Santos

Harriet Bravo Pipeline Additional Inspection Pigging Operation 2022

Bridging Document to the Varanus Island Hub Operations Environment Plan (EA-60-RI-00186) Rev 9

PROJECT / FACILITY	Varanus Island Hub
REVIEW INTERVAL (MONTHS)	No Review Required
SAFETY CRITICAL DOCUMENT	NO

Rev	**Owner**	**Reviewer/s** *Managerial/Technical/Site*	**Approver**
	Pipeline Integrity Engineer	**Gas Assets, Environment Adviser**	**Production Manager – Gas Assets**
0	Deny Nugraha	Ben Pace	Nathan Vitanza
	Deny Nugraha	BPace	Nathan Vitanza

Any hard copy of this document, other than those identified above, are uncontrolled. Please refer to the Santos Offshore Business Document Management System for the latest revision.

Rev	Rev Date	Author / Editor	Amendment
A	24/05/22	B. Pace/M. Ranaldi	Issued for internal review
B	30/05/22	B. Pace/M. Ranaldi	Issued for internal review
0	31/05/22	B. Pace/M. Ranaldi	Issued to DMIRS

Contents

Appendices

1 Introduction

1.1 Purpose

Santos WA submits this bridging document (BD) under the *Varanus Island Hub Operations Environment Plan* (VI Hub Ops EP) (EA-60-RI-00186), Revision 9, in accordance with the *Petroleum (Submerged Lands) (Environment) Regulations 2012* and *Petroleum Pipelines Act 1969,* for pigging operations on the Harriet Bravo pipeline. Whilst pigging operations are described in Sections 2.4 and 2.5 of the accepted VI Hub Ops EP, the required volume of treated seawater has not been disclosed.

On 4 February 2022 Santos submitted a BD to increase the volume of treated seawater for an inspection pigging campaign (refer *Harriet Bravo Pipeline Pigging Operations 2022* [HB-02-IP-20002]). The BD was subsequently approved by DMIRS on 21 February 2022 (letter ref. EARS-EPBD-102791). The inspection pigging campaign (as detailed in Section 2.1.1 of *Harriet Bravo Pipeline Pigging Operations 2022*) was undertaken between 8 – 11 March 2022. The inspection pigging runs were deemed to be unsuccessful (unusable data) and therefore the inspection pigging activity is proposed to be repeated in July 2022. In addition, the Baker Hughes XC24380 biocide used in the previous pigging activity will be replaced by Baker Hughes XC24359 biocide in the proposed repeated activity.

In accordance with DMIRS' Chemical Disclosure Guideline, this BD has been prepared as there is a greater than 5 % change in volume compared to the accepted EP, and recently approved *Harriet Bravo Pipeline Pigging Operations 2022* BD. The chemicals planned for use are already disclosed in the accepted VI Hub Ops EP.

2 Activity Description

2.1 Activity Details

2.1.1 Inspection Pigging Campaign

An inspection pigging campaign is planned on the 8" Harriet Bravo production pipeline using an intelligent pig and planned to commence on 11 July 2022. As pipeline operational pressure does not allow for significant control for the nominated intelligent pig, a pumping spread is required on the platform to drive the pig(s) using a seawater medium dosed with a corrosion inhibitor. The treated seawater will be pumped into the 8" pipeline to push the cleaning/intelligent pig tools from the pig launcher at the Harriet Bravo platform to the pig receiver at Varanus Island (VI).

As previously described in Section 2.5 of the VI Hub Ops EP, a temporary pumping spread will be mobilised to the Harriet Bravo platform. The pigging medium / flushing liquids will be returned to VI for treatment/injection as per normal process in accordance with the EP.

This inspection pigging campaign of the 8" Harriet Bravo production pipeline will be completed with seawater dosed with Baker Hughes CRW24830 corrosion inhibitor and XC24359 biocide. Both chemicals have been previously disclosed in the current in-force EP. The *Harriet Bravo Pipeline Pigging Operations 2022* BD approves the discharge of 1,440 L of Baker Hughes CRW24830 corrosion inhibitor and XC24380 biocide. This BD seeks approval for the down hole discharge of 1,440 L of Baker Hughes CRW24830 corrosion inhibitor and XC24359 biocide.

There will be no planned discharges of production fluids and/or chemically treated seawater to the marine environment.

2.2 Schedule

2.2.1 Inspection Pigging

The work is scheduled to commence on 11 July 2022, dependent upon a suitable weather window and availability of equipment and personnel, and the intelligent pigging campaign is expected to take approximately 10 days to allow for preparation, pigging runs and pigging data analysis. The treated seawater from the last pig run will remain in the pipeline until production from the Harriet Bravo is restarted. The final flushing activity using production fluids is targeted to be completed by the end of September 2022.

2.3 Location

The Harriet Bravo monopod is situated in Production Licence area TL/1, approximately 4 km from Santos WA's Harriet Alpha platform, 10 km from VI and 80 km from the mainland. Co-ordinates are provided in **Table 2-1** and the location of the monopod is shown in **Figure 2-1**.

Table 2-1: Location of Harriet Bravo Platform

Latitude	Longitude
20° 34' 30.798" S	115° 38' 15.26" E

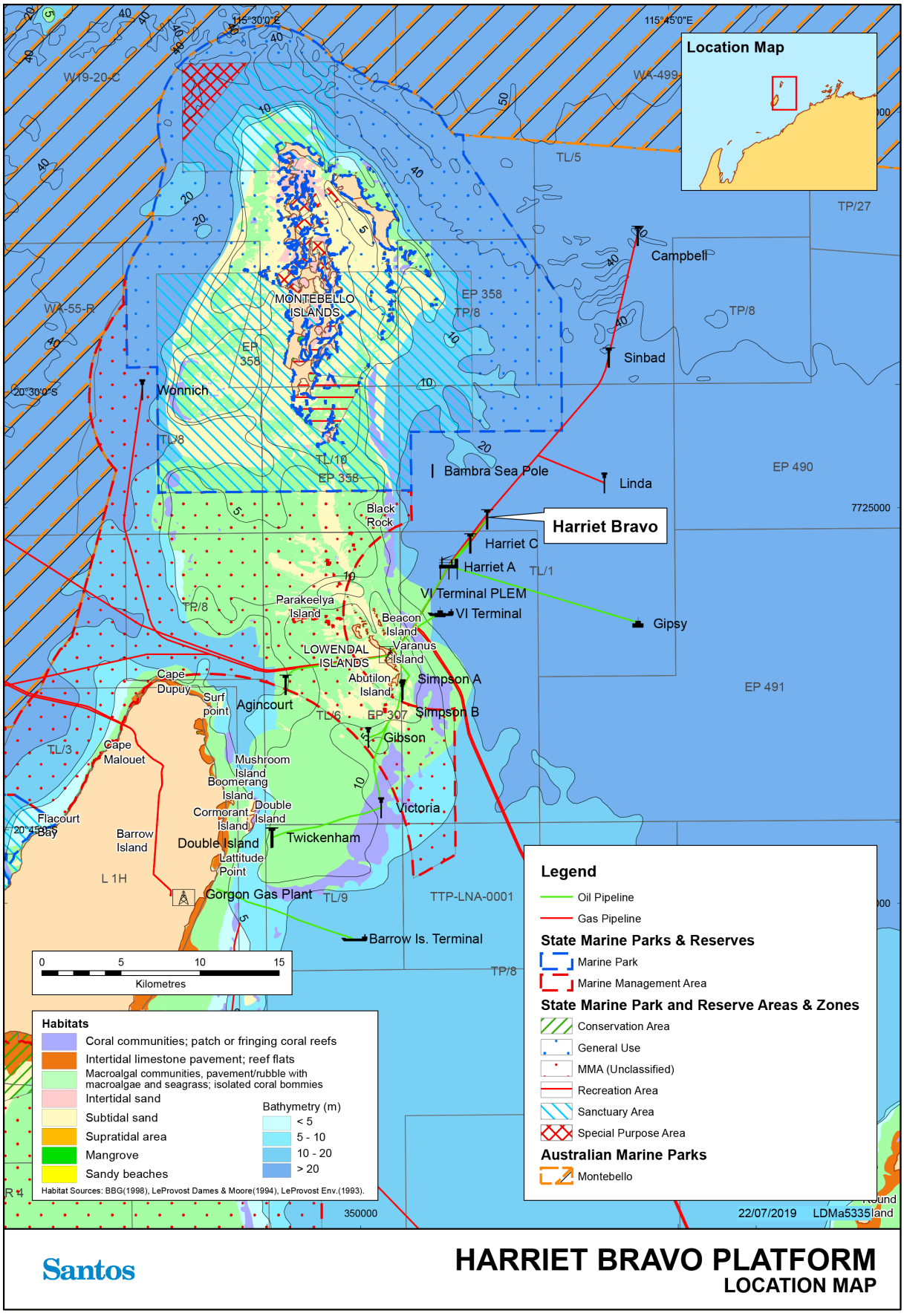

Figure 2-1: Harriet Bravo Platform Location

3 Chemical Disclosure

3.1 Inspection Pigging

Inspection pigging of the 8" Harriet Bravo production pipeline will be completed with seawater dosed with Baker Hughes CRW24830 corrosion inhibitor at 1000 ppm and XC24359 biocide at 1000 ppm. CRW24830 corrosion inhibitor is a mixture of corrosion inhibitor, oxygen scavenger and biocide used to treat seawater for the pipeline flushing/preservation to prevent corrosion and bacterial growth within the pipeline. XC24359 biocide is used to control microbial induced corrosion (MIC) inside the pipeline.

The volume flushed per pig run will be approximately 1.2 times the pipeline volume (1080 m^3), although some contingency has been included in the chemical disclosure in **Appendix A** to allow for multiple pig runs (if required) up to a maximum of 4.8 times the pipeline volume (4320 m^3) (4 Pig Runs). The most recent Safety Data Sheets (SDS) for CRW24830 and XC24359 are included in **Appendix B**.

The proposed volumes of corrosion inhibitors, biocide and water allowed for in this activity are provided in Table 3-1 below (both the proposed 2.4 times pipeline volume, and maximum volumes).

Table 3-1: Proposed and Maximum Volumes

Chemical (pig type)	2.4 x Line Volume (m^3)	4.8 x Line Volume (m^3)
XC24359 (gauge and cleaning plus contingency)	0.72	1.44
CRW24830 (inspection)	0.72	1.44
Seawater	2158	4316
Total (chemicals and seawater)	2160	4320

Upon returning the fluids to VI, the flushing fluid will be co-mingled with produced water fluid in tank T201/202 prior to re-injection down hole (at Tanami and Alkimos disposal wells). Given that the disposal of treated seawater will be into depleted oil/gas reservoirs via injection wells, there are no expected environmental or socio-economic impacts identified for this process. No planned discharges to State waters will occur during this activity. All chemicals have been accurately disclosed in **Appendix A**.

4 Environmental Management

Harriet Bravo pigging activities will be managed under Santos WA's safety management system and the VI Hub Ops EP.

The proposed activities are not considered a significant modification to the operational details described within the VI Hub Ops EP as they pose no significant new risks or significant increase in existing risks.

All chemicals used for the planned pigging/flushing activities for the Harriet Bravo pipeline will be disposed of through the VI production system as outlined in Section 6.8 of the VI Hub Ops EP. There is no planned discharge of production fluids and/or chemically treated seawater to the marine environment.

In the unlikely event that a chemical or hydrocarbon spill occurs during pigging/flushing activities, Santos WA's emergency response procedures are in place to cover such an occurrence. These include:

- Varanus Island Hub Operations Oil Pollution Emergency Plan (OPEP; EA-60-RI-00186.2);
- Varanus Island Hub Incident Response Plan (QE-00-ZF-00044);
- Incident Command and Management Manual (QE-00-ZF-00025.01);
- Varanus Island General Cyclone Procedure (VI-91-IF-10012); and
- Emergency response reported as per the Incident Reporting and Investigation Procedure (QE-91-IF-00002).

5 Stakeholder Consultation

Stakeholders are regularly updated on activities at the VI Hub through Santos WA's Quarterly Consultation Updates. These regular, non-project oriented updates detail Santos WA's ongoing and proposed activities on the north-west shelf, looking out three to six months, including operating facilities. Information provided in this way is intended to afford stakeholders an opportunity to request additional information on specific activities or elements that may be of interest to them, and voice any concerns. Should stakeholders request additional information this can then be incorporated into the relevant documentation, and dialogue with Santos WA can continue should the concerns or issues require further consultation.

No additional consultation was undertaken for this BD as the activity is not significantly different from Santos WA's day to day activities on VI or within the greater VI Hub.

6 Reporting and Recording

DMIRS will be notified of the inspection pigging commencement and cessation dates.

If incidents do occur during the proposed activities, they will be reported to DMIRS under established recording and reporting requirements as documented in the VI Hub Operations EP.

In addition, the volumes of chemicals used, and any exceedances will be reported to DMIRS.

Appendix A: Chemical Disclosure

1. Inspection Pigging Campaign

1 A. SYSTEM DETAILS

OPERATOR:	Santos WA
PROJECT / WELL:	Harriet Bravo
SYSTEM:	Harriet Bravo Pipeline Inspection Pigging and Cleaning
TOTAL VOLUME OF SYSTEM:	4320 m^3

1 B. PRODUCT LIST

Product Name	Supplier	Purpose	Product % Content in System	Toxicity & Ecotoxicity Information	SDS Attached
Water	Locally Sourced	Carrier Fluid	99.9333%	Not appliable as naturally occurring – exempted from chemical disclosure guidelines.	N/A
XC24359	Baker Hughes	Biocide	0.0333%	**Aquatic Mammalian Toxicity** ***Component 1 (60-100%)*** Natural product – exempted under the Chemical Disclosure Guidelines ***Component 2 (10-30%)*** Specie: Rat LD50 (oral): 575 mg/kg ***Component 3 (1-5%)*** Specie: Rat LD50 (oral): 1002 mg/kg **Chronic Toxicity** This product does carry the following H phrase: H361 – Suspected of damaging unborn child. This product does not carry any of the following H phrases for carcinogenic (H350, H351), chronic (H341, H370, H371, H373), mutagenic (H340) reproductive (H360, H362) effects.	Yes

Product Name	Supplier	Purpose	Product % Content in System	Toxicity & Ecotoxicity Information	SDS Attached
				Aquatic Toxicity ***Component 1 (60-100%)*** Natural product – exempted under the Chemical Disclosure Guidelines ***Component 2 (10-30%)*** Specie: *Skeletonema costatum* (marine algae) EC50 (72h): 0.16 mg/L Specie: *Acartia tonsa* (marine invertebrate) LC50 (48h): 0.60 mg/L Specie: *Cyprinodon variegatus* (marine fish) LC50 (96h): 72 mg/L ***Component 3 (1-5%)*** Specie: *Selenastrum capricarnutum* (freshwater algae) EC50 (72h): 0.019 mg/L Specie: *Daphnia magna* (freshwater invertebrate) LC50 (48h): 0.025 mg/L Specie: *Lepomis macrochirus* (freshwater fish) LC50 (96h): 0.059 mg/L **Biodegradation / Bioaccumulation** **Ready Biodegradability Test** ***Component 1 (60-100%)*** Natural product – exempted under the Chemical Disclosure Guidelines ***Component 2 (10-30%)*** Method: USEPA 164-2. Biodegradability 30 days: 67% **Component 3 (1-5%)** Method: Die-away test with radiolabelled. Biodegradability 7 days: > 98% **Octanol/Water Partition Coefficient** ***Component 1 (60-100%)*** Natural product – exempted under the Chemical Disclosure Guidelines ***Component 2 (10-30%)*** Method: OECD 117 (HPLC). Log (Pow): <0	

Product Name	Supplier	Purpose	Product % Content in System	Toxicity & Ecotoxicity Information	SDS Attached
				Component 3 (1-5%) Method: OECD 107 (Shake Flask Method). Log (Pow) 2.45	
CRW24830	Baker Hughes	Corrosive Inhibitor	0.0333%	**Acute Mammalian Toxicity** ***Component 1 (30-60%)*** Natural product – exempted under chemical disclosure guidelines. ***Component 2 (10-30%)*** No scientific data or research is available for this component. An estimate value could not be generated as no suitable read-across data could be sourced in the literature. However, aquatic toxicity data is available for this component in the section below. ***Component 3 (10-30%)*** OSPAR PLONOR Listed ***Component 4 (5-10%)*** Specie Rat (Oral) LD50: 4500 mg/kg ***Component 5 (5-10%)*** Specie Rat (Oral): 426 mg/kg ***Component 6 (5-10%)*** OSPAR PLONOR Listed ***Component 7 (<1%)*** Specie: Rat (Oral) LD50: 6720 mg/kg **Chronic Toxicity** No known carcinogens (Cat 1 & 2), mutagens (Cat 1 & 2) or reproductive hazards (Cat 1, 2 & 3). **Aquatic Toxicity** **Component 1 (30-60%)** Natural product – exempted under chemical disclosure guidelines. ***Component 2 (10-30%)***	Yes

Product Name	Supplier	Purpose	Product % Content in System	Toxicity & Ecotoxicity Information	SDS Attached
				Specie: *Skeletonema costatum* (marine algae) EC50 (72h).: 0.15 mg/L Specie: *Acartia tonsa* (marine invertebrate) LC50 (48h): 1.1 mg/L Specie: *Cyprinodon variegatus* (marine fish) LC50 (96h): >0.1 mg/L ***Component 3 (10-30%)*** OSPAR PLONOR Listed ***Component 4 (5-10%)*** Specie: *Skeletonema costatum* (marine algae) EC50 (48h): 500 – 5000 mg/L Specie: *Daphnia magna* (freshwater invertebrate) LC50 (48h): 2850 mg/L Specie: *Lepomis macrochirus* (freshwater fish) LC50 (96h): 1300 mg/L ***Component 5 (5-10%)*** Specie: Algae: No scientific data or research is available for this component at this trophic level. An estimate value could not be generated as no suitable read-across data could be sourced in the literature. Aquatic toxicity data is available for fish and crustacea. Specie: *Daphnia magna* (freshwater invertebrate) LC50 (48h): 0.08 mg/L Specie: *Pimephales promelas* (freshwater fish) LC50 (96h): 0.66 mg/L ***Component 6 (5-10%)*** OSPAR PLONOR Listed ***Component 7 (<1%)*** Specie: *Chlorella sp.* (freshwater algae) EC50 (48h): >10 mg/L Specie: *Daphnia pulex* (freshwater invertebrate) LC50 (48h): 337 mg/L Specie: *Scophthalmus maximus* (marine fish) LC50 (96h): 423 mg/L **Biodegradation/Bioaccumulation** **Ready Biodegradability Test** ***Component 1 (30-60%)*** Natural product – exempted under chemical disclosure guidelines. ***Component 2 (10-30%)*** Method: OECD 306 Biodegradability 28 days: 39%	

Product Name	Supplier	Purpose	Product % Content in System	Toxicity & Ecotoxicity Information	SDS Attached
				Component 3 (10-30%) OSPAR PLONOR Listed ***Component 4 (5-10%)*** Method: OECD 306 Biodegradability 28 days: 75% ***Component 5 (5-10%)*** No scientific data or research is available for this component. An estimate value could not be generated as no suitable read-across data could be sourced in the literature. ***Component 6 (5-10%)*** OSPAR PLONOR Listed ***Component 7 (<1%)*** No scientific data or research is available for this component. An estimate value could not be generated as no suitable read-across data could be sourced in the literature. **<u>Octanol/Water Partition Coefficient</u>** ***Component 1 (30-60%)*** Natural product – exempted under chemical disclosure guidelines. ***Component 2 (10-30%)*** Not considered bioaccumulative, molecular weight (MW) > 700 ***Component 3 (10-30%)*** OSPAR PLONOR Listed ***Component 4 (5-10%)*** Method: OECD 177 (HPLC) Log (Pow): 0.2 ***Component 5 (5-10%)*** Not applicable to surfactants with surface active properties. ***Component 6 (5-10%)*** OSPAR PLONOR Listed ***Component 7 (<1%)*** Method" OECD 117 (HPLC) Log (Pow): 3.35	
			~100		

1 C. CHEMICAL LIST

Chemical Ingredients within Products in Section 1 B.	CAS Number	Mass Fraction (%)
Water	7732-18-5	99.95933
Tetrakis (hydroxymethyl) phosphonium sulphate (2:1)	55566-30-8	0.01000
Amine, N-Tallow Alkyltrimethylenedi-, ethoxylated	61790-85-0	0.01000
Ammonium bisulphite	10192-30-0	0.01000
2-(2-butoxyethoxy)ethanol)	112-34-5	0.00333
Quaternary ammonium compounds, benzyl-C12-14-alkyldimethyl, chlorides	68424-85-1	0.00333
Ethanediol	107-21-1	0.00333
Tributyltetradecylphosphonium chloride	81741-28-8	0.00033
Fluorescein sodium salt	518-47-8	0.00033
	Total of System	**~100%**

Appendix B: Safety Data Sheets

Safety Data Sheet

CRW24830

1 . Identification of the material and supplier

Product identifier : CRW24830

Product code : CRW24830

ADG : AMINES, LIQUID, CORROSIVE, N.O.S. (contains oxyalkylated amine)

Product type : Liquid.

Identified uses : Hydrotest Corrosion Inhibitor

Supplier's details : Baker Hughes, Australia
5 Walker Street,
Braeside,
Victoria 3195,
Australia

Tel: +613 9580 9004
Fax: +613 9580 6004

Emergency telephone number : CHEMTREC Emergency Telephone Numbers (Australasia Geomarket):
- Australia: (02) 9037 2994
- New Zealand: 9801 0034
- PNG: +(61) 2 9037 2994

- UK: +(44) 870-820-0418
- USA: +(1) 703-527-3887 (CHEMTREC International 24 hour)

2 . Hazards identification

Classification of the substance or mixture : ACUTE TOXICITY (oral) - Category 4
SKIN CORROSION/IRRITATION - Category 1B
ACUTE AQUATIC HAZARD - Category 1
LONG-TERM AQUATIC HAZARD - Category 2

GHS label elements

Hazard pictograms :

Signal word : DANGER

Hazard statements : H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H400 - Very toxic to aquatic life.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention : Wear protective gloves: > 8 hours (breakthrough time): Rubber gloves.. Wear eye or face protection. Wear protective clothing. Avoid release to the environment.

Response : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call a POISON CENTER or physician. IF IN EYES: Immediately call a POISON CENTER or physician.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

2 . Hazards identification

Precautionary statements (Code) : P280, P273, P304 + P340 + P310, P301 + P310 + P331, P303 + P361 + P353 + P310, P305 + P310, P405, P501

Supplemental label elements : Not applicable.

Other hazards which do not result in classification : None known.

3 . Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% (w/w)	CAS number
Amines, N-tallow alkyltrimethylenedi-, ethoxylated	10 - 30	61790-85-0
ammonium hydrogensulphite	10 - 30	10192-30-0
2-(2-butoxyethoxy)ethanol	5 - 10	112-34-5
Quaternary ammonium compounds, benzyl-C12-14-alkyldimethyl, chlorides	5 - 10	.68424-85-1 (outside EU)
ethanediol	5 - 10	107-21-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

4 . First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Get medical attention immediately. Call a poison center or physician. Wash affected area with soap and mild detergent for at least 20 - 60 minutes. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Call a poison center or physician. Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes severe burns.

Ingestion : Harmful if swallowed.

4 . First aid measures

Over-exposure signs/symptoms

Eye contact : pain,watering,redness

Inhalation : No specific data.

Skin contact : pain or irritation,redness,blistering may occur

Ingestion : stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

5 . Firefighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Hazardous thermal decomposition products : carbon dioxide,carbon monoxide,nitrogen oxides,sulfur oxides

Hazchem code : 2X

6 . Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6 . Accidental release measures

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and material for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7 . Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

The information in this section contains generic advice and guidance. Information is provided based on typical anticipated uses of the product. Additional measures might be required for bulk handling or other uses that could significantly increase worker exposure or environmental releases.

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
2-(2-butoxyethoxy)ethanol	**ACGIH TLV (United States, 3/2016).** TWA: 10 ppm 8 hours. Form: Inhalable fraction and vapor
ethanediol	**Safe Work Australia (Australia, 1/2014). Absorbed through skin.** TWA: 10 mg/m³ 8 hours. Form: Particulate STEL: 104 mg/m³ 15 minutes. Form: Vapour

8 . Exposure controls/personal protection

	TWA: 52 mg/m³ 8 hours. Form: Vapour TWA: 20 ppm 8 hours. Form: Vapour STEL: 40 ppm 15 minutes. Form: Vapour

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. Recommended: > 8 hours (breakthrough time): Rubber gloves.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

9 . Physical and chemical properties

Appearance

Physical state : Liquid.

Colour : Brown. With yellow/green tinge.

Odour : Mild.

Odour threshold : Not available.

pH : 5 to 7 [Conc. (% w/w): 100%]

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

9 . Physical and chemical properties

Lower and upper explosive (flammable) limits : Not available.

Vapour pressure : Not available.

Vapour density : Not available.

Relative density : 1.08 (20°C)

Solubility : Easily soluble in the following materials: cold water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

10 . Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Not available.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-(2-butoxyethoxy)ethanol	LD50 Dermal	Rabbit	2700 mg/kg	-
	LD50 Oral	Rat	4500 mg/kg	-
Quaternary ammonium compounds, benzyl-C12-14-alkyldimethyl, chlorides	LD50 Oral	Rat	426 mg/kg	-
ethanediol	LC50 Inhalation Vapour	Rat	>2.5 mg/l	6 hours
	LD50 Dermal	Mouse	>3500 mg/kg	-

Conclusion/Summary : May be harmful if ingested. Can cause target organ damage.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
2-(2-butoxyethoxy)ethanol	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Eyes - Severe irritant	Rabbit	-	20 milligrams	-
Quaternary ammonium compounds, benzyl-C12-14-alkyldimethyl, chlorides	Skin - Severe irritant	Rabbit	-	25 milligrams	-
ethanediol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	1 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	6 hours 1440 milligrams	-
	Skin - Mild irritant	Rabbit	-	555 milligrams	-

Conclusion/Summary

Skin : Causes pain and burns in contact with skin. May cause permanent skin damage.

11 . Toxicological information

Eyes : Risk of serious damage to eyes. May cause eye burns and permanent eye injury.

Respiratory : No known significant effects or critical hazards.

Sensitisation

Conclusion/Summary

Skin : No known significant effects or critical hazards.

Respiratory : No known significant effects or critical hazards.

Mutagenicity

Conclusion/Summary : No known significant effects or critical hazards.

Carcinogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Reproductive toxicity

Conclusion/Summary : No known significant effects or critical hazards.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Not available.			

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Not available.			

Aspiration hazard

Name	Result
Not available.	

Information on likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes severe burns.

Ingestion : Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : pain,watering,redness

Inhalation : No specific data.

Skin contact : pain or irritation,redness,blistering may occur

Ingestion : stomach pains

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

11 . Toxicological information

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Toxicity : Very toxic to aquatic organisms. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Product/ingredient name	Result	Species	Exposure
Amines, N-tallow alkyltrimethylenedi-, ethoxylated	Acute LC50 2723 mg/l Marine water	Crustaceans - Corophium Volutator	10 days
2-(2-butoxyethoxy)ethanol	Acute LC50 1300000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
ethanediol; ethylene glycol	Acute EC50 6500 to 13000 mg/l Fresh water	Algae	72 hours
	Acute EC50 >100 mg/l Fresh water	Daphnia	48 hours
	Acute LC50 >100000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 10000000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 72860 mg/l Fresh water	Fish	96 hours
	Acute LC50 10000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Quaternary ammonium compounds, benzyl-C12-14-alkyldimethyl, chlorides	-	-	Readily
ethanediol; ethylene glycol	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
2-(2-butoxyethoxy)ethanol	1	-	low
ethanediol	-1.36	-	low

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Disposal methods : Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Transport hazard class(es)	PG*	Label
ADR/RID	UN2735	AMINES, LIQUID, CORROSIVE, N.O.S. (contains oxyalkylated amine)	8	III	
ADG	UN2735	AMINES, LIQUID, CORROSIVE, N.O.S. (contains oxyalkylated amine)	8	III	
IMDG	UN2735	AMINES, LIQUID, CORROSIVE, N.O.S. (contains oxyalkylated amine)	8	III	
IATA	UN2735	AMINES, LIQUID, CORROSIVE, N.O.S. (contains oxyalkylated amine)	8	III	

PG* : Packing group

Regulatory information	Environmental hazards	Additional information**
ADR/RID Class	Yes.	The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg. **Hazchem code** 2X
ADG Class	No.	**Hazchem code** 2X
IMDG Class	Yes.	-
IATA Class	No.	-

Additional information**: A • in the Hazchem code indicates that Alcohol Resistant Foam is the preferred extinguishing medium. If not available, use the extinguishing medium indicated by the number in the Hazchem code.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of Marpol and the IBC Code : Not available.

15 . Regulatory information

Standard Uniform Schedule of Medicine and Poisons

5

Model Work Health and Safety Regulations - Scheduled Substances

Australia inventory (AICS) : All components are listed or exempted.

15 . Regulatory information

References : **National Code of Practice for the Control of Workplace Hazardous Substances. National Code of Practice for the Labelling of Workplace Substances. National Code of Practice for the Preparation of Material Safety Data Sheets. Approved Criteria for Classifying Hazardous Substances.**

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

16 . Other information

History

Date of printing : 6 August 2017.

Date of issue/Date of revision : 6 August 2017

Date of previous issue : 13 April 2014

Version : 3

Key to abbreviations : ADG = Australian Dangerous Goods
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NOHSC = National Occupational Health and Safety Commission
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations

Procedure used to derive the classification

Classification	Justification
Acute Tox. 4, H302	Calculation method
Skin Corr. 1B, H314	Calculation method
Aquatic Acute 1, H400	Calculation method
Aquatic Chronic 2, H411	Calculation method

References : Not available.

Indicates information that has changed from previously issued version.

Disclaimer

16 . Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Section 1. Identification

Product identifier : XC24359 BIOCIDE

Product code : XC24359

ADG : -

Product type : Liquid.

Identified uses : Biocide.

Supplier's details : Baker Hughes, Australia
631 Karel Avenue,
Jandakot,
Western Australia 6164,
Australia

Tel: 1800 199 059
Fax: 1800 020 115

Emergency telephone number : CHEMTREC Emergency Telephone Numbers (Asia Pacific Region):
- Australia: (02) 9037 2994
- Brunei: +(65)-31581349 (Mandarin/English)
- China: 4001-204937 (Mandarin) *
- Hong Kong: 800-968-793 (Cantonese) *
- Indonesia: 001-803-017-9114 (Bahasa Indonesian) *
- Japan: +(81)-345209637 (Japanese)
- Malaysia: 1-800-815-308 (Bahasa Malay) *
- New Zealand: 9801 0034
- Philippines: 1-800-1-116-1020 (Tagalog) *
- PNG: +(61) 2 9037 2994
- Singapore: 800-101-2201 (Mandarin) *
- South Korea: 00-308-13-2549 (Korean) *
- Taiwan: 00801-14-8954 (Mandarin) *
- Thailand: 001-800-13-203-9987 (Thai) *
- Vietnam: +(84)-838012436 (Vietnamese)

- UK: +(44) 870-820-0418
- USA: +(1) 703-527-3887 (CHEMTREC International 24 hour)

* Number can only be dialled in-country

Section 2. Hazard(s) identification

Classification of the substance or mixture : ACUTE TOXICITY (oral) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1
SKIN SENSITISATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE - Category 2

GHS label elements

Hazard pictograms :

GHS05 GHS08 GHS07

Signal word : DANGER

Hazard statements : H302 - Harmful if swallowed.
H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H318 - Causes serious eye damage.
H373 - May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Section 2. Hazard(s) identification

Prevention : Wear protective gloves: > 8 hours (breakthrough time): Nitrile gloves. Neoprene gloves.. Wear eye or face protection. Do not breathe vapour. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.

Response : Get medical attention if you feel unwell. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Precautionary statements (Code) : P280, P260, P301 + P312, P305 + P310, P501

Supplemental label elements : Not applicable.

Other hazards which do not result in classification : None known.

Section 3. Composition and ingredient information

Substance/mixture : Mixture

Ingredient name	% (w/w)	CAS number
tetrakis(hydroxymethyl)phosphonium sulphate(2:1)	10 - 30	55566-30-8
tributyltetradecylphosphonium chloride	0 - 1	81741-28-8

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Skin contact : Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.

Section 4. First aid measures

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation. May cause an allergic skin reaction.

Ingestion : Harmful if swallowed.

Over-exposure signs/symptoms

Eye contact : pain,watering,redness

Inhalation : No specific data.

Skin contact : pain or irritation,redness,blistering may occur

Ingestion : stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Firefighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Hazardous thermal decomposition products : carbon dioxide,carbon monoxide,sulfur oxides,phosphorus oxides,halogenated compounds

Hazchem code : -

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Section 6. Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls and personal protection

The information in this section contains generic advice and guidance. Information is provided based on typical anticipated uses of the product. Additional measures might be required for bulk handling or other uses that could significantly increase worker exposure or environmental releases.

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
tetrakis(hydroxymethyl)phosphonium sulphate (2:1)	**ACGIH TLV (United States, 3/2019). Skin sensitiser.** TWA: 2 mg/m³ 8 hours.

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls and personal protection

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Recommended: > 8 hours (breakthrough time): Nitrile gloves. Neoprene gloves.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Clear.]

Colour : Colourless.

Odour : Moderate.

Odour threshold : Not available.

pH : 3.4 [Conc. (% w/w): 100%]

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapour pressure : Not available.

Vapour density : Not available.

Relative density : 1.065 (20°C)

Solubility : Easily soluble in the following materials: cold water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Reactive or incompatible with the following materials: alkalis.

Section 10. Stability and reactivity

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
tetrakis(hydroxymethyl) phosphonium sulphate(2:1)	LC50 Inhalation Dusts and mists	Rat	0.591 mg/l @ 75% THPS (Aqueous solution)	4 hours
	LD50 Dermal	Rat	>2000 mg/kg (75% solution)	-
	LD50 Oral	Rat	575 mg/kg (75% solution)	-

Conclusion/Summary : May be harmful if ingested. Can cause target organ damage.

Irritation/Corrosion

Skin : May cause skin irritation.

Eyes : Risk of serious damage to eyes. May cause eye burns and permanent eye injury.

Respiratory : No known significant effects or critical hazards.

Sensitisation

Skin : May cause sensitisation by skin contact. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Respiratory : No known significant effects or critical hazards.

Mutagenicity

Conclusion/Summary : No known significant effects or critical hazards.

Carcinogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Reproductive toxicity

Conclusion/Summary : No known significant effects or critical hazards.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Not available.			

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
tetrakis(hydroxymethyl)phosphonium sulphate(2:1)	Category 2	Oral	Not determined

Aspiration hazard

Name	Result
Not available.	

Information on likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation. May cause an allergic skin reaction.

Ingestion : Harmful if swallowed.

Section 11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : pain,watering,redness

No specific data.

Skin contact : pain or irritation,redness,blistering may occur

Ingestion : stomach pains

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity :

Section 12. Ecological information

Toxicity : Toxic to aquatic organisms. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Product/ingredient name	Result	Species	Exposure
tetrakis(hydroxymethyl) phosphonium sulphate(2:1)	Acute EC50 0.66 mg/l	Algae	96 hours
	Acute EC50 15.1 mg/l	Daphnia	48 hours
	Acute LC50 95 mg/l	Fish	96 hours
	Chronic NOEC 0.064 mg/l	Algae	96 hours
	Chronic NOEC 0.032 mg/l	Daphnia	21 days
	Chronic NOEC 1.1 mg/l	Fish	32 days
tributyltetradecylphosphonium chloride	Acute EC50 25.2 ppb Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 58.6 ppb Fresh water	Fish - Lepomis macrochirus	96 hours

Persistence and degradability

Not available.

Product/ingredient name	Test	Result	Dose	Inoculum
tetrakis(hydroxymethyl) phosphonium sulphate(2:1)	-	70 % - Readily - 21 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
tetrakis(hydroxymethyl) phosphonium sulphate(2:1)	-	-	Readily

Section 13. Disposal considerations

Disposal methods : Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Transport hazard class(es)	PG*	Label
ADR/RID	Not regulated.	-	-	-	
ADG	Not regulated.	-	-	-	
IMDG	Not regulated.	-	-	-	
IATA	Not regulated.	-	-	-	

PG* : Packing group

Regulatory information	Environmental hazards	Additional information
ADR/RID Class	No.	**Hazchem code** -
ADG Class	No.	**Hazchem code** -
IMDG Class	No.	-
IATA Class	No.	-

Additional information**: A • in the Hazchem code indicates that Alcohol Resistant Foam is the preferred extinguishing medium. If not available, use the extinguishing medium indicated by the number in the Hazchem code.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Standard for the Uniform Scheduling of Medicines and Poisons

Not regulated.

Model Work Health and Safety Regulations - Scheduled Substances

Australia inventory (AIIC) : All components are listed or exempted.

References : **National Code of Practice for the Control of Workplace Hazardous Substances.**

National Code of Practice for the Labelling of Workplace Substances.
National Code of Practice for the Preparation of Material Safety Data Sheets.
Approved Criteria for Classifying Hazardous Substances.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Section 15. Regulatory information

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Any other relevant information

History

Date of printing : 25 August 2021.

Date of issue/Date of revision : 25 August 2021

Date of previous issue : 29 July 2020

Version : 3

Key to abbreviations : ADG = Australian Dangerous Goods
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations

Procedure used to derive the classification

Classification	Justification
Acute Tox. 4, H302	Calculation method
Skin Irrit. 2, H315	Calculation method
Eye Dam. 1, H318	Calculation method
Skin Sens. 1, H317	Calculation method
STOT RE 2, H373	Calculation method

References : Not available.

Indicates information that has changed from previously issued version.

Disclaimer

This 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. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.