29 ENVIRONMENTAL MANAGEMENT FRAMEWORK

29.1 UPPER SPENCER GULF FACILITIES

29.1.1 LANDING FACILITY AND ASSOCIATED INFRASTRUCTURE

Issue:

Clarification was sought on how the impacts associated with the landing facility (and access corridor) would be managed and monitored. Particular concerns were raised about ballast water management, anti-fouling systems on ships, refuelling and waste transfer practices and spill response, all of which relate to the operation of the landing facility and activities associated with shipping and operating barges.

Submissions: 2 and 211

Response:

The Draft EIS Chapters 9 to 23 discussed the potential impacts and management measures proposed for the landing facility and access corridor. These were collated in the Draft Environmental Management Program (Draft EM Program) included in Appendix U of the Draft EIS.

The Draft EM Program is being modified and additional Management Plans and Monitoring Programs are being developed to manage potential environmental impacts, including those associated with the proposed landing facility and access corridor. If the expansion were approved, improvements would be made to these management plans and monitoring programs as the detailed design of the landing facility and associated infrastructure was finalised. Survey data obtained during the EIS process (some of which is presented in the Supplementary EIS, see Section 17 for marine-based surveys) would be used to inform the management plans and monitoring programs for the landing facility.

As was outlined in Chapter 24 of the Draft EIS, construction environmental management plans would be used to manage construction activities. These would be developed as part of contract agreements that BHP Billiton would have in place with the subcontractors undertaking the construction activities. The construction environmental management plans would be developed to ensure activities that had the potential to cause impacts to the surrounding environment and/or nuisance issues for nearby neighbours/users were managed, and that controls were implemented and monitored. BHP Billiton would audit activities and the implementation of these plans and regularly review the performance of subcontractors.

Chapter 24 of the Draft EIS outlined the framework for ongoing environmental management in the operational phase of the landing facility and access corridor, and Appendix U provided the Draft EM Program (with program identification numbers ID 5.3, 1.3, 2.1, 3.1, 3.2, 3.3, 3.6, 4.1, 4.4, and 4.6 to provide management and monitoring measures relevant to aspects associated with the proposed landing facility and associated access corridor).

It is anticipated that no fuelling/refuelling or transfer of ships' waste (i.e. kitchen waste, general waste, oils and the like) would occur at the landing facility. Such activities would be undertaken using established practices already implemented by others, and/or use existing facilities, located in Spencer Gulf.

Waste that is likely to be generated from ships at the landing facility would be limited to lashing and securing equipment for the pre-assembled modules (i.e. steel ropes, steel beams, wooden blocks and the like). These materials would be removed from the landing facility (following appropriate clearances), stored at the pre-assembly yard and either transported to Olympic Dam for reuse or recycled off-site where possible. Where reuse and recycling was not a viable option, the waste materials would be disposed of in accordance with the Environment Protection Authority's requirements.

It is expected that temporary and/or mobile refuelling and waste management and transfer facilities would be located at the landing facility site during its construction. BHP Billiton would require the Construction EMPs to include management strategies, controls and monitoring for the refuelling and waste management and transfer facilities (whether temporarily fixed or mobile), in line with requirements of the draft EM Program IDs 2.1 and 4.6 (see Appendix U of the Draft EIS).

The emergency response procedures for spills in the marine environment would adhere to requirements specified in Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (AMSA 2007) and any relevant requirements stipulated by the National Plan State Committee (refer to Section 29.1.8 of the Draft EIS). Environmental monitoring of flora and fauna and water quality would be undertaken as outlined in the Marine Flora and Fauna Monitoring Program and the Marine Water Quality Monitoring Program, respectively. These documents would be finalised and provided to government for review well before construction activities and operation began at the landing facility.

Additional surveys and ongoing environmental monitoring programs would continue to inform future management and monitoring strategies for activities at the landing facility. Surveys and assessments have already been undertaken for the Draft EIS (over a period of two years). Pre-construction monitoring would occur for at least an additional two years prior to construction, and continue during the proposed construction period. The active involvement of relevant stakeholder groups in developing these management plans and monitoring programs, together with the process of review and endorsement as part of the regulatory regime, would facilitate the management of the proposed BHP Billiton activities in Upper Spencer Gulf.

Annual public reporting of the environmental performance of Olympic Dam operations, including the new infrastructure proposed for Upper Spencer Gulf, would continue using the operation's annual environmental report.

29.1.2 SHIPPING ACTIVITIES

Issue:

Further information was sought on how the impacts associated with shipping activities would be managed and monitored.

Submissions: 2 and 84

Response:

Concerns were raised that shipping activities may cause significant impacts to Upper Spencer Gulf. These concerns related to safety, contaminants (namely tributyl tin (TBT)) and ballast water management.

The particular concerns raised in relation to shipping activities are discussed below.

Safety

The issue of marine safety as a consequence of shipping movements associated with the proposed landing facility was the subject of an independent review, the details and results of which are provided in Section 25.1.2 of the Supplementary EIS. Briefly, the safety review concluded that the volumes of BHP Billiton-related seagoing traffic would be low and with appropriate management measures and compliance with existing regulations, the impacts and risks would be acceptable. The review noted that for comparison, the proposed movement of about 300 vessels over seven years to the landing facility is considerably less than the existing 1,000 movements per year at the port of Whyalla, where a high level of safety is achieved by actively managing the interaction between commercial and recreational vessels.

It is also noted that shipping channels in South Australia are monitored, maintained and managed by the Department of Transport, Energy and Infrastructure (DTEI). To assist DTEI with future planning and resource allocation, BHP Billiton would undertake further hydrographic survey work in Upper Spencer Gulf and discuss with DTEI appropriate shipping routes, navigation aids and cost arrangements for such measures to ensure the safe passage of vessels and barges to and from the proposed landing facility.

Contaminants

Concerns were raised about the use of tributyl tin (TBT) as an anti-foulant on vessel hulls, and the resulting toxic effects on marine organisms. The Anti-fouling Systems Convention, held in 2001, banned the use of organotin compounds, and in particular TBT. As a result, all state parties have restricted or prohibited the use of TBT and other harmful anti-fouling systems on ships. In this context, ships are defined as vessels of any type operating in the marine environment including, hydrofoil boats, aircushion vessels, submersibles, floating craft, fixed or floating platforms, floating storage units and floating production storage and offloading units.

Systems and controls for TBT have been put in place by the Australian Government, with the International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001 coming into force in Australia in 2008 (it was signed in 2002 and ratified in 2007). The Australian Maritime Authority administers Marine Orders, under Part 98, Marine Pollution – Anti-fouling Systems Issue 1, which prescribes various matters, such as survey and certification requirements and forms to be used to report incidents, for the purpose of the *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006*. This Act applies to all ships in Australian waters, including Upper Spencer Gulf. Under the Convention, it is an offence for any ship bearing harmful chemical compounds on their hulls or external parts or surfaces to enter an Australian port, shipyard or offshore terminal, unless the ship bears a coating to prevent such compounds leaching into the water. The Convention sets out the survey and certification requirements for anti-fouling systems for ships.

Regulatory and non-regulatory controls, which include anti-fouling systems requirements, currently apply and operate for international vessels that call into existing ports in Upper Spencer Gulf (Port Pirie, Whyalla and Port Bonython). The existing protocols would apply to the landing facility.

Ballast water management

The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) implements the National Ballast Water Arrangements under the Australian National System for the Prevention and Management of Marine Pest Incursions. The Biosecurity Services Group in DAFF relies on the Australian Quarantine and Inspection Service (AQIS) to ensure that the requirements of the Arrangements are met.

AQIS deems all salt water from ports and coastal waters outside Australia's territorial sea to present a 'high risk' of introducing exotic marine pests into Australia. The discharge of 'high risk' ballast water from ships is prohibited anywhere inside Australia's territorial waters. AQIS specifies criteria for ballast water that can be discharged and, as stated in Section 16.6.13 of the Draft EIS, ocean vessels, as standard practice, are required to discharge ballast water outside Australian waters; this means they are not permitted to discharge in Upper Spencer Gulf.

The barges operating in Upper Spencer Gulf would discharge and take on ballast water as part of unloading operations at the landing facility. A system of recycling ballast water would be put in place, where the ballast water would be discharged into onshore holding tanks at the landing facility and the same water would be used to re-ballast vessels.

The landing facility would be declared an 'entry port' and as the first port of call, inspection activities by Australian Customs and AQIS would be undertaken before the ship's crew and/or the ship's cargo was free to leave the vessel. As part of the inspections AQIS verifies whether the master of the vessel has complied with a ballast management program as stipulated under Australian law.

In addition to this procedure of inspection upon arrival at the first Australian port, AQIS also implements pre-border inspection programs whereby AQIS officers visit overseas origin point(s) to undertake pre-inspections and provide advice on ways to ensure compliance with Australian quarantine requirements to minimise delays when cargo arrives at the landing facility. It is anticipated that such inspections at international origin point(s) would also include preliminary reviews of the vessel's ballast management program and other compliance requirements for Australian clearances. Such programs do not replace the inspection requirements upon arrival of the ship and its cargo in Australia.

Regulatory and non-regulatory controls, which include ballast water management requirements, currently apply and operate for international vessels that call into existing ports in Upper Spencer Gulf (Port Pirie, Whyalla and Port Bonython). The existing protocols would apply to the landing facility.

The Marine Flora and Fauna monitoring program would provide ongoing monitoring of the environmental values of Upper Spencer Gulf, and should any issues arise that may be associated with ballast water discharges, further assessment and investigation would occur, in liaison with the relevant regulator.

29.1.3 SAFETY, SECURITY AND BIOSECURITY

Issue:

Further information was requested about the specific requirements for safety and security associated with the operation of the landing facility, and how these would be managed.

Submissions: 1 and 211

Response:

The Australian Maritime Safety Authority (AMSA) is the government agency with the charter of enhancing the efficiency of the safety and other services to the Australian maritime industry. Liaison with AMSA throughout planning, design, construction and operation would ensure the safety requirements at the landing facility were met.

The Australian Government has implemented a maritime security regime to help safeguard Australia's maritime transport system and offshore facilities from terrorism and unlawful interference. Under this regime all security regulated ports, port facilities, offshore facilities, port and offshore service providers and ships undertake security risk assessments and implement security plans to address identified risks.

Following 11 September 2001, the international community resolved to implement a system to secure the maritime transport sector against the threat of terrorism. As a consequence the International Ship and Port Facility Security (ISPS) Code was developed by the International Maritime Organization (IMO) in December 2002. The Australian Government developed the *Maritime Transport Security Act 2003* to implement the ISPS Code in Australia. Both the ISPS Code and the Act came into effect on 1 July 2004.

The landing facility would be categorised as an 'entry port'. The guidelines set by the Department of Infrastructure, Transport, Regional Development and Local Government, as part of administering and regulating the above-mentioned Act, are reviewed and adopted for any 'port' facility, including the landing facility. Appropriate security measures would be incorporated into the design and operation of the BHP Billiton facility, particularly in areas close to the public and communities. Liaison with the Australian Customs and Border Protection Service would ensure all requirements were met.

A Biosecurity Management Plan would be developed for international vessels that import or export goods (including machinery) to or from the landing facility. The plan would cover the following quarantine issues and management options:

- Vessel requirements: All arriving international vessels are required to comply with AQIS clearance requirements. A management plan for marine pest risks associated with ballast water and bio-fouling would be developed in accordance with relevant regulations and guidelines, and in liaison with AQIS.
- Importation of goods (machinery): Machinery not meeting acceptable cleanliness standards will be refused entry into Australia. The final decision on acceptable cleanliness standards rests with the AQIS inspecting officer. It is the importer's responsibility to ensure all machinery arrives in Australia in a clean state. AQIS defines clean as 'clean as new' and has a zero tolerance for any contamination from soil or plant material.
- Pre-arrival inspections: An offshore inspection is not a clearance of quarantine, but is designed to significantly minimise quarantine clearance requirements on arrival in Australia. An offshore inspection involves an importer requesting a quarantine officer from AQIS to inspect machinery/equipment before it is shipped/transported to Australia. The offshore inspection is a replication of the inspection procedures undertaken in Australia. The benefit of an offshore inspection is that large volumes and/or complex machinery can be inspected at a reduced cost to industry. However, the machinery would still be subject to a verification inspection on arrival in Australia to ensure it is clean.
- Quarantine approved premises: A quarantine approved premise (QAP) is a place approved by AQIS where specific post-entry quarantine activities may be carried out on specific imported items (e.g. goods, materials, equipment, plants and animals) that have the potential to carry pests or disease of quarantine concern. The conditions applied to approval premises ensure the risks inherent with the specific imported goods and the activities undertaken are minimised.

It is also understood that AQIS places an increased emphasis on the risks associated with QAPs located outside metropolitan areas. As a result, BHP Billiton would liaise with AQIS on the additional assessment requirements that would apply to approvals for premises in fringe and rural areas, such as Upper Spencer Gulf.

29.1.4 DESALINATION PLANT AND ASSOCIATED INFRASTRUCTURE

Issue:
Clarification was sought on how the activities of the desalination plant would be managed and monitored.

Submissions: 2, 12, 36, 68, 79, 81, 84, 106, 118, 124, 194, 211 and 272

Response:

Chapters 9 to 23 of the Draft EIS discussed the potential impacts and management measures proposed for the desalination plant, and the key issues are summarised below.

Design features incorporated to minimise impacts

A number of design features, including a specially designed outfall diffuser, have been built into the desalination plant and associated infrastructure to minimise environmental impacts. As discussed in Chapter 17 of the Supplementary EIS, the design and refinement of such features would continue throughout the detailed design of the plant. In parallel with these design refinements and monitoring outcomes, the relevant management plan(s) would be updated as necessary to ensure the higher-risk activities associated with the construction and operation of the plant are well documented and that construction activities and operations are undertaken in a manner that does not cause significant impact to the environmental values of Upper Spencer Gulf.

Design features, such as locating the outfall pipe in deep water away from the Australian Giant Cuttlefish breeding habitat, would minimise potential impacts to the cuttlefish (see Section 17.10 of the Supplementary EIS for further details) by keeping the plant's return waters away from the cuttlefish.

A question was also raised in relation to the composition of the anti-scalant to be used in the desalination process and concerns were expressed that the anti-scalant may contain tributyl tin (TBT). As stated in Section 16.4 of the Draft EIS, the anti-scalant chemical used in reverse osmosis process desalination plants (to prevent scale accumulating on membranes) similar to the type proposed for Point Lowly, commonly consists of an organophosphonate compound and sulphuric acid for pH adjustment to improve reverse osmosis performance. The anti-scalant chemicals associated with the desalination plant do not contain TBT.

The organophosphonate compounds generally have relatively low toxicity to fish and invertebrates, but can deprive algae of micronutrients through the formation of metal complexes. For this reason the marine water quality monitoring programs for the proposed desalination plant would monitor algae. The organophosphate compounds are not inherently toxic themselves (S Lattemann, University of Oldenburg, pers. comm., 26 March 2008).

The use of sulphuric acid lowers the return water pH to approximately 7 (compared with ambient seawater that has a pH of 8). It is anticipated that ambient seawater would rapidly buffer the return water, resulting in a pH above 7.6 near the outfall. It is noted that the ongoing development of anti-scalants that are even less toxic may result in new chemicals becoming available in the future. Newly developed anti-scalants may therefore ultimately be used in the desalination plant if they prove to be operationally more effective and/or environmentally more benign (see Section 17.8.4 of the Supplementary EIS for further details).

EM Framework

Chapter 24 of the Draft EIS outlined the environmental management framework for all expansion activities. More specifically, the Draft Environmental Management Program (EM Program) provided in Appendix U of the Draft EIS (namely ID 2.1) discussed the environmental values, environmental objectives and assessment criteria that are specific to the marine environment. The timeframes for the marine monitoring programs were provided in the Draft EIS, Figure 24.4. An updated schedule is provided in Figure 29.1.

Marine monitoring is proposed to occur for two years before construction commences, and during the construction of the plant. An intensive monitoring program would continue in the first year of plant operation to confirm the return water modelling outcomes.

The Draft EM Program is being modified and additional Management Plans and Monitoring Programs are being developed to manage the environmental aspects and potential impacts of all elements of the proposed expansion, including the proposed desalination plant. If the expansion receives approval and the detailed design of the desalination plant is finalised, the management plans and monitoring programs would be improved.

As outlined in Chapter 24 of the Draft EIS, construction environmental management plans would be used to manage construction activities, and these would be developed as part of the contract agreements that BHP Billiton would have in place with contractors undertaking the construction activities. Construction environmental management plans would be developed for activities that have the potential to cause impacts to the surrounding environment and/or nuisance issues for nearby neighbours/users. These plans would be audited and BHP Billiton would review the contractor's performance regularly.

In terms of the operational phase of the desalination plant, Chapter 24 of the Draft EIS outlined the framework for the ongoing environmental management of the expansion activities, and Appendix U provided the Draft Environmental Management Program (with program identification numbers ID 5.1, 1.3, 2.1, 3.1, 3.2, 3.3, 3.6, 4.1, 4.4, and 4.6 to provide management and monitoring measures relevant to aspects associated with the desalination plant).

The return water discharge during the operational phase would be managed within acceptable parameters and comply with licence conditions. Baseline monitoring and ongoing monitoring (through the Marine Water Quality and Marine Flora and Fauna monitoring programs) would inform operational procedures, monitor compliance and measure environmental performance.

Design features have been built into the desalination plant and associated infrastructure to minimise environmental impacts, and specific management plans would be developed to ensure high-risk activities associated with construction activities (such as marine blasting) were undertaken in a manner that does not cause significant impact to the environmental values of Upper Spencer Gulf.

BHP Billiton accepts its responsibility to the communities in which its operations are located and to its shareholders. It would monitor the impact of these activities to meet the requirements and objectives of its own mandated Health, Safety, Environment and Community (HSEC) policy.

Survey, baseline and ongoing environmental monitoring

The outcomes of the impact assessments and hydrodynamic modelling predictions presented in Chapter 16 and detailed in Appendix O of the Draft EIS indicated the impacts on the environmental values of Upper Spencer Gulf from the proposed expansion activities (i.e. the landing facility and desalination plant) would not be significant. This information, together with further site surveying and environmental monitoring outlined here and detailed in Chapter 17 of the Supplementary EIS, also provides valuable data for determining lead and lag indicators for baseline and ongoing future environmental monitoring to identify impacts and determine appropriate management.

The information presented in Chapter 17 of the Supplementary EIS (see Sections 17.2 and 17.5 in particular) further clarifies the marine survey and environmental assessments undertaken, and outlines how the studies have addressed the effects of dodge tides and water quality.

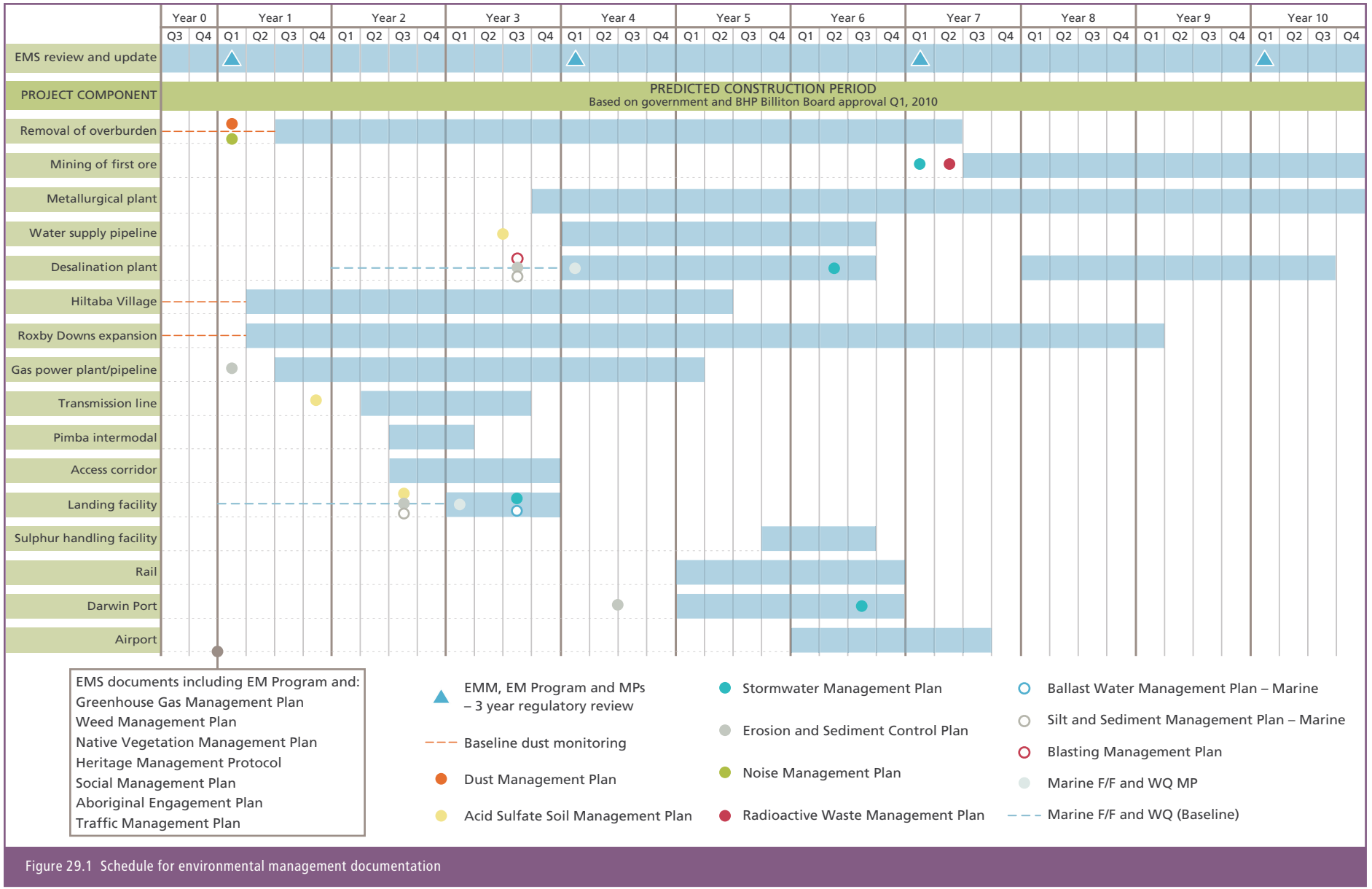

Figure 29.1 Schedule for environmental management documentation

Ongoing monitoring (during pre-construction, construction and operation) of the activities associated with the desalination plant would be undertaken by qualified and experienced marine specialists and would allow for a cross-check of actual impacts with predicted impacts identified during the Draft EIS and the subsequent Supplementary EIS. This in turn would ensure current information was obtained to inform reviews and updates to the monitoring programs and management plans as, and if, required.

Environmental monitoring of flora and fauna, and water (and sediment) quality would be undertaken according to the Marine Flora and Fauna Monitoring Program, and the Marine Water Quality Monitoring Program, respectively. These documents would be finalised before the desalination plant was constructed. Site survey and environmental monitoring programs of Upper Spencer Gulf, already undertaken for the Draft EIS (i.e. two years of monitoring) and anticipated pre-construction monitoring (for an additional two years), plus monitoring during the proposed three-year construction period would continue to inform future management and monitoring strategies for activities at the desalination plant. Monitoring programs are also being reviewed to identify where partnerships and/or sponsorships, with bodies such as South Australian universities and research bodies, would provide value to the scientific community. These programs would obtain detailed baseline data for Upper Spencer Gulf and monitor the effects of expansion activities on the marine environment. The active involvement of relevant stakeholder groups in the development of management plans and monitoring programs, together with the process of review and endorsement which is part of the regulatory regime, would facilitate ongoing and future management of the proposed BHP Billiton activities in Upper Spencer Gulf.

The monitoring of salinity would be an important component of water quality monitoring programs for Upper Spencer Gulf. These are expected to also include assessments of sediment oxygen demand, dissolved oxygen, physico-chemical parameters (e.g. temperature and pH), potential contaminants resulting from the desalination process (e.g. anti-scalants) and the effects of outputs which have been concentrated by the process (e.g. trace metals, trace organic water treatment chemicals, faecal coliforms and trace chlorinated compounds).

The monitoring program would embrace proven and new technologies and techniques for testing and measuring, and would be designed to ensure that water quality parameters relevant to the desalination process were monitored, that the number of sampling locations provided adequate representation and data to allow for model predictions to be verified, and that control sites would be properly assessed. Only qualified and experienced professionals and technical experts would undertake the monitoring. The program would incorporate objectives and assessment criteria consistent with those presented in the Draft EIS.

Similar to the SA Water Adelaide Desalination Plant, the operation of the desalination plant at Point Lowly is expected to be licensed by the South Australian EPA (with the generation of return water discharge as part of the desalination process expected to be classified as a prescribed activity under the *Environment Protection Act 1993*), and would therefore operate under set licence conditions. The requirements under the licence would be incorporated into monitoring programs.

The specific components to be included in marine monitoring programs are discussed in Sections 29.1.5 and 29.1.6 below.

Operational monitoring of water intake and plant performance

Operational monitoring would be undertaken to ensure the quality of intake water was acceptable and that operational performance met required standards. Operational monitoring would include the continuous monitoring of water quality parameters that may affect the desalination process and plant performance. These parameters would include potential contaminants, salinity, temperature and pH.

Public reporting of monitoring outcomes

Since 1988, the environmental performance of the Olympic Dam operation has been reported each year in the operation's annual environmental report. This process would be used for the new infrastructure proposed for Upper Spencer Gulf.

The details of the environmental monitoring for the components of the Olympic Dam expansion, such as the desalination plant, would be provided to the relevant government authorities as part of the environmental reporting. This reporting would comply with requirements established as part of the development approval and/or as part of subsequent licences issued by the Government. The current regulatory regime for the Olympic Dam operation provides for annual reporting of environmental monitoring and achievements against set objectives to the Department of Primary Industries and Resources South Australia (PIRSA) in the Environmental Management and Monitoring Report (EMMR). These reports are made available, in whole, to the public via PIRSA's communication and information dissemination media, such as via its website.

BHP Billiton is committed to providing support and input to regional environmental management and monitoring with other users and occupiers of Upper Spencer Gulf, to assist in a collective and collaborative approach to managing the marine environment of Upper Spencer Gulf.

The ongoing monitoring and assessment would be used to routinely review and verify the predictions of future potential impacts presented in the Draft EIS.

BHP Billiton would continue to be accountable for its activities and the impacts that they create, and is committed to establishing robust environmental monitoring programs to ensure that lead and lag indicators are monitored and provide early notification of potential impacts, and to enable appropriate actions to be taken to prevent significant impacts.

29.1.5 RISK ASSESSMENTS (VERSUS IMPACT ASSESSMENT) FOR THE DESALINATION PLANT

Issue:

Some concerns were raised in relation to the adequacy of the risk assessments undertaken of the desalination plant, and how the risk assessment and impact assessment affects mitigation measures and contingencies for the future.

Submissions: 2 and 15

Response:

The major components of the proposed expansion, including the desalination plant, were subject to an iterative process of risk assessment for unplanned events during the EIS process. The risk assessment process undertaken for the purpose of the Draft EIS was outlined in Chapter 26 and Appendix C of the Draft EIS. The primary aims of the risk assessment completed for the Draft EIS were to:

- identify possible risk events or risk situations that were considered to be 'extreme' (and therefore intolerable and requiring modification)
- develop a list of project risks
- identify key project risks requiring additional controls in the form of management plans.

A level of risk was assigned to each event based on the consequence and likelihood of the event occurring. The design or activity (of the expansion project) was modified where the risk assessment resulted in an extreme risk. Where 'high' or 'moderate' risk items were identified, controls and/or contingency measures were devised (where adequate information was available to do so), and these are presented in the draft EM Program (Refer to Appendix U of the Draft EIS). Upon project approval, further risk assessments would be undertaken as part of BHP Billiton's internal systems and processes during detailed design, construction, operation and decommissioning/closure for the various components.

It was suggested that the risk assessment analysis for the desalination plant should be significantly expanded to provide an adequate level of risk definition to assess whether the relevant mitigation strategies were likely to be effective. Specific details confirming the robustness of the risk assessment undertaken for the Draft EIS are discussed in Chapter 31 of the Supplementary EIS. This includes a discussion of the differences between the risk assessment and impact assessment processes, how each was addressed in the Draft EIS and how risks would continue to be addressed for the expansion project into the future.

29.1.6 REVIEW OF ASSESSMENT CRITERIA, MODEL PREDICTIONS AND MONITORING PROGRAMS

Issue:

Clarification was sought on how the marine monitoring programs would be reviewed and updated to ensure the assessment criteria, predictions and modelling were current. In some cases, specific monitoring requirements were suggested.

Submissions: 2, 86, 143 and 211

Response:

Chapter 24 of the Draft EIS outlined the framework for environmental management of expansion activities and detailed how the components in the framework, including monitoring programs, assessment criteria, models and predictions, would be reviewed and updated as the expansion project progressed.

Specifically for Upper Spencer Gulf, a Marine Water Quality Monitoring Program and a Marine Flora and Fauna Monitoring Program would be drafted and implemented in the pre-construction, construction and post-construction phases of the desalination plant and the landing facility. These programs are 'live' and would be designed for rigidity to enable quantitative and statistical analysis of the impacts. The programs would be updated as required based on information obtained from monitoring programs conducted for two years before construction began, and a further three years during the construction period (as presented in Figure 24.4 of the Draft EIS and updated in Figure 29.1 for the Supplementary EIS).

ID 2.1 of the Draft EM Program (Appendix U of the Draft EIS) is relevant to the marine environment and under review and currently being updated to reflect the environmental values, environmental objectives and assessment criteria that are specific to the environments in which activities would occur. This review process would continue as part of internal ISO 14001 Environmental Management System and as part of the regulatory regime for Olympic Dam. These updates ensure the environmental values are appropriately identified and remain current, and appropriate management measures and controls are put in place.

Recommendations put forward as part of consultative processes for the proposed management procedures for the design and operation of the desalination plant would be considered (if they have not already been considered), as the operational water quality and the marine water quality monitoring programs are developed and refined, and as the results of ongoing baseline assessments for marine water quality are completed and the outcomes from the monitoring are assessed. Such recommendations include, for example, the regular ongoing monitoring of sediment oxygen demand and dissolved oxygen levels with remote data loggers and optical instruments, the monitoring of control sites well outside the return water discharge zone, and devising trigger points based on the published EIS data for salinity. The monitoring program(s) would continue to be refined and finalised in liaison with regulatory agencies.

Concerns were raised about the adequacy of salinity measurements presented in the Draft EIS and this concern is addressed in Section 17.2.1 of the Supplementary EIS.

With regard to field measurements of tidal velocities, an additional Acoustic Doppler Current Profiler (ADCP) was deployed around Point Lowly after the Draft EIS was published, to collect additional data for a year. The ADCPs continuously monitored and data-logged current speeds and directions throughout the water column. One ADCP was deployed at the site of the proposed outfall, one in the shallow water off Point Lowly, one in the shallow cuttlefish habitat off Stony Point and one near the fish farms in Fitzgerald Bay. Regular water sampling has also occurred as part of the Supplementary EIS (see Section 17.5 of the Supplementary EIS for further details).

Continued baseline assessments and monitoring provide (and would continue to provide) additional data and information to verify hydrodynamic and salinity modelling undertaken as part of the Supplementary EIS and into the future as the expansion project progressed.

As with the Adelaide desalination plant, turbidity monitoring would also form an important component of the marine water quality monitoring undertaken during the construction of the desalination plant (and of the landing facility).

The aim of implementing robust and sensitive monitoring programs for Upper Spencer Gulf is to obtain good-quality, meaningful data that enables rigorous statistical analysis and contributes to a high-quality assessment of environmental performance. The monitoring programs also provide inputs into processes for reviewing and improving the EM Program.

Further development of the monitoring programs would continue to enhance the database and information base for the benthic and intertidal communities and associated flora and fauna for the areas associated with the expansion activities in Upper Spencer Gulf.

The programs would be reviewed and updated to ensure impact and control sites (and their location and number) were adequate and provided data to satisfy the objectives of the programs. The programs would not only capture potential pollution impacts, but would also incorporate specific sampling to analyse changes to the primary food chain constituents considered important for marine ecosystems, such as nutrient loads, oxygen and micro-organisms.

The programs would be designed to provide robust data to allow model predictions to be assessed and validated.

A review of whether identified environmental values, (i.e. values of the environment that are considered to be important and/or unique), which may include receptors such as a receiving environment, ecosystem and/or specific plant or animal, would be continuously undertaken as part of the continuous improvement processes to ensure those values were enhanced, protected and/or conserved.

29.1.7 SPECIFICS TO BE INCORPORATED INTO MONITORING PROGRAMS FOR UPPER SPENCER GULF

Issue:

Clarification was sought on the specific inclusions into marine monitoring programs for the Australian Giant Cuttlefish, sponge communities, benthic communities, planktonic invertebrates, marine migratory species and commercial fish species that would be implemented in Upper Spencer Gulf to monitor BHP Billiton's activities.

Submissions: 1, 15, 79, 84, 123 and 243

Response:

The specifics of such monitoring programs would be developed in liaison with relevant stakeholders before the baseline monitoring surveys commenced. Chapter 17 of the Supplementary EIS discusses the possible marine monitoring parameters.

The assessment and survey environmental monitoring undertaken in Upper Spencer Gulf as part of the impact assessment (see Chapter 17 of the Supplementary EIS) and additional monitoring anticipated to be undertaken prior to and during construction would inform the development and refining of baseline monitoring programs, which in turn would inform the operational environmental monitoring programs.

Chapter 24 of the Draft EIS provided the EM Framework in which marine management plans and monitoring programs would be developed for Upper Spencer Gulf. Marine-specific programs for Upper Spencer Gulf include the Marine Flora and Fauna Monitoring Program and the Marine Water Quality Monitoring Programs.

As outlined in the EM Program provided as a draft in Appendix U of the Draft EIS, the environmental values requiring environmental management and/or monitoring which are specific to Upper Spencer Gulf include:

- Australian Giant Cuttlefish breeding aggregation
- recreational fishing resources
- aquaculture (Fitzgerald Bay facilities) businesses
- commercial fishing resources
- heritage values in the marine environment.

The Draft EIS provides environmental objectives and assessment criteria developed for protecting the above-mentioned environmental values.

Specific lead indicators for monitoring potential impacts to identified environmental values would be incorporated into monitoring programs for the marine environment. Lead indicators provide early warning that control measures may be failing and that the objectives are potentially at risk of not being achieved. Lead indicators would be developed using baseline monitoring data and model predictions and would take into consideration relevant regulations and conditions set for approval. The lead indicators would be developed in collaboration with relevant regulatory authorities.

The monitoring programs developed would undergo audit and review as part of the annual reporting to government, as is currently required for Olympic Dam. A review of the acceptability of the data collected, and the robustness of the assessment, against the objectives and assessment criteria, would be undertaken and presented in the annual report.

Issue:

Clarification was sought on the specific management and monitoring programs that would be implemented for the Australian Dogwhelk.

Submissions: 15, 79, 84, 123 and 243

Response:

Monitoring programs for Upper Spencer Gulf would include monitoring pest species and specific requirements would be developed based on survey and assessment data collected as part of the EIS and appropriate guidelines and codes of practice, such as the National System for the Prevention and Management of Marine Pest Incursions, which was implemented in 2009. The inclusion of the Australian Dogwhelk, a marine pest species sometimes introduced as a result of shipping and boating activities, would be determined as baseline data, information and advice from regulatory agencies and risk assessments were assessed.

As was mentioned in Section 17.17.5 of the Supplementary EIS, Australia has worked with New Zealand to develop National Marine Pest Monitoring Guidelines and a Monitoring Manual that would be used to design and implement each of the monitoring programs that form part of the national system (DAFF 2009). The national system aims to prevent new marine pests arriving, respond when a new pest does arrive and minimise the spread and impact of pests already established.

Management plans developed for the components located in marine environments that have an introduced marine pests component would be consistent with the national system. Further discussion on marine pests is provided in Section 17.17.5 of the Supplementary EIS.

29.1.8 EMERGENCY RESPONSE IN THE MARINE ENVIRONMENT

Issue:

It was requested that a management plan be developed and included in the Supplementary EIS for emergency response in the marine environment of Upper Spencer Gulf.

Submission: 2

Response:

A draft plan addressing emergency response in the marine environment of Upper Spencer Gulf has been developed and is included, in draft form, in Appendix N2 of the Supplementary EIS.

29.1.9 REGULATOR INVOLVEMENT IN ENVIRONMENTAL MONITORING PROGRAMS FOR THE DESALINATION PLANT

Issue:

Information was requested on how regulators would be involved in the future management and monitoring of the desalination plant.

Submissions: 84, 124 and 346

Response:

The relevant regulators would be consulted in the management and monitoring of activities in Upper Spencer Gulf and would also be involved through BHP Billiton's regional research programs.

The active involvement of regulators in developing management plans and monitoring programs (i.e. the EM Program, refer to Appendix U of Draft EIS) and the review, check and endorse processes of the regulatory regime would ensure the ongoing and future management of day-to-day activities for the desalination plant met the regulatory requirements. The Draft EM Program components developed for the desalination plant would be reviewed regularly to ensure that environmental values were appropriately identified and that appropriate management measures and controls were put in place by the regulators.

The details of environmental monitoring for the components of the Olympic Dam expansion, such as the desalination plant, would be provided as part of environmental reporting to the relevant government authorities and would comply with the requirements set as part of the development approval and/or as part of subsequent licences issued by the government. The current regulatory regime for the Olympic Dam operation provides for annual reporting of environmental monitoring and achievements against set objectives in the Environmental Management and Monitoring Report (EMMR) submitted to the Department of Primary Industries and Resources South Australia (PIRSA). These reports are audited by third parties and made available to the public via PIRSA's communication and information dissemination media, such as its website. It is expected that this regime of reporting and communicating to the community would remain.

Specialist sub-consultants to BHP Billiton, who have demonstrated capability in the required fields of expertise, would undertake monitoring programs. The programs would also be reviewed to identify partnerships and/or sponsorships with bodies such as South Australian universities and research bodies, which would provide value to the scientific community. These would be used to obtain baseline data for Upper Spencer Gulf and monitor the effects of the expansion activities on the marine environment.

Like the SA Water Adelaide desalination plant, it is expected the desalination plant at Point Lowly would be licensed to operate by the South Australian EPA. It would, therefore, operate under set licence conditions and a specific reporting regime would apply to aspects of those conditions. Continued liaison with the EPA would occur as management and monitoring programs were being implemented to satisfy specific licence conditions and criteria.

BHP Billiton is committed to providing support and input into regional environmental management and monitoring with regulators and other users and occupiers of Upper Spencer Gulf, to assist in a collective and collaborative approach to managing this marine environment.

29.1.10 DEVELOPMENT OF CONTINGENCIES AND ACCOUNTABILITY FOR IMPACTS

Issue:

Information was requested on the contingencies that have been developed for any unplanned events at the desalination plant, particularly in relation to the discharge of return water.

Submissions: 2, 57, 68, 84, 85, 86, 140, 143, 194, 285, 286, 263, 346 and 354

Response:

BHP Billiton and its specialist consultants have confidence in the impact assessments undertaken for the proposed desalination plant and the conclusions regarding potential impacts on the local marine communities (refer Chapter 16 of the Draft EIS and Chapter 17 of the Supplementary EIS for details of these assessments and the findings). In the unlikely event that return water discharge from the proposed desalination plant did not meet the agreed dilution criteria specified by the South Australian Government as part of the approval conditions, the desalination plant would cease discharging return water into Upper Spencer Gulf until the issue was resolved.

The identified risk events that resulted in a 'high' residual risk level for the expansion are summarised below, together with a brief outline of the management measures and contingencies developed, at this stage, for each event.

Summary of 'high' residual risks identified for the desalination plant:

Hazard/threat	Fault/failure/cause	Risk event/ consequence	Management measure/contingency
Construction			
Loss of control of inert/ recyclable waste	Contractor fails to follow procedures	Visual amenity effects	The BHP Billiton-approved Construction Environmental Management Plan would be implemented and would incorporate requirements for responsible waste management and compliance with South Australian Environment Protection Authority legislation and regulations.
Shore/jack up barge transfers of materials via service barge	Collision event/sinking/ impact	Oil spill	The BHP Billiton-approved Construction Environmental Management Plan would be implemented. It would include spill response plans and procedures would incorporate provisions to prevent collisions with the service barge
Temporary toilets	Failure of liquid management processes causing contamination to surface and stormwater	Contamination of site and stormwater	The BHP Billiton-approved Construction Environmental Management Plan would be implemented. It would include spill response plans and procedures would incorporate provisions for the preventative maintenance and inspection of toilets on-site to ensure they are in working order.
Tunnelling spoil off-site management plan	Pond (dewatering ponds) base leaks Vehicle movements result in nuisance issues to nearby residents	Impact to groundwater Public concerns greater than expected	The BHP Billiton-approved Construction Environmental Management Plan would be implemented. It would include specific management measures and controls for activities associated with the tunnelling spoil. The BHP Billiton-approved Construction Environmental Management Plan would be implemented and would include a communications plan for nearby residents and procedures for managing community complaints.

Summary of 'high' residual risks identified for the desalination plant (cont'd):

Hazard/threat	Fault/failure/cause	Risk event/ consequence	Management measure/contingency
Construction			
Test water	Inability to control the place of release	Soil erosion, short-term waterlogging	The BHP Billiton approved Construction Environmental Management Plan would be implemented and would include management strategies for planning the place of release of test waters, as well as contingencies, should the place of release be uncontrolled.
Operation			
Intake structure	Collision with ship/ vessel	Oil spill	Operational controls and procedures would incorporate provisions for the prevention of collision of a ship/vessel with the intake structure. The Emergency Response Plan would include provisions for such an event.
Discharge	Inaccurate modelling; unpredicted set of circumstances	Build up of salinity in local areas at seabed level – stratification and reduction in oxygen. Potential impact to aquaculture in Fitzgerald Bay	Ongoing operational and environmental monitoring in the marine environment would detect potential variation from model predictions. Regular review and assessment of modelling as part of annual management and monitoring assessment and reporting would consider accuracy of modelling. Significant excursions of salinity assessment criteria would result in consideration of contingency options, including plant shutdown.
	Significant failure of outfall pipe and/or diffuser	Reduced ability for dispersion and resulting local increase in salinity impacting local fauna and flora	Preventive maintenance inspections and schedules would minimise the event of pipe and diffuser failure. The Emergency Response Plan would include provisions for unexpected failures. Tunnelling of pipeline would reduce the risk of this occurring.
Sludge/ evaporation basins	Upset conditions	Pungent odour discharges	The Emergency Response Plan would include provisions for response to odour incidents. Contingencies for ceasing/reducing odours as quickly as practicable would be developed in consultation with odour specialists.
	Seepage	Groundwater contamination	The groundwater monitoring program would be implemented for sludge/evaporation basins as part of the EM program and the operational environmental management systems for the desalination plant. The Emergency Response Plan would include provisions for response to groundwater impact incidents. Contingencies for ceasing/managing groundwater impacts as quickly as practicable would be developed in consultation with specialist groundwater consultants.
Return water pipeline at evaporation pan	Burst pipe/fitting failure	Salt contamination to land	Preventive maintenance inspections and schedules would minimise the event of pipe failure. The Emergency Response Plan would include provisions for unexpected pipe failure.
	Easement through urban areas – flooding risk		The easement to be finalised in consultation with the South Australian Government and specialist civil/environmental engineers, to achieve a route of least risk to flooding (taking into consideration other limitations for easement location). Preventive maintenance inspections and schedules would minimise the event of pipe failure. The Emergency Response Plan would include provisions for unexpected flooding.

* Information sourced from ARUP Risk Consulting, Olympic Dam Development Study, Arup 2008 – Technical Supplement to the Olympic Dam Development Study – Risk Assessment (Amended), June 2009.

Issue:

Additional information was requested in the Supplementary EIS on mitigation measures and contingency strategies for all 'high' risks identified for the desalination plant. In addition, risks and mitigation measures/contingencies associated with the disposal of excess dewatering water (as part of the desalination processes) were requested.

Submissions: 2 and 15

Response:

The Draft EM Program (Appendix U of the Draft EIS) provides controls and management measures in response to the impact assessment undertaken and contingency measures for key project risks, where information is available to develop them at this stage.

Contingency measures for key project risks would be further developed during the subsequent stages of the expansion project. The EIS risk assessment process has identified a comprehensive register of risks associated with the proposed expansion, and these have been fed into the BHP Billiton expansion project risk management system. The EIS risk process resulted in immediate control measures being applied to any risks identified as 'intolerable', which reduced the specific risk to a 'tolerable' level.

Depending on the magnitude of risk and where appropriate, contingency measures for the identified tolerable risks would be developed using the principles of risk management. This is an iterative approach, which aims to eliminate or reduce the likelihood and/or consequence of incidents to a level considered to be as low as reasonably achievable (ALARA) or as low as reasonably practicable (ALARP).

BHP Billiton applies risk reduction measures and controls in the stages where there is sufficient detail available to maximise the effectiveness of the controls. As a result, only some contingency options are identified in this Draft EM Program (refer to Appendix U of Draft EIS).

Issue:

Clarification was sought on who would be accountable for impacts that may arise from the desalination plant.

Submissions: 57, 62, 68, 84, 85, 140, 194, 346 and 354

Response:

BHP Billiton, as the proponent constructing and operating the desalination plant, must comply with relevant legislation and regulations, approval and licence conditions, and would be responsible for undertaking these activities in a responsible manner with a view to protecting the environmental values associated with Upper Spencer Gulf ecology, fisheries and recreational use.

The desalination plant, like SA Water's Adelaide desalination plant, would be expected to operate under set conditions licensed by the South Australian EPA. Conditions may also be set (by the State and/or Australian governments) for the construction and operation of the plant as part of EIS approvals.

Through the conditioning and licensing of the plant, the State and Australian governments would be accountable for regulating the activities and ensuring BHP Billiton implemented the management, monitoring and reporting programs that met government requirements.

29.1.11 REGULATION AND RESPONSIBILITIES

Issue:

Clarification was sought on the regulatory regime to be imposed for the operation of the desalination plant in the event that BHP Billiton passed on the management of the plant to a contractor/third party. It was also requested that BHP Billiton guarantee the long-term safe operation of the plant over its lifespan of 40-plus years, even if market forces and commodity prices reduce profits.

Submissions: 79, 140, 346 and 347

Response:

Specialist skills would be needed to construct and operate the desalination plant and BHP Billiton would most likely contract this task to another company. However, BHP Billiton would remain ultimately responsible, and therefore any subcontracting party would operate in accordance with BHP Billiton's requirements, and any approval conditions and regulatory requirements set by government. BHP Billiton would undertake a strict program for reviewing contractor performance, and adhere to any mandatory regulatory reporting required to demonstrate compliance and performance to government.

The desalination plant would operate under conditions set by the South Australian Government for the duration of its lifespan, even during unfavourable economic times. Reporting against performance criteria would be publicised in the annual environmental management and monitoring report. Should the plant be 'mothballed' or decommissioned, this would be done in accordance with government requirements and in compliance with relevant legislation and regulations.

Through appropriate assignment arrangements as a result of any divestment, the desalination plant would continue to operate according to the approval conditions set for the facility as part of the EIS approval, as well as any licences or permits that had been issued. Whether BHP Billiton or another party owned or operated the plant, the State Government would regulate activities in accordance with the relevant legislation and associated regulations.

29.2 DARWIN PORT FACILITIES

Issue:

Clarification was sought on the management and monitoring of activities at the Port of Darwin.

Submission: 30

Response:

The management and mitigation measures for the Port of Darwin facilities were determined as part of the impact assessment process and were discussed throughout Chapters 9 to 23 and collated in Section E4.8 of Appendix E of the Draft EIS. Measures were identified for air quality, noise, surface water, soils, flora and fauna, mosquito breeding, cultural heritage, visual amenity and waste management.

Ranges of engineering and administrative controls have been incorporated into the design of the storage and loading facility at the Port of Darwin. Some of these include:

- a closed system design with built-in wet scrubbers and dust baghouses in a negative pressure storage and loading shed and enclosed conveyors providing control for particulates and loss of product, as well as for noise attenuation
- a zero discharge system for water that comes into contact with copper concentrate, with recycling of washdown water prior to its transport to and disposal at Olympic Dam
- on-site stormwater control to separate water that may come into contact with concentrate and 'clean' stormwater that would be diverted to on-site storage (for first flush) and then into the existing East Arm stormwater management system
- appropriate bunding and storage requirements for hazardous materials
- waste concentrate (resulting from cleaning activities, collection via the closed system design, and capture in pollution control equipment such as baghouses) collected on-site to be transferred to Olympic Dam for disposal to the on-site landfill or in the tailings storage facility.

Assessment and survey data obtained during the EIS process would be used to inform management plans and monitoring programs developed for the Port of Darwin facilities. Section E4.8 of Appendix E of the Draft EIS provided an outline of the impact assessment and associated mitigation measures for the storage and loading facility at the Port of Darwin.

Appendix E4.12 of the Draft EIS provided details for environmental management for the expansion activities at the Port of Darwin. BHP Billiton has developed an Environmental Management Framework (EM Framework), which provides for developing specific systems for environmental management and monitoring for the East Arm facilities.

The EM Framework identifies the environmental objectives for the proposed NT Transport Option and outlines the process and environmental management documentation required to ensure that the relevant Draft EIS commitments, management measures and monitoring requirements were implemented.

A Draft Environmental Management Program (EM Program) has been developed for the NT Transport Option and was provided in Attachment E4.4 of Appendix E of the Draft EIS. The EM Program identified the assessment criteria proposed to measure performance against objectives. As the project would progress through the definition phase, and further data would be collected from baseline studies, more specific assessment criteria would be defined and design improvements or additional management measures would be captured. The objectives and assessment criteria would be routinely reviewed, in consultation with government, over the life of the project, as the various project components were constructed and commissioned.

The EM Program would also integrate key risk items identified for the expansion and include, where appropriate, contingency measures to manage those risks.

BHP Billiton would continue to liaise, collaborate and cooperate with the Darwin Port Authority to further develop and implement suitable environmental monitoring programs for the proposed East Arm facilities. It is envisaged that the outcomes of these programs would be reported in accordance with any conditions set for the development by the Northern Territory and Australian governments.

29.3 TRENCH MANAGEMENT DURING CONSTRUCTION OF LINEAR INFRASTRUCTURE

Issue:

Concern was raised about how trenching and excavation associated with the construction of linear infrastructure would be managed to ensure impacts were minimised.

Submissions: 2 and 15

Response:

As stated in Section 15.5.11 of the Draft EIS, a trench management plan would be developed and implemented to minimise fauna entrapment (and fatalities) in temporary trenching during construction of the water and gas supply pipelines. The plan would be developed by a fauna expert with appropriate experience in arid/semi-arid environments. As well as the mitigation measures outlined in Section 15.5.11, the plan would also include:

- procedures for managing fauna injured as a result of entrapment
- procedures for managing and releasing fauna captured in the trench
- the number and position of 'shelters' provided in the trench (such as water-soaked hessian bags) and exit ramps to take account of hazardous conditions for entrapped fauna, such as extremely hot and dry weather
- monitoring and maintenance programs for the controls put in place as part of the Trench Management Plan
- reporting and root cause analysis to allow for continuous improvement of controls and processes put in place as part of the Trench Management Plan
- training requirements for people undertaking tasks under the Trench Management Plan.

The trench management plan would be developed to mitigate the impacts of trench entrapment to all fauna in the construction areas for the water and gas supply pipelines. In particular, it would look to address potential impacts on the Plains Rat and the Dusky Hopping Mouse, which are listed as vulnerable species under Australian and South Australian legislation) and the Pernatty Knob-tailed Gecko (which is listed as rare under South Australian legislation).

Contractors would be required to implement the trench management plan as part of their environmental obligations and this would form part of BHP Billiton's construction site audits and contract performance reviews. Contractors would be required to report on the Trench Management Plan and actions that result.

Further details of the Trench Management Plan would be made available once pre-construction surveys were complete (details of which would be finalised with confirmation of alignments) and once construction methods and programs were finalised.

29.4 WEEDS AND PESTS (NON-MARINE)

Issue:

Clarification was sought on the specific programs that would be implemented to monitor and control terrestrial pest plants and animals, in particular introduced weeds, kangaroos and feral rabbits, cats, dogs and foxes.

Submissions: 2 and 72

Response:

Section 15.5.11 of the Draft EIS discussed the management and monitoring of pest animals and plants. Appendix U (of the Draft EIS) also provided a Draft Environmental Management Program specifically addressing the spread of pest animals and plants (see ID1.3 of Appendix U). This EM Program noted that the Weed Management Plan for the existing Olympic Dam operation would be reviewed and expanded to incorporate the expansion following a reassessment of risks, particularly those associated with new infrastructure components and new geographical areas for both construction and operation. This review would include additional weed surveys, where gaps in information and data exist, and the development of weed management and monitoring programs. Monitoring programs will include assessing the spread of introduced weeds and the success of weed management and control strategies for declared weeds.

The Draft EM Program also stated that prior to the construction phase, BHP Billiton would develop appropriate weed control strategies for the Eyre Peninsula and Northern and Yorke NRM regions in consultation with the respective boards (also stated in Section 15.5.11 of the Draft EIS). These consultations could also be extended to include the SA Arid Lands NRM region.

The routine feral animal monitoring and control programs that BHP Billiton currently undertakes in the Olympic Dam region would continue. As stated in Section 15.5.11 of the Draft EIS, these include:

- regularly monitoring populations of feral animals via spotlight surveys to determine the need, timing and location of trapping programs (the fringes of landfill sites, accommodation and workplaces are typically the focus of such surveys)
- conducting regular programs to control and monitor feral cats and foxes, in accordance with previous programs in collaboration with Arid Recovery.

The Draft EIS also committed to providing support to Roxby Downs Council for educating the community, subsidising desexing programs for cats, subsidising the installation of cat enclosures in backyards, and investigating the possibility of establishing an RSPCA branch in the township. Further management measures would be considered in support of the Roxby Downs Council, including fencing landfill sites and improving the management of landfill sites to reduce favourable conditions for feral animals.

BHP Billiton will continue to support proposals put forward by the Roxby Downs Council to improve feral animal management and monitoring in its municipal area.

The annual EMMR includes reporting levels of pest species (both weeds and feral animals), indicators of their impacts and actions to be implemented for the following reporting year.

29.5 MITIGATION AND MONITORING OF IMPACTS ON BIRDS RESULTING FROM TAILINGS STORAGE AND TRANSMISSION LINES

Issue:

Clarification was sought on the specific programs, including updating monitoring techniques that would be implemented to manage and monitor wildlife at the tailings storage facility.

Submissions: 2, 17 and 92

Response:

Further studies of the existing Olympic Dam operation have been undertaken as part of the EIS process.

BHP Billiton, through its process of continual improvement, routinely commissions professional, specialist expert advice for verifying, reviewing and improving the monitoring of bird deaths at Olympic Dam associated with the existing tailings storage facilities. As is stated in Section 15.5.7 of the Draft EIS, BHP Billiton has monitored and publicly reported fauna mortalities associated with the existing Olympic Dam tailings retention system since 1996.

BHP Billiton will continue to be committed to ongoing avian research to inform management measures and controls, improve monitoring methods, assess environmental performance, and to facilitate continual improvement. Section 16.6 of the Supplementary EIS provides further details of the monitoring and the interaction between birds and the tailings storage facilities.

Issue:

It was suggested that monitoring was required of the proposed placing of highly visible reflective markers along the transmission lines in an effort to reduce bird strikes, and that additional measures should be implemented if required.

Submission: 92

Response:

All controls and management measures implemented as part of the expansion would be reviewed and/or monitored as part of the environmental management framework (refer Chapter 24 of the Draft EIS) and the monitoring programs as part of the EM Program (refer Appendix U of the Draft EIS).

The Fauna Monitoring Program would be reviewed and updated to capture any additional monitoring requirements for the expansion. The outcomes of monitoring programs would provide an indication of the effectiveness of the controls and mitigation measures implemented.

If monitoring indicated that certain practices were inadequate then modifications and/or new controls or mitigation measures would be investigated, trialled, assessed and implemented. This process forms the fundamental structure of the Olympic Dam ISO 14001 certified EMS.

29.6 SOCIAL

Issue:

It was understood that a Social Management Plan would be developed as a collaborative effort between BHP Billiton and relevant state and local government bodies. Clarification was sought as to whether social indicators and parameters would be included in this plan.

Submission: 1

Response:

BHP Billiton would continue to be committed to understanding and managing the social impacts and benefits of the proposed expansion of Olympic Dam. This is reflected in its commitment to instigate the development and implementation of a Social Management Plan. The plan would include a broad range of indicators to monitor and respond to the social effects of the expansion on Roxby Downs and other relevant communities in the northern region (refer Section 19.5.7 of the Draft EIS). As noted in Chapter 19 of the Draft EIS, these effects would vary over time and place.

The Social Management Plan would be expected to clearly define geographic parameters in its evaluation of social indicators. It would also be expected to include indicators to assess the health and well-being of the construction workforce, particularly those accommodated at Hiltaba Village.

Further research, discussion with social planning experts, and liaison with relevant organisations is required to develop and expand the plan, which is expected to occur through the project's detailed definition phase. A draft of the plan, provided as a platform for discussion, is provided in Appendix J of the Supplementary EIS.

29.7 REVIEW, UPDATE AND CONTINUOUS IMPROVEMENT OF THE ENVIRONMENTAL MANAGEMENT FRAMEWORK

Issue:

Clarification was sought on how the environmental management framework (EMF) would be updated and implemented to ensure an adequate level of risk mitigation, ongoing management and monitoring.

Submission: 1 and 2

Response:

Chapter 24 of the Draft EIS outlined the process for monitoring, reviewing and updating the environmental management framework for the expansion project. Table 24.1 of the Draft EIS provided an overview of the expansion activities and the subsequent requirements for environmental management and monitoring.

The Olympic Dam operation currently implements an ISO 14001 certified EMS (Environmental Management System), which provides a robust tool for environmental management and monitoring, ensuring legal and other requirements are met and facilitating ongoing checking, revision and improvement. The EMS would be revised and updated to ensure the requirements of the expansion project, the outcomes of the environmental impact assessment, and the EIS commitments and approval conditions were captured. The various components of the EMS that would be revised and the new components that would be developed (namely specific management plans and monitoring programs) were discussed in Chapter 24 of the Draft EIS, and a draft Environmental Management Program was provided in Appendix U of the Draft EIS.

More detailed management plans and monitoring programs would be delivered as detailed planning was completed and construction of the various components of the expansion project approached (refer Figure 24.5 of the Draft EIS). An updated schedule for delivery of various management plans and monitoring programs is provided in Figure 29.1. These more detailed plans and programs aim to provide an adequate level of risk mitigation and a robust assessment of the management measures and controls that would be implemented.

Components of the EMF (refer to Figures 24.4 and 24.5 of the Draft EIS) are currently being reviewed, modified and/or developed for the proposed expansion to the level of detail that is possible at this time. The existing Olympic Dam EMS, and its relevant components, have also undergone review and changes to better align and prepare the systems for changes that would be required as a result of the expansion. The Department of Primary Industries and Resources South Australia (PIRSA) has been actively involved in the consultation processes for reviewing and improving the Olympic Dams EMS.

Adequate resources would be allocated for the ongoing review, maintenance and implementation of the EMF and its constituents.

The current South Australian regulatory regime includes triennial ministerial approval of the EM Program and monitoring programs which identify environmental values that are to be managed and monitored to protect the environment. The EM Program is also reviewed annually in liaison with the South Australian Government, and where significant changes have been made to the program, a submission is made to seek approval from the Minister for those changes. This process of continuous regulatory review will add extra rigour to BHP Billiton's internal systems for review and improvement. It will ensure the environmental values, associated environmental objectives and assessment criteria, and the programs developed to monitor potential impacts to those environmental values, are kept current and relevant to the activities being undertaken, and correspond to the expectations and regulations of the day.

As well as developing new management and monitoring programs for the expansion project outlined in Chapter 24 of the Draft EIS and reiterated in Section 29.8 below, the State Government has suggested that a monitoring program should be included for collecting long-term (life-of-mine) meteorological data, and to facilitate this, the automated weather station located at Olympic Dam should be kept operational and meet the Bureau of Meteorology's standards for the life-of-mine.

Meteorological data is a vital component of environmental management and monitoring at the Olympic Dam site and the meteorological weather station would remain operational for the life-of-mine. In addition, the current systems on-site for collecting, assessing and monitoring meteorological information would be reviewed and modified on an ongoing basis as part of continuous improvement processes, intrinsic to the ISO14001 certified EMS implemented on-site.

29.8 INVOLVEMENT OF STAKEHOLDERS AND REGULATORS

Issue:

It was requested that the South Australian Government be involved in developing management plans and monitoring programs.

Submissions: 2 and 59

Response:

As stated in Chapter 24 of the Draft EIS, components of the Olympic Dam EMS are currently regulated by the South Australian Government under the *Roxby Downs (Indenture Ratification) Act* and this is expected to continue for the proposed expansion.

Management plans and monitoring programs are currently being developed to manage the environmental aspects and potential impacts of the various components of the expansion project, and in particular, of components remote to the Olympic Dam mine operation. Data and information obtained from assessment and survey environmental monitoring programs, undertaken as part of the EIS process, would inform and improve the draft management plans and inform monitoring programs.

Regulatory authorities, including the Department of Primary Industries and Resources South Australia (PIRSA) and the Environment Protection Authority (EPA), would be consulted during the development of management plans and monitoring programs.

It is acknowledged that the Northern and Yorke Natural Resources Management Board is interested in being an active partner in establishing a monitoring, evaluation and reporting program for the sustainability of Spencer Gulf ecosystems. To this end, it would be consulted.

The list of management plans and monitoring programs to be developed for the expansion was summarised in Figure 24.4 of the Draft EIS and includes the following:

- Erosion and Sediment Control Management Plan (for construction activities)
- Trench Management Plan (for construction of linear infrastructure)
- Silt and Sediment (Marine) Management Plan (for the construction of the desalination plant)
- Marine Blasting Management Plan (for the construction of the desalination plant)
- Ballast Water Management Plan (for managing barge ballast water via the water recycling system at the landing facility)
- Stormwater Management Plan (for the mine pit as it is developed and mined)
- Dust Management Plan (the the mine pit as it is developed and mined)
- Noise Management Plan (for Olympic Dam mine and expansion component areas)
- Weed Management Plan (for Olympic Dam mine and expansion component areas)
- Vegetation Management Plan (providing the administrational processes, land disturbance cpntrol, planning, implementation and reporting of SEB offset activities as approved by the State Government)
- Acid Sulfate Soils Management Plan (for construction activities where ASS exist)
- Topsoil and Closure Management Plan
- Rehabilitation and Closure Management Plan
- Water Management Plan
- Greenhouse Energy and Gas Management Plan
- Mosquito Management Plan (for Port of Darwin facility)
- General Waste Management Plan (for the Olympic Dam mine site)
- Landfill Management Plan (for the landfill to be located at the Olympic Dam mine site)
- Used Tyre Management Plan (for the ongoing research, development and implementation of initiatives for managing of used tyres on the Olympic Dam mine site)
- Tailings Storage Facility Management Plan (for the operational planning, development and maintenance of the TSF)
- Rock Storage Facility Management Plan (for the operational planning, development and maintenance of the RSF)
- Radioactive Waste Management Plan (for the expanded Olympic Dam operation, satisfying legislative requirements)

- Radiation Management Plan (for the expanded Olympic Dam operation, satisfying legislative requirements)
- Hazardous Materials Management Plan (for the expanded Olympic Dam operation)
- Incident Response Plan/s (for new and changed activities for the expanded Olympic Dam operations and associated components)
- Emergency Response Plan/s (for new and changed activities for the expanded Olympic Dam operations and associated components, including for the marine environment)
- Aboriginal Engagement Plan
- Social Management Plan (a framework for moving forward in terms of the collaborative approach between government, BHP Billiton and community groups)
- Industry Participation (Port of Darwin)
- Traffic Management Plan – Community
- Traffic Management Plan – Workplace
- Radioactive Materials Transport Plan (formerly the Transport Plan for Uranium Oxide and the Transport Plan for Copper Concentrate)
- Security Management/Operations Plan (for Port of Darwin)
- Risk Management and Cyclone Response Plan (for Port of Darwin)
- Environmental Management Program as part of the site EMS and regulatory framework for Olympic Dam operation
- Monitoring programs would be developed for:
    - flora (terrestrial)
    - fauna (terrestrial)
    - marine flora and fauna
    - groundwater
    - Great Artesian Basin
    - dust
    - noise
    - airborne emissions
    - energy and greenhouse gas (GHG)
    - marine water quality
    - stormwater
    - waste
    - dose to public (radiation)

Additional management plan and monitoring programs would be developed following approvals and outlined in the SEIS, including the following:

- Biosecurity Management Plan for the landing facility (refer to Chapter 29)
- Maritime Mangement Plan for Shipping (refer to Chapter 25).

Interim draft management plans have been developed for a select number of required management plans and are included in Appendix N. The plans are intended to demonstrate how management measures, controls and commitments presented in the Draft and Supplementary EIS are captured to ensure implementation and ongoing review and reporting.

- HSEC Management Plans for activities to be undertaken as part of construction of the various components for the expansion project would be developed. HSEC plans would include the requirement for specific Environment Management plans and for Construction Safety Management plans.

The active and continuous involvement of regulators in reviewing and endorsing the management plans and monitoring programs is part of the expected regulatory regime for the expansion. Their involvement would ensure the ongoing management of activities addressed any concerns raised.

Issue:

It was questioned whether regular and frequent stakeholder communication meetings would be held for local stakeholders in Upper Spencer Gulf.

Submissions: 346 and 347

Response:

Chapter 7 of the Draft EIS documented the stakeholder consultation and engagement process already undertaken to assist in the preparation of the Draft EIS and also the ongoing consultation program, which has been proposed.

As stated in Section 7.4 of the Draft EIS, if the project is approved, a program of ongoing consultation would be undertaken to address community issues as the project progressed. Interaction with the large group of stakeholders who have already been consulted as a part of the project planning phase would continue throughout the project construction, execution and decommissioning phases, where relevant. A dedicated communications program would provide the broader community with information about the project's progress through the construction and execution phases.

It is expected that more detailed consultation would occur as planning continued for constructing the landing facility and desalination plant.

Issue:

It was suggested that monitoring plans and contingency measures are required in case a decision is made in the future to implement a managed aquifer recharge (MAR) scheme, and that should a MAR be proposed, an exemption would be required from the Environment Protection Authority (EPA) under the Water Quality Environment Protection Policy.

Submissions: 2 and 59

Response:

The proposed expansion of Olympic Dam does not include a MAR as part of the project. It is acknowledged that should a MAR scheme be proposed, appropriate regulatory notification is required, and a management plan, monitoring program and contingency measures would need to be developed in consultation with the South Australian Government.

29.9 ENVIRONMENTAL REPORTING, TRANSPARENCY AND INDEPENDENT VERIFICATION

Issue:

It was questioned whether public reporting would form part of the environmental management framework. It was also suggested that BHP Billiton should commit to creating and maintaining a dedicated Olympic Dam mine website with full reporting of mine operations, summary data on the health of past and present workers and their families, greenhouse gas emissions, energy use, water use, air quality, incidents and corrective actions, and fauna entrapments and corrective actions.

Submission: 222

Response:

BHP Billiton currently communicates the environmental performance outcomes of the Olympic Dam operation publicly in the annual Environmental Management and Monitoring Report (EMMR). BHP Billiton also specifically reports against the objectives of the EM Program to the relevant South Australian Government agencies and/or the Minister for Mineral Resources Development in the Quarterly Environment Report and the GAB Wellfield Report. These annual reports are available for downloading via the Department of Primary Industries and Resources South Australia (PIRSA) website.

At a company level, BHP Billiton also communicates the environmental performance to the community through public environmental reporting in annual reports to shareholders and interested parties, and via the BHP Billiton website.

Relevant aspects of the public reporting suggested in this submission will continue to be provided in the annual environment report, which is publicly available.

Issue:

It was questioned whether the reporting of environmental management and monitoring associated with the desalination plant would be transparent, available to the public and undergo third party review.

Submission: 46

Response:

Throughout the preparation of the Draft EIS, BHP Billiton has engaged the services of internationally recognised specialists in the fields of desalination plant hydrodynamic modelling and the potential effects of the desalination plant on the marine ecosystems of Spencer Gulf. This level of review and scrutiny and the favourable responses received has provided a high degree of confidence in the works undertaken by Australian consultants in this area of the expansion project (refer Appendix O of the Draft EIS for letters of testimony from the international experts).

Environmental monitoring associated with the desalination plant would be leading practice and would continue to utilise specialist consultants with appropriate qualifications, training and experience for the task. BHP Billiton would develop monitoring programs in a manner appropriate to measure, and monitor activities against the agreed performance criteria and objectives. BHP Billiton would also seek advice from relevant third parties as to the appropriateness of the programs, and report the findings to the relevant authorities. Some of the programs would be reviewed and approved by government before being implemented.

The current regulatory regime for the Olympic Dam operation also provides for annual reporting in the Environmental Management and Monitoring Report (EMMR) to PIRSA of environmental monitoring and achievements against set objectives. The EMMR is also audited by a third party as part of the ISO 14001 EMS requirements. The EMMR reports are made available, in whole, to the public via PIRSA's communication and information dissemination media, such as its website.

The EMMR currently deals with the existing operation and it would be extended to include reporting of monitoring outcomes for the expansion and the various new components such as the desalination plant, landing facility and the facilities at the Port of Darwin.