

Auralandia NL.

AC/P35

Fairfax Marine Seismic Survey Environment Plan Summary



1. INTRODUCTION

Auralandia NL is proposing to undertake a marine seismic survey (the Fairfax MSS) in Commonwealth Petroleum Area AC/P35 using conventional marine seismic survey techniques. The survey area is located in waters of between 400 m and 520 m deep approximately 640 km WNW of Darwin, 300 km NNW of the closest Australian mainland coastline and 190 km NE of the Ashmore Reef-Cartier Island group.

The survey is scheduled to occur sometime between early late August and October 2009. The timing for actual commencement of the survey is dependent on availability of the contracted vessel, weather and environmental constraints. It is expected that it would take approximately 10 to 20 days to complete.

2. CORPORATE ENVIRONMENTAL POLICY

Auralandia NL is committed to protecting the environment and consequently has a written corporate Environment Policy (see Attachment) that provides a public statement of the corporate commitment to protecting the environment during offshore exploration operations such as seismic surveys.

3. DESCRIPTION OF SURVEY ACTIVITIES

The survey proposed will be a two-dimensional marine seismic survey (2D MSS); a method commonly used in Australian waters and internationally to conduct geophysical surveys of the seabed and sub-layers. Two-dimensional surveys employ a specialised survey vessel towing an air-gun array while moving along pre-determined sail lines at a speed of approximately 8 to 9 km/hr. It is likely that a support vessel will also be present during operations.

The airgun array will release a series of acoustic pulses, with energy directed downwards towards the seabed. The acoustic pulses are reflected from the boundaries of the geological layers in the subsurface, and these reflected signals are recorded by a series of hydrophones set in a single cable (streamer) that is also towed behind the vessel. The survey vessel will be the *BOS Atlantic*. The seismic array details are summarised in the following table (Table 1). The seismic data acquired will be used to map the sub-seabed geology of the survey area in order to evaluate the potential for further petroleum exploration activities.

Table 1: Seismic array details

Parameter	2D MSS
No of streamers	1
Streamer length	Up to 8000 m
Streamer depth	6 – 8 m
Streamer type	SEAL Fluid ALS (Acquisition Line Section)
Number of Airgun Arrays	1
Airgun array total volume	4300 cubic inch
Operating pressure	~ 13 500 kPa (2,000 psi)
Source depth	5 – 8 m
Shot point interval	~25 m (7 to 8 seconds)
Peak source sound pulse	260-270 dB re 1µPa-m
Frequency range	1 to 128 Hz

4. LOCATION

The area of the Fairfax MSS is encompassed within the nominated area (Table 2). The location of the survey area is shown by Figure 1. The survey area is located in waters of between 400 m and 520 m deep approximately 640 km west north-west of Darwin, 300 km north north-west of the closest Australian mainland coastline and 190 km north-east of the Ashmore Reef-Cartier Island group. The area within the 2D MSS boundary nominated in Table 2 is approximately 830 km².

Table 2: Bounding Coordinates of Auralandia NL's Fairfax MSS

location point	Latitude			Longitude		
	degrees	minutes	seconds	degrees	minutes	seconds
A	11	23	39	124	48	40
B	11	32	38	124	56	40
C	11	24	4	125	12	37
D	11	9	33	125	1	49

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5. SURROUNDING ENVIRONMENT

5.1 GEOMORPHOLOGY AND BATHYMETRY

The survey area lies within a geomorphologic basin that intrudes into Sahul Shelf. The basin is open to the north while on the east are the Barton Shoals and (in clockwise direction to the west) are Mangolia Shoal, Jabiru Shoal, Pee Shoal and a series of unnamed shoals. Within the basin there are several isolated pinnacles that rise abruptly from the seafloor. The shallowest of these reach to within approximately 90 m of the sea surface. It is expected that the majority of the seabed will be muddy sediments primarily derived from material formed in the pelagic environment, rather than terrigenous (land-based) origins. The isolated pinnacles are likely to be drowned carbonate banks.

The water depth varies between 400 and 520 m generally sloping downwards towards the northern and north-western margins of the survey area. There are two isolated pinnacles within the boundary of the survey area. One lies near the eastern corner and rises about 50 m from the surrounding seabed to a charted depth of 384 m. The other lies at the southern corner and rises approximately 200 m abruptly from the seabed to a charted depth of 238 m.

5.2 FAUNA

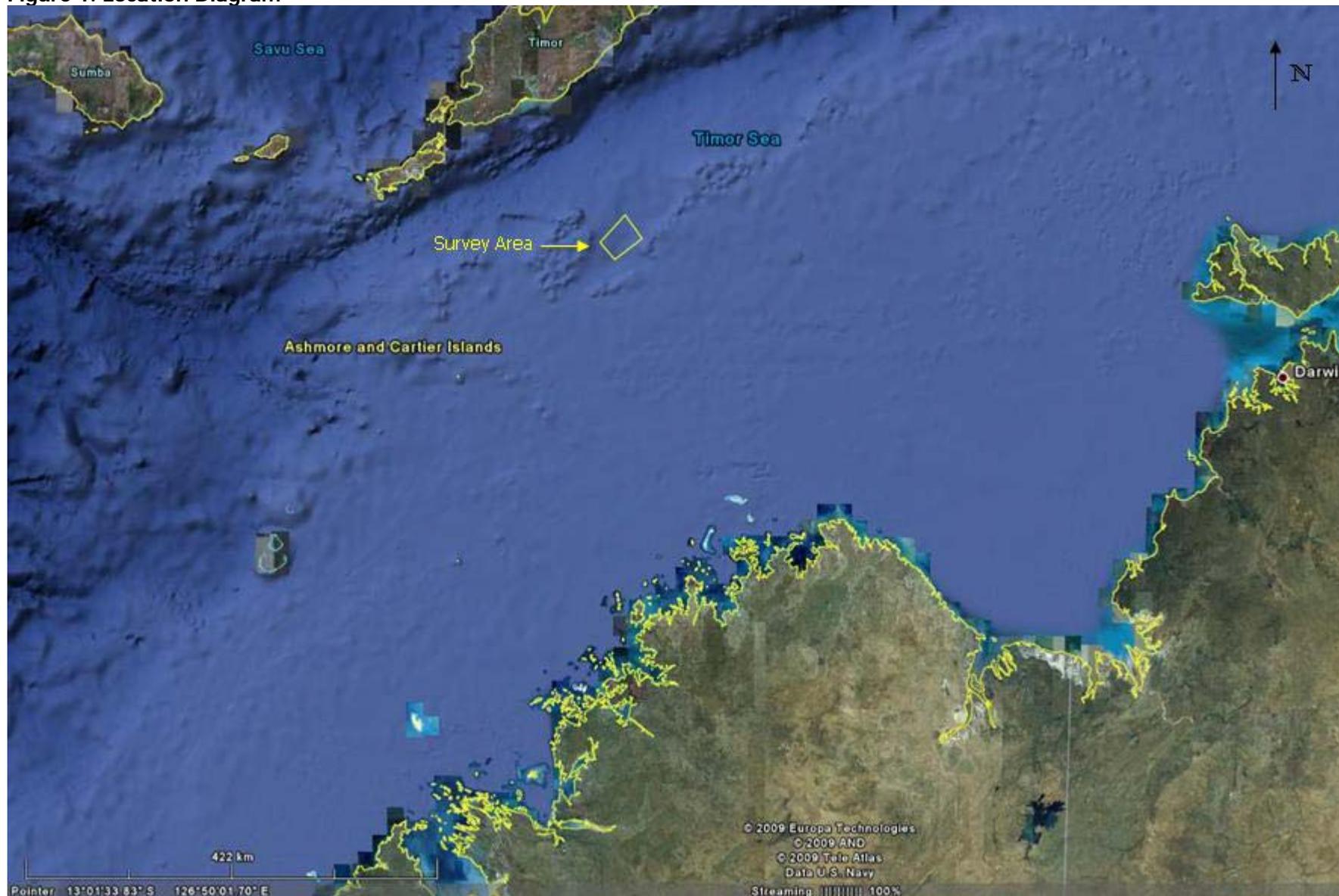
There are no listed threatened ecological communities or recorded sensitive environments within the survey area.

There are five threatened species listed on the EPBC Protected Matters database (Department of the Environment, Water, Heritage and the Arts (DEWHA)) that may occur, or whose habitat may occur, within or adjacent to the survey area, these are:

1. blue whale
2. humpback whale
3. green turtle
4. leather back turtle, and
5. flatback turtle

All five of these species are also listed as migratory species under provisions of the EPBC Act and the blue and humpback whales are also listed as cetaceans under provisions of the EPBC Act.

Figure 1. Location Diagram



There are 10 migratory species listed on the EPBC Protected Matters database (Department of the Environment, Water, Heritage and the Arts (DEWHA)) that may occur, or whose habitat may occur, within or adjacent to the survey area (refer to Table 2) including:

- 6 cetacean species (2 of which are also listed as threatened)
- 3 turtle species (all 3 of which are also listed as threatened)
- 1 species of seabird.

There are 20 species of marine mammals, or species habitat, may occur within the survey area; two of which are matters of NES, listed as threatened species (blue whale: Endangered, humpback whale: Vulnerable), and six (including the blue and humpback whales) are listed as migratory. There are 12 species of sea snake and one species of seabird that may occur, or whose habitat may occur, within or adjacent to the survey area.

Potential impacts to these species has been described previously in the referral submitted by Auralandia NL to DEWHA (22nd April 2009, reference number [2009/4864](#)).

5.3 SOCIO-ECONOMIC ENVIRONMENT

The survey area lies outside of the Australian Exclusive Economic Zone but within the limits of the Continental Shelf. Therefore jurisdictional responsibilities in the area are shared between Australia, which has sovereign rights to the seabed resources and the Republic of Indonesia.

The Australian Fishing Zone extends (in the area of the survey) to the limits of the EEZ. Therefore there are no Australian managed fisheries operating in, or near to, the survey area.

Due to the remoteness of the location there are no regular tourism or recreation activities in the permit area. It is possible that a recreational vessel may occasionally pass the survey area but it is unlikely that they would remain in the area.

The region is highly prospective for oil and gas; there have been numerous seismic surveys that have crossed the survey area and an exploration well has previously been drilled within the survey area.

There are no designated military training areas in the vicinity of the survey permit areas. There are no clearly defined shipping lanes in the area of the proposed survey.

6. RISK ASSESSMENT

The components of the seismic survey that could result in significant environmental effects have been determined through a review and evaluation of:

- The proposed activity
- The surrounding environment
- Comparison to previous surveys in the region
- Review of known environmental outcomes of marine seismic surveys, both nationally and internationally
- Review of literature including:
 - direct studies,
 - theoretical assessments and
 - compiled reviews
- Legislative requirements
- DEWHA 'Significant Impact Guidelines'
- DEWHA 'Interaction between offshore seismic operations and whales'

The activities with potential to cause significant environmental effect include:

- Operation of the seismic vessel and towing of the airgun and streamer (hydrophone) array through the survey area
- Discharge or 'firing' of the airgun arrays

- Routine waste discharges from the survey vessel
- Accidental fuel and oil spills from the survey vessel
- Accidental loss of cables and associated equipment.
- Introduction of exotic species

The assessed risks have been ranked using a likelihood and consequence matrix that is consistent with that described within AS/NZS 4360. Table 3 shows the Goldsborough Energy Pty Ltd risk matrix that associates the probability of an event occurring and the consequences to derive a characterisation of environmental risk.

Table 3: HSE Risk Matrix

CONSEQUENCE	LIKELIHOOD				
	Virtually Impossible (<10 ⁻⁶ /year)	Rare (10 ⁻⁶ -10 ⁻⁴ /year)	Unlikely (10 ⁻⁴ -10 ⁻² /year)	Likely (10 ⁻² -10 ⁻¹ /year)	Virtually Certain (>1-10 ⁻¹ /year)
Negligible	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
Minor	NEGLIGIBLE	NEGLIGIBLE	MODERATE	MODERATE	MODERATE
Major	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Severe	MODERATE	MODERATE	MODERATE	INTOLERABLE	INTOLERABLE
Disastrous	INTOLERABLE	INTOLERABLE	INTOLERABLE	INTOLERABLE	INTOLERABLE

7. ENVIRONMENTAL MANAGEMENT

To either eliminate potential environmental risks or to reduce them to as low as reasonably practicable, a number of key control and mitigation measures must be implemented. The management actions and strategies for control of the significant environmental risks associated with the proposed survey.

Performance objectives, standards and criteria for each significant aspect of Auralandia NL's Fairfax MSS are presented in Table 4. The objectives and standards proposed are consistent with all legislative requirements. The criteria listed provide a means for quantitatively determining whether the environmental standards and objectives have been met.

Table 4: Performance objectives, standards, management actions and criteria for each significant aspect of the Fairfax MSS

Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Vessel Presence	Disruption or interference to vessels in the main shipping route	Minimise interference with shipping traffic	<ul style="list-style-type: none"> • AMSA requirements • Offshore Petroleum Act 2006 	<ul style="list-style-type: none"> • Functional navigational lighting in place and in use. • Vessel meets Classification Society and Statutory inspection requirements • Operations carried out in a manner that does not interfere with navigation to a greater extent than is necessary • Marine notices broadcast according to requirements. Rescue Co-ordination Centre (RCC) notified of survey. Radio monitoring undertaken. 	Likely	Negligible	Negligible
Vessel Presence	Disruption to fishing vessels or interference with catch	Minimise interference with commercial fishing	<ul style="list-style-type: none"> • Offshore Petroleum Act 2006; • Auralandia NL Environment Policy 	<ul style="list-style-type: none"> • Operations carried out in a manner that does not interfere with fishing to a greater extent than is necessary 	Likely	Negligible	Negligible
Vessel Presence	Collision with large cetaceans	Minimise disruption to cetaceans	<ul style="list-style-type: none"> • Auralandia NL Environment Policy • DEWHA EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (May 2007) • DEWHA <i>Whale and Dolphin Sighting Report</i> • Survey Vessel Environmental Management Procedures 	<ul style="list-style-type: none"> • Work procedures if whales within 3 km of source vessel • Responsibilities for monitoring and recording whale sightings clearly identified and conveyed to vessel personnel • Sighting reports completed and returned to Auralandia NL and DEWHA 	Unlikely	Minor	Moderate
Vessel Presence	Introduction of marine pests	Avoid introduction of exotic species	<ul style="list-style-type: none"> • Auralandia NL Environment Policy • AQIS Ballast Water Management Requirements 	<ul style="list-style-type: none"> • Ensure vessel complies with, and records compliance with, AQIS Ballast Water Management Requirements 	Unlikely	Major	Moderate

Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Operation of acoustic source	Disturbance from discharge of the airgun arrays to Baleen whales and great whales	Minimise disruption to cetaceans	<ul style="list-style-type: none"> Auralandia NL Environment Policy DEWHA EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (May 2007) Conditions set by DEWHA, following assessment of referral under the EPBC Act DEWHA <i>Whale and Dolphin Sighting Report</i> Survey Vessel Environmental Management Procedures 	<ul style="list-style-type: none"> DEWHA Guidelines in place and adhered to 'Soft start' procedures Source powered down to lowest level if whale approaches within 2 km of source vessel Source shut down if whale approaches within 1 km of source vessel Responsibilities for monitoring and recording whale sightings clearly identified and conveyed to vessel personnel Sighting reports completed and returned to Auralandia NL and DEWHA 	Likely	Minor	Moderate
Lost or dropped objects	Damage and of seafloor habitats, potential contamination of sediments and water quality	Minimise disturbance to benthic habitats	<ul style="list-style-type: none"> Auralandia NL Environment Policy 	<ul style="list-style-type: none"> Recovery of lost items wherever practicable Recording and reporting of all items lost overboard 	Virtually certain	Negligible	Negligible
Waste disposal, discharge of sewage, putrescible waste	Adverse effect on water quality, potential damage to sensitive resources	Minimise effects of sewage discharge	<ul style="list-style-type: none"> Auralandia NL Environment Policy 'Protection of the Sea (Prevention of Pollution From Ships) Act 1983' (Cth); 'MARPOL 73/78 Annex IV Survey Vessel Environmental Management Procedures Survey Vessel Garbage Management Plan 	<ul style="list-style-type: none"> Sewage not discharged within 3 nautical miles of the coastline unless vessel has a certified approved sewage treatment plant in place under Regulation 8 (1) (b) of MARPOL 73/78 Annex IV. Between 3 and 12 nautical miles of coast sewage must, as a minimum, be comminuted and disinfected Ensure procedures for treatment and disposal of sewage are in place Ensure that sewage treatment system is operational and includes maceration and disinfection Relevant discharge requirements are adhered to Waste log will be maintained to record waste management practises 	Virtually certain	Negligible	Negligible

Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Waste disposal, incorrect disposal of chemicals and solid and hazardous wastes	Impact to marine environment, adverse effect on water quality	Minimise potential impacts of solid and hazardous wastes	<ul style="list-style-type: none"> Auralandia NL Environment Policy MARPOL 73/78 Annex V Survey Vessel Environmental Management Procedures Survey Vessel Garbage Management Plan 	<ul style="list-style-type: none"> Correct segregation of solid and hazardous wastes in all areas of the vessel A vessel <i>Waste Log Form</i> is kept detailing quantities of wastes transported ashore Procedures comply with MARPOL requirements 	Unlikely	Minor	Moderate
Fuel and oil spills (<80L)	Impact to marine environment, adverse effect on water quality	Minimise occurrence of fuel and oil spills	<ul style="list-style-type: none"> Auralandia NL Environment Policy MARPOL 73/78 Annex I AMSA Marine Notice 36/2002 P(SL)A Schedule 1995, Clause 220 P(SL)A Schedule 1995, Clause 285 Vessel <i>Oil Spill Contingency Plan</i> Vessel SOPEP (<i>Shipboard Oil Pollution Emergency Plan</i>) 	<ul style="list-style-type: none"> SOPEP Procedures comply with MARPOL 73/78 requirements MARPOL <i>Oil Record Book</i> kept up to date Fuel spill contingency procedures are in place and operational Designated containment areas onboard the vessel for storage of oils, greases and streamer fluid Sufficient spill response equipment on board to respond to foreseeable spill events Appropriate actions are taken to minimise pollution Any spills >80 litres are reported to the Designated Authority Personnel responsibilities are clearly identified No refuelling at sea 	Likely	Minor	Moderate
Fuel and oil spills. Leak from survey vessel's fuel tanks (>80L)	Impact to marine environment, adverse effect on water quality, potential damage to sensitive resources	Minimise occurrence of fuel and oil spills	<ul style="list-style-type: none"> Auralandia NL HSE Policy MARPOL 73/78 Annex I AMSA <i>Marine Notice 6/1995</i> P(SL)A Schedule 1995, Clause 220 P(SL)A Schedule 1995, Clause 285 Vessel <i>Oil Spill Contingency Plan</i> Vessel SOPEP (<i>Shipboard Oil Pollution Emergency Plan</i>) 	<ul style="list-style-type: none"> SOPEP Procedures comply with MARPOL 73/78 requirements MARPOL <i>Oil Record Book</i> kept up to date Fuel spill contingency procedures are in place and operational Designated containment areas onboard the vessel for storage of oils, greases and streamer fluid Sufficient spill response equipment on board to respond to foreseeable spill events Appropriate actions are taken to minimise pollution Any spills >80 litres are reported to the Designated Authority Personnel responsibilities are clearly identified 	Unlikely	Major	Moderate

Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Loss of fluid (Isopar M) from damaged streamer section	Impact to marine environment, adverse effect on water quality.	Minimise occurrence of leakage or spill of streamer fluid	<ul style="list-style-type: none"> • Auralandia NL HSE Policy • MARPOL 73/78 Annex I • P(SL)A Schedule 1995, Clause 220 • P(SL)A Schedule 1995, Clause 285 • Vessel <i>Oil Spill Contingency Plan</i> 	<ul style="list-style-type: none"> • All sections are routinely checked on deployment and retrieval of streamer the seismic streamer cable • Any sections that show leakage of fluid or contamination with sea water are drained into special holding tanks on the ship following strict procedures to prevent any accidental discharge into the sea. • Designated containment areas onboard the vessel for storage of oils, greases and streamer fluid 	Likely	Negligible	Negligible

7.1 AUDIT REVIEW AND REPORTING

Activities are monitored against HSE objectives, standards and measurement criteria defined within the EP. Two types of audit and review are conducted.

1. *Compliance Audits* An audit of the seismic survey vessel will be carried out by relevant Auralandia NL team members prior to the start of operations to ensure that procedures and equipment are in place to enable compliance with the accepted EP.

2. *Site Inspections.* The Auralandia NL Site Representative will conduct periodic site inspections. The frequency of inspection is to be once prior to commencement, once within 48 hours of commencement and thereafter as required based on professional judgement of the Site Representative

Information gathered from incident investigations is to be analysed to identify and monitor trends and develop prevention programmes. Corrective or preventative action taken to eliminate the causes of potential incidents will be commensurate with the environmental or business risk.

All incidents that have the potential to cause significant effects on the environment or interference to other users must be reported and investigated according to legislative requirements, survey vessel procedures and the Auralandia NL Environmental Policy.

Reportable incidents must be reported to Northern Territory Department of Regional Development, Primary Industries, Fisheries and Resources, (NT DRDPIFR) within 2 hours of the incident occurring or within 2 hours of first becoming aware of the incident. Auralandia NL must submit a written report of any Reportable Incident to Designated Authority as soon as practicable and in any case not later than 3 days after the first occurrence of the incident.

Auralandia NL must submit a written report of any Recordable Incident(s) that have occurred in the calendar month to Designated Authority as soon as practicable and in any case not later than 15 days after the end of the calendar month.

All discharge of oil or noxious liquids in excess of rate permitted under [*Protection of the Sea \(Prevention of Pollution from Ships\) Act 1983*](#) in Commonwealth waters must be reported to AMSA,

Any death of an individual of a species listed under the *EPBC Act* will be reported as soon as practicable, to DEWHA. Any injury or damage caused to a Matter of National Environmental Significance (e.g. listed threatened species or listed migratory species) will be reported as soon as practicable to DEWHA.

8. CONSULTATION

Auralandia NL has advised the relevant Australian government agencies listed below of the proposed survey activities and will provide details of the survey operation to these agencies no less than 14 days prior to undertaking the survey.

1. Border Protection Command
2. General Defence
3. Australian Hydrographic Office

9. CONTACT DETAILS OF NOMINATED LIAISON

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AURALANDIA N.L. ENVIRONMENT POLICY

To prevent or minimise any possible environmental impact as a result of its operations, Auralandia N.L. commits itself, and will encourage those companies providing services to Auralandia, to:

- comply, at a minimum, with applicable laws, regulations, standards and guidelines for the protection of the environment and, in their absence, adopt the best practicable means to prevent or minimise adverse environmental impacts;
- work and consult with appropriate government agencies drafting policies laws, regulations or procedures to protect the environment;
- ensure that adequate waste management practices are carried out based on the prevention, minimisation, recycling, treatment and disposal of wastes;
- provide adequate training to enable employees to adopt environmentally responsible work practices and to be aware of their environmental responsibilities;
- develop emergency plans and procedures so that incidents can be responded to in a timely and effective manner;
- develop and maintain management systems to identify, control and monitor risks and compliance with government regulations and industry guidelines;
- monitor environmental effects and assess environmental performance at all stages of exploration, development, production and rehabilitation; and
- communicate openly with government, non-government bodies and the public in a timely manner on environmental issues which relate to Auralandia's operations.

E. Geoffrey Albers
Chairman
April 2009