptomatically.

**First aid facilities** Eye wash facilities and safety shower are recommended.

## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition. Vapour may form explosive mixtures with air.
<b>Fire and explosion</b>	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.
<b>Extinguishing</b>	Dry agent, carbon dioxide or foam. Prevent contamination of drains or waterways.
<b>Hazchem code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Personal precautions</b>	Wear Personal Protective Equipment (PPE) as detailed in Section 8 of this SDS. Clear area of all unprotected personnel. Ventilate area where possible. Contact emergency services where appropriate.
<b>Environmental precautions</b>	Prevent product from entering drains and waterways.
<b>Methods of cleaning up</b>	Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.
<b>References</b>	See Sections 8 and 13 for exposure controls and disposal.

## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from oxidising agents, acids, alkalis, phosphorus pentasulphide, 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).
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Ethylene glycol (particulate)	SWA (AUS)	--	10	--	--
Ethylene glycol (vapour)	SWA (AUS)	20	52	40	104

<b>Biological limits</b>	No biological limit allocated.
<b>Engineering controls</b>	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

<b>Eye / Face</b>	Wear splash-proof goggles.
<b>Hands</b>	Wear rubber or butyl or neoprene gloves.
<b>Body</b>	Wear coveralls.
<b>Respiratory</b>	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.



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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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<b>Appearance</b>	VISCOUS CLEAR COLOURLESS LIQUID
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	CLASS C1 COMBUSTIBLE
<b>Flash point</b>	110°C (cc)
<b>Boiling point</b>	197°C
<b>Melting point</b>	-13°C
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	NOT AVAILABLE
<b>Vapour density</b>	2.2 (Air =1)
<b>Specific gravity</b>	1.12
<b>Solubility (water)</b>	SOLUBLE
<b>Vapour pressure</b>	0.05 mm Hg @ 20°C
<b>Upper explosion limit</b>	12.8 %
<b>Lower explosion limit</b>	3.2 %
<b>Autoignition temperature</b>	314°C
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Partition coefficient</b>	NOT AVAILABLE
<b>% Volatiles</b>	NOT AVAILABLE

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**10. STABILITY AND REACTIVITY**

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<b>Chemical stability</b>	Stable under recommended conditions of storage.
<b>Conditions to avoid</b>	Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.
<b>Material to avoid</b>	Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), alkalis (eg. hydroxides) and phosphorus pentasulphide.
<b>Hazardous Decomposition Products</b>	May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.
<b>Hazardous Reactions</b>	Polymerization is not expected to occur.

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	Harmful - 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. At room temperature ethylene glycol has a low vapour pressure and therefore an inhalation hazard is not anticipated unless heated or sprayed. Chronic exposure may result in kidney and central nervous system (CNS) damage.
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Harmful. Over exposure may result in mild respiratory irritation. High level exposure may result in headache, nausea, dizziness and central nervous system (CNS) depression. Due to the low vapour pressure, an inhalation hazard is not anticipated with normal use.
<b>Skin</b>	Irritant. Contact may result in drying and defatting of the skin, rash and dermatitis.
<b>Ingestion</b>	Harmful. Ingestion may result in nausea, vomiting, abdominal pain, diarrhoea, drowsiness and unconsciousness. Chronic exposure may result in kidney damage. Aspiration may result in chemical pneumonitis and pulmonary oedema.
<b>Toxicity data</b>	ETHYLENE GLYCOL (107-21-1) LC50 (inhalation) 10 876 mg/kg (rat) LD50 (ingestion) 1650 mg/kg (cat) LD50 (skin) 9530 ug/kg (rabbit) LDLo (ingestion) 398 mg/kg (human) TCLo (inhalation) 10,000 mg/m <sup>3</sup> (human - cough) TDLo (ingestion) 5500 mg/kg (child - anaesthesia)

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**12. ECOLOGICAL INFORMATION**

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<b>Toxicity</b>	LC50 (Aquatic species): >100mg/L/96hrs. Non hazardous to aquatic organisms.
<b>Persistence and degradability</b>	Biodegradation in both soil and water is expected to be a major fate process for this compound. Not expected to bioconcentrate in aquatic organisms.



**Product Name** PIPE FREE M

**Bioaccumulative potential** No information provided.

**Mobility in soil** Expected to be very highly mobile in soil. Not anticipated to volatilise from moist soil or water surfaces.

**Other adverse effects** No information provided.

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### 13. DISPOSAL CONSIDERATIONS

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**Waste disposal** Dispose of by controlled incineration, by licensed or competent personnel. Contact the manufacturer 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.

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### 14. TRANSPORT INFORMATION

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

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
<b>UN number</b>	None Allocated	None Allocated	None Allocated
<b>Proper shipping name</b>	None Allocated	None Allocated	None Allocated
<b>DG class/ Division</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary risk(s)</b>	None Allocated	None Allocated	None Allocated
<b>Packing group</b>	None Allocated	None Allocated	None Allocated
<b>Hazchem code</b>	None Allocated		

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### 15. REGULATORY INFORMATION

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**Poison schedule** Classified as a Schedule 6 (S6) 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.

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### 16. OTHER INFORMATION

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**Additional information** ETHYLENE GLYCOL: Has been reported to cause teratogenic and mutagenic effects, however the doses recorded for these effects are extremely high. For example experimental rat studies by the oral route have shown that ingestion of 8.5 g/kg by pregnant rats in their 6-15 day of gestation caused teratogenic effects. This equates to the ingestion of 500 ml of ethylene glycol by a 60 kg women for similar effects to occur. Exposure at such levels is not reported in industry.

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.

STORAGE OF COMBUSTIBLE LIQUIDS. Combustible liquids with a flash point between 61°C and 150°C are required to be stored as for flammable liquids (Dangerous Goods Class 3) under AS 1940. [Refer to Australian Standard 1940, Storage and Handling of Flammable and Combustible Liquids, for full storage guidelines].

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.

**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 <sup>3</sup>	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
1.1	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:** 1.1  
**SDS Date:** 29 January 2013

**End of SDS**

## MATERIAL SAFETY DATA SHEET

Product Name **POTASSIUM CHLORIDE (RHEOCHEM)****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)** KCL • MURIATE OF POTASH • POTASH • SYLVITE  
**Use(s)** DRILLING FLUID ADDITIVE • FERTILISER • INHIBITOR  
**SDS Date** 01 Nov 2010

**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
POTASSIUM CHLORIDE	KCl	7447-40-7	>97%

**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.

**5. FIRE FIGHTING MEASURES**

**Flammability** Non flammable. May evolve toxic gases (potassium oxides, chlorides) 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** Prevent contamination of drains or waterways.

**Hazchem Code** None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage** If spilt (bulk), use personal protective equipment. Contain spillage, then collect and place in suitable containers for disposal. Avoid generating dust.

## 7. STORAGE AND HANDLING

**Storage** Store in a cool, dry, well ventilated area, removed from oxidising agents 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 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** Personal Protective Equipment is not required under normal conditions of use. At high dust levels, wear: dust-proof goggles and a Class P1 (Particulate) respirator. With prolonged use, wear: rubber or cotton or PVC gloves and coveralls.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE SOLID	<b>Solubility (water)</b>	340 g/L @ 20°C
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	2.0
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	1413°C	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	773°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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 (potentially explosive) with oxidising agents (eg. hypochlorites).

**Hazardous Decomposition Products** May evolve toxic gases (potassium oxides, chlorides) when heated to decomposition.

**Hazardous Reactions** Polymerization will not occur.

## 11. TOXICOLOGICAL INFORMATION

**Health Hazard Summary** Low toxicity. Use safe work practices to avoid eye or skin contact and inhalation. Acute potassium poisoning via ingestion is rare as a large single dose usually induces vomiting, and potassium is rapidly excreted by the body, however this product does have the potential to cause cardiovascular disorders.

**Eye** Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.

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

**Skin** Low irritant. Prolonged or repeated contact may result in mild irritation, rash and dermatitis.

**Ingestion** Low toxicity. Ingestion may result in gastrointestinal irritation, nausea, vomiting, abdominal pain and diarrhoea. Ingestion of large quantities may result in blood clotting changes, cardiac arrhythmias, increased respiration, muscle weakness, convulsions and coma.

**Toxicity Data** POTASSIUM CHLORIDE (7447-40-7)  
LD50 (Ingestion): 1500 mg/kg (mouse)  
LD50 (Intraperitoneal): 620 mg/kg (mouse)

**Product Name POTASSIUM CHLORIDE (RHEOCHEM)**

LD50 (Intravenous): 117 mg/kg (mouse)  
LDLo (Ingestion): 20 mg/kg (man)  
LDLo (Intraperitoneal): 900 mg/kg (guinea pig)  
LDLo (Intravenous): 77 mg/kg (guinea pig)  
LDLo (Subcutaneous): 2120 mg/kg (frog)  
TDL0 (Ingestion): 60 mg/kg/days (woman)

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## 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.

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## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal** Collect and place in sealable containers and dispose of to an approved landfill site. Contact the manufacturer for additional information.

**Legislation** Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 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).

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## 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

**Product Name**     **POTASSIUM CHLORIDE (RHEOCHEM)**

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**     Risk Management Technologies  
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Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

Product Name **QUICKSEAL (F,M,C)****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)** QUICKSEAL  
**Use(s)** DRILLING FLUID ADDITIVE  
**SDS Date** 01 Nov 2010

**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
ORGANIC FIBRE(S)	Not Available	Not Available	100%

**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.

**5. FIRE FIGHTING MEASURES**

**Flammability** Non flammable. May evolve toxic gases if strongly heated.

**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

Product Name **QUICKSEAL (F,M,C)**

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage** If spilt (bulk), use personal protective equipment. Contain spillage, then collect and place in suitable containers for disposal. Avoid generating dust.

## 7. STORAGE AND HANDLING

**Storage** Store in a cool, dry, well ventilated area, removed from foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Also store removed from calcium oxides, bleaching powder, perchlorates, perchloric acid, sodium chlorate, fluorine, nitric acid, sodium nitrate and sodium nitrite.

**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** ORGANIC FIBRE(S)  
ES-TWA: 10 mg/m<sup>3</sup> (dust)

**Biological Limits** No Biological Limit Value allocated.

**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** Personal Protective Equipment is not required under normal conditions of use. When using large quantities or where heavy contamination is likely, wear: dust-proof goggles, rubber or PVC gloves and coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	YELLOW TO BROWN SOLID	<b>Solubility (water)</b>	INSOLUBLE
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	0.9 - 1.2
<b>pH</b>	7 - 8	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT AVAILABLE
<b>Boiling Point</b>	NOT RELEVANT	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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** Compatible with most commonly used materials. Also incompatible with calcium oxides, bleaching powder, perchlorates, perchloric acid, sodium chlorate, fluorine, nitric acid, sodium nitrate and sodium nitrite.

**Hazardous Decomposition Products** May evolve toxic gases if heated to decomposition.

**Hazardous Reactions** Polymerization is not expected to occur.

## 11. TOXICOLOGICAL INFORMATION

**Health Hazard Summary** Low toxicity - low irritant. Use safe work practices to avoid eye or skin contact and inhalation.

**Eye** Low irritant. Contact may result in irritation, lacrimation and redness.

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

**Skin** Low irritant. Prolonged or repeated exposure to dust may result in irritation and dermatitis.

**Ingestion** Low toxicity. Ingestion may result in gastrointestinal irritation, nausea and vomiting. However, due to product form ingestion is considered unlikely.

**Toxicity Data** No LD50 data available for this product.



Product Name **QUICKSEAL (F,M,C)**

## 12. ECOLOGICAL INFORMATION

**Environment** This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.

## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal** Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is 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

**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** 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/m<sup>3</sup> - 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

**Product Name**     **QUICKSEAL (F,M,C)**

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.

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**Prepared By**

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Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

Product Name **RHEOBEN****1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER**

**Supplier name** RHEOCHEM LTD  
**Address** 11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**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)** API BENTONITE (SECTION 9), GEL, BENTONITE  
**Use(s)** DRILLING FLUID  
**SDS date** 05 June 2013

**2. HAZARDS IDENTIFICATION**

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**RISK PHRASES**

R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

**SAFETY PHRASES**

S22 Do not breathe dust.

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

<b>UN number</b>	None Allocated	<b>DG class</b>	None Allocated
<b>Packing group</b>	None Allocated	<b>Subsidiary risk(s)</b>	None Allocated
<b>Hazchem code</b>	None Allocated		

**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

Ingredient	Identification	Classification	Content
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	2 to 10%
BENTONITE	CAS: 1302-78-9 EC: 215-108-5	Not Available	90 to 98%
SODA ASH	Not Available	Not Available	2 to 4%

**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.

**Ingestion** For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). Due to product form and application, ingestion is considered unlikely.

**Advice to doctor** Treat symptomatically.

**First aid facilities** Eye wash facilities and safety shower should be available.

## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Non flammable. May evolve toxic gases if strongly heated.
<b>Fire and explosion</b>	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.
<b>Extinguishing</b>	Use an extinguishing agent suitable for the surrounding fire.
<b>Hazchem code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Personal precautions</b>	Wear Personal Protective Equipment (PPE) as detailed in Section 8 of this SDS.
<b>Environmental precautions</b>	Prevent product from entering drains and waterways.
<b>Methods of cleaning up</b>	Moisten with water to prevent a dust hazard and place in sealable containers for disposal.
<b>References</b>	See Sections 8 and 13 for exposure controls and disposal.

## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from hydrofluoric acid, strong alkalis and foodstuffs. Store in a cool, dry, well ventilated place, removed from direct sunlight, oxidising agents (eg. hypochlorites), acids, water and foodstuffs. Storage area floors may become slippery if wetted. Ensure packaging are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills.
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Silica, Crystalline Quartz	SWA (AUS)	--	0.1	--	--

<b>Biological limits</b>	No Biological Limit Value allocated.
<b>Engineering controls</b>	Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.
<b>PPE</b>	
<b>Eye / Face</b>	Wear dust-proof goggles.
<b>Hands</b>	Wear PVC or rubber gloves.
<b>Body</b>	When using large quantities or where heavy contamination is likely, wear coveralls.
<b>Respiratory</b>	Wear a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	BROWN POWDER
<b>Odour</b>	SLIGHT ODOUR
<b>Flammability</b>	NON FLAMMABLE

**Product Name RHEOBEN**

Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	1100°C to 1200°C (Fusion Point)
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Specific gravity	2.7
Solubility (water)	INSOLUBLE
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

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**10. STABILITY AND REACTIVITY**

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<b>Chemical stability</b>	Stable under recommended conditions of storage.
<b>Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources.
<b>Material to avoid</b>	Incompatible with acids (eg. nitric acid) and alkalis (eg. hydroxides).
<b>Hazardous Decomposition Products</b>	May evolve toxic gases if heated to decomposition.
<b>Hazardous Reactions</b>	Polymerization is not expected to occur.

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	Irritant - high chronic toxicity. Use safe work practices to minimise dust generation (ie. moisten) and eye or skin contact. Chronic exposure to crystalline silica may result in lung fibrosis (silicosis). Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Irritant. Over exposure may result in irritation of the nose and throat, with coughing. Chronic exposure to respirable silica may result in pulmonary fibrosis (silicosis). Crystalline silica is classified as carcinogenic to humans (IARC Group 1).
<b>Skin</b>	Low to moderate irritant. Prolonged or repeated contact may result in irritation, rash and dermatitis.
<b>Ingestion</b>	Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation.
<b>Toxicity data</b>	QUARTZ (SILICA CRYSTALLINE) (14808-60-7) LCLo (inhalation) 300 ug/m <sup>3</sup> /10 years (human) TCLo (inhalation) 16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis)  BENTONITE (1302-78-9) LD50 (intravenous) 35 mg/kg (rat) LDLo (intravenous) 10 mg/kg (dog)

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**12. ECOLOGICAL INFORMATION**

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<b>Toxicity</b>	No information provided.
<b>Persistence and degradability</b>	No information provided.
<b>Bioaccumulative potential</b>	No information provided.
<b>Mobility in soil</b>	No information provided.
<b>Other adverse effects</b>	The main component/s of this product are not anticipated to cause any adverse effects to plants or animals.

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**13. DISPOSAL CONSIDERATIONS**

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**Product Name** RHEOBEN

**Waste disposal** Reuse where possible. No special precautions are required for this product.

**Legislation** Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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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		

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## 15. REGULATORY INFORMATION

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**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.

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## 16. OTHER INFORMATION

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**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.

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).

**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.

**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.

**Product Name RHEOBEN**

<b>Abbreviations</b>	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 <sup>3</sup>	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
1.1	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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Email: info@rmt.com.au  
Web: www.rmt.com.au.

**Revision:** 1.1  
**SDS Date:** 05 June 2013

**End of SDS**

## MATERIAL SAFETY DATA SHEET

Product Name **RHEOPAC R/LV/UL/RD/LVD****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)** RHEOPAC LV • RHEOPAC R • RHEOPAC UL  
**Use(s)** DRILLING FLUID ADDITIVE  
**SDS Date** 01 Nov 2010

**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
SODIUM CARBOXYMETHYL CELLULOSE	C28-H30-O27.Na8	9004-32-4	98%
WATER	H2O	7732-18-5	10%
SODIUM CHLORIDE	Na-Cl	7647-14-5	1.4%
SODIUM GLYCOLATE	C2-H3-O3.Na	2836-32-0	0.7%

**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. Ingestion is considered unlikely due to product form.

**Advice to Doctor** Treat symptomatically.



## 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Combustible. May evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition. Finely divided dust may form explosive mixtures with air.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Dry agent, carbon dioxide, foam or water fog. Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	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.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	Store in a cool, dry, well ventilated area, removed from oxidising agents, acids and foodstuffs. Ensure containers are adequately labelled.
<b>Handling</b>	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

<b>Exposure Stds</b>	No exposure standard(s) allocated.
<b>Biological Limits</b>	No biological limit allocated.
<b>Engineering Controls</b>	Avoid inhalation. Use in well ventilated areas. Maintain dust levels below the recommended exposure standard.
<b>PPE</b>	Wear dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE OR YELLOWISH POWDER/GRANULES	<b>Solubility (water)</b>	SOLUBLE
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	NOT AVAILABLE
<b>pH</b>	6.0 - 8.5 (1 % solution)	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	COMBUSTIBLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT AVAILABLE
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT AVAILABLE
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	NOT AVAILABLE
<b>Evaporation Rate</b>	NOT AVAILABLE		

## 10. STABILITY AND REACTIVITY

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

## 11. TOXICOLOGICAL INFORMATION

<b>Health Hazard Summary</b>	Low toxicity. Under normal conditions of use, adverse health effects are not anticipated. This product is generally considered to be of low toxicity. Use safe work practices to avoid eye contact, prolonged skin contact and dust generation - inhalation.
<b>Eye</b>	Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Low irritant. Prolonged or repeated contact may result in mild irritation.
<b>Ingestion</b>	Low toxicity. Ingestion may result in gastrointestinal irritation. However, due to product form ingestion is considered unlikely. Maintain good personal hygiene standards.
<b>Toxicity Data</b>	<b>SODIUM CARBOXYMETHYL CELLULOSE (9004-32-4)</b> LD50 (Ingestion): 16000 mg/kg (guinea pig) LD50 (Skin): > 2000 mg/kg (rabbit) TDLo (Ingestion): 140 mg/kg (rat) <b>SODIUM CHLORIDE (7647-14-5)</b> LC50 (Inhalation): > 42000 mg/m <sup>3</sup> /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) <b>SODIUM GLYCOLATE (2836-32-0)</b> LD50 (Ingestion): 6700 mg/kg (mouse) LDLo (Ingestion): 500 mg/kg (cat)

## 12. ECOLOGICAL INFORMATION

<b>Environment</b>	This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.
<b>Ecotoxicity</b>	Aquatic toxicity: LC50 (Fresh Water Trout) > 21,000 ppm/96hrs. LC50 (Salt Water Stickel Back) > 56,000 ppm/96hrs.

## 13. DISPOSAL CONSIDERATIONS

<b>Waste Disposal</b>	Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is required.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

## 15. REGULATORY INFORMATION

<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

## 16. OTHER INFORMATION

<b>Additional Information</b>	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.
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ABBREVIATIONS:

**Product Name****RHEOPAC R/LV/UL/RD/LVD**

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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Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

## MATERIAL SAFETY DATA SHEET

Product Name **SAPP (RHEOCHEM)****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)** DISODIUM DIHYDROGEN PYROPHOSPHATE • DISODIUM PYROPHOSPHATE  
**Use(s)** ACIDIFIER • BUFFERING AGENT  
**SDS Date** 01 Nov 2010

**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
DISODIUM PYROPHOSPHATE	H <sub>2</sub> -O <sub>7</sub> -P <sub>2</sub> .2Na	7758-16-9	100%

**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.

**Ingestion** For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once).

**Advice to Doctor** Treat symptomatically.

**First Aid Facilities** Eye wash facilities and safety shower should be available.

**5. FIRE FIGHTING MEASURES**

**Flammability** Non flammable. May evolve toxic gases (phosphorus oxides) when heated to decomposition. May evolve phosphorus oxides and/or phosphine 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** Prevent contamination of drains or waterways.

**Hazchem Code** None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage** If spilt (bulk), use personal protective equipment. Ventilate area where possible. Contain spillage, then collect and place in suitable containers for 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.

**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	
Nuisance dust	SWA (AUS)	--	10 mg/m <sup>3</sup>	--	--

**Biological Limits** No biological limit allocated.

**Engineering Controls** Avoid inhalation. Use in well ventilated areas.

**PPE** Wear dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE POWDER	<b>Solubility (water)</b>	119 g/L
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	1.35 - 1.41
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	> 600°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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 toxic gases (phosphorus oxides) when heated to decomposition. May evolve phosphorus oxides and/or phosphine when heated to decomposition.

**Hazardous Reactions** Polymerization is not expected to occur.

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity. Use safe work practices to avoid eye or skin contact and inhalation.
<b>Eye</b>	Irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Low to moderate irritant. Prolonged or repeated contact may result in irritation and rash.
<b>Ingestion</b>	Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation. Ingestion of large quantities may also result in serious disturbances in calcium metabolism.
<b>Toxicity Data</b>	DISODIUM PYROPHOSPHATE (7758-16-9) LD50 (Ingestion): 2650 mg/kg (mouse) LD50 (Intraperitoneal): 1 g/kg (mouse) LD50 (Intravenous): 59 mg/kg (mouse) LD50 (Subcutaneous): 480 mg/kg (mouse)

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	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.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	<p>ABBREVIATIONS:</p> <p>ACGIH - American Conference of Industrial Hygienists. ADG - Australian Dangerous Goods. BEI - Biological Exposure Indices(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/m<sup>3</sup> - 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.</p>
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### 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.

**Product Name**     **SAPP (RHEOCHEM)**

**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.

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**Prepared By**

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**SDS Date**01 Nov 2010

**End of Report**

## MATERIAL SAFETY DATA SHEET

Product Name **SODA ASH (RHEOCHEM)****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)** SODA ASH DENSE • SODIUM CARBONATE  
**Use(s)** DRILLING AID  
**SDS Date** 01 Nov 2010

**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.

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

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
SODIUM CARBONATE	Na <sub>2</sub> -C-O <sub>3</sub>	497-19-8	>97%

**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

<b>Flammability</b>	Non flammable. May evolve toxic gases (sodium oxides) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Prevent contamination of drains or waterways.
<b>Hazchem Code</b>	None Allocated

## 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	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.
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## 7. STORAGE AND HANDLING

<b>Storage</b>	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.
<b>Handling</b>	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	
Sodium Carbonate (total dust)	SWA (AUS)	--	10 mg/m3	--	--

**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 dust-proof goggles and PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear: coveralls. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE POWDER	<b>Solubility (water)</b>	170 g/L
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	2.533
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	854°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	NOT AVAILABLE		

## 10. STABILITY AND REACTIVITY

<b>Chemical Stability</b>	Stable under recommended conditions of storage.
<b>Conditions to Avoid</b>	Avoid heat, sparks, open flames and other ignition sources.
<b>Material to Avoid</b>	Incompatible with oxidising agents and acids (eg. nitric acid).
<b>Hazardous Decomposition Products</b>	May evolve toxic gases (sodium oxides) when heated to decomposition.

**Product Name SODA ASH (RHEOCHEM)**

**Hazardous Reactions** Polymerization is not expected to occur.

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	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.
<b>Eye</b>	Slightly corrosive - irritant. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and possible burns.
<b>Inhalation</b>	Slightly corrosive - irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Slightly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis and possible burns.
<b>Ingestion</b>	Slightly corrosive. Ingestion may result in burns to the mouth and throat, nausea, vomiting and abdominal pain. Ingestion is considered unlikely due to product form.
<b>Toxicity Data</b>	SODIUM CARBONATE (497-19-8) LC50 (Inhalation): 800 mg/m <sup>3</sup> /2 hours (guinea pig) LD50 (Ingestion): 4090 mg/kg (rat) LD50 (Intraperitoneal): 117 mg/kg (mouse) LD50 (Subcutaneous): 2210 mg/kg (mouse)

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	WATER: If released to waterways, alkaline products may change the pH of the waterway. Fish will die if the pH reaches 10-11 (goldfish 10.9, bluegill 10.5). SOIL: May leach to groundwater with toxic effects on aquatic life as above. ATMOSPHERE: Not expected to reside in the atmosphere. Drops or particles released to atmosphere should be removed by gravity and/or be rained out.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Neutralise with dilute acid (eg. 3 mol/L hydrochloric acid) or similar. For small amounts absorb with sand or similar and dispose of to an approved landfill site. Contact the manufacturer for additional information.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

---

<b>Additional Information</b>	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.
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### ABBREVIATIONS:

ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.  
BEI - Biological Exposure Indices(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/m<sup>3</sup> - 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.

**Product Name**     **SODA ASH (RHEOCHEM)**

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**

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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** 01 Nov 2010

**End of Report**

## MATERIAL SAFETY DATA SHEET

Product Name **SODIUM BICARBONATE (RHEOCHEM)****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)** BAKING SODA • BICARBONATE OF SODA • CARBONIC ACID, MONOSODIUM SALT • MONOSODIUM CARBONATE • SODIUM ACID CARBONATE • SODIUM HYDROGEN CARBONATE

**Use(s)** PH CONTROL  
**SDS Date** 01 Nov 2010

**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
SODIUM BICARBONATE	C-H-O3.Na	144-55-8	>99%

**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.

**Ingestion** For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once).

**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 (carbon oxides, hydrocarbons) 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** If spilt (bulk), use personal protective equipment. Contain spillage, then collect and place in suitable containers for disposal. Avoid generating dust.

## 7. STORAGE AND HANDLING

**Storage** Store in a cool, dry, well ventilated area, removed from acids. Ensure packages 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 Stds

Ingredient	Reference	TWA		STEL	
SODIUM BICARBONATE (total dust)	SWA (AUS)	--	10 mg/m3	--	--

**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** Personal Protective Equipment is not required under normal conditions of use. When using large quantities or where heavy contamination is likely, wear: dust-proof goggles and rubber or PVC gloves. Where an inhalation risk exists, wear: a Class P1 (Particulate) respirator.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	WHITE POWDER	<b>Solubility (water)</b>	170 g/L @ 25°C
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	2.533
<b>pH</b>	8 (1% Solution)	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	NON FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	854°C	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	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 acids (eg. nitric acid).

**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 toxicity - low irritant. Use safe work practices to avoid eye or skin contact and inhalation.

**Eye** Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.

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

**Skin** Low irritant. Prolonged or repeated contact may result in mild irritation.

**Ingestion** Low toxicity. Ingestion of large quantities may result in nausea, vomiting and gastrointestinal irritation. Sodium bicarbonate can neutralise the gastric juices in the stomach. During neutralisation, carbon dioxide gas is evolved and may cause stretching of the stomach, and with very large doses possible damage or rupture.

**Toxicity Data** SODIUM BICARBONATE (144-55-8)

**Product Name SODIUM BICARBONATE (RHEOCHEM)**

LD50 (Ingestion): 4220 mg/kg (rat)  
TDLo (Ingestion): 1260 mg/kg (infant - lungs, kidney)

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## 12. ECOLOGICAL INFORMATION

**Environment** This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.

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## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal** Dispose of to an approved landfill site. Contact the manufacturer for additional information.

**Legislation** Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 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).

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## 16. OTHER INFORMATION

**Additional Information** 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/m<sup>3</sup> - 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.

**Product Name**      **SODIUM BICARBONATE (RHEOCHEM)**

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**SDS Date** 01 Nov 2010

**End of Report**

**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**

<b>UN Number</b>	None Allocated	<b>DG Class</b>	None Allocated
<b>Packing Group</b>	None Allocated	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Hazchem Code</b>	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.



**Product Name**      **SODIUM SULPHITE**

<b>Skin</b>	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.
<b>Ingestion</b>	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.
<b>Advice to Doctor</b>	Treat symptomatically.
<b>First Aid Facilities</b>	Eye wash facilities and safety shower are recommended.

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**5. FIRE FIGHTING MEASURES**

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<b>Flammability</b>	Non flammable. May evolve toxic gases (sulphur oxides) when heated to decomposition.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Use an extinguishing agent suitable for the surrounding fire.
<b>Hazchem Code</b>	None Allocated

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**6. ACCIDENTAL RELEASE MEASURES**

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<b>Spillage</b>	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.
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**7. STORAGE AND HANDLING**

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<b>Storage</b>	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.
<b>Handling</b>	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.

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**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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**Exposure Standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Sodium Carbonate (total dust)	SWA (AUS)	--	10	--	--

<b>Biological Limits</b>	No biological limit allocated.
<b>Engineering Controls</b>	Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

**PPE**

<b>Eye / Face</b>	Wear dust-proof goggles.
<b>Hands</b>	Wear PVC or rubber gloves.
<b>Body</b>	When using large quantities or where heavy contamination is likely, wear coveralls.
<b>Respiratory</b>	Where an inhalation risk exists, wear a Class P1 (Particulate) respirator. At high dust levels, wear a Full-face Class P3 (Particulate) respirator.



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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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<b>Appearance</b>	WHITE CRYSTALLINE SOLID
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**Product Name**      **SODIUM SULPHITE**

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

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**10. STABILITY AND REACTIVITY**

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

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**11. TOXICOLOGICAL INFORMATION**

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<b>Health Hazard Summary</b>	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.																						
<b>Eye</b>	Low irritant. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and possible corneal damage.																						
<b>Inhalation</b>	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.																						
<b>Skin</b>	Low irritant. Contact may result in irritation, redness, rash and dermatitis.																						
<b>Ingestion</b>	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.																						
<b>Toxicity Data</b>	<p>SODIUM CARBONATE (497-19-8)</p> <table><tr><td>LC50 (inhalation)</td><td>800 mg/m<sup>3</sup>/2 hours (guinea pig)</td></tr><tr><td>LD50 (ingestion)</td><td>4090 mg/kg (rat)</td></tr><tr><td>LD50 (intraperitoneal)</td><td>117 mg/kg (mouse)</td></tr><tr><td>LD50 (subcutaneous)</td><td>2210 mg/kg (mouse)</td></tr></table> <p>SODIUM SULPHITE (7757-83-7)</p> <table><tr><td>LD50 (ingestion)</td><td>820 mg/kg (mouse)</td></tr><tr><td>LD50 (intraperitoneal)</td><td>950 mg/kg (mouse)</td></tr><tr><td>LD50 (intravenous)</td><td>175 mg/kg (mouse)</td></tr><tr><td>LDLo (ingestion)</td><td>2825 mg/kg (rabbit)</td></tr><tr><td>LDLo (intravenous)</td><td>400 mg/kg (cat)</td></tr><tr><td>LDLo (subcutaneous)</td><td>600 mg/kg (rabbit)</td></tr></table> <p>SODIUM SULPHATE (7757-82-6)</p> <table><tr><td>LD50 (ingestion)</td><td>5989 mg/kg (mouse)</td></tr></table>	LC50 (inhalation)	800 mg/m <sup>3</sup> /2 hours (guinea pig)	LD50 (ingestion)	4090 mg/kg (rat)	LD50 (intraperitoneal)	117 mg/kg (mouse)	LD50 (subcutaneous)	2210 mg/kg (mouse)	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)	LD50 (ingestion)	5989 mg/kg (mouse)
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LDLo (intravenous)	400 mg/kg (cat)																						
LDLo (subcutaneous)	600 mg/kg (rabbit)																						
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)

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## 12. ECOLOGICAL INFORMATION

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**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.

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## 13. DISPOSAL CONSIDERATIONS

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**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.

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## 14. TRANSPORT INFORMATION

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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		

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## 15. REGULATORY INFORMATION

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**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.

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## 16. OTHER INFORMATION

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**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 <sup>3</sup>	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.

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**Prepared By**

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Web: [www.rmt.com.au](http://www.rmt.com.au)

**Revision:** 1.2

**SDS Date:** 12 November 2012

**End of SDS**

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**1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER**


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**1.1 Product identifier**

**Product name** STARCH B  
**Synonym(s)** PREGEL STARCH • STARCH (API 13A SECTION 16)

**1.2 Uses and uses advised against**

**Use(s)** DRILLING FLUID ADDITIVE

**1.3 Details of the supplier of the product**

**Supplier name** NEWPARK DRILLING FLUIDS (AUSTRALIA) LTD  
**Address** 11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**Telephone** +61 8 9410 8200  
**Fax** +61 8 9410 8299  
**Website** [www.newpark.com](http://www.newpark.com)

**1.4 Emergency telephone number(s)**

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

---

**2. HAZARDS IDENTIFICATION**


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**2.1 Classification of the substance or mixture**

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

**2.2 Label elements**

No signal word, pictograms, hazard or precautionary statements have been allocated.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**


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**3.1 Substances / Mixtures**

Ingredient	Identification	Classification		Content
		GHS	Risk	
DAZOMET (ISO)[TETRAHYDRO-3,5-DIMETHYL-1,3,5-THIADIAZINE-2-THIONE]	CAS: 533-74-4 EC: 208-576-7	Acute Tox. 4, H302 Eye Irrit. 2A, H319 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	Xn;R22, Xi;R36, N;R50/53	<1%
STARCH	CAS: 9005-25-8 EC: 232-679-6	Not Available	Not Available	>98%

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**4. FIRST AID MEASURES**


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**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** Due to product form / nature of use, an inhalation hazard is not anticipated.

**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). Due to

**PRODUCT NAME STARCH B**

product form and application, ingestion is considered unlikely.

**First aid facilities** No information provided.

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

Adverse effects not expected from this product under normal conditions of use.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**5.1 Extinguishing media**

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

**5.2 Special hazards arising from the substance or mixture**

Combustible. May evolve carbon oxides and hydrocarbons when heated to decomposition.

**5.3 Advice for firefighters**

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.

**5.4 Hazchem code**

None allocated.

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**6. ACCIDENTAL RELEASE MEASURES**

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**6.1 Personal precautions, protective equipment and emergency procedures**

Wear Personal Protective Equipment (PPE) as detailed in Section 8.

**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 disposal. Avoid generating dust.

**6.4 Reference to other sections**

See Sections 8 and 13 for exposure controls and disposal.

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**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. Check regularly for leaks or spills.

**7.3 Specific end use(s)**

No information provided.

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**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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**8.1 Control parameters**

**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Starch (a)	SWA (AUS)	--	10	--	--

**Biological limits**

No biological limit values have been entered for this product.

**8.2 Exposure controls**

**Engineering controls** No special precautions are normally required when handling this product. Maintain dust levels below the recommended exposure standard.

**PPE**

<b>Eye / Face</b>	When using large quantities or where heavy contamination is likely, wear dust-proof goggles.
<b>Hands</b>	When using large quantities or where heavy contamination is likely, wear PVC or rubber gloves.
<b>Body</b>	Not required under normal conditions of use.
<b>Respiratory</b>	Where an inhalation risk exists, wear a Class P1 (Particulate) respirator.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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**9.1 Information on basic physical and chemical properties**

<b>Appearance</b>	OFF WHITE POWDER
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	COMBUSTIBLE
<b>Flash point</b>	> 125°C
<b>Boiling point</b>	NOT AVAILABLE
<b>Melting point</b>	NOT AVAILABLE
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	5 - 8
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	NOT AVAILABLE
<b>Solubility (water)</b>	DISPERSIBLE
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT AVAILABLE
<b>Lower explosion limit</b>	NOT AVAILABLE
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE

**9.2 Other information**

<b>Bulk density</b>	550 - 700 kg/m <sup>3</sup>
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**10. STABILITY AND REACTIVITY**

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**10.1 Reactivity**

Carefully review all information provided 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 heat, sparks, open flames and other ignition sources.

**10.5 Incompatible materials**

Incompatible with oxidising agents (eg. hypochlorites).

**10.6 Hazardous decomposition products**

May evolve carbon oxides and hydrocarbons when heated to decomposition.

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

<b>Acute toxicity</b>	This product is expected to be of low toxicity. This product contains Dazomet (ISO) [Tetrahydro-3,5-dimethyl-1,3,5-thiadiazine-2-thione], however due to the low levels present, adverse health effects are not anticipated.
<b>Skin</b>	Not classified as a skin irritant. Contact may result in mild irritation.
<b>Eye</b>	Not classified as an eye irritant. Contact may cause mild irritation and lacrimation.
<b>Sensitization</b>	This product is not known to be a skin or respiratory sensitiser.
<b>Mutagenicity</b>	No evidence of mutagenic effects.
<b>Carcinogenicity</b>	No evidence of carcinogenic effects.
<b>Reproductive</b>	No evidence of reproductive effects.
<b>STOT – single exposure</b>	No known effects from this product.
<b>STOT – repeated exposure</b>	No known effects from this product.
<b>Aspiration</b>	Not relevant.

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

Starch B is not harmful to aquatic organisms and does not cause long-term adverse effects in the aquatic environment. This product contains Dazomet (ISO) [Tetrahydro-3,5-dimethyl-1,3,5-thiadiazine-2-thione], however due to the low levels present, adverse environmental effects are not anticipated.

### 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 Other adverse effects

No information provided.

## 13. DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

<b>Waste disposal</b>	No special precautions are required for the disposal of this product.
<b>Legislation</b>	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)
<b>14.1 UN Number</b>	None Allocated	None Allocated	None Allocated
<b>14.2 Proper Shipping Name</b>	None Allocated	None Allocated	None Allocated
<b>14.3 Transport hazard class</b>	None Allocated	None Allocated	None Allocated
<b>14.4 Packing Group</b>	None Allocated	None Allocated	None Allocated

**14.5 Environmental hazards** No information provided

**14.6 Special precautions for user**



Hazchem code None Allocated

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## 15. REGULATORY INFORMATION

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

<b>Poison schedule</b>	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).
<b>Classifications</b>	Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.  The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].
<b>Hazard codes</b>	None allocated.
<b>Risk phrases</b>	None allocated.
<b>Safety phrases</b>	None allocated.
<b>Inventory listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> All components are listed on AICS, or are exempt.

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## 16. OTHER INFORMATION

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<b>Additional information</b>	<p><b>WORKPLACE CONTROLS AND PRACTICES:</b> Unless a less toxic chemical can be substituted for a hazardous substance, <b>ENGINEERING CONTROLS</b> 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.</p> <p><b>RESPIRATORS:</b> 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.</p> <p><b>PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:</b> 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.</p> <p><b>HEALTH EFFECTS FROM EXPOSURE:</b> 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.</p>
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**PRODUCT NAME STARCH B****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
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
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
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

**Revision history**

Revision	Description
3.2	Standard SDS Review.
3.1	Amended synonyms.
3.0	Converted to GHS.
2.0	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:** 3.2  
**SDS date:** 06 August 2014

**[ End of SDS ]**

## SAFETY DATA SHEET

**Product Name**      **STRATA-VANGUARD**

### 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Supplier name**                    **RHEOCHEM LTD**  
**Address**                            11 Alacrity Place, Henderson, WA, 6166, AUSTRALIA  
**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)**                        STRATA VANGUARD  
**Use(s)**                                DRILLING FLUID ADDITIVE  
**SDS date**                            11 July 2013

### 2. HAZARDS IDENTIFICATION

**NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA**

**RISK PHRASES**

None allocated

**SAFETY PHRASES**

None allocated

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

<b>UN number</b>	None Allocated	<b>DG class</b>	None Allocated
<b>Packing group</b>	None Allocated	<b>Subsidiary risk(s)</b>	None Allocated
<b>Hazchem code</b>	None Allocated		

### 3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
CRISTOBALITE	CAS: 14464-46-1 EC: 238-455-4	Not Available	<5%
QUARTZ (SILICA CRYSTALLINE)	CAS: 14808-60-7 EC: 238-878-4	Not Available	<2%
2-PROPENENITRILE-1,3-BUTADIENE RUBBER	CAS: 9003-18-3 EC: 618-357-1	Not Available	<50%
NATURAL RUBBER	CAS: 9006-04-6 EC: 232-689-0	Not Available	<50%
POLYISOPRENE	CAS: 9003-31-0 EC: 618-362-9	Not Available	<50%
SBR ELASTOMERS	CAS: 9003-55-8 EC: 618-370-2	Not Available	<50%
CELLULOSE	CAS: 9004-34-6 EC: 232-674-9	Not Available	<30%
DIATOMACEOUS EARTH, FLUX CALCINED	CAS: 68855-54-9 EC: 272-489-0	Not Available	<15%

FULLERS EARTH	CAS: 8031-18-3 EC: 617-052-0	Not Available	<10%
LIMESTONE	CAS: 1317-65-3 EC: 215-279-6	Not Available	<10%
POLYETHYLENE	CAS: 9002-88-4 EC: 618-339-3	Not Available	<3%
MAGNESIUM OXIDE	CAS: 1309-48-4 EC: 215-171-9	Not Available	<1%

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#### 4. FIRST AID MEASURES

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<b>Eye</b>	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.
<b>Inhalation</b>	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
<b>Skin</b>	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.
<b>Ingestion</b>	For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
<b>Advice to doctor</b>	Treat symptomatically.

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#### 5. FIRE FIGHTING MEASURES

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<b>Flammability</b>	Non flammable. May evolve toxic gases if strongly heated.
<b>Fire and explosion</b>	No fire or explosion hazard exists.
<b>Extinguishing</b>	Use an extinguishing agent suitable for the surrounding fire.
<b>Hazchem code</b>	None Allocated

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#### 6. ACCIDENTAL RELEASE MEASURES

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<b>Personal precautions</b>	Wear Personal Protective Equipment (PPE) as detailed in Section 8 of this SDS. Clear area of all unprotected personnel. Contact emergency services where appropriate.
<b>Environmental precautions</b>	Prevent product from entering drains and waterways.
<b>Methods of cleaning up</b>	Contain spillage, then collect and place in suitable containers for reuse or disposal. Avoid generating dust.
<b>References</b>	See Sections 8 and 13 for exposure controls and disposal.

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#### 7. STORAGE AND HANDLING

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<b>Storage</b>	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.
<b>Handling</b>	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/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Calcium carbonate	SWA (AUS)	--	10	--	--
Cellulose (paper fibre) (a)	SWA (AUS)	--	10	--	--
Cristobalite	SWA (AUS)	--	0.1	--	--
Magnesium oxide (fume)	SWA (AUS)	--	10	--	--
Silica, Crystalline Quartz	SWA (AUS)	--	0.1	--	--

**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 dust levels below the recommended exposure standard.

**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 Powered Air Purifying Respirator (PAPR) with Class P3 (Particulate) filter or a Full-face Class P3 (Particulate) respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance</b>	TAN COLOURED POWDER
<b>Odour</b>	MILD ODOUR
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT AVAILABLE
<b>Boiling point</b>	NOT AVAILABLE
<b>Melting point</b>	NOT AVAILABLE
<b>Evaporation rate</b>	NOT AVAILABLE
<b>pH</b>	6.3 (5% Suspension)
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	2.1
<b>Solubility (water)</b>	INSOLUBLE
<b>Vapour pressure</b>	1 mm Hg @ 20°C
<b>Upper explosion limit</b>	NOT AVAILABLE
<b>Lower explosion limit</b>	NOT AVAILABLE
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE
<b>% Volatiles</b>	NOT AVAILABLE

**10. STABILITY AND REACTIVITY****Chemical stability**

Stable under recommended conditions of storage.

**Conditions to avoid**

Avoid contact with incompatible substances.

**Material to avoid**

Incompatible with acids (eg. nitric acid). Also incompatible with oxygen difluoride, chlorine and trifluoride.

**Product Name STRATA-VANGUARD**

**Hazardous Decomposition Products** May evolve toxic gases if heated to decomposition.  
**Hazardous Reactions** Polymerization is not expected to occur.

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**11. TOXICOLOGICAL INFORMATION**

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**Health Hazard Summary** Low toxicity. Under normal conditions of use, adverse health effects are not anticipated. Adverse health effects associated with silica, such as the development of silicosis (lung fibrosis) are not anticipated unless chronic (ie. prolonged and repeated) exposure to silica quartz dust occurs. Crystalline silica is classified as carcinogenic to humans (IARC Group 1).

**Eye** Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.

**Inhalation** Irritant. Over exposure may result in irritation of the nose and throat, with coughing. Chronic exposure to respirable silica may result in pulmonary fibrosis (silicosis). Crystalline silica is classified as carcinogenic to humans (IARC Group 1).

**Skin** Low irritant. Prolonged or repeated exposure to dust may result in irritation and dermatitis.

**Ingestion** Low toxicity. Ingestion may result in gastrointestinal irritation, nausea and vomiting. However, due to product form ingestion is considered unlikely.

**Toxicity data**

CRISTOBALITE (14464-46-1)	
TCLo (inhalation)	16 mppcf/8hours/17.9 years (human-fibrosis)
QUARTZ (SILICA CRYSTALLINE) (14808-60-7)	
LCLo (inhalation)	300 ug/m <sup>3</sup> /10 years (human)
TCLo (inhalation)	16 000 000 particles/ft <sup>3</sup> /8 hours/17.9 years (human-fibrosis)
CELLULOSE (9004-34-6)	
LC50 (inhalation)	> 5800 mg/m <sup>3</sup> /4 hours (rat)
LD50 (ingestion)	> 5000 mg/kg (rat)
LD50 (intraperitoneal)	> 31600 mg/kg (rat)
LD50 (skin)	> 2000 mg/kg (rabbit)
POLYETHYLENE (9002-88-4)	
LDLo (ingestion)	3000 mg/kg (rat)
MAGNESIUM OXIDE (1309-48-4)	
TCLo (inhalation)	400 mg/kg (human)

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**12. ECOLOGICAL INFORMATION**

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**Toxicity** This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities.

**Persistence and degradability** Not applicable.

**Bioaccumulative potential** This product is not expected to bioaccumulate.

**Mobility in soil** This product has low mobility in soil.

**Other adverse effects** No information provided.

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**13. DISPOSAL CONSIDERATIONS**

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

**Legislation** Dispose of in accordance with relevant local legislation.

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**14. TRANSPORT INFORMATION**

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

	<b>LAND TRANSPORT (ADG)</b>	<b>SEA TRANSPORT (IMDG / IMO)</b>	<b>AIR TRANSPORT (IATA / ICAO)</b>
<b>UN number</b>	None Allocated	None Allocated	None Allocated

**Product Name STRATA-VANGUARD**

<b>Proper shipping name</b>	None Allocated	None Allocated	None Allocated
<b>DG class/ Division</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary risk(s)</b>	None Allocated	None Allocated	None Allocated
<b>Packing group</b>	None Allocated	None Allocated	None Allocated
<b>Hazchem code</b>	None Allocated		

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**15. REGULATORY INFORMATION**

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<b>Poison schedule</b>	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).
<b>Inventory Listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> All components are listed on AICS, or are exempt.

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**16. OTHER INFORMATION**

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**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.

**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.

**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.

<b>Abbreviations</b>	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 <sup>3</sup>	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**

<b>Revision</b>	<b>Description</b>
1.4	Standard SDS Review
1.3	Standard SDS Review.
1.2	Standard SDS Review.
1.1	Standard SDS Review.
1.0	Initial SDS creation

**Product Name**      **STRATA-VANGUARD**

**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.

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**Prepared by**

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**Revision:** 1.4  
**SDS Date:** 11 July 2013

**End of SDS**



Product Name **XANTHAN GUM (P)****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)** XANTHAN GUM (BIOPOLYMER)  
**Use(s)** DRILLING FLUID ADDITIVE • VISCOSITY MODIFIER  
**SDS Date** 01 Nov 2010

**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
XANTHAN GUM	Not Available	11138-66-2	>90%

**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. Ingestion is considered unlikely due to product form.

**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. Finely divided dust may form explosive mixtures with air.

**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.

**Product Name** XANTHAN GUM (P)

**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.

**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 dust-proof goggles, PVC or rubber gloves and a Class P1 (Particulate) respirator. When using large quantities or where heavy contamination is likely, wear: coveralls.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	LIGHT BEIGE POWDER	<b>Solubility (water)</b>	MISCIBLE
<b>Odour</b>	SLIGHT ODOUR	<b>Specific Gravity</b>	1.5
<b>pH</b>	NOT AVAILABLE	<b>% Volatiles</b>	NOT AVAILABLE
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	COMBUSTIBLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT RELEVANT
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT RELEVANT
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	NOT RELEVANT
<b>Evaporation Rate</b>	NOT AVAILABLE		

## 10. STABILITY AND REACTIVITY

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

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## 11. TOXICOLOGICAL INFORMATION

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<b>Health Hazard Summary</b>	Low toxicity. Under normal conditions of use, adverse health effects are not anticipated. This product is generally considered to be of low toxicity. Use safe work practices to avoid eye contact, prolonged skin contact and dust generation - inhalation.
<b>Eye</b>	Low to moderate irritant. Contact may result in irritation, lacrimation, pain and redness.
<b>Inhalation</b>	Low irritant. Over exposure may result in irritation of the nose and throat, with coughing.
<b>Skin</b>	Low irritant. Prolonged or repeated contact may result in mild irritation.
<b>Ingestion</b>	Low toxicity. Ingestion may result in gastrointestinal irritation. However, due to product form ingestion is considered unlikely. Maintain good personal hygiene standards.
<b>Toxicity Data</b>	No LD50 data available for this product.

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## 12. ECOLOGICAL INFORMATION

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<b>Environment</b>	This product is not anticipated to cause adverse effects to animal or plant life if released to the environment in small quantities. Not expected to bioaccumulate.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal</b>	Ensure product is covered with moist soil to prevent dust generation and dispose of to approved Council landfill. Contact the manufacturer if additional information is required.
<b>Legislation</b>	Dispose of in accordance with relevant local legislation.

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## 14. TRANSPORT INFORMATION

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

<b>Shipping Name</b>	None Allocated			
<b>UN No.</b>	None Allocated	<b>DG Class</b>	None Allocated	<b>Subsidiary Risk(s)</b> None Allocated
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	None Allocated	

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## 15. REGULATORY INFORMATION

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<b>Poison Schedule</b>	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).
<b>AICS</b>	All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

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## 16. OTHER INFORMATION

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<b>Additional Information</b>	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.
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### ABBREVIATIONS:

ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.  
BEI - Biological Exposure Indices(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/m<sup>3</sup> - 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

**Product Name**     **XANTHAN GUM (P)**

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**     Risk Management Technologies  
5 Ventnor Ave, West Perth  
Western Australia 6005  
Phone: +61 8 9322 1711  
Fax: +61 8 9322 1794  
Email: info@rmt.com.au  
Web: www.rmt.com.au

**SDS Date** 01 Nov 2010

**End of Report**

## **Cementing**

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** CEMENT - CLASS G

**Revision Date:** 29-Apr-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
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**Statement of Hazardous Nature** Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

**Product Emergency Telephone**

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

**Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

**Identification of Substances or Preparation**

**Product Trade Name:** CEMENT - CLASS G  
**Synonyms:** None  
**Chemical Family:** Cement  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Portland cement	65997-15-1	60 - 100%	TWA: 10 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup>
Crystalline silica, quartz	14808-60-7	<3	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

#### Hazard Overview

**CAUTION! - ACUTE HEALTH HAZARD**

May cause eye, skin, and respiratory irritation.

**DANGER! - CHRONIC HEALTH HAZARD**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

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

#### Risk Phrases

R41 Risk of serious damage to eyes.

R43 May cause sensitization by skin contact.

R37/38 Irritating to respiratory system and skin.

#### HSNO Classification

6.1E (Inhalation) Acutely Toxic Substances 8.2C Corrosive to dermal tissue if exposed for greater than 1 hour 8.3A Corrosive to ocular tissue 6.5B Contact sensitizers 6.7A Known or presumed human carcinogens 6.9A Toxic to human target organs or systems

### 4. FIRST AID MEASURES

#### Inhalation

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

#### Skin

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

#### Eyes

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

#### Ingestion

Under normal conditions, first aid procedures are not required.

#### Notes to Physician

Not Applicable

### 5. FIRE FIGHTING MEASURES

#### Suitable Extinguishing Media

None - does not burn.

#### Extinguishing media which must not be used for safety reasons

None known.

#### Special Exposure Hazards

Not applicable.

#### Special Protective Equipment for Fire-Fighters

Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

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

CEMENT - CLASS G

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**Environmental Precautionary Measures** None known.

**Procedure for Cleaning / Absorption** Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

## 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

**Storage Information** Store in a cool well ventilated area. Keep container closed when not in use. Store locked up. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

**Respiratory Protection** Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.

**Hand Protection** Normal work gloves.

**Skin Protection** Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

**Eye Protection** Wear safety glasses or goggles to protect against exposure.

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

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Solid
<b>Color:</b>	Gray
<b>Odor:</b>	Odorless
<b>pH:</b>	12.4
<b>Specific Gravity @ 20 C (Water=1):</b>	3.14
<b>Density @ 20 C (kg/l):</b>	Not Determined
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined



## 9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Not Determined
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

## 10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from any contact with water.
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure **Inhalation**

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

**Skin Contact** Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

**Eye Contact** May cause severe eye irritation.

**Ingestion** None known

**Aggravated Medical Conditions** Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

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

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

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

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

#### **Toxicity Tests**

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

## **12. ECOLOGICAL INFORMATION**

**Mobility (Water/Soil/Air)** Not determined

**Persistence/Degradability** Not applicable

**Bio-accumulation** Not determined

#### **Ecotoxicological Information**

**Acute Fish Toxicity:** Not determined

**Acute Crustaceans Toxicity:** Not determined

<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

### 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Bury in a licensed landfill according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

### 14. TRANSPORT INFORMATION

#### Land Transportation

**ADR**  
Not restricted

#### Air Transportation

**ICAO/IATA**  
Not restricted

#### Sea Transportation

**IMDG**  
Not restricted

#### Other Transportation Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

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

**Classification** Xi - Irritant.

**Risk Phrases** R41 Risk of serious damage to eyes.  
R43 May cause sensitization by skin contact.  
R37/38 Irritating to respiratory system and skin.

**Safety Phrases**

S2 Keep out of reach of children.  
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S37 Wear suitable gloves.  
S24/25 Avoid contact with skin and eyes.

**16. OTHER INFORMATION**

The following sections have been revised since the last issue of this SDS

Not applicable

**Contact****Australian Poisons Information Centre**

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

**New Zealand National Poisons Centre**

0800 764 766

**Additional Information**

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

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

**Disclaimer Statement**

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

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

# MATERIAL SAFETY DATA SHEET

**Product Trade Name:** ECONOLITE LIQUID

**Revision Date:** 17-Jan-2013

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

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substance or Preparation**

**Product Trade Name:** ECONOLITE LIQUID  
**Synonyms:** None  
**Chemical Family:** Silicate  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None  
**Poisons Schedule:** S5  
**Application:** Light Weight Cement Additive

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

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance	CAS Number	Percent	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Sodium silicate	1344-09-8	35-49	Not determined	Not determined	Not applicable

## Non-hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

<b>Hazard Overview</b>	May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed.
<b>Risk Phrases</b>	R34 Causes burns.
<b>HSNO Classification</b>	Not Determined

### 4. FIRST AID MEASURES

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

### 5. FIRE FIGHTING MEASURES

<b>Suitable Extinguishing Media</b>	Water fog, carbon dioxide, foam, dry chemical.
<b>Unsuitable Extinguishing Media</b>	None known
<b>Special Exposure Hazards</b>	Decomposition in fire may produce toxic gases.
<b>Special Protective Equipment for Fire-Fighters</b>	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

### 6. ACCIDENTAL RELEASE MEASURES

<b>Personal Precautionary Measures</b>	Use Appropriate protective equipment.
<b>Environmental Precautionary Measures</b>	Prevent from entering sewers, waterways or low areas.
<b>Procedure for Cleaning/Absorption</b>	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralise to pH of 6-8. Scoop up and remove. Do NOT spread spilled product with water.

### 7. HANDLING AND STORAGE

<b>Handling Precautions</b>	Avoid contact with eyes, skin, or clothing. Avoid breathing vapours. Wash hands after use. Launder contaminated clothing before reuse. Avoid breathing mist.
<b>Storage Information</b>	Store away from acids. Store in a cool well ventilated area. Keep container closed when not in use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Engineering Controls</b>	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
<b>Respiratory Protection</b>	Dust/mist respirator. (N95,P2/P3)
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Full protective clothing.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Colour:</b>	Clear to hazy
<b>Odour:</b>	Slightly soapy
<b>pH:</b>	11.2
<b>Specific Gravity @ 20 C (Water=1):</b>	1.4
<b>Density @ 20 C (kg/l):</b>	1.4
<b>Bulk Density @ 20 C (kg/l):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	101
<b>Freezing Point/Range (C):</b>	-1
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapour Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapour Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate = 1):</b>	Not determined.
<b>Solubility in Water (g/100ml):</b>	Soluble
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerisation:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None anticipated
<b>Incompatibility (Materials to Avoid)</b>	Strong acids. Amphoteric metals such as aluminium, magnesium, lead, tin, or zinc.

<b>Hazardous Decomposition Products</b>	Toxic fumes.
<b>Additional Guidelines</b>	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
<b><u>Symptoms related to exposure</u></b>	
<b>Inhalation</b>	Causes severe respiratory irritation.
<b>Skin Contact</b>	May cause skin burns.
<b>Eye Contact</b>	May cause eye burns.
<b>Ingestion</b>	Causes burns of the mouth, throat and stomach.
<b>Aggravated Medical Conditions</b>	Skin disorders.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	LD50: 2000-3000 mg/kg (Rat)
<b>Dermal Toxicity:</b>	Not determined.
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity:</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive/Developmental Toxicity:</b>	Not determined

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not determined
<b>Bio-accumulation</b>	Not Determined

### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable



### 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state and local regulations.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations.

### 14. TRANSPORT INFORMATION

#### Land Transportation

ADR Not restricted

#### Air Transportation

ICAO/IATA Not restricted

#### Sea Transportation

IMDG Not restricted

#### Other Shipping Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

<b>Australian AICS Inventory</b>	All components listed.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>US TSCA Inventory</b>	All components listed.
<b>EINECS Inventory</b>	All components are listed on the inventory.

**Classification** C - Corrosive.

**Risk Phrases** R34 Causes burns.

**Safety Phrases** S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S36 Wear suitable protective clothing.

### 16. OTHER INFORMATION

**The following sections have been revised since the last issue of this MSDS:**

Not applicable

## Contact

### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

### Disclaimer Statement

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** GASCON 469

**Revision Date:** 26-Mar-2014

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

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

**Product Emergency Telephone**

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

**Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

### Identification of Substances or Preparation

**Product Trade Name:** GASCON 469  
**Synonyms:** None  
**Chemical Family:** Blend  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement Additive

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

### 2. HAZARDS IDENTIFICATION

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

**Hazard Overview** May cause mild eye irritation. May cause mild skin irritation.

**Classification** None

**Risk Phrases** None

**Safety Phrases** S24/25 Avoid contact with skin and eyes.

**HSNO Classification** 6.3B Mildly irritating to the skin

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable	Not applicable

**Non-Hazardous Substance to Total of 100%**

**4. FIRST AID MEASURES**

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

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

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

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

**Notes to Physician** Not Applicable

**5. FIRE FIGHTING MEASURES**

**Suitable Extinguishing Media**  
All standard fire fighting media

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

**Special Exposure Hazards** Not applicable.

**Special Protective Equipment for Fire-Fighters** Not applicable.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal Precautionary Measures** Use appropriate protective equipment.

**Environmental Precautionary Measures** None known.

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

## 7. HANDLING AND STORAGE

<b>Handling Precautions</b>	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
<b>Storage Information</b>	Store in a cool well ventilated area. Keep from excessive heat. Keep from freezing. Keep container closed when not in use. Store in non-rusting containers. Product has a shelf life of 12 months.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Engineering Controls</b>	Use in a well ventilated area.
<b>Respiratory Protection</b>	Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Transparent
<b>Odor:</b>	Odorless
<b>pH:</b>	10
<b>Specific Gravity @ 20 C (Water=1):</b>	1.1
<b>Density @ 20 C (kg/l):</b>	1.098
<b>Bulk Density @ 20 C (kg/M3):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	100
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	80
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	10
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
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**Hazardous Polymerization:** Will Not Occur

**Conditions to Avoid** None anticipated

**Incompatibility (Materials to Avoid)** Strong oxidizers. Strong acids.

**Hazardous Decomposition Products** None known.

**Additional Guidelines** Not Applicable

## 11. TOXICOLOGICAL INFORMATION

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### Acute Toxicity

**Inhalation**

May cause mild respiratory irritation.

**Eye Contact**

May cause mild eye irritation.

**Skin Contact**

May cause mild skin irritation.

**Ingestion**

Irritation of the mouth, throat, and stomach.

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

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances	Mixture	No data available	No data available	No data available

## 12. ECOLOGICAL INFORMATION

### Ecotoxicological Information

#### Ecotoxicity Product

**Acute Fish Toxicity:** Not determined

**Acute Crustaceans Toxicity:** Not determined

**Acute Algae Toxicity:** Not determined

#### Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances	Mixture	No information available	No information available	No information available	No information available

### 12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

### 12.3 Bioaccumulative potential

Does not bioaccumulate

### 12.4 Mobility in soil

No information available

### 12.5 Results of PBT and vPvB assessment

No information available.

12.6 Other adverse effects

**13. DISPOSAL CONSIDERATIONS**

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

**14. TRANSPORT INFORMATION**

**Land Transportation**

**ADR**  
Not restricted

**Air Transportation**

**ICAO/IATA**  
Not restricted

**Sea Transportation**

**IMDG**  
Not restricted

**Other Transportation Information**

**Labels:** None

**15. REGULATORY INFORMATION**

**Chemical Inventories**

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS
<b>Classification</b>	Not Classified
<b>Risk Phrases</b>	Not classified

**Safety Phrases**  
S24/25 Avoid contact with skin and eyes.

**16. OTHER INFORMATION**

**The following sections have been revised since the last issue of this SDS**

Not applicable

## **Contact**

### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

### **New Zealand National Poisons Centre**

0800 764 766

### **Additional information**

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

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

### **Disclaimer Statement**

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

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



## MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-6L**

Revision Date: 02-May-2013

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

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

**Product Emergency Telephone**

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

**Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

### Identification of Substances or Preparation

**Product Trade Name:** HR-6L  
**Synonyms:** None  
**Chemical Family:** Lignosulfonate  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement Retarder

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

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Modified lignosulfonate	Proprietary	30 - 60%	Not applicable	Not applicable	Not applicable

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** May cause eye and respiratory irritation.

**Risk Phrases** None

**HSNO Classification** Non-hazardous

### 4. FIRST AID MEASURES

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

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

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

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

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

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

**Special Exposure Hazards** Decomposition in fire may produce toxic gases.

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

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

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

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

### 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

**Storage Information** Store away from oxidizers. Keep container closed when not in use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.

<b>Respiratory Protection</b>	Not normally necessary.
<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Dark brown
<b>Odor:</b>	Molasses
<b>pH:</b>	9.5
<b>Specific Gravity @ 20 C (Water=1):</b>	1.21
<b>Density @ 20 C (kg/l):</b>	1.208
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined <b>Min:</b> > 98
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Soluble
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None anticipated
<b>Incompatibility (Materials to Avoid)</b>	Strong oxidizers.
<b>Hazardous Decomposition Products</b>	Oxides of sulfur. Carbon monoxide and carbon dioxide.
<b>Additional Guidelines</b>	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
<b>Symptoms related to exposure</b>	
<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Skin Contact</b>	None known.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Ingestion</b>	None known
<b>Aggravated Medical Conditions</b>	None known.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	Not determined
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

## 12. ECOLOGICAL INFORMATION

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

### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

## 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	This product is not regarded as hazardous waste. Dispose in accordance with local regulations.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**ADR**  
Not restricted

### Air Transportation

**ICAO/IATA**  
Not restricted

### Sea Transportation

**IMDG**  
Not restricted

### Other Transportation Information

**Labels:** None

## 15. REGULATORY INFORMATION

### Chemical Inventories

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

**Classification** Not Classified

**Risk Phrases** None

**Safety Phrases** None

## 16. OTHER INFORMATION

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

### Contact

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

**New Zealand National Poisons Centre**  
0800 764 766

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

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

**Disclaimer Statement**

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

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

# MATERIAL SAFETY DATA SHEET

**Product Trade Name:** CFR-3L

**Revision Date:** 22-Feb-2012

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

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:** CFR-3L  
**Synonyms:** None  
**Chemical Family:** Blend  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None  
**Poisons Schedule:** None  
**Application:** Friction Reducer

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

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand OEL	ACGIH TLV-TWA
Sulfonic acid salt		30 - 60%	Not applicable	Not applicable	Not applicable

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** May cause eye and skin irritation.

**Risk Phrases** None

**HSNO Classification** Non-hazardous

### 4. FIRST AID MEASURES

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

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

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

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

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

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

**Special Exposure Hazards** Decomposition in fire may produce toxic gases.

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

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

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

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

### 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing.

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

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.



<b>Respiratory Protection</b>	Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Red
<b>Odor:</b>	Musty
<b>pH:</b>	7
<b>Specific Gravity @ 20 C (Water=1):</b>	1.17
<b>Density @ 20 C (kg/l):</b>	1.17
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined <b>Min:</b> > 98
<b>Flash Point Method:</b>	PMCC
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	67
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Soluble
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None anticipated
<b>Incompatibility (Materials to Avoid)</b>	Strong oxidizers.
<b>Hazardous Decomposition Products</b>	Oxides of sulfur. Carbon monoxide and carbon dioxide.
<b>Additional Guidelines</b>	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
<b>Inhalation</b>	None known.
<b>Skin Contact</b>	May cause skin irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Ingestion</b>	None known
<b>Aggravated Medical Conditions</b>	None known.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	LD50: 8670 mg/kg (Rat)
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not determined
<b>Bio-accumulation</b>	Not determined

### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

## 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state, and local regulations.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**ADR**  
Not restricted

### Air Transportation

**ICAO/IATA**  
Not restricted

### Sea Transportation

**IMDG**  
Not restricted

### Other Transportation Information

**Labels:** None

## 15. REGULATORY INFORMATION

### Chemical Inventories

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	This product does not comply with NZIOC
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS

**Classification** Not Classified

**Risk Phrases** None

**Safety Phrases** None

## 16. OTHER INFORMATION

**The following sections have been revised since the last issue of this MSDS**

Not applicable

### Contact

#### Australian Poisons Information Centre

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

#### New Zealand National Poisons Centre

0800 764 766

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

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

**Disclaimer Statement**

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** HALAD® 413L CEMENT ADDITIVE

**Revision Date:** 02-May-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:** HALAD® 413L CEMENT ADDITIVE  
**Synonyms:** None  
**Chemical Family:** Polymer  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Fluid Loss Additive

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Acrylic polymer	Proprietary	10 - 30%	Not applicable	Not applicable	Not applicable

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** No significant hazards expected.

**Risk Phrases** None

**HSNO Classification** Non-hazardous

### 4. FIRST AID MEASURES

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

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

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

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** All standard fire fighting media

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

**Special Exposure Hazards** Decomposition in fire may produce toxic gases.

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

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

**Environmental Precautionary Measures** None known.

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

### 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing.

**Storage Information** Store away from oxidizers. Product has a shelf life of 24 months.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.

<b>Respiratory Protection</b>	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.
	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Brown-black
<b>Odor:</b>	Sweet
<b>pH:</b>	7.5
<b>Specific Gravity @ 20 C (Water=1):</b>	1.1
<b>Density @ 20 C (kg/l):</b>	1.098
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Miscible
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None anticipated
<b>Incompatibility (Materials to Avoid)</b>	Strong oxidizers.

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

**Additional Guidelines** Not Applicable

## 11. TOXICOLOGICAL INFORMATION

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

**Inhalation** None known.

**Skin Contact** None known.

**Eye Contact** None known.

**Ingestion** None known

**Aggravated Medical Conditions** None known.

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

**Other Information** None known.

### **Toxicity Tests**

**Oral Toxicity:** LD50: > 5000 mg/kg (Rat)

**Dermal Toxicity:** LD50: > 2000 mg/kg (Rabbit)

**Inhalation Toxicity:** Not determined

**Primary Irritation Effect:** Draize Rating (Skin): 0.09/8.0 (Rabbit) Practically Non-irritating

**Carcinogenicity** Not determined

**Genotoxicity:** Not determined

**Reproductive / Developmental Toxicity:** Not determined

## 12. ECOLOGICAL INFORMATION

**Mobility (Water/Soil/Air)** Not determined

**Persistence/Degradability** Slowly biodegradable

**Bio-accumulation** Not determined

### **Ecotoxicological Information**

**Acute Fish Toxicity:** Not determined

**Acute Crustaceans Toxicity:** Not determined

**Acute Algae Toxicity:** Not determined

**Chemical Fate Information** Not determined

**Other Information** Not applicable



### 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state, and local regulations.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations.

### 14. TRANSPORT INFORMATION

#### Land Transportation

**ADR**  
Not restricted

#### Air Transportation

**ICAO/IATA**  
Not restricted

#### Sea Transportation

**IMDG**  
Not restricted

#### Other Transportation Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

<b>Australian AICS Inventory</b>	Product contains one or more components not listed on inventory.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product does not comply with EINECS

**Classification** Not Classified

**Risk Phrases** None

**Safety Phrases** None

### 16. OTHER INFORMATION

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

#### Contact

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

**New Zealand National Poisons Centre**  
0800 764 766

**Additional Information**

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

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

**Disclaimer Statement**

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** NF-6

**Revision Date:** 10-Apr-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

**Product Emergency Telephone**

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

**Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

**Identification of Substances or Preparation**

**Product Trade Name:** NF-6  
**Synonyms:** None  
**Chemical Family:** Blend  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Defoamer

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Vegetable oil	Proprietary	60 - 100%	10 mg/m <sup>3</sup>	Not applicable	Not applicable
Aluminum stearate	637-12-7	1 - 5%	10 mg/m <sup>3</sup>	Not applicable	2 mg/m <sup>3</sup>

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

<b>Hazard Overview</b>	May cause mild eye, skin, and respiratory irritation. May be harmful if swallowed.
<b>Risk Phrases</b>	None
<b>HSNO Classification</b>	9.1D Slightly harmful in the aquatic environment

### 4. FIRST AID MEASURES

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Ingestion</b>	Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.
<b>Notes to Physician</b>	Not Applicable

### 5. FIRE FIGHTING MEASURES

<b>Suitable Extinguishing Media</b>	Carbon dioxide, dry chemical, foam.
<b>Extinguishing media which must not be used for safety reasons</b>	None known.
<b>Special Exposure Hazards</b>	Use water spray to cool fire exposed surfaces. Decomposition in fire may produce toxic gases.
<b>Special Protective Equipment for Fire-Fighters</b>	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

### 6. ACCIDENTAL RELEASE MEASURES

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

### 7. HANDLING AND STORAGE

<b>Handling Precautions</b>	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
<b>Storage Information</b>	Store away from oxidizers. Keep container closed when not in use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Engineering Controls</b>	A well ventilated area to control dust levels. Local exhaust ventilation should be used in areas without good cross ventilation.
<b>Respiratory Protection</b>	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Organic vapor respirator with a dust/mist filter. (A2P2/P3)
<b>Hand Protection</b>	Polyvinylchloride gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Yellow
<b>Odor:</b>	Mild
<b>pH:</b>	Not Determined
<b>Specific Gravity @ 20 C (Water=1):</b>	0.93
<b>Density @ 20 C (kg/l):</b>	0.93
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	182
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	>170
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	385
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Disperses
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None known.
<b>Incompatibility (Materials to Avoid)</b>	Strong oxidizers.

**Hazardous Decomposition Products** Hydrocarbons. Carbon monoxide and carbon dioxide.

**Additional Guidelines** Not Applicable

## 11. TOXICOLOGICAL INFORMATION

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

**Inhalation** None known.

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

**Eye Contact** May cause mild eye irritation.

**Ingestion** May cause abdominal pain, vomiting, nausea, and diarrhea.

**Aggravated Medical Conditions** None known.

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

**Other Information** None known.

### **Toxicity Tests**

**Oral Toxicity:** Not determined

**Dermal Toxicity:** Not determined

**Inhalation Toxicity:** Not determined

**Primary Irritation Effect:** Not determined

**Carcinogenicity** Not determined

**Genotoxicity:** Not determined

**Reproductive / Developmental Toxicity:** Not determined

## 12. ECOLOGICAL INFORMATION

**Mobility (Water/Soil/Air)** Not determined

**Persistence/Degradability** Readily biodegradable

**Bio-accumulation** Not determined

### **Ecotoxicological Information**

**Acute Fish Toxicity:** Not determined

**Acute Crustaceans Toxicity:** Not determined

**Acute Algae Toxicity:** Not determined

**Chemical Fate Information** Not determined

**Other Information** Not applicable

### 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

### 14. TRANSPORT INFORMATION

#### Land Transportation

**ADR**  
Not restricted

#### Air Transportation

**ICAO/IATA**  
Not restricted

#### Sea Transportation

**IMDG**  
Not restricted

#### Other Transportation Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

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

**Classification** Not Classified

**Risk Phrases** None

**Safety Phrases** None

### 16. OTHER INFORMATION

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

## Contact

### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

### Disclaimer Statement

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



## SAFETY DATA SHEET

### D-AIR 3000L

Revision Date: 17-Feb-2015

Revision Number: 16

#### 1. Product Identifier & Identity for the Chemical

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

##### 1.1. Product Identifier

**Product Name** D-AIR 3000L

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM003191

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Defoamer  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: 61 (08) 9455 8300  
Fax Number: 61 (08) 9455 5300  
E-Mail address: fdunexchem@halliburton.com

##### Emergency phone number

61 (08) 9455 8300

##### Australian Poisons Information Centre

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

#### 2. Hazard Identification

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

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

##### Hazard Pictograms

**Signal Word**

Not Hazardous

**Hazard Statements**

Not Classified

**Precautionary Statements****Prevention** None**Response** None**Storage** None**Disposal** None**Contains****Substances**

Alkenes

**CAS Number**

Proprietary

**Other hazards which do not result in classification**

None known

**Australia Classification***For the full text of the R/H-phrases mentioned in this Section, see Section 16***Classification**

Not Classified

**Risk Phrases**

None

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Alkenes	Proprietary	60 - 100%	

**4. First aid measures****Description of necessary first aid measures****Inhalation**

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

**Eyes**

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

**Skin**

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

**Ingestion**

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

**Symptoms caused by exposure**

May cause lung damage if swallowed.

**Medical Attention and Special Treatment****Notes to Physician**

Treat symptomatically

**5. Fire Fighting Measures****Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special Exposure Hazards**

Decomposition in fire may produce toxic gases.

**Special protective equipment and precautions for fire fighters****Special Protective Equipment for Fire-Fighters**

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

<b>6. Accidental release measures</b>
---------------------------------------

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment.

**6.2. Environmental precautions**

None known.

**6.3. Methods and material for containment and cleaning up**

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

<b>7. Handling and storage</b>
--------------------------------

**7.1. Precautions for Safe Handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
---

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Alkenes	Proprietary	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area.

**Personal protective equipment (PPE)****Respiratory Protection**

Not normally necessary.

**Hand Protection**

None known.

**Skin Protection**

Normal work coveralls.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**Environmental Exposure Controls**

No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid      **Color:** Opaque  
**Odor:** Hydrocarbon      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
<b>pH:</b>	5.5-7.9
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	> 121 °C PMCC
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	0.92
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

**VOC Content (%)** No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not applicable

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### Most Important Symptoms/Effects

May cause lung damage if swallowed.

### Numerical measures of toxicity

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Alkenes	Proprietary	> 5000 mg/kg (Rat) (similar substance)	> 2000 mg/kg (Rat) (similar substance)	> 2.1 mg/L (Rat)

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Ingestion</b>	May cause abdominal pain, vomiting, nausea, and diarrhea. Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

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

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

<b>12. Ecological Information</b>
-----------------------------------

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Alkenes	Proprietary	EC50(72h): > 1000 mg/L (Selenastrum capicomutum) (similar substance)	LL50(96h): > 1000 mg/L (Oncorhynchus mykiss) (similar substance) LL50(96h): > 10000 mg/L (Scophthalmus maximus) (similar substance)	No information available	EC50(48h): > 1000 mg/L (Daphnia magna) (similar substance)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Alkenes	Proprietary	Readily biodegradable (77 - 81% @ 28d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Alkenes	Proprietary	> 7

**12.4. Mobility in soil**

No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

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

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

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

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review**

Revision Date: 17-Feb-2015

**Revision Note**

Update to Format SECTION: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

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

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

**Key abbreviations or acronyms used**

Not applicable

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

NZ CCID

**Disclaimer Statement**

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**End of Safety Data Sheet**

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** WellLife™ 734

**Revision Date:** 12-Apr-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton/Baroid Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

**Product Emergency Telephone**

Australia: 08-64244950  
Papua New Guinea: 05 1 281 575 5000  
New Zealand: 06-7559274

**Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

**Identification of Substances or Preparation**

**Product Trade Name:** WellLife™ 734  
**Synonyms:** None  
**Chemical Family:** Inorganic  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement Enhancer

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable	Not applicable



Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** No significant hazards expected.

**Risk Phrases** None

**HSNO Classification** Non-hazardous

### 4. FIRST AID MEASURES

**Inhalation** Under normal conditions, first aid procedures are not required.

**Skin** Under normal conditions, first aid procedures are not required.

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

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** All standard fire fighting media

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

**Special Exposure Hazards** Not applicable.

**Special Protective Equipment for Fire-Fighters** Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

**Environmental Precautionary Measures** None known.

**Procedure for Cleaning / Absorption** Scoop up and remove.

### 7. HANDLING AND STORAGE

**Handling Precautions** Material is slippery underfoot. Keep floors clean of spills.

**Storage Information** Store in a dry location. Product has a shelf life of 60 months.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** None known.

**Respiratory Protection** Not normally necessary.

<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Solid
<b>Color:</b>	White to Variable
<b>Odor:</b>	Odorless
<b>pH:</b>	Not Determined
<b>Specific Gravity @ 20 C (Water=1):</b>	2.6
<b>Density @ 20 C (kg/l):</b>	2.48
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	1200
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Insoluble
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None known.
<b>Incompatibility (Materials to Avoid)</b>	None known.
<b>Hazardous Decomposition Products</b>	None known.
<b>Additional Guidelines</b>	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
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**Symptoms related to exposure**

<b>Inhalation</b>	None known.
<b>Skin Contact</b>	None known.
<b>Eye Contact</b>	May cause mechanical irritation to eye.
<b>Ingestion</b>	None known
<b>Aggravated Medical Conditions</b>	None known.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.

**Toxicity Tests**

<b>Oral Toxicity:</b>	Not determined
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Draize Rating (Eye): 1.3/110 (Rabbit) Practically Non-irritating Draize Rating (Skin): 0.5/8.0 (Rabbit) Non-Irritating
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

**12. ECOLOGICAL INFORMATION**

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not biodegradable
<b>Bio-accumulation</b>	Not determined

**Ecotoxicological Information**

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 10 ppb
<b>Acute Algae Toxicity:</b>	Not determined

<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

**13. DISPOSAL CONSIDERATIONS**

<b>Disposal Method</b>	Bury in a licensed landfill according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
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**Contaminated Packaging**

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

**14. TRANSPORT INFORMATION****Land Transportation****ADR**

Not restricted

**Air Transportation****ICAO/IATA**

Not restricted

**Sea Transportation****IMDG**

Not restricted

**Other Transportation Information**

Labels: None

**15. REGULATORY INFORMATION****Chemical Inventories****Australian AICS Inventory**

All components listed on inventory or are exempt.

**New Zealand Inventory of Chemicals**

All components listed on inventory or are exempt.

**US TSCA Inventory**

All components listed on inventory or are exempt.

**EINECS Inventory**

This product, and all its components, complies with EINECS

**Classification**

Not Classified

**Risk Phrases**

None

**Safety Phrases**

None

**16. OTHER INFORMATION**

The following sections have been revised since the last issue of this SDS

Not applicable

**Contact****Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

**New Zealand National Poisons Centre**

0800 764 766

**Additional Information**

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

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

**Disclaimer Statement**

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** CEMENT - CLASS G + 35% SSA-1

**Revision Date:** 29-Apr-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substance or Preparation**

**Product Trade Name:** CEMENT - CLASS G + 35% SSA-1  
**Synonyms:** None  
**Chemical Family:** Cement  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None  
**Poisons Schedule:** None  
**Application:** Cement

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substance	CAS Number	Percent	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Portland cement	65997-15-1	60 - 100%	TWA: 10 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup>
Crystalline silica, quartz	14808-60-7	30 - 60%	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

## Non-hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

#### Hazard Overview

**CAUTION! - ACUTE HEALTH HAZARD**

May cause eye, skin and respiratory irritation.

**DANGER! - CHRONIC HEALTH HAZARD**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

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

#### Risk Phrases

R41 Risk of serious damage to eyes.

R43 May cause sensitisation by skin contact.

R49 May cause cancer by inhalation.

R37/38 Irritating to respiratory system and skin.

R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

#### HSNO Classification

Not Determined

### 4. FIRST AID MEASURES

#### Inhalation

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

#### Skin

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

#### Eyes

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

#### Ingestion

Under normal conditions, first aid procedures are not required.

#### Notes to Physician

Not Applicable

### 5. FIRE FIGHTING MEASURES

#### Suitable Extinguishing Media

None - does not burn.

#### Unsuitable Extinguishing Media

None known

#### Special Exposure Hazards

Not applicable.

#### Special Protective Equipment for Fire-Fighters

Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

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

**Environmental Precautionary Measures** None known.

**Procedure for Cleaning/Absorption** Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

## 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

**Storage Information** Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

**Respiratory Protection** Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.

**Hand Protection** Normal work gloves.

**Skin Protection** Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

**Eye Protection** Wear safety glasses or goggles to protect against exposure.

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

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Solid
<b>Colour:</b>	Grey
<b>Odour:</b>	Odourless
<b>pH:</b>	12.4
<b>Specific Gravity @ 20 C (Water=1):</b>	Not Determined
<b>Density @ 20 C (kg/l):</b>	Not Determined
<b>Bulk Density @ 20 C (kg/l):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapour Pressure @ 20 C (mmHg):</b>	Not Determined



## 9. PHYSICAL AND CHEMICAL PROPERTIES

Vapour Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate = 1):	Not determined.
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

## 10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerisation:	Will Not Occur
Conditions to Avoid	Keep away from any contact with water.
Incompatibility (Materials to Avoid)	Hydrofluoric acid
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure **Inhalation**

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See Chronic Effects/Carcinogenicity" subsection below).

"

**Skin Contact** Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

**Eye Contact** May cause severe eye irritation.

**Ingestion** None known

**Aggravated Medical Conditions** Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

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

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

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

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

#### Toxicity Tests

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

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not applicable
<b>Bio-accumulation</b>	Not Determined

#### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined

**Chemical Fate Information** Not determined

**Other Information** Not applicable

### 13. DISPOSAL CONSIDERATIONS

**Disposal Method** Bury in a licensed landfill according to federal, state, and local regulations.

**Contaminated Packaging** Follow all applicable national or local regulations.

### 14. TRANSPORT INFORMATION

#### Land Transportation

ADR Not restricted

#### Air Transportation

ICAO/IATA Not restricted

#### Sea Transportation

IMDG Not restricted

#### Other Shipping Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

**Australian AICS Inventory** All components listed.  
**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.  
**US TSCA Inventory** All components listed.  
**EINECS Inventory** All components are listed on the inventory.

**Classification**  
T - Toxic.  
Xi - Irritant.

**Risk Phrases**  
R41 Risk of serious damage to eyes.  
R43 May cause sensitisation by skin contact.  
R49 May cause cancer by inhalation.  
R37/38 Irritating to respiratory system and skin.  
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

**Safety Phrases**  
S2 Keep out of reach of children.  
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S37 Wear suitable gloves.  
S24/25 Avoid contact with skin and eyes.

## 16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS:

Not applicable

### Contact

#### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

### Disclaimer Statement

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** SCR-100L

**Revision Date:** 12-Apr-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:** SCR-100L  
**Synonyms:** None  
**Chemical Family:** Anionic Polymer  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Retarder

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable	Not applicable

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** May cause eye irritation.

**HSNO Classification** Non-hazardous

### 4. FIRST AID MEASURES

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

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

**Eyes** Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** All standard fire fighting media

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

**Special Exposure Hazards** Decomposition in fire may produce toxic gases.

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

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

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

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

### 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing.

**Storage Information** Store away from oxidizers. Store in a dry location. Keep container closed when not in use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.

<b>Respiratory Protection</b>	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Blue
<b>Odor:</b>	Odorless
<b>pH:</b>	3 - 4 (28%)
<b>Specific Gravity @ 20 C (Water=1):</b>	1.16
<b>Density @ 20 C (kg/l):</b>	1.16
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	-4
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined <b>Min:</b> > 93
<b>Flash Point Method:</b>	PMCC
<b>Autoignition Temperature (C):</b>	520
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	Not Determined
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	~60
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Soluble
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	15-30 (25C)
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

<b>Stability Data:</b>	Stable
<b>Hazardous Polymerization:</b>	Will Not Occur
<b>Conditions to Avoid</b>	None anticipated
<b>Incompatibility (Materials to Avoid)</b>	Strong oxidizers.
<b>Hazardous Decomposition Products</b>	Oxides of nitrogen. Oxides of sulfur. Carbon monoxide and carbon dioxide.
<b>Additional Guidelines</b>	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
<b>Symptoms related to exposure</b>	
<b>Inhalation</b>	May cause respiratory irritation.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Ingestion</b>	Irritation of the mouth, throat, and stomach.
<b>Aggravated Medical Conditions</b>	Skin disorders.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	Not determined
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not determined
<b>Bio-accumulation</b>	Not determined

### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

## 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Bury in a licensed landfill or burn in an approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
------------------------	--



**Contaminated Packaging**

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

**14. TRANSPORT INFORMATION****Land Transportation****ADR**

Not restricted

**Air Transportation****ICAO/IATA**

Not restricted

**Sea Transportation****IMDG**

Not restricted

**Other Transportation Information**

Labels: None

**15. REGULATORY INFORMATION****Chemical Inventories****Australian AICS Inventory**

All components listed on inventory or are exempt.

**New Zealand Inventory of Chemicals**

All components listed on inventory or are exempt.

**US TSCA Inventory**

All components listed on inventory or are exempt.

**EINECS Inventory**

This product, and all its components, complies with EINECS

**Classification**

Not Classified

**Risk Phrases**

Not classified

**Safety Phrases**

Not classified

**16. OTHER INFORMATION**

The following sections have been revised since the last issue of this SDS

Not applicable

**Contact****Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

**New Zealand National Poisons Centre**

0800 764 766

**Additional Information**

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

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

**Disclaimer Statement**

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** SILICALITE LIQUID

**Revision Date:** 22-Feb-2012

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
 15 Marriott Road  
 Jandakot  
 WA 6164  
 Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:** SILICALITE LIQUID  
**Synonyms:** None  
**Chemical Family:** Blend  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None  
**Poisons Schedule:** None  
**Application:** Light Weight Cement Additive

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand OEL	ACGIH TLV-TWA
Silica, amorphous - fumed	7631-86-9	30 - 60%	2 mg/m <sup>3</sup>	Not applicable	2 mg/m <sup>3</sup>

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview** May cause eye irritation.

**Risk Phrases** None

**HSNO Classification** Not Determined

### 4. FIRST AID MEASURES

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

**Skin** Wash with soap and water.

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

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

**Notes to Physician** Not Applicable

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** All standard fire fighting media

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

**Special Exposure Hazards** Not applicable.

**Special Protective Equipment for Fire-Fighters** Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

**Environmental Precautionary Measures** None known.

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

### 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing.

**Storage Information** Keep container closed when not in use. Product has a shelf life of 24 months.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.

<b>Respiratory Protection</b>	Not normally necessary.
<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Liquid
<b>Color:</b>	Dark gray
<b>Odor:</b>	Odorless
<b>pH:</b>	6- 8
<b>Specific Gravity @ 20 C (Water=1):</b>	1.37
<b>Density @ 20 C (kg/l):</b>	1.397
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	100
<b>Freezing Point/Range (C):</b>	0
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	100
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined
<b>Vapor Pressure @ 20 C (mmHg):</b>	22.9
<b>Vapor Density (Air=1):</b>	Not Determined
<b>Percent Volatiles:</b>	Not Determined
<b>Evaporation Rate (Butyl Acetate=1):</b>	Not Determined
<b>Solubility in Water (g/100ml):</b>	Miscible
<b>Solubility in Solvents (g/100ml):</b>	Not Determined
<b>VOCs (g/l):</b>	Not Determined
<b>Viscosity, Dynamic @ 20 C (centipoise):</b>	Not Determined
<b>Viscosity, Kinematic @ 20 C (centistokes):</b>	Not Determined
<b>Partition Coefficient/n-Octanol/Water:</b>	Not Determined
<b>Molecular Weight (g/mole):</b>	Not Determined
<b>Decomposition Temperature (C):</b>	Not Determined

## 10. STABILITY AND REACTIVITY

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

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye and skin contact.
<b>Inhalation</b>	None known.
<b>Skin Contact</b>	Practically Non-toxic by Skin Contact.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Ingestion</b>	None known
<b>Aggravated Medical Conditions</b>	None known.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	Not determined
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Ames Test: Negative

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not determined
<b>Bio-accumulation</b>	Not determined

### Ecotoxicological Information

<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

## 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state, and local regulations.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**ADR**  
Not restricted

### Air Transportation

**ICAO/IATA**  
Not restricted

### Sea Transportation

**IMDG**  
Not restricted

### Other Transportation Information

**Labels:** None

## 15. REGULATORY INFORMATION

### Chemical Inventories

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	This product does not comply with NZIOC
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS

**Classification** Not Classified

**Risk Phrases** None

**Safety Phrases** None

## 16. OTHER INFORMATION

**The following sections have been revised since the last issue of this MSDS**

Not applicable

### Contact

#### Australian Poisons Information Centre

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

#### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

**Disclaimer Statement**

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

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



## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** HR-25L

**Revision Date:** 14-May-2013

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:** HR-25L  
**Synonyms:** None  
**Chemical Family:** Organic acid  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement Retarder

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Tartaric acid	87-69-4	30 - 60%	Not applicable	Not applicable	Not applicable

## Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

<b>Hazard Overview</b>	May cause eye, skin, and respiratory irritation.
<b>Risk Phrases</b>	R41 Risk of serious damage to eyes.
<b>HSNO Classification</b>	8.3A Corrosive to ocular tissue 9.3C Harmful to terrestrial vertebrates

### 4. FIRST AID MEASURES

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

### 5. FIRE FIGHTING MEASURES

<b>Suitable Extinguishing Media</b>	All standard fire fighting media
<b>Extinguishing media which must not be used for safety reasons</b>	None known.
<b>Special Exposure Hazards</b>	Decomposition in fire may produce toxic gases.
<b>Special Protective Equipment for Fire-Fighters</b>	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

### 6. ACCIDENTAL RELEASE MEASURES

<b>Personal Precautionary Measures</b>	Use appropriate protective equipment.
<b>Environmental Precautionary Measures</b>	Prevent from entering sewers, waterways, or low areas.
<b>Procedure for Cleaning / Absorption</b>	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

### 7. HANDLING AND STORAGE

<b>Handling Precautions</b>	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
<b>Storage Information</b>	Store away from alkalis. Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 60 months.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (N95, P2/P3)
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Light yellow-green
Odor:	Odorless
pH:	1.7
Specific Gravity @ 20 C (Water=1):	1.2
Density @ 20 C (kg/l):	1.2
Bulk Density @ 20 C (kg/m <sup>3</sup> ):	Not Determined
Boiling Point/Range (C):	103
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m <sup>3</sup> ):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m <sup>3</sup> ):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	60
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

## 10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers. Strong alkalis.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
<b>Symptoms related to exposure</b>	
<b>Inhalation</b>	May cause respiratory irritation.
<b>Skin Contact</b>	May cause skin irritation.
<b>Eye Contact</b>	May cause moderate eye irritation.
<b>Ingestion</b>	Irritation of the mouth, throat, and stomach.
<b>Aggravated Medical Conditions</b>	Skin disorders.
<b>Chronic Effects/Carcinogenicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Other Information</b>	None known.
<b>Toxicity Tests</b>	
<b>Oral Toxicity:</b>	Not determined
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Not determined
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

## 12. ECOLOGICAL INFORMATION

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not determined
<b>Bio-accumulation</b>	Not determined
<b>Ecotoxicological Information</b>	
<b>Acute Fish Toxicity:</b>	Not determined
<b>Acute Crustaceans Toxicity:</b>	Not determined
<b>Acute Algae Toxicity:</b>	Not determined
<b>Chemical Fate Information</b>	Not determined
<b>Other Information</b>	Not applicable

### 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method</b>	Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.
<b>Contaminated Packaging</b>	Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

### 14. TRANSPORT INFORMATION

#### Land Transportation

**ADR**  
Not restricted

#### Air Transportation

**ICAO/IATA**  
Not restricted

#### Sea Transportation

**IMDG**  
Not restricted

#### Other Transportation Information

**Labels:** None

### 15. REGULATORY INFORMATION

#### Chemical Inventories

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

**Classification** Xi - Irritant.

**Risk Phrases** R41 Risk of serious damage to eyes.

**Safety Phrases** S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

### 16. OTHER INFORMATION

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

## Contact

### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

### Disclaimer Statement

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:**           **BARITE**

**Revision Date:**                   03-Aug-2012

<b>1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING</b>
--

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

**Manufacturer/Supplier**           Halliburton Australia Pty. Ltd.  
53-55 Bannister Road  
Canning Vale  
WA 6155  
Australia

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

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

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

**Identification of Substances or Preparation**

**Product Trade Name:**           BARITE  
**Synonyms:**                       None  
**Chemical Family:**               Mineral  
**UN Number:**                     None  
**Dangerous Goods Class:**       None  
**Subsidiary Risk:**               None  
**Hazchem Code:**                 None  
**Poisons Schedule:**           None  
**Application:**                   Weight Additive

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

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS</b>
--

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand OEL	ACGIH TLV-TWA
Barium sulfate	7727-43-7	60 - 100%	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Crystalline silica, quartz	14808-60-7	1 - 5%	0.1 mg/m <sup>3</sup>	0.2 mg/m <sup>3</sup>	0.025 mg/m <sup>3</sup>

Non-Hazardous Substance to Total of 100%

### 3. HAZARDS IDENTIFICATION

**Hazard Overview**

**CAUTION! - ACUTE HEALTH HAZARD**

May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

**DANGER! - CHRONIC HEALTH HAZARD**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

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

**Risk Phrases**

None

**HSNO Classification**

6.7A Substances that are known or presumed human carcinogens.  
6.9A Substances that are toxic to human target organs or systems.

### 4. FIRST AID MEASURES

**Inhalation**

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

**Skin**

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

**Eyes**

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

**Ingestion**

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

**Notes to Physician**

Not Applicable

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** All standard fire fighting media

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

**Special Exposure Hazards** Not applicable.

**Special Protective Equipment for Fire-Fighters** Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

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

**Environmental Precautionary Measures** None known.



**Procedure for Cleaning / Absorption**

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

**7. HANDLING AND STORAGE**

**Handling Precautions**

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

**Storage Information**

Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Engineering Controls**

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

**Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.

**Hand Protection**

Normal work gloves.

**Skin Protection**

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Physical State:</b>	Solid
<b>Color:</b>	Pink to tan to gray
<b>Odor:</b>	Odorless
<b>pH:</b>	Not Determined
<b>Specific Gravity @ 20 C (Water=1):</b>	4.23
<b>Density @ 20 C (kg/l):</b>	Not Determined
<b>Bulk Density @ 20 C (kg/m<sup>3</sup>):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	> 100
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	233.4
Decomposition Temperature (C):	Not Determined

## 10. STABILITY AND REACTIVITY

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

## 11. TOXICOLOGICAL INFORMATION

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

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

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

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

Prolonged inhalation of fine barium sulfate dusts form harmless nodular granules in lung, an affliction called baritosis. Baritosis produces no symptoms of bronchitis or emphysema, and lung functioning is not affected although dyspnea, upon exertion, may occur. The nodulation disappears if exposure is stopped.

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

#### **Toxicity Tests**

<b>Oral Toxicity:</b>	LD50: >15000 mg/kg (Rat)
<b>Dermal Toxicity:</b>	Not determined
<b>Inhalation Toxicity:</b>	Not determined
<b>Primary Irritation Effect:</b>	Not determined
<b>Carcinogenicity</b>	Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres</u> (June 1997).
<b>Genotoxicity:</b>	Not determined
<b>Reproductive / Developmental Toxicity:</b>	Not determined

## **12. ECOLOGICAL INFORMATION**

<b>Mobility (Water/Soil/Air)</b>	Not determined
<b>Persistence/Degradability</b>	Not applicable
<b>Bio-accumulation</b>	Not determined

## Ecotoxicological Information

**Acute Fish Toxicity:** TLM96: 7500 ppm (Oncorhynchus mykiss)  
**Acute Crustaceans Toxicity:** Not determined  
**Acute Algae Toxicity:** Not determined

**Chemical Fate Information** Not determined

**Other Information** Not applicable

## 13. DISPOSAL CONSIDERATIONS

**Disposal Method** Bury in a licensed landfill according to federal, state, and local regulations.

**Contaminated Packaging** Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**ADR**  
Not restricted

### Air Transportation

**ICAO/IATA**  
Not restricted

### Sea Transportation

**IMDG**  
Not restricted

### Other Transportation Information

**Labels:** None

## 15. REGULATORY INFORMATION

### Chemical Inventories

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

**Classification** Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

**Risk Phrases** None

**Safety Phrases** None

## 16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

Not applicable

### Contact

#### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### New Zealand National Poisons Centre

0800 764 766

### Additional Information

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

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

### Disclaimer Statement

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

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

## MATERIAL SAFETY DATA SHEET

**Product Trade Name:** TUNED SPACER E+

**Revision Date:** 16-Sep-2013

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

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

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

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

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

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

### Identification of Substances or Preparation

**Product Trade Name:** TUNED SPACER E+  
**Synonyms:** None  
**Chemical Family:** Mineral  
**UN Number:** None  
**Dangerous Goods Class:** None  
**Subsidiary Risk:** None  
**Hazchem Code:** None Allocated  
**Poisons Schedule:** None Allocated  
**Application:** Cement Spacer

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

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Bentonite	1302-78-9	60 - 100%	Not applicable	Not applicable	TWA: 1 mg/m <sup>3</sup>
Crystalline silica, quartz	14808-60-7	1 - 5%	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

Crystalline silica, cristobalite	14464-46-1	0 - 1%	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>
Crystalline silica, tridymite	15468-32-3	0 - 1%	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.1 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>

**Non-Hazardous Substance to Total of 100%**

### 3. HAZARDS IDENTIFICATION

#### Hazard Overview

**DANGER! - CHRONIC HEALTH HAZARD**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

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

#### Risk Phrases

R49 May cause cancer by inhalation.

R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

#### HSNO Classification

6.7A Known or presumed human carcinogens

6.9A Toxic to human target organs or systems

### 4. FIRST AID MEASURES

#### Inhalation

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

#### Skin

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

#### Eyes

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

#### Ingestion

Under normal conditions, first aid procedures are not required.

#### Notes to Physician

Treat symptomatically.

### 5. FIRE FIGHTING MEASURES

#### Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

#### Extinguishing media which must not be used for safety reasons

None known.

#### Special Exposure Hazards

Decomposition in fire may produce toxic gases.

#### Special Protective Equipment for Fire-Fighters

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

## 6. ACCIDENTAL RELEASE MEASURES

<b>Personal Precautionary Measures</b>	Use appropriate protective equipment. Avoid creating and breathing dust.
<b>Environmental Precautionary Measures</b>	None known.
<b>Procedure for Cleaning / Absorption</b>	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

## 7. HANDLING AND STORAGE

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

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Engineering Controls</b>	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.
<b>Respiratory Protection</b>	Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.
<b>Hand Protection</b>	Normal work gloves.
<b>Skin Protection</b>	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Solid
<b>Color:</b>	White to light straw
<b>Odor:</b>	Odorless
<b>pH:</b>	Not Determined
<b>Specific Gravity @ 20 C (Water=1):</b>	2.65
<b>Density @ 20 C (kg/l):</b>	Not Determined
<b>Bulk Density @ 20 C (kg/M3):</b>	Not Determined
<b>Boiling Point/Range (C):</b>	Not Determined
<b>Freezing Point/Range (C):</b>	Not Determined
<b>Pour Point/Range (C):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined



Flammability Limits in Air - Lower (g/m <sup>3</sup> ):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m <sup>3</sup> ):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

## 10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

### Symptoms related to exposure

#### Acute Toxicity

##### **Inhalation**

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

##### **Eye Contact**

May cause eye irritation.

##### **Skin Contact**

May cause mechanical skin irritation.

##### **Ingestion**

None known

## Chronic Effects/Carcinogenicity

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

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

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

## Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Bentonite	1302-78-9	5000 mg/kg ( Rat )	No data available	No data available
Crystalline silica, quartz	14808-60-7	500 mg/kg ( Rat )	No data available	No data available
Crystalline silica, cristobalite	14464-46-1	No data available	No data available	No data available
Crystalline silica, tridymite	15468-32-3	No data available	No data available	No data available

## 12. ECOLOGICAL INFORMATION

### Ecotoxicological Information

#### Ecotoxicity Product

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

#### Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Bentonite	1302-78-9	No information available	TLM96: 10000 ppm (Oncorhynchus mykiss)	No information available	No information available
Crystalline silica, quartz	14808-60-7	No information available	No information available	No information available	No information available
Crystalline silica, cristobalite	14464-46-1	No information available	No information available	No information available	No information available
Crystalline silica, tridymite	15468-32-3	No information available	No information available	No information available	No information available

### 12.2 Persistence and degradability

No information available

### 12.3 Bioaccumulative potential

No information available

### 12.4 Mobility in soil

No information available

#### **12.5 Results of PBT and vPvB assessment**

No information available.

#### **12.6 Other adverse effects**

### **13. DISPOSAL CONSIDERATIONS**

**Disposal Method** Bury in a licensed landfill according to federal, state, and local regulations.

**Contaminated Packaging** Follow all applicable national or local regulations.

### **14. TRANSPORT INFORMATION**

#### **Land Transportation**

##### **ADR**

Not restricted

#### **Air Transportation**

##### **ICAO/IATA**

Not restricted

#### **Sea Transportation**

##### **IMDG**

Not restricted

#### **Other Transportation Information**

**Labels:** None

### **15. REGULATORY INFORMATION**

#### **Chemical Inventories**

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

**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.

**US TSCA Inventory** All components listed on inventory or are exempt.

**EINECS Inventory** This product, and all its components, complies with EINECS

**Classification** T - Toxic.

Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

**Risk Phrases** R49 May cause cancer by inhalation.  
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

**Safety Phrases**

S53 Avoid exposure - obtain special instructions before use.  
S22 Do not breathe dust.  
S38 In case of insufficient ventilation wear suitable respiratory equipment.

**16. OTHER INFORMATION**

**The following sections have been revised since the last issue of this SDS**

Not applicable

**Contact****Australian Poisons Information Centre**

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

**New Zealand National Poisons Centre**

0800 764 766

**Additional Information**

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

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

**Disclaimer Statement**

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

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

## **Appendix 3 - Fracture Stimulation & Coil Tubing Chemicals**

## **Fracture Stimulation**

### Proposed Treatment Schedule per Stage

Stg No.	Stage Type	Fluid Type	Proppant	Prop Conc (ppg)		Slurry Rate (bpm)		Clean Gel Vol (gal)		Slurry Vol (gal)		Prop (lbs)	
				Start	End	Start	End	Stage	Cum	Stage	Cum	Stage	Cum
1	Establish Injectivity	FRW	None					500	500	500	500	0	0
2	Acid Spearhead	15% HCL	None			5	5.0	1200	1700	1200	1700	0	0
3	DFIT	FRW	none			15	15.0	19500	21200	19500	21200	0	0
4	Step Rate Test	FRW	none			15	5.0	500	21700	500	21700	0	0
5	Shut-In	FRW	None				0.0	0	21700	0	21700	0	0
6	Pad	24# Cross-Linked	None		0.0	35	35.0	45000	66700	45000	66700	0	0
7	slurry	24# Cross-Linked	40/70 ISP	0.5	0.5	35	35.0	10000	76700	10187	76887	5000	5000
8	Slurry	24# Cross-Linked	20/40 ISP	1.0	1.0	35	35.0	10000	86700	10374	87261	10000	15000
9	Slurry	24# Cross-Linked	20/40 ISP	2.0	2.0	35	35.0	10000	96700	10748	98009	20000	35000
10	Slurry	24# Cross-Linked	20/40 ISP	3.0	3.0	35	35.0	10000	106700	11122	109131	30000	65000
11	Slurry	24# Cross-Linked	20/40 ISP	4.0	4.0	35	35.0	10000	116700	11496	120627	40000	105000
12	Slurry	24# Cross-Linked	20/40 ISP	5.0	5.0	35	35.0	10000	126700	11870	132497	50000	155000
13	Sand Plug	24# Linear Gel	20/40 ISP	6.0	6.0	35	35.0	5000	131700	6122	138619	30000	185000
14	Flush	24# Linear Gel	None	0.0	0.0	20	20.0	15000	146700	15000	153619	0	185000
15	Shut-In	None	None	0.0	0.0	0	0.0		146700			0	185000
<b>Totals</b>								<b>146700.0</b>	<b>153619</b>	<b>185000.0</b>			

### Fluid, Additive and Proppants Amounts

Additive	Concentration	Base Amount/Stage
CF110HT - Clay Control	1	132
CF100FSE - Flowback Surfactant	0.5	66
CF120HT - Biocide	0.3	40
CF110SC - Scale Inhibitor	0.5	65.85
CF110GS - Gel Stabilizer	1.2	126
CF200PH - True Buffer	0.8	84
CF 305DXL - Borate Delayed XL	0.75	79
CF 8800 - SB Breaker	0	0
CF200 - Friction Reducer	1	22
CF 10GGC - Guar Slurry	6	660
CF8500 - AP Breaker	0.25 - 1.0	39
40/70 ISP		5000
20/40 ISP		180000
Water		146700
32% Raw Acid		563
CF600CI - Corrosion Inhibitor	12	12
CA370FE - Iron Control	35	42
CAI200 - Acid Intensifier	20	24



**Operator: Transerv Energy**  
**Project/Well: Warro5**  
**System: Hydraulic Fracturing System Fluid – Hybrid Frac Design**  
**Total Volume of System, (gallons): 153,619**

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
Water	On site Bore	Base Fluid/water	Natural Product, Non-hazardous	94.03315%	NA	N/A
CF100FSE	Condor	Surfactant	<p>Species: Vibrio fischeri; Exposure: 0.25 h; Test Type: EC50; Value: 6.16 mg/l; Test Descriptor: Product MOBILITY :</p> <p>The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;</p> <p>Air: &lt;5%; Water: 10 - 30%; Soil/Sediment: 50 - 70%</p> <p>The portion in water is expected to be soluble or dispersible.</p> <p><b>BIOACCUMULATION POTENTIAL</b></p> <p>Component substances have a low potential to bioconcentrate.</p> <p><b>ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION</b></p> <p>Based on our hazard characterization, the potential environmental hazard is: Moderate</p> <p>Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low</p>	0.04270%	SDS/EPISuite (Biodegradation)	Yes
CF110GS	Condor	Gel Stabiliser	<p><b>Sodium Thiosulphate</b></p> <p>Acute Toxicity: Gambusia affinis (Fish): LC 50 (96h) 26,400 mg/L</p> <p>Chronic Toxicity: No known carcinogenic properties or chronic impacts</p> <p>Biodegradation/bioaccumulation: Inorganic Compound</p> <p>Acute Toxicity: <b>Sodium Sulphate</b></p> <p>Gambusia affinis (Fish): LC 50 (96h) 120 mg/L</p> <p>D. Magna (Invertebrate): EC50(96h) 630 mg/L</p> <p>Nitzschia linearis (Algae): EC50 (5d) 1900 mg/L</p> <p>Chronic Toxicity:</p> <p>No known carcinogenic properties or chronic impacts</p> <p>Biodegradation/bioaccumulation:</p> <p>Inorganic Compound</p> <p><b>Sodium Sulphite</b></p> <p>Acute Toxicity:</p> <p>Leuciscus idus (Fish): LC50 (96h) 220-460 mg/L</p> <p>D. Magna (Invertebrate): TLM(100h): 203 mg/L</p> <p>Chlamydomonas reinhardtii (Algae): EC50 16-32 mg/L</p> <p>Chronic Toxicity:</p> <p>No known carcinogenic properties or chronic impacts</p> <p>Biodegradation/bioaccumulation:</p> <p>Inorganic Compound</p>	0.08202%	IUCLID	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF110HT	Condor	Clay Control	<p><b>Choline chloride</b>            Acute Toxicity: Leuciscus idus (fish): LC 50 (96h) &gt;10,000 mg/L            D. Magna Straus (Invertebrate): EC50(48h) &gt;500 mg/L            Scenedesmus subspicatus (Algae): EC50 (72h) &gt;500 mg/L            Acute Oral Toxicity LD50 (rat): 3400 mg/kg            Chronic Toxicity:            No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation:            Log Pow -3.77 @ 25C            Biodegradation: 93.5% (14d)</p> <p><b>Ethylene Glycol</b>            Acute Toxicity: Oncorhynchus mykiss (fish): LC50 (96h) 40,761 mg/L            Daphnia Magna (Invertebrate): EC50 (24h) &gt;10,000 mg/L            Selenastrum capricornutum (Algae): EC50 (7d)24,000 mg/L Acute            Oral Toxicity LD50 (rat): 4000 mg/kg            Acute inhalation toxicity (rat): LC50 (4h) 2.725 mg/l; Acute dermal toxicity (rabbit): LD50 10,600mg/kg            Chronic Toxicity:            No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation:            Log Pow -1.34 @ 25C</p>	0.08573%	IUCLID	Yes
CF120HT	Condor	Biocide	<p>The following results are for the active components. Acute Fish Results :Species Exposure, Test Type, Value, Test DescriptorRainbow Trout, 96 hrs, LC50, 42.1 mg/l, 25% Active Ingredient (Glutaraldehyde)Bluegill Sunfish, 96 hrs, LC50, 37.6 mg/l, 25% Active Ingredient ( Glutaraldehyde )Acute Toxicity (rat) oral(OECD 401) LD50 316 mg/kg (m) ' LD50 285 mg/kg (f)LD50: 1.87 mg/kg Test Descriptor: 25% Active Ingredient GlutaraldehydeACUTE INVERTEBRATE RESULTS :Species Exposure, Test Type, Value, Test DescriptorDaphnia magna, 48 hrs, LC50, 16.9 mg/l, 25% Active Ingredient (Glutaraldehyde)AQUATIC MICROORGANISM RESULTS Species Exposure, Test Type, Value, Test DescriptorSewage Microorganisms, 96 hrs, LC50, 17 mg/l, 25% Active Ingredient (Glutaraldehyde)Sewage Microorganisms, 96 hrs, NOEC, 5 mg/l, 25% Active Ingredient (Glutaraldehyde)AVIAN RESULTS :Species Exposure, Test Type, Value, Test DescriptorMallard Duck, LD50, 1,631 mg/kg, 25% Active IngredientMallard Duck, LD50, 933 mg/kg, 50% Active Ingredient</p> <p>TOXICITY DATA:            Acute Oral Toxicity: LD50: 1.87 mg/kg (Rat)            Acute Dermal Toxicity: LD: 8.0-12.8 mg/kg (Rabbit)            Acute Inhalation Toxicity: LD: 20.4 mg/kg (Rat)</p> <p>MOBILITY AND BIOACCUMULATION POTENTIAL : The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;Air, Water, Soil/Sediment - &lt;5%, 30-50%, 50-70%The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bio accumulate.</p> <p>PERSISTENCY AND DEGRADATION : The organic portion of this preparation is expected to be readily biodegradable.</p> <p>ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION: Based on our hazard characterization, the potential environmental hazard is: High</p>	0.02572%	SDS, OECD	Yes
CF200	Condor	Friction Reducer	<p>Acute Toxicity: Skeletonema costatum (Algae): LC50 (72h) 165.54 mg/L            Chronic Toxicity: Skeletonema costatum (Algae): NOEC (72h) 10mg/L            No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation:            The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.            If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;            Air &lt;5%; Water 10 - 30%; Soil/Sediment 70 - 90%            The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bioaccumulate.</p> <p>PERSISTENCY AND DEGRADATION :            The organic portion of this preparation is expected to be inherently biodegradable.</p> <p>ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION            Based on our hazard characterization, the potential environmental hazard is: Moderate</p>	0.01413%	SDS	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF200PH	Condor	Buffer	<p><b>Potassium Carbonate</b> Acute Toxicity: Pimephales promelas (Fish): LC50 (48h) 820 mg/L; D. Magna (Invertebrate): LC50 (48h) 650 mg/L; Acute Oral Toxicity LD50 (rat): &gt;2000 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Log Pow -6.19 (Calculated) Component is predicted to have a low potential to bioaccumulate</p> <p><b>Potassium Hydroxide</b> Acute Toxicity: Gambusia affinis (Fish): LC 50 (96h) 80 mg/L Acute Oral Toxicity LD50 (rat): 270 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Inorganic Compound The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; The portion in water is expected to be soluble or dispersible Air Water Soil/Sediment &lt;5% 30 - 50% 50 - 70% The portion in water is expected to be soluble or dispersible.</p>	0.05468%	IUCLID/ECOTOX/EPISuite (Bioaccumulation)	Yes
CF305DXL	Condor	Cross Linker	<p><b>Choline Chloride</b> Acute Toxicity: Leuciscus idus (Fish): LC50 (96h) &gt;10,000 mg/L D. Magna Straus (Invertebrate): EC50 (48h) &gt;500 mg/L Scenedesmus subspicatus (Algae): EC50 (72h) &gt;500 mg/L Acute Oral Toxicity LD50 (rat): 3,400 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Log Pow -3.77 @ 25C Biodegradation (14d) 93.5%</p> <p><b>Alkyl Alcohol</b> Acute Toxicity: Carassius auratus (Fish): LC50 (24h) &gt;5000 mg/L D. Magna (Invertebrate): EC50 (24h) &gt;10,000 mg/L Acute Oral Toxicity LD50 (rat): &gt;10,000 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Log Pow -1.76</p> <p><b>Sodium Thiosulphate</b> Acute Toxicity: Gambusia affinis (fish): LC50 (96h) 26,400 mg/L Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Inorganic Compound</p> <p><b>L-Ascorbic Acid (analogue for Sodium Ascorbate)</b> Acute Toxicity: Oncorhynchus mykiss (Fish): LC50 (96h) &gt;1000 mg/L Acute Oral Toxicity LD50 (rat): &gt;5,000 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Biodegradation (5d) 97% The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; Air Water Soil/Sediment - &lt;5% 10 - 30% 30 - 50% The portion in water is expected to be soluble or dispersible. BIOACCUMULATION POTENTIAL: This preparation or material is not expected to bioaccumulate. ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION Based on our hazard characterization, the potential environmental hazard is: Low Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High</p>	0.05126%	IUCLID EPISuite (Envir. Fate)	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF8500	Condor	Oxidiser Breaker	<p>TOXICOLOGICAL INFORMATION: Acute Oral Toxicity: LD50: 600 mg/kg (Rat) Acute Dermal Toxicity: LD: &gt;10 g/kg (Rabbit) Acute Inhalation Toxicity: LD: 520 mg/l (1 hrs) (Rat) ECOTOXICOLOGICAL EFFECTS :No toxicity studies have been conducted on this product. ADDITIONAL ECOLOGICAL DATANO adverse effects expected. PERSISTENCY AND DEGRADATION :Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable. MOBILITY :The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;Air Water Soil/Sediment&lt;5% 30 - 50% 50 - 70%The portion in water is expected to float on the surface. BIOACCUMULATION POTENTIALThis preparation or material is not expected to bioaccumulate. ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATIONBased on our hazard characterization, the potential environmental hazard is: LowAcute Toxicity: Lepomis macrochirus (Fish): LC50 (96h) 103 mg/LOncorhynchus mykiss (Fish): LC50 (96h) 76.3 mg/LD. Magna (Invertebrate): EC50 (48h) 120 mg/LScenedesmus quadricauda (Algae): EC10 (96h) 33 mg/LAcute Oral Toxicity LD50 (rat): 495 mg/kgChronic Toxicity:No known carcinogenic propertiesD. Magna (Invertebrate): NOEC (48h) 41 mg/LBiodegradation/bioaccumulation: Inorganic Compound</p>	0.00286%	IUCLID	Yes
ISP 40/70	Condor	Proppant	Natural Product – Naturally occurring minerals, corundum and mullite. These minerals are considered stable with a melting point above 1000 deg C. They are not soluble in hydrocarbons, acid or water. These products are considered nonhazardous.	0.12173%		Yes
ISP 20/40	Condor	Proppant	Natural Product – Naturally occurring minerals, corundum and mullite. These minerals are considered stable with a melting point above 1000 deg C. They are not soluble in hydrocarbons, acid or water. These products are considered nonhazardous.	4.38227%		Yes
CF110SC	Condor	Scale Inhibitor	<p><b>Partially neutralized polycarboxylic acid polymer</b> Acute Toxicity: Scop (Fish): LC50 (96h) &gt;1000 mg/L; Acar (Invertebrate): LC50 (48h)100-1000 mg/L; Skel (Algae): EC50 (72h)100-1000 mg/L Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Biodegradation: 41% (28d)</p>	0.04287%		Yes
CF10GGC	Condor	Gelling Agent	<p>Biodegradation/bioaccumulation: The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; Air 10 - 30% - Water 50 - 70% -- Soil 10 <b>Hydrotreated Light Distillate</b> Acute Toxicity Pimephales promelas (Fish): LC50 (96h) 45 mg/L; Diatomus forbesi (Invertebrate): LC50 (96h) 140 mg/L; Selenastrum capricornutum (Algae): IC50 (96h) 4.2 mg/L (WSF; dissolved hydrocarbons); Acute Oral Toxicity LD50 (rat): LD50 (rat) &gt;5000 mg/kg Chronic Toxicity: No known carcinogenic properties Jordanella floridae (Fish): NOEC (128d, length) 1 mg/L (WSF) Biodegradation/bioaccumulation: BCF values of &lt;0.2 to &lt;1.4 (carp at 2.0 and 0.2 mg/L concentrations); Low potential to bioconcentrate in aquatic organisms <b>1,6-Hexanediol Acute Toxicity</b> Leuciscus idus (Fish): LC50 (96h) 460-1000 mg/L; D. magna straus (Invertebrate): EC50 (48h) &gt;500 mg/L; Scenedesmus subspicatus (Algae): EC50 (72h, biomass) 2200 mg/L; Acute Oral Toxicity LD50 (rat): LD50 (rat) 3000 mg/kg Chronic Toxicity: No known carcinogenic properties; Leuciscus idus (Fish): NOEC (96h) 460 mg/L; Biodegradation/bioaccumulation: Log Pow 0 @ 25C/ 75% (28d) readily biodegradable <b>Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite</b> Acute Toxicity D. Magna (Invertebrate): EC50 (48h) &gt;100 mg/L (2M(2Alk) bentonite); Skeletonema costatum (Algae): Er50 (72h, growth) &gt;1,000 mg/L; (2M(2Alk) bentonite); Corophium volutator (sediment reworker) &gt;10,000 mg/kg; (2M(2Alk) bentonite) Chronic Toxicity: minimal to moderate eye irritation, respiratory irritation; observed in acute studies using high exposure levels, potential; carcinogenicity from crystalline silica, which is an impurity in amounts up to 10 percent for some of the substances Biodegradation/bioaccumulation: Inorganic polymers with no water solubility</p>	0.42963%	IUCLID OECD (organoclays (2M(2Alk) bentonite)) ECOTOX (aquatic toxicity); OECD(biodegradation)	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF600CI	Condor	Acid Corrosion Inhibitor	<p><b>Formic Acid</b> Acute Toxicity: Leuciscus idus (Fish): LC50 (48h) 122 mg/L - D. Magna (Invertebrate): EC50 (48h) 120 mg/L - Scenedesmus quadricauda (Algae): EC50 (72h) 26.9 mg/L            Acute Oral Toxicity LD50 (rat): 730 mg/kg            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow -0.54            Biodegradation: 100% (11d) readily biodegradable</p> <p><b>Cinnamaldehyde</b> Acute Toxicity: Scop (Fish): LC50 (96h) 1-10 mg/L; Acar (Invertebrate): LC50 (48h) 1-10 mg/L; Skel (Algae): EC50 (72h) 1-10 mg/L            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow 2.22 @18C            Biodegradation: 91% (14d) activated sludge for cinnamyl alcohol (cinnamylaldehyde is metabolite of cinnamyl alcohol so would also be readily biodegradable)</p> <p><b>Tar bases, quinoline derivs, benzyl chloridequaternized</b>            Acute Toxicity: Scop (Fish): LC50 (96h) 10-100 mg/L; Acar (Invertebrate): LC50 (48h) 1-10 mg/L; Skel (Algae): EC50 (72h) 1-10 mg/L            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow &gt;3            Biodegradation: 41% (28d)</p> <p><b>Isopropanol</b>            Acute Toxicity: Pimephales promelas(Fish): LC50 (96h) 9640 mg/L; Daphnia Magna (Invertebrate): EC50 (48h) 13299 mg/L            Acute inhalation toxicity LC50 (Rat): 30mg/l (4hrs); Accute Dermal toxicity LD50 (Rabbit):12,870 mg/kg            Scenedesmus subspicatus(Algae): EC50 (96h) &gt;1,000 mg/L; Acute Oral Toxicity LD50 (rat): 4396 mg/kg            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow 0.05 @ 25C;            Biodegradation: 95% (21d) readily biodegradable</p> <p><b>N-Benzyl-Alkylpyridinium Chloride</b>            Acute Toxicity: Acar (Invertebrate): LC50 (48h) 10-100 mg/L (WAF); Skel (Algae): EC50 (72h) 1-10 mg/L (WAF)            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow 2.9-4.8 (avg 4.0); Biodegradation: 34% (28d)</p> <p><b>2-Mercaptoethyl Alcohol</b>            Acute Toxicity: Leibes reticulatus (Fish): LC50 (24h) 187 mg/L; D. Magna (Invertebrate): EC50 (48h) 1.52 mg/L; Scenedesmus subspicatus(Algae): EC50 (72h) 12 mg/L            Acute Oral Toxicity LD50 (rat): 131 mg/kg; Accute dermal toxicity LD50 (rabbit): 168mg/kg            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Leuciscus idus (Fish): NOEC(96h) 46 mg/L            Biodegradation/bioaccumulation: Log Pow -0.056 @25C</p> <p><b>Polyoxyethylenepolyoxypropylene Block Copolymer</b>            Acute Toxicity: Skel (Algae): EC50 (72h) 100-1000 mg/L            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Pow &lt;0 – 5.1 average 4.0 MW 3000            Biodegradation: 10% (28d)</p> <p><b>Methanol</b>            Acute Toxicity: Lepomis macrochirus (Fish): LC50 (96h) 15400 mg/L; D. Magna (Invertebrate): EC50 (48h) 10000 mg/L; Acute Oral Toxicity LD50 (rat): 5628 mg/kg            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Log Kow -0.63            The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.            If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;            Air 5-15% ; Water 30-60%; Soil/Sediment 50-70%            The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bioaccumulate.</p> <p><b>Castor Oil, Ethoxylated</b>            Acute Toxicity: Acar (Invertebrate): LC50 (48h) 10-100 mg/L; Skel (Algae): EC50 (72h) 1-10 mg/L            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Biodegradation: 47% (28d)</p> <p><b>Diethylene Glycol</b>            Acute Toxicity: Gambusia affinis (Fish): LC50 (96h) &gt;32000 mg/L; D. Magna (Invertebrate): EC50 (48h) &gt;10000 mg/L; Acute Oral Toxicity LD50 (rat): 12565 mg/kg            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Scenedesmus quadricauda (Algae): NOEC(7d) 100 mg/L            Biodegradation/bioaccumulation: Log Pow-1.98 @25C            Biodegradation: &gt;90% after 28d</p>	0.00781%	IUCLID; EPISuite (Model, Biodegradation)	Yes



Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CA370FE	Condor	Iron Reducing Agent	<b>Sodium erythorbate</b> Acute Toxicity: Fish: LC50 (48h) 5.25 mg/L; Invertebrate: EC50 (24h) 1.3 mg/L; Algae: EC50 (72h) 86.2 mg/L Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Log Kow -1.88 The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite™, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; Air <1% Water 30-60% Soil/Sediment 60-90% The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bioaccumulate.	0.24164%	EPA EPI Suite/ECOSAR (Modeled, All)	Yes
CAI200	Condor	Acid Intensifier	<b>Formic Acid</b> Acute Toxicity: Leuciscus idus (Fish): LC50 (48h) 122 mg/L; D. Magna (Invertebrate): EC50 (48h) 120 mg/L; Scenedesmus quadricauda (Algae): EC50 (72h) 26.9 mg/L Acute Oral Toxicity LD50 (rat): 730 mg/kg Chronic Toxicity: No known carcinogenic properties or chronic impacts Biodegradation/bioaccumulation: Log Pow -0.54 Biodegradation: 100% (11d) readily biodegradable	0.01562%	IUCLID	Yes
Acid Raw 32%	Condor	Acid	TOXICITY DATA LC50 (inhalation): 1108ppm/1hour (human – respiratory irritation) LCLo (inhalation): 1300ppm/30minutes (human) LD50 (ingestion): 900mg/kg (rabbit) LDLo (ingestion): 81mg/kg (man) TCLo (inhalation): 450mg/m3/1 hour (pregnant rat – teratogenic effects) Environment If hydrochloric acid is spilled on soil, it will infiltrate. During its transport through soil, the acid will dissolve some of the soil material, in particular carbonates, and will be neutralised to some degree. However, significant amounts of acid are expected to remain for transport down to groundwater. Toxic to aquatic invertebrates at low levels (LC50: 1.21 ppm/96 hours).	0.36617%	SDS	Yes
<b>TOTAL</b>				<b>100.0000%</b>		

Compound	CAS Number	% Mass
Water Supplied by Customer	NO CAS	94.0332%
Isopropanol	67-63-0	0.0134%
Alcohols, C9-11, ethoxylated	68439-46-3	0.0043%
Water	7732-18-5	3.5206%
Potassium Chloride	7447-40-7	0.0021%
Ethoxylated C11 Alcohol	34398-01-1	0.0128%
sodium thiosulphate	7772-98-7	0.0272%
sodium sulphate	7757-82-6	0.0041%
sodium sulphite	7757-83-7	0.0041%
Ethylene Glycol	107-21-1	0.0009%
Choline Chloride	67-48-1	0.0745%
Glutaraldehyde	111-30-8	0.0077%
Ammonium Sulphate	7783-20-2	0.0042%
Polyacrylamide	25085-02-3	0.0042%
Sodium polyacrylate	2594415	0.0007%
Sodium bisulfite	7631-90-5	0.0001%
Alkyl Alcohol	56-81-5	0.0053%
2-Propenoic acid, homopolymer, ammonium salt	2594383	0.0001%
Ammonium Persulphate	7727-54-0	0.0001%
Potassium persulfate	7727-21-1	0.0001%
2-Ethoxy-naphthalene	93-18-5	0.0001%
Potassium Hydroxide	1310-58-3	0.0164%
Potassium Carbonate	584-08-7	0.0164%
Ulexite	1319-33-1	0.0205%
L-Ascorbic acid, monosodium salt	134-03-2	0.0026%
Quartz	14808-60-7	0.0464%
Corundum	1302-74-5	0.1461%
Mullite	1302-93-8	1.0225%
Partially neutralized polycarboxylic acid polymer	68715-83-3	0.0214%
DISTILLATES, HYDROTREATED LIGHT	64742-47-8	0.1719%
Guar Gum	9000-30-0	0.1456%
Polyoxyethylene nonylphenol ether	9016-45-9	0.0430%
Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	0.0430%
1,6-Hexanediol	629-11-8	0.0043%
HydroChloric Acid	7647-01-0	0.3159%
Formic Acid	64-18-6	0.0187%
Cinnamaldehyde	104-55-2	0.0005%
Tar Bases, Quinoline Derivatives, Benzyl Chloride-Quat	72480-70-7	0.0005%
Castor Oil	61791-12-6	0.0005%
Pine Oil	2228957	0.0005%
N-Benzyl-Alkylpyridinium Chloride	68909-18-2	0.0004%
2-Mercaptoethyl Alcohol	60-24-2	0.0004%
Polyoxyethylene-polyoxypropylene Block Copolymer	2594628	0.0004%
Diethylene Glycol	111-46-6	0.0001%
Methanol	67-56-1	0.0003%
Sodium erythorbate	6381-77-7	0.2416%
<b>TOTAL</b>		<b>100.0000%</b>

## **Coil Tubing**





### System Details

Operator  
 Project/Well  
 System  
 Total Volume of System, (bbls)

Latent Petroleum  
 Warro-05 and -06  
 Coiled Tubing Operation Fluid  
 2,000

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
Water	On site Bore	Base Fluid/water	Natural Product, non hazardous	99.91198%	NA	N/A
CF110HT	Condor	Clay Control	<p><b>Choline chloride</b>            Acute Toxicity: Leuciscus idus (fish): LC 50 (96h) &gt;10,000 mg/L            D. Magna Straus (Invertebrate): EC50(48h) &gt;500 mg/L            Scenedesmus subspicatus (Algae): EC50 (72h) &gt;500 mg/L            Acute Oral Toxicity LD50 (rat): 3400 mg/kg            Chronic Toxicity:            No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation:            Log Pow -3.77 @ 25C            Biodegradation: 93.5% (14d)</p> <p><b>Ethylene Glycol</b>            Acute Toxicity: Oncorhynchus mykiss (fish): LC50 (96h) 40,761 mg/L            Daphnia Magna (Invertebrate): EC50 (24h) &gt;10,000 mg/L            Selenastrum capricornutum (Algae): EC50 (7d)24,000 mg/L Acute            Oral Toxicity LD50 (rat): 4000 mg/kg            Acute inhalation toxicity (rat): LC50 (4h) 2.725 mg/l; Acute dermal toxicity (rabbit): LD50 10,600mg/kg            Chronic Toxicity:            No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation:            Log Pow -1.34 @ 25C</p>	0.01000%	IUCLID	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF120HT	Condor	Biocide	<p>The following results are for the active components.</p> <p>Acute Fish Results :Species Exposure, Test Type, Value, Test DescriptorRainbow Trout, 96 hrs, LC50, 42.1 mg/l, 25% Active Ingredient (Glutaraldehyde)Bluegill Sunfish, 96 hrs, LC50, 37.6 mg/l, 25% Active Ingredient ( Glutaraldehyde )Acute Toxicity (rat) oral(OECD 401) LD50 316 mg/kg (m) ' LD50 285 mg/kg (f)LD50: 1.87 mg/kg Test Descriptor: 25% Active Ingredient GlutaraldehydeACUTE INVERTEBRATE RESULTS :Species Exposure, Test Type, Value, Test DescriptorDaphnia magna, 48 hrs, LC50, 16.9 mg/l, 25% Active Ingredient (Glutaraldehyde)AQUATIC MICROORGANISM RESULTS Species Exposure, Test Type, Value, Test DescriptorSewage Microorganisms, 96 hrs, LC50, 17 mg/l, 25% Active Ingredient (Glutaraldehyde)Sewage Microorganisms, 96 hrs, NOEC, 5 mg/l, 25% Active Ingredient (Glutaraldehyde)AVIAN RESULTS :Species Exposure, Test Type, Value, Test DescriptorMallard Duck, LD50, 1,631 mg/kg, 25% Active IngredientMallard Duck, LD50, 933 mg/kg, 50% Active Ingredient</p> <p>TOXICITY DATA:            Acute Oral Toxicity: LD50: 1.87 mg/kg (Rat)            Acute Dermal Toxicity: LD: 8.0-12.8 mg/kg (Rabbit)            Acute Inhalation Toxicity: LD: 20.4 mg/kg (Rat)</p> <p>MOBILITY AND BIOACCUMULATION POTENTIAL : The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;Air, Water, Soil/Sediment - &lt;5%,</p>	0.00300%	SDS	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
			<p>30-50%, 50-70%The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bio accumulate.</p> <p>PERSISTENCY AND DEGRADATION : The organic portion of this preparation is expected to be readily biodegradable.</p> <p>ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION: Based on our hazard characterization, the potential environmental hazard is: High</p>			
CF200	Condor	Friction Reducer	<p>Acute Toxicity: Skeletonema costatum (Algae): LC50 (72h) 165.54 mg/L</p> <p>Chronic Toxicity: Skeletonema costatum (Algae): NOEC (72h) 10mg/L</p> <p>No known carcinogenic properties or chronic impacts</p> <p>Biodegradation/bioaccumulation:</p> <p>The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.</p> <p>If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;</p> <p>Air &lt;5%; Water 10 - 30%; Soil/Sediment 70 - 90%</p> <p>The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bioaccumulate.</p> <p>PERSISTENCY AND DEGRADATION :</p> <p>The organic portion of this preparation is expected to be inherently biodegradable.</p> <p>ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION</p>	0.01002%	Internalk Database, SDS	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
			Based on our hazard characterization, the potential environmental hazard is: Moderate			
CF110SC	Condor	Scale Inhibitor	<p><b>Partially neutralized polycarboxylic acid polymer</b>            Acute Toxicity: Scop (Fish): LC50 (96h) &gt;1000 mg/L; Acar (Invertebrate): LC50 (48h)100-1000 mg/L; Skel (Algae): EC50 (72h)100-1000 mg/L            Chronic Toxicity: No known carcinogenic properties or chronic impacts            Biodegradation/bioaccumulation: Biodegradation: 41% (28d)</p>	0.00500%	Internak Database	Yes

Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
CF10GGC	Condor	Gelling Agent	<p>Biodegradation/bioaccumulation:            The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; Air 10 - 30% - Water 50 - 70% -- Soil 10</p> <p><b>Hydrotreated Light Distillate</b>            Acute Toxicity            Pimephales promelas (Fish): LC50 (96h) 45 mg/L;            Diatomus forbesi (Invertebrate): LC50 (96h) 140 mg/L;            Selenastrum capricornutum (Algae): IC50 (96h) 4.2 mg/L (WSF; dissolved hydrocarbons); Acute Oral Toxicity LD50 (rat): LD50 (rat) &gt;5000 mg/kg            Chronic Toxicity: No known carcinogenic properties            Jordanella floridae (Fish): NOEC (128d, length) 1 mg/L (WSF)            Biodegradation/bioaccumulation: BCF values of &lt;0.2 to &lt;1.4 (carp at 2.0 and 0.2 mg/L concentrations); Low potential to bioconcentrate in aquatic organisms</p> <p><b>1,6-Hexanediol Acute Toxicity</b>            Leuciscus idus (Fish): LC50 (96h) 460-1000 mg/L; D. magna straus (Invertebrate): EC50 (48h) &gt;500 mg/L;            Scenedesmus subspicatus (Algae): EC50 (72h, biomass) 2200 mg/L; Acute Oral Toxicity LD50 (rat): LD50 (rat) 3000 mg/kg            Chronic Toxicity: No known carcinogenic properties;            Leuciscus idus (Fish): NOEC (96h) 460 mg/L;            Biodegradation/bioaccumulation: Log Pow 0 @ 25C/ 75%</p>	0.06000%	IUCLID OECD (organoclay (2M(2Alk) bentonite) ) ECOTOX (aquatic toxicity); OECD(biodegradation)	Yes



Product Name	Supplier	Purpose	Eco Toxicity Data	% Product in system fluid	Source	MSDS Attached
			<p>(28d) readily biodegradable  <b>Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite</b>            Acute Toxicity D. Magna (Invertebrate): EC50 (48h) &gt;100 mg/L (2M(2Alk) bentonite); Skeletonema costatum (Algae): Er50 (72h, growth) &gt;1,000 mg/L; (2M(2Alk) bentonite); Corophium volutator (sediment reworker) &gt;10,000 mg/kg; (2M(2Alk) bentonite)            Chronic Toxicity: minimal to moderate eye irritation, respiratory irritation; observed in acute studies using high exposure levels, potential; carcinogenicity from crystalline silica, which is an impurity in amounts up to 10 percent for some of the substances            Biodegradation/bioaccumulation: Inorganic polymers with no water solubility</p>			
<b>TOTAL</b>				<b>100.0000%</b>		

Compound	CAS Number	% Mass
Water Supplied by Customer	NO CAS	99.9120%
Water	7732-18-5	0.0056%
Ethylene Glycol	107-21-1	0.0001%
Chlorine Chloride	67-48-1	0.0069%
Glutaraldehyde	111-30-8	0.0009%
Ammonium Sulphate	7783-20-2	0.0030%
Polyacrylamide	25085-02-3	0.0030%
Sodium polyacrylate	2594415	0.0005%
Sodium bisulfite	7631-90-5	0.0001%
Alkyl Alcohol	56-81-5	0.0001%
2-Propenoic acid, homopolymer, ammonium salt	2594383	0.0001%
Ammonium Persulphate	7727-54-0	0.0001%
Potassium persulfate	7727-21-1	0.0001%
2-Ethoxy-naphthalene	93-18-5	0.0001%
Quartz	14808-60-7	0.0001%
Partially neutralized polycarboxylic acid polymer	68715-83-3	0.0025%
DISTILLATES, HYDROTREATED LIGHT	64742-47-8	0.0240%
Guar Gum	9000-30-0	0.0282%
Polyoxyethylene nonylphenol ether	9016-45-9	0.0060%
Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	0.0060%
1,6-Hexanediol	629-11-8	0.0006%
<b>TOTAL</b>		<b>100%</b>

**Appendix 4 - Fracture Stimulation & Coil Tubing  
Chemicals MSDS's**



## **Fracture Stimulation**



### Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : CF 110HT

Application : Clay Stabiliser

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER: +61 430 138 290 (24 Hours)  
+65 6542 9595

### Section: 2. HAZARDS IDENTIFICATION

#### Hazard classification

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

#### Safety-phrase(s)

Avoid contact with skin and eyes.

#### Other hazards which do not result in classification

None known.

### Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration: (%)
Ethylene Glycol	107-21-1	0.1 - 1

### Section: 4. FIRST AID MEASURES

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

Contact the Poison's Information Centre (eg Australia 13 1126; New

If inhaled : Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**



### Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting. : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.



**Section: 6. ACCIDENTAL RELEASE MEASURES**

Personal precaution protective equipment and emergency procedures	Refer to protective measures listed in sections 7 and 8.
Environmental precautions	Do not allow contact with soil, surface or ground water
Methods and materials for containment and cleaning up	Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway

**Section: 7. HANDLING AND STORAGE**

Advice on safe handling	: Wash hands thoroughly after handling. Use only with adequate ventilation.
Conditions for safe storage	: Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
Packaging material	: Suitable material: Keep in properly labelled containers.  Unsuitable material: not determined

**Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Components with workplace control parameters**

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Ethylene Glycol	107-21-1	TWA (Vapour.)	20 ppm 52 mg/m3	AU OEL
		VLE (Vapour.)	40 ppm 104 mg/m3	AU OEL
Ethylene Glycol	107-21-1	WES-Ceiling	50 ppm 127 mg/m3	NZ OEL
Ethylene Glycol	107-21-1	Ceiling	100 mg/m3	ACGIH



Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Wash face, hands and any exposed skin thoroughly after handling.

### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid

Colour : Clear Colorless

Odour : Amine

Flash point : 104.4 °C

pH : 7.0, 100 %

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : 98.9 °C estimated

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

Vapour pressure : 0.00666 kPa (25 °C)similar to water



## CF 110HT

Relative vapour density	: no data available
Relative density	: 1.10 (15.6 °C)
Density	: no data available
Water solubility	: completely soluble
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
VOC	: 0.5 %

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.
Hazardous decomposition products	: Carbon oxides

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure: Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	: Health injuries are not known or expected under normal use.
Skin	: Health injuries are not known or expected under normal use.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.
Chronic Exposure	: Health injuries are not known or expected under normal use.



### Experience with human exposure

Eye contact : No symptoms known or expected

Skin contact : No symptoms known or expected

Ingestion : No symptoms known or expected

Inhalation : No symptoms known or expected

### Toxicity

Acute oral toxicity : no data available

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available



- Carcinogenicity : No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- Reproductive effects : no data available
- Germ cell mutagenicity : no data available
- Teratogenicity : no data available
- STOT - single exposure : no data available
- STOT - repeated exposure : no data available
- Aspiration toxicity : No aspiration toxicity classification

### Components

- Acute inhalation toxicity : Ethylene Glycol LC50  
rat: 2.725 mg/l  
Exposure time: 4 h

### Components

- Acute dermal toxicity : Ethylene Glycol  
LD50 rabbit: 10,600 mg/kg

### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

## Section: 12. ECOLOGICAL INFORMATION

### Ecotoxicity

- Toxicity to fish : no data available
- Toxicity to daphnia and other aquatic invertebrates. no data available
- Toxicity to algae : no data available

### Persistence and degradability

no data available

### Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

- Air : <5%





## CF 110HT

Water : 30 - 50%  
Soil : 50 - 70%

The portion in water is expected to be soluble or dispersible.

### Bioaccumulative potential

This preparation or material is not expected to bioaccumulate.

### Other information

no data available

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

### Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

### Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### Land transport

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Sea Transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION



### Section: 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 6  
Scheduling of Medicines and  
Poisons

INTERNATIONAL CHEMICAL CONTROL LAWS :

TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

This product contains substance(s) which are not in compliance with the European Commission Directive 67/548/EEC and may require additional review.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

### Section: 16. OTHER INFORMATION

REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

# Condor Energy Services – Safety Data Sheet

## CF 110HT



Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet

## CF 100FSE



### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **CF 100FSE**

APPLICATION : SURFACTANT

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

**EMERGENCY TELEPHONE NUMBER:** +61 430 138 290 (24 Hours)  
+65 6542 9595

NFPA 704M/HMIS RATING  
HEALTH: 3/3 FLAMMABILITY: 3/3 INSTABILITY: 0/0 OTHER: 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Isopropanol	67-63-0	10.0 - 30.0
Alcohols, C9-11, ethoxylated	68439-46-3	5.0 - 10.0
Oxyalkylated alcohol	Proprietary	10.0 - 30.0

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### DANGER

Flammable. Risk of serious damage to eyes. Harmful if swallowed.  
Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection. Avoid breathing vapor. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.  
Wear suitable protective clothing.  
Flammable Liquid; may release vapors that form flammable mixtures at or above the flash point. Vapors can travel to a source of ignition and flash back. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin, Inhalation

# Condor Energy Services – Safety Data Sheet



## CF 100FSE

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Severely irritating. If not removed promptly, will injure eye tissue and may result in permanent eye damage.

SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

Not a likely route of exposure. Harmful if swallowed.

INHALATION :

Product mist or vapors may cause headache, nausea, vomiting, drowsiness, stupor or unconsciousness. Can cause central nervous system depression.

### 4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Get immediate medical attention.

SKIN CONTACT :

Flush with large amounts of water. Use soap if available. If symptoms develop, seek medical advice.

INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink.

INHALATION :

First aid is normally not required. Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.



### 5. FIRE FIGHTING MEASURES

FLASH POINT : 73.4 - 100 F / 23 - 37.8 C

Estimated

#### EXTINGUISHING MEDIA :

Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.

Water mist may be used to cool closed containers.

#### FIRE AND EXPLOSION HAZARD :

Flammable Liquid; may release vapors that form flammable mixtures at or above the flash point. Vapors can travel to a source of ignition and flash back. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Remove sources of ignition. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment., Prevent material from entering sewers or waterways., If drains, streams, soil or sewers become contaminated, notify local authority.

# Condor Energy Services – Safety Data Sheet

## CF 100FSE



### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame.

#### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store away from heat and sources of ignition. Have appropriate fire extinguishers available in and near the storage area. Connections must be grounded to avoid electrical charges. Store separately from oxidizers.

#### SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Basis	ppm	mg/m3	Non-Standard Unit
Isopropanol	ACGIH/TWA	200		
	ACGIH/STEL	400		
	NIOSH REL/TWA	400	980	
	NIOSH REL/STEL	500	1,225	
	OSHA Z1/TWA	400	980	

\* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

#### ENGINEERING MEASURES:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fume hood. Provide mechanical ventilation of confined spaces.

#### RESPIRATORY PROTECTION:

Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure, full-face SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

#### HAND PROTECTION:

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

# Condor Energy Services – Safety Data Sheet



## CF 100FSE

### SKIN PROTECTION:

Wear standard protective clothing.

### EYE PROTECTION:

Wear a face shield with chemical splash goggles.

### HYGIENE RECOMMENDATIONS:

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless to red amber
ODOR	Alcoholic
SPECIFIC GRAVITY	0.95 @ 60.0 °F / 15.5 °C
DENSITY	7.9 lb/gal
SOLUBILITY IN WATER	Complete

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Avoid extremes of temperature. Heat and sources of ignition including static discharges.

### MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon



# Condor Energy Services – Safety Data Sheet

## CF 100FSE



### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

#### SENSITIZATION :

This product is not expected to be a sensitizer.

#### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

#### HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

### 12. ECOLOGICAL INFORMATION

#### ECOTOXICOLOGICAL EFFECTS :

The following results are for the product, unless otherwise indicated.

#### AQUATIC MICROORGANISM RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Vibrio fischeri	0.25 h	EC50	6.16 mg/l	Product

#### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	50 - 70%

The portion in water is expected to be soluble or dispersible.

#### BIOACCUMULATION POTENTIAL

Component substances have a low potential to bioconcentrate.

#### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.



### 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

#### LAND TRANSPORT :

Proper Shipping Name :	FLAMMABLE LIQUID, N.O.S.
Technical Name(s) :	ISOPROPANOL
UN/ID No :	UN 1993
Hazard Class - Primary :	3
Packing Group :	III
Flash Point :	73.4 - 100 F / 23 - 37.8 C

#### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	FLAMMABLE LIQUID, N.O.S.
Technical Name(s) :	ISOPROPANOL
UN/ID No :	UN 1993
Hazard Class - Primary :	3
Packing Group :	III

#### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	FLAMMABLE LIQUID, N.O.S.
Technical Name(s) :	ISOPROPANOL
UN/ID No :	UN 1993
Hazard Class - Primary :	3
Packing Group :	III

# Condor Energy Services – Safety Data Sheet

## CF 100FSE



### 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Condor Energy accepts no liability for the use of this information.

#### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

#### EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

### 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Moderate

\* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

#### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

# Condor Energy Services – Safety Data Sheet

## CF 100FSE



Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet

## CF 120HT



### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: CF 120HT  
APPLICATION: BIOCIDE  
IMPORTER IDENTIFICATION: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER(S): +65 6542 9595  
+ 61 430 138 290

### 2. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION : TOXIC, CORROSIVE

This product is classified as hazardous according to the Safe Work Australia. This product is classified as a dangerous good only when transported by air (IATA regulations).

#### RISK PHRASES

R22 - Harmful if swallowed.  
R23 - Toxic by inhalation.  
R34 - Causes burns.  
R42/43 - May cause sensitization by inhalation and skin contact.

#### SAFETY PHRASES

S23 - Do not breathe vapor.  
S24/25 - Avoid contact with skin and eyes.  
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.  
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NO	% (w/w)
Glutaraldehyde	111-30-8	10 - 30
The balance of the substances in this product are not classified as hazardous or are present below hazard cut-off limits		



### 4. FIRST AID MEASURES

#### EYE CONTACT :

PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. If only one eye is affected be sure to use care not to contaminate the other eye with the run-off. Get immediate medical attention.

#### SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated leather articles such as shoes or belts must be discarded.

#### INGESTION :

Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

DO NOT INDUCE VOMITING. Do not give anything to drink. Get immediate medical attention. Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).

#### INHALATION :

Get immediate medical attention. Remove to fresh air. If breathing is difficult, administer oxygen.

#### NOTE TO PHYSICIAN :

As mucosal damage may occur following oral exposure to glutaraldehyde solutions, dilution with limited amounts of fluid is usually appropriate, as long as there are no contraindications. If there are no contraindications, rinse mouth several times with cool water, then have the patient sip cool water to a maximum of 250 mL (for adults).

Contraindications include respiratory distress, altered mental status, severe abdominal pain, nausea or vomiting, inability to swallow (or a refusal to drink) or the patient not protecting their own airway.

### 5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

HAZCHEM CODE : 3Z

#### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. Not flammable or combustible.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

#### SENSITIVITY TO STATIC DISCHARGE :

Not expected to be sensitive to static discharge.



### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Dilute the glutaraldehyde to 5% or less with water. Add sodium bisulfite (2-3 parts by weight per part glutaraldehyde). This will typically reduce the glutaraldehyde concentration to 2 ppm or less in 5 minutes at room temperature. The remaining solution can be disposed of via appropriate means. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Very toxic to aquatic organisms., Prevent material from entering sewers or waterways., If drains, streams, soil or sewers become contaminated, notify local authority.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Discard contaminated shoes, belts and other articles made of leather.

#### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

#### SUITABLE CONSTRUCTION MATERIAL :

PVC, Plexiglass, Perfluoroelastomer, Polytetrafluoroethylene/polypropylene copolymer, HDPE (high density polyethylene), Ethylene propylene, Polypropylene, Polyethylene, Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, Aluminum, Brass

#### UNSUITABLE CONSTRUCTION MATERIAL :

Copper, Mild steel, EPDM, Nylon, Natural rubber, Polyurethane, Chlorosulfonated polyethylene rubber, Fluoroelastomer, Neoprene, PTFE



<b>8.</b>	<b>EXPOSURE CONTROLS/PERSONAL PROTECTION</b>
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### OCCUPATIONAL EXPOSURE LIMITS

The following component(s) have been assigned an exposure standard by Safe Work Australia (Australia) and/or other Agencies:

Country/Source	Substance(s)	Basis	ppm	mg/m <sup>3</sup>
AUSTRALIA	Glutaraldehyde	Peak limit	0.1	0.41
USA	Glutaraldehyde	NIOSH REL/Ceiling	0.2	0.8
		Skin * ACGIH/Ceiling	0.05	

\* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

### MONITORING MEASURES :

A small volume of air is drawn through an absorbant or barrier to trap the substance(s) which can then be desorbed or removed and analyzed as referenced below:

Substance(s)	Method	Analysis	Absorbant
Glutaraldehyde	UK MDHS: 93	High pressure liquid chromatography	

Glass fibre filter treated with Dinitrophenyl hydrazine

### ENGINEERING MEASURES :

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

### PERSONAL PROTECTION RESPIRATORY PROTECTION:

If the occupational exposure limit is likely to be exceeded, an approved respirator must be selected and used in accordance with AS/NZS 1715 and AS/NZS 1716. An organic vapor cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

Impervious gloves Neoprene gloves Nitrile gloves PVC gloves Viton# gloves

### SKIN PROTECTION :

When handling this product, the use of a chemical resistant suit and rubber boots is recommended. A full slicker suit is recommended if gross exposure is possible.

### EYE PROTECTION :

Wear a face shield with chemical splash goggles.





### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

<b>9.</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	Pungent
pH (100 %)	3.1 - 4.5 ASTM E-70
VAPOR PRESSURE	2.13 kPa (20 °C)
VAPOR DENSITY	No data available.
SPECIFIC GRAVITY	1.0605 - 1.0725 (20 °C)
DENSITY	No data available.
SOLUBILITY IN WATER	Complete
VISCOSITY	3.4 cps (20.6 °C) ASTM D-2983
VISCOSITY	2.71 cst (20 °C)
VISCOSITY	1.4 cst (40 °C) ASTM D-445
MELTING POINT	-4 °C
BOILING POINT	101 °C
FLASH POINT	Not flammable
LOWER EXPLOSION LIMIT	No data available.
UPPER EXPLOSION LIMIT	No data available.
AUTOIGNITION TEMPERATURE	No data available.

Note: These physical properties are typical values for this product and are subject to change.

<b>10.</b>	<b>STABILITY AND REACTIVITY</b>
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### STABILITY :

Stable under normal conditions.

### CONDITIONS TO AVOID

: Extremes of temperature

### INCOMPATIBLE MATERIALS :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Strong Bases Strong acids Contact with these may cause a heat-generating reaction which is not expected to be violent.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon

### HAZARDOUS REACTIONS :

Hazardous polymerization will not occur.



<b>11.</b>	<b>TOXICOLOGICAL INFORMATION</b>
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### OVERVIEW OF HEALTH HAZARDS

#### ACUTE HAZARDS - EYE CONTACT

Corrosive. Will cause eye burns and permanent tissue damage. Vapors can cause watering of the eyes.

#### ACUTE HAZARDS - SKIN CONTACT

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Contact may cause staining.

#### ACUTE HAZARDS - INGESTION

Not a likely route of exposure. Harmful if swallowed. Corrosive; causes chemical burns to the mouth, throat and stomach. Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

#### ACUTE HAZARDS - INHALATION

Toxic by inhalation. Irritating to the eyes, nose, throat and lungs. Inhalation of product mist or vapors may cause respiratory allergy.

#### CHRONIC HAZARDS :

No adverse effects expected other than those mentioned above.

### SUMMARY OF TOXICITY INFORMATION

#### ACUTE TOXICITY DATA :

The following results are for the active components.

#### ACUTE ORAL TOXICITY :

Species:	Rat
LD50:	1.87 mg/kg
Test Descriptor:	25% Active Ingredient Glutaraldehyde
Species:	Rat
LD50:	1.07 - 1.62 ml/kg
Test Descriptor:	10% Active Ingredient

#### ACUTE DERMAL TOXICITY :

Species:	Rabbit
LD50:	8.0-12.8 ml/kg
Test Descriptor:	25% Active Ingredient Glutaraldehyde

#### ACUTE INHALATION TOXICITY :

Species:	Rat
LC50:	20.4 mg/L (4 hrs)
Test Descriptor:	Glutaraldehyde



### SENSITIZATION :

Levels of greater than 0.2% of glutaraldehyde produced allergic contact dermatitis in human studies. May cause sensitization by inhalation and skin contact.

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

### TERATOGENICITY AND EMBRYOTOXICITY :

Doses of 25 and 50 mg/kg given by gavage to pregnant rats produced decreases in maternal body weight. There were no other indications of maternal toxicity nor was there evidence of fetotoxicity or external, visceral or skeletal abnormalities. Mice (CD-1 strain) given 100 mg/kg by gavage showed fetotoxicity as evidenced by decreased body weight. At lower doses, there was no evidence of fetotoxicity or skeletal abnormalities. No evidence of teratogenic effects were noted in either species.

### MUTAGENICITY :

Mutagenicity in vitro tests of Chinese hamster ovary, sister chromatid exchange and unscheduled DNA synthesis did not produce dose-related responses. Oral doses of 30 and 60 mg/kg to mice showed no effect in the dominant lethal assay. In all five strains of Salmonella, with and without metabolic activation by S9 liver homogenate, no mutagenic response was noted.

For additional information on the hazard of the preparation, please consult section 2 and 12.

### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: High

<b>12.</b>	<b>ECOLOGICAL INFORMATION</b>
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### ECOTOXICOLOGICAL EFFECTS :

The following results are for the active

components. Acute Fish Results :

Species	Exposure	Test Type	Value	Test Descriptor
Rainbow Trout	96 hrs	LC50	42.1 mg/l	25% Active Ingredient ( Glutaraldehyde )
Bluegill Sunfish	96 hrs	LC50	37.6 mg/l	25% Active Ingredient ( Glutaraldehyde )

### ACUTE INVERTEBRATE RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Daphnia magna	48 hrs	LC50	16.9 mg/l	25% Active Ingredient ( Glutaraldehyde )



### AQUATIC MICROORGANISM RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Sewage Microorganisms	96 hrs	LC50	17 mg/l	25% Active Ingredient ( Glutaraldehyde )
Sewage Microorganisms	96 hrs	NOEC	5 mg/l	25% Active Ingredient ( Glutaraldehyde )

### AVIAN RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Mallard Duck		LD50	1,631 mg/kg	25% Active Ingredient
Mallard Duck		LD50	933 mg/kg	50% Active Ingredient

### MOBILITY AND BIOACCUMULATION POTENTIAL :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bio accumulate.

### PERSISTENCY AND DEGRADATION :

The organic portion of this preparation is expected to be readily biodegradable.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: High

## 13. DISPOSAL CONSIDERATIONS

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

Empty drums should be taken for recycling, recovery, or disposal through a suitably qualified or licensed contractor.



SPECIAL PRECAUTIONS FOR LANDFILL OR INCINERATION :  
No additional special precautions have been identified.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

#### LAND TRANSPORT

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III  
HAZCHEM CODE : 3Z  
SPECIAL PRECAUTIONS FOR USER : Dangerous goods of Class 9 (Miscellaneous - not fire risk substance, not combustible liquid) are incompatible in a placard load with any of the following:  
Class 1 Explosives

#### AIR TRANSPORT (ICAO/IATA)

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III

#### MARINE TRANSPORT (IMDG/IMO)

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III  
EmS-Nr. : F-A, S-F  
\*Marine Pollutant : Glutaraldehyde



<b>15.</b>	<b>REGULATORY INFORMATION</b>
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### AUSTRALIA :

#### NICNAS

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

SUSDP SCHEDULE : S6

<b>16.</b>	<b>OTHER INFORMATION</b>
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This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0



## CF 110SC

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 110 SC**

APPLICATION **SCALE INHIBITOR**

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

**EMERGENCY TELEPHONE NUMBER:** +61 430 138 290 (24 Hours)  
+65 6542 9595

#### NFPA 704M/HMIS RATING

HEALTH: 0/0 FLAMMABILITY: 1/1 INSTABILITY: 0/0 OTHER: \*  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.  
Wear suitable protective clothing.  
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.  
Not flammable or combustible.



## CF 110SC

### PRIMARY ROUTES OF EXPOSURE:

Eye, Skin

### HUMAN HEALTH HAZARDS – ACUTE:

#### EYE CONTACT:

No adverse effects expected

#### SKIN CONTACT:

No adverse effects expected

#### INGESTION:

Not a likely route of exposure. No adverse effects expected.

#### INHALATION:

Not a likely route of exposure. No adverse effects expected.

### SYMPTOMS OF EXPOSURE:

#### Acute:

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### Chronic:

A review of available data does not identify any symptoms from exposure not previously mentioned

### HUMAN HEALTH HAZARDS - CHRONIC:

No adverse effects expected other than those mentioned above

## 4. FIRST AID MEASURES

#### EYE CONTACT:

Flush affected area with water. If symptoms develop, seek medical advice.

#### SKIN CONTACT:

Flush affected area with water. If symptoms develop, seek medical advice.

#### INGESTION:

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If vomiting occurs, rinse mouth and repeat administration of water.

#### INHALATION:

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN:

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.





## CF 110SC

### 5. FIRE FIGHTING MEASURES

FLASH POINT: 105 °C (PMCC)

LEL No data available

UEL No data available

AUTOIGNITION Temperature No data available

#### EXTINGUISHING MEDIA:

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD:

May evolve oxides of carbon (CO<sub>x</sub>) under fire conditions. May evolve oxides of sulfur (SO<sub>x</sub>) under fire conditions. Not flammable or combustible.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING:

In case of fire, wear a full face positive-pressure self-contained breathing apparatus and protective suit.

#### SENSITIVITY TO MECHANICAL IMPACT:

Not expected to be sensitive to mechanical impact

#### SENSITIVITY TO STATIC DISCHARGE:

Not expected to be sensitive to static discharge.

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS:

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

#### METHODS FOR CLEANING UP:

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS:

Do not contaminate surface water



## CF 110SC

### 7. HANDLING AND STORAGE

#### HANDLING:

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

#### STORAGE CONDITIONS:

Store in suitable labeled containers. Store the containers tightly closed.

#### SUITABLE CONSTRUCTION MATERIAL:

HDPE (high density polyethylene), Natural rubber, Viton, Polypropylene, Stainless Steel 304, Stainless Steel 316L, PTFE, Epoxyresin coating, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any substance that has an established exposure limit.

#### ENGINEERING MEASURES:

General ventilation is recommended. The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fume hood. Provide mechanical ventilation of confined spaces.

#### RESPIRATORY PROTECTION:

Respiratory protection is not normally needed

#### HAND PROTECTION:

See general advice

#### SKIN PROTECTION:

See general advice.

#### EYE PROTECTION:

Wear safety glasses with side-shields.

#### HYGIENE RECOMMENDATIONS:

Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

#### HUMAN EXPOSURE CHARACTERISATION:

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low



## CF 110SC

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light Yellow
ODOR	No data available
SPECIFIC GRAVITY	1.245 @ 20 °C
SOLUBILITY IN WATER	Complete
pH (100.0 %)	5.3
VISCOSITY	7 cst @ 40 °C
BOILING POINT	212.0 °F / 100.0 °C
VAPOR PRESSURE	no data available
EVAPORATION RATE	no data available
VAPOR DENSITY	no data available
COEFFICIENT OF WATER/OIL DISTRIBUTION	no data available

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

#### STABILITY:

Stable under normal conditions.

#### HAZARDOUS POLYMERIZATION:

Hazardous polymerization will not occur.

#### CONDITIONS TO AVOID:

Heat and sources of ignition including static discharges.

#### MATERIALS TO AVOID:

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

#### HAZARDOUS DECOMPOSITION PRODUCTS:

Under fire conditions: Oxides of carbon, Oxides of sulfur

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

#### SENSITIZATION:

This product is not expected to be a sensitizer.

#### CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).



## CF 110SC

REPRODUCTIVE EFFECTS:  
No quantitative data available.

TERATOGENICITY AND EMBRYOTOXICITY:  
No quantitative data available.

MUTAGENICITY:  
No quantitative data available

OTHER TOXICITY INFORMATION:  
Toxicologically Synergistic Products: None known

HUMAN HAZARD CHARACTERIZATION:  
Based on our hazard characterization, the potential human hazard is: Low

## 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS:  
No toxicity studies have been conducted on this

### MOBILITY:

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30-50%	50-70%

The portion in water is expected to be soluble or dispersible.

### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bio-accumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low



## CF 110SC

### 13. DISPOSAL CONSIDERATIONS

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations.

Do not dispose of wastes in local sewer or with normal garbage.

### 14. TRANSPORT INFORMATION

Product is not regulated during transportation.

### 15. REGULATORY INFORMATION

No data available.

### 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

- The human risk is: Low
- The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information

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Prepared By: Condor Energy HSEQ Department  
Date issued: 18 June 2014  
Version Number: 1.0



## CF 110GS

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **CF110GS**

APPLICATION **Gel Stabiliser**

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

**EMERGENCY TELEPHONE NUMBER:** +61 430 138 290 (24 Hours)  
+65 6542 9595

NFPA 704M/HMIS RATING  
HEALTH: 0 / 1 FLAMMABILITY: 0 / 0 INSTABILITY: 0 / 0 OTHER :  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.  
Wear suitable protective clothing.  
Not flammable or combustible.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :  
May cause irritation with prolonged contact.

SKIN CONTACT :  
May cause irritation with prolonged contact.



## CF 110GS

### INGESTION :

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract with nausea and vomiting.

### INHALATION :

Not a likely route of exposure. Repeated or prolonged exposure may irritate the respiratory tract

### HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

## 4. FIRST AID MEASURES

### EYE CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

### SKIN CONTACT :

Flush with large amounts of water. Use soap if available. If symptoms develop, seek medical advice.

### INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink.

### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable

### EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

Not flammable or combustible.

### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



## CF 110GS

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

#### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

#### SUITABLE CONSTRUCTION MATERIAL :

Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

#### ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

#### RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.





## CF 110GS

### HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear safety glasses with side-shields.

### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless Clear
ODOR	None
SPECIFIC GRAVITY	1.2615 - 1.2915 @ 70.0 °F / 21.1 °C
DENSITY	10.53 - 10.78 lb/gal
SOLUBILITY IN WATER	Complete

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Avoid extremes of temperature.

### MATERIALS TO AVOID :

None known



## CF 110GS

HAZARDOUS DECOMPOSITION PRODUCTS :  
Under fire conditions: None known

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :  
This product is not expected to be a sensitizer.

CARCINOGENICITY :  
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :  
Based on our hazard characterization, the potential human hazard is: Low

### 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

MOBILITY :  
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL  
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION  
Based on our hazard characterization, the potential environmental hazard is: Low  
Based on our recommended product application and the product's characteristics, the potential environmental



## CF 110GS

exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

### 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous.

Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

#### LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Condor Energy accepts no liability for the use of this information.

#### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).



## CF 110GS

<b>16.</b>	<b>OTHER INFORMATION</b>
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Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Low

\* The environmental risk is: Low

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

# Condor Energy Services – Safety Data Sheet

## CF 110GS



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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet

CF 110GS





### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF200PH**

APPLICATION: **Buffer**

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER: +61 430 138 290 (24 Hours)  
+65 6542 9595

NFPA 704M/HMIS RATING  
HEALTH: 3/3 FLAMMABILITY: 0/0 INSTABILITY: 0/0 OTHER:  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Potassium Hydroxide	1310-58-3	10.0 - 30.0
Inorganic salt	Proprietary	10.0 - 30.0

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### DANGER

Corrosive. May cause tissue damage. Harmful if swallowed.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.  
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.  
Not flammable or combustible.



## CF 200PH

### PRIMARY ROUTES OF EXPOSURE:

Eye, Skin

### HUMAN HEALTH HAZARDS - ACUTE:

#### EYE CONTACT:

Corrosive. Will cause eye burns and permanent tissue damage.

#### SKIN CONTACT :

Corrosive; causes permanent skin damage.

#### INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach. Harmful if swallowed.

#### INHALATION :

Not a likely route of exposure. Elevated temperatures or mechanical action may form vapors, mists or fumes which may be irritating to the eyes, nose, throat and lungs.

## 4. FIRST AID MEASURES

### EYE CONTACT :

Get immediate medical attention. PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open.

### SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. Use a mild soap if available. For a large splash, flood body under a shower. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

### INGESTION :

Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

### INHALATION :

Remove to fresh air, treat symptomatically. Get immediate medical attention.

### NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable

### EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

Not flammable or combustible.

### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.





## CF 200PH

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not mix with acids.

#### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from acids.

#### SUITABLE CONSTRUCTION MATERIAL :

Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Potassium Hydroxide	ACGIH/Ceiling		2	

#### ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.



## CF 200PH

### RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

### SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

### EYE PROTECTION :

Wear a face shield with chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless Clear
ODOR	None
SPECIFIC GRAVITY	1.37 @ 70.0 °F / 21.1 °C
DENSITY	11.4 lb/gal
SOLUBILITY IN WATER	Complete
pH (100.0 %)	> 13.0
INITIAL BOILING POINT	212.0 °F / 100.0 °C
VAPOR PRESSURE	< 5.1 mm Hg @ 100.0 °F / 37.7 °C

Note: These physical properties are typical values for this product and are subject to change.



## CF 200PH

### 10. STABILITY AND REACTIVITY

**STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Avoid extremes of temperature.

**MATERIALS TO AVOID :**

Acids Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: None known

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: High



## CF 200PH

### 12. ECOLOGICAL INFORMATION

#### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

#### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

#### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

#### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

### 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste.

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.



## CF 200PH

### LAND TRANSPORT :

Proper Shipping Name :	POTASSIUM HYDROXIDE SOLUTION
Technical Name(s) :	Potassium Hydroxide
UN/ID No :	UN 1814
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	Not applicable
Reportable Quantity (per package) :	8,890 lbs
RQ Component :	POTASSIUM HYDROXIDE

### AIR TRANSPORT (ICAO/IATA) :

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

Proper Shipping Name :	POTASSIUM HYDROXIDE SOLUTION
Technical Name(s) :	Potassium Hydroxide
UN/ID No :	UN 1814
Hazard Class - Primary :	8
Packing Group :	II
Reportable Quantity (per package) :	8,890 lbs
RQ Component :	POTASSIUM HYDROXIDE

### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	POTASSIUM HYDROXIDE SOLUTION
Technical Name(s) :	Potassium Hydroxide
UN/ID No :	UN 1814
Hazard Class - Primary :	8
Packing Group :	II

## 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Condor Energy Services accepts no liability for the use of this information.



### 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Low

\* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

#### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

# Condor Energy Services – Safety Data Sheet

## CF 200PH



The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0



## CF 305DXL

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 305DXL**

APPLICATION: **FRACTURING ADDITIVE**

IMPORTER: **Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986**

EMERGENCY TELEPHONE NUMBER: **+61 430 138 290 (24 Hours)  
  
+65 6542 9595**

**NFPA 704M/HMIS RATING**

HEALTH: 2/2\* FLAMMABILITY: 1/1 INSTABILITY: 0/0 OTHER: 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Ulexite	1319-33-1	30.0 - 60.0
Alkyl Alcohol	Proprietary	5.0 - 10.0
Sulfur compound	Proprietary	1.0 - 5.0

### 3. HAZARDS IDENTIFICATION

**\*\*EMERGENCY OVERVIEW\*\***

**DANGER**

Irritating to eyes, respiratory system and skin. May impair fertility. May cause harm to the unborn child. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available. Wear suitable protective clothing and gloves. Wear chemical splash goggles. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin





## CF 305DXL

### HUMAN HEALTH HAZARDS - ACUTE :

#### EYE CONTACT :

Can cause moderate to severe irritation.

#### SKIN CONTACT :

Can cause moderate irritation.

#### INGESTION :

Not a likely route of exposure. Can cause mild irritation. There may be irritation to the gastro-intestinal tract with nausea and vomiting.

#### INHALATION :

Not a likely route of exposure. Irritating to the eyes, nose, throat and lungs.

### HUMAN HEALTH HAZARDS - CHRONIC :

May impair fertility. May cause harm to the unborn child.

## 4. FIRST AID MEASURES

#### EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

#### SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. Use a mild soap if available. If symptoms develop, seek medical advice.

#### INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink.

#### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 F/ > 93.3 °C

#### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



## CF 305DXL

### 6. ACCIDENTAL RELEASE MEASURES

**PERSONAL PRECAUTIONS :**

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

**METHODS FOR CLEANING UP :**

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

**ENVIRONMENTAL PRECAUTIONS :**

Prevent material from entering sewers or waterways.

### 7. HANDLING AND STORAGE

**HANDLING :**

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

**STORAGE CONDITIONS :**

Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

**SUITABLE CONSTRUCTION MATERIAL :**

Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**OCCUPATIONAL EXPOSURE LIMITS :**

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Basis	ppm	mg/m3	Non-Standard
Alkyl Alcohol	ACGIH/TWA		10	Unit



## CF 305DXL

\* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

### ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

### RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Slurry
APPEARANCE	Milky Off-white Light grey
ODOR	None
SPECIFIC GRAVITY	1.45 @ 60.0 °F / 15.5 °C
DENSITY	12.0 lb/gal
SOLUBILITY IN WATER	Dispersible
pH (100.0 %)	7.0
VISCOSITY	450.0 cps @ 75.0 °F / 23.8 °C
POUR POINT	-40.0 °F / -40.0 °C
INITIAL BOILING POINT	212.0 °F / 100.0 °C

Note: These physical properties are typical values for this product and are subject to change.



## CF 305DXL

### 10. STABILITY AND REACTIVITY

**STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Avoid extremes of temperature.

**MATERIALS TO AVOID :**

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**TERATOGENICITY AND EMBRYOTOXICITY :**

A component of this product may impair fertility and/or may cause harm to the unborn child.

**HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: High



## CF 305DXL

### 12. ECOLOGICAL INFORMATION

#### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

#### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	30 - 50%

The portion in water is expected to be soluble or dispersible.

#### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

#### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

### 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

# Condor Energy Services – Safety Data Sheet



## CF 305DXL

### LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Condor Energy Services accepts no liability for the use of this information.

## 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Low

\* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

# Condor Energy Services – Safety Data Sheet



## CF 305DXL

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,  
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet

## CF 200



### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 200**

APPLICATION: Friction Reducer

IMPORTER IDENTIFICATION: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER(S): +61 430 138 290 (24 Hours)  
+65 6542 9595

### 2. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION :

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

SAFETY PHRASES

S24/25 - Avoid contact with skin and eyes.

S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NO	% (w/w)
Ingredients determined not to be hazardous		100





## CF 200

### 4. FIRST AID MEASURES

#### EYE CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

#### SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

#### INGESTION :

DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

#### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

### 5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

#### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

#### SENSITIVITY TO STATIC DISCHARGE :

Not expected to be sensitive to static discharge.

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).



## CF 200

### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

## 7. HANDLING AND STORAGE

### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep the containers closed when not in use. Ensure all containers are labeled.

### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

### SUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Neoprene, Viton, Buna-N, Polypropylene, Polyethylene, Polyurethane, EPDM, Epoxy phenolic resin, HDPE (high density polyethylene), PVC

### UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Hypalon, Mild steel

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS

None of the components have been assigned an exposure standard by Safe Work Australia (Australia) or EPA (New Zealand).

### ENGINEERING MEASURES :

General ventilation is recommended.

### PERSONAL PROTECTION

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

#### HAND PROTECTION :

NEOPRENE, NITRILE, OR PVC GLOVES Breakthrough time not determined as preparation, consult PPE manufacturers.

#### SKIN PROTECTION :

Wear standard protective clothing.

#### EYE PROTECTION :

Wear safety glasses with side-shields.

#### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

#### ENVIRONMENTAL EXPOSURE CONTROL PRECAUTIONS :

Consider the provision of containment around storage vessels.



## CF 200

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Milky White
ODOR	Mild
pH	No data available.
VAPOR PRESSURE	No data available.
VAPOR DENSITY	No data available.
SPECIFIC GRAVITY	1.198 - 1.225 (23.88 °C)
DENSITY	No data available.
SOLUBILITY IN WATER	Complete
OCTANOL/WATER COEFFICIENT (log Kow)	-0.9 Product (estimated) OECD 117
MELTING POINT	No data available.
BOILING POINT	No data available.
FLASH POINT	Not flammable
LOWER EXPLOSION LIMIT	No data available.
UPPER EXPLOSION LIMIT	No data available.
AUTOIGNITION TEMPERATURE	No data available.

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

#### STABILITY :

Stable under normal conditions.

#### CONDITIONS TO AVOID

: Extremes of temperature

#### INCOMPATIBLE MATERIALS :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. SO<sub>2</sub> may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

#### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

#### HAZARDOUS REACTIONS :

Hazardous polymerization will not occur.

### 11. TOXICOLOGICAL INFORMATION

#### OVERVIEW OF HEALTH HAZARDS

##### ACUTE HAZARDS - EYE CONTACT

May cause irritation with prolonged contact.

##### ACUTE HAZARDS - SKIN CONTACT

May cause irritation with prolonged contact.

# Condor Energy Services – Safety Data Sheet



## CF 200

### ACUTE HAZARDS - INGESTION

Not a likely route of exposure. No adverse effects expected.

### ACUTE HAZARDS - INHALATION

Not a likely route of exposure. No adverse effects expected.

### CHRONIC HAZARDS :

No adverse effects expected other than those mentioned above.

### SUMMARY OF TOXICITY INFORMATION

#### ACUTE TOXICITY DATA :

No toxicity studies have been conducted on this product.

#### SENSITIZATION :

This product is not expected to be a sensitizer.

#### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

For additional information on the hazard of the preparation, please consult section 2 and 12.

#### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS:

The following results are for the product.

#### AQUATIC PLANT RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Marine Algae (Skeletonema costatum)	72 hrs	LC50	165.54 mg/l	Product
Marine Algae (Skeletonema costatum)	72 hrs	NOEC	10 mg/l	Product

#### MOBILITY AND BIOACCUMULATION POTENTIAL :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

# Condor Energy Services – Safety Data Sheet



## CF 200

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	70 - 90%

The portion in water is expected to be soluble or dispersible.

This preparation or material is not expected to bioaccumulate.

### PERSISTENCY AND DEGRADATION :

The organic portion of this preparation is expected to be inherently biodegradable.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

## 13. DISPOSAL CONSIDERATIONS

Dispose of wastes in an approved waste treatment / disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage.

Triple rinse (or equivalent) all containers and offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

### LAND TRANSPORT

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### AIR TRANSPORT (ICAO/IATA)

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### MARINE TRANSPORT (IMDG/IMO)

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## 15. REGULATORY INFORMATION

### AUSTRALIA :

#### NICNAS

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

#### SUSDP SCHEDULE :

Not Listed

Ver 1.0

27 March 2014



## CF 200

<b>16. OTHER INFORMATION</b>
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This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : NALCO® CF10GGC

Other means of identification : Not applicable.

Recommended use : FRACTURING ADDITIVE

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Australia  
2 Drake Avenue  
Macquarie Park NSW 2113  
Australia  
A.B.N. 59 000 449 990  
TEL: +61 2 8870 8100  
FAX: +61 2 8870 8680

Emergency telephone number : 1800 205 506  
International: +65 6542 9595 Free call: +800 2537 8747

Issuing date : 03.08.2014

**SECTION 2. HAZARDS IDENTIFICATION**

**Hazard classification**

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

**S-phrase(s)**

This material and/or its container must be disposed of as hazardous waste.

**Other hazards which do not result in classification**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No.	Concentration: (%)
Hydrotreated Light Distillate	64742-47-8	30 - 60
Hexamethylene Glycol	629-11-8	0.1 - 1

The balance of the substances in this product are not classified as hazardous or are present below hazard cut-off limits

**SECTION 4. FIRST AID MEASURES**

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

# SAFETY DATA SHEET

## NALCO® CF10GGC

- If swallowed : Rinse mouth. Get medical attention if symptoms occur.  
Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).
- If inhaled : Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

### SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Not flammable
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8. Wash hands after handling.
- Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.



# SAFETY DATA SHEET

**NALCO® CF10GGC**

Suitable material : Keep in properly labelled containers.

Unsuitable material : not determined

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Hydrotreated Light Distillate	64742-47-8	TWA	500 ppm 2,000 mg/m <sup>3</sup>	OSHA Z1
		TWA	200 mg/m <sup>3</sup>	ACGIH
Hexamethylene Glycol	629-11-8	TWA	10 mg/m <sup>3</sup>	WEEL

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : slurry

Colour : Opaque

Odour : Hydrocarbon

Flash point : 76.7 °C  
Method: Pensky-Martens closed cup  
Estimated

pH : no data available

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : 246.1 °C

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

## SAFETY DATA SHEET

### NALCO® CF10GGC

Vapour pressure	: 0.23 hPa (20 °C)
Relative vapour density	: no data available
Relative density	: 1.020 - 1.090
Density	: no data available
Water solubility	: Emulsifiable
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: 350 mPa.s (22 °C)
Viscosity, kinematic	: 350 mm <sup>2</sup> /s
VOC	: no data available

### SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: None known
Hazardous decomposition products	: Carbon oxides

### SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	: Health injuries are not known or expected under normal use.
Skin	: Health injuries are not known or expected under normal use.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.
Chronic Exposure	: Health injuries are not known or expected under normal use.

#### Experience with human exposure

Eye contact	: No symptoms known or expected.
Skin contact	: No symptoms known or expected.
Ingestion	: No symptoms known or expected.
Inhalation	: No symptoms known or expected.

# SAFETY DATA SHEET

**NALCO® CF10GGC**

## Toxicity

### Product

Acute oral toxicity : no data available

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

### **Components**

Acute oral toxicity : Hydrotreated Light Distillate  
LD50 rat: > 5,000 mg/kg

## HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

## SECTION 12. ECOLOGICAL INFORMATION

### **Ecotoxicity**

Environmental Effects : Harmful to aquatic life with long lasting effects.

### Product

Toxicity to fish : no data available

Toxicity to daphnia and other aquatic invertebrates : no data available

Toxicity to algae : no data available

### **Components**

Toxicity to fish : Hydrotreated Light Distillate

# SAFETY DATA SHEET

**NALCO® CF10GGC**

LC50 : > 1,000 mg/l  
Exposure time: 96 h

## Components

Toxicity to daphnia and other aquatic invertebrates : Hydrotreated Light Distillate  
EC50 : > 1,000 mg/l  
Exposure time: 72 h

## Components

Toxicity to algae : Hydrotreated Light Distillate  
EC50 : > 1,000 mg/l  
Exposure time: 48 h

## Components

Toxicity to bacteria : Hydrotreated Light Distillate  
> 1,000 mg/l

## Persistence and degradability

no data available

## Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air : 10 - 30%  
Water : 50 - 70%  
Soil : 10 - 30%

## Bioaccumulative potential

no data available

## Other information

no data available

## ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

## SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## SECTION 14. TRANSPORT INFORMATION

## SAFETY DATA SHEET

**NALCO® CF10GGC**

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport

Proper shipping name : Not Regulated for Transport except by Road in Bulk (Combustible Liquid)  
Special precautions for user : This product is classified as a combustible liquid and is not regulated for transport unless transported in bulk aboard a vehicle at the same time as a Class 3 dangerous goods - in bulk or as packaged goods with an aggregate quantity exceeding 1000 litres. Refer to the Australian Code for the Transport of Dangerous Goods by Road and Rail for specific details.

### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Sea Transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## SECTION 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 5  
Scheduling of Medicines and  
Poisons  
INTERNATIONAL CHEMICAL CONTROL LAWS :

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## SECTION 16. OTHER INFORMATION

REFERENCES

## SAFETY DATA SHEET

**NALCO® CF10GGC**

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Revision Date : 03.08.2014  
Date of first issue : 04.08.2014  
Version Number : 1.0  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the MSDS.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.

# Condor Energy Services – Safety Data Sheet

## CF 8500



### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 8500**

APPLICATION: **Oxidiser Breaker**

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER: +61 430 138 290 (24 Hours)  
+65 6542 9595

NFPA 704M/HMIS RATING  
HEALTH: 2 / 2\* FLAMMABILITY: 0 / 0 INSTABILITY: 1 / 1 OTHER: OX  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Ammonium Persulphate	7727-54-0	60.0 - 100.0

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### WARNING

Oxidizer. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact. Harmful if swallowed. Contact with combustible material may cause fire. Keep away from combustible material. Do not get in eyes, on skin, on clothing. Do not take internally. Do not breathe dust. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Wear suitable protective clothing. Not flammable but can act as an oxidizing agent, enhancing the burning rate of other materials. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May form explosive dust-air mixtures. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

## CF 8500



PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :  
Irritating, and may injure eye tissue if not removed promptly.

SKIN CONTACT :  
Can cause moderate irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

INGESTION :  
Not a likely route of exposure. There may be irritation to the gastro-intestinal tract. Harmful if swallowed.

INHALATION :  
Not a likely route of exposure. Irritating to the eyes, nose, throat and lungs. Inhalation of aerosol or dust may cause respiratory allergy.

SYMPTOMS OF EXPOSURE :  
Acute :  
A review of available data does not identify any symptoms from exposure not previously mentioned.  
Chronic :  
A review of available data does not identify any symptoms from exposure not previously mentioned.

HUMAN HEALTH HAZARDS - CHRONIC :  
No adverse effects expected other than those mentioned above.

### **4. FIRST AID MEASURES**

EYE CONTACT :  
Immediately flush with plenty of water for at least 15 minutes. Get medical attention.

SKIN CONTACT :  
Immediately flush with large amounts of water. Use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. For a large splash, flood body under a shower. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use. If symptoms develop, seek medical advice.

INGESTION :  
Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If reflexive vomiting occurs, rinse mouth and repeat administration of water.

INHALATION :  
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :  
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.





### 5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable

The Self-Accelerating Decomposition Temperature (SADT) is 266°F (130°C).

AUTOIGNITION TEMPERATURE : Not applicable

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Not flammable but can act as an oxidizing agent, enhancing the burning rate of other materials. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May form explosive dust-air mixtures. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

Do not clean up spills with sawdust, cotton waste or other combustible absorbent materials. Ensure that the container is free of readily combustible / oxidizable material. Sweep up and shovel. Reclaim into recovery or salvage drums. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations). Contact an approved waste hauler for disposal of contaminated recovered material.

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.



### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating dusts. Keep the containers closed when not in use. Ensure all containers are labeled.

#### STORAGE CONDITIONS :

This product is hygroscopic. Store away from heat and sources of ignition. Store in suitable labeled containers. Store the containers tightly closed. Keep in dry place. Store away from organic chemicals and other oxidizable materials, reducing agents, acids and alkalis. Keep at temperature not exceeding 30 °C Store separately from acids. Store separately from bases.

#### SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Basis	ppm	mg/m3	Non-Standard Unit
Ammonium Persulphate as persulfate	Skin *	ACGIH/TWA	0.1	

\* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

#### ENGINEERING MEASURES :

General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded. A dust respirator may be used.

#### HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

#### SKIN PROTECTION :

When handling this product, the use of a chemical resistant suit and rubber boots is recommended. Keep a safety shower available.

#### EYE PROTECTION :

When handling this product, the use of splash chemical goggles is recommended. Keep an eye wash fountain available

#### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure.. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.



### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Crystalline
APPEARANCE	Straw-colored
ODOR	None
SPECIFIC GRAVITY	2
DENSITY	16.6 lb/gal
BULK DENSITY	66 lb/ft <sup>3</sup>
SOLUBILITY IN WATER	Complete
pH (1 %)	4 - 5
DECOMPOSITION TEMPERATURE	Decomposes 320 °F / 160 °C
VOC CONTENT	0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

#### STABILITY :

Stable under normal conditions.

#### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

#### CONDITIONS TO AVOID :

Avoid extremes of temperature. Moisture Heat and sources of ignition including static discharges.

#### MATERIALS TO AVOID :

Combustible materials Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes.

#### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of nitrogen, Oxides of sulfur

### 11. TOXICOLOGICAL INFORMATION

The following results are for the product.

#### ACUTE ORAL TOXICITY :

Species:	Rat
LD50:	600 mg/kg
Test Descriptor:	Product



## CF 8500

### ACUTE DERMAL TOXICITY :

Species: Rabbit  
LD50: > 10 g/kg  
Test Descriptor: Product

### ACUTE INHALATION TOXICITY :

Species: Rat  
LC50: 520 mg/l (1 hrs)  
Test Descriptor: Product

### SENSITIZATION :

Repeated or prolonged contact may cause sensitization in some individuals.

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

### HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

### ADDITIONAL ECOLOGICAL DATA

No adverse effects expected.

### PERSISTENCY AND DEGRADATION :

Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable.

### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to float on the surface.



### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

### LAND TRANSPORT :

Proper Shipping Name :	AMMONIUM PERSULPHATE
Technical Name(s) :	
UN/ID No :	UN 1444
Hazard Class - Primary :	5.1
Packing Group :	III
Flash Point :	Not applicable

### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	AMMONIUM PERSULPHATE
Technical Name(s) :	
UN/ID No :	UN 1444
Hazard Class - Primary :	5.1
Packing Group :	III

# Condor Energy Services – Safety Data Sheet

## CF 8500



### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	AMMONIUM PERSULPHATE
Technical Name(s) :	
UN/ID No :	UN 1444
Hazard Class - Primary :	5.1
Packing Group :	III

## 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Condor Energy Services accepts no liability for the use of this information.

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

## 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

# Condor Energy Services – Safety Data Sheet

## CF 8500



The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0



# MATERIAL SAFETY DATA SHEET

Product name: Santrol ISP Ceramic Proppant  
Chemical family: Aluminosilicate  
Company: Santrol, A Fairmount Minerals Company  
50 Sugar Creek Center Blvd.,  
Sugarland, TX 77478 USA  
Tel/Fax: 1-800-338-4686/1-713-234-5451

## 2.COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS	CAS NUMBER	CONCENTRATION
Corundum	1302-74-5	70-85%
Mullite	1302-93-8	<10%

Inhalation: Inhalation of particles of respirable size may cause certain respiratory disease.  
Eye contact: Airborne dust may cause irritation to eyes.  
Skin contact: Prolonged contact with a skin may cause irritation.  
HMIS Rating: Health 1(slight) Flammability 0(minimal) Reactivity 0(minimal) Special protection (section 7)

Ingestion: Seek medical attention if large quantities are ingested.  
Eye contact: Flush eyes with water. If irritation is present after washing get medical attention.  
Skin contact: Wash the affected area with soap and water. Get medical attention if irritation occurs.

Estimated explosive limits (% By volume in air): LEL: N/A UEL: N/A FLASH POINT: N/A

Special fire fighting procedures: This material does not give a flash point by conventional test methods.  
Use extinguishing agent suitable for type of surrounding fire.

Unusual hazards: N/A

Caution should be exercised regarding personal safety and exposure to the spilled material. Persons should take care so as not to slip.

## 7.EXPOSURE CONTROLS/PROTECTION DURING USE

Exposure limits:	Ingredients	OSHA PEL-TWA	ACGIH-TWA TLV
	Corundum	15mg/m3(total) 5mg/m3(respirable)	10mg/m3(total) 3mg/m3(respirable)
	Mullite	15mg/m3(total) 5mg/m3(respirable)	10mg/m3(total) 3mg/m3(respirable)



Engineering control measures: Exposure to this material may be controlled in a number of ways. The measures appropriate for a particular worksite depend on how the material is used and the potential for exposure.

Respiratory: Wear a mask to prevent dust inhalation.

Eye protection: Wear safety glasses to prevent eye contact.

Ventilation: Provide sufficient ventilation.

Handling: Do not create dust. Use personal protective equipment. Refer to section 7 for personal protective equipment.

Storage: Store dry in closed container to reduce dust.

Melting point:	4000°F (estimated)	Apparent specific gravity:	2.60~3.60g/cm <sup>3</sup>
Appearance/Odor:	Odorless black spheres	Bulk density:	1.40~2.10g/cm <sup>3</sup>
Volatile:	N/A	Solubility in water:	Insoluble

Reactivity: N/A

Stability: stable

Incompatible materials: N/A

## 11. TOXICOLOGICAL INFORMATION

Acute effects: May be irritating to the respiratory system, lungs and skin, as well as to eyes.

Chronic effects: In excess of established human exposure levels can cause severe respiratory disease.

## 12. ECOLOGICAL INFORMATION

This product poses no significant environmental contamination.

## 13. DISPOSAL CONSIDERATIONS

Waste disposal: Disposal must be at an approved waste disposal facility.

## 14. TRANSPORTATION INFORMATION

UN No.	N/A
ICAO/IATA	Not Restricted
RID/ADR	Not Restricted
DOT shipping description:	Not Restricted
CAN	Not Restricted
IMO	Not Restricted

Toxic Substance Control Act (TSCA) status: N/A

Cercal reportable quantity: None

Clean air amendments-hazardous air pollutants (HAPS): None

California state proposition 65: N/A

Product Name **HYDROCHLORIC ACID 32% (COOGEE CHEMICALS)**

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Supplier Name** COOGEE CHEMICALS  
**Address** Cnr of Patterson and Kwinana Beach Roads, Kwinana, WA, AUSTRALIA, 6167  
**Telephone** (08) 9439 8200  
**Fax** (08) 9439 8300  
**Emergency** 1800 800 655  
**Email** businessrelations@coogee.com.au  
**Web Site** http://www.coogee.com.au

**Synonym(s)** 9178 - PRODUCT CODE • COOGEE HYDROCHLORIC ACID 32% • HCL • HYDROCHLORIC ACID 32% • HYDROCHLORIC ACID 32% (NUFARM) (FORMERLY) • MURIATIC ACID • SPIRITS OF SALTS

**Use(s)** ACIDIFIER • CHEMICAL INTERMEDIATE • LABORATORY REAGENT • PICKLING AND ANODISING METALS • SCALE REMOVER

## 2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO ASCC CRITERIA

### RISK PHRASES

R34 Causes burns.  
R37 Irritating to respiratory system.

### SAFETY PHRASES

S1/2 Keep locked up and out of reach of children.  
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice  
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.  
S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).  
S9 Keep container in a well ventilated place.

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

<b>UN No.</b>	1789	<b>DG Class</b>	8	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Packing Group</b>	II	<b>Hazchem Code</b>	2R	<b>EPG</b>	8A1

## 3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
HYDROCHLORIC ACID	H-Cl	7647-01-0	32%
WATER	H <sub>2</sub> O	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 Full-face Type B (Inorganic and acid gas) 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.

**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** CORROSIVE POISONING TREATMENT: Immediate treatment preferably in a hospital is mandatory. It is also important to attempt to discover the chemical substances ingested. In treating corrosive poisoning, DO NOT INDUCE VOMITING; DO NOT ATTEMPT GASTRIC LAVAGE; and DO NOT ATTEMPT TO NEUTRALISE THE CORROSIVE SUBSTANCE. Vomiting will increase the severity of damage to the oesophagus as the corrosive substance will again come in contact with it. Attempting gastric lavage may result in perforating either the oesophagus or stomach.

**Product Name**     **HYDROCHLORIC ACID 32% (COOGEE CHEMICALS)**

Immediately dilute the corrosive substance by having the patient drink milk or water. If the trachea has been damaged tracheostomy may be required. For oesophageal burns begin broad-spectrum antibiotics and corticosteroid therapy. Intravenous fluids will be required if oesophageal or gastric damage prevents ingestion of liquids. Long-range therapy will be directed toward preventing or treating oesophageal scars and strictures.

**First Aid Facilities** Eye wash facilities and safety shower should be available.

**5. FIRE FIGHTING MEASURES**

- Flammability**       Non flammable. May evolve toxic gases (chlorides) when heated to decomposition. May evolve flammable hydrogen gas when in contact with some metals.
- 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**        Prevent contamination of drains or waterways.
- Hazchem Code**        2R

**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 sodium bicarbonate or 50-50 mixture of sodium carbonate and calcium hydroxide. Collect for complete neutralisation and appropriate disposal.

**7. STORAGE AND HANDLING**

- Storage**            Store in secured, cool, dry, well ventilated area, removed from oxidising agents, alkalis, most metals, alcohols, acids, dinitroaniline, cyanides, sulphides, heat or ignition sources and foodstuffs. Ensure containers are labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate ventilation systems. Also store removed from amines.
- 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	
			ppm	mg/m3	ppm	mg/m3
	Hydrogen chloride (Hydrochloric acid)	ASCC (AUS)	5.0	7.5	--	--

**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, a PVC apron, rubber boots, full-length rubber or full-length PVC gloves, a faceshield and coveralls. Wear full-length PVC or full-length rubber gloves, splash-proof goggles, a PVC apron, rubber boots, full PVC coveralls (or better) and a faceshield. Where an inhalation risk exists, wear: a Full-face Type B (Inorganic and Acid gas) or an Air-line respirator.



**9. PHYSICAL AND CHEMICAL PROPERTIES**

Product Name **HYDROCHLORIC ACID 32% (COOGEE CHEMICALS)**

Appearance	COLOURLESS TO SLIGHTLY YELLOW LIQUID	Solubility (Water)	SOLUBLE
Odour	PUNGENT ODOUR	Specific Gravity	1.161
pH	< 1	% Volatiles	100 %
Vapour Pressure	18 mm Hg @ 20°C	Flammability	NON FLAMMABLE
Vapour Density	1.3 (Air = 1)	Flash Point	NOT RELEVANT
Boiling Point	109°C	Upper Explosion Limit	NOT RELEVANT
Melting Point	< -20°C	Lower Explosion Limit	NOT RELEVANT
Evaporation Rate	AS FOR 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), alkalis (eg. hydroxides), most metals, acids (eg. nitric acid), alcohols, dinitroanilines, cyanides, sulphides and heat sources. Corrodes most materials when moist. Also incompatible with amines.

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

**Hazardous Reactions** Polymerization is not expected to occur.

## 11. TOXICOLOGICAL INFORMATION

**Health Hazard Summary** Highly corrosive. This product has the potential to cause serious adverse health effects. Use safe work practices to avoid eye or skin contact and inhalation. Over exposure may result in severe skin, eye and respiratory burns with permanent lung and tissue damage. Upon dilution, the potential for adverse health effects may be reduced.

**Eye** Highly corrosive. Contact may result in irritation, lacrimation, pain, redness, conjunctivitis and corneal burns with possible permanent damage.

**Inhalation** Toxic - corrosive. Over exposure may result in irritation of the nose and throat, coughing and bronchitis. High level exposure may result in intense thirst, ulceration, lung tissue damage, chemical pneumonitis and pulmonary oedema. Effects may be delayed.

**Skin** Highly corrosive. Contact may result in irritation, redness, pain, rash, dermatitis, blistering and severe burns. May cause discolouration of the skin. Effects may be delayed.

**Ingestion** Highly corrosive. Ingestion may result in burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea. Ingestion of large quantities may result in ulceration, unconsciousness, convulsions and death.

**Toxicity Data** HYDROCHLORIC ACID (7647-01-0)  
LC50 (Inhalation): 1108ppm/1 hour (human - respiratory irritation)  
LCLo (Inhalation): 1300 ppm/30 minutes (human)  
LD50 (Ingestion): 900 mg/kg (rabbit)  
LDLo (Ingestion): 81 mg/kg (man)  
TCLo (Inhalation): 450 mg/m<sup>3</sup>/1 hour (pregnant rat - teratogenic effects)

## 12. ECOLOGICAL INFORMATION

**Environment** If hydrochloric acid is spilled on soil, it will infiltrate. During its transport through soil, the acid will dissolve some of the soil material, in particular carbonates, and will be neutralised to some degree. However, significant amounts of acid are expected to remain for transport down to groundwater. Toxic to aquatic invertebrates at low levels (LC50: 1.21 ppm/96 hours).

## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal** Wearing the protective equipment detailed above, neutralise to pH 6-8 by SLOW addition to a saturated sodium bicarbonate solution or similar basic solution. Dilute with excess water and flush to drain. Waste disposal should only be undertaken in a well ventilated area.

**Legislation** Dispose of in accordance with relevant local legislation.

Product Name **HYDROCHLORIC ACID 32% (COOGEE CHEMICALS)**

## 14. TRANSPORT INFORMATION



**CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE**

<b>Shipping Name</b>	HYDROCHLORIC ACID				
<b>UN No.</b>	1789	<b>DG Class</b>	8	<b>Subsidiary Risk(s)</b>	None Allocated
<b>Packing Group</b>	II	<b>Hazchem Code</b>	2R	<b>EPG</b>	8A1

## 15. REGULATORY INFORMATION

**Poison Schedule** Classified as a Schedule 6 (S6) 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.

ACIDS: When mixing acids with water (diluting), caution must be taken as heat will be generated which causes violent spattering. Always add a small volume of acid to a large volume of water, NEVER the reverse.

### ABBREVIATIONS:

ADB - Air-Dry Basis.

BEI - Biological Exposure Indice(s)

CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.

CNS - Central Nervous System.

EINECS - European INventory of Existing Commercial chemical Substances.

IARC - International Agency for Research on Cancer.

M - moles per litre, a unit of concentration.

mg/m<sup>3</sup> - Milligrams per cubic metre.

NOS - Not Otherwise Specified.

NTP - National Toxicology Program.

OSHA - Occupational Safety and Health Administration.

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.

TWA/ES - Time Weighted Average or Exposure Standard.

### 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.

COLOUR RATING SYSTEM: RMT has assigned all Chem Alert reports a colour rating of Green, Amber or Red for the sole purpose of providing users with a quick and easy means of determining the hazardous nature of a product. Safe handling recommendations are provided in all Chem Alert reports so as to clearly identify how users

**Product Name**      **HYDROCHLORIC ACID 32% (COOGEE CHEMICALS)**

can control the hazards and thereby reduce the risk (or likelihood) of adverse effects. As a general guideline, a Green colour rating indicates a low hazard, an Amber colour rating indicates a moderate hazard and a Red colour rating indicates a high hazard.

While all due care has been taken by RMT in the preparation of the Colour Rating System, it is intended as a guide only and RMT does not provide any warranty in relation to the accuracy of the Colour Rating System. As far as is lawfully possible, RMT accepts no liability or responsibility whatsoever for the actions or omissions of any person in reliance on the Colour Rating System.

**Report Status**      This Chem Alert report has been independently compiled by RMT's scientific department utilising the original Material Safety Data Sheet ('MSDS') 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.

This Chem Alert report does not constitute the manufacturer's original MSDS and is not intended to be a replacement for same. It is provided to subscribers of Chem Alert 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 Chem Alert 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 Chem Alert report.

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Web: www.rmt.com.au

**Last Reviewed:** 16 Jul 2010

**Date Printed:** 19 Jul 2010

**End of Report**

**Section: 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : CF600CI

Other means of identification : Not applicable.

Recommended use : ACID CORROSION INHIBITOR

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Condor Energy Services Ltd  
Level 4 / 15 Ogilvie Road  
Mt Pleasant, 6153  
  
Western Australia  
TEL: +61 8 9315 5986  
FAX: +61 8 9364 8569

Emergency telephone : 1800 205 506  
number International: +65 6542 9595 Free call: +800 2537 8747

Issuing date : 11.11.2014

**Section: 2. HAZARDS IDENTIFICATION****Hazard classification**

HIGHLY FLAMMABLE, CORROSIVE

This product is classified as hazardous according to Safe Work Australia. This product is classified as a dangerous good according to national and/or international regulations.

**R-phrase(s)**

Highly flammable.

Harmful by inhalation, in contact with skin and if swallowed.

Causes burns.

Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.

May cause sensitization by skin contact.

**S-phrase(s)**

Keep container in a well-ventilated place.

Keep away from sources of ignition - No smoking.

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Take precautionary measures against static discharges.

Wear suitable protective clothing, gloves and eye/face protection.

# SAFETY DATA SHEET

**CF600CI**

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

## Other hazards which do not result in classification

None known.

## Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture : Mixture

Chemical Name	CAS-No.	Concentration: (%)
Formic Acid	64-18-6	30 - 60
Cinnamaldehyde	104-55-2	10 - 30
Isopropanol	67-63-0	5 - 10
2-Mercaptoethyl Alcohol	60-24-2	1 - 5
Methanol	67-56-1	1 - 5

## Section: 4. FIRST AID MEASURES

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes. Use a mild soap if available. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

If swallowed : Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).

Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

## Section: 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : High volume water jet

Specific hazards during : Fire Hazard



# SAFETY DATA SHEET

**CF600CI**

firefighting	Keep away from heat and sources of ignition. Flash back possible over considerable distance. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
Hazardous combustion products	: Carbon oxides
Special protective equipment for firefighters	: Use personal protective equipment.
Specific extinguishing methods	: Use water spray to cool unopened containers. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Hazchem Code	: ●3WE

## Section: 6. ACCIDENTAL RELEASE MEASURES

INITIAL EMERGENCY RESPONSE GUIDE NO	: 18
Personal precautions, protective equipment and emergency procedures	: Ensure adequate ventilation. Remove all sources of ignition. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	: Do not allow contact with soil, surface or ground water.
Methods and materials for containment and cleaning up	: Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

## Section: 7. HANDLING AND STORAGE

Advice on safe handling	: Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Do not ingest. Keep away from fire, sparks and heated surfaces. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation.
Conditions for safe storage	: Keep away from heat and sources of ignition. Keep in a cool, well-ventilated place. Keep away from oxidizing agents. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
Suitable material	: The following compatibility data is suggested based on similar product data and/or industry experience: HDPE (high density polyethylene), Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, PTFE, Perfluoroelastomer

# SAFETY DATA SHEET

**CF600CI**

Unsuitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Copper, Ethylene propylene, Mild steel, Polypropylene, Polyethylene, Plexiglass, EPDM, Brass, PVC, Buna-N, Polyurethane, Neoprene, Aluminum, Chlorosulfonated polyethylene rubber, Polytetrafluoroethylene/polypropylene copolymer, Fluoroelastomer

## Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Formic Acid	64-18-6	TWA	5 ppm 9.4 mg/m <sup>3</sup>	AU OEL
		VLE	10 ppm 19 mg/m <sup>3</sup>	AU OEL
Formic Acid	64-18-6	WES-STEL	10 ppm 19 mg/m <sup>3</sup>	NZ OEL
		WES-TWA	5 ppm 9.4 mg/m <sup>3</sup>	NZ OEL
Formic Acid	64-18-6	TWA	5 ppm	ACGIH
		STEL	10 ppm	ACGIH
		TWA	5 ppm 9 mg/m <sup>3</sup>	NIOSH REL
		TWA	5 ppm 9 mg/m <sup>3</sup>	OSHA Z1
Isopropanol	67-63-0	TWA	400 ppm 983 mg/m <sup>3</sup>	AU OEL
		VLE	500 ppm 1,230 mg/m <sup>3</sup>	AU OEL
Isopropanol	67-63-0	WES-TWA	400 ppm 983 mg/m <sup>3</sup>	NZ OEL
		WES-STEL	500 ppm 1,230 mg/m <sup>3</sup>	NZ OEL
Isopropanol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m <sup>3</sup>	NIOSH REL
		STEL	500 ppm 1,225 mg/m <sup>3</sup>	NIOSH REL
		TWA	400 ppm 980 mg/m <sup>3</sup>	OSHA Z1
2-Mercaptoethyl Alcohol	60-24-2	TWA	0.2 ppm	WEEL
Methanol	67-56-1	TWA	200 ppm 262 mg/m <sup>3</sup>	AU OEL
		VLE	250 ppm 328 mg/m <sup>3</sup>	AU OEL
Methanol	67-56-1	WES-TWA	200 ppm 262 mg/m <sup>3</sup>	NZ OEL
		WES-STEL	250 ppm 328 mg/m <sup>3</sup>	NZ OEL
Methanol	67-56-1	TWA	200 ppm	ACGIH
		STEL	250 ppm	ACGIH

# SAFETY DATA SHEET

**CF600CI**

		TWA	200 ppm 260 mg/m <sup>3</sup>	NIOSH REL
		STEL	250 ppm 325 mg/m <sup>3</sup>	NIOSH REL
		TWA	200 ppm 260 mg/m <sup>3</sup>	OSHA Z1

Engineering measures : Effective exhaust ventilation system Maintain air concentrations below occupational exposure standards.

## Personal protective equipment

Eye protection : Face-shield

Safety goggles  
Face-shield

Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling. Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

## Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid

Colour : dark brown

Odour : Sharp

Flash point : 13 °C  
Method: ASTM D 93, Pensky-Martens closed cup

pH : 3.1, 5 %

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : 64.4 °C

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

Vapour pressure : 92.5 mm Hg (15.6 °C)

# SAFETY DATA SHEET

**CF600CI**

	118.4 mm Hg (37.7 °C)
Relative vapour density	: 1.11
Relative density	: 1.11 (15.6 °C)
Density	: 9.26 lb/gal
Water solubility	: dispersible
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition temperature	: no data available
Viscosity, dynamic	: no data available
Viscosity, kinematic	: 12 mm <sup>2</sup> /s (40 °C)
VOC	: no data available

## Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: Heat, flames and sparks.
Incompatible materials	: Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Strong Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

## Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

### Potential Health Effects

Eyes	: Causes serious eye damage.
Skin	: Harmful in contact with skin. Causes severe skin burns. May cause allergic skin reaction.
Ingestion	: Harmful if swallowed. Causes digestive tract burns.
Inhalation	: Harmful if inhaled. May cause nose, throat, and lung irritation.
Chronic Exposure	: Health injuries are not known or expected under normal use.

### Experience with human exposure

Eye contact : Redness, Pain, Corrosion

# SAFETY DATA SHEET

**CF600CI**

Skin contact : Redness, Pain, Irritation, Corrosion, Allergic reactions

Ingestion : Corrosion, Abdominal pain

Inhalation : Respiratory irritation, Cough

## **Toxicity**

### **Product**

Acute oral toxicity : no data available

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : Contains no ingredient listed as a carcinogen

Reproductive effects : No toxicity to reproduction

Germ cell mutagenicity : Contains no ingredient listed as a mutagen

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : No aspiration toxicity classification

### **Components**

Acute oral toxicity : Isopropanol  
LD50 rat: 4,710 mg/kg

2-Mercaptoethyl Alcohol  
LD50 rat: 131 mg/kg

### **Components**

Acute inhalation toxicity : Isopropanol  
LC50 rat: 30 mg/l  
Exposure time: 4 h

# SAFETY DATA SHEET

**CF600CI**

2-Mercaptoethyl Alcohol  
LC50 rat: 2 mg/l  
Exposure time: 4 h

## Components

Acute dermal toxicity : Isopropanol  
LD50 rabbit: 12,870 mg/kg

2-Mercaptoethyl Alcohol  
LD50 rabbit: 168 mg/kg

## HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: High

## Section: 12. ECOLOGICAL INFORMATION

### Ecotoxicity

#### Product

Toxicity to fish : no data available

Toxicity to daphnia and other aquatic invertebrates : no data available

Toxicity to algae : no data available

### Components

Toxicity to fish : Formic Acid  
LC50 : > 100 mg/l  
Exposure time: 96 h

Isopropanol  
LC50 Fish: 9,640 mg/l  
Exposure time: 96 h

Methanol  
LC50 : 15,400 mg/l  
Exposure time: 96 h

### Components

Toxicity to daphnia and other aquatic invertebrates : 2-Mercaptoethyl Alcohol  
EC50 : 0.89 mg/l  
Exposure time: 48 h

Methanol  
EC50 : > 10,000 mg/l  
Exposure time: 48 h

### Components

Toxicity to algae : Methanol  
EC50 : 22,000 mg/l  
Exposure time: 72 h

### Components

# SAFETY DATA SHEET

**CF600CI**

Toxicity to bacteria : Methanol  
> 1,000 mg/l

## Components

Toxicity to fish (Chronic toxicity) : Methanol  
NOEC: 7,900 mg/l  
Exposure time: 8.3 d

## Persistence and degradability

The organic portion of this preparation is expected to be inherently biodegradable.

## Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air : <5%  
Water : 10 - 30%  
Soil : 50 - 70%

The portion in water is expected to float on the surface.

## Bioaccumulative potential

Component substances have a low potential to bioconcentrate.

## Other information

no data available

## ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

## Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

## Land transport

Proper shipping name : FLAMMABLE LIQUID, CORROSIVE, N.O.S.

# SAFETY DATA SHEET

**CF600CI**

Technical name(s) : Isopropanol, Formic Acid  
UN/ID No. : UN 2924  
Transport hazard class(es) : 3, 8  
Packing group : II  
IERG No : 18  
Hazchem Code : ●3WE

Special precautions for user : Dangerous goods of Class 3 (Flammable Liquid) Subsidiary Class 8 (Alkali) are incompatible in a placard load with any of the following:  
and are incompatible with food or food packaging in any quantity.  
Class 1 Explosives  
Class 2.1 Flammable gases (where both are in bulk)  
Class 2.3 Poisonous gases  
Class 4.2 Spontaneously combustible substances  
Class 4.3 Dangerous when wet substances  
Class 5.1 Oxidising agents  
Class 5.2 Organic peroxides  
Class 7 Radioactive substances

## Air transport (IATA)

UN/ID No. : UN 2924  
Proper shipping name : FLAMMABLE LIQUID, CORROSIVE, N.O.S.  
Technical name(s) : Isopropanol, Formic Acid  
Transport hazard class(es) : 3, 8  
Packing group : II

## Sea transport (IMDG/IMO)

UN/ID No. : UN 2924  
Proper shipping name : FLAMMABLE LIQUID, CORROSIVE, N.O.S.  
Technical name(s) : Isopropanol, Formic Acid  
Transport hazard class(es) : 3, 8  
Packing group : II

## Section: 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 6  
Scheduling of Medicines and  
Poisons  
INTERNATIONAL CHEMICAL CONTROL LAWS :

### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

This product contains substance(s) which are not in compliance with the Provisions on the Environmental Administration of New Chemical Substances and may require additional review.



# SAFETY DATA SHEET

**CF600CI**

## EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

## JAPAN

This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Existing and New Chemical Substances list (ENCS).

## KOREA

This product contains substance(s) which are not in compliance with the Toxic Chemical Control Law (TCCL) and may require additional review.

## PHILIPPINES

This product contains substance(s) which are not in compliance with the Republic Act 6969 (RA 6969) and may require additional review.

## Section: 16. OTHER INFORMATION

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Revision Date : 11.11.2014  
Version Number : 1.1  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the MSDS.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

info@condorenergy.com.au

**Section: 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : CA370FE

Other means of identification : Not applicable.

Recommended use : IRON CONTROL ADDITIVE

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Australia  
2 Drake Avenue  
Macquarie Park NSW 2113  
Australia  
A.B.N. 59 000 449 990  
TEL: +61 2 8870 8100  
FAX: +61 2 8870 8680

Emergency telephone number : 1800 205 506  
International: +65 6542 9595 Free call: +800 2537 8747

Issuing date : 23.05.2014

**Section: 2. HAZARDS IDENTIFICATION**

**Hazard classification**

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

**R-phrases(s)**

not hazardous

**Other hazards which do not result in classification**

None known.

**Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No.	Concentration: (%)
Ingredients determined not to be hazardous		100

**Section: 4. FIRST AID MEASURES**

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

Contact the Poison's Information Centre (eg Australia 13 1126; New

# SAFETY DATA SHEET

**CA370FE**

Zealand 0800 764 766).

- If inhaled : Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

## **Section: 5. FIREFIGHTING MEASURES**

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

## **Section: 6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

## **Section: 7. HANDLING AND STORAGE**

- Advice on safe handling : Wash hands thoroughly after handling. Use only with adequate ventilation.
- Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
- Suitable material : Keep in properly labelled containers.

# SAFETY DATA SHEET

**CA370FE**

Unsuitable material : not determined

## Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

We are not aware of any national exposure limit.

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Wash face, hands and any exposed skin thoroughly after handling.

## Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : solid

Colour : no data available

Odour : no data available

Flash point : > 100 °C

pH : 5 - 8, Concentration:: 50.00 g/l  
5 %

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : no data available

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

Vapour pressure : no data available

Relative vapour density : no data available

Relative density : no data available

Density : no data available

Water solubility : 153 g/l (25 °C)

# SAFETY DATA SHEET

**CA370FE**

Solubility in other solvents : no data available  
Partition coefficient: n-octanol/water : no data available  
Auto-ignition temperature : no data available  
Thermal decomposition : Carbon oxides  
Viscosity, dynamic : no data available  
Viscosity, kinematic : no data available  
VOC : no data available

## Section: 10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions.  
Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.  
Conditions to avoid : None known.  
Hazardous decomposition products : Carbon oxides

## Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Eye contact, Skin contact

### Potential Health Effects

Eyes : Health injuries are not known or expected under normal use.  
Skin : Health injuries are not known or expected under normal use.  
Ingestion : Health injuries are not known or expected under normal use.  
Inhalation : Health injuries are not known or expected under normal use.  
Chronic Exposure : Health injuries are not known or expected under normal use.

### Experience with human exposure

Eye contact : No symptoms known or expected.  
Skin contact : No symptoms known or expected.  
Ingestion : No symptoms known or expected.  
Inhalation : No symptoms known or expected.

### Toxicity

#### Product

Acute oral toxicity : no data available  
Acute inhalation toxicity : no data available  
Acute dermal toxicity : no data available

## SAFETY DATA SHEET

**CA370FE**

Skin corrosion/irritation	: no data available
Serious eye damage/eye irritation	: no data available
Respiratory or skin sensitization	: no data available
Carcinogenicity	: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
Reproductive effects	: no data available
Germ cell mutagenicity	: no data available
Teratogenicity	: no data available
STOT - single exposure	: no data available
STOT - repeated exposure	: no data available
Aspiration toxicity	: No aspiration toxicity classification

### Section: 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Toxicity to fish	: no data available
Toxicity to daphnia and other aquatic invertebrates	: no data available
Toxicity to algae	: no data available

#### Persistence and degradability

no data available

#### Mobility

no data available

#### Bioaccumulative potential

no data available

#### Other information

no data available

### Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods	: Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.
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# SAFETY DATA SHEET

**CA370FE**

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Sea Transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## Section: 15. REGULATORY INFORMATION

Standard for the Uniform Scheduling of Medicines and Poisons : No poison schedule number allocated  
INTERNATIONAL CHEMICAL CONTROL LAWS :

### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

# SAFETY DATA SHEET

**CA370FE**

## PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## Section: 16. OTHER INFORMATION

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Revision Date : 23.05.2014  
Version Number : 1.0  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the MSDS.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.



**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : CAI200

Other means of identification : Not applicable.

Recommended use : CORROSION INHIBITOR INTENSIFIER

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Condor Energy Services Ltd  
Level 4 / 15 Ogilvie Road  
Mt Pleasant, 6153  
  
Western Australia  
TEL: Ph: +61 8 9315 5986  
FAX: Fax: +61 8 9364 8569

Emergency telephone number : 1800 205 506  
International: +65 6542 9595 Free call: +800 2537 8747

Issuing date : 01.07.2014

**SECTION 2. HAZARDS IDENTIFICATION****Hazard classification**

CORROSIVE

This product is classified as hazardous according to Safe Work Australia. This product is classified as a dangerous good according to national and/or international regulations.

**R-phrase(s)**

Causes burns.

**S-phrase(s)**

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

This material and/or its container must be disposed of as hazardous waste.

**Other hazards which do not result in classification**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No.	Concentration: (%)
Formic Acid	64-18-6	60 - 100

# SAFETY DATA SHEET

**CAI200**

The balance of the substances in this product are not classified as hazardous or are present below hazard cut-off limits

## SECTION 4. FIRST AID MEASURES

- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
- In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes. Use a mild soap if available. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
- If swallowed : Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).  
  
Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

## SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Fire Hazard  
Keep away from heat and sources of ignition.  
Flash back possible over considerable distance.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
- Hazchem Code : 2X

## SECTION 6. ACCIDENTAL RELEASE MEASURES

- INITIAL EMERGENCY RESPONSE GUIDE NO : 36

# SAFETY DATA SHEET

**CAI200**

- Personal precautions, protective equipment and emergency procedures : Ensure adequate ventilation. Remove all sources of ignition. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

## SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Do not ingest. Keep away from fire, sparks and heated surfaces. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation.
- Conditions for safe storage : Keep away from heat and sources of ignition. Keep away from oxidizing agents. Keep away from strong bases. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
- Suitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.
- Unsuitable material : not determined

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Formic Acid	64-18-6	TWA	5 ppm 9.4 mg/m <sup>3</sup>	AU OEL
		VLE	10 ppm 19 mg/m <sup>3</sup>	AU OEL
Formic Acid	64-18-6	WES-STEL	10 ppm 19 mg/m <sup>3</sup>	NZ OEL
		WES-TWA	5 ppm 9.4 mg/m <sup>3</sup>	NZ OEL
Formic Acid	64-18-6	TWA	5 ppm	ACGIH
		STEL	10 ppm	ACGIH
		TWA	5 ppm 9 mg/m <sup>3</sup>	NIOSH REL
		TWA	5 ppm	OSHA Z1

# SAFETY DATA SHEET

**CAI200**

9 mg/m<sup>3</sup>

Engineering measures : Effective exhaust ventilation system. Maintain air concentrations below occupational exposure standards.

## Personal protective equipment

Eye protection : Safety goggles  
Face-shield

Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling. Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid

Colour : Colorless

Odour : Pungent

Flash point : 66.0 °C  
minimum

pH : 1.0, 100 %

Odour Threshold : no data available

Melting point/freezing point : MELTING POINT: -10.0 °C, <

Initial boiling point and boiling range : 107.0 °C Calculated

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

Vapour pressure : 33.0 mm Hg (20.0 °C)

Relative vapour density : no data available

Relative density : no data available

Density : no data available

Water solubility : completely soluble

Solubility in other solvents : no data available

# SAFETY DATA SHEET

**CAI200**

Partition coefficient: n-octanol/water : no data available  
Auto-ignition temperature : no data available  
Thermal decomposition : Carbon oxides  
Viscosity, dynamic : no data available  
Viscosity, kinematic : no data available  
VOC : 85.0 %

## SECTION 10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions.  
Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.  
Conditions to avoid : Heat, flames and sparks.  
Incompatible materials : Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.  
Bases  
Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.  
Hazardous decomposition products : Carbon oxides

## SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

### Potential Health Effects

Eyes : Causes serious eye damage.  
Skin : Causes severe skin burns.  
Ingestion : Causes digestive tract burns.  
Inhalation : Health injuries are not known or expected under normal use.  
Chronic Exposure : Health injuries are not known or expected under normal use.

### Experience with human exposure

Eye contact : Redness, Pain, Corrosion  
Skin contact : Redness, Pain, Corrosion  
Ingestion : Corrosion, Abdominal pain  
Inhalation : Respiratory irritation, Cough

### Toxicity

### Product

## SAFETY DATA SHEET

**CAI200**

Acute oral toxicity	: no data available
Acute inhalation toxicity	: no data available
Acute dermal toxicity	: no data available
Skin corrosion/irritation	: no data available
Serious eye damage/eye irritation	: no data available
Respiratory or skin sensitization	: no data available
Carcinogenicity	: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
Reproductive effects	: No toxicity to reproduction
Germ cell mutagenicity	: Contains no ingredient listed as a mutagen
Teratogenicity	: no data available
STOT - single exposure	: no data available
STOT - repeated exposure	: no data available
Aspiration toxicity	: No aspiration toxicity classification

### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: High  
High

## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Toxicity to fish	: no data available
Toxicity to daphnia and other aquatic invertebrates	: no data available
Toxicity to algae	: no data available

### Components

Toxicity to fish	: Formic Acid LC50 : > 100 mg/l Exposure time: 96 h
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### Persistence and degradability

The organic portion of this preparation is expected to be readily biodegradable.

### Mobility

# SAFETY DATA SHEET

## CAI200

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	:	<5%
Water	:	30 - 50%
Soil	:	50 - 70%

The portion in water is expected to be soluble or dispersible.

### Bioaccumulative potential

This preparation or material is not expected to bioaccumulate.

### Other information

no data available

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate Moderate

## SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## SECTION 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport

Proper shipping name	:	FORMIC ACID SOLUTION
UN/ID No.	:	UN 1779
Transport hazard class(es)	:	8
Packing group	:	II
IERG No	:	36
Hazchem Code	:	2X

Special precautions for user : Dangerous goods of Class 8 (Acids) are incompatible in a placard load with any of the following:  
Class 1 Explosives  
Class 4.3 Dangerous when wet substances  
Class 5.1 Oxidising agents  
Class 5.2 Organic peroxides  
Class 6 Cyanides only  
Class 7 Radioactive substances  
and are incompatible with food or food packaging in any

# SAFETY DATA SHEET

**CAI200**

quantity.

## Air transport (IATA)

UN/ID No. : UN 1779  
Proper shipping name : FORMIC ACID SOLUTION  
Technical name(s) :  
Transport hazard class(es) : 8  
Packing group : II

## Sea Transport (IMDG/IMO)

UN/ID No. : UN 1779  
Proper shipping name : FORMIC ACID SOLUTION  
Technical name(s) :  
Transport hazard class(es) : 8  
Packing group : II

## SECTION 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 5  
Scheduling of Medicines and  
Poisons  
INTERNATIONAL CHEMICAL CONTROL LAWS :

### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## SECTION 16. OTHER INFORMATION



# SAFETY DATA SHEET

**CAI200**

## REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Revision Date : 01.07.2014  
Date of first issue : 10.06.2014  
Version Number : 1.1  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the MSDS.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Email: [info@condorenergy.com.au](mailto:info@condorenergy.com.au)

## **Coil Tubing**



### Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : CF 110HT

Application : Clay Stabiliser

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER: +61 430 138 290 (24 Hours)  
+65 6542 9595

### Section: 2. HAZARDS IDENTIFICATION

#### Hazard classification

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

#### Safety-phrase(s)

Avoid contact with skin and eyes.

#### Other hazards which do not result in classification

None known.

### Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration: (%)
Ethylene Glycol	107-21-1	0.1 - 1

### Section: 4. FIRST AID MEASURES

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

Contact the Poison's Information Centre (eg Australia 13 1126; New

If inhaled : Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**



### Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting. : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.



**Section: 6. ACCIDENTAL RELEASE MEASURES**

Personal precaution protective equipment and emergency procedures	Refer to protective measures listed in sections 7 and 8.
Environmental precautions	Do not allow contact with soil, surface or ground water
Methods and materials for containment and cleaning up	Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway

**Section: 7. HANDLING AND STORAGE**

Advice on safe handling	: Wash hands thoroughly after handling. Use only with adequate ventilation.
Conditions for safe storage	: Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
Packaging material	: Suitable material: Keep in properly labelled containers. Unsuitable material: not determined

**Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Components with workplace control parameters**

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Ethylene Glycol	107-21-1	TWA (Vapour.)	20 ppm 52 mg/m3	AU OEL
		VLE (Vapour.)	40 ppm 104 mg/m3	AU OEL
Ethylene Glycol	107-21-1	WES-Ceiling	50 ppm 127 mg/m3	NZ OEL
Ethylene Glycol	107-21-1	Ceiling	100 mg/m3	ACGIH



Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Wash face, hands and any exposed skin thoroughly after handling.

### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid

Colour : Clear Colorless

Odour : Amine

Flash point : 104.4 °C

pH : 7.0, 100 %

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : 98.9 °C estimated

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

Vapour pressure : 0.00666 kPa (25 °C)similar to water



## CF 110HT

Relative vapour density	: no data available
Relative density	: 1.10 (15.6 °C)
Density	: no data available
Water solubility	: completely soluble
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
VOC	: 0.5 %

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.
Hazardous decomposition products	: Carbon oxides

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure: Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	: Health injuries are not known or expected under normal use.
Skin	: Health injuries are not known or expected under normal use.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.
Chronic Exposure	: Health injuries are not known or expected under normal use.



### Experience with human exposure

Eye contact : No symptoms known or expected

Skin contact : No symptoms known or expected

Ingestion : No symptoms known or expected

Inhalation : No symptoms known or expected

### Toxicity

Acute oral toxicity : no data available

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available





- Carcinogenicity : No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- Reproductive effects : no data available
- Germ cell mutagenicity : no data available
- Teratogenicity : no data available
- STOT - single exposure : no data available
- STOT - repeated exposure : no data available
- Aspiration toxicity : No aspiration toxicity classification

### Components

- Acute inhalation toxicity : Ethylene Glycol LC50  
rat: 2.725 mg/l  
Exposure time: 4 h

### Components

- Acute dermal toxicity : Ethylene Glycol  
LD50 rabbit: 10,600 mg/kg

### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

## Section: 12. ECOLOGICAL INFORMATION

### Ecotoxicity

- Toxicity to fish : no data available
- Toxicity to daphnia and other aquatic invertebrates. no data available
- Toxicity to algae : no data available

### Persistence and degradability

no data available

### Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

- Air : <5%



## CF 110HT

Water : 30 - 50%  
Soil : 50 - 70%

The portion in water is expected to be soluble or dispersible.

### Bioaccumulative potential

This preparation or material is not expected to bioaccumulate.

### Other information

no data available

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

### Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

### Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### Land transport

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Sea Transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION



### Section: 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 6  
Scheduling of Medicines and  
Poisons

INTERNATIONAL CHEMICAL CONTROL LAWS :

TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

This product contains substance(s) which are not in compliance with the European Commission Directive 67/548/EEC and may require additional review.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

### Section: 16. OTHER INFORMATION

REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

# Condor Energy Services – Safety Data Sheet

## CF 110HT



Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet

## CF 120HT



### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: CF 120HT  
APPLICATION: BIOCIDE  
IMPORTER IDENTIFICATION: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER(S): +65 6542 9595  
+ 61 430 138 290

### 2. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION : TOXIC, CORROSIVE

This product is classified as hazardous according to the Safe Work Australia. This product is classified as a dangerous good only when transported by air (IATA regulations).

#### RISK PHRASES

R22 - Harmful if swallowed.  
R23 - Toxic by inhalation.  
R34 - Causes burns.  
R42/43 - May cause sensitization by inhalation and skin contact.

#### SAFETY PHRASES

S23 - Do not breathe vapor.  
S24/25 - Avoid contact with skin and eyes.  
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.  
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NO	% (w/w)
Glutaraldehyde	111-30-8	10 - 30
The balance of the substances in this product are not classified as hazardous or are present below hazard cut-off limits		



### 4. FIRST AID MEASURES

#### EYE CONTACT :

PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. If only one eye is affected be sure to use care not to contaminate the other eye with the run-off. Get immediate medical attention.

#### SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated leather articles such as shoes or belts must be discarded.

#### INGESTION :

Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

DO NOT INDUCE VOMITING. Do not give anything to drink. Get immediate medical attention. Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).

#### INHALATION :

Get immediate medical attention. Remove to fresh air. If breathing is difficult, administer oxygen.

#### NOTE TO PHYSICIAN :

As mucosal damage may occur following oral exposure to glutaraldehyde solutions, dilution with limited amounts of fluid is usually appropriate, as long as there are no contraindications. If there are no contraindications, rinse mouth several times with cool water, then have the patient sip cool water to a maximum of 250 mL (for adults).

Contraindications include respiratory distress, altered mental status, severe abdominal pain, nausea or vomiting, inability to swallow (or a refusal to drink) or the patient not protecting their own airway.

### 5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

HAZCHEM CODE : 3Z

#### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. Not flammable or combustible.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

#### SENSITIVITY TO STATIC DISCHARGE :

Not expected to be sensitive to static discharge.



### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Dilute the glutaraldehyde to 5% or less with water. Add sodium bisulfite (2-3 parts by weight per part glutaraldehyde). This will typically reduce the glutaraldehyde concentration to 2 ppm or less in 5 minutes at room temperature. The remaining solution can be disposed of via appropriate means. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Very toxic to aquatic organisms., Prevent material from entering sewers or waterways., If drains, streams, soil or sewers become contaminated, notify local authority.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Discard contaminated shoes, belts and other articles made of leather.

#### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

#### SUITABLE CONSTRUCTION MATERIAL :

PVC, Plexiglass, Perfluoroelastomer, Polytetrafluoroethylene/polypropylene copolymer, HDPE (high density polyethylene), Ethylene propylene, Polypropylene, Polyethylene, Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, Aluminum, Brass

#### UNSUITABLE CONSTRUCTION MATERIAL :

Copper, Mild steel, EPDM, Nylon, Natural rubber, Polyurethane, Chlorosulfonated polyethylene rubber, Fluoroelastomer, Neoprene, PTFE



<b>8.</b>	<b>EXPOSURE CONTROLS/PERSONAL PROTECTION</b>
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### OCCUPATIONAL EXPOSURE LIMITS

The following component(s) have been assigned an exposure standard by Safe Work Australia (Australia) and/or other Agencies:

Country/Source	Substance(s)	Basis	ppm	mg/m <sup>3</sup>
AUSTRALIA	Glutaraldehyde	Peak limit	0.1	0.41
USA	Glutaraldehyde	NIOSH REL/Ceiling	0.2	0.8
		Skin * ACGIH/Ceiling	0.05	

\* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

### MONITORING MEASURES :

A small volume of air is drawn through an absorbant or barrier to trap the substance(s) which can then be desorbed or removed and analyzed as referenced below:

Substance(s)	Method	Analysis	Absorbant
Glutaraldehyde	UK MDHS: 93	High pressure liquid chromatography	

Glass fibre filter treated with Dinitrophenyl hydrazine

### ENGINEERING MEASURES :

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

### PERSONAL PROTECTION RESPIRATORY PROTECTION:

If the occupational exposure limit is likely to be exceeded, an approved respirator must be selected and used in accordance with AS/NZS 1715 and AS/NZS 1716. An organic vapor cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

Impervious gloves Neoprene gloves Nitrile gloves PVC gloves Viton# gloves

### SKIN PROTECTION :

When handling this product, the use of a chemical resistant suit and rubber boots is recommended. A full slicker suit is recommended if gross exposure is possible.

### EYE PROTECTION :

Wear a face shield with chemical splash goggles.





### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

<b>9.</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	Pungent
pH (100 %)	3.1 - 4.5 ASTM E-70
VAPOR PRESSURE	2.13 kPa (20 °C)
VAPOR DENSITY	No data available.
SPECIFIC GRAVITY	1.0605 - 1.0725 (20 °C)
DENSITY	No data available.
SOLUBILITY IN WATER	Complete
VISCOSITY	3.4 cps (20.6 °C) ASTM D-2983
VISCOSITY	2.71 cst (20 °C)
VISCOSITY	1.4 cst (40 °C) ASTM D-445
MELTING POINT	-4 °C
BOILING POINT	101 °C
FLASH POINT	Not flammable
LOWER EXPLOSION LIMIT	No data available.
UPPER EXPLOSION LIMIT	No data available.
AUTOIGNITION TEMPERATURE	No data available.

Note: These physical properties are typical values for this product and are subject to change.

<b>10.</b>	<b>STABILITY AND REACTIVITY</b>
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### STABILITY :

Stable under normal conditions.

### CONDITIONS TO AVOID

: Extremes of temperature

### INCOMPATIBLE MATERIALS :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Strong Bases Strong acids Contact with these may cause a heat-generating reaction which is not expected to be violent.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon

### HAZARDOUS REACTIONS :

Hazardous polymerization will not occur.



<b>11.</b>	<b>TOXICOLOGICAL INFORMATION</b>
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### OVERVIEW OF HEALTH HAZARDS

#### ACUTE HAZARDS - EYE CONTACT

Corrosive. Will cause eye burns and permanent tissue damage. Vapors can cause watering of the eyes.

#### ACUTE HAZARDS - SKIN CONTACT

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Contact may cause staining.

#### ACUTE HAZARDS - INGESTION

Not a likely route of exposure. Harmful if swallowed. Corrosive; causes chemical burns to the mouth, throat and stomach. Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

#### ACUTE HAZARDS - INHALATION

Toxic by inhalation. Irritating to the eyes, nose, throat and lungs. Inhalation of product mist or vapors may cause respiratory allergy.

#### CHRONIC HAZARDS :

No adverse effects expected other than those mentioned above.

### SUMMARY OF TOXICITY INFORMATION

#### ACUTE TOXICITY DATA :

The following results are for the active components.

#### ACUTE ORAL TOXICITY :

Species:	Rat
LD50:	1.87 mg/kg
Test Descriptor:	25% Active Ingredient Glutaraldehyde
Species:	Rat
LD50:	1.07 - 1.62 ml/kg
Test Descriptor:	10% Active Ingredient

#### ACUTE DERMAL TOXICITY :

Species:	Rabbit
LD50:	8.0-12.8 ml/kg
Test Descriptor:	25% Active Ingredient Glutaraldehyde

#### ACUTE INHALATION TOXICITY :

Species:	Rat
LC50:	20.4 mg/L (4 hrs)
Test Descriptor:	Glutaraldehyde



### SENSITIZATION :

Levels of greater than 0.2% of glutaraldehyde produced allergic contact dermatitis in human studies. May cause sensitization by inhalation and skin contact.

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

### TERATOGENICITY AND EMBRYOTOXICITY :

Doses of 25 and 50 mg/kg given by gavage to pregnant rats produced decreases in maternal body weight. There were no other indications of maternal toxicity nor was there evidence of fetotoxicity or external, visceral or skeletal abnormalities. Mice (CD-1 strain) given 100 mg/kg by gavage showed fetotoxicity as evidenced by decreased body weight. At lower doses, there was no evidence of fetotoxicity or skeletal abnormalities. No evidence of teratogenic effects were noted in either species.

### MUTAGENICITY :

Mutagenicity in vitro tests of Chinese hamster ovary, sister chromatid exchange and unscheduled DNA synthesis did not produce dose-related responses. Oral doses of 30 and 60 mg/kg to mice showed no effect in the dominant lethal assay. In all five strains of Salmonella, with and without metabolic activation by S9 liver homogenate, no mutagenic response was noted.

For additional information on the hazard of the preparation, please consult section 2 and 12.

### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: High

<b>12.</b>	<b>ECOLOGICAL INFORMATION</b>
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### ECOTOXICOLOGICAL EFFECTS :

The following results are for the active

components. Acute Fish Results :

Species	Exposure	Test Type	Value	Test Descriptor
Rainbow Trout	96 hrs	LC50	42.1 mg/l	25% Active Ingredient ( Glutaraldehyde )
Bluegill Sunfish	96 hrs	LC50	37.6 mg/l	25% Active Ingredient ( Glutaraldehyde )

### ACUTE INVERTEBRATE RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Daphnia magna	48 hrs	LC50	16.9 mg/l	25% Active Ingredient ( Glutaraldehyde )



### AQUATIC MICROORGANISM RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Sewage Microorganisms	96 hrs	LC50	17 mg/l	25% Active Ingredient ( Glutaraldehyde )
Sewage Microorganisms	96 hrs	NOEC	5 mg/l	25% Active Ingredient ( Glutaraldehyde )

### AVIAN RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Mallard Duck		LD50	1,631 mg/kg	25% Active Ingredient
Mallard Duck		LD50	933 mg/kg	50% Active Ingredient

### MOBILITY AND BIOACCUMULATION POTENTIAL :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible. This preparation or material is not expected to bioaccumulate.

### PERSISTENCY AND DEGRADATION :

The organic portion of this preparation is expected to be readily biodegradable.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: High

## 13. DISPOSAL CONSIDERATIONS

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

Empty drums should be taken for recycling, recovery, or disposal through a suitably qualified or licensed contractor.



SPECIAL PRECAUTIONS FOR LANDFILL OR INCINERATION :  
No additional special precautions have been identified.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

#### LAND TRANSPORT

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III  
HAZCHEM CODE : 3Z  
SPECIAL PRECAUTIONS FOR USER : Dangerous goods of Class 9 (Miscellaneous - not fire risk substance, not combustible liquid) are incompatible in a placard load with any of the following:  
Class 1 Explosives

#### AIR TRANSPORT (ICAO/IATA)

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III

#### MARINE TRANSPORT (IMDG/IMO)

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Technical Name(s) : Glutaraldehyde  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III  
EmS-Nr. : F-A, S-F  
\*Marine Pollutant : Glutaraldehyde



<b>15.</b>	<b>REGULATORY INFORMATION</b>
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### AUSTRALIA :

#### NICNAS

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

SUSDP SCHEDULE : S6

<b>16.</b>	<b>OTHER INFORMATION</b>
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This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0

# Condor Energy Services – Safety Data Sheet



## CF 200

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 200**

APPLICATION: Friction Reducer

IMPORTER IDENTIFICATION: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

EMERGENCY TELEPHONE NUMBER(S): +61 430 138 290 (24 Hours)  
+65 6542 9595

### 2. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION :

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

SAFETY PHRASES

S24/25 - Avoid contact with skin and eyes.

S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NO	% (w/w)
Ingredients determined not to be hazardous		100



## CF 200

### 4. FIRST AID MEASURES

#### EYE CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

#### SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

#### INGESTION :

DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

#### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

### 5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

#### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

#### SENSITIVITY TO STATIC DISCHARGE :

Not expected to be sensitive to static discharge.

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).





## CF 200

### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

## 7. HANDLING AND STORAGE

### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep the containers closed when not in use. Ensure all containers are labeled.

### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

### SUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Neoprene, Viton, Buna-N, Polypropylene, Polyethylene, Polyurethane, EPDM, Epoxy phenolic resin, HDPE (high density polyethylene), PVC

### UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Hypalon, Mild steel

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS

None of the components have been assigned an exposure standard by Safe Work Australia (Australia) or EPA (New Zealand).

### ENGINEERING MEASURES :

General ventilation is recommended.

### PERSONAL PROTECTION

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

#### HAND PROTECTION :

NEOPRENE, NITRILE, OR PVC GLOVES Breakthrough time not determined as preparation, consult PPE manufacturers.

#### SKIN PROTECTION :

Wear standard protective clothing.

#### EYE PROTECTION :

Wear safety glasses with side-shields.

#### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

#### ENVIRONMENTAL EXPOSURE CONTROL PRECAUTIONS :

Consider the provision of containment around storage vessels.



## CF 200

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Milky White
ODOR	Mild
pH	No data available.
VAPOR PRESSURE	No data available.
VAPOR DENSITY	No data available.
SPECIFIC GRAVITY	1.198 - 1.225 (23.88 °C)
DENSITY	No data available.
SOLUBILITY IN WATER	Complete
OCTANOL/WATER COEFFICIENT (log Kow)	-0.9 Product (estimated) OECD 117
MELTING POINT	No data available.
BOILING POINT	No data available.
FLASH POINT	Not flammable
LOWER EXPLOSION LIMIT	No data available.
UPPER EXPLOSION LIMIT	No data available.
AUTOIGNITION TEMPERATURE	No data available.

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

#### STABILITY :

Stable under normal conditions.

#### CONDITIONS TO AVOID

: Extremes of temperature

#### INCOMPATIBLE MATERIALS :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. SO<sub>2</sub> may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

#### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

#### HAZARDOUS REACTIONS :

Hazardous polymerization will not occur.

### 11. TOXICOLOGICAL INFORMATION

#### OVERVIEW OF HEALTH HAZARDS

##### ACUTE HAZARDS - EYE CONTACT

May cause irritation with prolonged contact.

##### ACUTE HAZARDS - SKIN CONTACT

May cause irritation with prolonged contact.

# Condor Energy Services – Safety Data Sheet



## CF 200

### ACUTE HAZARDS - INGESTION

Not a likely route of exposure. No adverse effects expected.

### ACUTE HAZARDS - INHALATION

Not a likely route of exposure. No adverse effects expected.

### CHRONIC HAZARDS :

No adverse effects expected other than those mentioned above.

### SUMMARY OF TOXICITY INFORMATION

#### ACUTE TOXICITY DATA :

No toxicity studies have been conducted on this product.

#### SENSITIZATION :

This product is not expected to be a sensitizer.

#### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

For additional information on the hazard of the preparation, please consult section 2 and 12.

#### HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

<b>12.</b>	<b>ECOLOGICAL INFORMATION</b>
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#### ECOTOXICOLOGICAL EFFECTS:

The following results are for the product.

#### AQUATIC PLANT RESULTS :

Species	Exposure	Test Type	Value	Test Descriptor
Marine Algae (Skeletonema costatum)	72 hrs	LC50	165.54 mg/l	Product
Marine Algae (Skeletonema costatum)	72 hrs	NOEC	10 mg/l	Product

#### MOBILITY AND BIOACCUMULATION POTENTIAL :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

# Condor Energy Services – Safety Data Sheet



## CF 200

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	70 - 90%

The portion in water is expected to be soluble or dispersible.

This preparation or material is not expected to bioaccumulate.

### PERSISTENCY AND DEGRADATION :

The organic portion of this preparation is expected to be inherently biodegradable.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

## 13. DISPOSAL CONSIDERATIONS

Dispose of wastes in an approved waste treatment / disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage.

Triple rinse (or equivalent) all containers and offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

### LAND TRANSPORT

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### AIR TRANSPORT (ICAO/IATA)

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### MARINE TRANSPORT (IMDG/IMO)

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## 15. REGULATORY INFORMATION

### AUSTRALIA :

#### NICNAS

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

#### SUSDP SCHEDULE :

Not Listed

Ver 1.0

27 March 2014

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<b>16. OTHER INFORMATION</b>
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This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By: Condor Energy HSEQ Department  
Date issued: 27 March 2014  
Version Number: 1.0



## CF 110SC

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **CF 110 SC**

APPLICATION **SCALE INHIBITOR**

IMPORTER: Condor Energy Services Ltd  
Level 4, 15 Ogilvie Road  
Applecross WA 6153  
Australia  
+61 8 9315 5986

**EMERGENCY TELEPHONE NUMBER:** +61 430 138 290 (24 Hours)  
+65 6542 9595

#### NFPA 704M/HMIS RATING

HEALTH: 0/0 FLAMMABILITY: 1/1 INSTABILITY: 0/0 OTHER: \*  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

Not flammable or combustible.



## CF 110SC

### PRIMARY ROUTES OF EXPOSURE:

Eye, Skin

### HUMAN HEALTH HAZARDS – ACUTE:

#### EYE CONTACT:

No adverse effects expected

#### SKIN CONTACT:

No adverse effects expected

#### INGESTION:

Not a likely route of exposure. No adverse effects expected.

#### INHALATION:

Not a likely route of exposure. No adverse effects expected.

### SYMPTOMS OF EXPOSURE:

#### Acute:

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### Chronic:

A review of available data does not identify any symptoms from exposure not previously mentioned

### HUMAN HEALTH HAZARDS - CHRONIC:

No adverse effects expected other than those mentioned above

## 4. FIRST AID MEASURES

#### EYE CONTACT:

Flush affected area with water. If symptoms develop, seek medical advice.

#### SKIN CONTACT:

Flush affected area with water. If symptoms develop, seek medical advice.

#### INGESTION:

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If vomiting occurs, rinse mouth and repeat administration of water.

#### INHALATION:

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN:

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.



## CF 110SC

### 5. FIRE FIGHTING MEASURES

FLASH POINT: 105 °C (PMCC)

LEL No data available

UEL No data available

AUTOIGNITION Temperature No data available

#### EXTINGUISHING MEDIA:

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

#### FIRE AND EXPLOSION HAZARD:

May evolve oxides of carbon (CO<sub>x</sub>) under fire conditions. May evolve oxides of sulfur (SO<sub>x</sub>) under fire conditions. Not flammable or combustible.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING:

In case of fire, wear a full face positive-pressure self-contained breathing apparatus and protective suit.

#### SENSITIVITY TO MECHANICAL IMPACT:

Not expected to be sensitive to mechanical impact

#### SENSITIVITY TO STATIC DISCHARGE:

Not expected to be sensitive to static discharge.

### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS:

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

#### METHODS FOR CLEANING UP:

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS:

Do not contaminate surface water





## CF 110SC

### 7. HANDLING AND STORAGE

#### HANDLING:

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

#### STORAGE CONDITIONS:

Store in suitable labeled containers. Store the containers tightly closed.

#### SUITABLE CONSTRUCTION MATERIAL:

HDPE (high density polyethylene), Natural rubber, Viton, Polypropylene, Stainless Steel 304, Stainless Steel 316L, PTFE, Epoxyresin coating, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any substance that has an established exposure limit.

#### ENGINEERING MEASURES:

General ventilation is recommended. The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fume hood. Provide mechanical ventilation of confined spaces.

#### RESPIRATORY PROTECTION:

Respiratory protection is not normally needed

#### HAND PROTECTION:

See general advice

#### SKIN PROTECTION:

See general advice.

#### EYE PROTECTION:

Wear safety glasses with side-shields.

#### HYGIENE RECOMMENDATIONS:

Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

#### HUMAN EXPOSURE CHARACTERISATION:

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low



## CF 110SC

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light Yellow
ODOR	No data available
SPECIFIC GRAVITY	1.245 @ 20 °C
SOLUBILITY IN WATER	Complete
pH (100.0 %)	5.3
VISCOSITY	7 cst @ 40 °C
BOILING POINT	212.0 °F / 100.0 °C
VAPOR PRESSURE	no data available
EVAPORATION RATE	no data available
VAPOR DENSITY	no data available
COEFFICIENT OF WATER/OIL DISTRIBUTION	no data available

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

#### STABILITY:

Stable under normal conditions.

#### HAZARDOUS POLYMERIZATION:

Hazardous polymerization will not occur.

#### CONDITIONS TO AVOID:

Heat and sources of ignition including static discharges.

#### MATERIALS TO AVOID:

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

#### HAZARDOUS DECOMPOSITION PRODUCTS:

Under fire conditions: Oxides of carbon, Oxides of sulfur

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

#### SENSITIZATION:

This product is not expected to be a sensitizer.

#### CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).



## CF 110SC

REPRODUCTIVE EFFECTS:  
No quantitative data available.

TERATOGENICITY AND EMBRYOTOXICITY:  
No quantitative data available.

MUTAGENICITY:  
No quantitative data available

OTHER TOXICITY INFORMATION:  
Toxicologically Synergistic Products: None known

HUMAN HAZARD CHARACTERIZATION:  
Based on our hazard characterization, the potential human hazard is: Low

## 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS:  
No toxicity studies have been conducted on this

### MOBILITY:

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30-50%	50-70%

The portion in water is expected to be soluble or dispersible.

### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bio-accumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low



## CF 110SC

### 13. DISPOSAL CONSIDERATIONS

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations.

Do not dispose of wastes in local sewer or with normal garbage.

### 14. TRANSPORT INFORMATION

Product is not regulated during transportation.

### 15. REGULATORY INFORMATION

No data available.

### 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

- The human risk is: Low
- The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information

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Prepared By: Condor Energy HSEQ Department  
Date issued: 18 June 2014  
Version Number: 1.0

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : NALCO® CF10GGC

Other means of identification : Not applicable.

Recommended use : FRACTURING ADDITIVE

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Australia  
2 Drake Avenue  
Macquarie Park NSW 2113  
Australia  
A.B.N. 59 000 449 990  
TEL: +61 2 8870 8100  
FAX: +61 2 8870 8680

Emergency telephone number : 1800 205 506  
International: +65 6542 9595 Free call: +800 2537 8747

Issuing date : 03.08.2014

**SECTION 2. HAZARDS IDENTIFICATION**

**Hazard classification**

Not classified as hazardous according to Safe Work Australia. This product is not classified as a dangerous good according to national or international regulations.

**S-phrase(s)**

This material and/or its container must be disposed of as hazardous waste.

**Other hazards which do not result in classification**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No.	Concentration: (%)
Hydrotreated Light Distillate	64742-47-8	30 - 60
Hexamethylene Glycol	629-11-8	0.1 - 1

The balance of the substances in this product are not classified as hazardous or are present below hazard cut-off limits

**SECTION 4. FIRST AID MEASURES**

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

# SAFETY DATA SHEET

## NALCO® CF10GGC

- If swallowed : Rinse mouth. Get medical attention if symptoms occur.  
Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).
- If inhaled : Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

### SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Not flammable
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8. Wash hands after handling.
- Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

# SAFETY DATA SHEET

**NALCO® CF10GGC**

Suitable material : Keep in properly labelled containers.

Unsuitable material : not determined

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Hydrotreated Light Distillate	64742-47-8	TWA	500 ppm 2,000 mg/m <sup>3</sup>	OSHA Z1
		TWA	200 mg/m <sup>3</sup>	ACGIH
Hexamethylene Glycol	629-11-8	TWA	10 mg/m <sup>3</sup>	WEEL

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : slurry

Colour : Opaque

Odour : Hydrocarbon

Flash point : 76.7 °C  
Method: Pensky-Martens closed cup  
Estimated

pH : no data available

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : 246.1 °C

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Upper explosion limit : no data available

Lower explosion limit : no data available

## SAFETY DATA SHEET

### NALCO® CF10GGC

Vapour pressure	: 0.23 hPa (20 °C)
Relative vapour density	: no data available
Relative density	: 1.020 - 1.090
Density	: no data available
Water solubility	: Emulsifiable
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: 350 mPa.s (22 °C)
Viscosity, kinematic	: 350 mm <sup>2</sup> /s
VOC	: no data available

### SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: None known
Hazardous decomposition products	: Carbon oxides

### SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	: Health injuries are not known or expected under normal use.
Skin	: Health injuries are not known or expected under normal use.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.
Chronic Exposure	: Health injuries are not known or expected under normal use.

#### Experience with human exposure

Eye contact	: No symptoms known or expected.
Skin contact	: No symptoms known or expected.
Ingestion	: No symptoms known or expected.
Inhalation	: No symptoms known or expected.



# SAFETY DATA SHEET

**NALCO® CF10GGC**

## Toxicity

### Product

Acute oral toxicity : no data available

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

### **Components**

Acute oral toxicity : Hydrotreated Light Distillate  
LD50 rat: > 5,000 mg/kg

## HUMAN HAZARD CHARACTERIZATION

Based on our hazard characterization, the potential human hazard is: Low

## SECTION 12. ECOLOGICAL INFORMATION

### **Ecotoxicity**

Environmental Effects : Harmful to aquatic life with long lasting effects.

### Product

Toxicity to fish : no data available

Toxicity to daphnia and other aquatic invertebrates : no data available

Toxicity to algae : no data available

### **Components**

Toxicity to fish : Hydrotreated Light Distillate

# SAFETY DATA SHEET

**NALCO® CF10GGC**

LC50 : > 1,000 mg/l  
Exposure time: 96 h

## Components

Toxicity to daphnia and other aquatic invertebrates : Hydrotreated Light Distillate  
EC50 : > 1,000 mg/l  
Exposure time: 72 h

## Components

Toxicity to algae : Hydrotreated Light Distillate  
EC50 : > 1,000 mg/l  
Exposure time: 48 h

## Components

Toxicity to bacteria : Hydrotreated Light Distillate  
> 1,000 mg/l

## Persistence and degradability

no data available

## Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air : 10 - 30%  
Water : 50 - 70%  
Soil : 10 - 30%

## Bioaccumulative potential

no data available

## Other information

no data available

## ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

## SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## SECTION 14. TRANSPORT INFORMATION

## SAFETY DATA SHEET

**NALCO® CF10GGC**

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport

Proper shipping name : Not Regulated for Transport except by Road in Bulk (Combustible Liquid)  
Special precautions for user : This product is classified as a combustible liquid and is not regulated for transport unless transported in bulk aboard a vehicle at the same time as a Class 3 dangerous goods - in bulk or as packaged goods with an aggregate quantity exceeding 1000 litres. Refer to the Australian Code for the Transport of Dangerous Goods by Road and Rail for specific details.

### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Sea Transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## SECTION 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 5  
Scheduling of Medicines and  
Poisons  
INTERNATIONAL CHEMICAL CONTROL LAWS :

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## SECTION 16. OTHER INFORMATION

REFERENCES

## SAFETY DATA SHEET

### NALCO® CF10GGC

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Revision Date : 03.08.2014  
Date of first issue : 04.08.2014  
Version Number : 1.0  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the MSDS.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.

## **Appendix 5 - Risk Assessment Matrix**

Consequence Rating	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)		
<b>Reputation</b>	Little internal or external attention	Workforce concern Limited community impact and interest Reportable to regulatory authorities	Widespread interest and adverse shareholder interest Lawsuits possible	National media interest Litigation almost certain Negative publicity and share price under pressure	International media interest		
<b>Environment</b>	Minor environmental impacts contained within site	Contamination or damage sufficiently large to impact the environment but without permanent impacts	Limited but non-permanent damage to environment, recoverable within 1 year Repeated or significant breach of regulatory compliance limits	Severe damage requiring extensive measures to restore polluted or damaged environment Repeated significant or a single major breach of regulatory compliance limits	Persistent severe environmental damage extending over a large area Damage can not be fully rehabilitated Duration of harm >5yrs		
<b>Financial</b>	<\$250K	\$250K-\$2.5M	\$2.5M-\$25M	\$25M-\$250M	>\$250M		
<b>Safety</b>	First aid injury	Medical treatment injury	Lost time injury	Severe disability/fatality	Multiple fatalities	<b>LIKELIHOOD OF OCCURENCE</b>	
<b>RISK RATING</b>	H-15	H-10	E-6	E-3	E-1	<ul style="list-style-type: none"> <li>• May occur frequently at site</li> <li>• Expect to occur &gt;2 times per year</li> </ul>	Almost Certain (A)
	M-19	H-14	H-9	E-5	E-2	<ul style="list-style-type: none"> <li>• May occur frequently within the sector</li> <li>• Expect to occur 1-2 times/year</li> </ul>	Likely (B)
	L-22	M-18	H-13	E-8	E-4	<ul style="list-style-type: none"> <li>• May have occurred several times in the past the sector</li> <li>• 25% chance of occurring in one year (occurs in 1-10 yrs)</li> </ul>	Possible (C)
	L-24	L-21	M-17	H-12	E-7	<ul style="list-style-type: none"> <li>• May have happened before within the sector but only on rare occasions.</li> <li>• 50% chance of occurring in one year (occurs in 10-100 years)</li> </ul>	Unlikely (D)
	L-25	L-23	M-20	H-16	H-11	<ul style="list-style-type: none"> <li>• May occur in exceptional circumstances.</li> <li>• 5% chance of occurring in one year (occurs &gt;every 100 years)</li> </ul>	Rare (E)
<b>RISK MANAGEMENT AND RESPONSE REQUIRED</b>							
<b>Extreme</b>	Board immediate action required.						
<b>High</b>	Senior management attention required.						
<b>Moderate</b>	Management responsibility must be specified.						
<b>Low</b>	Manage by routine procedures.						

\*Compliant with AS/NZS ISO 31000:2009: Risk Management – Principles and guidelines