

EA-91-II-10001

Santos

Offshore Division Operations Chemical Approval Procedure

PROJECT / FACILITY	Santos Offshore
REVIEW INTERVAL (MONTHS)	48 Months
SAFETY CRITICAL DOCUMENT	NO

Rev	Owner	Reviewer/s <i>Managerial/Technical/Site</i>	Approver
	HSE Operations Manager	Production Managers – Gas and Oil Assets,	VP Offshore Production Operations
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Rev	Rev Date	Author / Editor	Amendment
4	17.03.21	Melinda Ranaldi	Issued for use
3A	25.01.21	Melinda Ranaldi	New Santos Offshore chemical approval process: update to include the transition from the legacy QE Operations Chemical Introduction & Approval Form to chemical requests within the ChemAlert system. Change in Roles and Responsibilities. Overhaul of the procedure to include new assessment/approval process, addition of chemical register, manifest and placarding and SDS management sections. Reference to the SMS ST10 -Chemical Management Procedure for labelling, storage and handling of chemicals. Document Title changed from Operations Chemical Selection, Evaluation and Approval Procedure to Off shore Division Operations Chemical Approval Procedure.
3	07.07.20	Melinda Ranaldi	Issued for use
2B	29.06.20	Melinda Ranaldi	Replaced ALARP with SFAIRP to align with Santos terminology. Updated exemption list to include domestic cleaning/washing/personal care chemicals. Updated Reference List with new Code of Practices, Regulations and Government departments i.e. DMIRS, AICIS. Updated the MoC process for the introduction of new chemicals. Updated Regulatory requirements
2A	30.05.20	S Moran	Updated to a Santos template, Review comments, References and approve changes
2	22.02.17	Scott Whitehurst	Add Lithium Ion Batteries to scope exclusions (section 2)
1	03.06.16	Scott Whitehurst	Transition to new Quadrant Energy template Remove Armada Claire & Balnaves from scope Move safety, technical and environmental evaluation guidelines to Appendix Edit scope to include products not required for approval Edit approval workflow to accommodate removal of onshore chemist role and ensure field superintendent/PIC/OIM has final approval Edit approval form to reflect new workflow
0	20.05.14	Scott Whitehurst	New document created – separated from the CMC procedure. Now includes technical and environmental evaluation and approval process.

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1 PURPOSE

To ensure all chemicals (hazardous and non-hazardous) to be used at any Santos Offshore Division operating facility are approved for use prior to procurement and/or mobilisation to site. The offshore chemical approval process ensures health, safety and environmental risks are identified and controlled during use, storage and handling of the product.

Least hazardous chemicals are preferentially selected for use thereby minimising and/or eliminating potential health, safety and environmental impacts.

2 SCOPE

This procedure applies to chemicals procured by Santos Offshore Division and chemicals brought to Santos Offshore Facilities by contractors. This procedure applies to the following chemical substances:

- + Production chemicals
- + Chemicals used in flushing, cleaning and preservation of process equipment and pipelines
- + Utility treatment chemical.
- + Laboratory solvents and reagents
- + Paints, adhesives and protective coatings
- + Lube oils
- + Compressed gases
- + Lead acid batteries.

Under the model *Work Health and Safety Regulations*, consumer products are exempt from requiring an SDS or to be listed on a Hazardous Chemicals Register. Consumer products are defined as chemicals used in the workplace in quantities and methods consistent with household use. Therefore, the following chemicals are **not** included in this procedure and do not require approval prior to procurement and/or mobilisation to site:

- + Medical, hospital and personal care supplies
- + Stationary items
- + Lithium Ion & Alkaline batteries
- + Sunscreen and topical insect repellent products
- + Domestic cleaning and washing chemicals in consumer quantities < 30 kg.

This procedure does not cover:

- + Requirements for chemicals produced by Santos and safe storage and handling of chemicals. Refer to the SMS Risk Management ST10 – Chemical Management Procedure Sections 1.1 and 1.4 only for Santos as a Producer of Chemicals and Safe Storage and Use of Chemicals, respectively. **The remaining sections of ST10 are not applicable to the Offshore Division.**
- + The 'how-to-use' of the ChemAlert database and detailed chemical request process. The ChemAlert User Guide can be found under the help module of the ChemAlert database and the ChemAlert Chemical Request Process Training Modules can be found on SuccessFactors or requested from the Senior Chemical Management Adviser.
- + Transportation requirements for Dangerous Goods – this should be undertaken in accordance with the *Australian Code for Transportation of Dangerous Goods by Road and Rail (ADG Code)*, *International Air Transport Association (IATA) Regulations/Codes*, *International Maritime Dangerous Goods (IMDG) Code* and/or any Australian Maritime Safety Authority (AMSA)/port notification requirements for offshore.

- + All drilling activity related chemical selection and approvals are to be managed in accordance with procedure EA-91-II-00007 Offshore Division Drilling Chemical Selection and Approval Process.

Please Note: The risk assessment function within ChemAlert does not replace the requirement to adhere to this procedure.

3 REFERENCES

SOURCE	DOCUMENT
https://www.ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code	Australian Code for Transportation of Dangerous Goods by Road and Rail
https://www.dmp.wa.gov.au/Documents/Environment/ENV-PEB-177.pdf	DMIRS Guidance for the Development of Petroleum and Geothermal Environmental Plans in Western Australia (September 2016)
https://unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev08/ST-SG-AC10-30-Rev8e.pdf	Globally Harmonized System of Classification and Labelling Chemicals (GHS) Eighth revised edition. United Nations (2019)
https://www.iata.org/en/publications/dgr/	IATA Dangerous Goods Regulations
https://www.imo.org	International Maritime Dangerous Goods Code
https://www.safeworkaustralia.gov.au/doc/model-code-practice-labelling-workplace-hazardous-chemicals	Model Code of Practice: Labelling of Workplace Hazardous Chemicals (July 2020)
https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-hazardous-chemicals-workplace	Model Code of Practice: Managing Risks of Hazardous Chemicals in the Workplace (July 2020)
https://www.safeworkaustralia.gov.au/doc/model-code-practice-preparation-safety-data-sheets-hazardous-chemicals	Model Code of Practice: Preparation of safety data sheets for hazardous chemicals (July 2020)
https://www.safeworkaustralia.gov.au/collection/model-work-health-and-safety-act-document-collection	Model Work Health and Safety Regulations
https://santos.sharepoint.com/sites/Intranet/SMS/Pages/Management-Standards.aspx	SMS Risk Management ST-10 Chemical Management Procedure

4 ABBREVIATIONS

ALARP	Low As Reasonably Practicable
SFAIRP	So Far As Is Reasonably Practicable
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CHARM	Chemical Hazard Assessment and Risk Management
CMMS	Computerised Maintenance Management System
DG	Dangerous Good
DMIRS	Department of Mines, Industry Regulation and Safety (WA)
EP	Environmental Plan
GHS	Globally Harmonised System of Classification and Labelling of Chemicals
HSE	Health, Safety and Environment
HS	Hazardous Substance
AICIS	Australian Industrial Chemicals Introduction Scheme
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Agency
OCNS	Offshore Chemical Notification Scheme
OSPAR Convention	The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention')
PFW	Produced Formation Water
PLONOR	Pose Little or No Risk (to the environment)
RMT	Risk Management Technologies
SDS	Safety Data Sheet
SMS	Santos Management System

5 DEFINITIONS

Chemical (Chemical Substance)	A substance with a distinct molecular composition that is produced by or used in a chemical process.
ChemAlert	Third party chemical safety management software database, licensed by Risk Management Technologies (RMT), producing independently researched chemical records (SDS).
Dangerous Goods	<p>Dangerous goods are substances or articles that pose a risk to people, property or the environment, due to their chemical or physical properties. Dangerous goods are usually classified with reference to their immediate risk.</p> <p>This is different from the definition of a hazardous substance which is defined in terms of the chronic or acute harm caused to the health of people exposed to the substance. Hazardous substances are classified in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).</p>
End-Fate	<p>Pathway, stream or mode of which the chemical product exits the production facility or is disposed of. Known end-fate includes:</p> <ul style="list-style-type: none"> • Landfill (removed from site in general waste) • Controlled Waste (removed from site in dedicated waste container) • Stabilised crude oil (oil soluble product discharged in crude/condensate stream) • Re-injection down-hole in State waters (produced water re-injection system or seawater re-injection system) • Any planned discharged to the marine environment (e.g. overboard water stream, grey-water stream, subsea cleaning or flushing activities) • Potential for unplanned release > 80 Litres to the marine environment • Discharged to land via fire monitors or other spraying equipment. • Treatment of 'shut in' fluids (well suspension operations) • Maintenance of products for cleaning/calibration/laboratory testing • Equipment coating – no known fate (paint or lubricant product) • Dispersed into atmosphere (gas phase product) • Consumed in chemical reaction (scavenger products)
GHS	(Globally Harmonised System of Classification and Labelling of Chemicals) An international standardised system for chemical classification and communicating environmental and health hazards to consumers, workers, transport workers and emergency responders.
Hazardous Substance	Substances or articles that pose a risk of the chronic or acute harm caused to the health of people exposed to the substance. Hazardous substances are classified in accordance with the GHS Third Revised Edition.
Offshore Chemical Notification Scheme (OCNS)	The Offshore Chemical Notification Scheme (OCNS) manages chemical use and discharge by the UK and Netherlands offshore petroleum industries. The scheme is regulated in the UK by the Department of Energy and Climate Change using scientific and environmental advice from CEFAS and Marine Scotland. In the Netherlands, the scheme is regulated by the State Supervision of Mines with scientific and environmental advice from CEFAS and Netherlands government agencies.
AICIS	Australian Government's regulatory body for industrial chemicals. AICIS is designed to help protect workers, the public and the environment from the harmful effects of industrial chemicals.

	<p>Any business who wishes to import or manufacture industrial chemicals for commercial purposes must register with AICIS, regardless of the amount or toxicity of the chemical.</p>
<p>Safety Data Sheets (SDS)</p>	<p>Previously Material Safety Data Sheet (MSDS). Documentation that contains information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with the chemical product. Also contains information on the use, storage, handling and emergency procedures all related to the hazards of the material. SDSs are prepared by the supplier or manufacturer of the material. Under the GHS, from 01 January 2017 the structure and contents of SDS will be consistent worldwide.</p>

6 ROLES AND RESPONSIBILITIES

Offshore Installation Manager (OIM) / Person In Charge (PIC) / Field Superintendent

Responsible for:

- + Ensuring all personnel are aware of the requirements in this procedure
- + Ensuring all personnel understand the potential risks from existing and accepted new chemicals on the facility and are competent in the use of chemical control measures and procedures
- + Ensuring relevant personnel are trained and qualified to safely handle the chemicals on the facility
- + Ensuring all relevant personnel are supplied with the proper Personal Protective Equipment (PPE) and made aware of their responsibility for its use and maintenance.

Facility Health and Safety Adviser/Medic

Responsible for:

- + Completing the Safety Assessment of the ChemAlert Chemical Request Form, as required. For example, over the weekends and as requested by the Perth Office Health & Safety Adviser
- + Aiding the Materials and Logistics Coordinator for the maintenance of the chemical inventory on ChemAlert and facility chemical audits and inspections
- + Inspection of the SDS files at the facility (A hard copy file of chemical SDS's may be held on the facility). Act to reconcile gaps between hardcopy SDS and ChemAlert database.

Materials & Logistics Coordinator

Responsible for:

- + The control of all materials to and from the facility
- + The control of all materials at the facility, including preparation, review and revision of the Facility Hazardous Material Register & Dangerous Goods Listing
- + Ensuring transport of all DGs is accompanied by correct paperwork and is as per ADG Code, IATA Code and/or IMDG Code and if the facility is marine based, any AMSA/port notification requirements are complied with
- + All HS and DG products received on facility have correct paperwork and labelling and container integrity is intact
- + Ensure chemicals have a valid SDS available (revised within 5 years).

Note: SAP will remain the facility's accurate stock take for exact quantities on the facility, ChemAlert will only list the maximum quantities allowed at the facility.

Senior Chemical Management Adviser

Responsible for:

- + ChemAlert Administrator for the offshore division
- + Completing the Environmental Assessment of the ChemAlert Chemical Request Form and Chemical Risk Assessments when triggered in the approval workflow.
- + Authorising the Chemical Requests in ChemAlert and notifying the Master Data Officer by email Offshore.cataloguing.supply@santos.com that the chemical has been approved for use and is ready for cataloguing.
- + Liaising with the chemical suppliers to obtain sufficient ecotoxicity data for chemicals requiring environmental approval.
- + Liaising with the relevant environmental regulators to obtain approval for use of new or substitute chemicals, as required.
- + Ensuring the Environmental Plan for the facility is reviewed and updated with the new or substitute chemicals, as required.
- + Undertaking chemical management assurance and compliance activities (e.g. audits)
- + Providing support and advice on chemical management to all employees and contractors

- + Ensuring that training is provided for the ChemAlert Chemical Request Process .

Occupational Health Specialist

Responsible for:

- + Providing advice, assistance and support in relation to the health and hygiene component of the chemical approval process
- + Completing the Health and Hygiene Assessment of the ChemAlert Chemical Request Form for all chemical approvals
- + Ensuring exposure monitoring is identified and is being undertaken for chemicals where there is a significant risk to worker health due to hazardous chemical exposure
- + Reviewing control measures to ensure relevant exposure standards are not exceeded
- + Identify and review current control measures are effective to protect worker health.

Safety and Health Adviser

Responsible for:

- + Providing advice, assistance and support in relation to the safety component of the chemical approval process
- + Completing the Safety Assessment of the ChemAlert Chemical Request Form for all chemical approvals.

Environment Coordinator/ Senior Environmental Adviser/Environment Specialist

Responsible for:

- + Providing advice, assistance and support in relation to the environmental component of the chemical approval process
- + Assisting the Senior Chemical Management Adviser with the authorisation of Chemical Requests in ChemAlert and notifying the Master Data Officer by email [Off shore.cataloguing.supply@santos.com](mailto:Offshore.cataloguing.supply@santos.com) that the chemical has been approved for use and is ready for cataloguing.

Master Data Officer

Responsible for:

- + Assigning a catalogue number to a newly approved chemical
- + Adding the ChemAlert stock number against the Material Master (SAP Number).

Santos Contract Vendor Owner

Responsible for:

- + Confirming what Chemical Management controls the contractor have in place
- + Ensuring that chemicals used by contractors on Santos offshore facilities are approved for use prior to contractors mobilising
- + Facilitating the necessary approval of contractor chemicals with the Senior Chemical Management Adviser/ Perth Office HSE Adviser
- + Completing the ChemAlert Chemical Request Form for contractor chemicals proposed for use on site (allow 7 days for the approval)
- + Ensuring adequate chemical storage is in place and the necessary labelling, signage and emergency equipment is available and maintained whilst being used on Santos offshore facilities.

All Personnel

All employees and contractors are responsible for:

- + Complying with the requirements of this procedure
- + Ensuring chemicals have been approved prior to procurement/mobilisation to site
- + Submitting the ChemAlert Chemical Request Form for all chemical approvals
- + Following safe work practices and controls when working or handling chemicals.

7 PROCEDURE

Santos Offshore uses a range of chemical substances to assist in the production and processing of hydrocarbons from its oil and gas production facilities and within utility systems. For chemical substances that are new to the facility a process of approval must be carried out to address the list detailed in Section 1.

At all times throughout this procedure, SFAIRP principles shall be applied when performing any assessment.

A chemical approved for use on one production facility must proceed through a separate approval process for use on a separate facility. This is required to address the differences which arise in the end-fate of the chemical, storage conditions and estimated usage rates.

Where the same chemical product is known to have two or more end-fates, separate ChemAlert Chemical Request Forms must be completed for each end-fate. This is to ensure separate Chemical Risk Assessments are complete for the known end-fate which may differ in impacts to the receiving environment. For example, a single biocide product can apply in two different systems on the same facility being seawater or produced water re-injection systems, overboard PFW discharge or within utility systems.

It should be noted, for facilities that fall under DMIRS Regulations, the 'Guideline for the Development of Petroleum and Geothermal Environmental Plans in Western Australia (September 2016)' ensures a 30-day DMIRS approval process exists for assessment of new environmental plans or changes to existing EPs through submission of bridging documents.

7.1 Introduction of a New Chemical

A 'new' chemical is defined as:

- + any chemical substance that has not been approved for use on the specific facility, and.
- + any change in vendor for the same chemical substance.

Any chemicals mobilised to an operating facility by a contractor must be approved for use in accordance with this procedure. It is the responsibility of the Santos Vendor Contract Owner to inform the vendor of this requirement.

Third party service companies are the nominated operators for vessel activities and as such have day to day operational control. As a result, the third-party service company procedures shall address controls for safe handling and storage of all chemicals onboard. Santos Offshore shall request a copy of the contractor chemical management procedure for review purposes only.

Santos Offshore shall request a list of chemicals used as part of a campaign to ensure regulatory compliance. Where chemical use on vessels results in any planned discharge or potential for unplanned release > 80 Litres to the marine environment, the Environmental Assessment of this procedure must be adhered to.

7.2 ChemAlert

ChemAlert is the chemical management system for SDSs and the offshore chemical request/approval process. ChemAlert is accessible to all personnel via the Applications Directory on Santos Discover.

The ChemAlert database holds individual stock registers for each facility. Refer to the ChemAlert Chemical Request Training Module 1 in SuccessFactors on how to access facility stock registers. The approval status for each chemical is listed within a facility stock register listing.

Prior to submitting a chemical request form through ChemAlert, the facility stock register listing shall be checked to confirm the approval status.

7.3 Chemical Requests

Where new chemical substances are required for use on the facility, a chemical request must be submitted for approval. Only after final approval is granted shall the chemical substance be procured and/or mobilised to site.

Allow one week for approval of the chemical request. If the chemical request is submitted with insufficient time allocated for the approval process and the chemical is subsequently mobilised to site prior to approval, a non-conformance will be issued and recorded in HSE Toolbox.

The Chemical Request Form can be accessed via the ChemAlert Request Icon. Refer to the ChemAlert Chemical Request Training Modules 1 to 4 on how to initiate/submit a Chemical Request Form. Contact the Offshore Senior Chemical Management Adviser for access to all training modules.

The following information must be included on the ChemAlert Chemical Request Form :

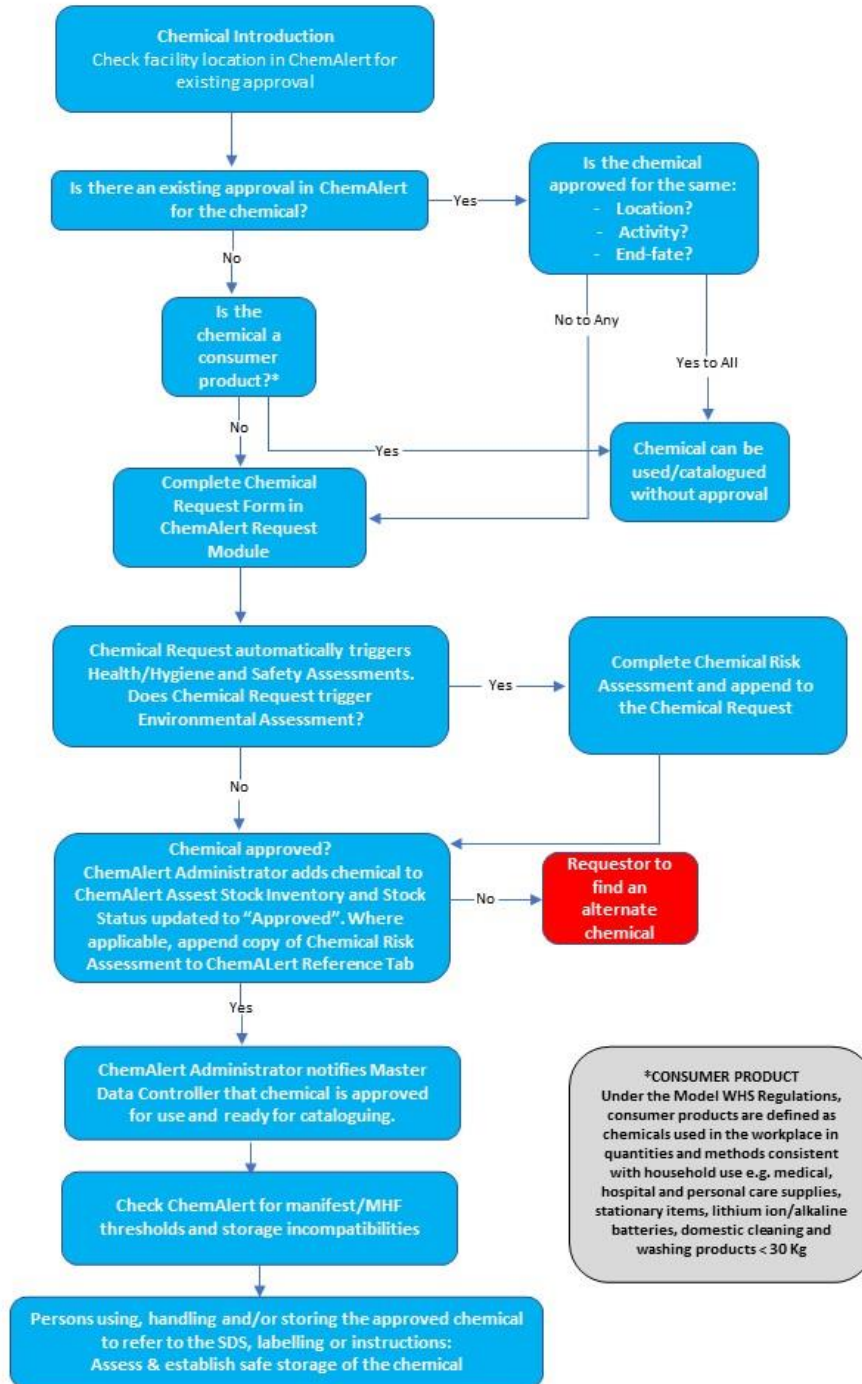
- + Requestor name and contact details
- + The facility where the chemical will be used. The facility (i.e. Department in ChemAlert) must be selected under the Security Tab to automatically generate the correct approval workflow for the offshore facility of interest.
- + The intended use and end-fate (i.e. disposal method in ChemAlert)
- + The storage location, total storage quantity and container size (units)
- + Risk and controls.

7.4 Approval Process

Refer to the ChemAlert Chemical Request Process Training Module 5 on the approval process. Contact the Offshore Senior Chemical Management Adviser for access to this training module.

The flow diagram below outlines the Offshore Division chemical approval process.

Offshore Division Chemical Approval Process



***CONSUMER PRODUCT**
Under the Model WHS Regulations, consumer products are defined as chemicals used in the workplace in quantities and methods consistent with household use e.g. medical, hospital and personal care supplies, stationary items, lithium ion/alkaline batteries, domestic cleaning and washing products < 30 Kg

7.5 Assessment Process

Chemical requests must first be approved by Perth Office HSE Operations. The approval process identifies controls for the safe use of the product and identifies any environmental risks/impacts, where applicable.

Assessments are based on the information provided on the completed Detailed Chemical Request Form of the ChemAlert Request Module and review of the SDS.

7.5.1 Health and Hygiene Assessment

The Health and Hygiene Assessment of the ChemAlert Chemical Request Form shall be completed by the Santos Occupational Hygiene Specialist, or delegate.

The Health and Hygiene Assessment is based on the following factors:

- + Usage (intended use, quantity per use, method of application)
- + Hazard statements
- + Preventative and response controls

The overall risk ranking shall be determined using the Santos Risk Matrix.

The Risk Matrix in ChemAlert has been customised to replicate the Santos Risk Matrix. For the likelihood and consequence definitions, refer to ChemAlert Chemical Request Process Training Module 4 or the Risk Management Standard of the SMS on Santos Discover.

7.5.2 Safety Assessment

The Safety Assessment of the ChemAlert Chemical Request Form shall be completed by the Santos Health and Safety Adviser, or delegate.

The Safety Assessment is based on the following factors:

- + Usage (intended use, quantity per use, method of application)
- + Hazard statements
- + Preventative and response controls
- + Storage and handling.

The overall risk rating shall be determined using the Santos Risk Matrix.

7.5.3 Environmental Assessment

The Environmental Assessment of the ChemAlert Chemical Request Form shall be completed by the Santos Senior Chemical Management Adviser/Ecotoxicologist, or delegate.

The Environmental Assessment is only triggered when the following end-fates (i.e. disposal methods in the request form) are selected:

- + End-fate of chemical is down-hole in State waters
- + Planned discharge of chemical to land (e.g. fire foam testing)
- + Planned discharge of chemical to the marine environment
- + Potential for unplanned release to the marine environment greater than 80 Litres.

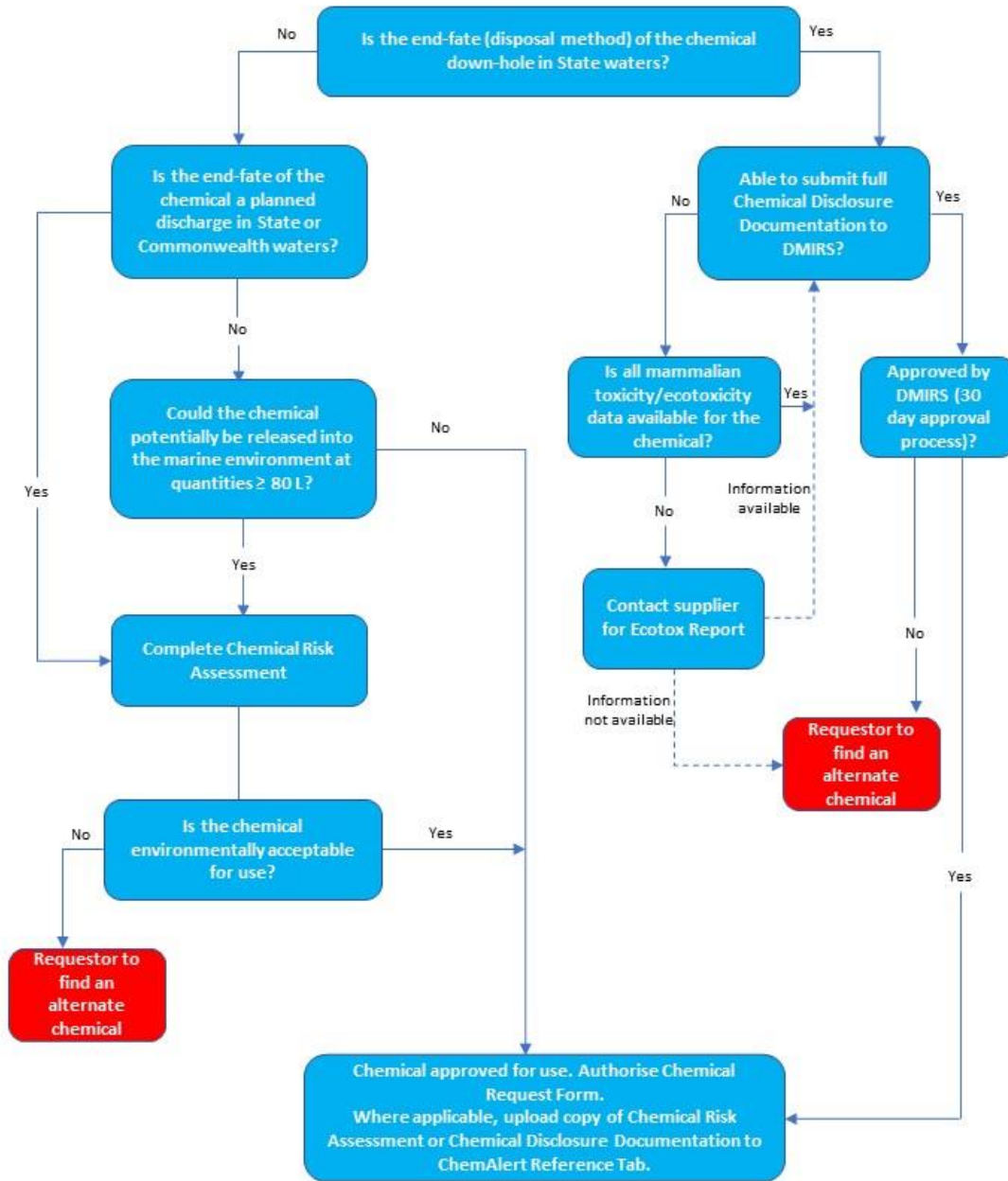
If the triggers for an environmental assessment are activated, an Environmental Risk Assessment of Chemical for Operational Activities Form (**Appendix 1**) shall be completed and appended to the ChemAlert Chemical Request Form.

Refer to **Appendix 2** for details of the ecotoxicity assessment process.

7.5.4 Offshore Division Regulatory Approval Process

The flowchart below summaries the offshore environmental approval process for chemicals.

**Offshore Division Regulatory Approval Process
(Environmental Assessment)**



7.5.4.1 WA State Water Requirements – Chemical Approval Process

Chemical disclosure information, in accordance with the DMIRS Chemical Disclosure Guidelines <http://www.dmp.wa.gov.au/Documents/Environment/ENV-PEB-178.pdf>, is required for all down-hole petroleum activities in State waters to assess environmental risks and impacts. For all proposed chemicals (new or changed formulation) that will be injected down-hole either as a production chemical or with gas or water injection, a Chemical Disclosure Reporting Form <http://www.dmp.wa.gov.au/Documents/Environment/ENV-PEB-178.pdf> must be completed. The use of the chemical must be accepted by DMIRS prior to introduction on a facility.

7.5.4.2 Commonwealth Waters Requirements – Chemical Approval Process

For all offshore petroleum activities in Commonwealth waters, NOPSEMA stipulate the requirements to demonstrate that the environmental impacts and risks will be acceptable and reduced to ALARP in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Environment Regulations).

The introduction of an additional chemical, substitute chemical or changed formulation of an existing chemical to a facility shall be subject to an assessment against the facility EP to ensure that any changes are risk assessed appropriately. The ChemAlert Chemical Request Form includes the requirement for review of the end-fate (i.e. disposal method) and subsequent chemical risk assessment, as required. Requirement for additional approval by the relevant government authority may be necessary, a Management of Change (MOC) may also be required. If the chemical will be discharged overboard with other fluids, ecotoxicity testing of the whole fluid may be required.

Chemicals proposed for a planned discharge or potential unplanned release >80L to the marine environment must meet at least one of the following environmental approval criteria:

- Rated as Gold or Silver under the OCNS CHARM model*
- Rated E or D under the OCNS non-CHARM grouping method*
- If the chemical is rated lower than OCNS Gold, Silver, E or D (i.e. CHARM rated purple, orange, blue or white or non-CHARM grouped A, B or C), robust technical justification must be provided whereby safety takes precedence over the environment.
- 100% of the composition of the chemical product is OSPAR Convention PLONOR Listed
- If not rated OCNS Gold, Silver, E or D, the OCNS CHARM model or non-CHARM grouping method shall be used to assign a 'pseudo' CHARM model Gold or Silver rating or non-CHARM method group E or D, where applicable (refer to **Appendix 1** - Environmental Risk Assessment Form to be completed)
- If there is insufficient ecotoxicity data to assign a pseudo-OCNS rating, robust justification demonstrating environmental acceptability of the chemical shall be provided based on product volume/concentration, receiving marine environmental characteristics and available ecotoxicity data (refer to **Appendix 1** - Environmental Risk Assessment Form to be completed). There is a preference for chemicals that have a low aquatic toxicity, are readily biodegradable and do not bioaccumulate (refer to **Appendix 2**).

* Chemicals are ranked according to their calculated Hazard Quotients (HQ) by the CHARM mathematical model, which uses aquatic toxicity, biodegradation and bioaccumulation data. The HQ is converted to a colour banding with Gold and Silver colour bands representing the least environmentally hazardous chemicals. Chemicals not amenable to the CHARM model (i.e. inorganic substances, hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS non-CHARM grouping based on the worst-case ecotoxicity data with Group E and D representing the least hazard potential.

Chemical risk assessments of drilling fluids and cementing products to be discharged to the marine environment are to be managed in accordance with procedure EA-91-II-00007 Drilling Fluid and Chemical Selection in Drilling Activities.

7.6 Chemical Register, Manifests and Placarding

All hazardous chemicals that are stored, handled or used on site must be listed on a register except where they are in-transit or consumer products. A register and associated SDSs must be maintained by all offshore facilities and be made available to workers.

The Facility Hazardous Material Register & Dangerous Goods Listing is maintained in ChemAlert unless otherwise approved. ChemAlert can be used to identify maximum allowable quantities and exceedance of thresholds.

Santos Contractor Vendor Owners must ensure that contractor chemicals have been approved via the ChemAlert Chemical Request Form and added to the chemical register prior to mobilisation to site.

A manifest is required where the quantities of those hazardous chemicals exceed the threshold amounts listed in Schedule 1 of the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*.

A manifest and dangerous goods site plan must comply with the requirements of Schedule 3 of the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* and it must be updated as soon as practicable after any change to the amount or types of chemical being used, stored, handled or produced on site.

Major hazard facilities (MHF) must comply with the *Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007* and MHF threshold quantities for Schedule 1 substances.

If the quantity at a storage location exceeds a defined or previously notified manifest or MHF threshold quantity, DMIRS must be given written notification.

Hazardous chemical placards are required at all offshore facilities that store hazardous chemicals above placard quantities. Placard requirements are set out in Schedule 1 of the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*.

7.7 SDS Management

In Australia, manufacturers and importers of hazardous chemicals must prepare SDS in accordance with the Model Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals (July 2020). Failure to create SDS correctly is a breach of the WHS Regulations.

A safety data sheet must:

- + Be in English
- + Include the name, Australian address and business telephone number of the manufacturer or the importer. International SDSs **will not be accepted** unless they have been amended by the importer to include the Australian contact details.
- + State an Australian address and business telephone number from which information about the chemical can be obtained in an emergency
- + Use the GHS format for hazard classification
- + Must be reviewed every five years from the date of original preparation or the last revision of the SDS.

Any product being stored on site must have a copy of the product SDS either with the product or readily available electronically on ChemAlert. This is required to ensure the SDS can be easily obtained and consulted before use.

Hardcopies of SDSs may be kept with the chemical, however as per the Model Code of Practice: Managing Risks of Hazardous Chemicals in the Workplace (July 2020), it is appropriate to use an electronic database (i.e. ChemAlert) as the primary means of SDS storage as long as access to the database is readily available and kept in a location near where the chemical is used.

It is the responsibility of Santos Offshore to check the 5-year currency of the SDSs for all chemicals stored on site. Where current SDSs are not found on ChemAlert, RMT are likely to have been denied the revised SDS by the supplier as RMT is a third-party interest. If a chemical SDS is expired in

ChemAlert, obtain the SDS from the manufacturer or supplier and submit the SDS to RMT to upload to the ChemAlert database.

7.8 Chemical Procurement and Mobilisation to Site

Only after the chemical has been assigned an 'Approved' Stock Status in ChemAlert shall the item be catalogued, procured and mobilised to site. The completed Chemical Request Form can be found under the Request Tab of the approved chemical. ChemAlert is used as an auditable trail of the approval. Offshore Supply Chain ensure that procurement will not proceed without an 'Approved' status in ChemAlert.

APPENDIX 1– ENVIRONMENTAL RISK ASSESSMENT OF CHEMICAL FOR OPERATIONAL ACTIVITIES

Environmental Risk Assessment of Chemical for Operational Activities

Chemical Name:

Supplier:

Prepared By

Document Owner(s)	Project/Department

Report Version Control

Version	Date	Author	Change Description

(Eco toxicologist Sign)

 (Date Approved)

STEP 1	CHEMICAL ECOTOXICITY INFORMATION		
Propose a new chemical for use	Yes	No	Attach Safety Data Sheet (SDS) and/or ecotoxicity report summary
Is an SDS available for this product including ecotoxicity ¹ information? (i.e. aquatic toxicity, biodegradability and bioaccumulation potential data for the whole product or product components.)	<input type="checkbox"/>	<input type="checkbox"/>	[Append a copy of SDS and separate ecotoxicity data report, if available]
<p>➤ If the answer to the above question is YES > Go to STEP 2</p> <p>➤ If the answer to the above question is NO > Seek ecotoxicity data from the supplier. If ecotoxicity data is not available and cannot be sourced from a literature search, the proposed chemical cannot be used, seek an alternative chemical.</p>			

¹ If ecotoxicity data cannot be sourced from the supplier, scientific literature may be used for commonly used chemical components in the product.

STEP 2	CHEMICAL DISCLOSURE REPORT		
Down-hole chemical use	Yes	No	Provide all information required for full chemical disclosure in the DMIRS template
Is the fate of the chemical down-hole in state waters?	<input type="checkbox"/>	<input type="checkbox"/>	
<p>➤ If the answer to the above question is YES > complete DMIRS Chemical Disclosure template and submit for approval with EP/Bridging Document. If chemical is approved by DMIRS accept chemical for use. If chemical is rejected by DMIRS, find a substitute chemical.</p> <p>➤ If the answer to the above question is NO > Go to STEP 3</p>			

STEP 3	CHEMICAL USAGE AND VOLUME		
Planned discharge or potential for unplanned release (>80 L) to the marine environment	Yes	No	Indicate end-fate of the chemical
Is any discharge planned or potential risk of an unplanned release (>80L) to the marine environment or land?	<input type="checkbox"/>	<input type="checkbox"/>	
➤ If the answer to the above question is YES > Go to STEP 4			
➤ If the answer to the above question is NO > Detailed environmental risk assessment of chemical is not required, evaluate chemical through ChemAlert Chemical Request Form.			

STEP 4	PLONOR CLASSIFICATION CHECK		
OSPAR Pose Little or NO Risk to the Environment (PLONOR) List	Yes	No	List the PLONOR components
Is the chemical or all constituents ² of the chemical on the OSPAR Convention PLONOR List? (approved list can be found at https://www.ospar.org/work-areas/oic/chemicals)	<input type="checkbox"/>	<input type="checkbox"/>	[List any PLONOR components that make up 100% of product]
➤ If the answer to the above question is YES > Accept chemical for use, a detailed chemical risk assessment is not required.			
➤ If the answer to the above question is NO > Go to STEP 5			

² PLONOR components should make up 100% of product with the addition of water only.

STEP 5	OCNS CLASSIFICATION CHECK		
OCNS Hazard Quotient (HQ) Colour Band (CHARM Model)	Yes	No	Indicate CHARM HQ Colour Band (GOLD, SILVER, WHITE, BLUE, ORANGE or PURPLE)
Has the chemical been hazard assessed by OCNS using the CHARM model? Check the latest list of registered products on the Cefas database (https://www.cefas.co.uk/data-and-publications/ocns/)	<input type="checkbox"/>	<input type="checkbox"/>	[Enter CHARM HQ Colour Band here]
<ul style="list-style-type: none"> ➤ If the answer to the above question is YES and the chemical is colour-banded GOLD or SILVER > Accept chemical for use, a detailed chemical risk assessment is not required. ➤ If the answer to the above question is YES and the chemical is colour-banded WHITE, BLUE, ORANGE or PURPLE > Go to STEP 9 			
<ul style="list-style-type: none"> ➤ If the answer to the above question is NO > Go to STEP 6 			

STEP 6	OCNS CLASSIFICATION CHECK		
OCNS Ranking Scheme (non-CHARM OCNS Grouping)	Yes	No	Indicate OCNS Final Grouping (E, D, C, B or A)
Has the chemical been hazard assessed using the OCNS Ranking Scheme? Check the latest list of registered products on the Cefas database (https://www.cefas.co.uk/data-and-publications/ocns/)	<input type="checkbox"/>	<input type="checkbox"/>	[Enter non-CHARM OCNS Group here]
<ul style="list-style-type: none"> ➤ If the answer to the above question is YES and the chemical is Group E or D > Accept product for use, a detailed chemical risk assessment is not required. ➤ If the answer to the above question is YES and the chemical is Group C, B or A > Go to STEP 9 			
<ul style="list-style-type: none"> ➤ If the answer to the above question is NO > Go to STEP 7 			

STEP 7		ENVIRONMENTAL RISK ASSESSMENT OF CHEMICAL	
Ecotoxicity data required for environmental risk assessment of chemical	Yes	No	Provide ecotoxicity data summary and evaluation. Assign a pseudo OCNS CHARM colour band or non-CHARM group ranking, if applicable.
Is sufficient ecotoxicity data available for the chemical or its chemical ingredients in order to determine the hazard level (using the OCNS CHARM model or non-CHARM OCNS grouping, if applicable) and subsequent risk to the receiving marine environment? (Refer to Appendix 2 of the Offshore Division <i>Operations Chemical Approval Procedure EA-91-II-10001</i>)	<input type="checkbox"/>	<input type="checkbox"/>	[Assign a pseudo OCNS CHARM colour band or non-CHARM OCNS group, if applicable (Use Table 1 for CHARM model HQ and Tables 2 & 3 for non-CHARM OCNS grouping)]
<ul style="list-style-type: none"> ➤ If the answer to the above question is YES and the chemical meets the acceptability criteria for a pseudo OCNS CHARM colour band GOLD or SILVER or non-CHARM OCNS Group E or D > Accept chemical for use. End of chemical risk assessment. ➤ If the answer to the above question is YES and there is sufficient ecotoxicity data to determine the environmental acceptability > Go to STEP 9 			
<ul style="list-style-type: none"> ➤ If the answer to the above question is NO > go to STEP 8. 			

STEP 8		ENVIRONMENTAL RISK ASSESSMENT OF CHEMICAL	
Ecotoxicity data of a comparable chemical required for environmental risk assessment	Yes	No	Provide ecotoxicity data summary for comparable chemical
Is ecotoxicity data available for a comparable chemical or for the product's chemical ingredients (i.e. no less than 95% similar in composition including all hazardous components)?	<input type="checkbox"/>	<input type="checkbox"/>	[Enter ecotoxicity summary and evaluation. Append supporting documentation]
<ul style="list-style-type: none"> ➤ If the answer to the above question is YES > go to STEP 9. 			
<ul style="list-style-type: none"> ➤ If the answer to the above question is NO > Seek an alternative chemical. ➤ If the answer to the above question is NO and there is no alternative chemical available, laboratory testing should be implemented by the supplier. 			

STEP 9	ENVIRONMENTAL RISK ASSESSMENT OF CHEMICAL		
Risk justification for chemical use	Yes	No	Provide environmental risk assessment summary
<p>If a pseudo-OCNS rating can be applied to the chemical, provide assessment summary and risk justification.</p> <p>If a pseudo-OCNS rating cannot be applied, is this chemical acceptable for use in the marine environment based on the product volume/concentration, end-fate (i.e. discharge), receiving environmental characteristics and available ecotoxicity information?</p> <p>If there is no alternative to using a non-CHARM OCNS Group A, B or C chemical, or a CHARM colour-banded purple, orange, blue or white chemical, provide a robust technical justification for use (i.e. safety precedence).</p>	<input type="checkbox"/>	<input type="checkbox"/>	<p>[Enter risk justification here]</p>
<p>➤ If the answer to the above question is YES > Accept chemical for use.</p>			
<p>➤ If the answer to the above question is NO > Reject the chemical and find an alternative chemical.</p>			
<p>Overall Risk:</p> <p> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>			

Table 1: OCNS risk ranking using the CHARM Model




Minimum HQ value	Maximum HQ value	Colour banding	
>0	<1	Gold	Lowest hazard  Highest hazard
≥1	<30	Silver	
≥30	<100	White	
≥100	<300	Blue	
≥300	<1000	Orange	
≥1000		Purple	

Table 2: The OCNS Stage 1 Initial Grouping*

DATA EVALUATION AND PRODUCT CLASSIFICATION			
Group A includes products considered to have the greatest potential environmental hazard and Group E the least			
HAZARD RATING	AQUATIC TOXICITY PPM	SEDIMENTARY TOXICITY PPM	GROUPING
LOWEST	>1,000	>10,000	E
 	>100 - 1,000	>1,000 - 10,000	D
	>10 - 100	>100 - 1,000	C
	>1 - 10	>10 - 100	B
HIGHEST	<1	<10	A

* All submitted toxicity data for the product should be compared with the table and the value giving the worst case 'Initial Grouping' (i.e. the test giving the most toxic response) should be used as the initial Group for the product.

- + **Aquatic toxicity test results:** LC₅₀/EC₅₀ data for *Skeletonema costatum*, *Acratia tonsa* or *Scophthalmus maximus* (juvenile turbot) (units = ppm or mg/litre)
- + **Sediment toxicity test result:** LC₅₀ data for *Corophium volutator* (units = ppm or mg/kg).

Table 3: The OCNS Adjustment Criteria for Final Grouping*

FINAL GROUPING ADJUSTED TO ACCOUNT FOR BIODEGRADATION & BIOACCUMULATION DATA				
Adjust the Final Grouping after factoring in Product Biodegradation and Bioaccumulation Data				
Increase by 2 groups (e.g. from C to E)	Increase by 1 group (e.g. from C to D)	Do not adjust initial grouping	Decrease by 1 group (e.g. from C to B)	Decrease by 2 groups (e.g. from C to A)
Substance is readily biodegradable and is non-bioaccumulative	Substance is inherently biodegradable and is non-bioaccumulative	Substance is not biodegradable and is non-bioaccumulative OR	Substance is inherently biodegradable and bioaccumulates	Substance does not biodegrade and bioaccumulates
		Substance is readily biodegradable and bioaccumulates		

*The product is awarded a letter-grouping determined by the worse-case log P_{ow} / biodegradation data. Definitions of terms used in classification table:

- + **Readily biodegradable:** results of >60% biodegradation in 28 days to an OSPAR HOCNF accepted ready biodegradation protocol
- + **Inherently biodegradable:** results of >20% and <60% to an OSPAR HOCNF accepted ready biodegradation protocol or result of >20% by OSPAR accepted Inherent biodegradation study
- + **Not biodegradable:** results from OSPAR HOCNF accepted ready biodegradation protocol or inherent biodegradation protocol are <20%, or half-life values derived from aquatic simulation tests indicate persistence
- + **Non-bio accumulative:** Log P_{ow} <3, or BCF \leq 100 and the molecular weight is \geq 700
- + **Bio accumulative:** Log P_{ow} \geq 3, or BCF >100 and the molecular weight is <700, or if the conclusion of a weight-of-evidence expert judgement under OSPAR Agreement 2008-5 is negative.

APPENDIX 2 – GUIDELINES FOR ECOTOXICITY ASSESSMENT

Acute Aquatic/Sediment Toxicity Assessment

Table 1 and **Table 2** act as guidance in assessing the ecotoxicity of chemicals during the investigation of potential alternatives. **Table 1** is used by Cefas to group a chemical based on ecotoxicity results, 'A' representing highest toxicity/risk to environment and 'E' lowest. **Table 2** shows classifications/categories of toxicity against aquatic toxicity results.

Table 1: Initial OCNS grouping

Initial grouping	A	B	C	D	E
Result for aquatic toxicity data (ppm)	<1	≥1-10	>10-100	>100-1,000	>1,000
Result for sediment toxicity data (ppm)	<10	≥10-100	>100-1,000	>1,000-10,000	>10,000

Note: Aquatic toxicity refers to the Skeletonema costatum EC₅₀, Acartia tonsa LC₅₀, and Scophthalmus maximus (juvenile turbot) LC₅₀ toxicity tests. Sediment toxicity refers to the Corophium volutator LC₅₀ test.

Source: Cefas Standard Procedure 2019, OCNS 011 NL Protocol PART 1: Core Elements

Table 2: Categories for substances hazardous to the aquatic environment

Category	Species	LC ₅₀ and EC ₅₀ criteria
Category Acute 1 Hazard statement - Very toxic to aquatic life	Fish	LC ₅₀ (96hr) of ≤1 mg/L
	Crustacea	EC ₅₀ (48hr) of ≤1 mg/L
	Algae / other aquatic plant species	ErC ₅₀ (72 or 96hr) of ≤1 mg/L
Category Acute 2 – Hazard statement – Toxic to aquatic life	Fish	LC ₅₀ (96hr) of >1 mg/L to ≤10 mg/L
	Crustacea	EC ₅₀ (48hr) of >1 mg/L to ≤10 mg/L
	Algae / other aquatic plant species	ErC ₅₀ (72 or 96hr) of >1 mg/L to ≤10 mg/L
Category Acute 3 – Hazard statement – Harmful to aquatic life	Fish	LC ₅₀ (96hr) of >10 mg/L to ≤100 mg/L
	Crustacea	EC ₅₀ (48hr) of >10 mg/L to ≤100 mg/L
	Algae / other aquatic plant species	ErC ₅₀ (72 or 96hr) of >10 mg/L to ≤100 mg/L

Source: United Nations (2019) Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Eight Revised Edition

Biodegradation Assessment

The biodegradation of chemicals is assessed using the Cefas biodegradation criteria, which aligns with the categorisation outlined in the United Nations GHS Annex 9 Guidance on Hazards to the Aquatic Environment (2019). The below is used as a guide during the investigation of potential chemical alternatives. Preference is to select readily biodegradable chemicals.

Cefas categorises biodegradation into the following groups:

- + Readily biodegradable: results of >X% biodegradation in 28 days to an OSPAR harmonised offshore chemical notification format (HOCNF) accepted ready biodegradation protocol.
- + Moderately biodegradable: results >20% and <X% to an OSPAR HOCNF accepted ready biodegradation protocol.
- + Poorly biodegradable: results from OSPAR HOCNF accepted ready biodegradation protocol <20%.

Where X is equal to:

- + 60% in 28 days in OECD 306, Marine BODIS or any other acceptable marine protocols, or in the absence of valid results for such tests.
- + 60% in 28 days (OECD 301B, 301C, 301D, 301F, Freshwater BODIS) OR
- + 70% in 28 days (OECD 301A, 301E).

Bioaccumulation Assessment

The bioaccumulation of chemicals is assessed using the Cefas bioaccumulation criteria, which aligns with the categorisation outlined in the United Nations GHS Annex 9 Guidance on Hazards to the Aquatic Environment (2019). Preference is to select non-bioaccumulative chemicals.

The following guidance is used by Cefas:

- + Non-bioaccumulative/non-bioaccumulating: $\text{Log } P_{ow} < 3$, or results from a bioaccumulation test (preferably using *Mytilus edulis*) demonstrates a satisfactory rate of uptake and depuration, and the molecular mass is ≥ 700 .
- + Bioaccumulative/Bioaccumulates: $\text{Log } P_{ow} \geq 3$, or results from a bioaccumulation test (preferably using *Mytilus edulis*) demonstrates an unsatisfactory rate of uptake and depuration, and the molecular mass is < 700 .