T/41P – Dalrymple 3D Seismic Acquisition Survey (Bass Basin)

Environment Plan Summary

Revision A

Issue date: 09/12/2010

A	09/12/10	Issued for Review	LC	KL	NN
Rev.	Date	Description	By	Chkd	App.

Introduction

3D Oil Ltd is undertaking the Dalrymple 3D seismic acquisition program in Exploration Permit T/41P (as shown in **Figure 1**) which is situated in Commonwealth waters .

An Environment Plan (EP) for this survey has been prepared in accordance with the requirements of the *Offshore Petroleum & Greenhouse Gas (Environment) Regulations 2009*. This summary document has been prepared to comply with the requirements of Regulation 11(7) and (8) of those regulations.

The EP has reviewed the seismic acquisition activity within the T/41P environmental context and assessed the risk this activity poses to the environment. The EP further defines control and mitigation measures; and management strategies which will minimise environmental risk associated with the activity.

The EP, which has been reviewed and accepted by Mineral Resources Tasmania (the Commonwealth's Designated Authority) details participant roles and responsibilities in implementing the identified control/mitigation measures, which ensures the seismic acquisition program is undertaken in accordance with 3D Oil's Health, Safety & Environment (HSE) Policy. The EP is intended to serve as a practical environmental management tool which can be used throughout the seismic acquisition program to achieve the stated and agreed environmental outcomes.

Description of Activity

3D Oil Ltd is the designated operator and 100% titleholder of Exploration Permit T/41P, located in the Bass Basin in central Bass Strait. Permit Area T/41P is located approximately 90km* north of Georgetown (Tas), 50km* west of Flinders Island and 65km* south of Wilsons Promontory (Vic).

3D Oil is undertaking the Dalrymple 3D marine seismic survey to assess the subsurface geology of the area. Marine seismic surveys emit high energy, low frequency sound sources towed behind a vessel. The 3D seismic survey will be conducted using a purpose built seismic survey vessel, the MV *Ramform Sterling* (refer **Figure 2**).

The survey location is provided in **Figure 1** with the coordinates of the survey corners provided in **Table 1**. The area to be surveyed is approximately 260km^2 and will traverse approximately 810 line kilometres over a 10-day period between January 15 and March 31, 2011. The duration and start date is dependent on vessel availability and weather conditions. Note the current survey area crosses the western permit boundary of Permit T/41P to acquire some data in the adjacent Petroleum Exploration Permit T/37P operated by Cue Energy Resources Limited, who have given their approval.

The *MV Ramform Sterling* will tow up to twelve (12) streamers measuring up to 6000m in length (100m separation distance) with hydrophone intervals located at 12.5m intervals along the streamer at a depth of approximately 8m below sea level (bsl). The vessel will acquire seismic data at an average speed of 4.5knots. The hydrophone streamers will be gel filled (solid). A dual source airgun array will be towed astern of the vessel at a depth of approximately 6m. The array will consist of Bolt LLXT 1900 air guns (up to 4130in^3 total capacity) operating at 2000psi, which will release acoustic pulses into the water column on average every 10-12 seconds. The reflected acoustic signals are recorded by

* From nearest permit boundary

hydrophones towed behind the vessel located in the streamers. Data collected by the hydrophones is stored in onboard computers for processing and analysis allowing the underlying geological strata to be imaged.

The MV *Ramform Sterling* will traverse the survey area along defined transects (or seismic lines) in water depths ranging from 70m to 85m (refer Figure 1). Seismic activities are planned to occur on a 24hr operational basis and in sea-states of <4.5m.

Figure 1: 3D Dalrymple Seismic Program (T/41P)

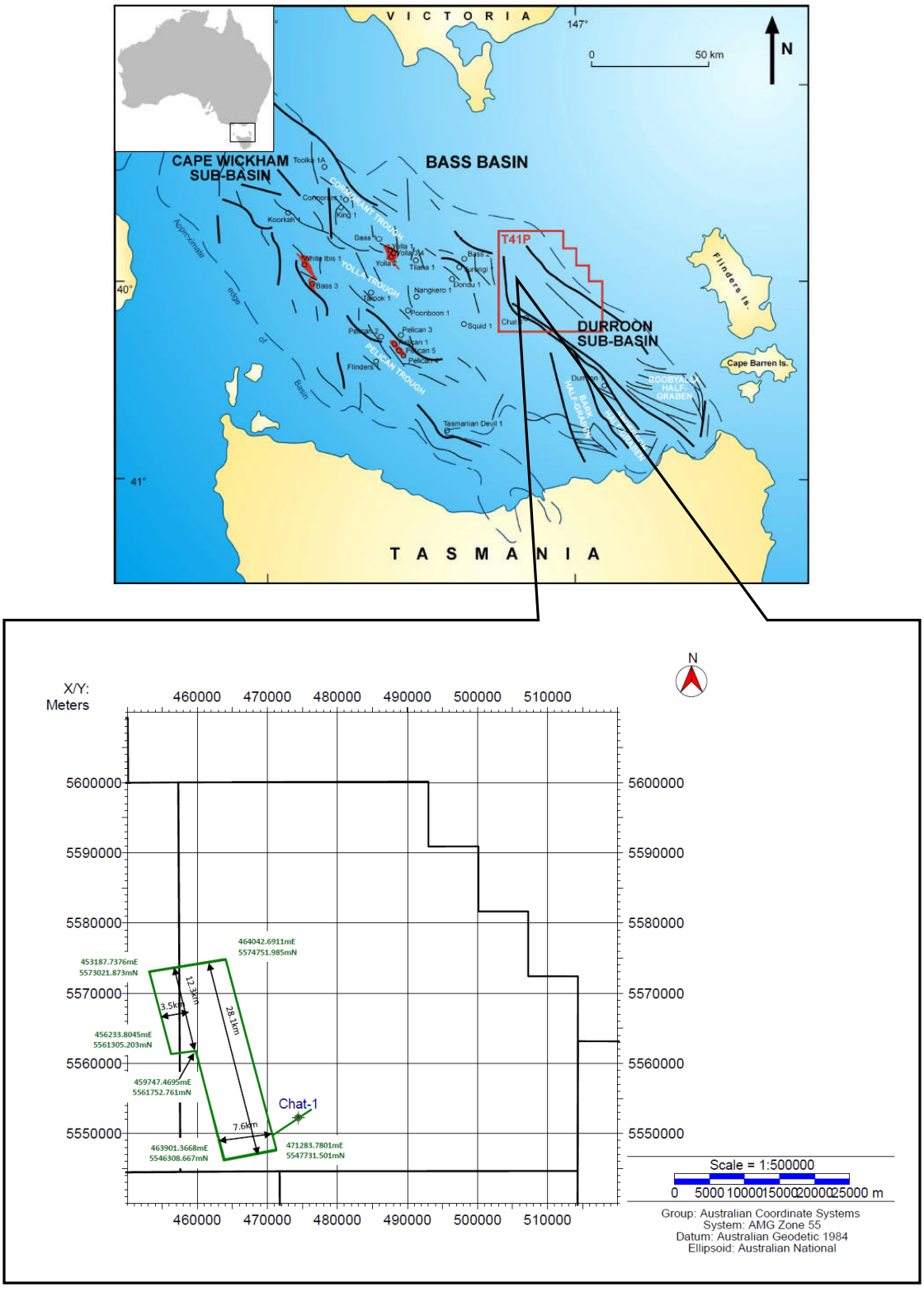

Table 1: T/41P Dalrymple Seismic Survey Location

Latitude			Longitude		
degrees	minutes	seconds	degrees	minutes	seconds
39	59	30.06	146	27	5.96
39	58	35.86	146	34	44.04
40	13	13.24	146	39	44.996
40	13	58.36	146	34	32.36
40	5	36.78	146	31	40.05
40	05	50.66	146	29	11.56

Figure 2: MV Ramform Sterling

Description of the Receiving Environment (T/41P)

Physical Environment & Areas of Environmental Significance

The T/41P permit area is situated within the Bass Basin, in Bass Strait, midway between Victoria and Tasmania. The permit is not near any area having World Heritage significance or listed RAMSAR wetlands. The nearest areas of conservation significance to the survey area include the Kent Group National Park (Tas) located approximately 60km NE, the Boags Marine Protected Area (Com) located approximately 120km west, the Beagle Marine Protected Area (Com) located 47km north and the Wilsons Promontory Marine National Park (Vic) located approximately 85km north of the survey area.

The climate of the region is cool temperate, with cool wet winters, and cool summers. Climate statistics for December to March is provided in **Table 2**.

Table 2: Climate Statistics (December to March)

Parameter	Month			
	December	January	February	March
Mean Max Temperature (°C)	18.3	20.2	20.5	19.4
Mean Min Temperature (°C)	12.6	14.1	14.6	14.2
Mean Rainfall (mm)	49.6	40.3	36	51.5
Rainfall Days	5.7	4.6	4.1	5.6

Tidal currents predominate in the area with velocities varying between 0.05m/s (central Bass Strait) to 0.5m/s at the margins (Flinders & King Islands). Wave conditions are dictated by local conditions and easterly swells propagating from the Tasman Sea. The region is protected from westerly and south-westerly swells by King Island and Tasmania. Extreme conditions in northern Bass Strait produced by easterly and south-easterly storms can produce significant wave heights ranging from 4.5-5.5m. Significant wave heights of 6.8-7.5m can be expected for the 50 and 100 year return period storms respectively, with lesser wave heights found further south into central Bass Strait.

Water depths in T/41P range from 80m (western permit area) to 50m (east/southern permit area). The seabed is flat to undulating, expected to consist of a sandy/muddy carbonate in the west of the permit area to a more gravel-type carbonate in the east. Benthic organisms in Bass Strait are dominated by sponges and bryozoans, with micro-crustaceans and polychaete worms.

Biological Environment

Migratory and resident fauna which may be present in the vicinity of the T/41P permit area include cetaceans, fish and seals. Up to eight EPBC-listed migratory marine species, including two (2) endangered species (Blue Whale, Southern Right Whale) and two (2) vulnerable species (Humpback Whale, Great White Shark) may migrate or forage through the permit area during certain periods of the year.

Blue Whale migration into Bass Strait is documented as November-December. The species has widespread migration pathways and does not follow coastlines or oceanographic faults. Feeding areas occur at locations where nutrient enriched waters and krill occur. Upwellings are not known to occur in the vicinity of the proposed seismic

acquisition area and the T/41P permit area is not a known feeding or aggregation area for this mammal.

The Southern Right Whale is also known to be seasonally present in southern Australian waters between mid-May and November. The nearest calving areas are located at Warrnambool with less regular calving occurring at Port Fairy, Portland (Vic), Eden (NSW) and Bruny Island & Maria Island (Tas). No known feeding or calving grounds are in proximity to the seismic survey area.

The migratory period for Humpback Whales in the Bass Strait region is generally from June-August (northward) and September-December (southward), however early arrivals can occur in May. There are no known calving, resting or feeding grounds in proximity to the seismic survey area, the closest resting areas documented are at Twofold Bay (NSW) and Warrnambool. The migration route of the species appears to pass along the continental shelf to the east of Bass Strait however it is possible that the species could pass through the seismic survey area.

There are no threatened EPBC-listed ecological communities in the vicinity of the permit area.

The Australian Fur-seal occurs throughout Bass Strait. There are numerous breeding colonies near Wilson's Promontory, Deal Island (Judgement Rock) and Tenth Island. Pupping season for the Australian Fur seals is late October to late December. There are no breeding grounds within the survey area or in the immediate vicinity of the permit area.

Great White Sharks have been recorded in Bass Strait and are known to frequent waters around seal colonies, particularly during seal pupping season. As above, the permit area does not contain known breeding areas for seals and the seismic activity will be undertaken outside the seal breeding season.

Sixteen species of EPBC-listed migratory birds may occur in proximity to the Permit Area. Bird species listed as threatened include 13 species of albatross and 3 species of petrel. These birds, protected by international agreements (BONN Convention, CAMBA, JAMBA, ROKAMBA) are mostly oceanic seabirds and seldom come to land unless breeding. Islands and rocky outcrops in Bass Strait support breeding populations of Australian seabirds, and while these species may overfly and forage within the permit area, given the distance of islands and rocky outcrops from the permit area, the likelihood of interaction is low.

There are numerous species of fish in Bass Strait, including a number of important pelagic commercial species such as pilchards, anchovies, Australian salmon, Blue Sprat and southern calamari. Among the demersal species, school whiting and flathead are significant commercial species. Lesser commercial species such as Gummy shark, school shark, jackass morwong, jack mackerel and snapper are also present.

Other Marine Users

The region in which the permit is situated supports other marine use activities including commercial fishing, commercial shipping and oil and gas infrastructure. Two historic shipwrecks are in proximity to the permit area (>11nm) however seismic activities will not have any effect on these heritage items.

Commercial vessels sailing to northern Australian ports (Sydney, etc) from Burnie and Devonport traverse the permit area, however the permit area lies east of the Melbourne-Devonport ferry service.

Commercial fisheries which may operate in the general vicinity of the permit area include the following Commonwealth Fisheries:

- Bass Strait Central Scallop Fishery (fishery closed in Bass Basin);
- Southern Square Jig Fishery;
- Small Pelagics Fishery;
- Commonwealth Trawl Fishery (Southern and Eastern Scale-fish and Shark Fishery); and
- Gillnet hook and trap fishery.

Tasmanian fisheries which may operate in the area include the Rock Lobster Fishery however given the soft sediment across the permit area, this is considered unlikely.

All fishery total catch figures for the permit area indicate that commercial fishing is of low intensity.

Major Environmental Hazards & Controls

An environmental risk assessment has been undertaken for the Dalrymple 3D Seismic Survey activities in accordance with the requirements of ISO14001, AS/NZ4360:2003 (Risk Management) and HB203: 2006 Environmental Risk Management Guidelines (2006). The qualitative risk assessment for seismic activities indicates that with the proposed/management and mitigation measures implemented, no significant environmental impacts are expected and the activity carries a medium/low environmental risk.

Details of key environmental activities and associated impacts, together with their risk control measures and residual risk ranking is provided in **Table 3**.

Management Approach

3D Oil, the operator of the permit area T/41P, is responsible for assuring that the proposed seismic survey is managed in accordance with this Environment Plan. The seismic contractor (PGS) will undertake the operations on 3D Oil's behalf and, under contractual arrangements with 3D Oil, will implement and comply with all environmental constraints and procedures nominated in the approved EP.

Specific responsibilities for the environmental commitments (controls, inspections, etc) made in the 3D Oil seismic acquisition survey EP are detailed within the Plan.

Consultation

3D Oil has consulted with regulatory agencies, fishery groups and fishing industry groups in preparation for the Dalrymple 3D seismic operations. Regulatory agencies consulted include the Mineral Resources Tasmania (MRT) (the Designated Authority), the Commonwealth Department of Sustainability, Environment, Water, Population & Communities (DSEWPC), the Tasmanian Department of Primary Industries & Water (Wild Fisheries Section, the Australian Fisheries Management Authority (AFMA), Australian Maritime Safety Authority (AMSA), Australian Hydrographic Office (AHO), Geosciences Australia (GA), Australian Quarantine Inspection Service (AQIS) and Border Protection Command.

Fisheries consulted with details associated with the Dalrymple 3D seismic survey include the following:

- Lakes Entrance Fishing Cooperative Ltd (LEFCOL);
- San Remo Fishing Cooperative;
- South-east Trawl Fishing Industry Association (SETFIA);
- Seafood Industry Victoria (SIV);
- Tasmanian Fishing Industry Council (TFIC);
- Sustainable Shark Fishery Inc;
- Tasmanian Scallop Fishermen's Association (TSFA); and
- Tasmanian Fishing Industry Council (TFIC).

3D Oil will continue to communicate with fisheries associated with changes to the seismic program which may affect commercial fishing operations.

Nominated Liaison Contact

Further information associated with the environmental aspects of the Dalrymple 3D seismic survey may be obtained from 3D Oil by writing to:

Kevin Lanigan
Exploration Manager – 3D Oil Limited,
Level 5, 164 Flinders Lane,
Melbourne, VIC, 3000

Table 3: Environmental Risk Assessment Summary

Aspects	Possible Environmental Impacts	Control & Mitigation Measures	Residual Risk
Acoustic Noise – Survey	Damage to marine mammals and marine life Behavioural changes to Cetaceans Behavioural changes to fish/planktonic species	No known feeding/breeding or aggregation grounds in proximity to T/41P Implement & comply with requirements of the DEWHA Industry Guidelines *Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales (2008) (includes soft-start, power-down, shut-down procedures)* Cetacean sightings during survey forwarded to DSEWPC All sightings of dolphins will be treated as whale sightings until is it confirmed by the MMO. All relevant control measures (power-down, shutdown) will be observed. Marine Crew supplied with APPEA CD as part of induction process Experienced MMO onboard to assist with cetacean observation MMO to record seal behaviour during daylight hours within proximity to the vessel and the behaviour noted. Observance of the 2005 Australia National Guideline for Whale and Dolphin Watching during non-seismic/transit periods Behavioural responses to fish likely to be localised and short-term with soft-start procedures minimising impacts Effects of seismic on fish transitory except at close range. No lethal effects have been observed for adult fish, crustaceans or shellfish exposed to seismic arrays Sharks thought to be less sensitive to seismic noise (lack of swim bladder) Fish may be displaced temporarily	Low-Medium

Aspects	Possible Environmental Impacts	Control & Mitigation Measures	Residual Risk
Seismic Vessel Presence	Interference with Commercial Shipping vessels (risk of vessel collision)	Low density of fishing/commercial vessels in permit area Seismic activities short duration (approx 10days) with no permanent infrastructure left on seabed Information on the location and timing of seismic program to be communicated to vessels via AMSA through a Notice to Mariners issued for activity duration Navigation lighting on MV *Ramform Sterling* Vessel equipped with navigation aids (radio, radar & visual watches) & crew vigilant for fishing /commercial vessel during survey Crew competent with required maritime training standards Support vessel available to identify & avert possible marine hazards In accordance to MARPOL, the vessels will operate under Shipboard Oil Pollution Emergency Plan (SOPEP). Crew is trained in preparedness and routine drills undertaken	Low
	Interference with Commercial Shipping (risk of streamer collision/damage)	Mitigation measures as per Interference with commercial shipping (risk of vessel collision) (*Detailed above*) Streamer depth increased to avert possible damage Support Vessel available to identify and avert possible marine hazards	Low
	Interference with Commercial Fishing vessels (Economic impacts)	Seismic vessel to accommodate fishing vessels where possible Detailed Notifications to marine users prior to survey commencement (vessel type, survey conducted) Continued consultation with fishing industry groups during seismic activity Interactions monitored and recorded (including position data) Support Vessel available to identify and avert possible marine hazards	Low
	Light-spill interfering with marine fauna and birds	Light emissions are in accordance with navigation safety and workplace safety requirements Extent of light-spill limited Survey area located at distance from nearest land	Low
	Anchoring activity creating disturbance to seabed benthos	Seabed substrate consists of mud/sands allowing for rapid re-colonisation No anchoring on location except in emergency	Low

Aspects	Possible Environmental Impacts	Control & Mitigation Measures	Residual Risk
Ballast Water	Introduction of exotic species which colonise and create competition for local resources	Initial mobilisation internationally will observe AQIS Australian Ballast Water Management Requirements Mobilise from adjacent Bass Basin Permit or from overseas port Local ballasting during seismic within permit area	Low
Vessel Bio-fouling	Introduce bio-fouling species/colonisation	Vessel to be assessed for bio-fouling risk prior to entry to Australian Waters Mobilise from adjacent Bass Basin Permit or from overseas port	Low
Grey water/sewage disposal	Increased nutrients in surrounding marine waters on discharge Visual amenity impacts	Sewage is treated in accordance with MARPOL 73/78 requirements (i.e. approved biological treatment). Treated to reduce BOD /organic loadings and disinfected prior to discharge Grey & black water directed to system (low volume) – POB (70) High dispersal/dilution in Bass Strait environment Permit area not in proximity to landmass (i.e. >12nm)	Low
Oily water discharges from equipment spaces	Toxicity impacts to marine flora & fauna Reduction of water quality	Oily water passes through an oil/water separator and treated to an oil-in-water content <15ppm (MARPOL 73/78 Annex 1) Oily water discharged via an IMO approved Oil-in-water (OIW) meter as per MARPOL 73/78 Annex 1 with alarm and shutdown/redirection to bilge tank on excursion Separated oil store in dedicated tank for onshore disposal (refer *Special wastes*) Activity recorded in the Oil Record Log (onboard) Low volumes discharged and rapid dilution/dispersion in marine waters	Low
Putrescible waste (food-scraps)	Increased nutrients in surrounding marine waters on discharge Visual amenity impacts	Waste macerated to less than 25mm particle size in accordance with MARPOL 73/78 and discharged below water line Low volumes discharged and rapid dilution/dispersion in marine waters Permit area not in proximity to landmass (i.e. >12nm)	Low

Aspects	Possible Environmental Impacts	Control & Mitigation Measures	Residual Risk
Special waste disposal (onshore)	Toxicity impacts to marine flora & fauna Reduced water quality Visual amenity impacts	Identification of waste reduction measures (at source) to prevent waste generation Clear waste identification, segregation, containment (in skips or sealed drums) and labelling; Waste storage areas are routinely inspected; Special waste disposed or recycles onshore Training and reinforcement to all crew (& other) personnel of waste management requirements; Documented Disposal Records.	Low
Incineration of solid Non-Biodegradable wastes (paper, plastic & wood) & Equipment Combustion	Reduction in air quality Aesthetic impacts of smoke	Segregation/disposal requirements detailed in Vessel Garbage Management Plan Low volumes generated and rapid dilution/dispersion in atmosphere Regular equipment monitoring and maintenance undertaken to ensure maximum efficiencies All emissions from marine utilities are in accordance with the guidelines in MARPOL Annex VI Prevention of Air Pollution from Ships	Low
Fuel transfer spill	Impacts on water quality and marine life	No 'at sea' refuelling planned for seismic campaign In unlikely event of requiring a fuel transfer at sea, activity will be undertaken in accordance with approved Bunkering Procedures with all associated equipment routinely maintained and inspected; Suitable absorbent material is held on the vessel to cleanup small diesel spills; Availability of implemented and tested SOPEP	Low
HFO spill due to vessel collision/grounding	Impacts on water quality and marine life Shoreline Pollution (very low probability) Disruption to fishing activities	Navigational aids on the *Ramform Sterling* including navigation lighting, radars, radio and visual surveillance to avoid collisions. Vessel operated by experienced and competent crew with access to bathymetric and marine charts Grounding risk low due to distance from nearest landmass (60km) and lack of emergent landforms in the permit area. Availability of implemented and tested SOPEP	Low

Aspects	Possible Environmental Impacts	Control & Mitigation Measures	Residual Risk
Streamer Loss	Impact to seabed & marine environment & fishery equipment	Streamer constructed of sponge material and not kerosene. Hence no spill potential. Streamer has buoyancy and does not immediately sink to seabed, hence more readily retrievable.	Low
Chemicals spills	Impact on water quality and marine life	Small quantities of chemical are stored onboard Chemicals are packaged & labelled in accordance with legislation Crew members trained in the handling and PPE requirements of specific chemicals All chemical storage areas are appropriately signed and labelled with instructions and warnings; Chemical storage areas routinely inspected; Lithium batteries – handling instructions on storage; MSDSs are to be made available for all chemicals; Spill kits to be provided in appropriate locations; Availability of implemented and tested SOPEP.	Low

Note: C = Consequence
L = Likelihood