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Olympic Dam

Annual Environmental Protection and Management Program Report

1 July 2014 – 30 June 2015

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INTRODUCTION

Purpose and scope

This annual environmental protection and management program report (annual EPMP report) presents data relating to the environmental management of the BHP Billiton Olympic Dam operations for the period 1 July 2014 to 30 June 2015 (FY15).

The objectives are to:

- Meet the requirements of clause 11 of the Olympic Dam and Stuart Shelf Indenture (the Indenture) and condition 18 of the major development approval (10th October 2011).
- Report performance against environmental outcomes, compliance criteria and leading indicators presented in the 2014 Environmental Protection and Management Program (EPMP).
- Report performance against targets and continuous improvement actions also contained in the 2014 EPMP.
- Document the results of the deliverables presented in the monitoring programs (MPs) of the 2014 EPMP.

The 2014 EPMP was submitted to the Indenture Minister in 2014 and revision was submitted in October 2014 and subsequently approved. The amendments are provided in Appendix A.

Report structure

A description of the EPMP structure against which reporting is based is given below.

The reporting against outcomes is achieved through a hierarchy of data reporting (deliverables) and statements of compliance leading to an assessment of whether or not the environmental outcome has been met. The main chapters in the report are aligned to the key environmental aspect ID's contained within the EPMP.

The reporting hierarchy then takes the following form:

- Deliverables from the various MPs are included in the most relevant chapter, and a presentation of data and discussion of results is provided.
- The results of the deliverables contribute to the compliance statement for the compliance criteria under which they are reported (and in some cases to other compliance criteria, in which case appropriate cross-referencing is provided).
- These compliance criteria then provide a statement of achievement of the environmental outcome.

Performance against targets and continuous improvement actions is reported separately but still within the relevant ID chapter.

Table 0-1 contains a summary of each Environmental Management Program (EM Program) ID. This provides an overview of the outcomes and has the following elements:

- the environmental outcome to be achieved.
- a 'traffic light' style indicator to indicate whether the outcome has been achieved.
- a statement that summarises whether or not the environmental outcome was achieved, and why.

EPMP STRUCTURE

Background

The structure of the EPMP report is closely aligned with the structure of the BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) 2014 EPMP, and in particular the EM Program contained within that document. The EPMP consists of a number of documents which form a portion of the Environmental Management System (EMS) requirements. A brief summary of each document within the EPMP is shown in Table 0-1.

Table 0-1: EPMP Structure

Document	Content summary
EMM	General overview of the EPMP. Purpose and scope. Regulatory framework. Background information about Olympic Dam and the expansion. Overview of the structure and requirements of the Environmental Management System. Glossary of defined terms. Cross-referencing of EPMP content to approval conditions and the requirements of the Mining Code.
EM Program	Addresses potentially significant environmental aspects and impacts, identified through analysis and prioritisation of environmental risks, legal obligations and community concerns. Documents the processes, systems and actions used to manage the prioritised aspects and impacts.
MP(s)	Address assessment and performance of the EM Program's outcomes, compliance criteria and targets, control mechanisms and legal and other requirements.
Mine Closure and Rehabilitation Plan	A plan for closure and rehabilitation of the mine, including the environmental outcomes expected to be achieved indefinitely, and options for progressive rehabilitation.

The EM Program documents the processes, systems and actions used to manage prioritised aspects and impacts, including the incorporation of:

- the environmental values that may be impacted, and the key risks to those values;
- the environmental outcomes that BHP Billiton aims to achieve;
- clear, specific and measurable compliance criteria that demonstrate achievement of the outcome(s);
- leading indicator(s) criteria, providing early warning of trends that indicate a compliance criteria may not be met;
- the management and operational controls in place to deal with the environmental risk (aspects and impacts), including any regulatory conditions;
- contingency options to be used in the event that identified risks are realised;
- continuous improvement opportunities and development opportunities identified that can assist in meeting compliance criteria and environmental outcomes and improving ODC's environmental performance;
- environmental improvement targets and the action plan to achieve such targets.

EXECUTIVE SUMMARY

Overview

The 2015 Annual EPMP Report demonstrates compliance and environmental improvements against the 2014 Environmental Protection and Management Program (EPMP).

Data from monitoring programs is presented as evidence against compliance criteria under the Environmental Management Program (EM Program) IDs.

Considerable progress against environmental outcomes, compliance criteria, actions and targets in the 2014 EM Program was made during the reporting period.

Major Achievements

Following is a list of major achievements for the reporting period:

- The abatement of 26kt of CO2-e was through improvement projects.
- Completion of a flickering light-based bird deterrent, Potentially Aversive Light Stimulus (PALS II), trial with Deakin University.
- Raise bore saline design controls established to reduce saline emissions.
- Completion of sewage lagoons on site to minimise potential seepage to groundwater.
- Established and implemented two key community partnerships in the focus areas of health and education. Both long term partners will work collaboratively with local community groups and organisations to positively influence quality of life indicators in health and education sustainably.

Compliance summary

Table 0-2 lists the environmental outcomes and compliance criteria for each EM Program ID. Next to each outcome 'traffic light' style indicators have been used to allow for overview assessment of achievement of the outcome, as follows:

- Environmental outcome achieved
- Significant progress towards achieving the Environmental outcome
- Environmental outcome not achieved.

The approved 2014 EMP contained 23 environmental outcomes, 28 compliance criteria, 15 leading indicators, 18 targets, and 33 actions.

All environmental outcomes, compliance criteria, leading indicators and actions were achieved or were within prescribed limits. Fourteen of the 18 targets were also achieved.

Targets not achieved were in relation to externally reportable spills of radioactive process material (Section 2.2 *Radioactive process material spills*), Tailings Storage Facility (TSF) pond area (Section 4.3 *Fauna interaction with Tailings Retention System)* and the proportion of resources diverted from landfill (Section 4.5 *Solid Waste Disposal*).

The target for externally reportable radioactive spills (2) was exceeded by one. Two of these spills were in relation to small amounts of ammonium diurate (ADU) within the processing area. Spills were investigated and procedures have been updated to reduce the likelihood of these types of spills re-occurring.

TSF pond area averaged 43.2 ha, 8.2 ha above the environmental target. Significant disruptions to normal operations in FY15 and inclement weather, with January, April and May 2015 receiving higher rainfall than average, has contributed to an increased TSF supernatant pond area during the reporting period. It is anticipated that the supernatant liquor pond area will be returned to within target by the end of the first full summer and autumn (high evaporation period) following high rainfall last summer.

The proportion of resources diverted from landfill fell slightly short of the FY15 target, however a significant amount of work was employed to reduce existing stockpiles and this is expected to increase in FY16. Further information is presented in Section 4.5 *Solid Waste Disposal*.

Table 0-2 provides a summary of the environmental outcomes assessed during FY15. A cross-reference is provided when an outcome, relates to an approval condition from the State or Australian Governments (eg. State17b).

Note that the Index shows the location of the compliance criteria and relevant deliverables from the 2014 EPMP that provide supporting evidence for the Outcome Statements summarised below.

Table 0-2: FY15 Compliance Summary

ID 1 USE OF NATURAL RESOURCES	
ID 1.1 Land Disturbance and Rehabilitation	
Environmental outcome (State 17b)	Outcome Statement
No significant adverse impacts to populations of listed species (South Australian, Commonwealth) as a result of the construction, operation and closure of Olympic Dam.	No significant adverse impacts to populations of listed species as a result of the construction, operation and closure of Olympic Dam occurred. No species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and low numbers of fauna species (1) listed under the National Parks and Wildlife (NPW) Act 1972, were observed interacting with the Tailings Retention System (TRS) during FY15, while four wide spread regionally significant flora species (not listed species) were considered disturbed.
ID 1.2 Pest Plants and Animals	
Environmental outcome (State 17b)	Outcome Statement
No significant increase in the areas of infestation or abundance of declared pest plants, plant pathogens or pest animal populations.	No significant increase in the area of infestation of declared pest plants was recorded. Regular and opportunistic monitoring to detect the introduction of new self-sustaining populations of declared pest plants or significant increases in the size of existing infestations is used to determine whether a significant increase has occurred. No new self-sustaining populations have been observed and only minor increases in infestation size were observed. Controls were undertaken throughout the reporting period.
ID 1.3 Aquifer Level Drawdown	
Environmental outcome (State 17b)	Outcome Statement
No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield Designated Areas for the proper development or management of the existing use of the lands as a result of ODC activities.	Drawdown and percentage wellhead pressure loss at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers, 1997), and significantly less than the maximum drawdown area defined within the 10 m contour. In the Wellfield A and B areas, wellhead pressures and environmental flow rates at Great Artesian Basin (GAB) springs remained consistent and in line with historical averages.
No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities.	No significant impact to groundwater for existing Stuart Shelf third-party users or to Yarra Wurta springs has occurred.
No significant adverse impact on groundwater-dependent listed species or ecological communities as a result of groundwater drawdown associated with ODC activities.	Drawdown remains less than the predicted long-term impact and was within compliance criteria limits. Environmental flow rates at GAB springs remained consistent and in line with historical averages. Monitoring showed no indication of a significant adverse impact on groundwater-dependent listed species or ecological communities.

ID 2 STORAGE, TRANSPORT AND HANDLING OF HAZARDOUS MATERIALS

ID 2.1 Chemical and Hydrocarbon Spills

Environmental outcome (State 17b)	Outcome Statement
No significant site contamination of soils, surface water or groundwater, as a result of the transport, storage or handling of hazardous substances associated with ODC's activities.	No significant site contamination of soils, surface water or groundwater occurred in FY15. All spills were appropriately contained and cleaned up as soon as practicable. Active monitoring and management of legacy hydrocarbon sites was continued during FY15.

ID 2.2 Process Material Spills

Environmental outcome (State 17b)	Outcome Statement
No adverse impacts to public health as a result of radioactive process material spills from ODC's activities.	BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1mSv/y limit. During FY15 there were no radioactive process material spills outside operational areas. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at ODC.
No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive process material spills from ODC's activities).	No significant impacts to populations of listed species or ecological communities were recorded due to operational activities including the effects of any radioactive process material spills. Impacts to listed species and ecological communities are avoided by ensuring that there is no uncontrolled loss of radioactive material to the natural environment. As there was no uncontrolled loss of radioactive material to the natural environment no impact can have occurred.

ID 3 OPERATION OF INDUSTRIAL SYSTEMS

ID 3.1 Particulate Emissions

Environmental outcome (State 17b)	Outcome Statement
No adverse impacts to public health as a result of particulate emissions from ODC's activities.	No adverse impacts to public health as a result of particulate emissions from operations conducted at ODC occurred during FY15. ODC considers the compliance limits as listed in Condition 49(a) of the Major Development Approval to be the threshold at which adverse impacts to public health may occur. Radionuclide levels recorded at Olympic Village were below limits considered to impact public health. Emission of particulates from Smelter, Acid Plant, Concentrate Dryer and Calciner stacks met the requirements of the Environment Protection (Air Quality) Policy 1994 during the reporting period.

ID 3.2 Sulphur dioxide emissions

Environmental outcome (State 17b)	Outcome Statement
No adverse impacts to public health as a result of sulphur dioxide emissions from ODC's activities.	There were no adverse impacts to public health as a result of sulphur dioxide (SO_2) emissions from ODC's activities during FY15. National Environmental Protection Measure (NEPM) levels for ambient air quality are based on protection of human health. Roxby Downs ambient SO_2 analyser results for the reporting period showed no exceedance of the NEPM for ambient air quality SO_2 at either Olympic Village or Roxby Downs Township.

ID 3.3 Saline aerosol emissions	
Environmental outcome (State 17b)	Outcome Statement
No significant adverse impacts to populations of listed species (South Australian, Commonwealth) as a result of ODC's activities.	No significant adverse impact to populations of listed species from saline aerosol emissions was observed during FY15. Recorded salt deposition levels were below historical levels for most of the year. Observations made during environmental inspections and supported by data collected during various flora and fauna monitoring programs, did not find any significant adverse impacts to listed species.

ID 3.4 Radioactive emissions	
Environmental outcome (State 17b)	Outcome Statement
No adverse impacts to public health as a result of radioactive emissions from ODC's activities.	ODC has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1 mSv/y limit. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at ODC.
No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive emissions from ODC's activities (State 34 row b, c).	There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of Uranium-238 (^{238}U) at non-human biota assessment sites is used as an indicator of the potential exposure of listed species to radioactive emissions. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

ID 3.5 Greenhouse gas emissions	
Environmental outcome (State 17b)	Outcome Statement
Contribute to stabilising global atmospheric greenhouse gas concentrations to minimise environmental impacts associated with climate change.	Through its carbon emissions management plan, ODC has reviewed its road-map to achieve a reduction in greenhouse gas emissions to an amount equivalent to at least a 60% reduction of 1990 emissions by 2050. Abatement of carbon emissions was achieved during FY15 through improvement projects.

ID 4 GENERATION OF INDUSTRIAL WASTES ID 4.1 Embankment stability of TSF	
Environmental outcome (State 17b)	Outcome Statement
No significant TSF embankment failure.	During FY15 the Tailings Storage Facility (TSF) was managed in accordance with the TRS Operations, Maintenance and Surveillance Manual (BHP Billiton, 2014a) and the TRS Management Plan (BHP Billiton, 2014b) and no significant embankment failures occurred.

ID 4.2 Tailings seepage	
Environmental outcome (State 17b)	Outcome Statement
No significant adverse impact on vegetation as a result of seepage from the TSF.	No significant adverse impact to vegetation as a result of seepage from the TSF has occurred. Eighty metres AHD (20 m below ground level) is considered as the level below which groundwater cannot interact with the root zone of plants in the Olympic Dam region. Groundwater levels in the vicinity of the TSF remain below 80 mAHD.
No compromise of current and future land uses on the SML or adjoining areas as a result of seepage from the TSF (State 32 row b).	No compromise of current and future land uses on the SML or adjoining areas has occurred. Groundwater levels in the vicinity of the TSF remain below 80 mAHD and sampling indicates that seepage is being attenuated. Seepage modelling presented in the expansion EIS remains valid.

No compromise of the environmental values of groundwater outside the SML as a result of seepage from the TSF.	No compromise of the environmental values of groundwater outside the SML has occurred. Sampling indicates that seepage is being attenuated within the SML, and groundwater levels of bores along the SML are consistent with other regional bores. Seepage modelling presenting in the expansion EIS remains valid.

ID 4.3 Fauna interaction with Tailings Retention System

Environmental outcome (State 17b)	Outcome Statement
No significant adverse impacts to listed species (South Australian, Commonwealth) as a result of interactions with the Olympic Dam TRS (Aus 5c, 18).	No significant adverse impacts to listed species as a result of interactions with the Olympic Dam TRS have occurred. No species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and low numbers of one species listed under the National Parks and Wildlife (NPWS) Act 1972, were observed interacting with the Tailings Retention System (TRS). Therefore it is concluded that there were no significant adverse impacts to South Australian or Commonwealth listed species as a result of interactions with the TRS.

ID 4.4 Solid waste disposal

Environmental outcome (State 17b)	Outcome Statement
No significant adverse impacts as a result of management of solid waste.	The Resource Recovery Centre (RRC) effectively manages solid waste as per the Waste Management Plan and the RRC Operations Manual. No material environmental harm was shown by groundwater sampling. No significant adverse impacts resulted from the management of solid waste at Olympic Dam for the reporting period.

ID 4.5 Radioactive waste

Environmental outcome (State 17b)	Outcome Statement
No adverse impacts to public health as a result of radioactive waste from ODC's activities (State 34 row a).	BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) has consistently operated in a manner that limits radiation dose to members of the public, from radioactive waste, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1mSv/y limit. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at Olympic Dam.
No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive waste from ODC's activities (State 34 row b).	There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at non-human biota assessment sites is used as an indicator of the potential exposure of listed species to radioactive waste. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

ID 5 INTERACTION WITH COMMUNITIES

ID 5.1 Community interaction

Environmental outcome (State 17b)	Outcome Statement
Residents in Roxby Downs, Andamooka and Woomera trust ODC to act in their best interests.	Responses to the most recent Olympic Dam Community Perception Survey indicate that ODC is a trusted organisation within our local communities. In addition to this, ODC provides employment to local and regional communities, increasing its accessibility through the provision of a bus service to communities such as Port Pirie and Port Augusta.

Note: Individual monitoring programs are referred to in this table with a two letter abbreviation as follows: Fauna – FA; Flora – FL; Great Artesian Basin – GA; Groundwater – GW; Environmental Radiation – ER; Airborne Emissions – AE; Energy Use and Greenhouse Gas (GHG) Emissions – EG; Waste – WA; Surface water – SW; Social Effects – SE

Olympic Dam Annual EPMP Report
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1 Use of natural resources

1.1 Land disturbance and rehabilitation

1.1.1 Environmental Outcome

No significant adverse impacts to populations of listed species (South Australian, Commonwealth) as a result of the construction, operation and closure of the expanded Olympic Dam.

No significant adverse impacts to populations of listed species as a result of the construction, operation and closure of Olympic Dam occurred.

No species listed under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, and low numbers of fauna species (1) listed under the *National Parks and Wildlife (NPW) Act 1972*, were observed interacting with the Tailings Retention System (TRS) during FY15, while four wide spread regionally significant flora species (not listed species) were disturbed.

Land disturbance associated with expansion activities was 882 ha well below 17,269 ha, the area indicated in the 2009 EIS.

1.1.2 Compliance criteria

No significant impact to the size of an important population of Category 1a species (State 17c, 17kiii) (FL 2.6). *Note: 'Significant Impact' is as defined in the Significant Impact Guidelines, and is an impact greater than that predicted in the EIS.*

All Category 1a species potentially impacted by operations at Olympic Dam are associated with the Great Artesian Basin (GAB) threatened ecological community, a discussion of which is provided in Chapter 1.3 on Aquifer Level Drawdown. During FY15, the abundance of *Eriocaulon carsonii* at individual spring units was either insufficient to test or did not change significantly ($p \geq 0.05$). When compared to baseline data (1983), the abundance of *Eriocaulon carsonii* was not significantly different for most spring groups, except for Hermit springs ($p \geq 0.05$). Due to many different individuals collecting the data between 1983 and 2005 this data is considered to contain higher error, and the most reliable data is considered to have been collected between 2006 and 2013. During this interval (2006-2013), the abundance of *Eriocaulon carsonii* was either insufficient to test or no significant change was detected ($p \geq 0.05$). Therefore, it is concluded that no significant impact to the size of an important population of Category 1a flora species has occurred in FY15.

No loss of an important population of Category 1b species (State 17c, 17kiii) (FA 2.6, FL 2.7).

No loss of an important population of Category 1b fauna or flora species occurred as a result of land disturbed by ODC activities. No known preferred habitats of Category 1b fauna species were cleared during FY15. Vegetation clearance was primarily restricted to the SML with small amounts of disturbance occurring in the near vicinity. No avian Category 1b species of fauna were impacted upon by the TRS during FY15; and is discussed in further detail in Section 4.3 *Fauna interaction with Tailings Retention System.*

Clearing of vegetation not to exceed the total area of 17,269 hectares as indicated in the EIS (DEIS and SEIS) (State 4, 17c, 17kiii) (FL 2.3).

Clearing of vegetation as indicated in the 2009 EIS did not exceed the total area of 17,269 ha. As at 30 June 2015 a total of 882 ha of land was cleared. The offset provisions indicated in the EIS do not apply to land approved for clearing under previous EIS approvals prior to 2003. This is discussed in further detail in Section 1.1.7.

1.1.3 Deliverables (FL 2.7)

A map of the known locations of Category 1b and 2 species (flora) within the impact area of the Olympic Dam operation

A statement of impacts to, and measures undertaken to avoid, Category 1b at-risk species (flora) (State 17f, 17ki).

There are currently no Category 1b flora species within the impact area of the Olympic Dam operation.

Category 2 species include all other species known to occur in the region that are either listed as threatened under state, national and/or international legislation or considered regionally or locally significant and have the potential to be adversely impacted by operations. This includes species that have a wider distribution within the state, interstate or overseas and are therefore not considered to be critically dependent on existing populations within the potential impact area (Figure 1.1-1).

Category 2 flora species impacted by disturbance activities during FY15 were Mulga *(Acacia aneura),* Western Myall *(Acacia papyrocarpa),* Bullock Bush *(Alectryon oleifolius)* and Northern Cypress Pine *(Callitris glaucophylla).* These locally common tree species are prevalent on the SML, Municipal lease and Pastoral leases and have been included as Category 2 species because they are long-lived and slow growing species with limited recruitment opportunities. During FY15 these species were impacted upon where ground disturbance requirements did not allow for the preservation of individual plants. Efforts are made wherever possible to avoid these species during the Environmental and Indigenous Heritage Clearance Permit (EIHCP) process.

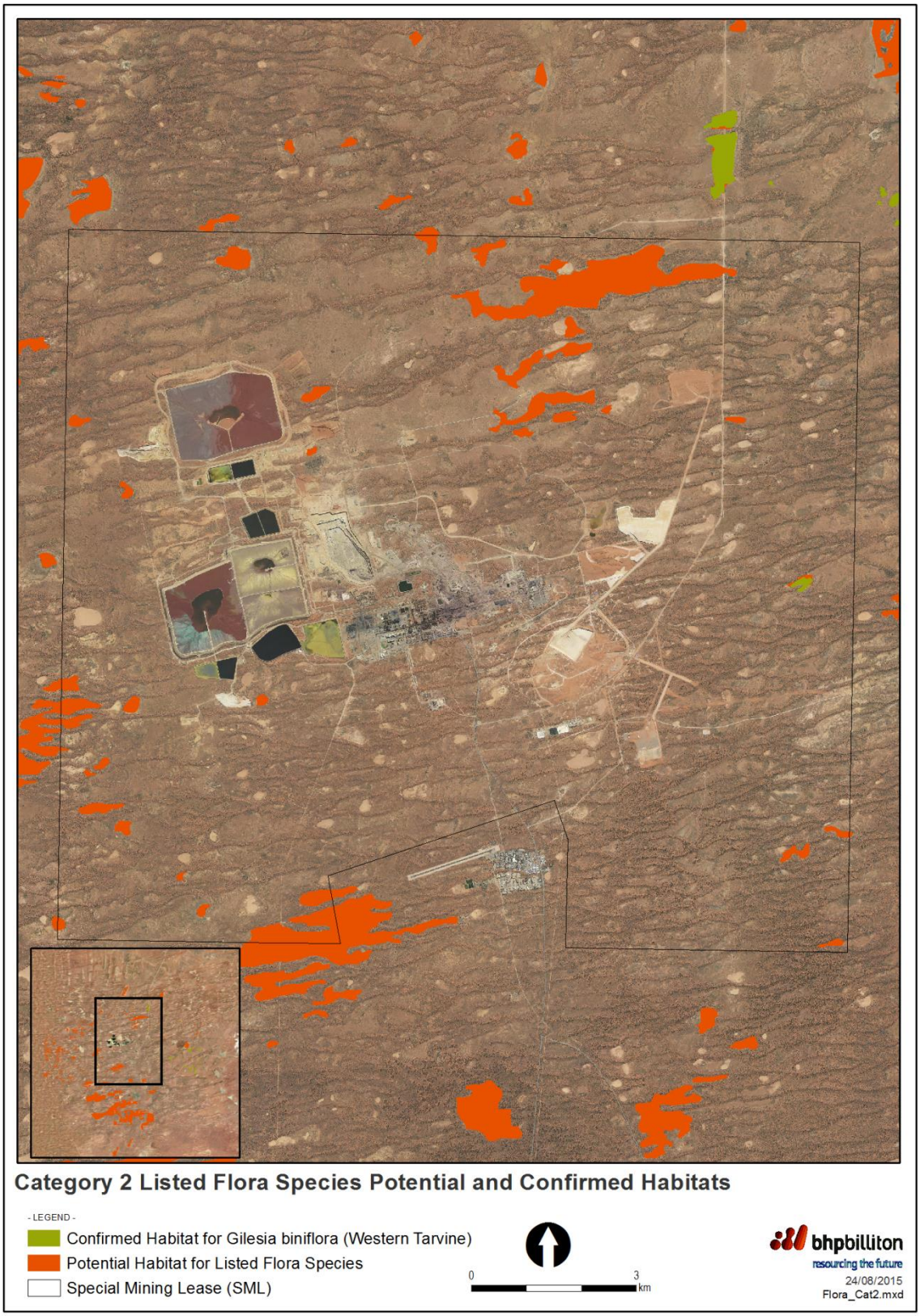


Figure 1.1-1: Category 2 Listed Flora Species Potential and Confirmed Habitats.

1.1.4 Deliverables (FA 2.6)

A quantitative assessment of the presence of Category 1b and Category 2 at-risk species (fauna) in the expanded SML, surrounding areas and wellfields region for internal records and EMMR reporting (State 7, 17f, 17ki).

A maintained and updated (where required) map of the known locations and important habitats for at-risk species (fauna), to assist the EIHCP process (State 17f, 17ki).

A statement of impacts to, and measures undertaken to avoid, Category 1b at-risk species (fauna).

Fourteen species of Category 1b and 2 birds and no species of mammal were recorded in the SML, wider region and the wellfields during the reporting period (Table 1.1-1).

Specifically at the TRS, two live and one dead Intermediate Egret (*Ardea intermedia*) were observed during the reporting period. Management of deaths associated with the TRS is discussed in chapter 4.3 *Fauna interaction with Tailings Retention System.*

No additional management activities were required for Category 1b and 2 species during FY15.

A map of known locations and important habitats for at-risk species is shown in Figure 1.1-2. This data is maintained and updated as required, to assist in the EIHCP process.

Figure 1.1-2: Category 1b and 2 Listed Fauna Species potential and confirmed Habitats

Table 1.1-1: FY15 Category 1b and 2 species in the Olympic Dam and Wellfields region.

Species	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Birds												
Australian Bustard								✓			✓	
Australasian Shoveler		✓										
Black-breasted Buzzard				✓								
Blue-billed Duck										✓		
Brolga										✓		
Flock Bronzewing								✓			✓	
Intermediate Egret						✓	✓			✓		
Letter-winged Kite							✓					
Musk Duck							✓	✓	✓	✓		
Red-necked Stint				✓								
Scarlet-chested Parrot											✓	
Sharp-tailed Sandpiper				✓					✓			
Splendid Fairy Wren								✓				
Thick-billed Grasswren								✓				

1.1.5 Deliverable (FA 2.1)

Map the impact footprint of ODC's Olympic Dam activities on abundance of Crested Bellbirds and mixed feeding flocks of insectivorous birds, and species richness of 'non-disturbance' species, for the Environmental Management and Monitoring Report.

An impact footprint of the bioindicators, Crested Bellbirds (CBB), insectivorous feeding flocks (IFF) and the species richness of 'non-disturbance' bird species, suggests that the impacts of the operations on avifauna are limited to the immediate vicinity of the mine and processing plant and surrounding areas within the Special Mining Lease (Figure 1.1-3). The decrease in bio-indicator bird species richness at intermediate sites since FY14 is attributable to increased activity and land clearing nearby intermediate sites (Figure 1.1-3). The stability of species richness of bio-indicator species at control sites since FY14 indicates that the impacts of the operations on avifauna are limited to the immediate vicinity of the mine and processing plant (Figure 1.1-3).

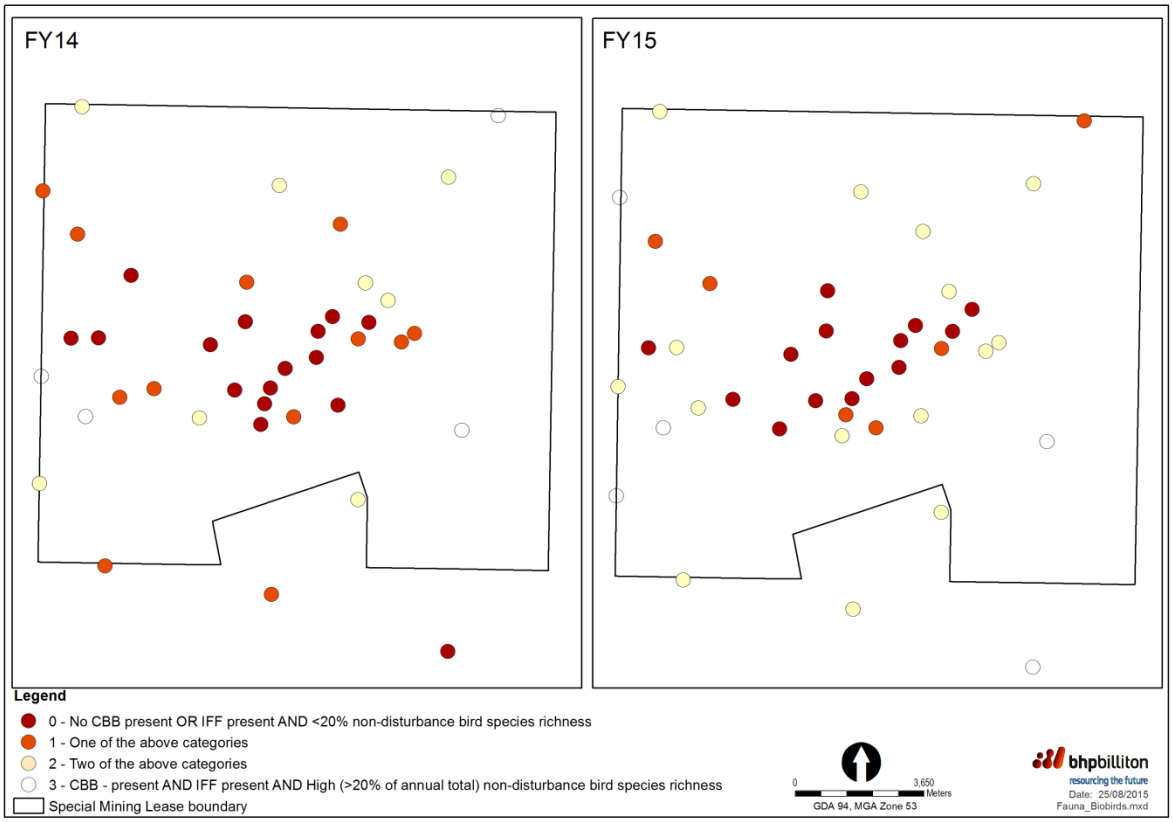


Figure 1.1-3: Impact footprint of the bioindicator bird species during FY14 and FY15

1.1.6 Deliverable (FA 2.2)

A map of the impact footprint of ODC's Olympic Dam activities on the fecundity of geckos, Ctenotus/Ctenophorus ratios and feral/native mouse ratios (State 17f, 17ki).

The FY15 results showed an impact footprint similar to that of the FY14 period (Figure 1.1-4). Sites closest to the operation generally scored lower than those at distance, which may indicate evidence of localised impacts from mining and processing operations as would be anticipated in these areas.

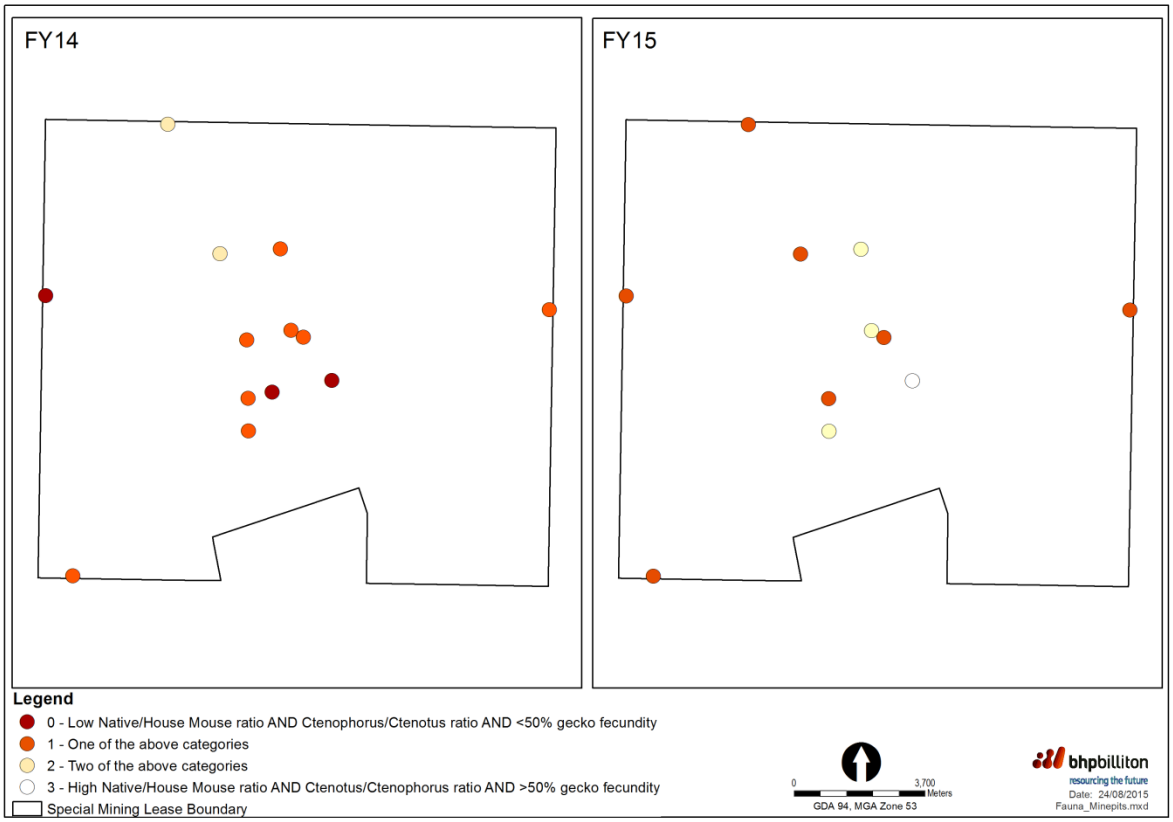


Figure 1.1-4: Impact footprint of reptiles and small mammals during FY14 and FY15

1.1.7 Deliverables (FL 2.3)

A map of the direct disturbance impact footprint of ODC's Olympic Dam activities.

A statement of comparison between the impact footprint of ODC's Olympic Dam activities (i.e. within and outside the SML) and the offset areas under SEB processes, to track progress towards a life of mine ratio of eight ha set aside for each hectare disturbed (State 17f, 17ki)

In 2010 the Gosse Springs Native Vegetation Management Plan was approved to establish a Significant Environmental Benefit (SEB) offset area of 10,963 ha. All land disturbance associated with the 2009 DEIS approval is tracked though the EIHCP procedure and allocated an appropriate SEB offset ratio.

Total offset areas are then subtracted from the total SEB offset area that have been approved by the Native Vegetation Council, and a remaining SEB offset is reported in Table 1.1-2.

Spatial analysis techniques were utilised on geo-referenced orthoimagery for FY15. During this reporting period, satellite imagery of the vast majority of the SML was captured on a quarterly basis (captured in June 2014, December 2014, March 2015,and June 2015), offering an accurate account of the timing of land disturbance.. Disturbances identified as occurring between these dates were digitised and are represented in Figure 1.1-5. The total area of disturbance that occurred during FY15 is 23 ha (Table 1.1-2).

The majority of disturbance for FY15 is attributed to construction of raise bores in the southern mining area and from the construction of the new sewage treatment facilities on site.

As at 30 June 2015 a total area of 882 Ha of land, was cleared resulting in a SEB offset of 7,235 ha, with an average offset ratio greater than 8:1. A balance of 3,728 ha remained in the Gosse Springs SEB offset area.

The total area of disturbance related to Olympic Dam activities is currently 4,350 ha. This figure is inclusive of rehabilitation areas and Roxby Downs town facilities, water pipelines and other associated infrastructure.

Table 1.1-2: Areas of Disturbance and SEB Offset Areas as at June 2015

	FY15 (ha)	Total Area Cleared to Date (ha)	SEB offset (ha)	Average SEB Ratio
Gosse Springs Offset Area Available	-	-	10963	-
Maximum Area Permitted to be Cleared as Indicated in the EIS	-	17,269	-	-
Land disturbed subject to an SEB offset*	0	881.8	7,235.1	8.3
Land disturbed not subject to an SEB offset	23.2	3,468.6	-	-
Total Land Cleared**	23.2	4,350.4	-	-
SEB Balance Remaining in Reserve ***	-	-	3,727.9	-
Area Permitted to be Cleared as Indicated in the EIS in Reserve	-	16,402.3	-	-

* This figure includes areas where permission was granted to clear under the SEB offset policy prior to the approval of the EIS in 2011. It also based on a conservative calculation where the higher offset value of any permit issued over the area is used, which can result in small co-mission errors.

** This figure includes all land cleared to date as a part of ODC activities under previous EIS approvals.

*** Slight variations will occur from year to year due to continuous improvement of the mapping layer.

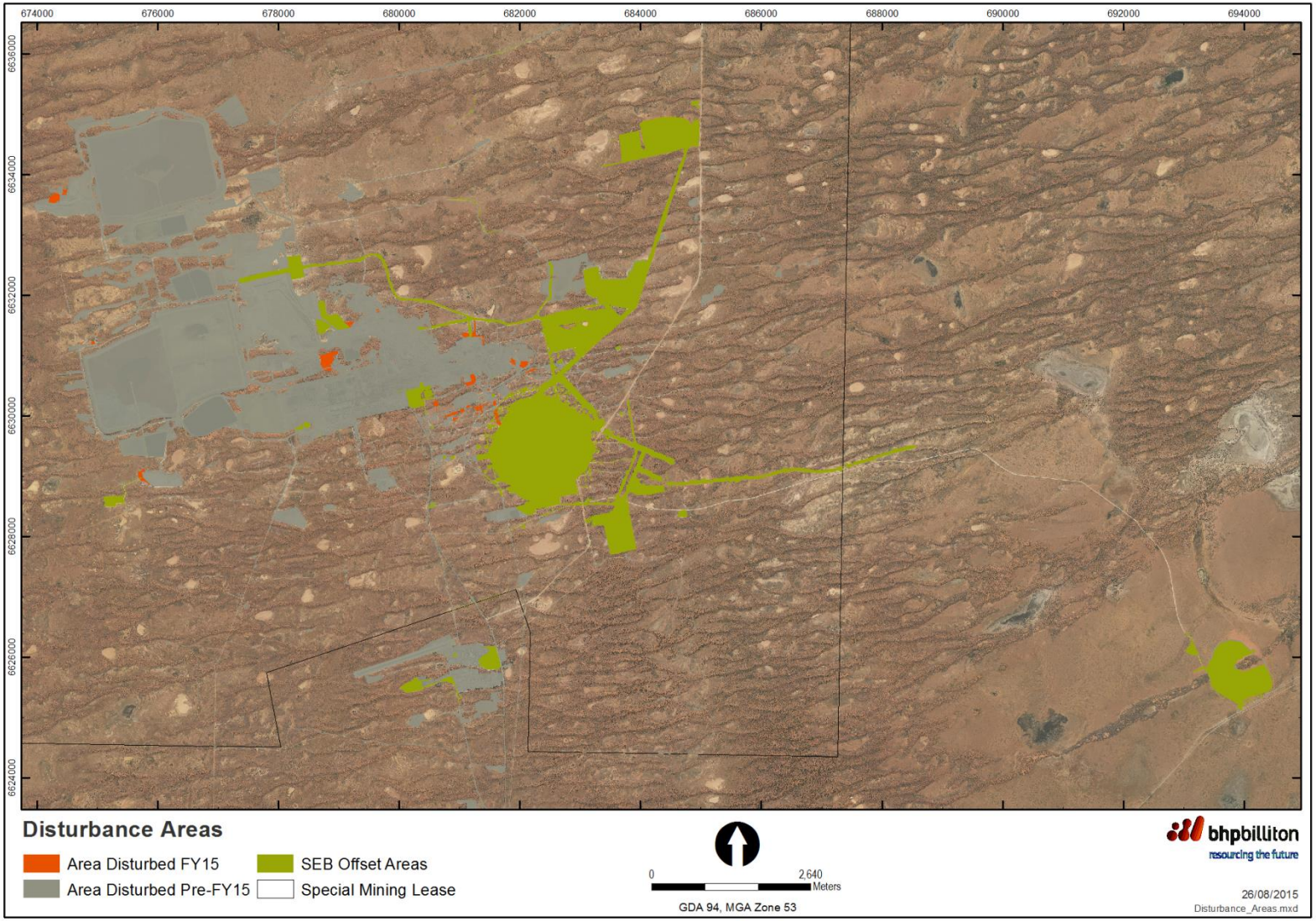


Figure 1.1-5: Areas of Disturbance as at June 2015

1.1.8 Deliverables (FL 2.8)

A summary of actions achieved from the SEB implementation plans within the fiscal year through the Annual EPMP Report.

An annual report to the government on SEB management outcomes through the Annual EPMP Report

(Shapefiles of the SEB areas for inclusion in relevant departmental databases).

Prior to FY15, a number of actions were undertaken by ODC within the Gosse Springs SEB area. ODC commissioned a baseline vegetation survey of the Gosse Springs SEB area to record species cover and abundance using landscape representative quadrats. The baseline survey also targeted known threatened species locations and land systems to aid in the identification of priority management areas. A new fence was also installed along the eastern boundary of the Gosse Springs SEB area.

The baseline survey also recorded the location of introduced species to guide weed management processes. The weed species locations have been added to ODC's weed management database and the Gosse SEB area has been included into the latest ODC Weed Management Strategy. A more detailed survey has been planned for the first half of FY16.

During FY15:

- Discussions commenced with stakeholders to construct a dedicated parking bay for monitoring personnel to ensure that the values of the area are retained. It is expected that this work will be completed in FY16.
- Regular meetings were held to track the progress of actions, including the review and improvement of the implementation plan for FY15. These meetings will continue in FY16.
- The conditions of the Heritage Agreement for the Gosse Springs SEB area were finalised in consultation with the Department of Environment, Water and Natural Resources during FY15. ODC has lodged the Heritage Agreement application with the Lands Titles Office and expects the agreement to be ratified in FY16.

A shapefile of the Gosse Springs SEB area has been provided to the Geographical Information System (GIS) Administrator – Native Vegetation and Biodiversity Management Unit of the South Australian Government. No further SEB areas have been implemented (Figure 1.1-6). The shapefiles of existing and proposed SEB offset areas are available in a standard GIS format that can be made available for other departmental databases as required.

1.1.9 Leading Indicators

- None applicable

1.1.10 Targets FY15

Implement an SEB offsets plan to compensate for the clearance of vegetation and other environmental impacts occurring during the life of the mine, providing an offset of at least 8 ha of vegetation for every hectare cleared by the end of the project (2052).

An SEB offsets plan has been compiled and has been added to the Olympic Dam controlled document system. The Plan provides information on the existing Gosse Springs SEB offset area, as well as the location and environmentally significant aspects of potential future SEB areas proposed by ODC.

As of June 2015, Gosse Springs is the only approved SEB offset area managed by ODC. Clearance activities to date (882 ha of which require an offset) have not necessitated further SEB offset areas to be initiated. Several actions approved under Gosse Springs NVMP have been implemented or initiated. These actions are discussed in further detail in Section 1.1.2. In addition to the NVMP actions, an application for a Heritage Agreement over the Gosse Springs SEB has been progressed for ratification in early FY16.

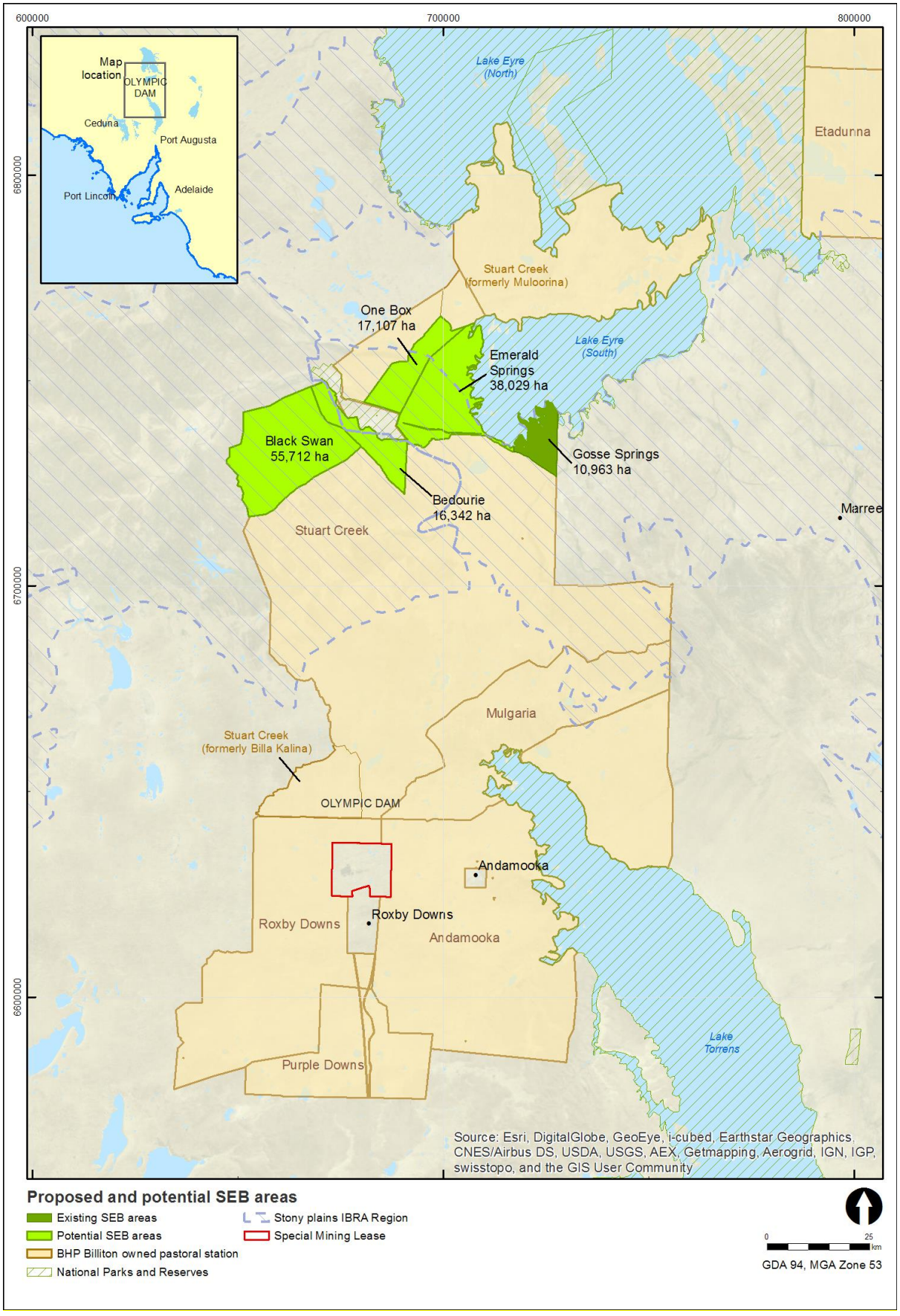


Figure 1.1-6: Map of existing and potential SEB offset areas

1.1.11 Action plan FY15

Implement FY15 actions identified in the site Rehabilitation Strategy.

Several actions associated with the cessation of Olympic Dam expansion pre-commitment works continued throughout FY15. The Rehabilitation Strategy actions associated with these works are described in Table 1.1-3. Quarterly photo point monitoring has shown that in some areas where specific stabilisation measures were adopted, an increase in vegetation coverage has occurred. See Figure 1.1-7: Photo Point ENV 492 at Hiltaba taken May 2013 to Figure 1.1-10: Photo Point ENV490 at Hiltaba taken June 2015.

as examples. Areas where compaction and saline water was used to minimise passive dust generation have showed signs of natural revegetation.

Regular inspections of the open pit area continued throughout FY15 and found that natural revegetation is occurring in some areas. Access to the pit itself and the immediate surrounding areas remains restricted. No further rehabilitation plans are in place for areas associated with pre-commitment works.

During FY15 a clay borrow pit south of Evaporation Pond 3 (EP3) had rehabilitation earthworks completed. Due to the underground mining method used at Olympic Dam, large scale rehabilitation works were not required during FY15. The EIHCP process requires temporary disturbances (i.e. excavation for pipe maintenance and cable installations) to be remediated through topsoil replacement and scarification to promote natural re-vegetation.

Figure 1.1-7: Photo Point ENV 492 at Hiltaba taken May 2013

Figure 1.1-8: Photo Point ENV 492 at Hiltaba taken June 2015 showing natural revegetation is occurring

Figure 1.1-9: Photo Point ENV490 at Hiltaba taken May 2013.

Figure 1.1-10: Photo Point ENV490 at Hiltaba taken June 2015.

Table 1.1-3: Rehabilitation Strategy actions undertaken in FY14

Rehabilitation Strategy Action	Comment
Set up photo monitoring points for the area cleared for the proposed contractor's village on Andamooka Station to visually monitor soil stability.	Six monitoring sites were established in May 2012. Quarterly photo points continue to be taken. These sites have shown a progress establishment local plant species Figure 1.1-7 to Figure 1.1-10).
Regular inspection of proposed contractor's village area for erosion.	The site of the proposed contractor's village is inspected during quarterly photo point monitoring and other time-in-field excursions. Minor erosion from high rainfall events is visible within the Hiltaba area but does not warrant corrective action.
Rehabilitation of clay borrow pit south of EP3	Earthworks were completed in FY15 (Figure 1.1-11).

Figure 1.1-11: Borrow pit rehabilitation works (before left, after right)

Review closure risks and assumptions through annual workshop.

The FY15 Annual Closure and Rehabilitation Plan review included a Closure Planning Workshop in February 2015. This workshop was held with the relevant internal stakeholders.

The following were implemented to update the Closure Economic Evaluation and associated Closure Risk Register:

- The mine closure date was increased to FY2083;
- The FY16 Life of Asset Optimised Base Plan has reduced the number of TSFs from 11 to 10; and,
- The FY17 Life of Asset Optimised Base Plan will update any changes.

1.2 Spread of pest plants and animals

1.2.1 Environmental Outcome

No significant increase in the areas of infestation or abundance of declared pest plants, plant pathogens or pest animal populations.

No significant increase in pest animal populations relative to control locations was detected from the data collected. The relative abundance of pest animals at control locations is used for comparison to determine whether numbers have increased or decreased in operational areas. Wild dogs, rabbits and kangaroos were statistically ($p < 0.05$) more abundant in operational than control areas. An increase in these species may be due to resource availability.

No significant increase in the area of infestation of declared pest plants was recorded (A significant increase is defined as the introduction of a new self-sustaining population of a species, which has not previously been recorded in operational areas, or a 100 per cent increase above the 12 month rolling average in the abundance or known infestation area). Data collected during scheduled and opportunistic monitoring is used to detect the introduction of new self-sustaining populations of declared pest plants, and any significant increases in the size of existing infestations. No new self-sustaining populations have been observed and only minor increases in infestation sizes of existing populations were observed. Control of declared pest plants was undertaken throughout the FY15 reporting period as per the ODC weed management strategy.

1.2.2 Compliance criteria

No significant increase (relative to control locations remote to and / or prior to operations) in abundance of pest animals (cats and foxes) on the SML that can be attributed to ODC's activities (FA 2.3).

No statistically significant difference ($0.61 \geq p \geq 0.05$) could be detected in the number of transects on which cats and foxes were detected between operational and control areas. However, there were significantly more wild dog ($p = 0.03$), rabbit ($p < 0.01$) and kangaroo ($p = 0.02$) tracks in operational compared to control areas (outlined in further detail within 1.2.3). While the overall number of dog tracks detected was low ($N = 10$), ODC plans to work in conjunction with the South Australian Natural Resources South Australian Arid Lands Management Board (NR SAAL) to control wild dog numbers (see SA Arid Lands Wild Dog Management Plan 2015).

No significant increase (relative to control locations remote to and / or prior to operations) in abundance or infestation area of declared pest plants and plant pathogens that can be attributed to ODC's activities within the SML and GAB wellfields area (FL 2.4). ***NOTE: A significant increase is defined as the introduction of a new self-sustaining population of a species, which has not previously been recorded in operational areas, or a 100 per cent increase above the 12 month rolling average in the abundance or known infestation area.***

No significant increase in abundance or infestation area of declared pest plants and plant pathogens was observed over FY15. Monitoring showed some minor increases in the area of some existing infestations of declared pest plants. See section 1.2.4

1.2.3 Deliverables (FA 2.3)

A quantitative assessment of the abundance of specific feral and abundant species within the expanded SML.

Identification of whether measures are required to control feral or abundant species in the operations area (State 17ki).

The presence or absence of rabbits, cats, foxes, dingoes and kangaroos is determined using transects located in operational (<5km from the operation) and control areas (>10km from the operation) by the presence of their tracks. Monitoring occurs on a quarterly basis. Differences between the mean presence of feral and abundant species between operational and control areas is tested for using analysis of variance (t-test).

No significant difference ($\alpha=0.05$) was detected in the number of transects on which Cats ($p=0.053$), Foxes ($p=0.613$) were recorded between operational and control areas. Significantly higher numbers of Wild dogs ($p=0.030$), Rabbits ($p < 0.001$) and Kangaroos ($p=0.019$) were recorded within the operation area compared to the control sites. Regular cat and dog control will continue on site in FY16, in line with NR SAAL initiatives.

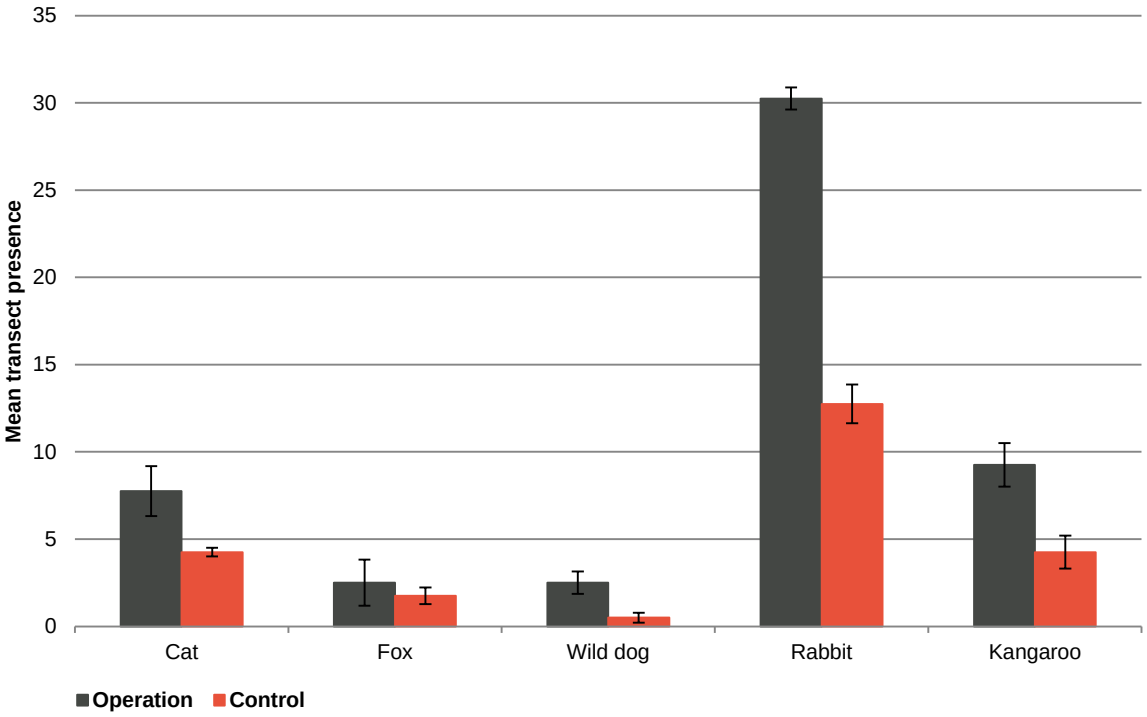


Figure 1.2-1: Mean presence of Cats, Foxes, Dingoes, Rabbits and Kangaroos at operational and control transects (± 1 standard error) in FY15

1.2.4 Deliverables (FL2.4)

Define and map the current distribution of extreme and high risk weed species within the Olympic Dam region, Roxby Downs Municipality, the expanded SML and Gosse Springs and Olympic Dam expansion SEB areas (17ki, 17kii).

Identification of whether measures are required to control declared weeds and plant pathogens in the operations area (State 17ki).

Routine and opportunistic observations were undertaken throughout the reporting period as per the Weed Management Strategy (BHP Billiton Olympic Dam 2013). A total of 55 plant species have been recorded, comprising three species identified as extreme risk weeds, and 16 identified as high risk weeds (Table 1.2-1). In developed habitat (residential, public and industrial areas and associated utilities/facilities), three species of extreme risk and 11 species of high risk were identified; and in rangeland habitat (pastoral leases, conservation reserves and generally unimproved arid zone vegetation), no species of extreme or high risk were identified. Control efforts for a number of these species were undertaken throughout FY15. No self-sustaining population of previously un-recorded species of declared pest plants were observed. Some existing infestations showed marginal increases in size following local rainfall events however there was no increase approaching 100% of an existing infestation. Despite this it was determined that control measures were still required for the continued management of pest plants.

Existing infestations of all known extreme risk species in a developed habitat were subject to significant control efforts. A continued decrease in density was noted at larger infestation areas. New infestations of Buffel Grass were identified, and physical and chemical control techniques for this species were implemented.

The FY15 distribution of extreme and high risk species is shown in Figure 1.2-2 to Figure 1.2-4.

Table 1.2-1: Pest plant species ranked as extreme or high risk (declared plants are shown in bold)

Risk	Extreme	High	
Developed habitat	Buffel Grass **Innocent Weed** **Prickly Pear**	**Athel Pine** **Caltrop** **Onion Weed** Potato Weed **Salvation Jane** White Cedar	Blackberry Nightshade Fountain Grass Paddy Melon Ruby Dock Saffron Thistle **Three-Corner Jack**
Rangeland habitat	**Prickly Pear**	**Bathurst Burr** **Caltrop** **Salvation Jane**	Buffel Grass **Horehound** Wards Weed

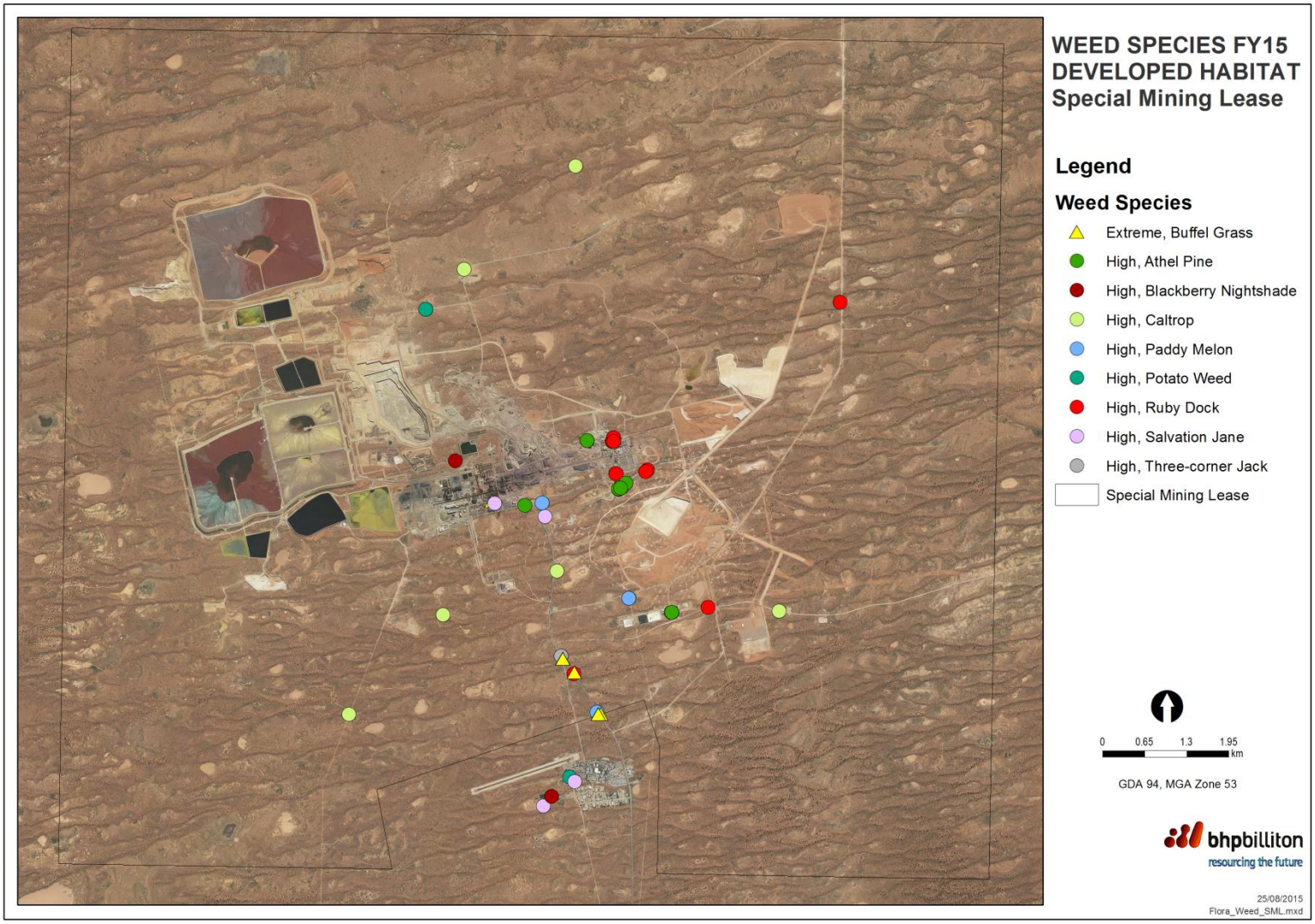


Figure 1.2-2: Locations of Extreme and High risk weed species on the SML in FY15

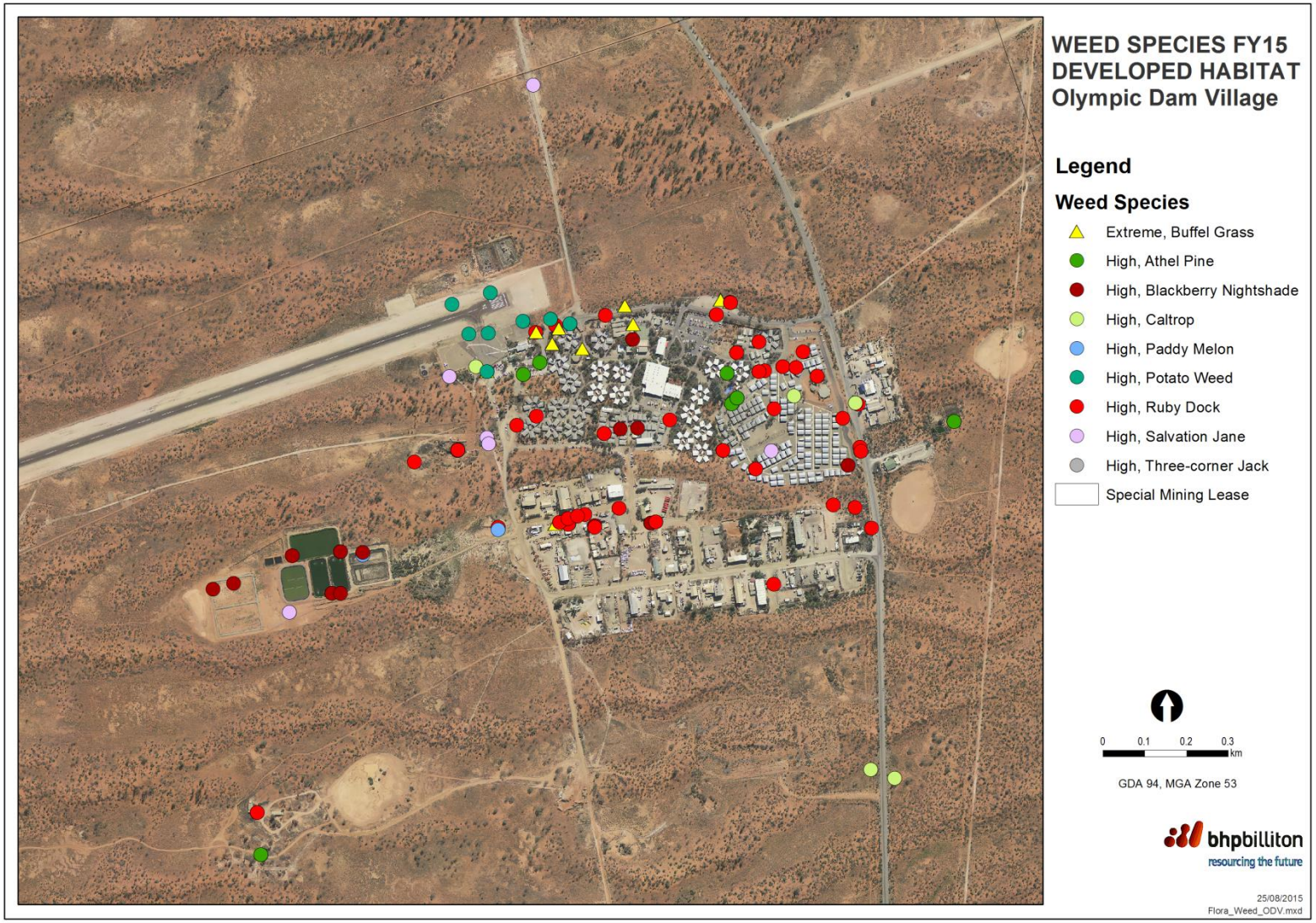


Figure 1.2-3: Locations of weed species at Olympic Dam Village (within the Municipal Lease) in FY15

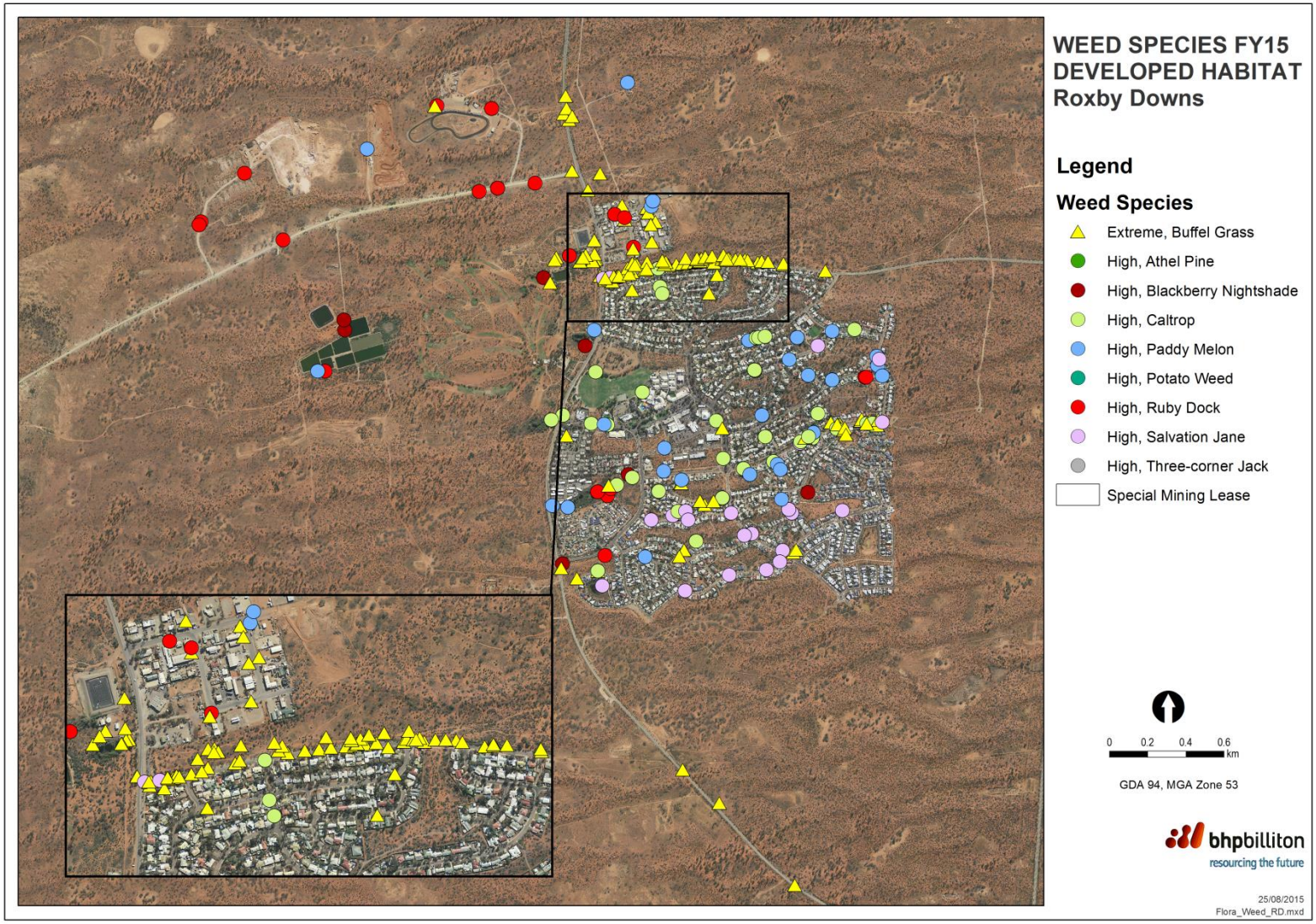


Figure 1.2-4: Locations of weed species in the Roxby Downs urban area (in the Municipal Lease) in FY15

1.2.5 Leading Indicators

- None applicable

1.2.6 Targets FY15

- None applicable

1.2.7 Action Plan FY15

Continue to progress control of Buffel Grass within the SML and Roxby Downs Municipality.

During FY15 Buffel Grass was monitored and controlled, using a combination of spot spraying and hand-pulling. The distribution of this weed has in the past been largely limited to the northern sections of Roxby Downs, particularly around the town water supply and light industrial area. During FY15 infestations of significant size were controlled around the Olympic Dam Airport and at the entry gate to the Special Mining Lease. Individual infestations continue to be controlled on the Special Mining Lease. Opportunistic monitoring, especially following rain, will continue in FY16.

Continue to monitor and control all known Innocent Weed infestation. Address any new infestations as required.

Innocent weed was present at known infestation locations during monitoring in FY15. Extensive physical and chemical control was undertaken on scheduled and opportunistic occasions. Many large infestations from previous years where absent with three small new infestation identified. Infestations are controlled in line with the Weed Management Strategy.

Continue to improve community knowledge of local pest plant and animal species.

In FY15, Environment Section representatives were active participants in the Roxby Downs-based community ‘Buffel Busters’ group dedicated to controlling the spread of introduced weed Buffel Grass within the region, which conducts weed control working bees on a regular basis. In addition to this BHP Billiton provided assistance and local infestation information to the Conservation Volunteer Australia’s Green Army team.

1.3 Aquifer level drawdown

1.3.1 Environmental Outcome

No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield Designated Areas for the proper development or management of the existing use of the lands as a result of ODC activities.

Drawdown and percentage wellhead pressure loss at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers 1997), and significantly less than the maximum drawdown area defined within the 10 m contour. In the Wellfield A and B areas, wellhead pressures and environmental flow rates at GAB springs remained consistent and in line with historical averages.

No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities.

No significant impact to groundwater for existing Stuart Shelf third-party users or to Yarra Wurta springs has occurred. Activity associated with the open pit and RSF have ceased, and the Motherwell wellfield has not been constructed, substantially reduced any potential for groundwater impact. Regional groundwater levels are stable.

No significant adverse impact on groundwater-dependent listed species or ecological communities as a result of groundwater drawdown associated with ODC activities (FL 2.5, FL 2.6).

Drawdown remains less than the predicted long-term impact and was within compliance criteria limits for FY15. Environmental flow rates at GAB springs remained consistent and in line with historical averages. Monitoring showed no indication of a significant adverse impact on groundwater-dependent listed species or ecological communities.

1.3.2 Compliance criteria

A 4 m drawdown limit at the point on the designated area for Wellfield A that is mid-way between GAB8 and HH2 based on the 12-month moving average (GA 2.5).

At the end of FY15 average drawdown between GAB8 and HH2 was 1.4 m (BHP Billiton Olympic Dam 2015).

A 4 m drawdown limit for Wellfield B at the point between monitoring bores S1 and S2 (measured as the average drawdown of the two bores) and based on the 12-month moving average (GA 2.5).

At the end of FY15, the average drawdown between S1 and S2 was 0 m (BHP Billiton Olympic Dam 2015).

A drawdown footprint for Wellfield B, measured as the area contained within the 10 m drawdown contour, that is less than or equal to 4,450 km^2(GA 2.5).

At the end of FY15, the area contained within the 10 m drawdown contour line was 2,658 km^2 (BHP Billiton Olympic Dam 2015).

No material change in the availability and quality of groundwater at existing bores in the Stuart Shelf area operated by third-party users.

Baseline water quality sampling indicates occasionally elevated uranium and manganese concentrations above drinking water limit. However the groundwater in the Stuart Shelf area is hyper-saline, which precludes it from any environmental benefit categories such as human and livestock consumption under ANZECC guidelines. See sections 1.3.11 and 1.3.12. Monitored water levels in the Stuart Shelf area are consistent with historical levels, and do not indicate any change in the availability of groundwater at existing bores.

1.3.3 Leading Indicators

No leading indicator trigger values were reached. Drawdown trends at monitoring bore S1 (for Wellfield A) remain well below threshold values, as does the drawdown footprint area for Wellfield B. Flow and water quality parameters at GAB springs, and drawdown trends at GAB pastoral bores, are stable and remain within the predictions of the 1997 EIS.

Trends in flow rates at Yarra Wurta springs are collected triennially with the next monitoring event due in FY17.

Water quality in the Stuart Shelf area remains unaffected.

1.3.4 Deliverables (FL 2.5)

A comparison of spring flow rates and aquifer pressure against predictions made in the Olympic Dam EIS of 1982 and 1997. (State 17ki)

Details of spring flow rates and aquifer pressure are reported in the Great Artesian Basin Wellfields Report (BHP Billiton Olympic Dam 2015). Near Wellfield A, flow rates at all of the monitored springs are within the range of historical observations. For Wellfield A, overall drawdown values slightly increased within the Northeast Sub-Basin due but remained stable in the Wellfield Sub-Basin and Hermit Hill areas.

For Wellfield B, the drawdown pattern in FY15 is similar to that of earlier reports. Drawdowns in FY15 increased slightly, consistent with a confined aquifer response to a wellfield that has operated some 19 years. Drawdown, along an arc of bores, situated to the west to south/south-east of Wellfield B and closest to the GAB springs, is less than 1 m, and in most cases is non-measurable.

In general drawdown and percentage wellhead pressure loss at pastoral bores remained less than the predicted long-term impact as presented in the EIS (Kinhill Engineers 1997).

Interpreted drawdown contours for Wellfield B show the drawdown pattern generally conforms to that presented in the EIS. Drawdown to the southwest of Wellfield B remains substantially less than EIS predictions, whilst drawdown remains greater than predicted on the southeast boundary of the designated area, with a strong drawdown gradient existing near the southern corner (S3) where the aquifer is known to be discontinuous. To better understand and predict the drawdown to the southeast, four additional bores on Mundowdna Station have been monitored since 2005 and trends are reported in the annual wellfield reports.

An evaluation of the area of vegetated wetlands within the GAB springs, and comparison with previously recorded measurements.

The results of the 2014 survey indicate that wetland vegetation area has expanded in both the short term (since 2011) and the medium term since 2000. Wetland vegetation expanded in four of the five Impact Zones (covering 23 spring groups) when compared to the 2011 survey results and the most recent survey continued the expanding or stable trend in most spring groups since 2000. Contraction was recorded at six spring groups of which two recorded minor contractions (Barratt and Fels 2014).

The contraction recorded at Welcome Springs Group in 2014 may be explained by ponded flood water due to an increase in flow between 2008 and 2011 inflating the wetland area. Flow rates recorded in 2011 and 2014 were relatively stable with a slight drop in flow back to a level similar to 2008 at one gauging station (WWS001). No spring groups have recorded successive contractions in 2011 and 2014.

Expanding wetland vegetation area across the study area (total area) and for most spring groups in 2014 continues the trend observable since 2000 and is considered indicative of increasing or at least stable flows at most spring groups over the last fourteen years (Barratt and Fels 2014).

Flow rates across all other spring groups between 2011 and 2014 remained within historic ranges.

The comparative wetland vegetation area for each impact zone is summarised in Figure 1.3-1, with the comparative spring data provided for each of the spring groups in Figure 1.3-2 to Figure 1.3-6.

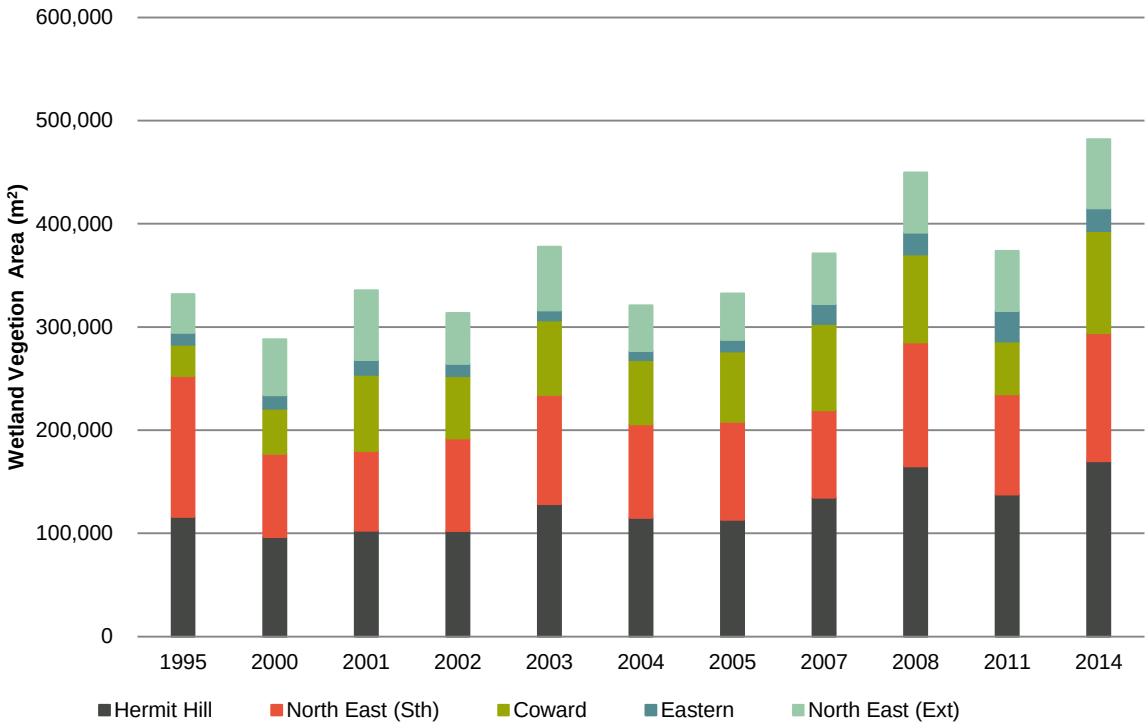


Figure 1.3-1: Measured wetland area in each impact zone (m^2)

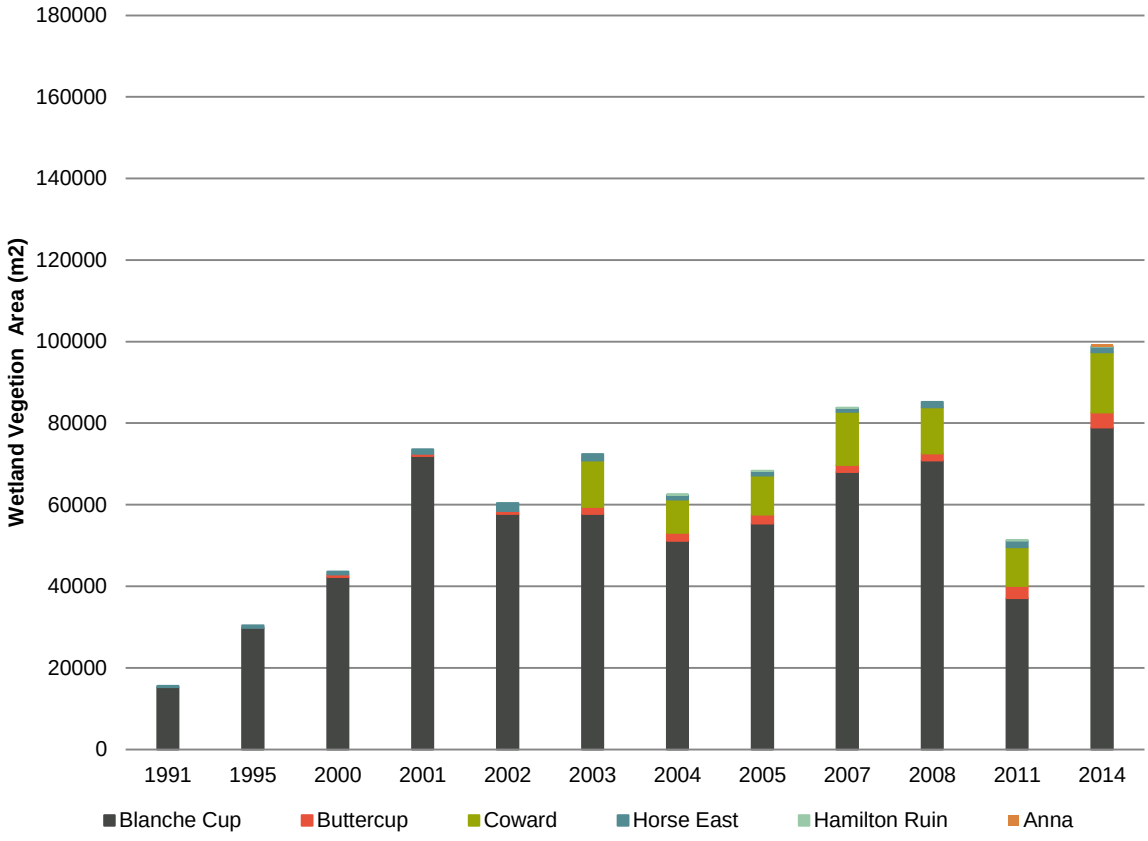


Figure 1.3-2: Coward impact zone vegetated wetland area (m^2)

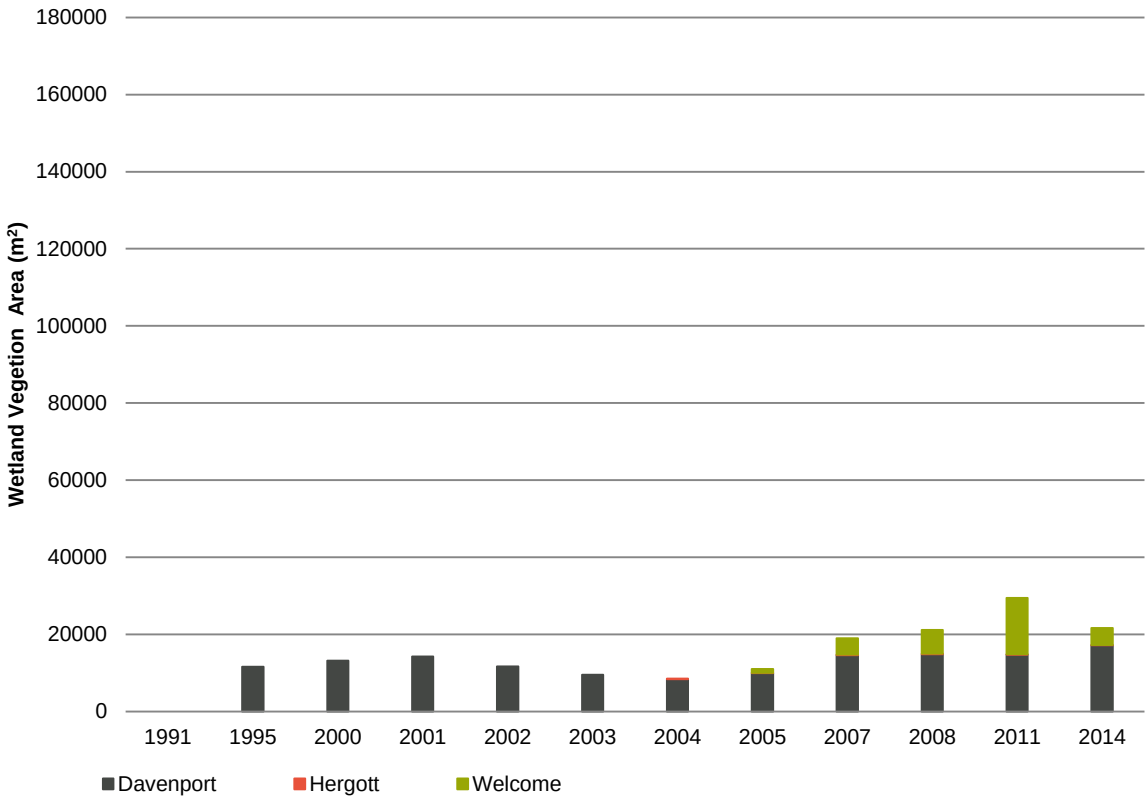


Figure 1.3-3: Eastern impact zone vegetated wetland area (m^2)

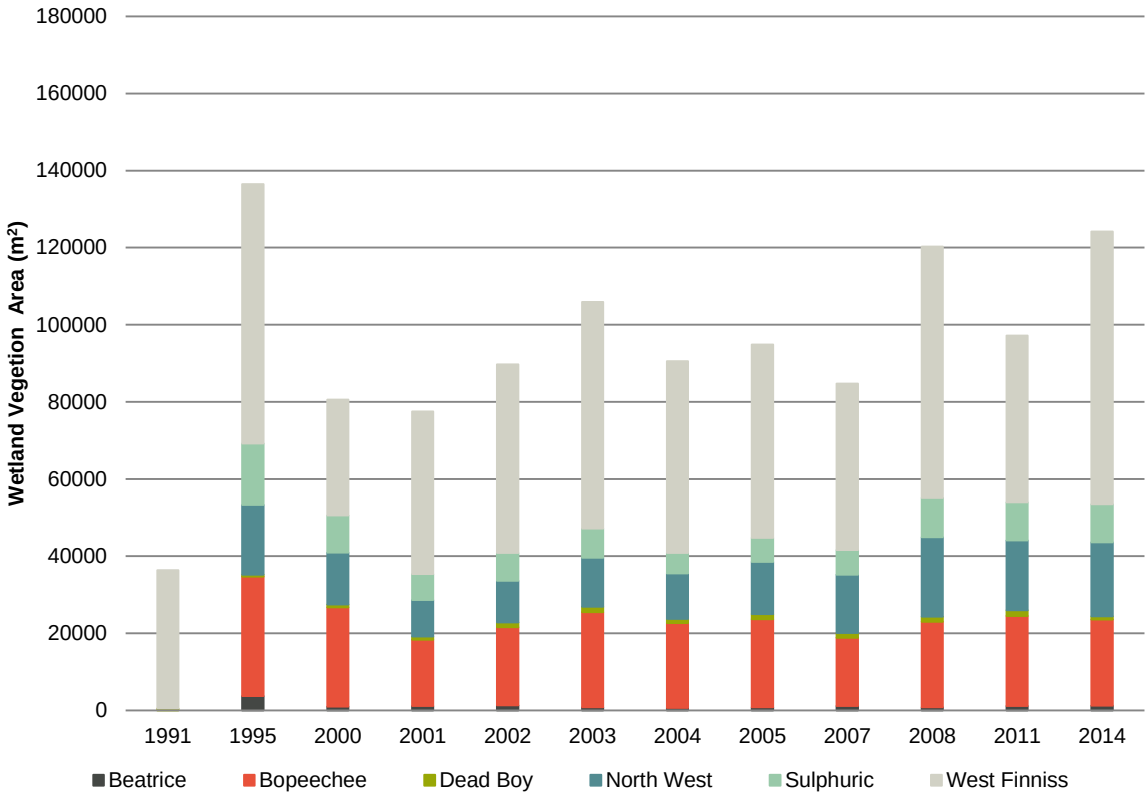


Figure 1.3-4 : Northeast Sub-basin (South) impact zone vegetated wetland area (m^2)

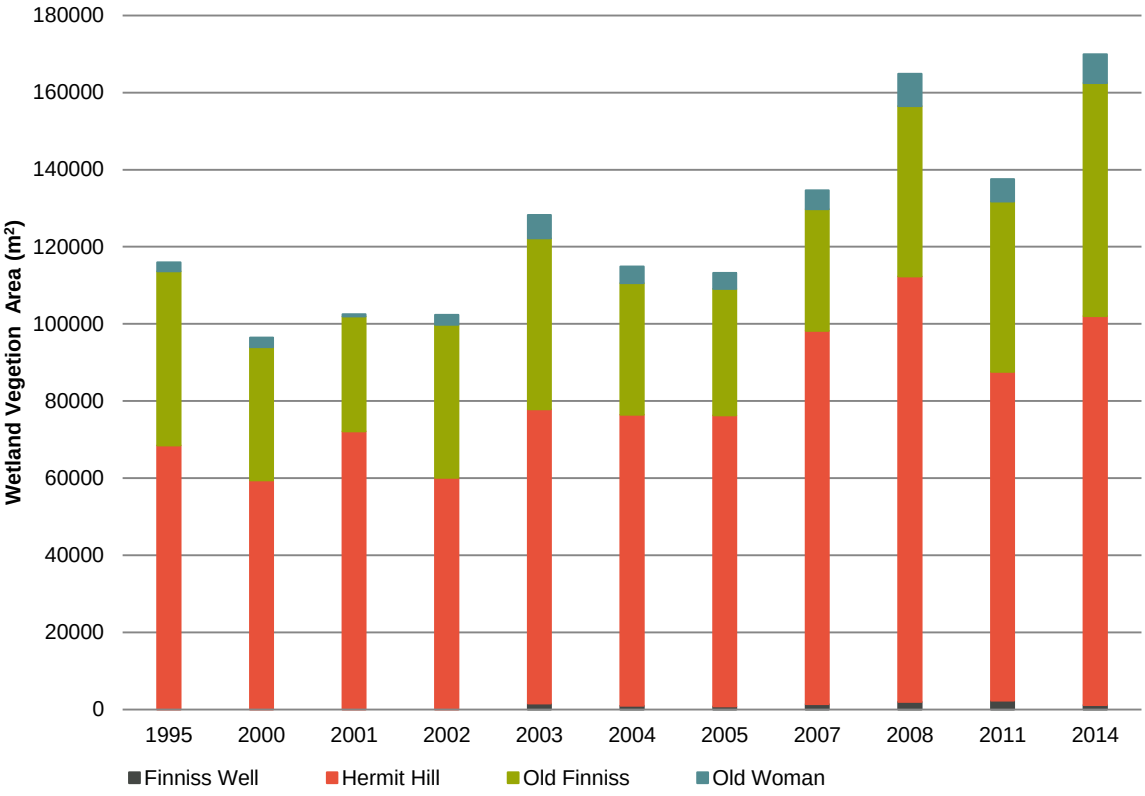


Figure 1.3-5 : Hermit Hill impact zone vegetated wetland area (m^2)

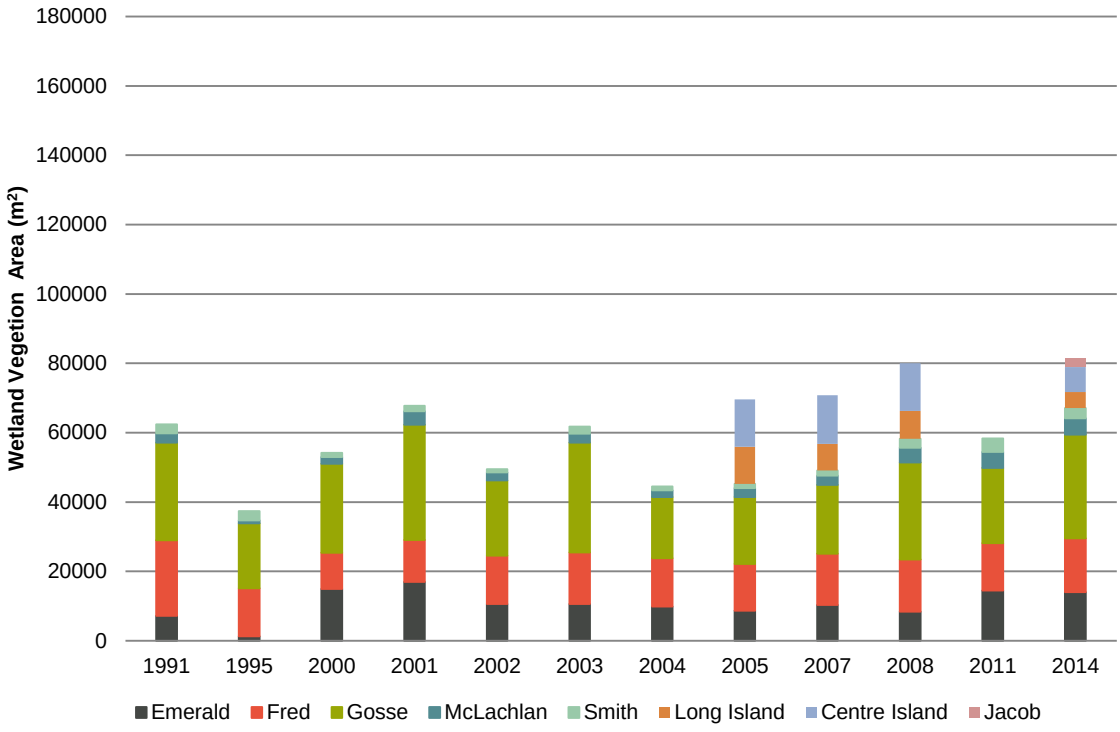


Figure 1.3-6: North-east Sub-basin (Extension) impact zone vegetated wetland area (m^2)

Triennial qualitative comparison of GAB spring monitoring data incorporating GAB spring flow, GAB springs vegetated wetland area, 'at risk' flora – category 1a and 'at risk' fauna – Category 1a.

A triennial qualitative comparison is due to be undertaken in FY17.

1.3.5 Deliverables (FL 2.6)

A comparison of the abundance and distribution of *E. carsonii*, per impact zone, with previously reported values, to determine impacts to the GAB springs. (State 17ki)

Flora species included under category 1a are those at-risk species whose population distribution as a whole is largely restricted to the impact area of the operation and are therefore at a higher risk of being impacted by the operations. *Eriocaulon carsonii* is restricted to the Great Artesian Basin (GAB) springs of the Lake Eyre South region in the vicinity of the wellfields and is the only plant to fall into this category.

Within the region studied, populations of *E. carsonii* were restricted to 18 spring units in the Hermit Hill and Lake Eyre springs complexes in FY15. *E. carsonii* occurred on the Hermit (11 units), Old Finniss (1), North West (1), Gosse (3), West Finniss (1), and Sulphuric (1) spring groups (Table 1.3-1). *E. carsonii* was uncommon and limited in abundance where it did occur. It ranged in cover class on any one spring unit on which it occurred from 1 (< 0.1% cover) to 6 (26-33% cover), with a median cover of 0.1-< 1%. *E. carsonii* occurred on spring mounds/springs and spring tails.

E. carsonii appeared on nine new spring units between the baseline years and 2014 (in addition to being transplanted to the spring HSS012). It disappeared from 15 spring units between the baseline years and 2014 (Table 1.3-2)

Between FY07 and FY15, *E. carsonii* disappeared from three spring units, and decreased in cover on one. It appeared on three, and increased in cover on two (Table 1.3-3). None of the changes in presence-absence was significant at the Hermit Hill impact zone (p = 0.876). The small increase in cover for the Northern Sub-Basin (Lower) impact zone was significant (p = 0.041), though it would not be significant were the change in recorded observations of HSS012 excluded (this change is probably an artefact of the size of the small population, meaning the population was not found in some years).

E. carsonii increased in cover on one spring unit between FY14 and FY15 (Table 1.3-1). Decreases in *E. carsonii* may be attributed to decreasing flow levels and/or associated changes in water quality, changes in grazing pressure and increases in the abundance of the reed *Phragmites australis*.

Table 1.3-1: Changes in *Eriocaulon carsonii abundance*, FY14 – FY15 (n=131)

Spring group	Sampling units where *Eriocaulon carsonii*: Disappeared	Decreased	Showed no change - present	Showed no change - absent	Increased	Appeared	n
Hermit Hill impact zone							
Hermit	0	0	11	28	0	0	39
Old Finniss	0	0	1	18	0	0	19
North West	0	0	1	33	0	0	34
Gosse	0	0	2	3	1	0	6
Zone total	1	0	15	82	1	0	98
Northern Sub-basin (lower) impact zone							
West Finniss	0	0	1	23	0	0	24
Sulphuric (transplants)	0	0	1	8	0	0	9
Zone total	0	0	2	31	0	0	33

Table 1.3-1 and Table 1.3-2 include only those spring groups where *E. carsonii* has been recorded at some time during or between 1983/4 and 2014.

Table 1.3-2: Changes in *Eriocaulon carsonii* abundance, baseline – FY15 (n=103)

Spring group	Sampling units where *Eriocaulon carsonii*: Disappeared	Decreased	Showed no change - present	Showed no change - absent	Increased	Appeared	n
Hermit Hill impact zone							
Hermit	12	6	0	16	0	4	38
Old Finniss	0	0	0	18	0	1	19
North West	0	0	0	6	0	1	7
Gosse	0	0	0	3	0	3	6
Zone total	12	6	0	43	0	9	70
Northern Sub-basin (lower) impact zone							
West Finniss	3	1	0	20	0	0	24
Sulphuric (transplants)	0	0	0	8	0	1	9
Zone total	3	1	0	28	0	1	33

Note. For all spring groups reported in the above table except North West, the baseline year was 1983/4. The baseline year for the North West spring groups reported here was 1988. (Of the 34 monitored springs in the North West spring group, the baseline year was variously 1988 (28 spring units), 2005 (4) and 2006 (2). 1988 *E. carsonii* data are missing for 21 of the sites with this year as baseline year). As there is some doubt about the 1983/4 Gosse results, the statistical tests for the Hermit Hill impact zone combined data have been applied only to the two spring groups with reliable 1983/4 baseline year data.

Table 1.3-3: Changes in *Eriocaulon carsonii* abundance, FY07 – FY15 (n=131)

Spring group	Sampling units where *Eriocaulon carsonii*: Disappeared	Decreased	Showed no change - present	Showed no change - absent	Increased	Appeared	n
Hermit Hill impact zone							
Hermit	3	1	9	25	0	1	39
Old Finniss	0	0	0	18	0	1	19
North West	0	0	1	33	0	0	34
Gosse	0	0	2	3	1	0	6
Zone total	3	1	12	79	1	2	98
Northern Sub-basin (lower) impact zone							
West Finniss	0	0	0	23	1	0	24
Sulphuric (transplants)	0	0	0	8	0	1	9
Zone total	0	0	0	31	1	1	33

Hermit Hill impact zone

Between FY14 and FY15, *E. carsonii* increased in cover on one spring unit (Table 1.3-1). The change was not significant.

Between baseline and FY15, *E. carsonii* increased in cover (was recorded for the first time) on eight spring units (Table 1.3-1), this number excludes spring units first monitored in 1988). However, there is some doubt as to the accuracy of the 1983/4 records for three of these spring units (reporting the appearance of *E. carsonii* at the Gosse spring group). It decreased in cover on six spring units, and disappeared from 12 spring units over this period. The change in cover for the impact zone for this time period was significant. For those spring units with a 1988 baseline year (from the North West spring group), *E. carsonii* was recorded for the first time on one spring unit between 1988 and 2014.

Between FY07 and FY15, *E. carsonii* disappeared from three spring units, decreased in cover on one, appeared on two, and increased in cover on one (Table 1.3-2). Neither the changes in presence-absence nor cover were significant.

Northern Sub-basin (Lower) impact zone

E. carsonii declined in cover on one spring unit and disappeared from three spring units between 1983/4 and FY15 (Table 1.3-2). The only other change represents plants transplanted in the intervening years. The changes in occurrence were not significant at the impact zone level.

1.3.6 Deliverables (GA 2.5)

Collated domestic and industrial water use efficiency data, to assess performance against improvement targets.

The GAB Industrial Water Efficiency of the operation in FY15 was 1.17kL/t, which was favourable compared to the target of 1.18kL/t. The FY15 performance was higher than that of FY14 (1.08kL/t), due to unplanned downtime in the processing plant. Historical GAB Industrial Water Efficiency is given in Figure 1.3-7.

Water efficiency was maintained under the target despite the significant interruptions to the operation in FY15. This was due to sustained operating discipline to minimise the use of GAB water across the operation.

Domestic water use during FY15 averaged 2.58 ML/d compared to 2.57 ML/d in FY14, which was below the target of 3.2 ML/d. Historical domestic water use is given in Figure 1.3-8.

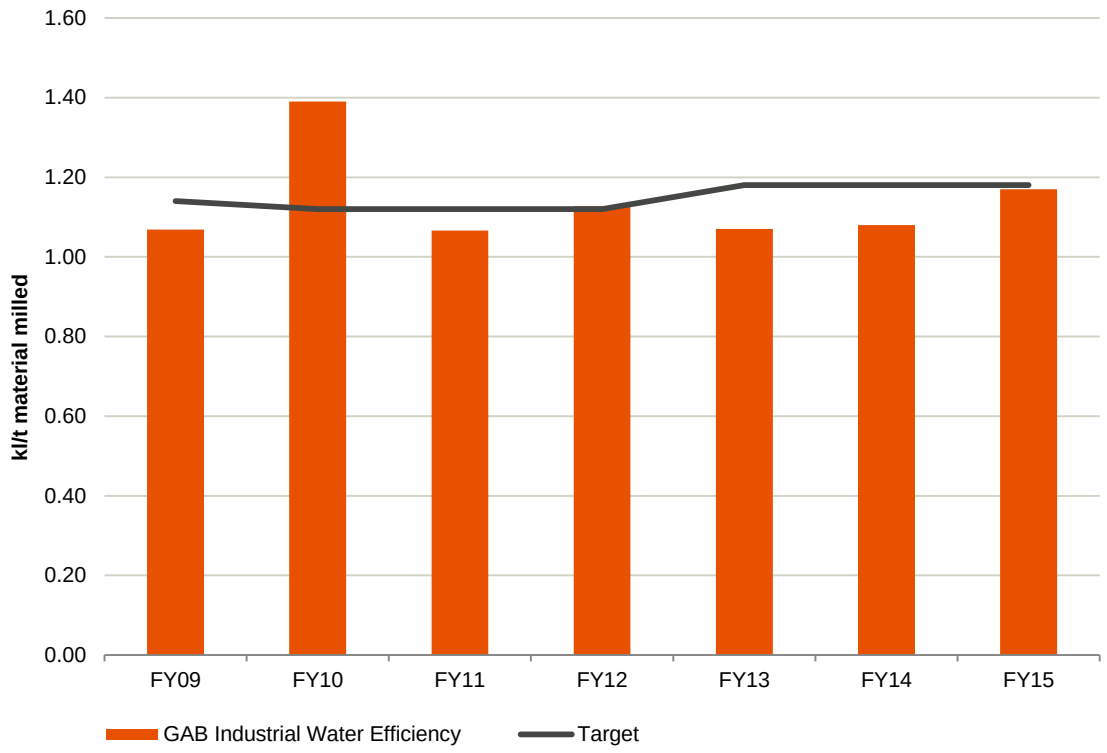


Figure 1.3-7: Historical industrial GAB water efficiency

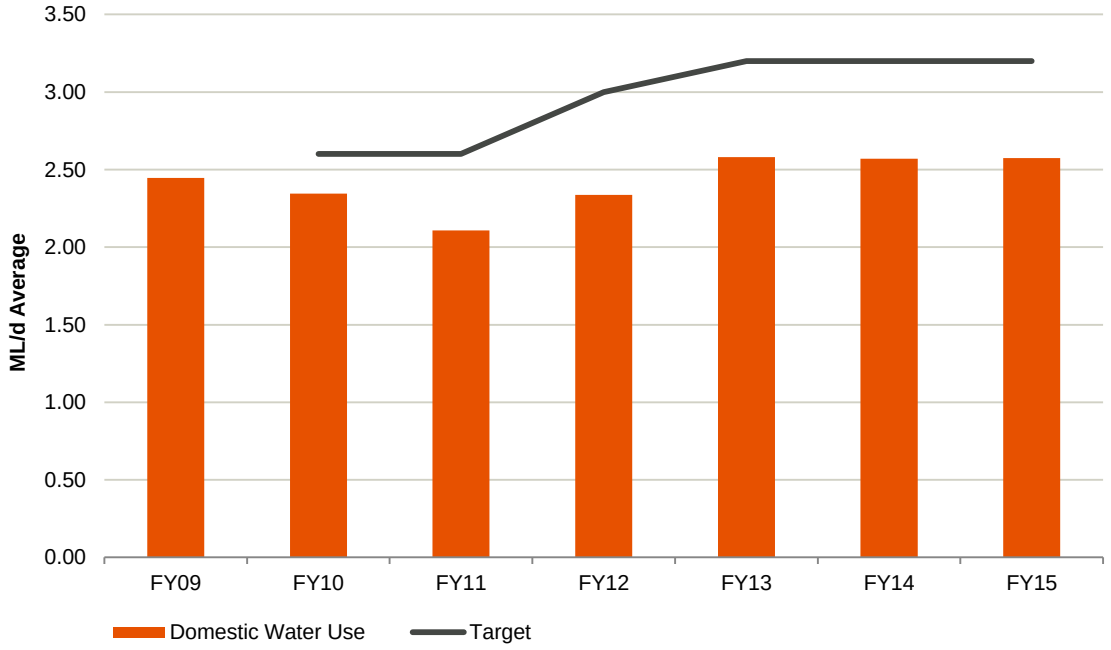


Figure 1.3-8: Historical domestic water use (note there was no target in FY09)

1.3.7 Deliverables (GA 2.5)

Ten-year water use schedule to be submitted to the Indenture Minister by 1 January annually.

The current 10-year water use schedule, as provided to the Minister for Mineral Resources Development in December 2014, is presented in Appendix 9 of the FY15 Annual Wellfields Report (BHP Billiton Olympic Dam 2015). An updated schedule will be provided by 1 January 2016.

The current forecast shows an increase in the non-potable water requirement in the Mine and Process Plant from 2015 to 2018. Water use is predicted to increase over the next decade as changing ore properties will result in the increased production of copper concentrate, which in turn will result in higher water use at the smelter. A detailed water forecast beyond 2018 is not available, however production and therefore water demand is forecast to remain steady.

1.3.8 Deliverables (GW 2.3)

A review of trends in groundwater quality at Yarra Wurta springs and a comparison between baseline measurements and ongoing monitoring.

Yarra Wurta Springs were monitored for the first time in FY13 (Land Use Consultants 2012). Baseline data indicates that Yarra Wurta Springs (YWS001, YWS002) comprise highly saline water in comparison to GAB springs, which could be due to occasional inundation from Lake Torrens, a nearby salt lake. Data is collected triennially with the next monitoring event due in FY17.

1.3.9 Deliverables (GW 2.4)

A review of trends in groundwater spring flow rates at Yarra Wurta springs and a comparison between baseline measurements and ongoing monitoring.

Several spring in the Yarra Wurta region were monitoring for the first time in late 2012 (YWS001) and early 2013 (YWS002) with flows of 0.15 L/s and 2.28 L/s respectively. Monitoring is conducted triennially with the next event due in FY17.

Data showing the tracking of trends towards the leading indicators for impacts to Yarra Wurta springs, and an alert to management when levels approach the leading indicators.

Data for regional groundwater levels is collected triennially. The next monitoring event is due in FY17.

1.3.10 Deliverables (FA 2.4)

A qualitative assessment of the abundance of the Lake Eyre Hardyhead in the Yarra Wurta springs and compare with previous surveys results (State 17ki).

An assessment of Lake Eyre Hardyhead at Yarra Wurta springs was first undertaken in September 2012 at YWS 001. Fish were found to be present and active.

Opportunistic viewing of Lake Eyre Hardyhead at Yarra Wurta springs in September 2014 at YWS001 found fish were found to be present and active.

1.3.11 Deliverables (GW 2.1)

A review of abstraction and injection rates and trends and an assessment with respect to groundwater levels.

Saline water was abstracted from the Arcoona Quartzite throughout FY15 from the Saline Wellfield located south of the Whenan Shaft.

Some of this water from the Saline Wellfield was used in construction projects throughout the operations, whilst the remainder was discharged to the mine water disposal pond for evaporation. An average of 2.3 ML/d (Figure 1.3-9) was abstracted over the period, compared to 1.0 ML/d during the previous reporting period.

A definition and map of the underground mine water balance.

The mine water balance is a summary of the volume of water going into and out of the underground mine. It includes saline water abstracted from local bores that is added to surface storages and used around site. The balance presented in (Figure 1.3-9) is generated from a combination of measured, derived and estimated data.

An estimate of the volume of groundwater discharge to underground.

Groundwater inflow to the mine occurs at several intersections with the underground operations (Figure 1.3-9). Total natural inflow is estimated to be approximately 1.1 ML/d, the majority entering via upcast raise bores.

Additional natural inflow comes into the mine via other entry points, including downcast raise bores, exploration drill holes and shafts (Figure 1.3-9).. Much of the total inflow to the mine is transported to the surface as ore content or exhausted to the atmosphere as saline aerosols or moisture-laden air via upcast raise bores, estimated at around 1.0 ML/d.

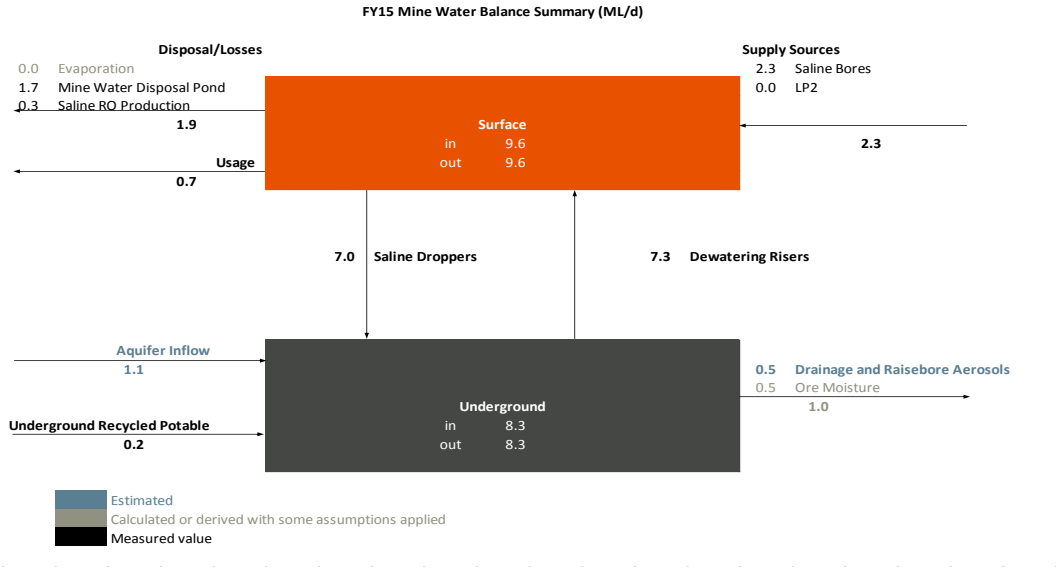


Figure 1.3-9: FY15 Saline (Mine) water balance summary (ML/d)

1.3.12 Deliverables (GW 2.2)

A review of the trends in local and regional groundwater levels and a comparison with historical groundwater levels.

A slight downward trend in local and regional groundwater levels (Figure 1.3-10) is evident over the last three years. The groundwater cross section (Figure 1.3-11) and hydrograph (Figure 1.3-12) confirm the limited changes in groundwater levels beneath the TSF between June 2014 and June 2015.

The maximum groundwater level recorded below the TSF for the current reporting period was 62.71 mAHD at LT50 in August 2014. The general downward trend has been maintained since late 2010 where groundwater levels are not expected to exceed the agreed limit of 20 m below the ground surface (80mAHD) within the next 12 months.

Groundwater level contours in the Andamooka limestone aquifer beneath the perimeter of the TSF (Figure 1.3-13) have generally remained stable during FY15. A continued contraction of the area above the 60 mAHD and no groundwater level above 65 mAHD has been maintained.

During FY15 groundwater levels beneath cells 1-4 have remained stable; particularly beneath cells 1-3 where there has been no deposition and good pond control (Figure 1.3-13) There is gradual rise in groundwater levels beneath TSF 5 (Figure 1.3-14) which can be attributed to the ongoing use of this facility. Levels are well below compliance limits of 80 mAHD.

Groundwater levels of bores in Figure 1.3-15 continue to show depressurisation of the geological units around the underground mine, consistent with ongoing mine depressurisation activities.

Limestone aquifer bores in the vicinity of Roxby Downs and the mine water disposal pond (Figure 1.3-16) demonstrate stable groundwater levels during FY15.

Historical level monitoring indicates steady groundwater levels over time with no overarching trends that would indicate material change in the availability at existing bores in the Stuart Shelf area operated by third-party users (section 1.3.3).

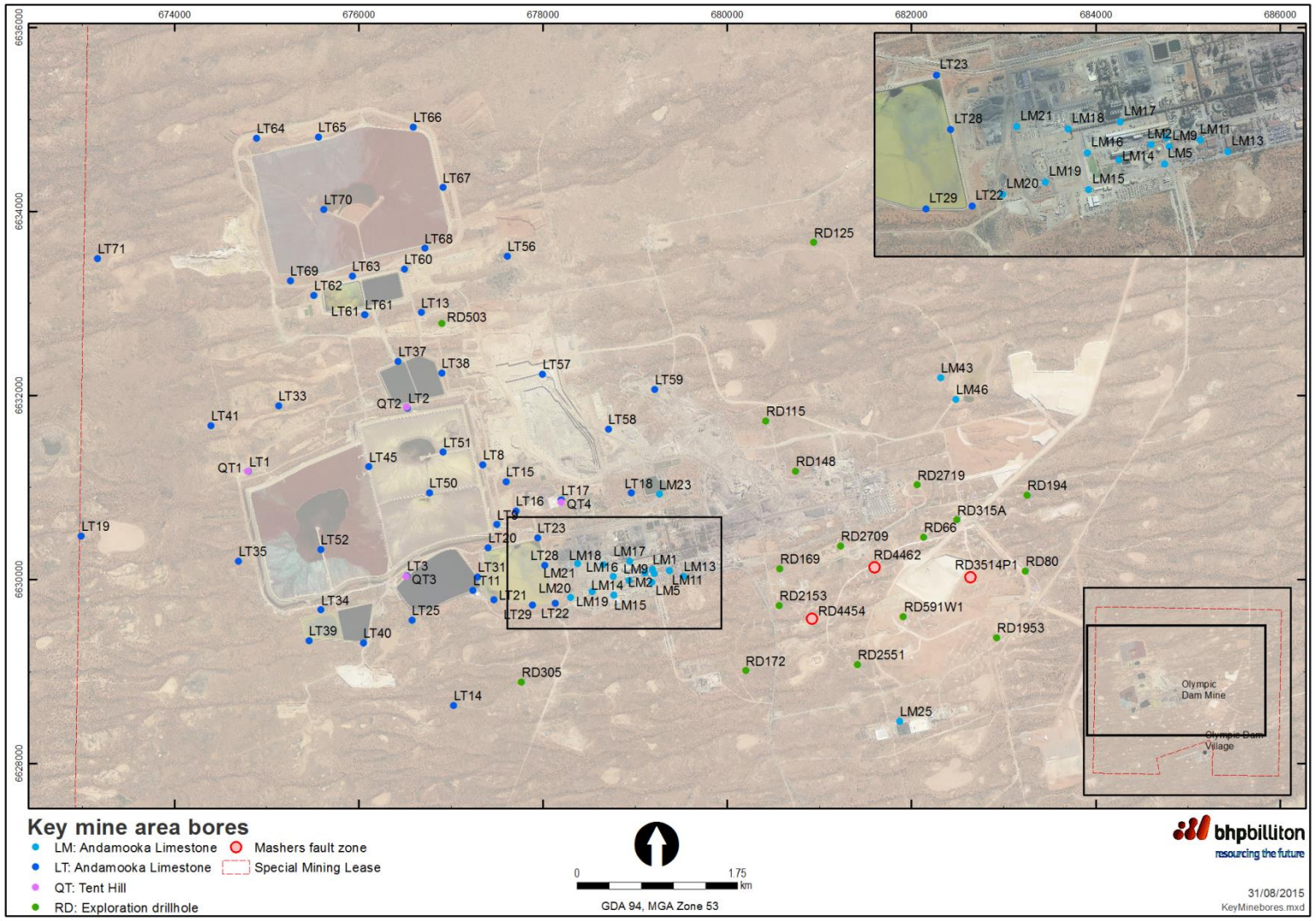


Figure 1.3-10: Location of key mine area bores

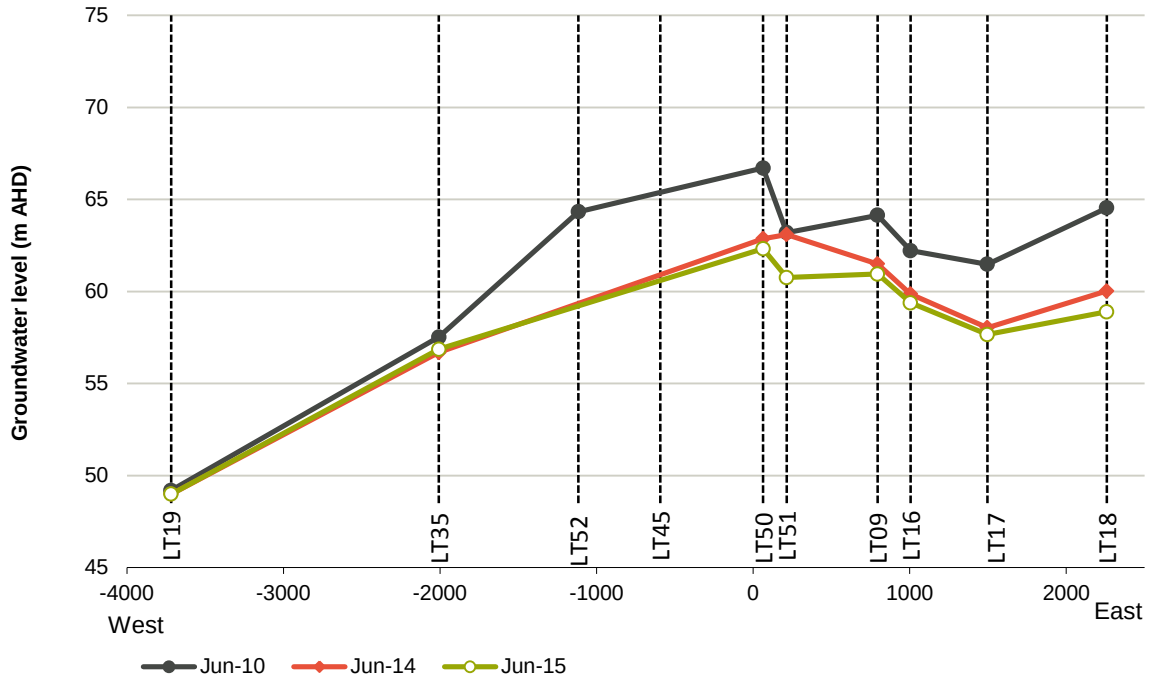


Figure 1.3-11: Change in groundwater elevation along an east-west cross-section from LT19 to LT18, through the centre of the TSF

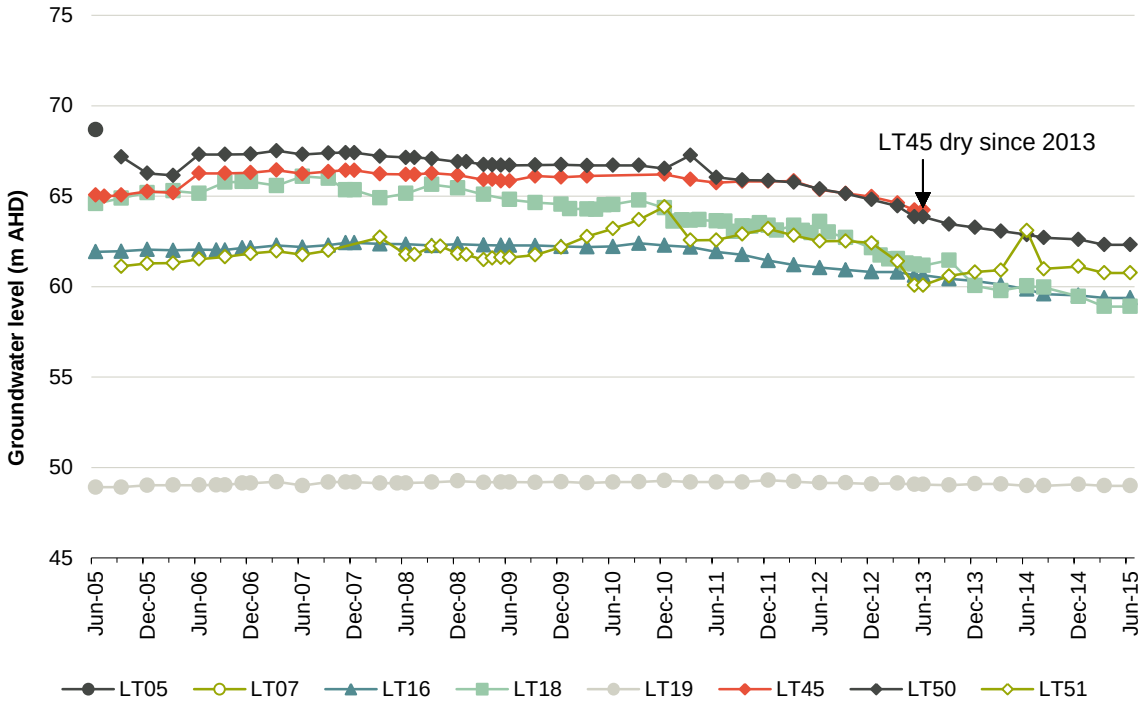
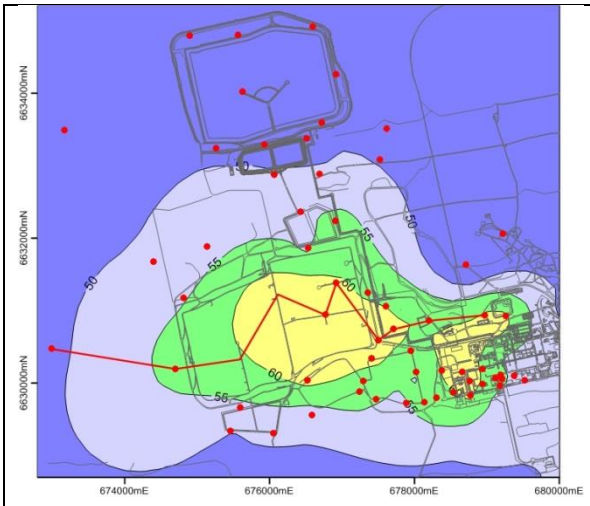
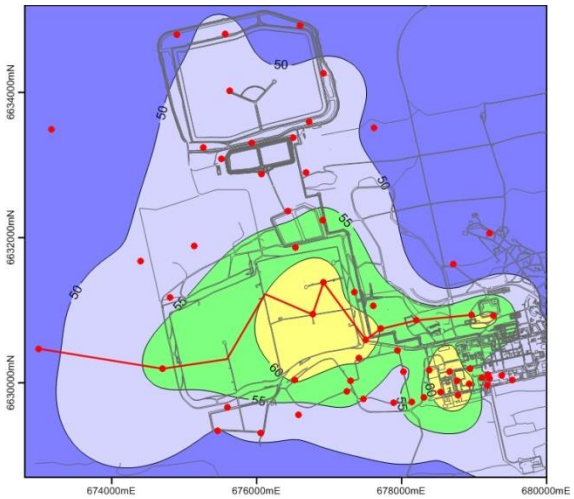


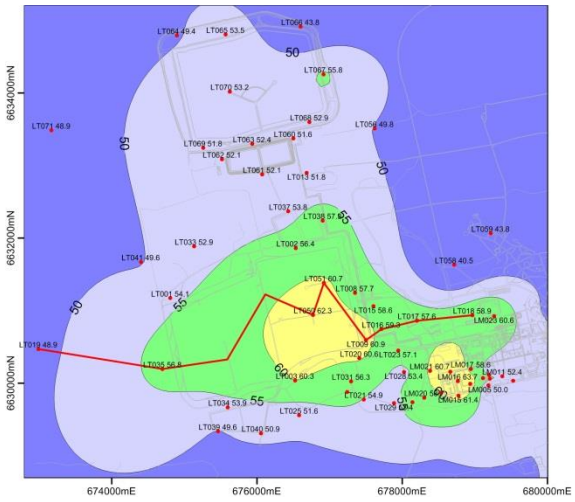
Figure 1.3-12: Groundwater levels for Andamooka Limestone bores in the vicinity of the TSF



June 2013



June 2014



June 2015

Datum: GDA94 Projection: MGA94 Zone: 53

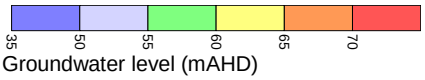


Figure 1.3-13: TRS area groundwater levels (mAHD) Andamooka Limestone Aquifer

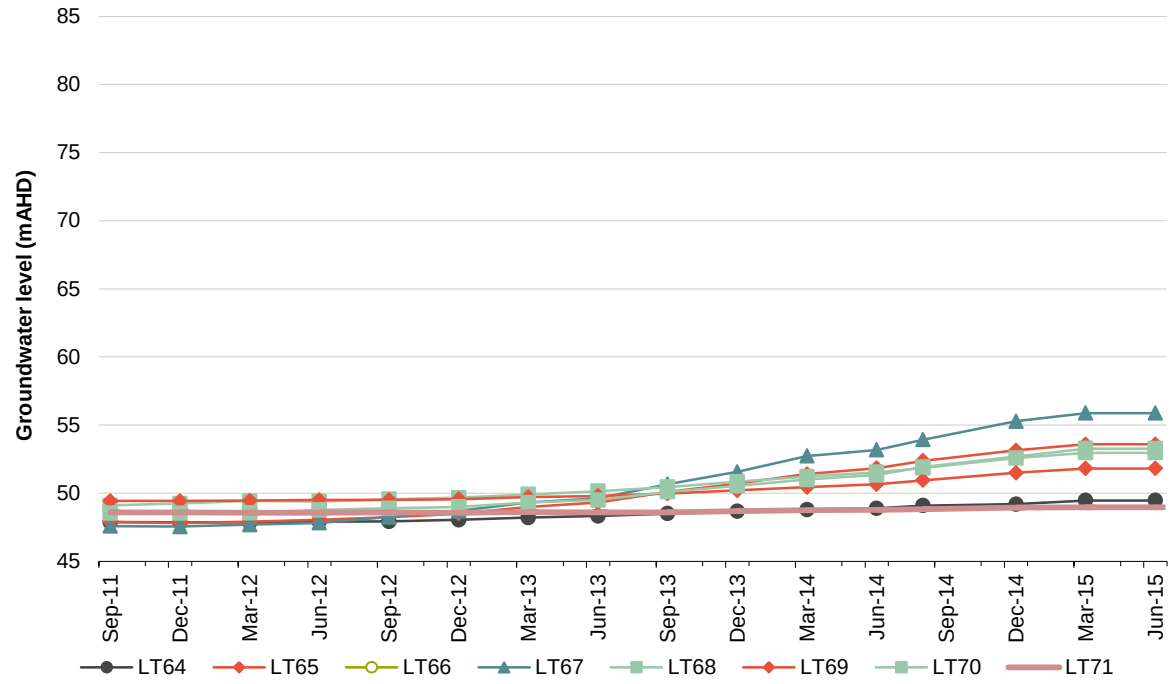


Figure 1.3-14: Groundwater levels for bores in the vicinity of TSF 5

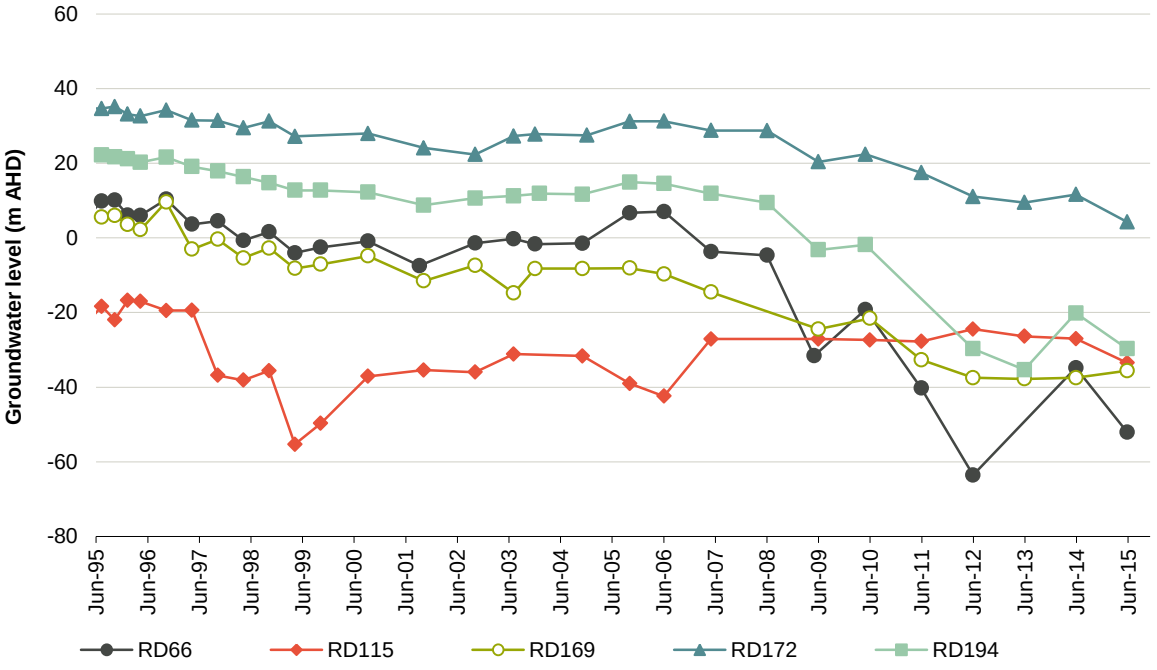


Figure 1.3-15: Groundwater levels for exploration drill holes in the vicinity of the underground mine

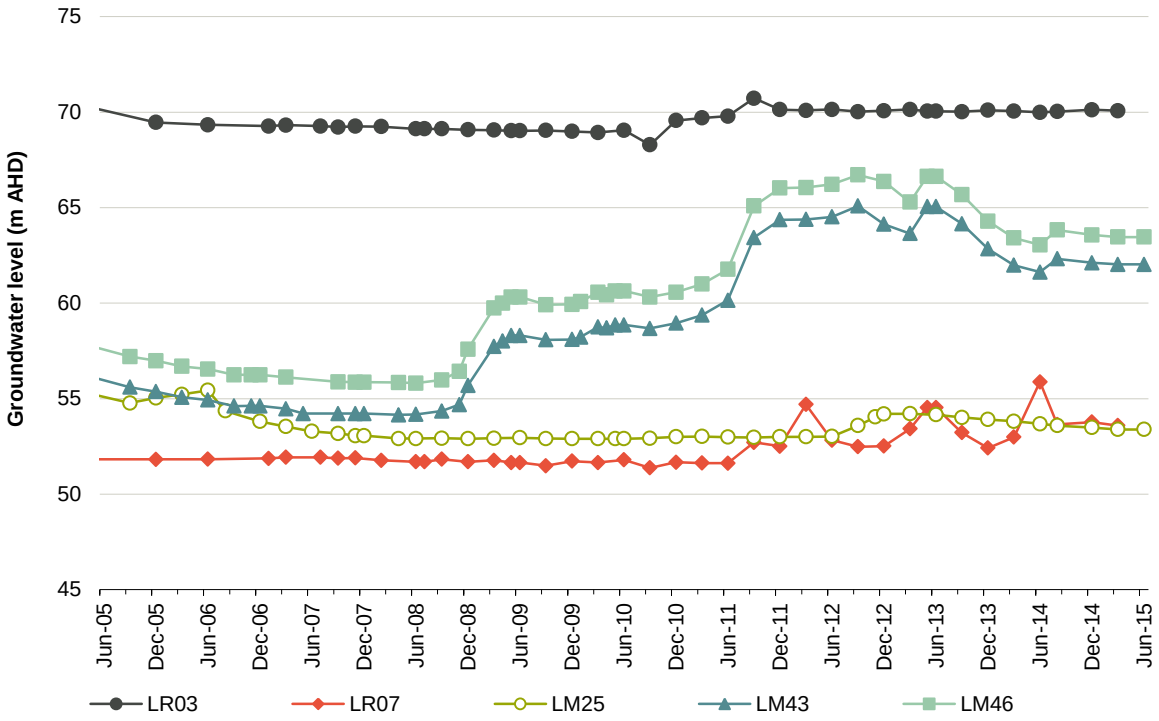


Figure 1.3-16: Groundwater levels for Andamooka Limestone bores in the vicinity of Roxby Downs (LR) and the Mine Water Pond (LM)

Data showing the tracking of trends towards leading indicators for groundwater impacts, and an alert to management when levels approach the leading indicators.

Data for groundwater level was collected, with a discussion of results in section 1.3.11. Leading indicator trigger levels were not reached (see section 1.3.16).

1.3.13 Deliverables (GW 2.3)

A review of trends in groundwater quality and a comparison to ANZECC criteria.

Groundwater in the vicinity of the Olympic Dam Operation occurs at depth and is highly saline making it unsuitable for human or livestock consumption and largely inaccessible. The local groundwater does not meet any of the beneficial use categories listed under ANZECC guidelines.

Groundwater salinity has generally remained stable and within the range that could be reasonably expected for natural variation within the aquifer. Salinity levels across site vary slightly due to input sources from various areas of the mine.

Groundwater pH ranges from 6.62 in LT2 to 7.57 in LT17, in line with previous years monitoring.

Concentrations of copper in all groundwater monitoring bores sampled during the FY15 monitoring program were reported below ANZECC (2000) guidelines for livestock consumption of 0.4 mg/L (Figure 1.3-17**).**

While slightly elevated concentrations of uranium continue to be detected in the groundwater beneath the mine water disposal pond, and in the vicinity of evaporation pond two, uranium concentrations remain steady in the majority bores. Uranium concentrations are generally higher than the adopted NHMRC (2011) guidelines for drinking water of 0.017 mg/L, but lower than the adopted ANZECC (2000) guidelines for livestock consumption of 0.2 mg/L (Figure 1.3-18).

Bores LT15 (0.397 mg/L), LT25 (0.584 mg/L), LM46 (0.298 mg/L) and LT2 (0.216mg/L) are reported to exceed the livestock guideline. LT15, LT25 and LT2 are located at the base of the tailings facility and are highly susceptible to changes in tailings pond use rates. Bore LT22, which is located nearby shows Uranium levels below ANZECC livestock guidelines. Bore LM43 is located next to the ore stockpile alongside LM46 which shows Uranium levels of 0.074, below ANZEEC livestock guidelines.

Baseline water quality sampling results for the Stuart Shelf region are consistent with baseline parameters.

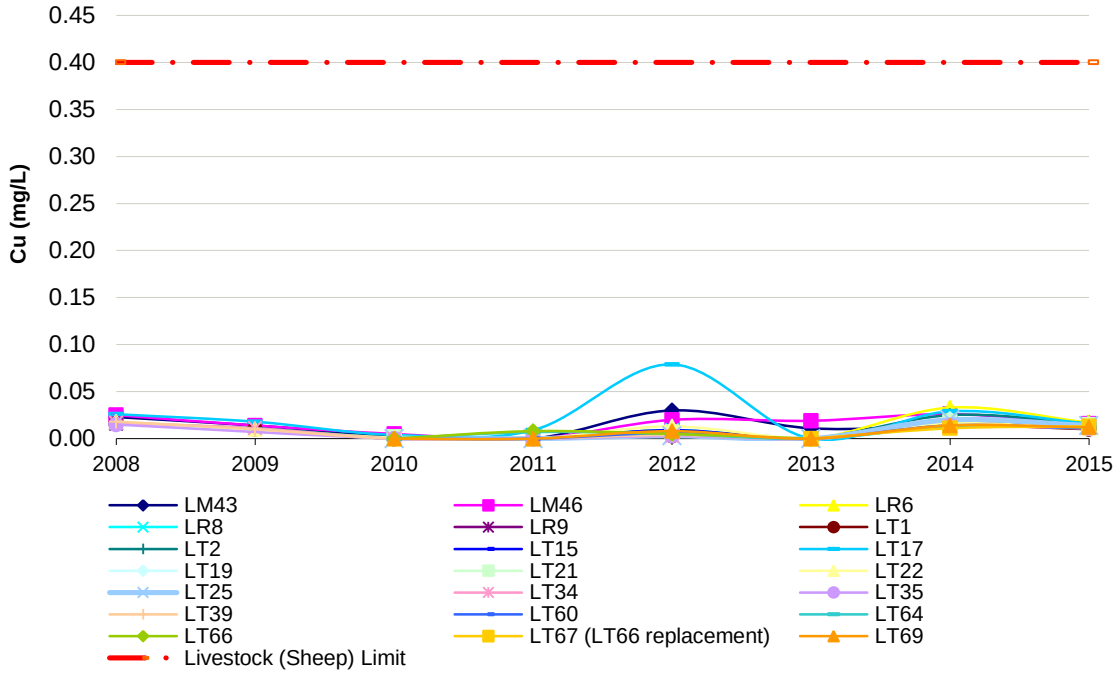


Figure 1.3-17: Olympic Dam on-site and regional groundwater monitoring bores: copper concentration

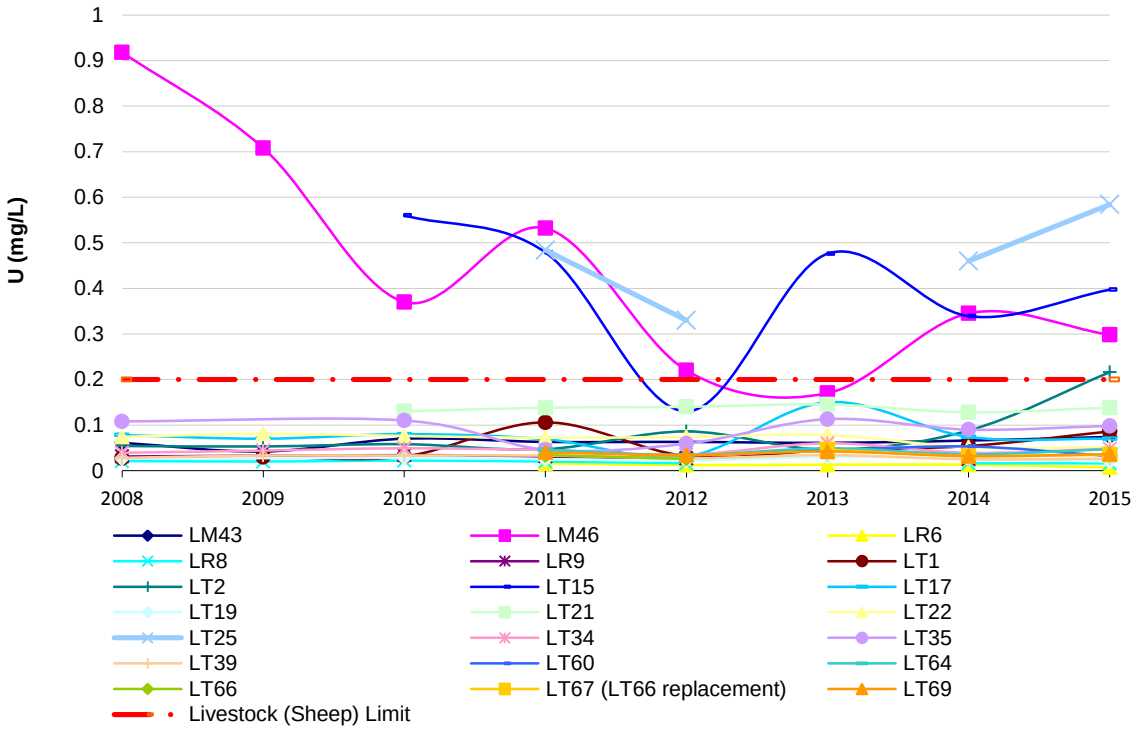


Figure 1.3-18: Olympic Dam on-site and regional groundwater monitoring bores: uranium concentration

1.3.14 Deliverables (WA 2.3)

Records of the water levels in the MWDP.

To determine any potential environmental impacts of the Mine Water Disposal Pond (MWDP), water levels were monitored weekly via local groundwater bores. Minor changes were observed, with reductions in groundwater level in LM43 and LM46 (Figure 1.3-16).

Records of quantities of water disposed of into the MWDP.

Quantities of water disposed of into the MWDP were measured and recorded each day, and reconciled monthly as part of the Saline Water balance (see Figure 1.3-9). An average of 1.7 ML per day was disposed into the MWDP during FY15.

1.3.15 Deliverables (WA 2.4)

Records of pond levels and pond wall condition (sewer ponds).

Sewage waste generated by Olympic Village (OV) is gravity fed to three on site chambers and pumped to the OV treatment facility west of the camp. The treatment facility consists of primary, secondary and storage ponds and a permanent evaporation pan with a combined volume of 32ML. The secondary ponds are mechanically aerated.

The OV treatment facility is inspected daily for security, inflow, wall integrity and available freeboard in storage ponds. Freeboard is reported daily and recorded. Inflow was recorded daily and averaged at 140 kl/day for FY15.

Sewage waste generated by the Mine and Process plant is treated onsite. The onsite facility was upgraded in FY15 with a new primary lagoon and storage pond. Currently inflow is averaging 228 kl /day.

A chemical and biological testing regime is undertaken monthly for both the onsite and OV facilities. All results are analysed and logged. No concerning results have been recorded in FY15.

1.3.16 Deliverables (GW 2.5)

Data demonstrating that radionuclide concentrations are below upper limits.

Surface ponds which hold groundwater were monitored and analysed during FY15 for specific radionuclides. Results from samples collected in March 2015 were below the upper limits for radionuclides ^{238}U and ^{226}Ra of 50 and 5 Bq/L respectively (Table 1.3-4, Figure 1.3-19).

Table 1.3-4: Radionuclide analysis for dust suppression water

	Analyte	^{238}U (Bq/L)	^{230}Th (Bq/L)	^{226}Ra (Bq/L)	^{210}Pb (Bq/L)	^{210}Po (Bq/L)
Upper Limits		50		5		
Sample site	Date					
A Block	March 2015	6.17	0.00		0.27	0.00
D Block	March 2015	14.7	0.05		0.20	0.01
F Block	March 2015	13.6	0.02		0.026	0.04
Turkey Nest	March 2015	0.30	0.001		0.104	0.00

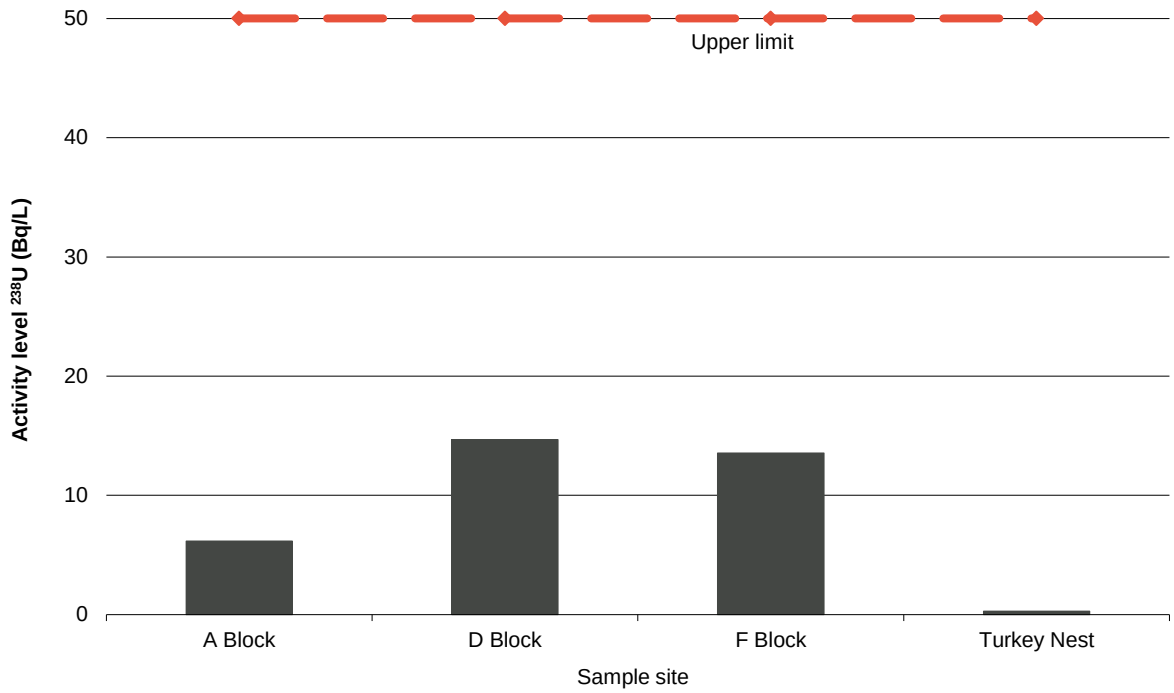


Figure 1.3-19: Mine water sample ^{238}U levels and upper limit FY15

A review of results and provision for increased monitoring frequency where concentrations are trending towards upper limits.

No samples collected during FY15 showed levels approaching upper limits.

1.3.17 Deliverables (FL 2.5)

A comparison of spring flow rates and aquifer pressure against predictions made in the Olympic Dam EIS of 1982 and 1997. (State 17ki)

Details of spring flow rates and aquifer pressure are reported in the Great Artesian Basin Wellfields Report (BHP Billiton Olympic Dam 2015). Near Wellfield A, flow rates at all of the monitored springs are within the range of historical observations. For Wellfield A, overall drawdown values slightly increased within the Northeast Sub-Basin, but remained stable in the Wellfield Sub-Basin and Hermit Hill areas.

For Wellfield B, the drawdown pattern in FY15 is similar to that of earlier reports. Drawdowns in FY15 increased slightly, consistent with a confined aquifer response to a wellfield that has operated more than 18 years. Drawdown, along an arc of bores, situated to the west to south/south-east of Wellfield B and closest to the GAB springs, is less than 1 m, and in most cases is non-measurable.

In general drawdown and percentage wellhead pressure loss at pastoral bores remained less than the predicted long-term impact as presented in the EIS (Kinhill Engineers 1997).

Interpreted drawdown contours for Wellfield B show the drawdown pattern generally conforms to that presented in the EIS. Drawdown to the southwest of Wellfield B remains substantially less than EIS predictions, whilst drawdown remains greater than predicted on the southeast boundary of the designated area, with a strong drawdown gradient existing near the southern corner (S3) where the aquifer is known to be discontinuous. To better understand and predict the drawdown to the southeast, four additional bores on Mundowdna Station have been monitored since 2005 and trends are reported in the Annual Wellfield Report.

1.3.18 Targets FY15

Maintain an industrial water efficiency of 1.18kL/t at the budgeted production rate.

The GAB Industrial Water Efficiency of the operation in FY15 was 1.17 kL/t, which was favourable compared to the target of 1.18 kL/t. The FY15 performance was higher than FY14 (1.08kL/t), due to unplanned outages in the processing plant. Historical GAB Industrial Water Efficiency is given in Figure 1.3-7**.**

Maintain a domestic water use target of 3.2 ML/d average

Domestic water use during FY15 averaged 2.58 ML/d, below the target of 3.2 ML/d, as outlined in the Great Artesian Basin Wellfields Report Wellfields Report (BHP Billiton Olympic Dam, 2015).

1.3.19 Action plan FY15

Complete a review of Wellfield B drawdown monitoring.

Wellfield B drawdown monitoring program was reviewed in FY15 resulting in increased monitoring frequency at several bores in the drawdown area.

Continue work on establishing Practical Reference Heads (PRHs).

The review of the Practical Reference Heads and temperatures in FY15 (BHP Billiton Olympic Dam 2015 – Section 16), made it possible to report temperature-inclusive drawdowns at increasing number of sites, including pastoral bores.

Continue implementation of water use conservation and recycling initiatives.

A water reduction project was implemented in FY15 to reduce abstraction of water at Muloorina Station. Optimisation of these flows to achieve pastoral and water conservation outcomes was achieved with a water saving of 8L/s.

Tanks and troughs were also purchased to supply two other neighbouring properties with the ability to shut-in free flowing bores.

Continue substitution of saline water for high quality water where possible.

Saline water continues to be used in lieu of high quality water where feasible, including use in CAF, road watering and construction.

Saline water is not being used to augment the process water stream as this would result in an unacceptable increase in chloride in the system, which affects plant performance.

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2 Storage, transport and handling of hazardous materials

2.1 Chemical / hydrocarbon spills

2.1.1 Environmental Outcome

No significant site contamination of soils, surface water or groundwater, as a result of the transport, storage or handling of hazardous substances associated with ODC's activities.

No significant site contamination of soils, surface water or groundwater occurred in undisturbed areas in FY15. All spills were appropriately contained and cleaned up as soon as practicable. Active monitoring and management of legacy hydrocarbon sites was continued during FY15. This is explained further in Section 2.1.4.

2.1.2 Compliance criteria

No site contamination leading to material environmental harm arising from hydrocarbon/chemicals spills within the SML and Wellfields Designated Areas.

During the reporting period, 24 chemical and hydrocarbon spills occurred across ODC operations, however no new material environmental harm has arisen. Three legacy hydrocarbon spill sites exist (one on-site and two in the wellfields area), all being actively monitored and managed.

It is concluded that no new material environmental harm has arisen from hydrocarbon/chemical spills within the SML and Wellfields Designated areas.

2.1.3 Leading Indicators

No significant chemical or hydrocarbon spills occurred during storage, use or transport. Therefore no leading indicator trigger values were reached and soil concentrations for metals/metalloids, organics and other substances caused by ODC are below NEPM investigation levels (Health Investigation Level Scenario D: Industrial/Commercial land use; Schedule B1 - National Environmental Protection (Assessment of Site Contamination Measure 1999) specifies the health based investigation levels for soil contaminants at Industrial sites.

2.1.4 Targets FY15

Total recordable spills of chemicals and hydrocarbons to be less than or equal to 28 events. Note: An internally recordable spill of chemicals and/or hydrocarbons is defined as a spill of 10 litres or greater, outside of a bund, in a single event.

During FY15 there were 24 internally reportable chemical and hydrocarbon spills across site. This did not exceed our target of 28 spills. Of the 24 spills; 17 occurred on surface and were related to equipment failure and operator error. Seven of these 17 spills were hydrocarbon spills and the remaining consisted of acid; flocculent; chlorate; caustic and coagulant.

The remaining 7 spills occurred at the Mine End with majority related to equipment failure. These spills were all hydrocarbon related. Internally reportable chemical and hydrocarbon spills are consistent with previous years as shown in (Figure 2.1-1). Furthermore substantial work has been made towards developing a good reporting culture for spills and other environmental events to ensure all events are reported in a timely and accurate manner which can attribute to the slight increase between FY14 to FY15.

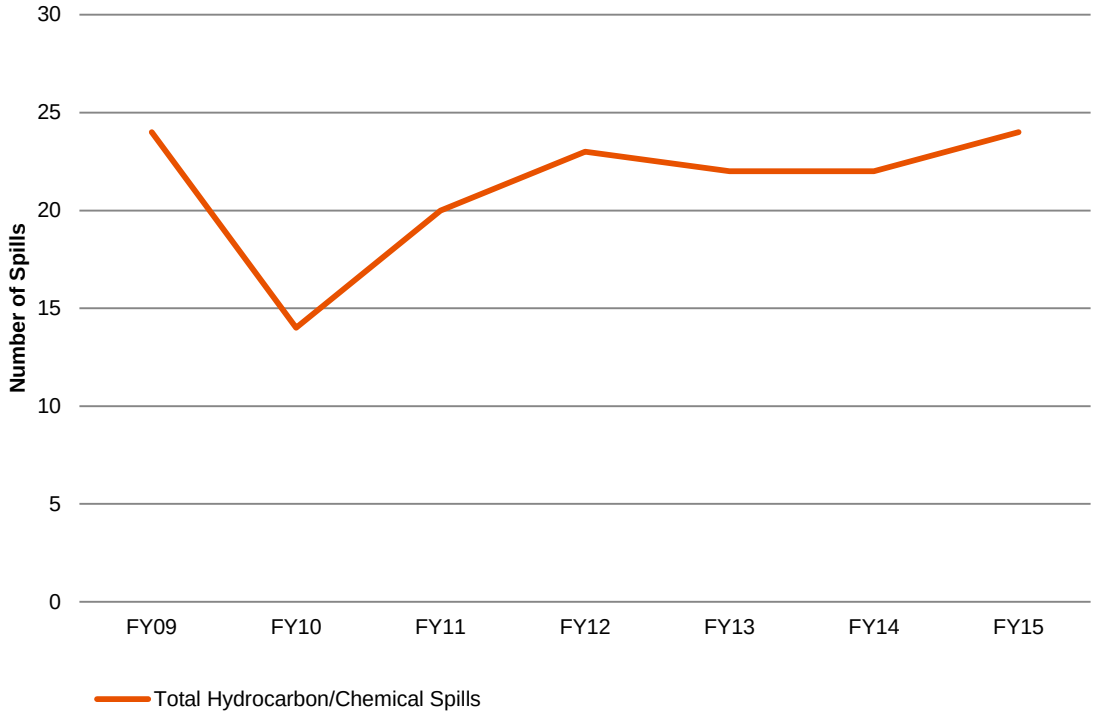

Figure 2.1-1: Historical hydrocarbon/chemical spills

Management of legacy hydrocarbon spills

The hydrocarbon plume at the 3ML tank is continuing to migrate slowly in a south easterly direction, and limited natural attenuation of the plume is occurring (Soil and Groundwater 2014). Management options including a Detailed Risk Assessment (DRA) are being progressed in FY15/FY16.

PS1 remediation commenced and has successfully treated a groundwater volume of 1.5million litres in the first 6 months of operation. PS6A remediation has treated groundwater in excess of 4.5million litres in the first 12 months of operation and recovered 14, 300L of light non-aqueous phase liquid (LNAPL).

2.1.5 Action plan FY15

Undertake scheduled area environmental inspections.

All environmental inspections were undertaken as per the schedule. The inspections served as a means to ensure that the areas were practicing appropriate hydrocarbon and chemical management and any that issues are addressed. All maintenance and inspections undertaken by the area owners were placed in SAP and recorded in the environmental Aspect and Impact Register. Using SAP and the Aspect and Impact register ensures that all tanks and bunds for each area can be effectively audited annually and transparency is maintained across site.

Progress action plan to close gaps with regard to existing bunds to ensure that requirements of the EPA Guidelines are met.

All maintenance and inspections carried out for all tanks and bunds have been recorded in SAP as a work item. This ensures that tanks and bunds are regularly maintained and recorded for tracking and auditing purposes. Bunds that do not meet the recent EPA guidelines have undergone a risk assessment with additional controls put in place if required to reduce the risk of spills. The controls include safe fill levels; regular inspections and maintenance and online monitoring via Citect. This is all captured in our Aspects and Impacts register as well as SAP for tracking purposes.

2.2 Radioactive process material spills

2.2.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive process material spills from ODC's activities).

BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1mSv/y limit. During FY15 there were no radioactive process material spills outside operational areas. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken by ODC.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive process material spills from ODC's activities.

No significant impacts to populations of listed species or ecological communities were recorded due to operational activities, including the effects of any radioactive process material spills. Impacts to listed species and ecological communities are avoided by ensuring that there is no uncontrolled loss of radioactive material to the natural environment. As there was no loss of radioactive material to undisturbed environment in FY15, no impact to populations of listed species or ecological communities occurred.

2.2.2 Compliance criteria

A dose limit for radiation doses to members of the public of 1 mSv/y above natural background).

The total dose to members of the public at Roxby Downs Monitoring Site (RDMS) and Olympic Village Monitoring Site (OVMS) due to radon progeny (including background dose) was 0.014mSv/yr and 0.021mSv/yr, respectively. For more detail refer to section 3.4 *Radioactive emissions*.

No significant radioactive contamination arising from uncontrolled loss of radioactive material to the natural environment. *Note: Significant is defined as requiring assessment and remedial action in accordance with the NEPM 1999 or EPP 2003 and the Mining Code. Measurement and monitoring is carried out in response to a specific event. (State 17ki, 17kii, 17kiv)*

In FY15 there were 41 radioactive spills across site. The majority of these spills were in the concentrator and hydromet areas. Of the spills in FY15 none required assessment and remedial action in accordance with the NEPM 1999 or EPP 2003 and the mining code. There was no uncontrolled loss of radioactive material to the undisturbed environment in FY15 which resulted in significant radioactive contamination, based on the definition stated above.

2.2.3 Leading Indicators

Soil concentrations above NEPM investigation and screening levels and added contaminant limits for Commercial/Industrial land-use that indicate a likelihood of adverse effects on human health, environmental or groundwater values based on a meaningful and appropriate site-specific risk assessment.

No significant radioactive spills occurred during storage, use or transport. Therefore no leading indicator trigger values were reached and soil concentrations for metals/metalloids, organics and other substances caused by ODC are below NEPM investigation levels (Health Investigation Level Scenario D: Industrial/Commercial land use; Schedule B1 - National Environmental Protection (Assessment of Site Contamination Measure 1999) specifies the health based investigation levels for soil contaminants at Industrial sites.

2.2.4 Targets FY15

Total recordable spills of radioactive process material to be less than or equal to 50 events.

During FY15 there were 41 radioactive process material spills across site, which occurred primarily in the concentrator and hydromet areas. The number of radioactive process material spills shows a decreasing trend since FY11 as shown in Figure 2.2-1.

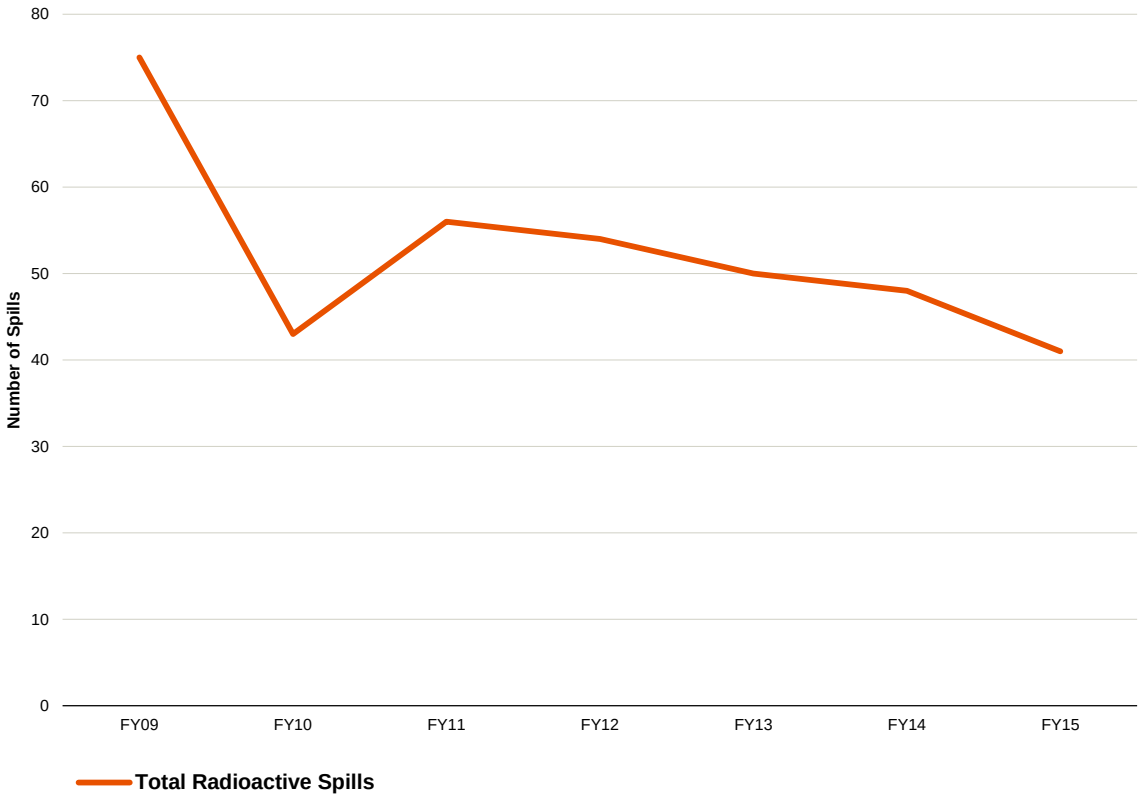

Figure 2.2-1: Historical radioactive process material spills

Externally reportable spills of radioactive process material to be less than or equal to 2 events. ***Note: Reportable spills of radioactive process material as defined by the Criteria and Procedures for Recording and Reporting Incidents at SA Uranium Mines (DSD), known as 'Bachmann Criteria'.***

During FY15 three externally reportable incidents occurred. On 31 October 2014, a hose was removed from a contaminated waste bin north of the nitrogen plant and approximately 5g of ADU product fell onto the ground outside a bund. The area was barricaded and the ammonium diurate (ADU) product covered to ensure no dust could be generated.

On 17 March 2015, yellow flakes were identified outside the USX bund south of Strip 1 mix box. The radiation department were notified and a sample was taken to identify the material as ADU. The material was removed and the area promptly cleaned up.

On 5 April 2015 a filter feed line blew out at Lasta 2 on the eastern end resulting in a spray of black concentrate. The control room operator was contacted immediately to stop the pumps. Approximately 10L of slurry was sprayed over a 10m² area. Lasta 2 was isolated and the repair was completed with a complete clean -up of the area.

No significant radioactive contamination arising from uncontrolled loss of radioactive material to the natural environment occurred with any of these incidents.

2.2.5 Action plan FY15

Continue with annual area-specific Environment Improvement Plans.

Environmental Improvement Plans continued in FY15. Some EIP actions were for the purpose of reducing the risk of radioactive spills. EIP actions completed in FY15 which were aimed at reducing the occurrence of radioactive spills included:

- Installation of ceramic-lined pipe spools , which are less likely to fail, in the Concentrator area.
- Use of thermography on critical pipe spools to identify which areas are likely to cause spills and change maintenance schedules accordingly.
- Ongoing identification of bund maintenance issues and assigning maintenance priorities based upon the level of risk associated with the bund.

Progress action plan to close gaps with regard to existing bunds to ensure that the requirements of the EPA Guideline – Bunding and Spill Management (2007) are met.

Maintenance activities were completed on the Lasta Feed bund and OSA Bund to ensure compliance with EPA bunding guidelines.

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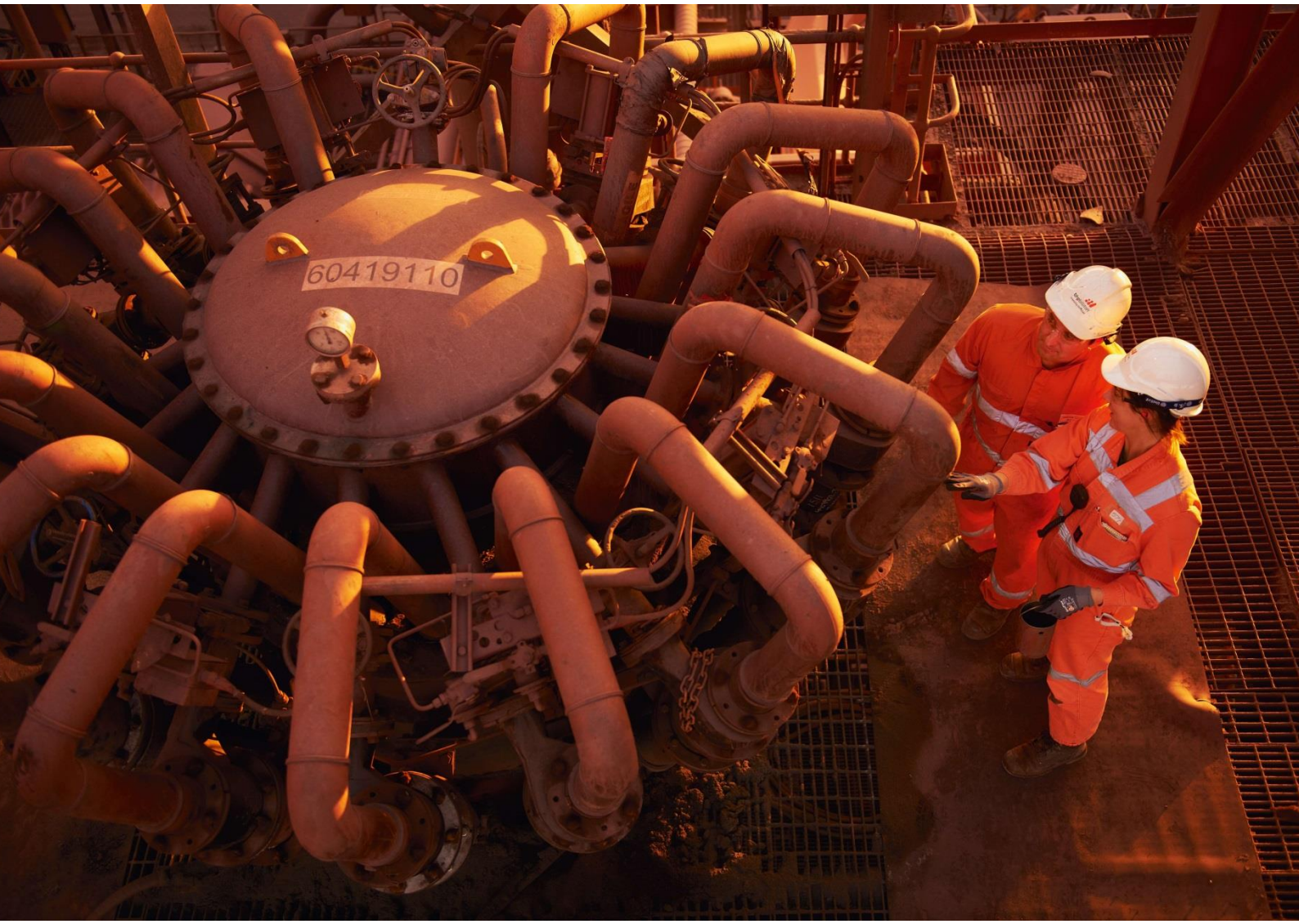
3 Operation of industrial systems



3.1 Particulate emissions

3.1.1 Environmental Outcome

No adverse impacts to public health as a result of particulate emissions from ODC's activities.

No adverse impacts to public health as a result of particulate emissions from operations conducted by ODC occurred during FY15. ODC considers the compliance limits as listed in Condition 49(a) of the Major Development Approval to be the threshold at which adverse impacts to public health may occur. Measured ground level dust concentrations derived from operations at Olympic Dam and recorded at sensitive receptor sites were below compliance criteria for both PM_{10} and $PM_{2.5}$ at all times during FY15.

Radionuclide levels recorded at Olympic Village were below limits considered to impact public health.

Emission of particulates from Calciners A and B and Feed Preparation Baghouse Stack met the requirements of the *Environment Protection (Air Quality) Policy 1994* during the reporting period in that particulate emissions are managed to less than 250mg/Nm³.

3.1.2 Compliance criteria

Ground level PM_{10} dust concentrations at Roxby Downs derived from construction and operational sources at Olympic Dam must not exceed the PM_{10} 24-hour average of 50 µg/m^3. (AE 2.7)

Note: Olympic Village is not referenced under Condition 49 of the Major Development Approval and is therefore not considered a compliance station. However, Olympic Village was the primary workers village at Olympic Dam during FY15 and is considered a sensitive receptor site. For this reason data pertaining to ground level dust concentration at Olympic Village has also been included into this report.

PM_{10} dust concentrations at Roxby Downs and Olympic Village did not exceed the compliance criteria 24-hour average of 50µg/m^3. The highest 24-hour average recorded for PM_{10} was 11.51 µg/m^3 and 19.9 µg/m^3 at Roxby Downs and Olympic Village respectively. This is below the limit of 50µg/m^3. See section 3.1.3.

Ground level $PM_{2.5}$ dust concentrations at Roxby Downs derived from construction and operational sources at Olympic Dam must not exceed the $PM_{2.5}$ 24-hour average of 25µg/m^3. (AE 2.5)

$PM_{2.5}$ dust concentrations at Roxby Downs and Olympic Village did not exceed the compliance criteria. The highest 24-hour average recorded for $PM_{2.5}$ was 4.6 µg/m^3, and 7.6µg/m^3 at Roxby Downs and Olympic Village respectively. This is below the limit of 25µg/m^3. See section 3.1.3.

Ground level $PM_{2.5}$ dust concentrations at Roxby Downs derived from construction and operational sources at Olympic Dam must not exceed the $PM_{2.5}$ annual average of 8µg/m^3. (AE 2.5)

The annual average ground level $PM_{2.5}$ dust concentrations, derived from construction and operational sources at Olympic Dam, were 0.3µg/m^3 and 0.7µg/m^3 at Roxby downs and Olympic Village respectively. This is less than the annual average limit of 8µg/m^3. See section 3.1.3.

3.1.3 Deliverables (AE 2.7)

Records of real-time monitoring of particulates to ensure that concentrations at receptor sites remain within the compliance criteria.

The real-time dust monitoring system records data at 10 minute intervals of ground level dust concentrations at sensitive receptor sites. The calculation of the operational component of these levels is determined by subtracting dust concentrations measured at background sites from measurements recorded at sensitive receptors during attributable wind direction periods (see Figure 3.1-1 for location of these stations).. The method for calculation can be found in the Monitoring Program - Airborne Emissions in the 2015 EPMP.

The real time operational dust concentration results for Roxby Downs and Olympic Village are shown in Figure 3.1-2 to Figure 3.1-5. During FY15 all receptor sites remained within compliance limits.

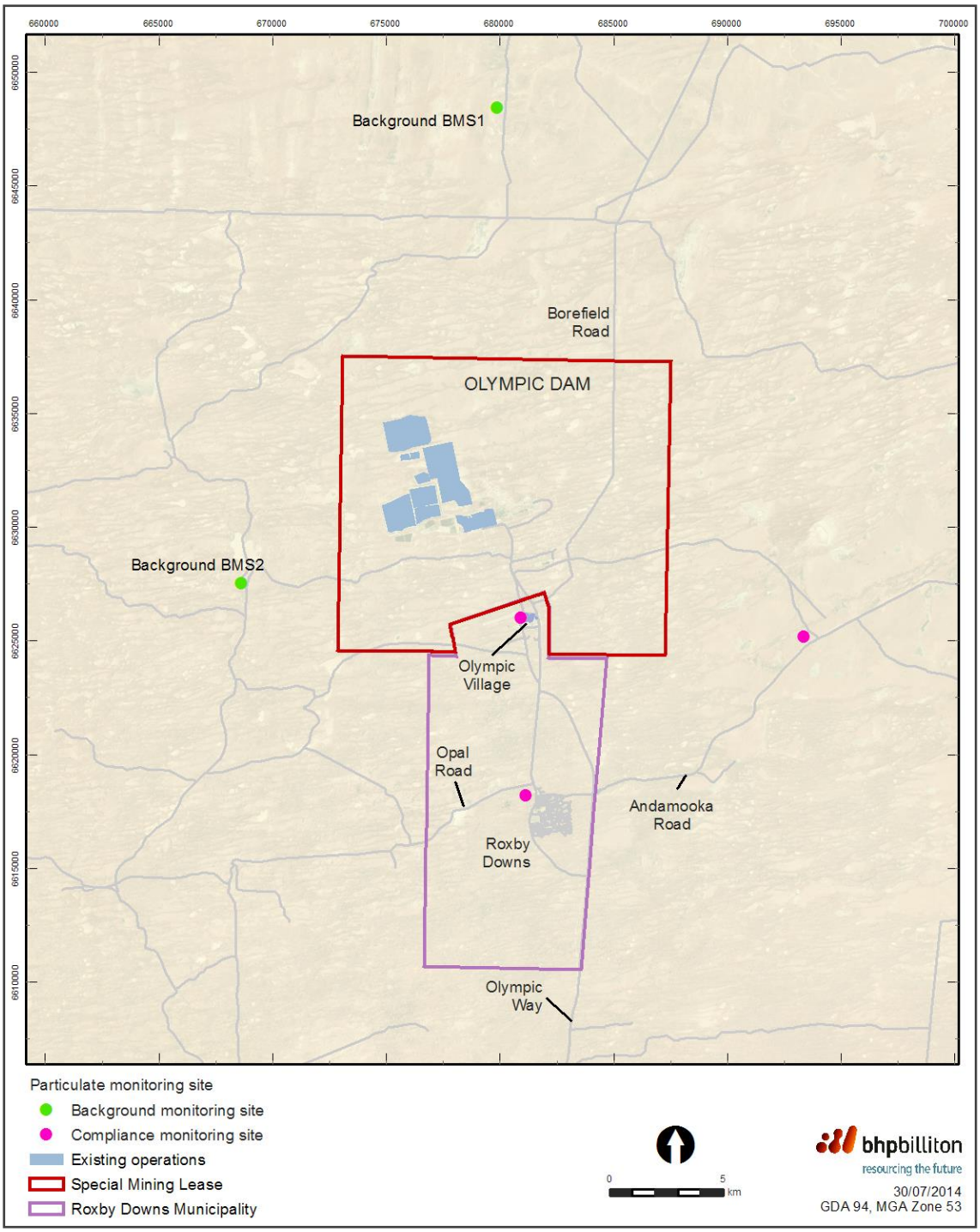


Figure 3.1-1: Location of real time dust monitoring sites

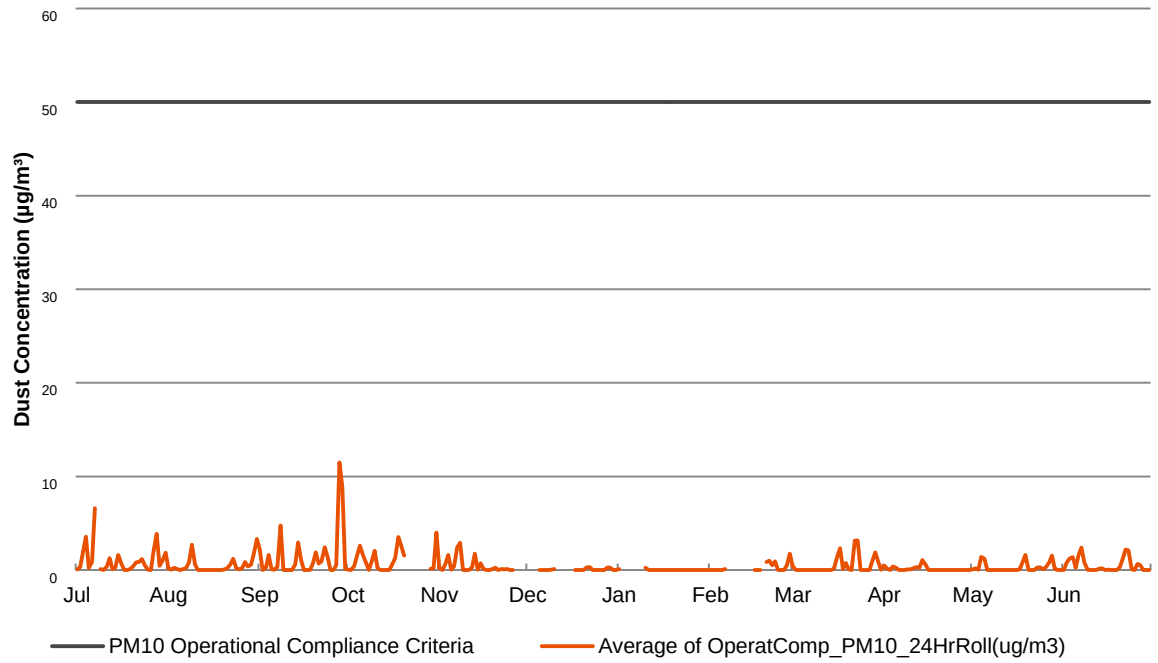


Figure 3.1-2: Real time PM10 24-hour 'operational contribution' dust concentrations at Roxby Downs

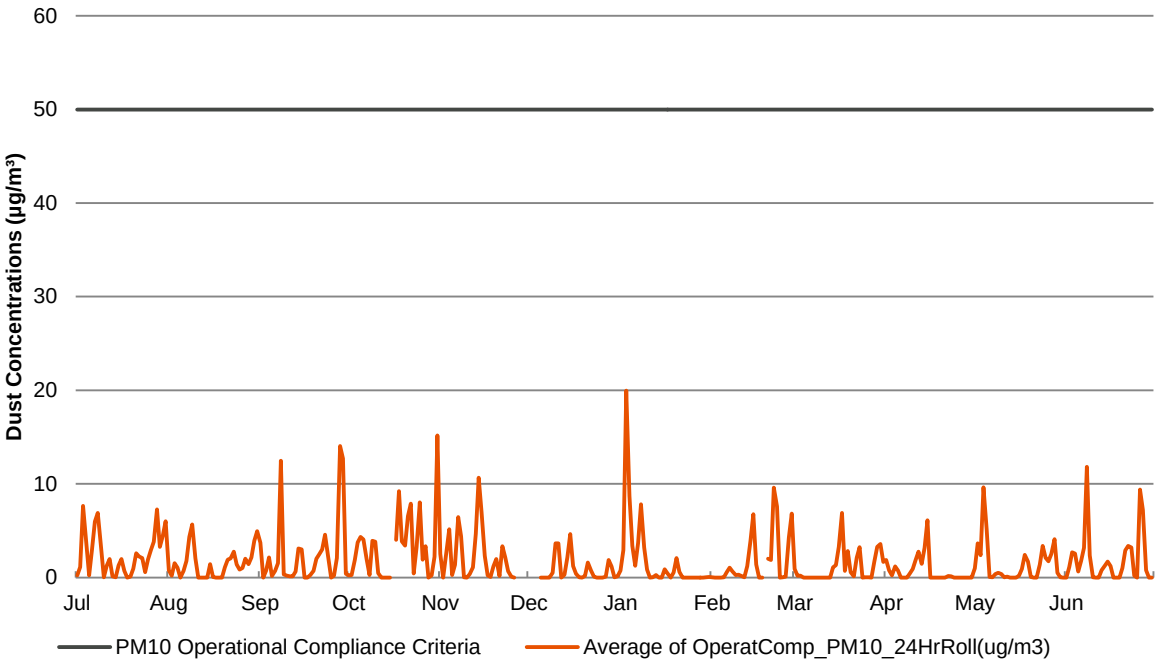


Figure 3.1-3: Real time PM10 24-hour 'operational contribution' dust concentrations at Olympic Village

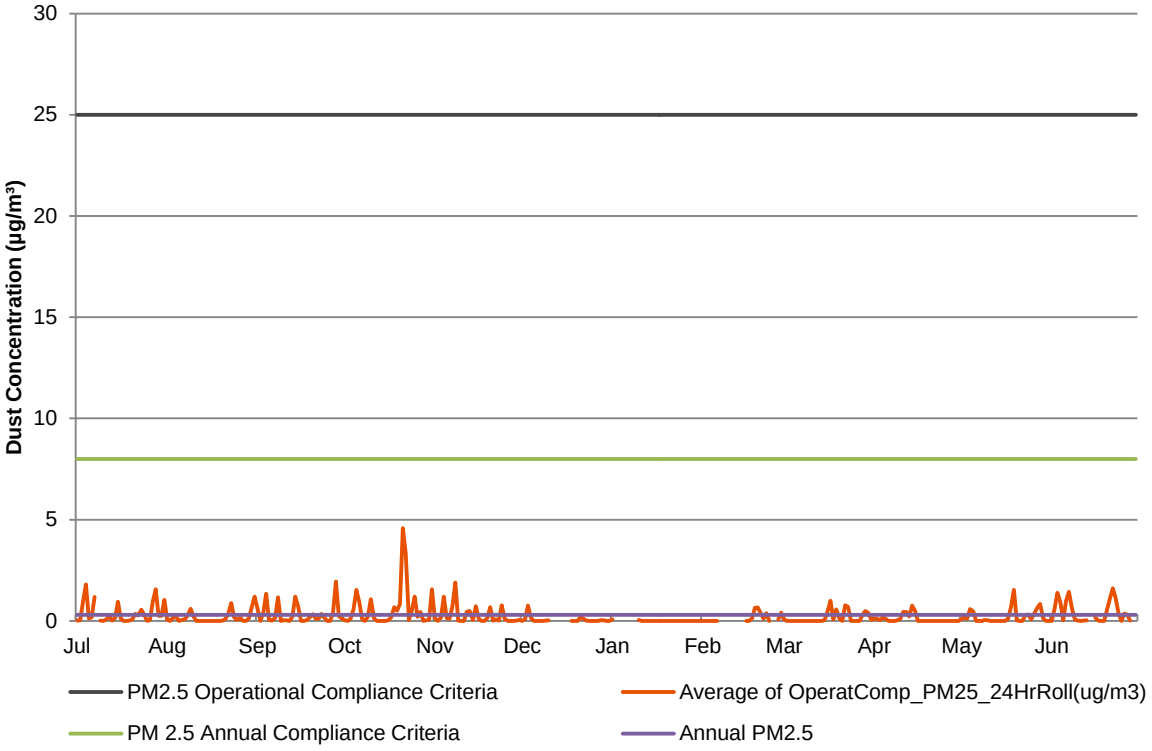


Figure 3.1-4: Real time PM2.5 24-hour 'operational contribution' dust concentrations at Roxby Downs (FY15)

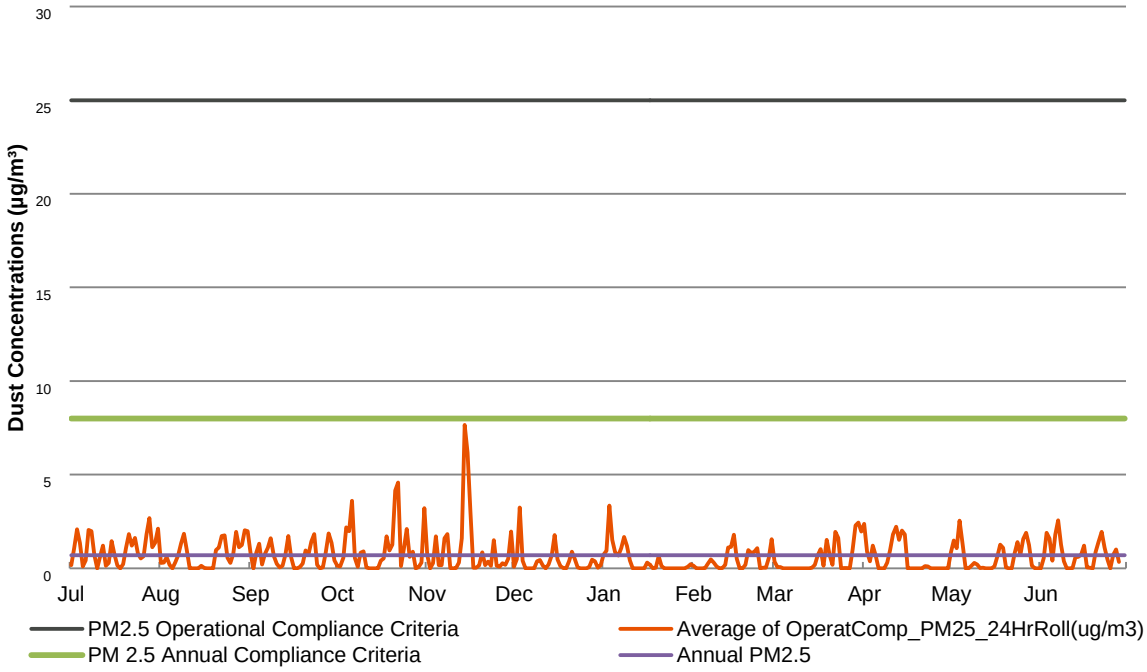


Figure 3.1-5: Real time PM2.5 24-hour 'operational contribution' dust concentrations at Olympic Village (FY15)

3.1.4 Deliverables (AE 2.5)

Records from passive dust deposition monitoring sites and visual inspections which characterise the annual dispersion and deposition of particulates.

A map detailing the passive dust monitoring site locations and deposition for FY15 is shown in Figure 3.1-6.

Monthly dust deposition rates are shown in Figure 3.1-7. Results are consistent with previous measurements and indicate seasonal variation in dust deposition rates throughout the year.

Overall dust deposition rates were consistent with historical levels for PD10; PD11, PD12, PD13 and PD14 (Figure 3.1-8).

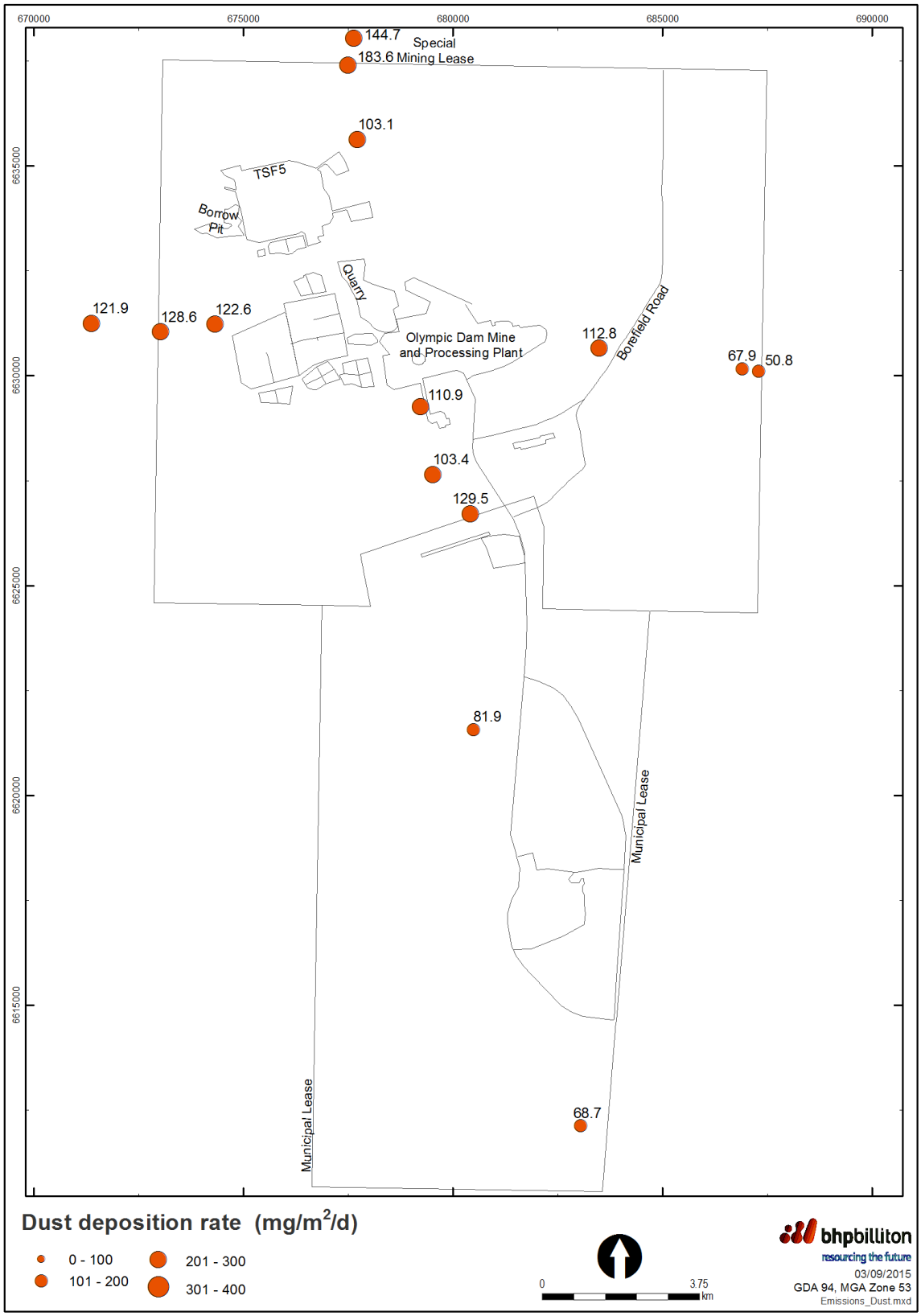


Figure 3.1-6: Annual passive dust deposition rates measured at monitoring sites, FY15

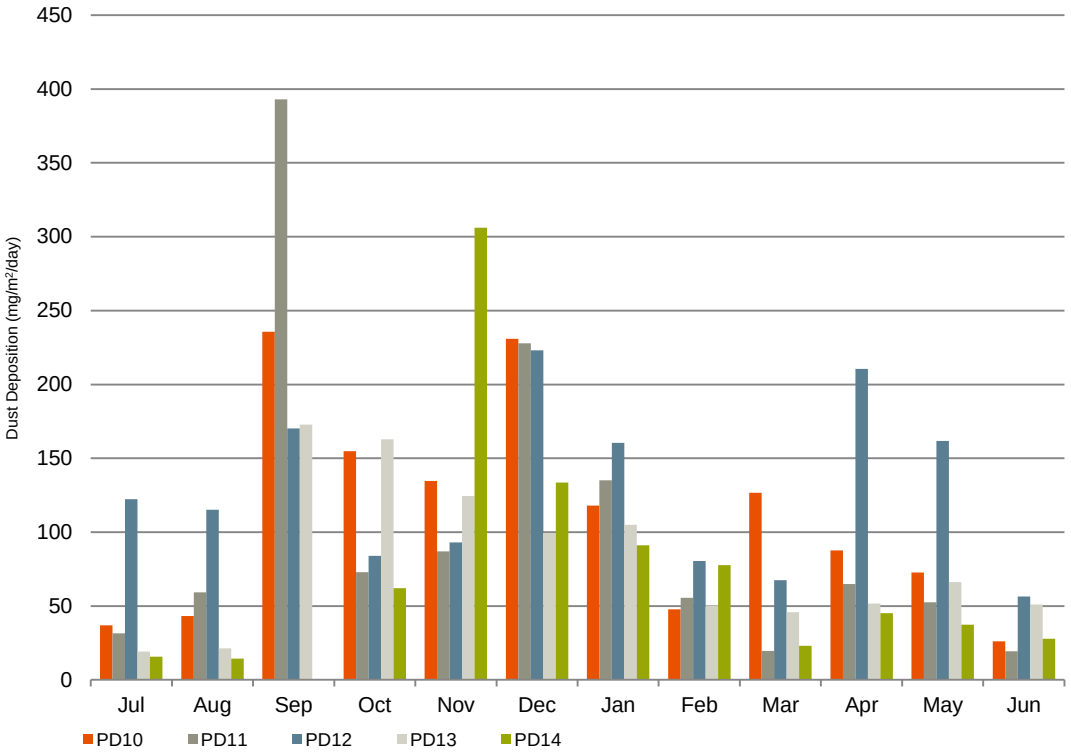


Figure 3.1-7: Monthly dust deposition rates at sites south of Olympic Dam

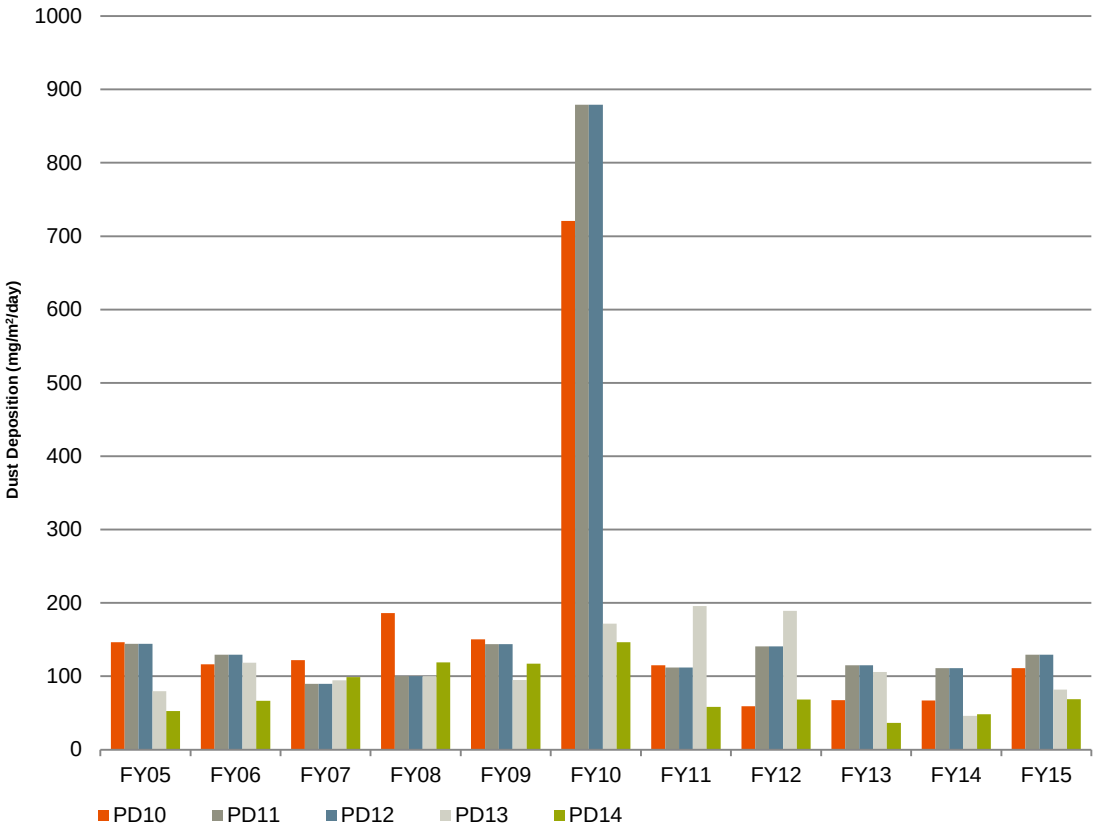


Figure 3.1-8: Annual dust deposition rate for sites south of Olympic Dam

During annual flora monitoring a visual inspection of limestone dust deposition is also assessed at specific monitoring sites (see Figure 3.1-13). Dust deposition was detectable in the area adjacent to the backfill quarry

(Figure 3.1-9). The modelled area of detectable dust extended 850 ha. The number of radial sites with dust scores detectable and higher (>1) was one-third higher in FY15 compared to FY14. In keeping with the higher result, the modelled detectable area was substantially larger in FY15 than in the previous year. Two sites were observed to have 'high' levels of dust. One of these (EV914) was immediately adjacent to the quarry, and the other (EV910) is south of the quarry, near the evaporation ponds. However, at the resolution of the model, no areas with a 'high' impact were included.

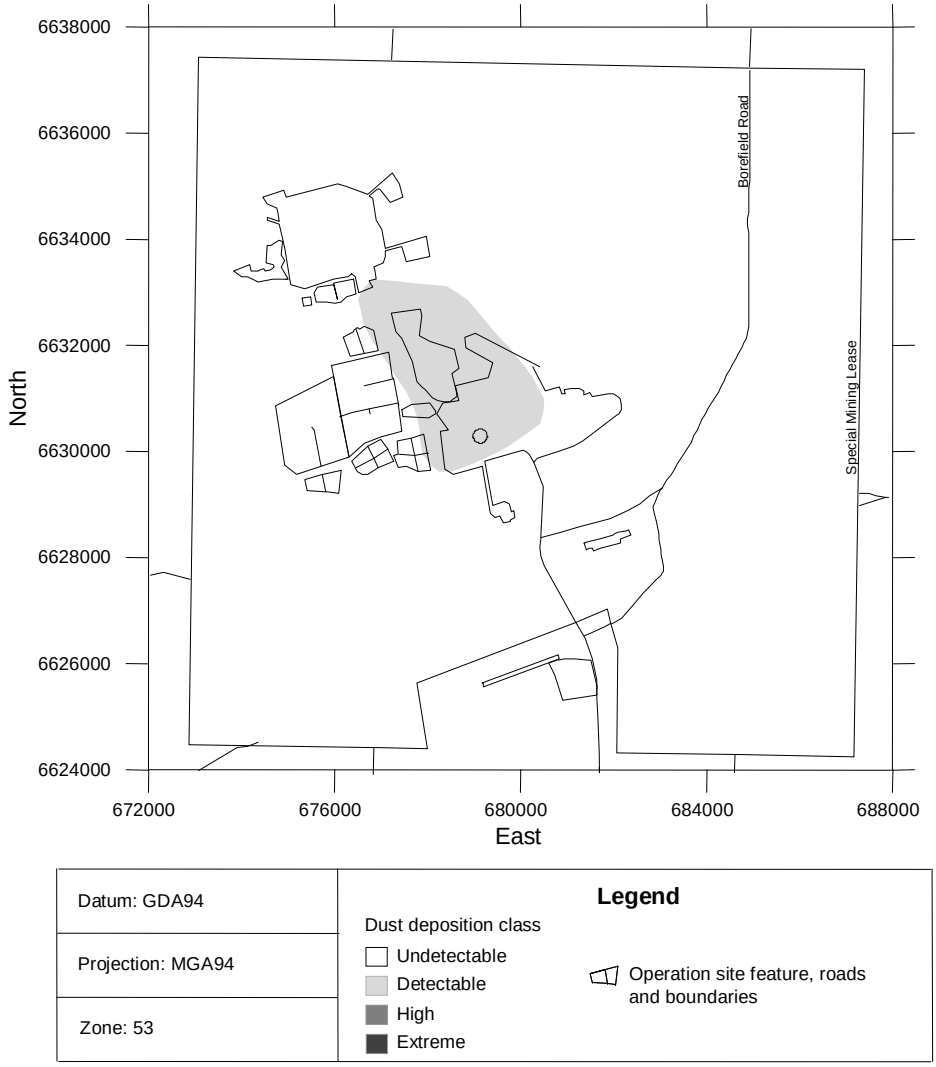


Figure 3.1-9: Modelled distribution of dust deposition in FY15 in and around the operation

The detectable dust distribution for FY15 was 7% higher than the average over FY06-FY15 (Figure 3.1-10). At the time of the September FY15 sampling, the most recent substantial rains had fallen in April that year, i.e. there had not been any substantial rain for about four to five months. Substantial rains fell at the start of June FY14, about three months before the September FY14 sampling. Total rain in the 12 months prior to sampling in FY15 was lower than that in FY14, although the timing of the rain also appears to be relevant to the level of detectable surface dust.

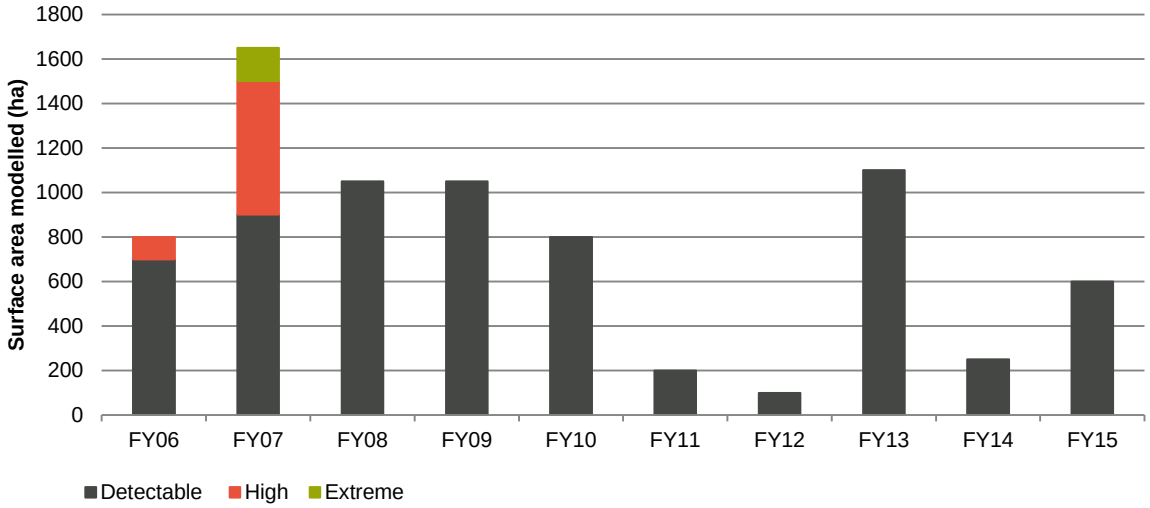


Figure 3.1-10: Modelled dust deposition areas for each category, over FY06-FY15.

Records from passive dust deposition monitoring sites and visual inspections which characterise the annual dispersion and deposition of radionuclides contained within deposited particulates.

Many activities undertaken by ODC generate fugitive particulate emissions, despite efforts to minimise these emissions. Particulate emissions are monitored using a passive dust sampling network to determine dust deposition rates and concentrations of Uranium-238 (^{238}U) contained within the dust.

Particulate ^{238}U deposition rate dispersion profiles are generated and analysed to assess the impact of airborne particulate on ambient air quality.

Fourteen passive dust deposition monitoring sites have been established radiating out from the operation and at a background location. Samples are collected every month and analysed for the total quantity of particulates. Annual composite samples are analysed for ^{238}U activity. From these values, dust and ^{238}U deposition rates are calculated and compared annually to previous monitoring results to assess trends.

Figure 3.1-11 shows the ^{238}U deposition rate at all sites for FY15.

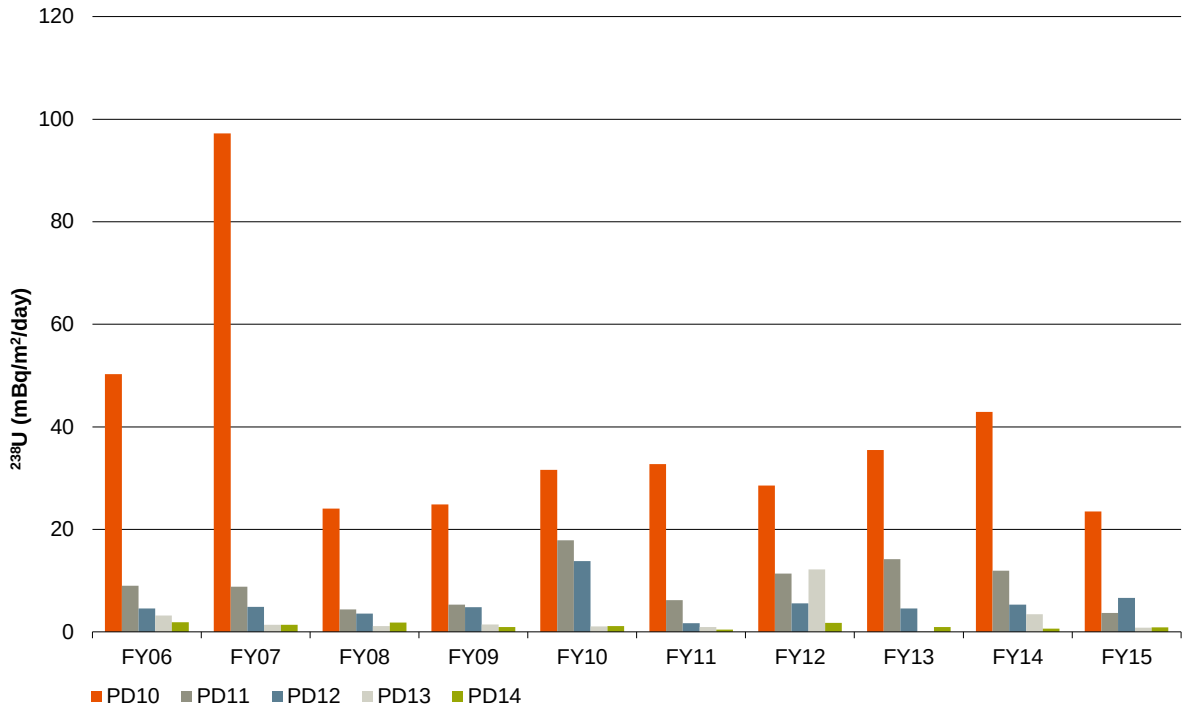


Figure 3.1-11: Annual 238U deposition rate by site

3.1.5 Deliverables (AE 2.2)

Records of particulate emissions from Calciners A and B to assess compliance with the relevant particulate emission limit specified in Environment Protection (Air Quality) Policy 1994.

Particulate emissions from Calciners A and B are measured on a quarterly basis by isokinetic sampling, where possible, depending upon process reliability and plant availability. Any measurement above 250 mg/Nm^3 is investigated and reported to EPA Regulation and Compliance. The isokinetic stack-sampling filters used to capture particulates are also analysed for ^{238}U activity. Results from the uranium analysis, together with data obtained from the process control system, are used to estimate total uranium discharged from the stacks, and subsequently reported in the LM1 Radiation Annual Report.

Scheduled sampling of the Calciner gas cleaning systems occurred in September 2014, January 2015 and April 2015.

Emission of particulates from Calciners A and B met the requirements of the Environment Protection (Air Quality) Policy 1994 during the reporting period.

Particulate emission concentrations measured in samples collected from Calciner A decreased from an average of 120 mg/Nm^3 during FY14 to 80 mg/Nm^3 during this reporting period. Particulate emissions from Calciner B decreased from an average of 103 mg/Nm^3 during FY14 to 24 mg/Nm^3 during this reporting period (Table 3.1-1).

The particulate emission trend for the Calciners is presented in Figure 3.1-12.

Table 3.1-1: Measured particulate concentrations in Calciner emissions (mg/Nm3)

	Calciner A (after mcombination of flow from both calciners)	Calciner B
September 2014	181	13
January 2015	31	13
April 2015	29	46
Average	80	24

Note: Environment Protection (Air Quality) Policy Limit is 250 mg/Nm^3.

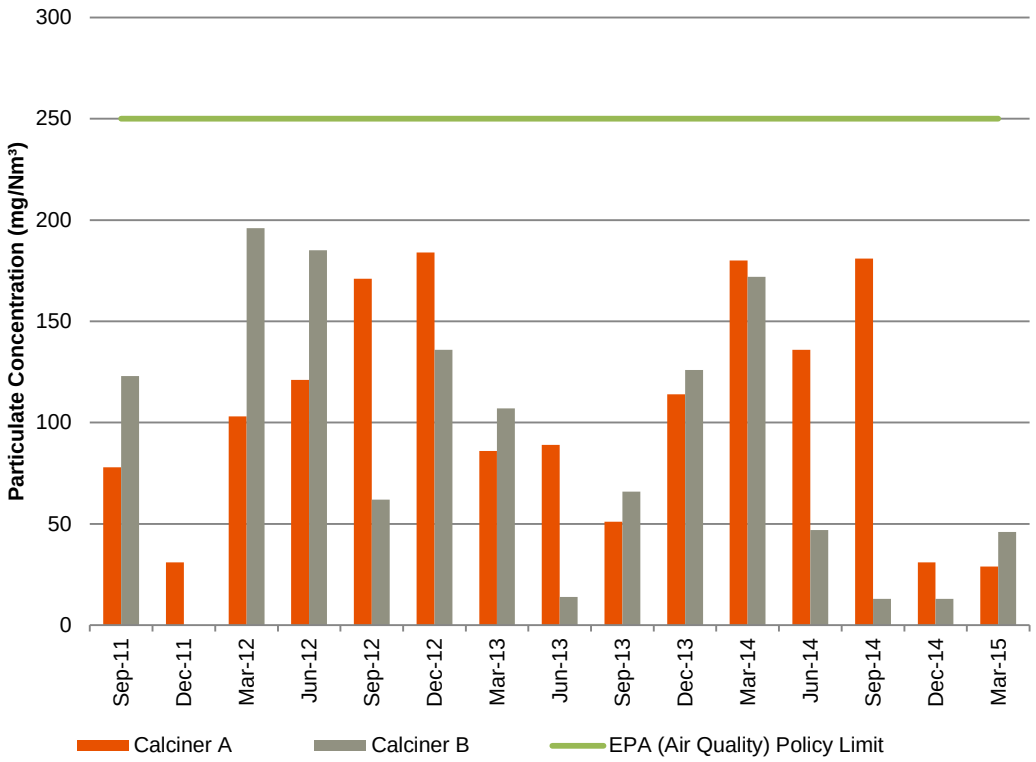


Figure 3.1-12: Historical Calciner quarterly particulate emissions sample

3.1.6 Deliverables (AE 2.3)

Records of particulate and hydrogen sulphide emissions from the Slimes Treatment Plant to assess compliance with the emission limits specified in the Environment Protection (Air Quality) Policy 1994.

Particulate and hydrogen sulphide emissions from the Slimes Treatment Plant are measured on a biannual and annual basis respectively by isokinetic sampling. Any measurement above 100 mg/Nm^3 for particulates from the roaster scrubber or above 5 mg/Nm^3 of hydrogen sulphide from the NOx Scrubber is reported to EPA Regulation and Compliance and then investigated.

Particulate sampling of the roaster scrubber off-gas was undertaken as per the monitoring program. The result for particulates during December 2014 was 50 mg/Nm^3 and during July 2015, 40 mg/Nm^3.

Hydrogen sulphide sampling of the NOx scrubber off-gas was undertaken as per the monitoring program. The result for hydrogen sulphide during January 2015 was <0.03 mg/Nm3 and May 2015 was <0.03 mg/Nm3. Emissions from the NOx Scrubber Stack are sampled periodically for the concentration of NOx for the purpose of National Pollutant Inventory reporting and for assessing emission trends.

3.1.7 Deliverables (FL 2.1)

A map of the impact footprint of ODC's expanded Olympic Dam activities for the annual EPMP report. (State 17f, 17ki)

Sites sampled in FY15 are shown in Figure 14. The modelled footprint of detectable emission levels in plants for FY15 covered 2,800 ha including 850 ha of high impact (Table 3.1-2, Figure 3.1-13). Sites sampled in FY15 are shown in Figure 14. The modelled footprint of detectable emission levels in plants for FY15 covered 2,800 ha including 850 ha of high impact.

The area modelled as having any form of impact in FY15 was 200 ha larger than in FY14 (Table 3.1-2). The modelled high impact area was 250 ha larger than that for FY14 (Table 3.1-2). The total area was substantially larger than those for FY12 and FY13, but otherwise comparable to, though slightly larger than, the results for all other years since this form of monitoring was introduced in FY07 (Table 3.1-2; Figure 3.1-14; Figure 3.1-15). At a general level, the area of the symptoms footprint appears to be larger on sampling occasions with lower rainfall in the previous 12 months. The footprint in FY15 is larger than that reflected in the long-term trend relationship between these variables (the record lies above the trend line), but is broadly consistent with the trend (Figure 3.1-15).

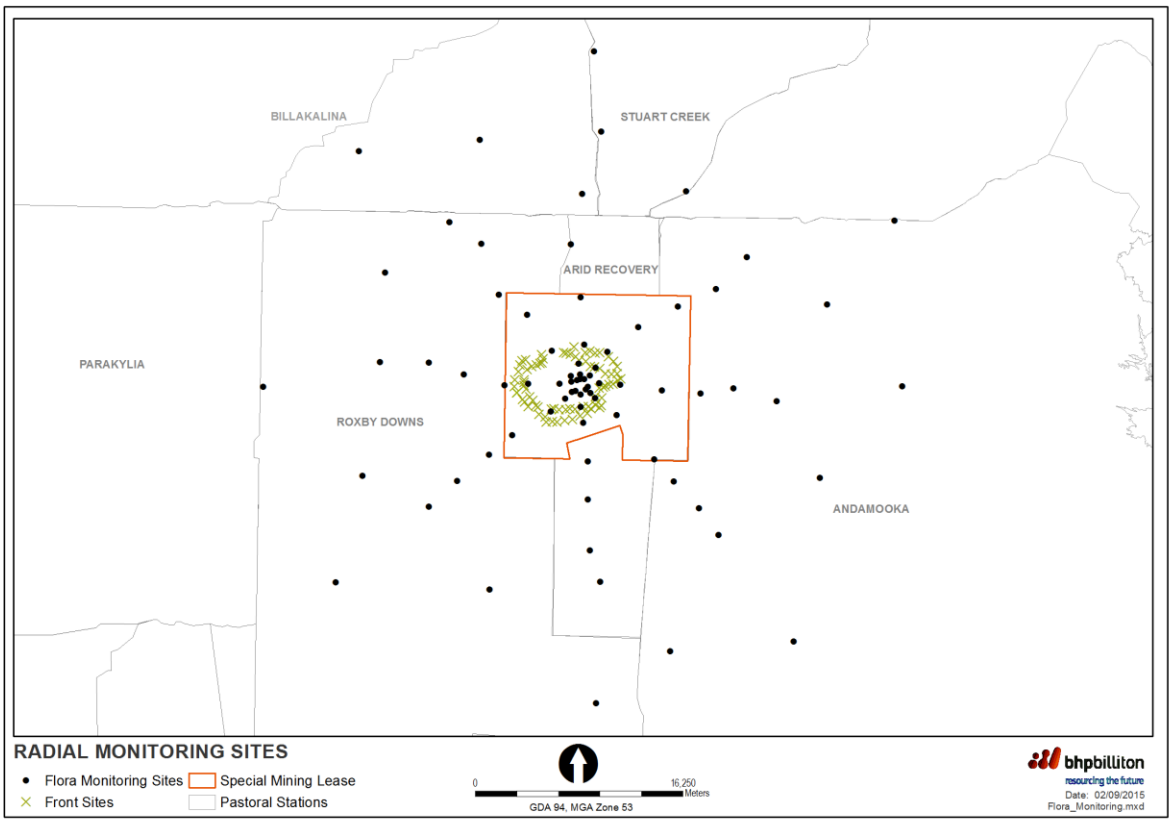


Figure 3.1-13: Location of radial sample sites and front sites monitored in FY15

Table 3.1-2: Areas of modelled impact for symptoms since FY13 and change between FY14 and FY15 (areas modelled to the nearest 50 ha)

Impact category	Surface area modelled (ha)				
	FY12	FY13	FY14	FY15	Change FY14–FY15
Total footprint	1,800	2,100	2,650	2,800	200
Detectable	1,800	1,950	2,050	1,950	-100
High	0	150	600	850	250
Extreme	0	0	0	0	0

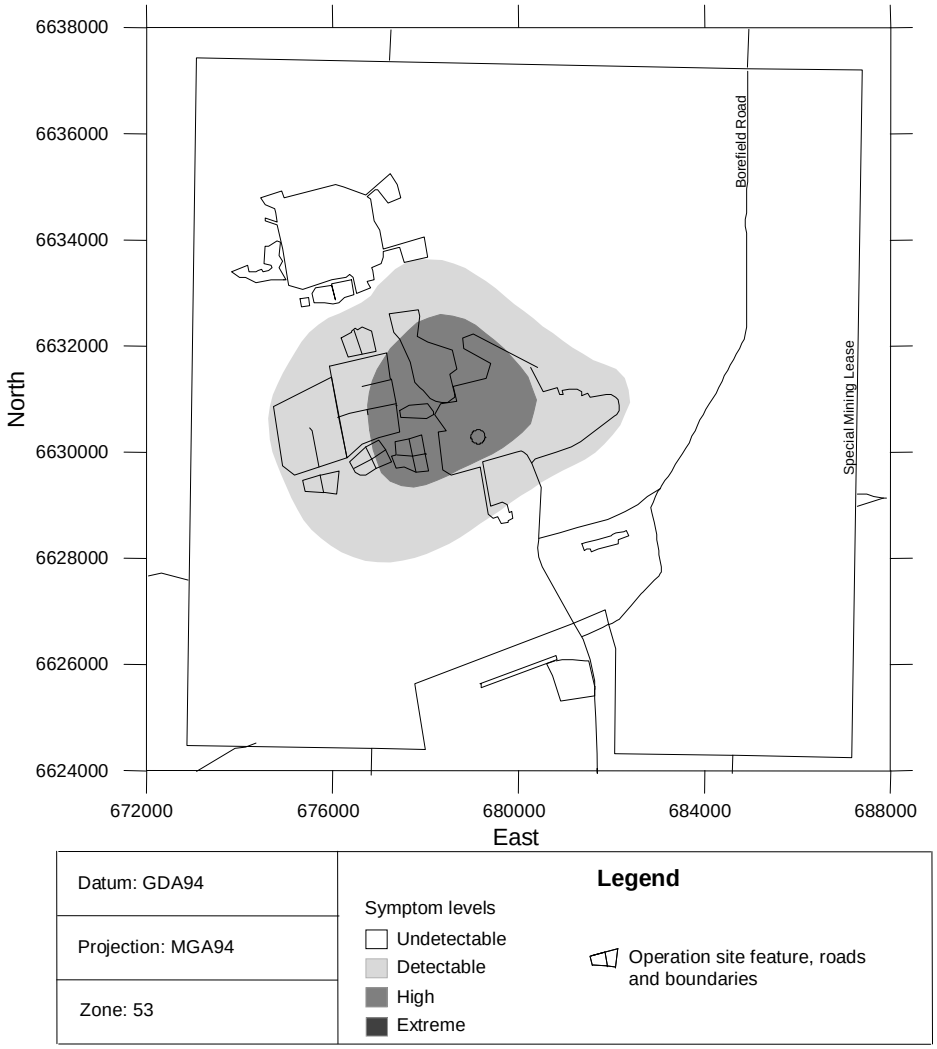


Figure 3.1-14: Modelled distribution of symptoms in FY15 in and around the operation

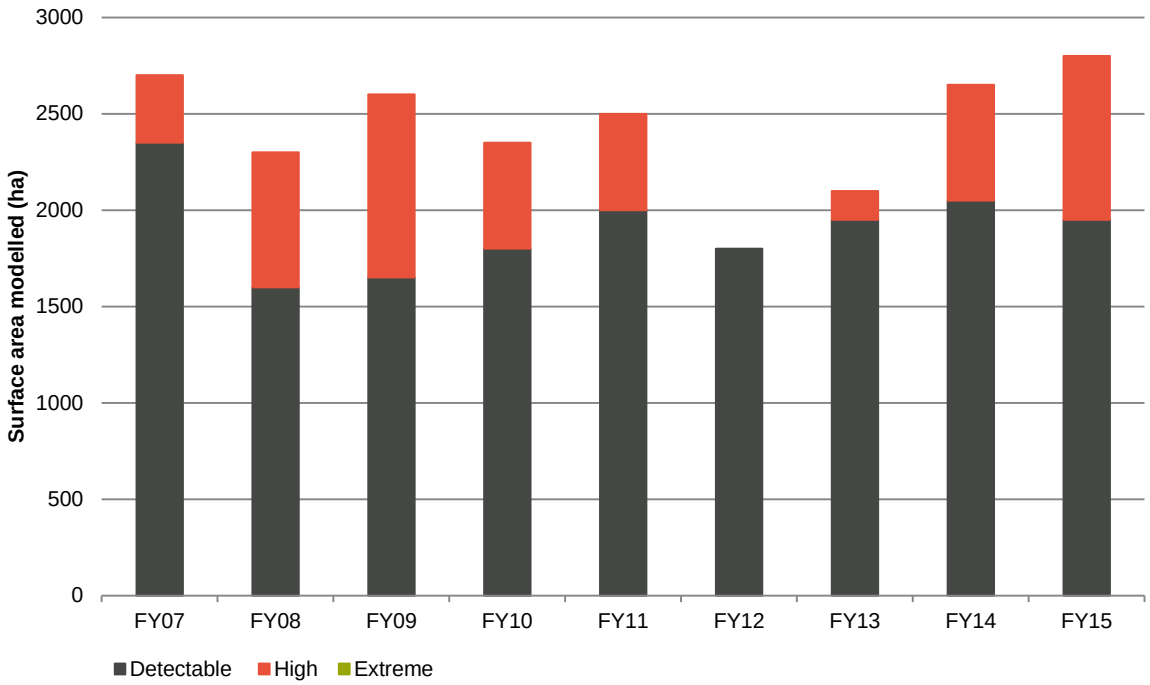


Figure 3.1-15: Modelled symptom distribution areas for each category, over FY07-15

3.1.8 Leading Indicators

- None applicable

3.1.9 Target FY15

- None applicable

3.1.10 Action plan FY15

Continue with area Environmental Improvement Plans

During FY15 the air quality management system was simplified and the associated monitoring reduced. Simplification entailed the removal of intermediate monitoring sites situated around the open pit area, Hiltaba Village and the Western Background station. The $PM_{2.5}$ and TSP monitoring form the remaining sites have been removed with PM_{10} monitoring remaining.

3.2 Sulphur dioxide emissions

3.2.1 Environmental Outcome

No adverse impacts to public health as a result of sulphur dioxide emissions from ODC's activities.

There were no adverse impacts to public health as a result of sulphur dioxide (SO_2) emissions from ODC's activities during FY15.

National Environmental Protection Measure (NEPM) levels for ambient air quality are based on protection of human health. Roxby Downs ambient SO_2 analyser results for the reporting period showed no exceedance of the NEPM for ambient air quality SO_2 at either Olympic Village or Roxby Downs Township.

3.2.2 Compliance criteria

Annual average SO_2 concentration of less than 0.02 ppm at sensitive receivers, Olympic Village and Roxby Downs. (AE 2.4)

The measured annual average SO_2 concentrations for the reporting period was 0.0004 ppm and 0.0001 ppm at Olympic Village and Roxby Downs respectively, which is less than the 0.02 ppm NEPM limit.

24-hour average SO_2 concentration of less than 0.08 ppm at sensitive receptors, Olympic Village and Roxby Downs. (AE 2.1, AE 2.4)

The measured maximum 24-hour average SO_2 concentrations for the reporting period was 0.001ppm and 0.001ppm for Roxby Downs and Olympic Village respectively which were more than an order of magnitude less than the 0.08ppm NEPM limit (Figure 3.2-2).

One-hour average SO_2 concentration of less than 0.2 ppm at sensitive receptors, Olympic Village and Roxby Downs. (AE 2.1, AE 2.4)

The measured maximum hourly average SO_2 concentration for the reporting period was 0.0037 ppm and 0.0148ppm for Roxby Downs and Olympic Village respectively, which is less than the 0.2 ppm NEPM limit (Table 3.2-1).

3.2.3 Leading Indicators

- None applicable

3.2.4 Deliverables (AE 2.4)

Records of ground level SO_2 concentrations at Olympic Village, Hiltaba Village and Roxby Downs township to assess compliance with the ground level SO_2 concentration requirements of the Ambient Air Quality NEPM.

Ambient SO_2 1 hour, 24 hour, and 1 year average (mean) concentrations for FY15 at Olympic Dam Village and Roxby Downs were measured using continuous real time monitoring in accordance with EPA Licence 1301 Condition 14.1.. Measured maximum 1 hour, 24 hour, and 1 year mean concentrations for Roxby Downs and Olympic Village and the applicable NEPM values, are presented in Table 3.2-1 and Figure 3.2-1 to Figure 3.2-3. Results of the monitoring are presented in the monthly Notification of Emission Events report submitted to EPA Regulation and Compliance within fifteen working days of the end of each quarter.

Table 3.2-1: Measured maximum average (mean) ambient SO2 concentrations at Roxby Downs and Olympic Village

	Annual average concentration (ppm)	Maximum 24 hour average concentration (ppm)	Maximum Hourly average concentration (ppm)
Roxby Downs			
Measured Concentration	0.0001	0.001	0.0037
NEPM	0.02	0.08	0.2
Olympic Village			
Measured Concentration	0.0004	0.001	0.0148
NEPM	0.02	0.08	0.2

The results of the measured concentration for the reporting period show that no exceedence of the NEPM for ambient air quality for SO_2 occurred at Olympic Village or Roxby Downs Township (Figure 3.2-1 to Figure 3.2-3).

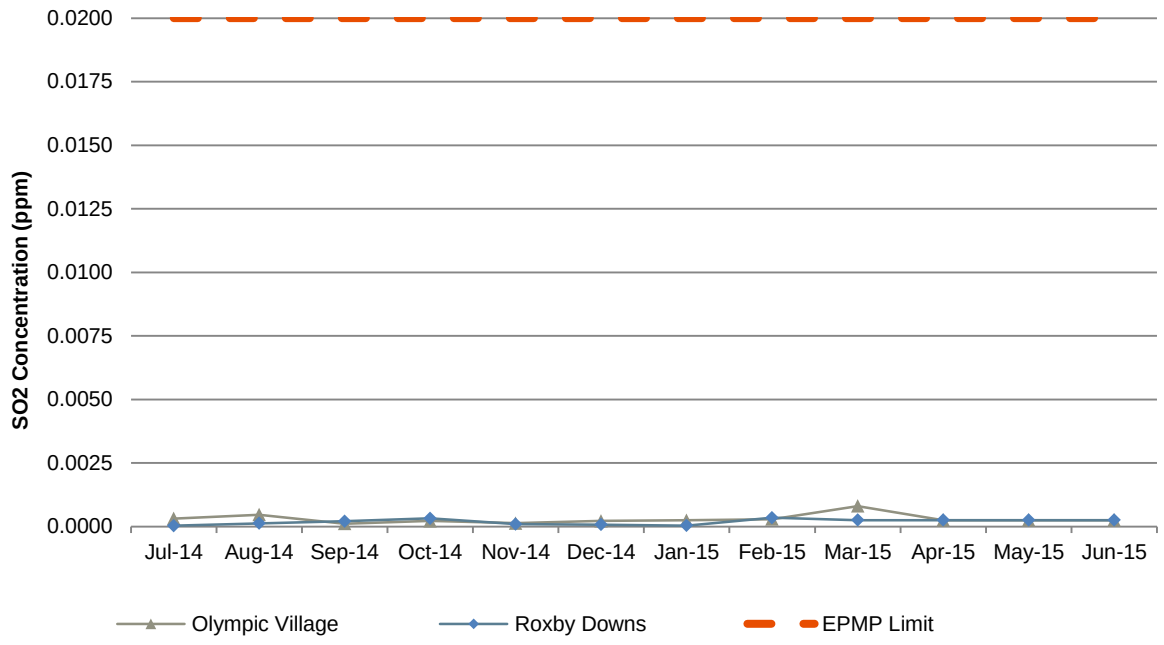


Figure 3.2-1: Measured monthly mean SO2 concentration at sensitive receptors, Olympic Village and Roxby Downs. (AE 2.4)

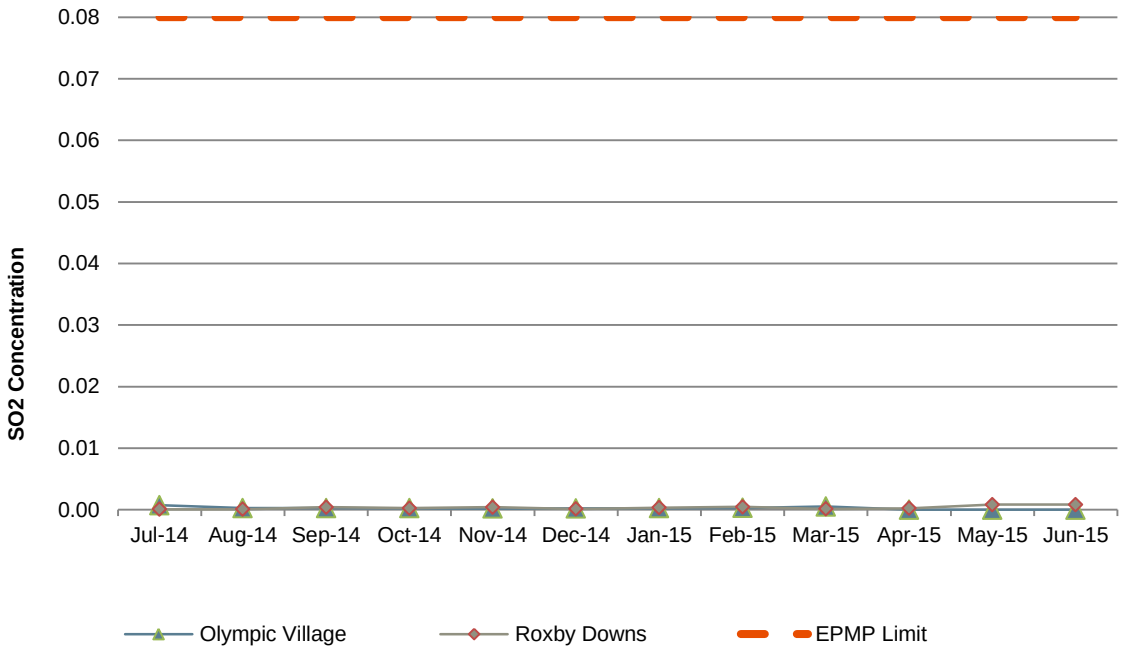


Figure 3.2-2: Measured maximum 24 hour mean SO2 concentration at sensitive receptors, Olympic Village and Roxby Downs. (AE 2.4)

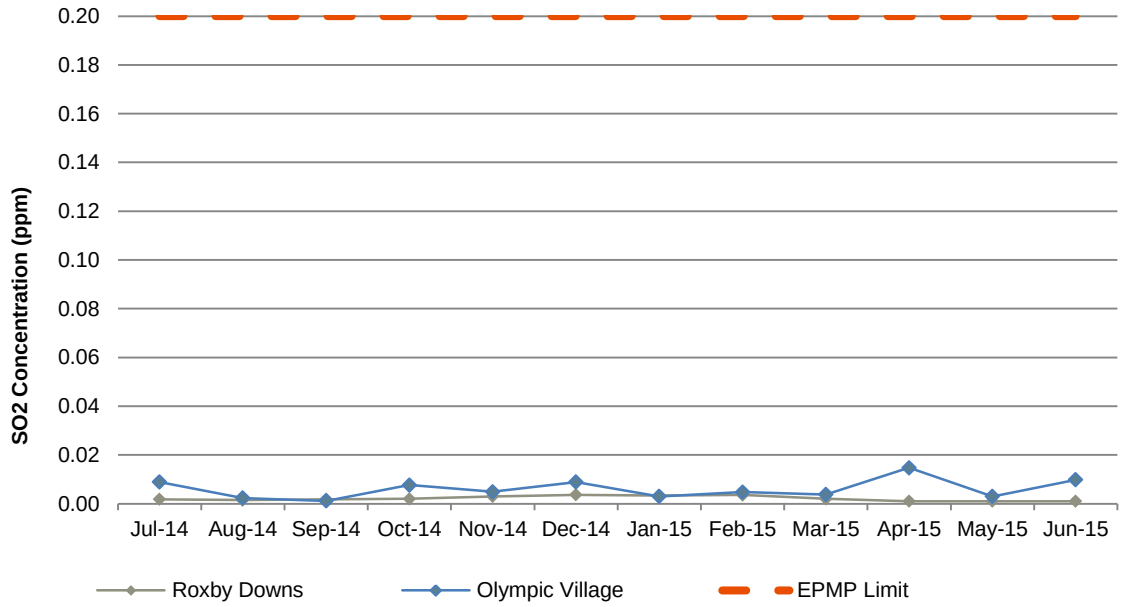


Figure 3.2-3: Measured maximum one hour mean SO2 concentration for each month, at sensitive receptors, Olympic Village and Roxby Downs. (AE 2.4)

3.2.5 Deliverables (AE 2.1)

Calibration records for SO_2 analysers on the Main Smelter Stack and Acid Plant Tails Gas Stack.

The Acid Plant Tail Gas Stack and Main Smelter Stack SO_2 analysers were maintained in accordance with site procedures and manufacturer's recommendations throughout the reporting period. Calibrations were completed monthly for the Main Smelter Stack analyser and 4 weekly for the Acid Plant Tail Gas Stack analyser. Calibration records are kept both electronically and in hard copy.

Records to assess compliance with the monitoring and reporting requirements of EPA Licence 1301 and the Environment Protection (Air Quality) Policy 1994.

Isokinetic sampling of the Main Smelter Stack and Acid Plant Tail Gas Stack was undertaken in September 2014. The results indicate continued compliance with the requirements of EPA Licence 1301 and the Environment Protection (Air Quality) Policy 1994 (EPP 1994) (Table 3.2-2).

Table 3.2-2: Smelter 2 Stack Sampling Results FY15

Sampling Point	Total acid gas emissions (mg/Nm^3)	Sulphur trioxide and acid mist emissions* (mg/Nm^3)	Particulate emissions (mg/Nm^3)
Reporting Level	3000	100	100
Main Smelter Stack	98	4	21
Acid Plant Tail Gas Stack	495	4	1.4

*** Expressed as sulphur trioxide equivalent**

Note: Reporting Level of Environment Protection (Air Quality) Policy 1994.

Records of particulate emissions from Smelter 2 to assess compliance with the emission limits of EPA Licence 1301 and the Environment Protection (Air Quality) Policy 1994

The EPP 1994 prescribes a level for emissions of particulates from any process using plant for the heating of metals or metal ores. This level is referenced in EPA Licence 1301 Authorisation Reference 7 (37-43).

Sampling of smelter stack emissions and analysis for particulate concentrations are undertaken periodically to assess the performance of gas cleaning systems against the requirements of the EPP 1994 reporting levels and EPA Licence 1301 Authorisation Reference 7 (37-43). Particulate emissions from the Acid Plant Tails Stack (APTS), Concentrate Dryer 1 (CD1), Concentrate Dryer 2 (CD2) and Main Smelter Stack were tested during FY15. The results of this testing program are summarised in Table 3.2-3 and Table 3.2-4. Mean particulate concentrations have been provided where more than one test was undertaken.

Table 3.2-3: Smelter 2 Particulate Sampling Results FY15

Sampling Point	Reporting Level	Particulate emissions (mg/Nm^3)
Acid Plant Tails Stack	100	1.4
Main Smelter Stack	100	21

Note: Reporting Level of Environment Protection (Air Quality) Policy 1994.

All FY15 particulate test results for the Concentrate Dryer outlet emissions are shown in Table 3.2-4.

Table 3.2-4: Concentrate Dryer Outlet Particulate Test Results FY15

Date	Concentrate Dryer Outlet Particulate emissions (mg/Nm3)
24/09/2014*	925
08/10/2014	44
10/12/2014	73

The exceedance on the 24th September was the result of a seal not being installed correctly two weeks earlier. The area was shut down and the EPA notified immediately. The subsequent results indicate that this exceedance was rectified quickly and comprehensively.

Data to confirm that greater than 99 per cent of all SO_2 generated during the smelting process is captured.

The percentage of SO_2 recovery for the reporting period was 99.25 per cent. This recovery result has increased slightly from 99.04 per cent in the previous reporting period.

3.2.6 Deliverables (FL 2.2)

A report on the annual changes in perennial communities within and surrounding the expanded SML.

Provide a comparative assessment on perennial species existing at different distances from the Main Smelter Stack (State 17f, 17ki).

Site characterisation

The perennial woody vegetation of dune slopes in the Olympic Dam area comprises a small number of species, mainly Acacia ligulata, Dodonaea viscosa, Senna artemisioides, Alectryon oleifolius, Acacia ramulosa, Gunniopsis quadrifida, Eremophila longifolia, Callitris glaucophylla, Acacia aneura, Acacia oswaldii, Santalum lanceolatum and Lycium australe. Several other minor species also occur (Table 3.2-5). All of the perennial woody species recorded in FY14 were also recorded in FY15. Seventeen different species were recorded over the 69 sites.

Table 3.2-5: Plant species recorded on the 69 sites, the number of sites on which they occurred, and the total number of individuals recorded on all sites in FY15

Species	No. of sites	No. of occurrences
Acacia aneura F.Muell. ex Benth.	15	28
Acacia ligulata A.Cunn. ex Benth.	67	4,541
Acacia oswaldii F.Muell.	3	28
Acacia ramulosa W.Fitzg.	22	110
Alectryon oleifolius (Desf.) S.T.Reynolds	28	141
Callitris glaucophylla Joy Thomps. & L.A.S.Johnson *	8	37
Dodonaea viscosa ssp. *angustissima* (DC.) J.G.West †	61	2,989
Eremophila longifolia (R.Br.) F.Muell.	2	68
Eremophila maculata (Ker Gawl.) F.Muell.	1	1
Gunniopsis quadrifida (F. Muell.) Pax	8	100
Hakea leucoptera R.Br.	1	1
Lycium australe F.Muell.	6	15
Pimelea microcephala R.Br.	1	1
Pittosporum angustifolium Lodd.	1	4
Santalum acuminatum (R.Br.) A.DC.	1	1
Santalum lanceolatum R.Br.	3	23
Senna artemisioides ssp. *petiolaris* Randell †	18	210
TOTAL	**69**	**8,298**

Note. Farjon (2005) included *C. glaucophylla* Joy Thomps. & L.A.S.Johnson within *C. columellaris F*.Muell. As this revision was not universally accepted (ANH *et al.,* 2008), we have retained the previous nomenclature.

† For reasons of simplicity, this report refers to *D. viscosa* ssp. *angustissima* as *D. viscosa* and *S. artemisioides* ssp. *petiolaris* as *S. artemisioides*.

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Hakea leucoptera R.Br.	1	1
Lycium australe F.Muell.	6	15
Pimelea microcephala R.Br.	1	1
Pittosporum angustifolium Lodd.	1	4
Santalum acuminatum (R.Br.) A.DC.	1	1
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† For reasons of simplicity, this report refers to *D. viscosa* ssp. *angustissima* as *D. viscosa* and *S. artemisioides* ssp. *petiolaris* as *S. artemisioides*.

The plants varied in abundance between species (Table 3.2-5). As in previous years, *A. ligulata* and *D. viscosa* were far more abundant and widely dispersed than all other species. *Senna artemisioides* was also abundant on some sites, but was distributed on only a few sites, suggesting it was locally patchy in its distribution. Several species were rare, and some occurred on only one of the 69 sites (*Eremophila maculata, Hakea leucoptera, Pimelea microcephala, Pittosporum angustifolium* and *Santalum acuminatum*).

Summed over each species and all sites, the counts of plant numbers changed by +268 plants in FY15 compared to FY14 (Table 3.2-6). The greatest changes occurred in the two most common species (*A. ligulata* and *D. viscosa*), with the former decreasing in number between FY14 and FY15 (summed across all sites), and the latter increasing.

Over FY14-FY15, the total number of plants across all sites increased (Table 3.2-6) and is now the highest number since FY11. Overall, total change equated to 3% of the FY14 plant numbers.

Table 3.2-6: Changes in the total number of plants for all 69 sites from FY11-15.

FY	Total no. plants (69 sites)	Net change from previous year
11	6,736	n/a
12	6,665	-71
13	8,082	1,417
14	8,030	-52
15	8,298	268

Note. The numbers of plants recorded each year from 2010-2014. ‘Net change’ equals net gains minus net losses; ‘n/a’ = not applicable (full set of sites not sampled in previous year).

Plant diversity

Simpson's index is a measure of the extent to which sites were dominated by one or a few species. A Simpson's value of one indicates a single species exclusively dominates a site. Simpson's values approaching zero indicate that numerous species are equally abundant on a site. We have varied our modelling of the Simpson index in FY15, using distance weighted least squares (DWLS) to construct the contours, instead of kriging. It reflects our field observations more closely than the kriging modelling did in previous years. Kriging tends to identify centralised distributions, whereas vegetation patterns are more heterogeneous.

Dominance was highest on several sites to the south-west, south-east, north-west and east of the operation. It was also high (≥0.696) in a large area immediately surrounding the operation (Figure 3.2-4). The pattern is largely consistent with emission impacts around the operation, and emissions distributed to the north-west (in the direction of the most frequent winds) (see Griffin and Dunlop (2006) for discussion on wind directions and strengths at Olympic Dam). Areas of high dominance in the east, approaching Andamooka, may possibly be affected by this town. The sites in the far south-east are not known to be affected by emissions.

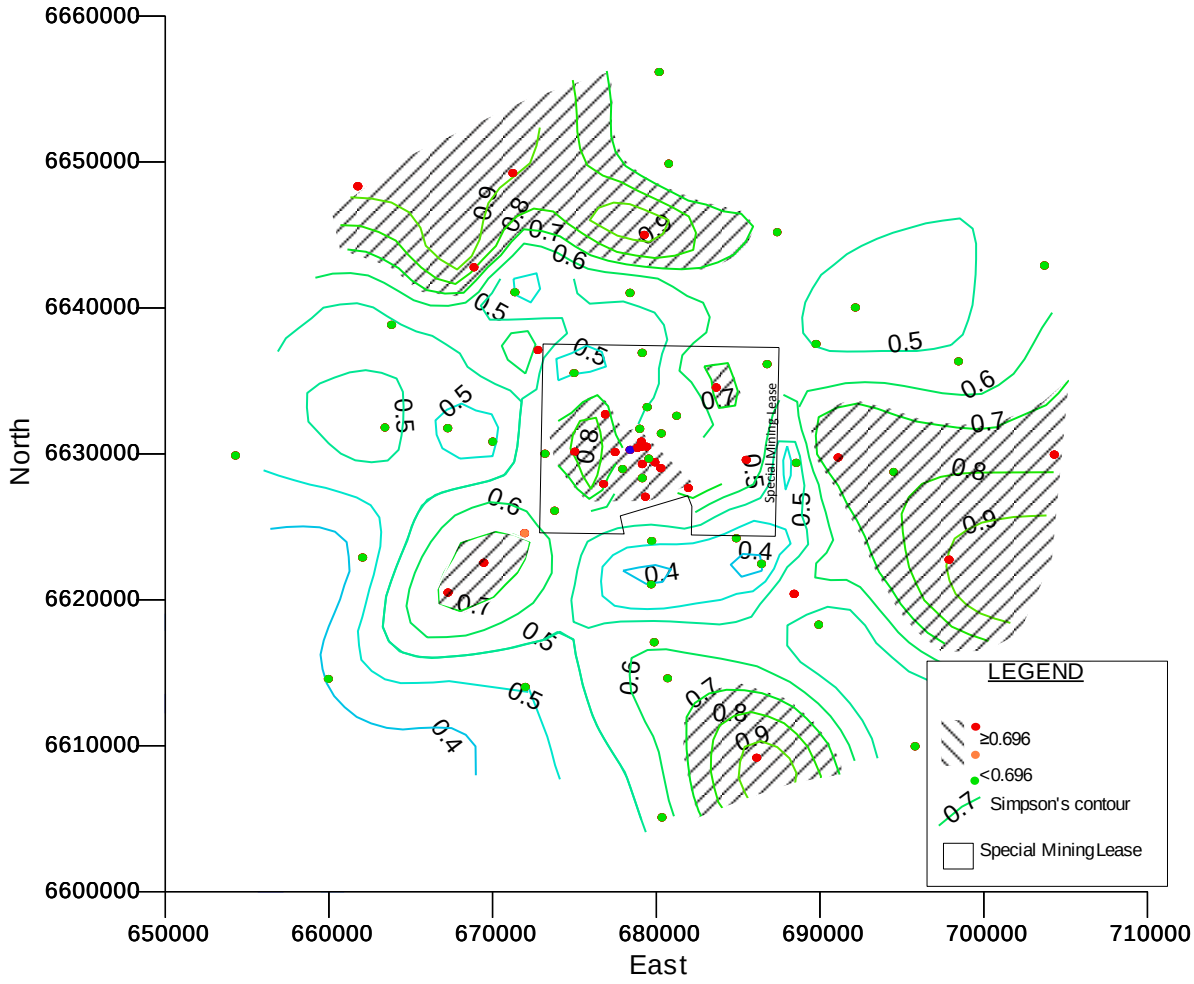

Figure 3.2-4: Modelled surface of Simpson's index in FY15. The contours represent the modelled level of dominance based on the values from the sample sites (red dots are sites with a Simpsons index ≥0.696; green dots are sites with a Simpson's index <0.696). The surface was modelled using DWLS. The Special Mining Lease boundary is overlain on the contours

3.2.7 Targets FY15

Reduce the total EPA notifiable emission events by 5% of the FY12 target (less than 176 events).

In FY15 there were a total of 175 notifiable emissions events which is less than the target set in the 2014 EPMP of 176 notifiable events. The result represents a 14% improvement from FY14 (down from 203 events), which demonstrates good progress in reducing emissions. The distribution of these events over the financial year is shown in Figure 3.2-5. Please note an administrative error was made when setting this target in the 2014 EPMP, which states a target of 156. The correct FY15 target is 176 notifiable events.

The distribution of these events over the financial year is shown in Figure 3.2-5.

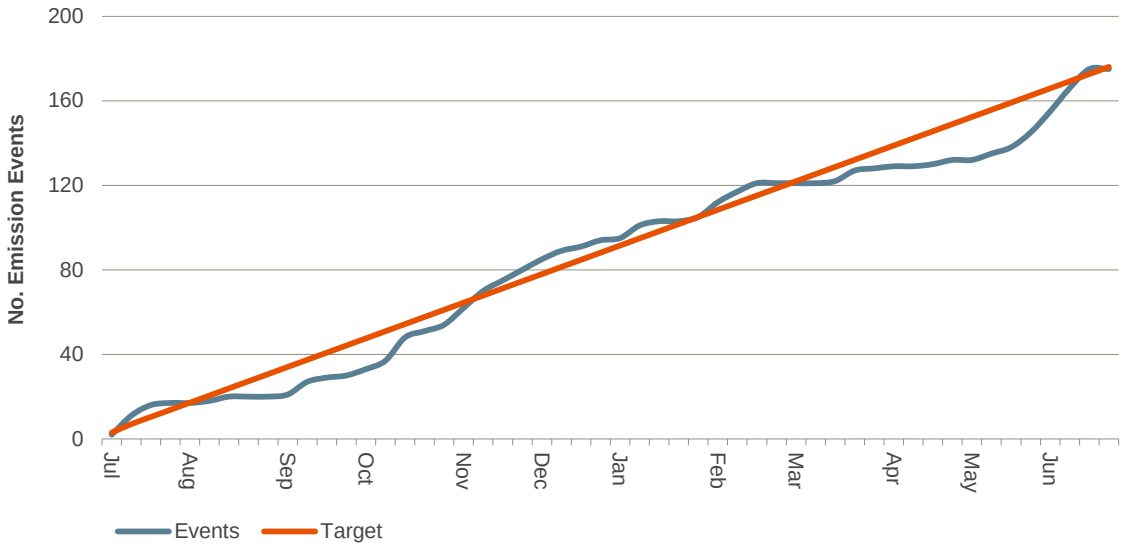

Figure 3.2-5: Notifiable emission events FY15

3.2.8 Action plan FY15

Continue with the Smelter Environmental Improvement Plan (EIP).

The Smelter EIP was continued in FY15 with 1 improvement action being completed in the 12 months. The actions and completion dates from the Smelter EIP are listed in Table 3.2-7.

Table 3.2-7: FY15 Smelter Environmental Improvement Plan completed actions

Action	Completion Date
Trial the use of pelletised tyres in place of coke	Q3 FY15

Implement the use of an ambient SO_2 analyser at Olympic Village

The ambient SO_2 analyser has been installed at Olympic Village and is collecting data.

3.3 Saline aerosol emissions

3.3.1 Environmental Outcome

No significant adverse impacts to populations of listed species (South Australian, Commonwealth) as a result of ODC's activities.

No significant adverse impact to populations of listed species from saline aerosol emissions was observed during FY15. Recorded salt deposition levels were well below historical levels for most of the year, with the exception of Raise Bore (RB) 10, and RB19. Observations made during environmental inspections and supported by data collected during various flora and fauna monitoring programs, did not find any significant adverse impacts to listed species.

3.3.2 Compliance criteria

No loss of an important population of Category 1b species. (AE 2.6)

There was no loss of an important population of Category 1b species during FY15 as a result of saline aerosol emissions. No loss of an important population of Category 1b species was observed during annual small mammal and reptile monitoring or during the annual monitoring of emission impacts to vegetation, which are used to assess impacts to flora and fauna within the potential impact area. One Category 1b species (Plains Mouse) is known to occur within the vicinity of raise bores but was not recorded as being present in the area during FY15.

3.3.3 Leading Indicators

- None applicable

3.3.4 Deliverables (AE 2.6)

Records from salt deposition monitoring jars which characterise the dispersion and deposition of saline aerosol emissions around the raise bores.

A statement of impacts to Category 1b at-risk species.

Raise bores are monitored if saline emissions are evident during operation and have the potential to impact surrounding vegetation. At Olympic Dam, eight exhaust raise bores are currently monitored. Salt deposition monitoring results from the FY15 monitoring period are presented in in Figure 3.3-1. The monitoring program for saline emissions was amended in FY15 to reduce monitoring to quarterly and to implement a strategy for monitoring new raise bores. In FY15 RB29 was removed from the program and RB40 was commissioned.

Impacts to flora and fauna within the impact zone of the operation are modelled through monitoring of long term changes to perennial vegetation (see Chapter 3.2 Sulphur dioxide emissions) and emissions impact to vegetation (see Chapter 3.1 Particulate emissions) as well as small mammal and reptile monitoring and avifauna monitoring (see Chapter 1.1 Land disturbance and rehabilitation). Results of these programs have demonstrated that the impact to flora and fauna is largely restricted to the vicinity of the operation and is rainfall dependent. No Category 1b species were observed to be impacted directly by saline emissions in FY15. No Plains Mice (*Psuedomys australis*) were recorded within the vicinity of the raise bores during FY15. Localised impacts to Plains Mice are likely however the species is irruptive and may not be recorded in the area for long periods. Due to this, numbers recorded in the area are highly variable and fluctuations in numbers in the region are more likely to be governed by availability of resources than localised impacts from the operation.

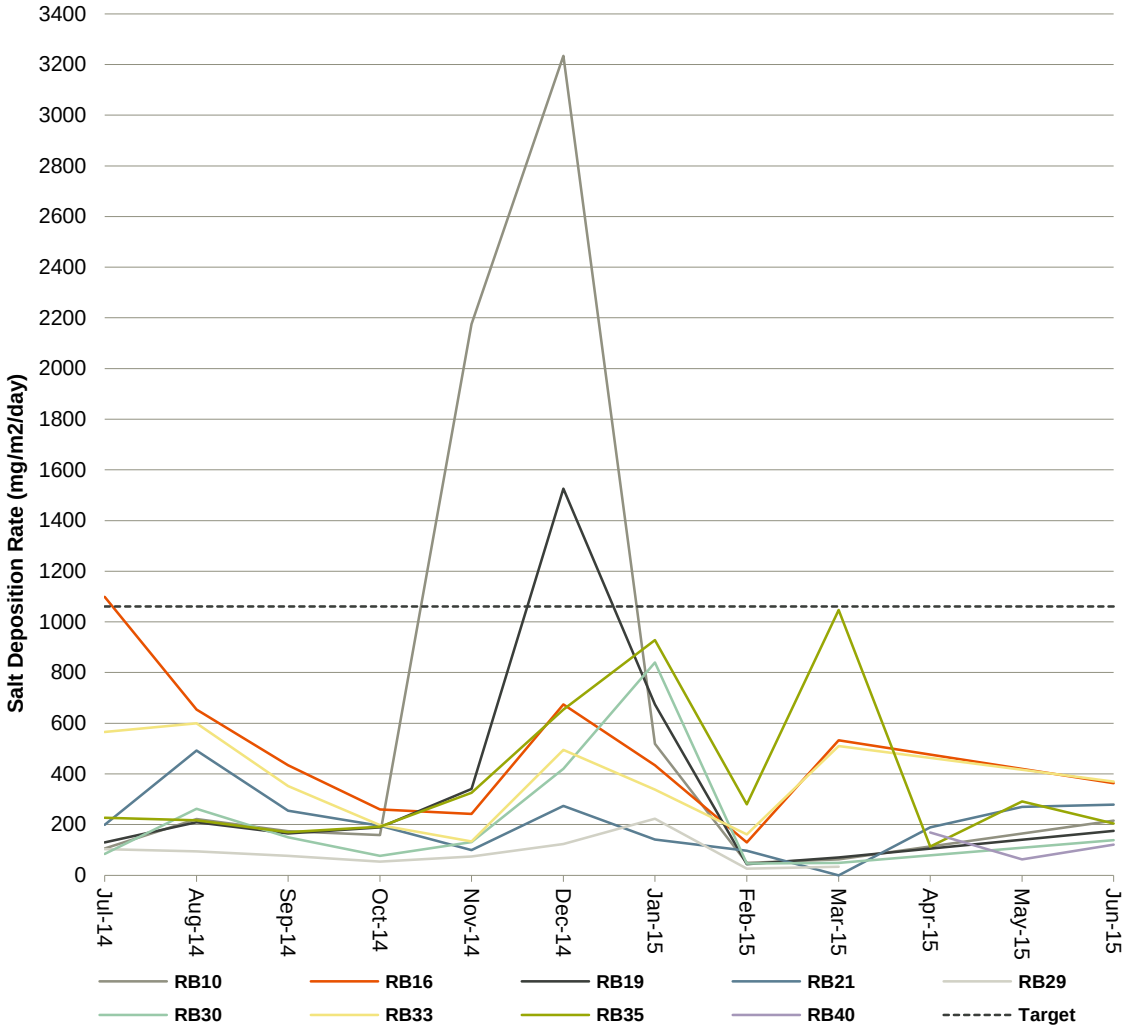

Figure 3.3-1: Saline aerosol emissions from raise bores in FY15

3.3.5 Targets FY15

Reduce the deposition of salt from saline aerosol emissions at RB21 salt jars by 10% of the FY14 target (less than 1,061 milligrams mg/m^2/day for FY15).

RB 21 remained below the salt deposition target of 1061 mg/m^2/day for all of FY15. Salt deposition records from RB16, RB130, RB33 and RB35 were within historical ranges for these RBs.

While not specifically listed as a target in the FY15 monitoring program, RB10 exceeded the RB21 target of 1061 mg/m^2/day in November and December 2014 and RB19 exceeded the target in December 2014. The highest of these exceedances was at RB10 reaching 3233.8 mg/m2/day in December 2014. These exceedances were investigated and can be related to local new road construction and earthworks in backfill not the raise bores. The new roads required increased dust suppression with saline water, which in turn affected the saline emission results. Historical data is provided in Figure 3.3-2

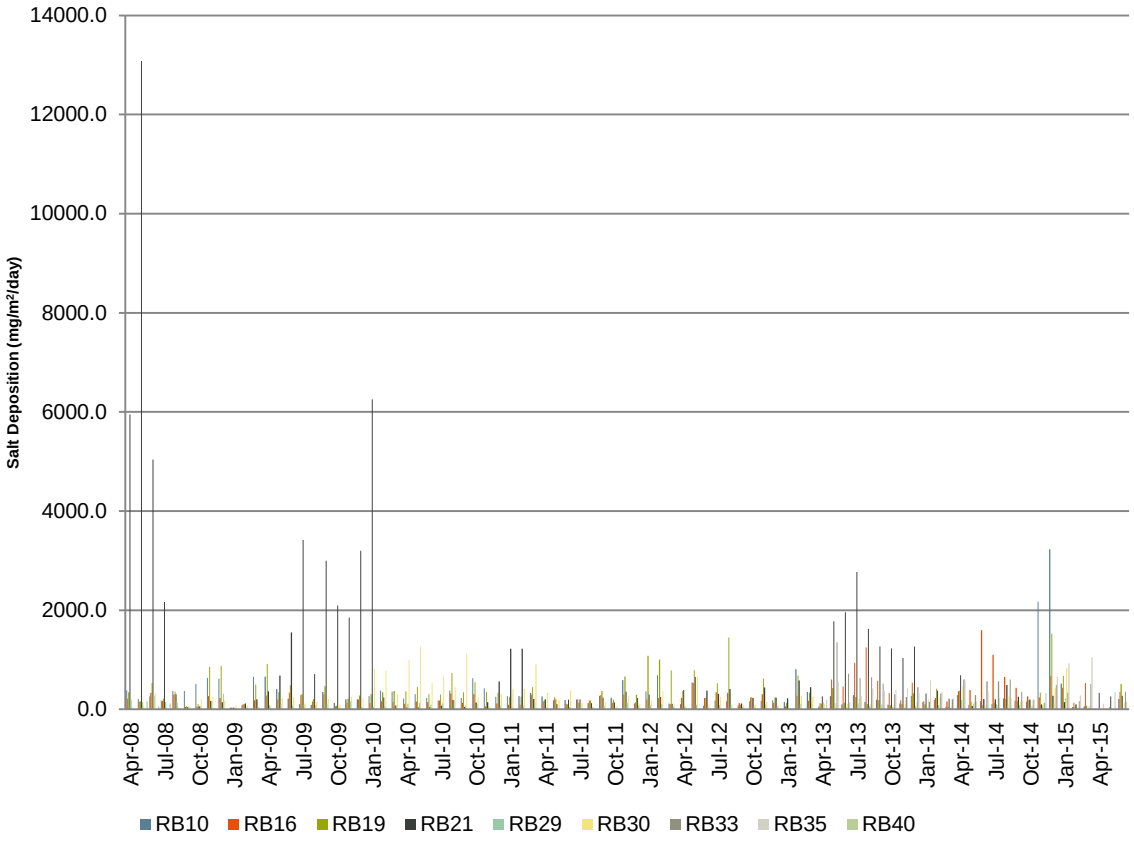

Figure 3.3-2: Historical saline aerosol emissions from raise bores

3.3.6 Action plan FY15

Install and repair controls as per the design standard around raise bores.

Saline emission control criteria at the raise bore design stage have been developed in collaboration with mining departments. All design controls for the raise bores are stored within the SmartPlant Enterprise for Operations (SPO). The control criteria will be incorporated into all future raise bores and those that are currently under construction. The design criteria for raise bore construction include:

- Installation of precast concrete splash pads.
- Fan outlets designed with curved veins in order to funnel energy towards the centre of the splash pad.
- Fans designed as bottom discharge to reduce the volume of emissions escaping over the fencing barricade.

A trial is being implemented on RB35 to determine if a shade cloth located over the top of the splash pond reduces the saline emissions emitted into the receiving environment. Additional controls continue to be investigated as a part of the mining Environmental Improvement Plan and monthly monitoring of the selected raise bores will continue.

3.4 Radioactive emissions

3.4.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive emissions from ODC's activities (State 34).

BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1mSv/yr limit. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at ODC.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive emissions from ODC's activities (State 34).

There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at non-human biota assessment sites is used as an indicator of the potential exposure of listed species to radioactive emissions. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

3.4.2 Compliance criteria

Radiation doses to members of the public of 1 mSv/y above natural background (State 34).

The total estimated dose to critical groups of members of the public at Roxby Downs Monitoring Site and Olympic Village Monitoring Site contributed by ODC operations is 0.015mSv/yr and 0.023mSv/yr, respectively. These values are not statistically significant as they fall below the limit of detection for effective dose to members of the public, and are less than 3% of the legislative limit of 1mSv/yr and less than 8% of the operation's internal working constraint of 0.3mSv/yr.

Deposition of project originated ^{238}U less than 25 Bq/m^2/y at non-human biota assessment sites.

The average deposition of Uranium-238 was at the four monitoring sites was determined to be 0.4 Bq/m^2/y. Well below the 25 Bq/m^2/y compliance criteria.

3.4.3 Deliverables (ER 2.2)

Data leading to calculated estimates of annual radiation doses to the public in the critical groups identified.

The effective dose attributable to radon decay products (ED_{Rn}) and radionuclides in dust (ED_D) are calculated and summed to produce the total effective dose (*i.e*. the annual radiation dose to members of the public).

Radon Decay Products

Monthly radon decay product (RDP) averages and the five year rolling average for RDMS and OVMS during the reporting period are shown in Figure 3.4-1

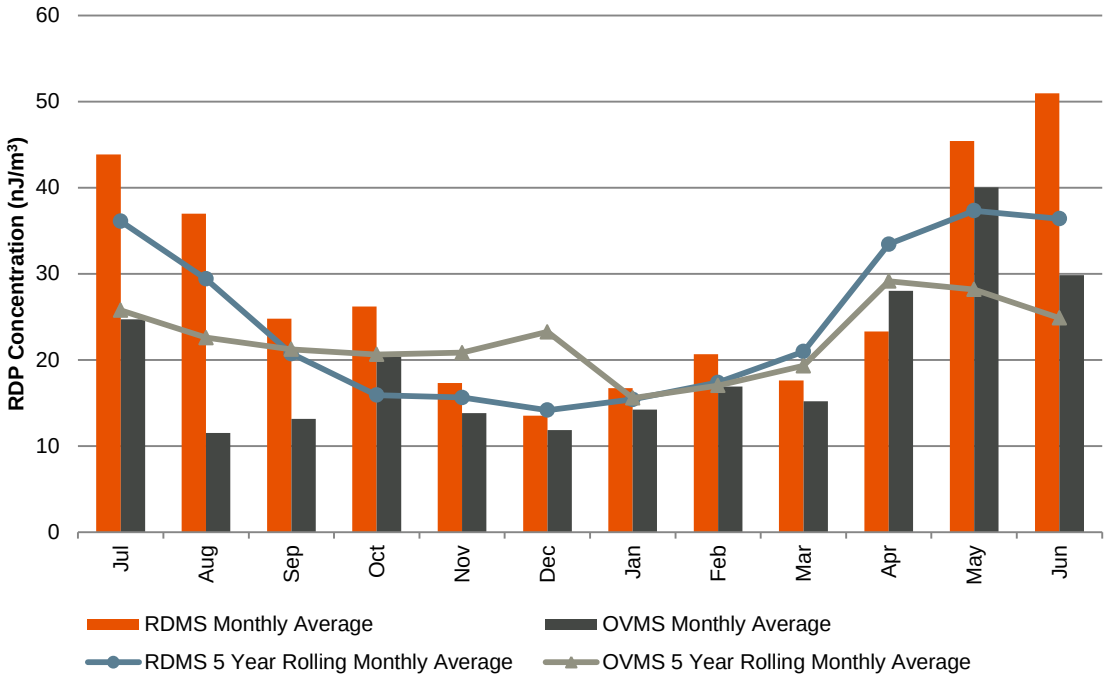

Figure 3.4-1: FY15 radon decay product monthly averages, including five-year trends

The dose to members of the public (as measured at RDMS and OVMS), due to ODC operation-related radon progeny was found to be close to or below the detection level (0.035 mSv). Historic monitoring data suggests that there is little operation-related radon progeny concentration at these monitoring sites.

The total estimated dose to members of the public at RDMS and OVMS due to radon progeny (including background dose) was 0.116 mSv/yr and 0.143 mSv/yr, respectively. Both dose results were lower when compared to previous reporting periods. The major source of error in these estimates arises from the natural variation of the background radon decay product concentration. When background concentrations were subtracted, the mean calculated doses to members of the public attributable to the operation were 0.014 mSv/yr at RDMS and 0.021 mSv/yr at OVMS. These values are not statistically significant as they fall below the limit of detection.

Radionuclides in dust dose assessment

Monthly concentrations of the long-lived radionuclides, ^{238}U, ^{230}Th, ^{226}Ra, ^{210}Pb and ^{210}Po for the previous five years, are shown in Figure 3.4-2 to Figure 3.4-6. The monthly dust (PM_{10}) concentration is shown in Figure 3.4-7.

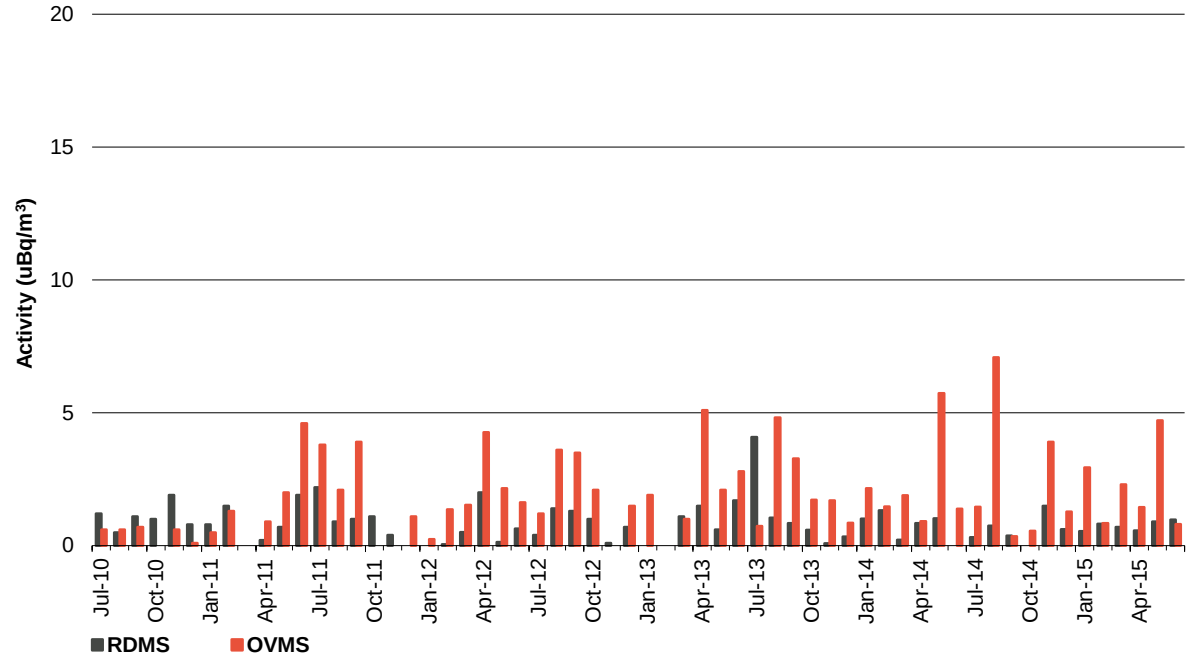

Figure 3.4-2: 238U concentration for the previous 5 years (PM10)

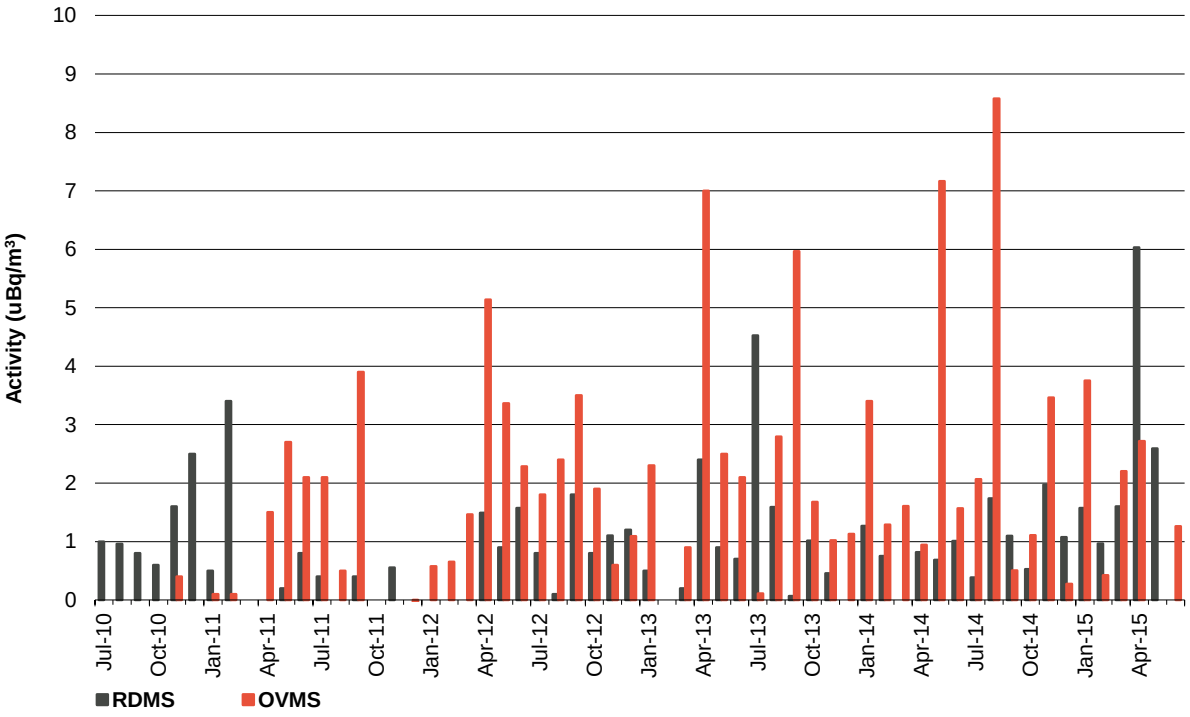

Figure 3.4-3: ^{230}Th concentration for the previous 5 years (PM10)

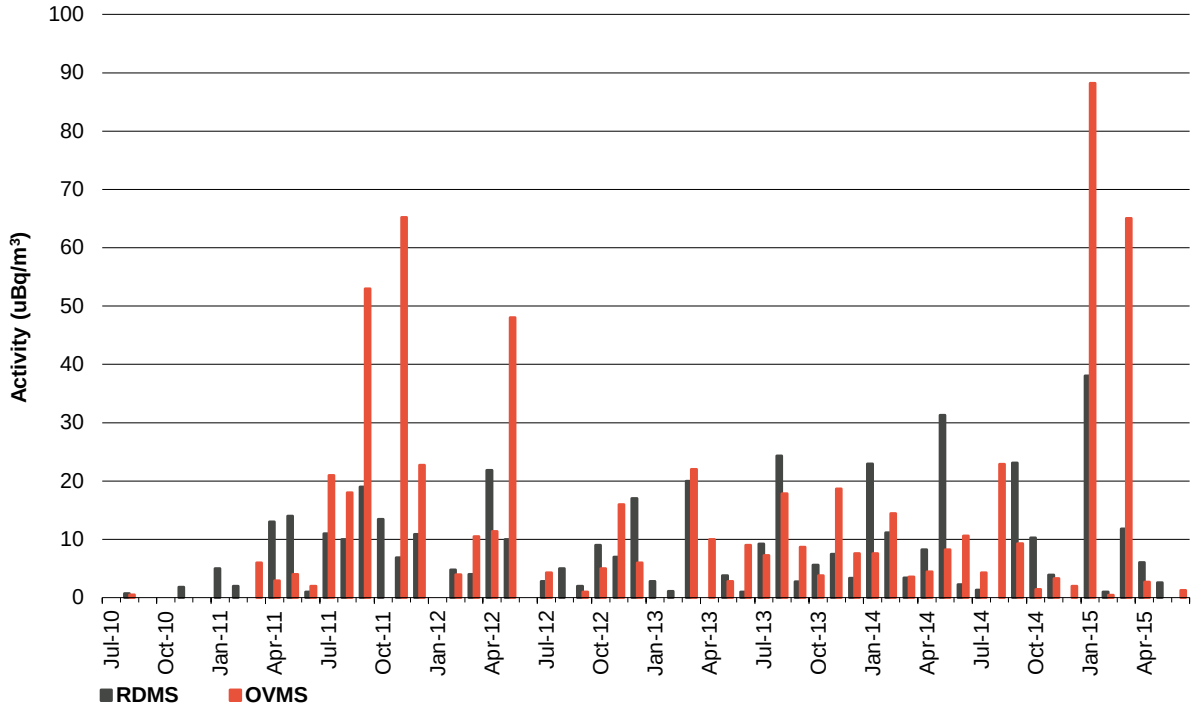

Figure 3.4-4: ^{26}Ra concentration for the previous 5 years (PM10) (Note 230Th concentrations were used for Feb – July 2015 as no lab results available.)

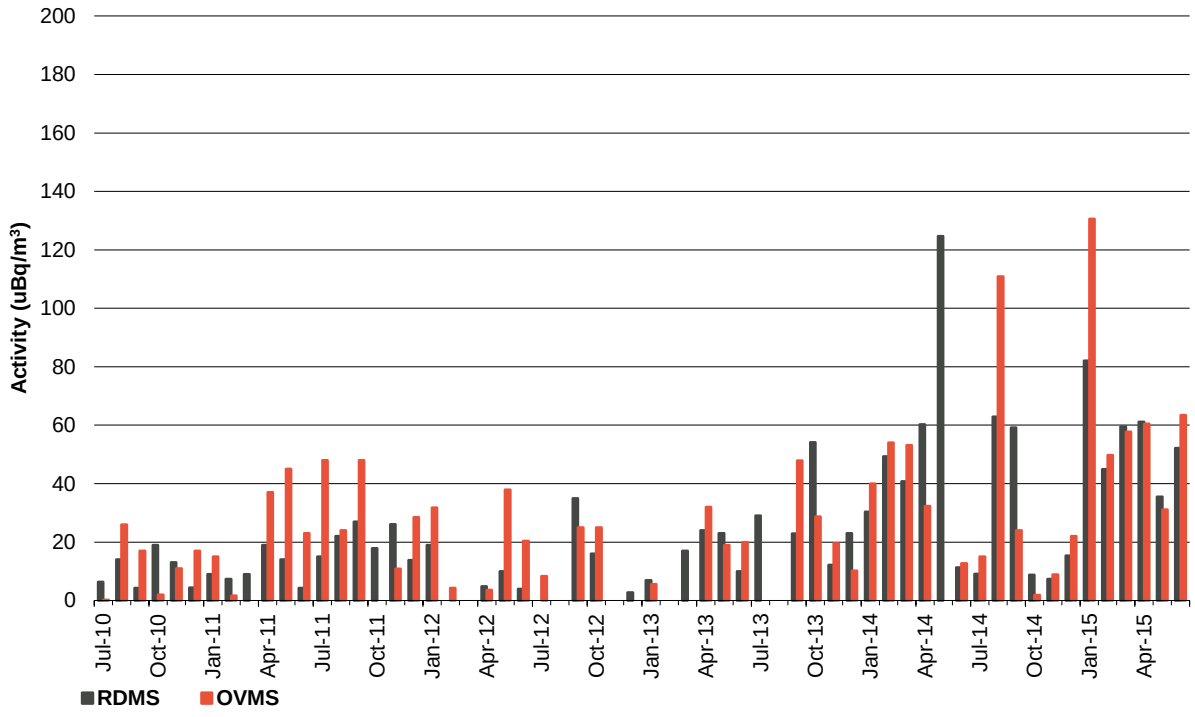

Figure 3.4-5: ^{210}Po concentration for the previous 5 years (PM10)

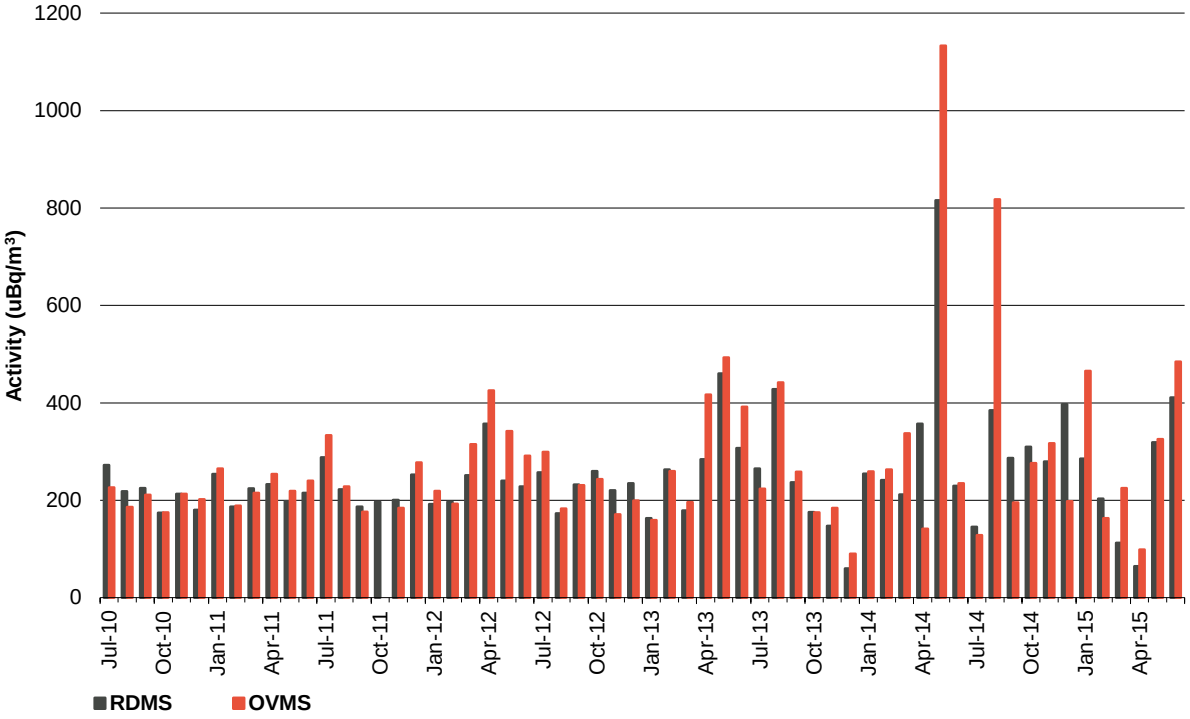

Figure 3.4-6: ^{210}**Pb concentration for the previous 5 years (PM10)**

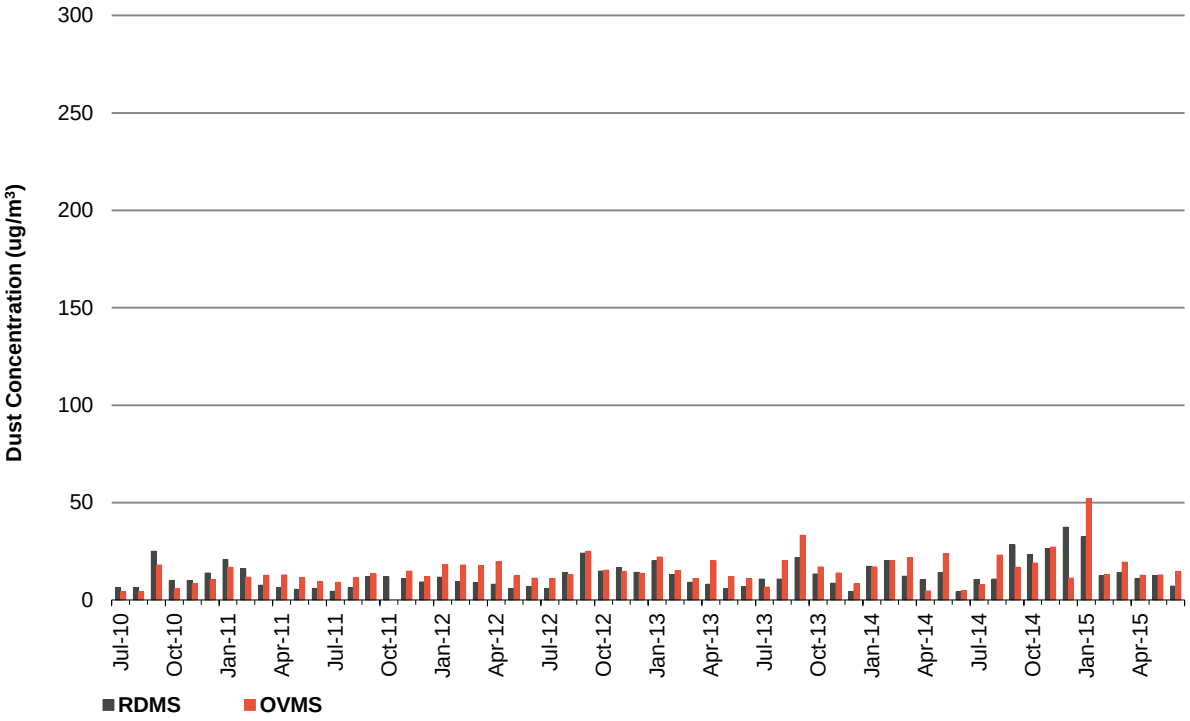

Figure 3.4-7: Total PM10 concentration for the previous 5 years

The estimated doses to members of the public at RDMS and OVMS due to radionuclides in dust, including background, were 0.0046 mSv/yr and 0.0066 mSv/yr, respectively.

When background is subtracted from the above figures, the mean calculated doses to members of the public at RDMS and OVMS, due to radionuclides in dust and attributable to the operation, were 0.0011 mSv/yr and 0.0027 mSv/yr, respectively. The results fall within the error margin for estimation of effective dose from radionuclides in dust and are not statistically significant.

Total Dose to Members of the Public

The total estimated dose to members of the public at RDMS and OVMS contributed by ODC operations is 0.015 mSv/yr and 0.024 mSv/yr, respectively. The effective dose to members of the public is less than 3% of the legislative limit of 1 mSv/yr and less than 8% of the operations internal working constraint of 0.3 mSv/yr (Figure 3.4-8).

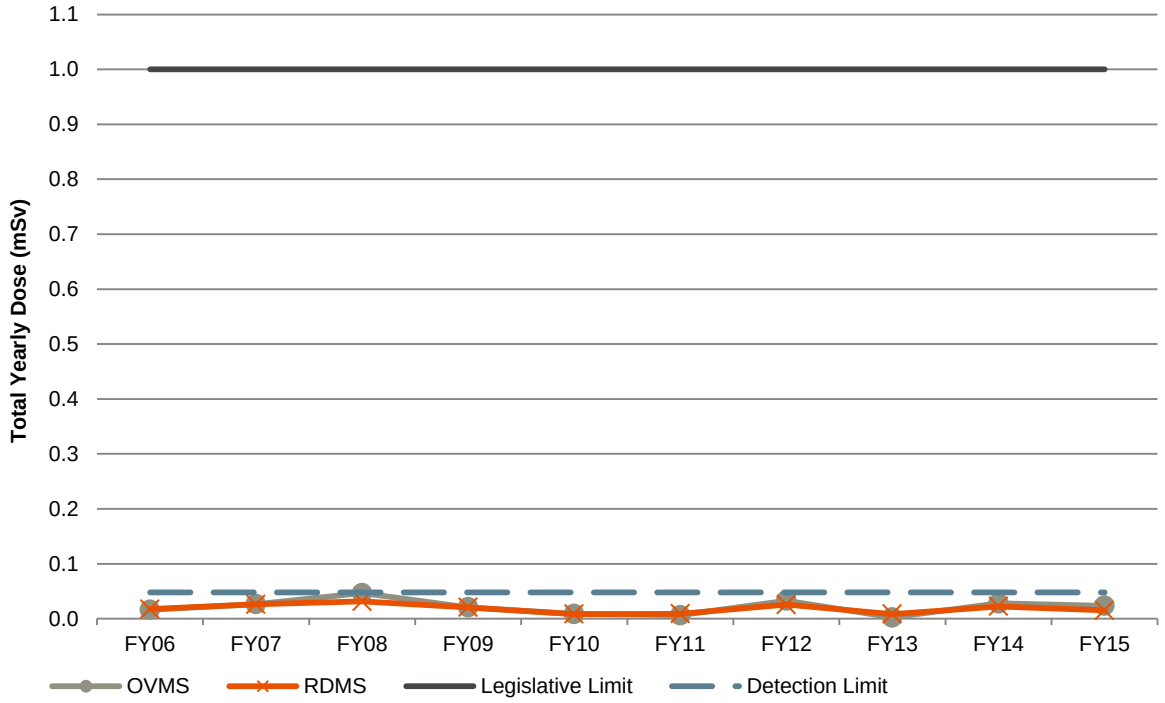

Figure 3.4-8: **Total effective dose trend**

3.4.4 Deliverables (ER 2.3.3)

Records from passive dust deposition monitoring sites and comparison with the annual compliance rate of 25 Bq/m^2/y.

An assessment of the impacts to reference plants and animals (ARPANSA 2010) and comparison of the results with the reference level of 10 µGy/h.

Dust deposition

Passive dust monitoring data for FY15 indicated an average project-originated (after background subtraction) ^{238}U deposition rate of 0.4 Bq/m^2/yr. Passive dust (PD) monitoring sites PD1, PD4, PD8 and PD13 were used for this assessment (Figure 3.4-9), with site PD14 used as the background site. The calculated results are below the limit of detection and well below the criterion of 25 Bq/m^2/yr as shown in Table 3.4-1

Table 3.4-1: FY15 - Project Originated Dust and U238 Deposition

	Project Originated Total Dust Deposition	Project Originated ^{238}U Deposition	Compliance Criteria
	g/m^2/yr	Bq/m^2/y	Bq/m^2/y
PD1	15.8	0.7	25
PD4	11.2	0.6	25
PD7	0.0	0.2	25
PD13	4.0	0.0	25

Dose rate reference level

The ERICA software tool was used to assess the significance of measured radionuclide dust deposition data. The analysis showed the estimated dose rate to be a very small fraction of the annual reference level. The output shows that the risk quotient for FY15 is approximately 0.00196, and the prediction for 20 years of operation is

approximately 0.1. The risk quotient is a unit-less measure that compares the calculated NHB dose rate with the reference level of 10 µGy/h.

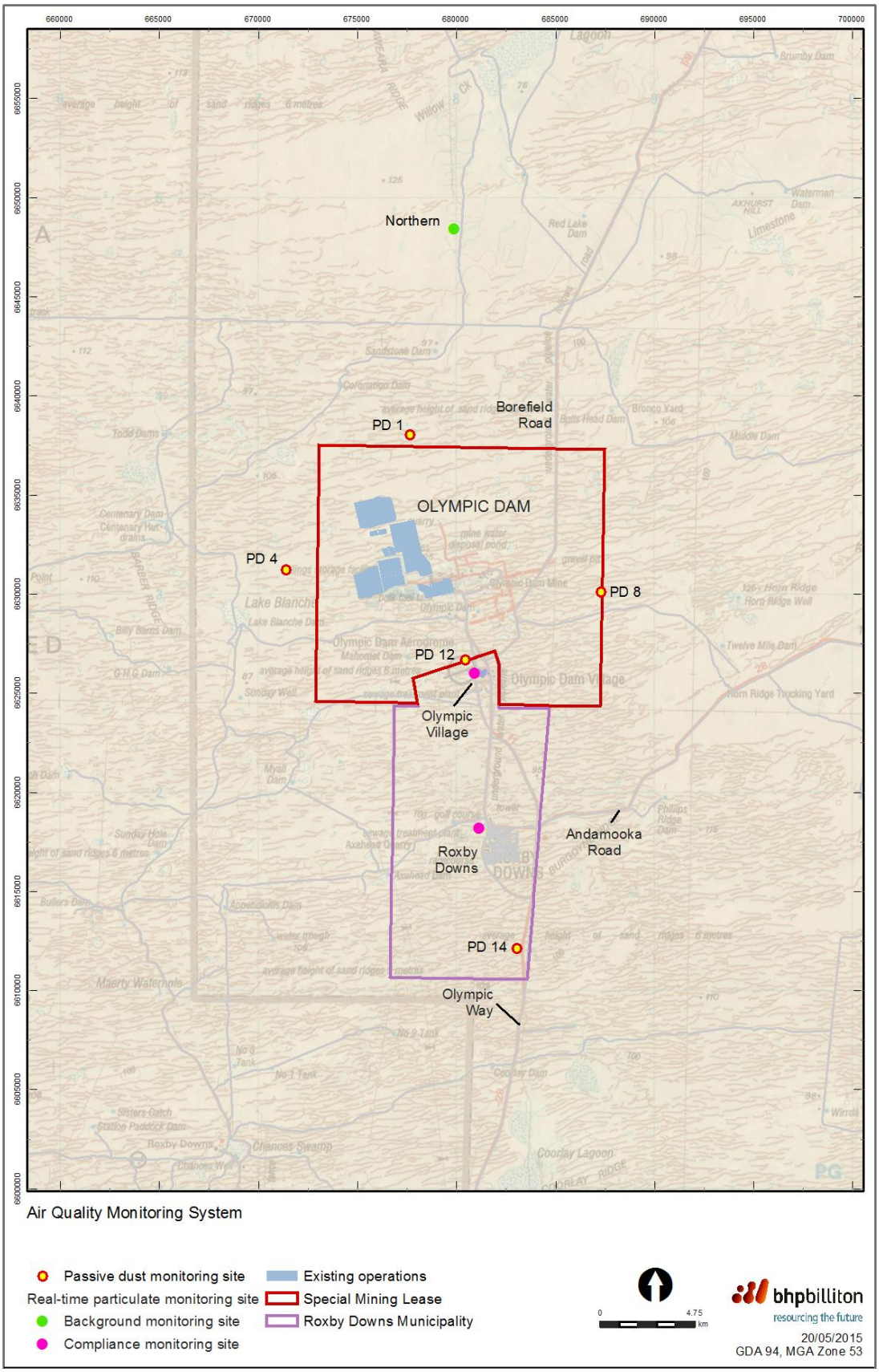

Figure 3.4-9: Location of dust deposition monitoring sites

3.4.5 Deliverables (ER 2.4)

A database of radionuclide concentrations in the environment over the long-term.

A database of radionuclide concentrations in the environment over the long-term has been maintained since 2005, refer Figure 3.4-2 to Figure 3.4-6.

3.4.6 Leading Indicators

No leading indicators were triggered. Doses to members of the public are below Olympic Dam's internal dose constraint of 0.3mSv/yr. Similarly the reference level of 10uGy/h for impacts on non-human biota has not been triggered.

3.4.7 Targets FY15

Maintain radiation doses as low as reasonably achievable, as assessed through the annual adequacy and effectiveness review.

An in-house review of the monitoring program noted that estimated doses were well below, less than 3% of, the public dose limit of 1mSv/yr (Figure 3.4-8). As a consequence, it is clear that efforts to attempt to further reduce doses would not be cost effective and protection can be considered optimized. This indicates that doses are as low as reasonably achievable.

3.4.8 Action Plan FY15

- None applicable

3.5 Greenhouse gas emissions

3.5.1 Environmental Outcome

Contribute to stabilising global atmospheric greenhouse gas concentrations to minimise environmental impacts associated with climate change.

ODC has a road-map to achieve a reduction in greenhouse gas (GHG) emissions to an amount equivalent to at least a 60% reduction of 1990 emissions by 2050. Abatement of carbon emissions was achieved during FY15 through improvement projects.

3.5.2 Compliance criteria

A reduction in greenhouse gas emissions to an amount equivalent to at least a 60% reduction of 1990 emissions, by 2050 (EG 2.1, 2.2).

ODC has reviewed its road-map to achieve a reduction in GHG emissions to an amount equivalent to at least a 60% reduction of 1990 emissions by 2050. The ramp-down in activities associated with the Olympic Dam expansion project has temporarily reduced, and introduced uncertainty to, the projected GHG emissions associated with ODC's future operations. Uncertainty will remain in GHG emission projections until the company decides on a likely expansion pathway for the Olympic Dam orebody.

In FY15, 26kt of CO_2-e was abated through improvement projects. Other projects continue to be investigated which will reduce emissions further against business as usual forecasts.

3.5.3 Deliverables (EG 2.1)

Calculation of the site-wide GHG emission intensities, expressed as carbon equivalent intensity (kg CO_2-e/t milled)).

GHG emissions were calculated using the National Greenhouse and Energy Reporting guidelines and emissions intensity was calculated and reported internally within BHP Billiton in line with monthly corporate reporting requirements. The calculated GHG emission intensity in FY15 was 88 kg CO2-e/t milled, compared to 77 kg CO_2-e/t milled in FY14. This was driven by a decrease in production associated with a mill outage, rather than a change in the underlying emissions.

3.5.4 Deliverables (EG 2.2)

A 'road map' that describes a pathway to achieving the GHG Emissions Goal which will be updated annually and include:

- **the likely emissions reduction pathway to 2050;**
- **quantification of emissions reduction opportunities and achievements;**
- **the conditions under which opportunities become viable and will be implemented;**
- **carbon reduction cost curves.**

Reporting on progress toward meeting targets. (State 13)

ODC initially developed a Carbon Emissions Management Plan in mid-2012, which was updated in mid-2013 to reflect the changing environment surrounding carbon emissions abatement, and to reflect the suspension of works associated with the Olympic Dam Expansion, for which the majority of GHG emissions and abatement opportunities were associated. This document incorporates the process for the setting of GHG targets and the identification, assessment and implementation of GHG-reduction opportunities within the BHP Billiton business development framework.

The likely emissions reduction pathway to 2050 will be highly dependent upon expansion options, which continue to be evaluated. Whilst these expansion options are under evaluation, the emission reduction options contained in the CEMP are the most likely options available at this time. The emissions trajectories to achieving the emissions reduction goal contained in the CEMP are unable to be improved upon at this time.

Revised projections for energy use and GHG emissions over the next five years are shown in Table 3.5-1. Emissions are forecast to increase after FY16 due to increasing production and changing ore grades which are forecast to result in proportionally higher energy use and emissions from the Smelter. As approximately 76% of total emissions are forecast from electricity, the actual emissions will be heavily influenced by the South Australian Electricity Emissions Factor which is used to calculate emissions.

Table 3.5-1: Energy Use Predictions by Type and GHG emissions for FY16, 17, 18, 19 and 20

Energy Type	FY16	FY17	FY18	FY19	FY20
Electricity (MWh)	1,075,076	1,093,483	1,197,870	1,198,230	1,218,981
Diesel (kL)	32,362	38,540	42,022	42,195	42,909
LPG (t)	18,745	18,633	20,469	19,790	20,753
Petrol (L)	36,000	36,000	36,000	36,000	36,000
Coke (t)	9,781	9,150	10,497	10,440	10,131
Anode paste (kg)	366,781	343,117	393,638	391,511	379,913
Fuel oil (kL)	5,928	6,035	5,274	5,274	5,413
Oil (L)	103,459	103,459	103,459	103,459	103,459
Grease (L)	16,597	16,597	16,597	16,597	16,597
Soda ash (t)	902	902	902	902	902
Acetylene (m^3)	3,888	3,888	3,888	3,888	3,888
GHG emissions (t CO_2-e)	825,013	850,994	931,238	929,695	946,726

Table 3.5-2 below outlines a summary of current emission reduction opportunities and achievements during FY15.

Carbon reduction cost curves, or marginal abatement cost curves were developed for the Olympic Dam EIS and are included in the Carbon Emissions Management Plan. As a result of uncertainty with regards to carbon abatement mechanisms and the status of proposed ODC expansion activities, the current marginal abatement cost curves presented in the EIS remain the best estimate of abatement economics and are unable to be improved upon at this time.

3.5.5 Leading Indicators

- None applicable

3.5.6 Targets FY15

Scope 1 and 2 GHG emissions for the combined mining and processing operations, and associated activities, of 0.90 Mt of CO_2-e.

The Scope 1 and 2 GHG emissions from the existing mining and processing operations was 0.69Mt of CO_2-e. The favourable variance to target was mainly due to unplanned downtime of the processing operation.

3.5.7 Action plan FY15

Continue to identify and implement energy efficiency projects for the existing operation, using the information collected from completed energy mass balances and audits, particularly those identified opportunities that do not require capital expenditure.

Olympic Dam continued to identify and implement projects with an energy savings benefit in FY15. This was driven by a desire to reduce costs, and commitments to reduce GHG emissions as a part of BHP Billiton's public reduction targets. Opportunities, their status and estimated benefit are shown in Table 3.5-2. Projects are generally measured by GHG emission reduction as this is aligned with corporate targets.

Table 3.5-2: Summary of Energy Efficiency Projects in FY15

Opportunity	Outcome	Status	Estimated FY15 GHG reduction kt CO2-e/year (if implemented)
Electrowinning Current efficiency improvements	Less electricity wastage in Electrowinning Refinery to produce final copper product.	Implemented	6.3
Stabilisation of electorefinery operation and anode casting process and a change to the criteria for the rejection of anodes (feed to the electrorefinery)	Reduced Refinery scrap production and fewer rejected anodes which reduced the energy consumption (LPG) for the remelting of copper in either Smelter 1 or 2.	Implemented	1.2
Laundry dryer replacement	Replacement with a more efficient model leading to lower LPG use.	Implemented	0.1
Stabilisation of Electric Furnace operation	More stable operation (feed rate and properties) has led to a reduction of coke consumption per tonne of production	Implemented	4.4
Improve steam management and reduce steam demand	Better management of the auxiliary boiler that reduced unnecessary operation. Also a change in process conditions for leaching in the plant to run at a lower temperature, reducing the demand for steam. Both led to lower LPG use.	Implemented	4.8
Improve control of Electric Furnace temperature and revert feed control	Reduced electricity requirement to maintain furnace temperature	Implemented	9.3

Continue dialogue with future electricity suppliers, in particular emerging renewable energy companies.

During FY15, ODC has kept a watching brief on potential renewable power sources and storage options for Olympic Dam over the long term. This includes conducting meetings with potential suppliers of solar thermal power.

In the event that a new expansion development path is identified that includes a need for coastal desalination or the new airport, a means of supplying renewable power at the required scale will be further evaluated.

Continue to improve the energy and GHG emission measurement, data collection and forecasting.

Measurement and reporting of GHG by ODC continued in FY15 as per the National Greenhouse and Energy Reporting (NGER) methodology. Any changes to the NGER methodology were identified and incorporated in Olympic Dam procedures. Work was undertaken to simplify and align monthly internal reporting requirements with annual NGER reporting and clearly document procedures for meeting these obligations. A transparency review of the site energy and GHG forecasting model was conducted and improvements made, which included improvements to reflect the projects implemented in Table 3.5-2. Olympic Dam's NGER data was audited by KPMG with no issues being identified.

Establish an appropriate Scope 1 and 2 GHG emissions target for the combined mining and processing operations for FY16.

The Scope 1 and 2 GHG emissions target for the combined mining and processing operations for FY16 has been set at 0.90Mt of CO2-e.

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4 Generation of industrial wastes

4.1 Embankment stability of TSF

4.1.1 Environmental Outcome

No significant TSF embankment failure.

During FY15 the Tailings Storage Facilities (TSFs) were managed in accordance with the TRS Operations, Maintenance and Surveillance Manual (BHP Billiton, 2014b) and the Tailings Management Plan (BHP Billiton, 2014a) and no embankment failures of any magnitude occurred.

4.1.2 Compliance criteria

No significant radioactive contamination arising from uncontrolled loss of radioactive material to the natural environment. *Note: Significant is defined as requiring assessment and remedial action in accordance with the NEPM or EPP and the Mining Code. Measurement and monitoring is carried out in response to a specific event. (State 17ki, 17kii, 17kiv)*

No uncontrolled loss of radioactive material to the natural environment occurred during FY15. To manage the risk of embankment failure, the rate of rise was maintained below 2 m per annum and the supernatant pond area was maintained below the 71 ha target for the financial year. Piezometers located in critical sections of the TSF embankments show pore pressures within design expectations for all in service and non-operational cells.

4.1.3 Leading Indicators

Pore pressures within or adjacent to the TSF embankment which are greater than the pore pressures used in the slope stability assessment demonstrating compliance with ANCOLD guidelines.

No leading indicator trigger values were reached. Piezometers located around the TSF remain below hydrostatic levels and trends do not indicate this level will be breached.

Stability analysis results of studies undertaken in FY15 show the Factors of Safety for the critical sections of the TSF embankments comply with ANCOLD Guidelines. Geotechnical testing of the in-situ strength and liquefaction potential of the tailings was undertaken in FY15 to validate the strength parameters used in the stability analysis which improved the Factors of Safety under all loading conditions, providing additional TSF stability confidence.

4.1.4 Deliverables (WA 2.1)

The tailings stored at the TSF have a concentration over the 10 Bq/g exemption limit and also a total activity over the 10,000 Bq exemption limit for Radium, which defines it as a radioactive material under ARPANSA guidelines.

Monitoring of the TSF, including rate of rise of tailings, supernatant pond area, and pore pressure all contributes to management of the TSF to ensure no uncontrolled loss of radioactive material to the natural environment or significant embankment failure.

Monitoring data showing the rate of rise of tailings in each TSF cell.

At current processing rates, approximately 9 Mtpa of tailings, containing low levels of radioactivity are disposed of in the TSFs annually.

The rate of rise of tailings has been limited to 2 m per annum or less for all cells to ensure consolidation of tailings material. During the reporting period, tailings were distributed to TSF Cells 4 and 5 with an average rate of rise of the perimeter tailings beach of 0.80 m per annum with TSF4 and TSF5 at 0.7 m and 0.9m per annum respectively. The decrease in rate of rise, when compared to the FY14 rate of 1.407 m per annum, is due to reduced milling performance during FY15. The tailings beach at TSF5 has developed over the completed floor of the facility up to the perimeter of the central decant area.

Tailings delivery to TSF Cell 4 prior to 2003 was biased towards the internal east wall as the availability of this wall for tailings deposition was largely unaffected by wall-raising activities, resulting in a higher beach level when compared to the external wall. A plan was initiated in 2003 to address this issue and bias the tailings delivery to TSF Cell 4 external walls. Due to wall-raising activities limiting external wall perimeter availability in the first half of FY15 and reduced milling performance in the latter half progress was not achieved during the current reporting period with a 1.03 m difference in tailings elevation between the east wall and other walls which equates to a 0.80 m increase on the previous reporting period.

No significant impacts have resulted from the difference in height between the internal east wall and external walls of TSF Cell 4. This issue will continue to be addressed by the program of reduced deposition to the east wall, gradually bringing it in line with other walls.

The elevation of tailings in the cells is illustrated in

Figure 4.1-1. The rate of rise in TSF Cells 4 and 5 were all less than or equal to the target of 2 m per annum. The rates of rise for TSF Cells 4 and 5 were 0.7 and 0.9m per annum respectively.

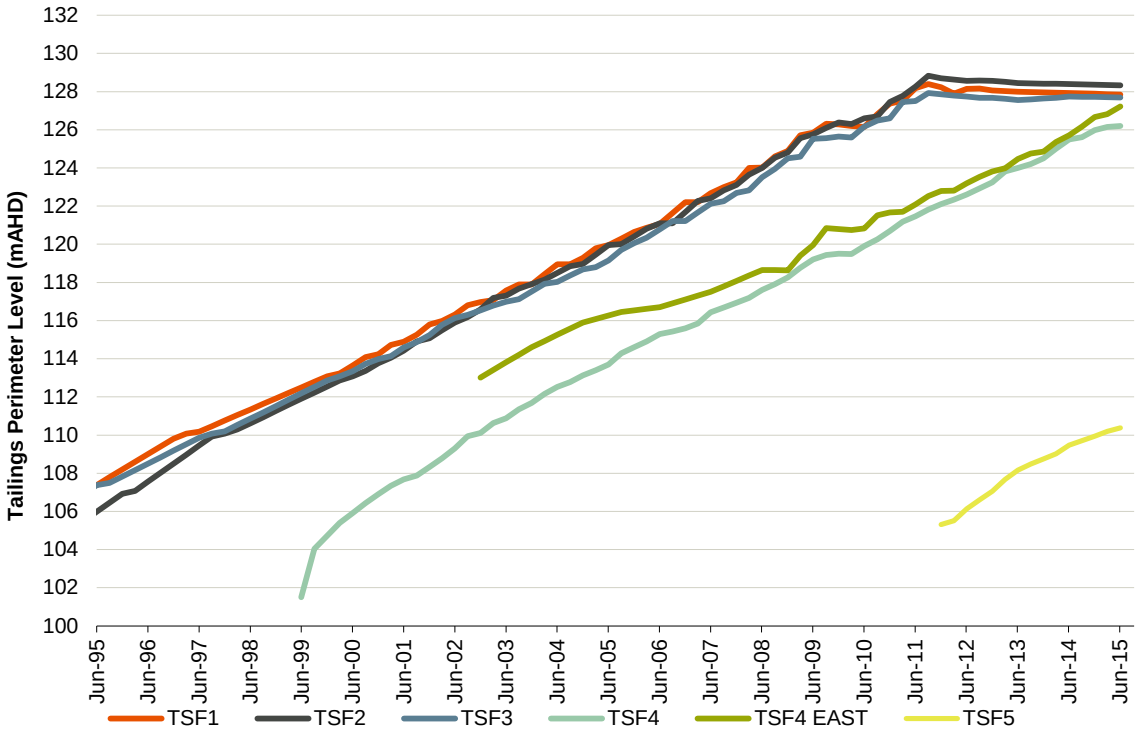

Figure 4.1-1: TSF rate of tailings rise

Monitoring data showing the size of the supernatant liquor ponds in each TSF cell on a monthly basis (EPA 31543.500-433).

Large supernatant liquor ponds have the potential to impact upon embankment stability by increasing the phreatic surface within the tailings and embankments, which in turn can lower the strength of the tailings and embankment materials. The TSF pond areas during FY15 are shown in Figure 4.1-2. Pond areas remained reasonably steady throughout the reporting period.

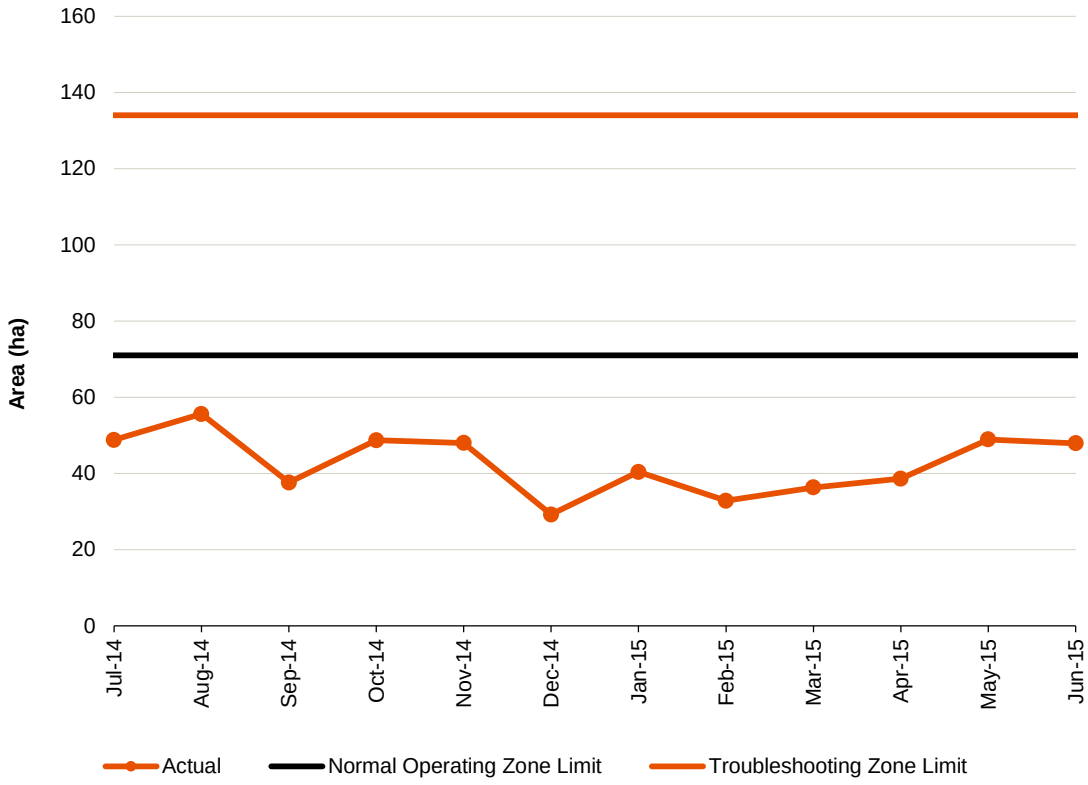

Figure 4.1-2: TSF Pond areas (ha) for FY15

Monitoring data showing the pore pressures within tailings adjacent to the external walls of the TSF.

Piezometers are monitored on a regular basis to assess the pore pressures within the tailings adjacent to the embankments of the TSFs. Monitoring of piezometers is carried out on a monthly basis or more frequently as required. Piezometers used include standpipe and vibrating wire piezometers. Additional or replacement piezometers are installed as required. In FY15, several new arrays of vibrating wire piezometers and standpipes were installed throughout the TSFs (Figure 4.1-3) to validate previously identified and new critical sections of the embankment. These sections were analysed for stability using in-situ strength of tailings and piezometer data collected during FY15 including the East Wall of Cells 1-3 and the North, South and West Wall of Cell 4. It is expected that new piezometric arrays installed in and adjacent to the embankments of the TSFs will improve the accuracy of phreatic surface estimates.

ANCOLD provides minimum Factors of Safety (FoS) for different loading conditions. Results of the stability analysis undertaken in FY15 show that the critical sections meet or exceed the minimum levels recommended by ANCOLD (Table 4.1-1). Geotechnical testing of the in-situ strength and liquefaction potential of the tailings was undertaken in FY15 to validate conservative strength parameters used in the stability analysis which improved the Factors of Safety under all loading conditions providing additional TSF stability confidence

Table 4.1-1: Stability Analysis Results

Wall Section	Long Term Drained FoS (min)	Short Term Undrained FoS (min)	Post-Seismic FoS (min)
Cell 1 East Wall	1.8 (1.5)	1.9 (1.5)	1.4 (1.0)
Cell 2 East Wall	1.8 (1.5)	1.7 (1.5)	1.5 (1.0)
Cell 3 East Wall	1.8 (1.5)	1.8 (1.5)	1.5 (1.0)
Cell 4 West Wall	1.6 (1.5)	1.7 (1.5)	1.3 (1.0)
Cell 4 North Wall	1.6 (1.5)	1.9 (1.5)	1.2 (1.0)

Piezometers located in the East Wall of Cells 1-3 generally show a gradual pressure drop consistent with no further addition of tailings. Piezometers installed in the tailings and upper embankment of Cell 4 West Wall show a gradual upward trend which is as expected as tailings continue to be added in this cell. Piezometers located on the North Wall Cell 4 show a minor decrease in pressure since the installation of a permanent geotextile filter blanket and liquor interception system on the eastern side of the north ramp. As tailings continue to be deposited in this area it is anticipated that pressures will remain steady within the expected range. Piezometer data for the critical sections is presented in Figure 4.1-4 to Figure 4.1-7.

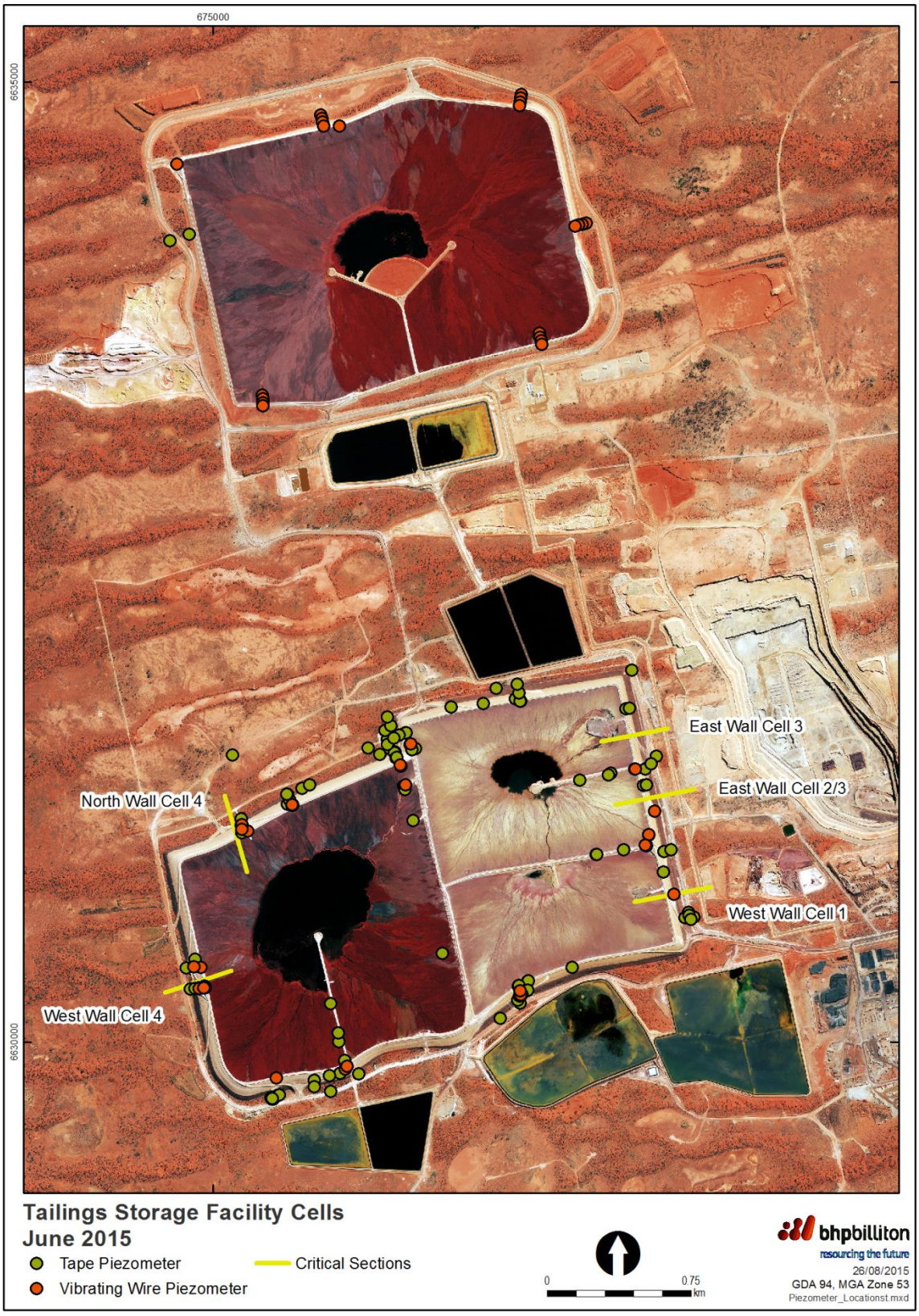

Figure 4.1-3: Piezometer Locations at critical sections of TSF Cells.

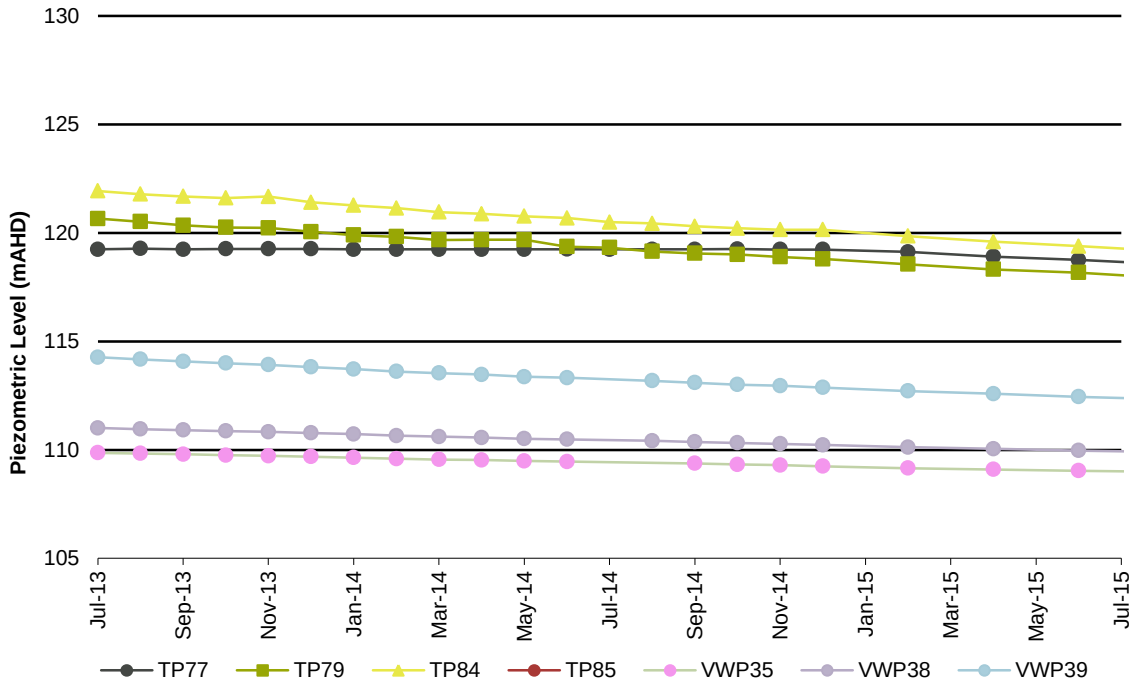

Figure 4.1-4: TSF Cell 1/2 East Hydrograph

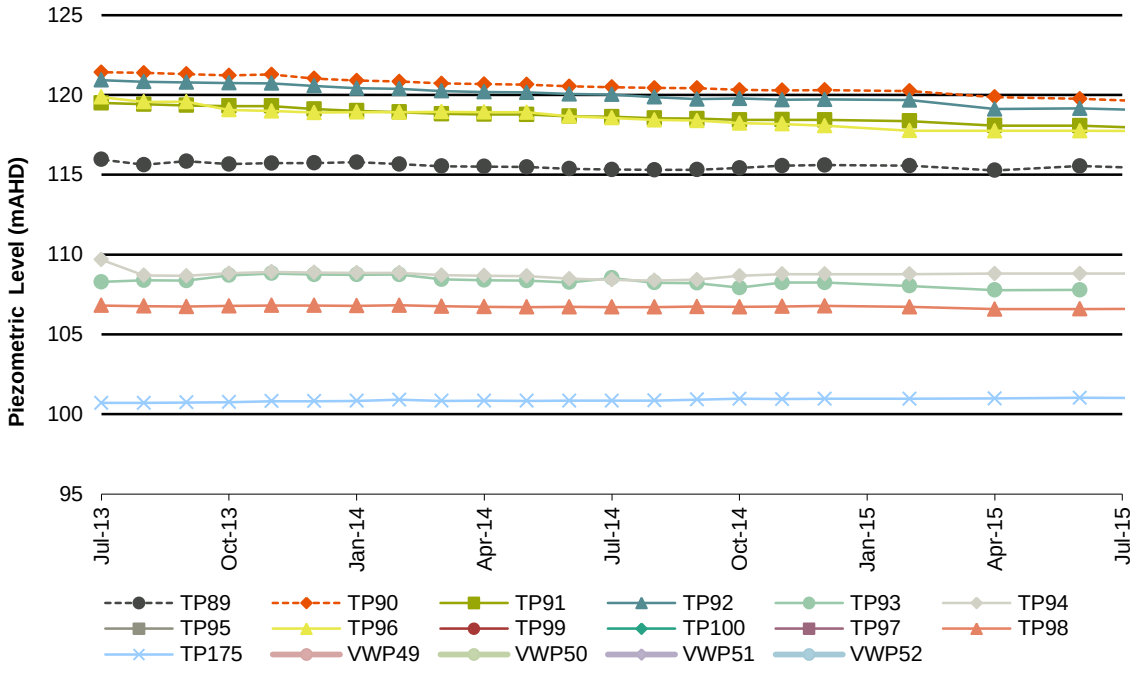

Figure 4.1-5: TSF Cell 2/3 East Hydrograph

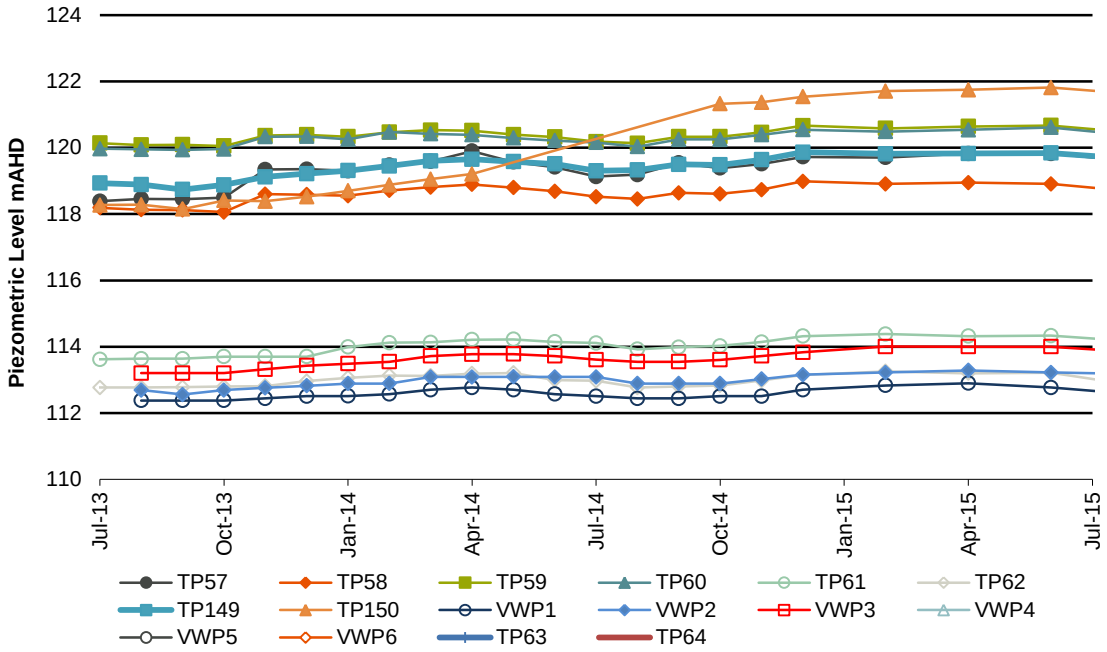

Figure 4.1-6: TSF Cell 4 West Hydrograph

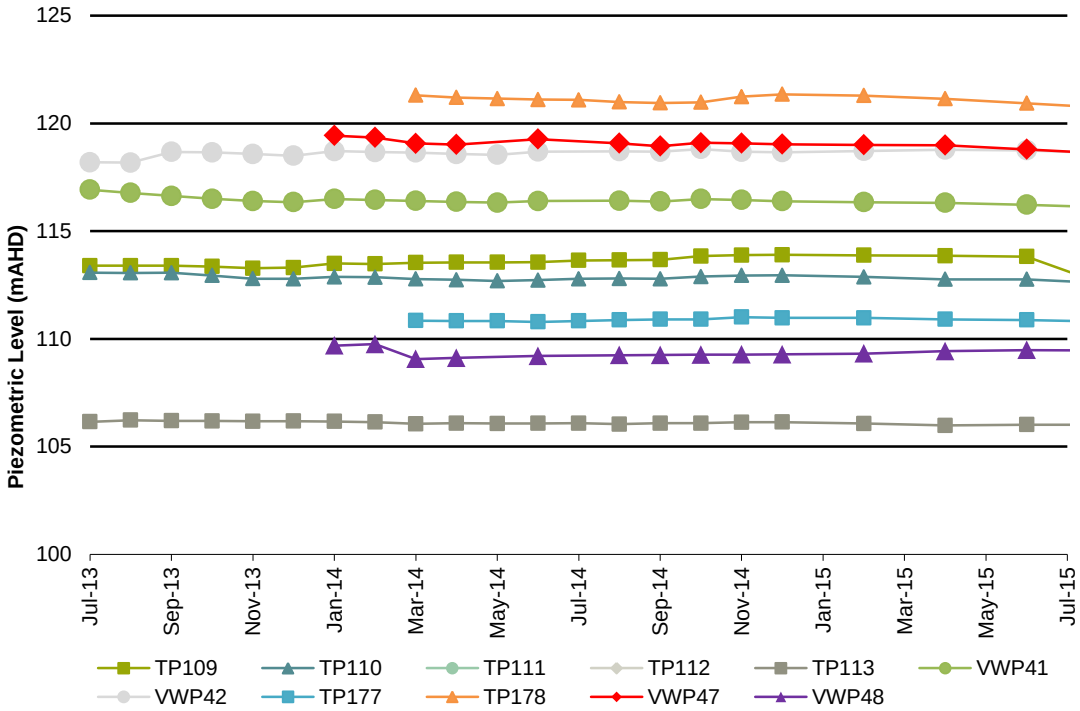

Figure 4.1-7: TSF Cell 4 North Hydrograph

During FY15 an independent operational audit and management review of the TRS was completed by Coffey and covered the period July 2013-June 2014. The audit was carried out in accordance with BHP Billiton TSF Management and ANCOLD Guidelines. The annual audit confirmed that the Tailings Retention System, including the Tailings Storage Facilities and Evaporation Ponds, are in good condition and are well managed.

4.1.5 Targets FY15

Rate of rise of tailings at an average of 2m per annum or less.

The average rate of rise of tailings for FY15 was less than the target at 0.8 m per annum.

TSF ponds to be maintained greater than 100m from the dam wall crest.

Critical operating parameters allow for an average pond area of 71 ha during normal operation. A minimum 100m of beach (between the pond and the TSF wall) was recommended and has been adopted from a seismic stability assessment undertaken by an external consultant in 2008.

During FY15 the combined supernatant liquor pond area averaged below 44 ha. Pond areas remained reasonably steady throughout the reporting period. The total TSF pond areas for each month of FY15 are shown in Figure 4.1-2.

4.1.6 Action plan FY15

Monitor the initial operation of TSF Cell 5 East including the vibrating wire piezometers.

Final commissioning of TSF Cell 5 is progressing as planned. Commissioning will be complete once tailings are beached over the underdrainage collection system, which is expected to be in the next 12 months. The wall raise of TSF5 commenced in Q4 FY13 with a 1 m raise of the south eastern wall. The Vibrating Wire Piezometers (VWP's) installed during the construction of TSF5 are showing gradually lower pressures from the centre of the TSF moving out to the outer embankment, as shown in Figure 4.1-8. An investigation to analyse the results so far against expected is planned for FY16. An additional 2 VWP's and 2 Tape Piezometers (TP's) have been installed in FY15 at TSF Cell 5 to monitor areas identified to have adversely changed.

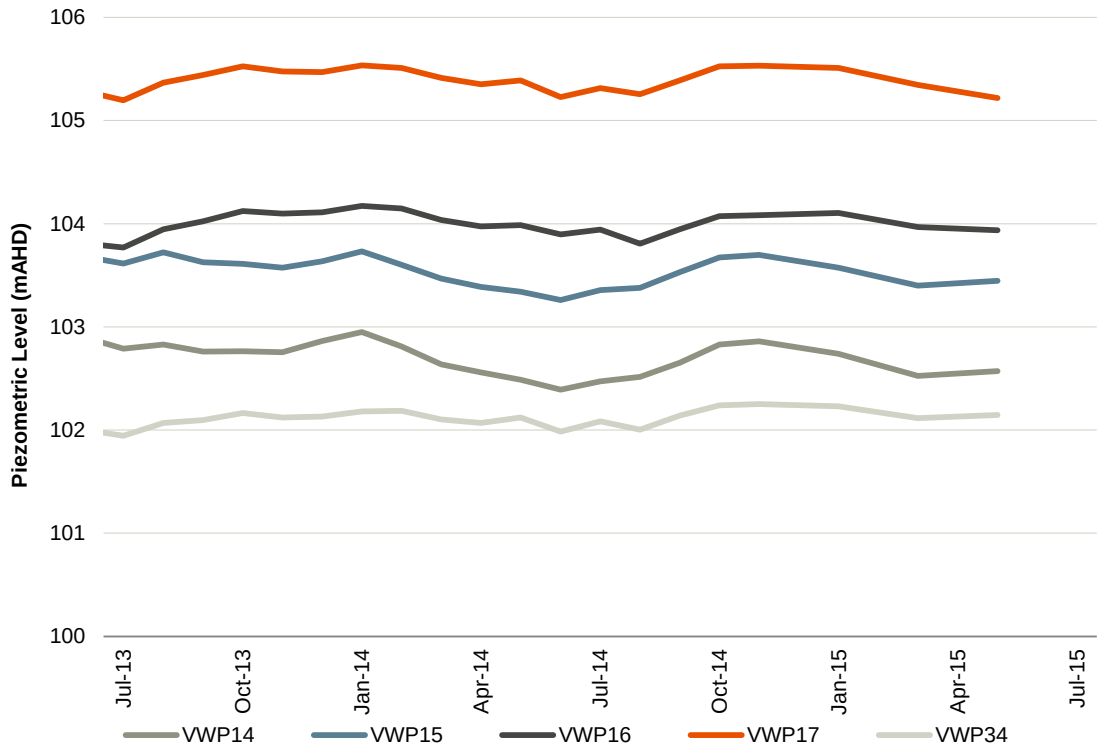

Figure 4.1-8: Vibrating Wire Piezometer results

4.2 Tailings seepage

4.2.1 Environmental Outcome

No significant adverse impact on vegetation as a result of seepage from the TSF (State 32).

No significant adverse impact to vegetation as a result of seepage from the TSF has occurred. Eighty metres AHD (20 m below ground level) is considered as the level below which groundwater cannot interact with the root zone of plants in the Olympic Dam region. Groundwater levels in the vicinity of the TSF remain below 80 mAHD.

No compromise of current and future land uses on the Special Mining Lease (SML) or adjoining areas as a result of seepage from the TSF (State 32).

No compromise of current and future land uses on the SML or adjoining areas has occurred. Groundwater levels in the vicinity of the TSF remain below 80 mAHD and sampling indicates that seepage is being attenuated. Seepage modelling presenting in the expansion EIS remains valid.

No compromise of the environmental values of groundwater outside the SML as a result of seepage from the TSF.

No compromise of the environmental values of groundwater outside the SML has occurred. Sampling indicates that seepage is being attenuated within the SML, and groundwater levels of bores along the SML are consistent with other regional bores. Seepage modelling presenting in the expansion EIS remains valid.

4.2.2 Compliance criteria

Maintain groundwater level outside the external perimeter road of TSF Cells 1 to 5 to not higher than 80 mAHD (20 m below ground level) (State 32).

Groundwater monitoring results indicate that the groundwater level has not reached a level higher than 80mAHD beneath TSF Cells (refer Figure 8 in Section 1.3). The maximum groundwater level recorded below the TSF for the current reporting period was 62.71 mAHD at LT50 in August 2014.

All TSF seepage attenuated within the SML, as demonstrated by a numerical geochemical model confirmed by monitoring (State 32).

Geochemical modelling carried out for the Expansion EIS (BHP Billiton, 2009) demonstrated that all TSF seepage would be attenuated within the SML. There has been no formal change to the major components incorporated into that model, including the location and size of the TSF.

Laboratory analysis of on-site and regional groundwater monitoring bores confirms the attenuation of TSF seepage within the SML. Samples from regional monitoring bores contained analytical concentrations either below limits of reporting, or within concentrations previously reported (see Chapter 1.3- *Aquifer level drawdown)*.

Groundwater levels of bores on the SML boundary are consistent with other regional bores. This seepage attenuation is demonstrated in Figure 1.3-11I n Chapter 1.3- *Aquifer level drawdown*, which shows water levels (AHD) from the perimeter of the TRS decreasing with distance from the TRS towards the SML boundary, to the same level as other regional bores.

Based on their being no change to the major project components incorporated into the EIS modelling, and the analysis of site groundwater monitoring, the results of the modelling presented in the EIS remain valid.

4.2.3 Deliverables (WA 2.1)

A review of the water balance on an annual basis (EPA 31543.500-435).

The water balance for TSF Cells 4 and 5 indicates that the calculated evaporation factor to dispose of unaccounted liquor is 47 % of the Class A pan evaporation rate. Results indicate that during the FY15 reporting period, the TSF had the capacity to dispose of excess liquor by evaporation. It is noted that the unaccounted liquor also included seepage from beach areas.

Unaccounted liquor includes input liquor shown in Figure 4.2-1 (tailings liquor, rainfall, flushing liquor, and the decrease in supernatant pond inventory) minus liquor retained in tailings (moisture content assumed of 30 % by weight), liquor decanted to evaporation ponds, and estimated seepage from (supernatant liquor) ponds. Note: flushing liquor is liquor pumped out of the evaporation ponds to the TSF for the purpose of flushing lines and to enhance evaporation.

The total output liquor volume is equal to input liquor volume and is shown in Figure 4.2-2**.** Seepage from pond areas has been calculated based on the average supernatant pond areas for TSF Cells 1 – 5 (43.2 ha) and

assumed tailings permeability ($2x10^{-8}$ m/s). Liquor retained in tailings was assumed to be 30 % of the weight of tailings solids deposited. This was based on previous testing of in-situ tailings.

The water balance shows 8 % of liquor input due to rainfall in FY15 compared to 6% in the previous reporting period. Rainfall measured for FY15 was 132.8 mm compared to the 108.6 mm last reporting period and a median rainfall of 134.2 mm.

A discussion on groundwater levels in the vicinity of the TSF in FY15 is provided in Chapter 1.3- *Aquifer level drawdown*

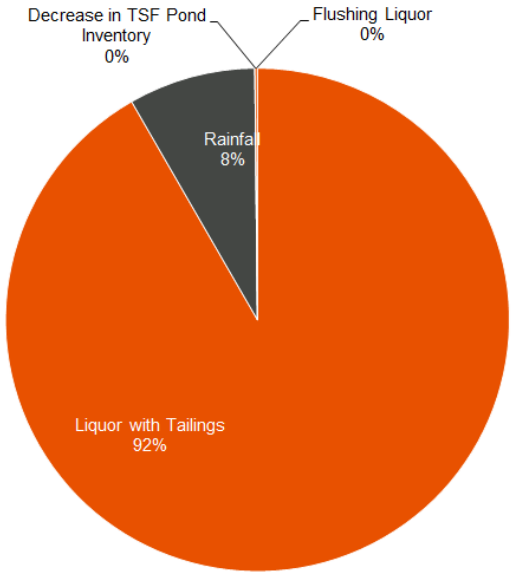

Figure 4.2-1: TSF Cells 4 & 5 Liquor Balance – Inputs, FY15

Note: Liquor Inputs [Total 8446 ML]

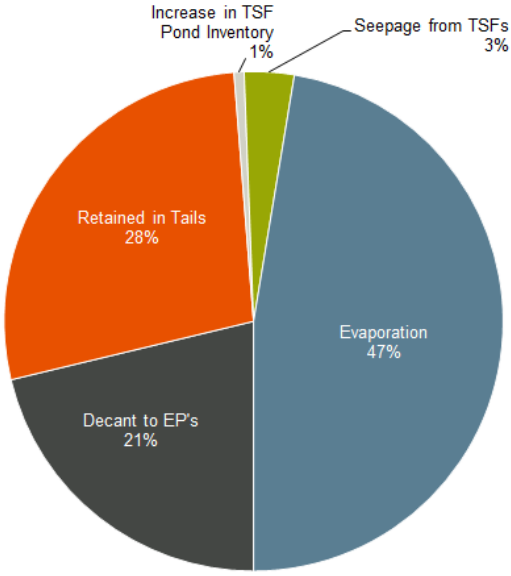

Figure 4.2-2: TSF Cells 4 & 5 Liquor Balance – Outputs, FY15

Note: Liquor Outputs [Total 8446 ML]

4.2.4 Deliverables (WA 2.2)

Monitoring data showing the liquor level in each cell of the Evaporation Ponds.

Figure 4.2-3 shows the liquor levels in the evaporation ponds with respect to freeboard limits. Freeboard in the Evaporation Ponds (EPs) consists of allowances for wind, waves and rainfall runoff.

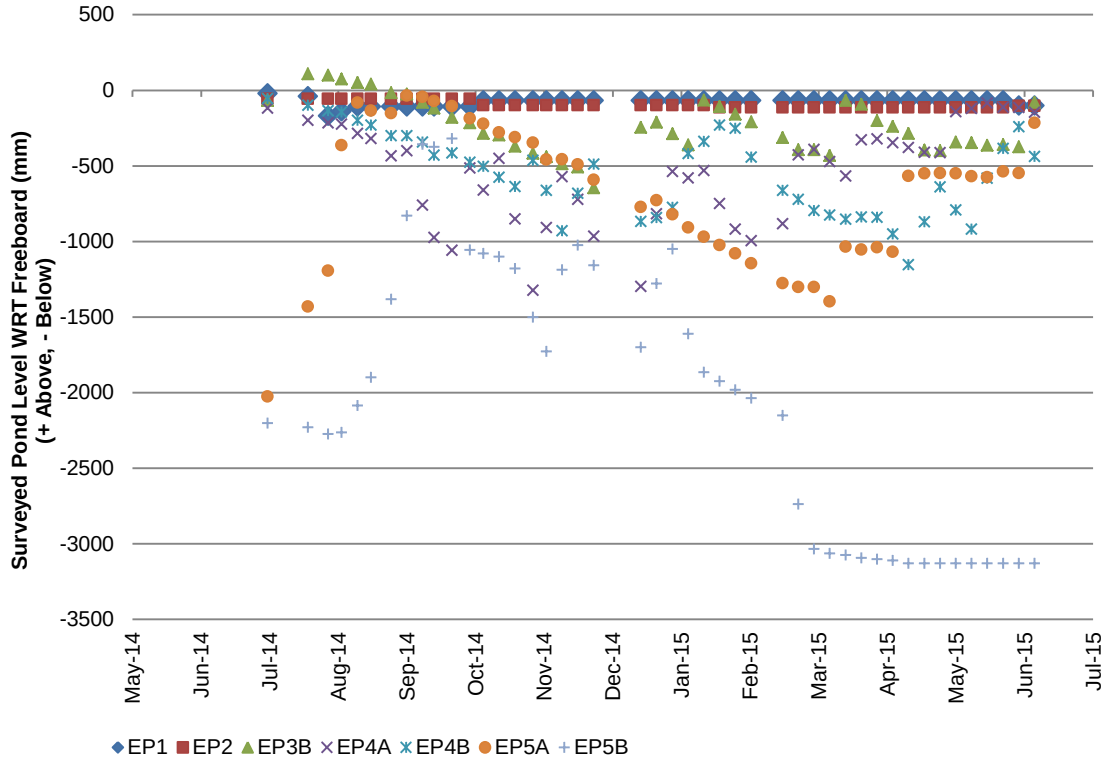

Figure 4.2-3: Evaporation Pond Liquor Levels

Monitoring data showing the overall (solids and liquor) inventory in the EPs.

Figure 4.2-4 shows the evaporation pond capacity in relation to the normal maximum operational storage capacity. Additional pond capacity is available as a contingency to allow for extreme rainfall events and waves.

Reported liquor inventory in the evaporation ponds as a proportion of storage capacity was 111% of the Normal Maximum Operational Level (NMOL) at June 2015 due to reduced EP Capacity resulting from EP5B placed out of service in March of the reporting period.

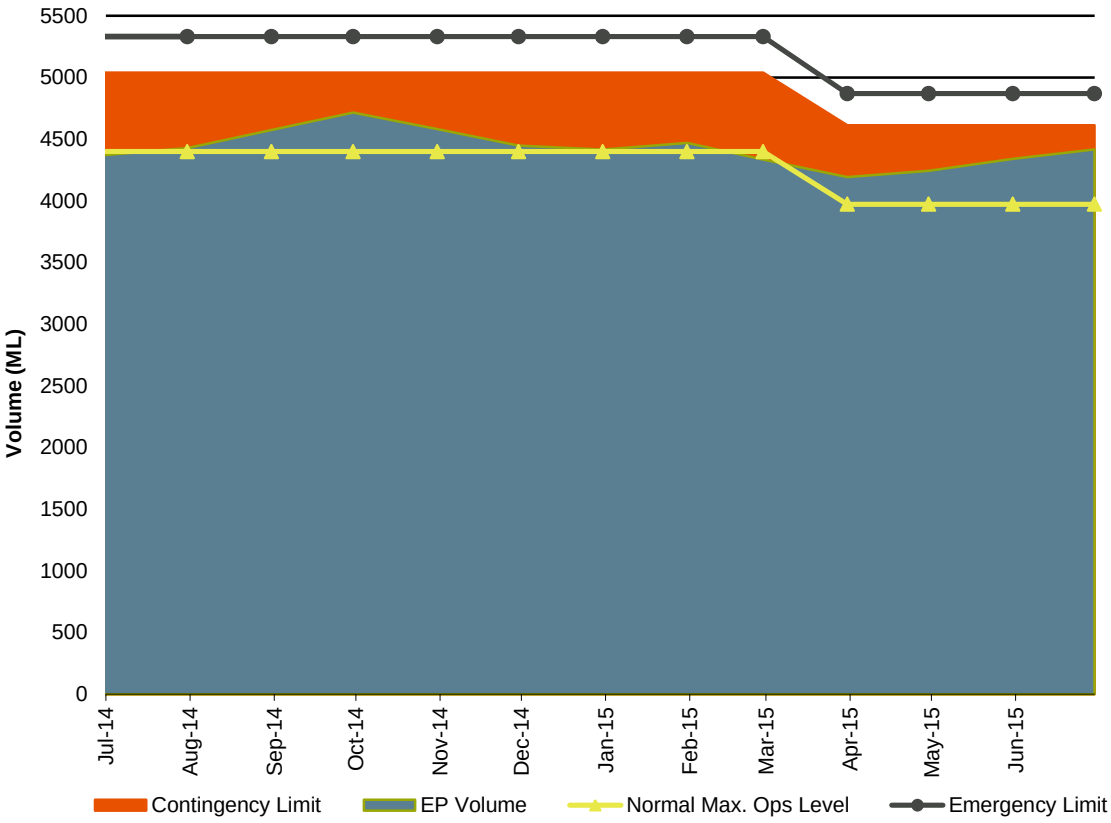

Figure 4.2-4: Evaporation Pond Capacity

Results of a liquor balance for each EP cell.

Figure 4.2-5 shows the cumulative evaporation trends for all Evaporation Ponds. The upper and lower bounds have been calculated using the average evaporation rate from all operational cells and applying an estimated error or variation (plus or minus) to the average value.

A liquor balance is performed to highlight cells with potential significant leaks by comparison of the apparent evaporation from each cell of each EP. The comparison is carried out on a monthly basis. The evaporation response for each cell is consistent, demonstrating that unexplained losses have not occurred. Groundwater levels beneath the ponds remain within expectations.

Evaporation cells occasionally ‘dry out’ when all free liquor is evaporated, exposing the surface of the solids sludge built up in the cell. During these periods a liquor level is not able to be measured and therefore the cumulative evaporation trends level out and the water balance method is no longer effective in confirming cell integrity. However, as the cell is ‘dry’ there is minimal, if any, free liquor available and therefore very little potential for significant seepage from the ‘dry’ cells.

EP3A was out of service for the entirety of the reporting period due to a high level of precipitated solids. EP5B was placed out of service in March of the reporting period for minor repairs and is expected to be placed back in service in FY16.

Groundwater level data collected in and around the ponds is used as an additional control to detect seepage from the Evaporation Ponds (discussed in more detail in Chapter 1.3- *Aquifer level drawdown*) and to support the liquor balance calculations.

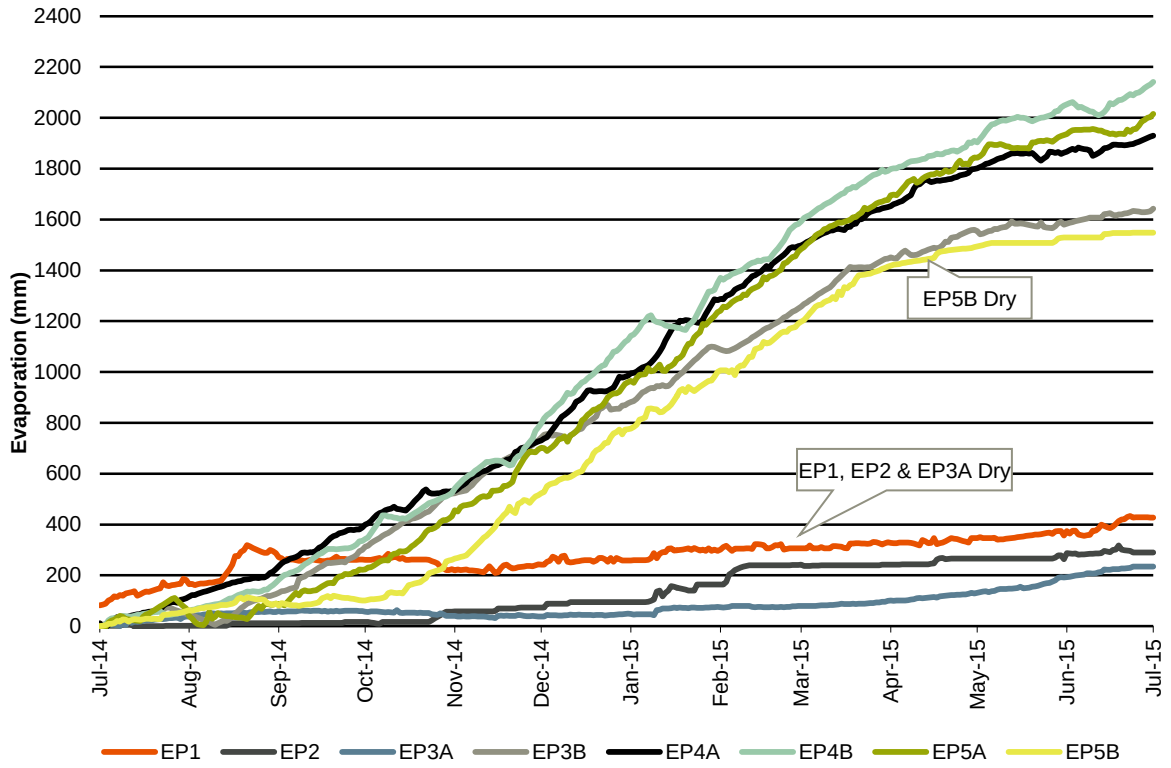

Figure 4.2-5: All EP Liquor Balance – cumulative apparent evaporation

Monitoring data showing the minimum pond depth for operational EPs.

Chapter 4.3 - Fauna interaction with Tailings Retention System, Table 1, shows ponds meeting the target minimum 250 mm liquor depth during FY15 on all operational EPs.

4.2.5 Leading Indicators

An increasing trend in the groundwater level outside the external perimeter road of the TSF that indicates 80 mAHD (20m below ground level) may be exceed within 12 months.

A numerical geochemical model trend that indicated that all TSF seepage may not be attenuate within the SML should the trend continue

No leading indicator criteria were triggered. Groundwater trends around the perimeter of the TSF remain well below 80 mAHD, and expansion EIS modelling of seepage impacts from the TSF remain valid.

4.2.6 Targets FY15

- None applicable

4.2.7 Action plan FY15

Identify and install additional liquor interception systems as required.

Construction of a permanent, more extensive geotextile filter blanket and liquor interception system on the eastern side of the north ramp of TSF Cell 4 (referred to as Location 18) was completed in December 2014.

A geotextile filter blanket has been ordered, and is planned for installation during FY16 for Locations 17 and 19. A new seepage location has been identified during the reporting period on the West Wall of Cell 5 adjacent to the embankment toe, no remedial works are currently required, regular monitoring will continue in FY16.

A summary of new and previously identified locations of interest is shown in Table 4.2-1 with locations show in Figure 4.2-6.

Table 4.2-1: List of perimeter features

Location Number	Location	Discovery Date	Summary of Status
1	East wall of TSF Cell 1 at the toe	2008	Interception drain, sump and pump to return seepage to the TSF. Mostly dry, seepage appears to be slowly extending north. installed. There has been a decrease in the average daily flow rate from 8.0 to 7.7m^3/day over the reporting period.
2	East wall of TSF Cell 1 at the toe and pipe corridor	2008	Liquor intercepted in trench, no change in dampness from previous reporting period. There has been a decrease in the average daily flow rate from 6.3 to 5.7m^3/day over the reporting period.
3	South wall of TSF Cell 1 on the embankment face	Feb 2008	Filter Blanket installed over area. Some evidence of a few damp areas around the blanket, however there are no signs of liquor. No change from previous reporting period.
4	Adjacent to the south wall of TSF Cell 4	2006	Slightly damp, no change from previous reporting period
5	Southwest Corner of TSF Cell 4 on the embankment face	2008	Slightly drier over reporting period
6A and 6B	West wall of TSF Cell 4 on the embankment face	2008	Slightly damp, no change from previous reporting period
7	Intersection of TSF Cell 3 and TSF Cell 4 at toe	Apr 2008	Beneath Cell 3-4 buttress, no change from previous reporting period. Flows into sump have been gradually increasing since 2013
8	Intersection of TSF Cell 3 and TSF Cell 4 on embankment face	Apr 2008	Beneath Cell 3-4 buttress, no change from previous reporting period. Flows into sump have been gradually increasing since 2013
9	Toe of the west wall of TSF Cell 3	Apr 2008	Beneath Cell 3-4 Buttress, no change from previous reporting period. Flows into sump have been gradually increasing since 2013
10	West wall of TSF Cell 4 on the embankment face	2008	Dry, no change from reporting period
11	South wall of TSF Cell 4 adjacent to the toe of the dune – east of decant pipe	2008	Slightly damp, no change from previous reporting period
12	Cell 2 crest of starter embankment	2009	Slightly damp, no change from previous reporting period
13, 13A and 13B	Cell 1 crest of starter embankment and at toe	2009	Liquor interception trench installed at Location 13A&B. Seepage extending slightly north of 13B beyond the filter blanket.
14	West wall of TSF Cell 4 at the embankment toe	2009	Dry, no significant change from previous reporting period
15	South wall of TSF Cell 4 (East of Location 11)	Jul 2010	Dry.
16	Northeast corner of Cell 3 (North of Location 12)	Dec 2010	Dry
17	East Wall of Cell 2 at the embankment toe (north of Location 13B)	Feb 2012	Moisture increasing over reporting period. Seepage continues to expand with tailings salts and free seepage liquor. Regular monitoring and installation of a filter blanket planned in FY16.
18	Eastern side of the north ramp of Cell 4	Nov 2012	Area covered by filter blanket with seepage collected and drained to a sump via a buried pipeline
19	East Wall of Cell 2 at the embankment toe (midway between of Location 12 & 17)	Dec 2013	Moisture increasing over reporting period. Seepage continues to expand with tailings salts and free seepage liquor. Regular monitoring and installation of a filter blanket planned in FY16.

Figure 4.2-6: Location of perimeter features

4.3 Fauna interaction with Tailings Retention System

4.3.1 Environmental Outcome

No significant adverse impacts to listed species (South Australian, Commonwealth) as a result of interactions with the Olympic Dam TRS.

No significant adverse impacts to listed species as a result of interactions with the Olympic Dam Tailings Retention System (TRS) have occurred.

No species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and low numbers of one species listed under the *National Parks and Wildlife Act 1972* (NPW Act), were observed interacting with the TRS during FY15.

Therefore it is concluded that there were no significant adverse impacts to South Australian or Commonwealth listed species as a result of interactions with the TRS.

4.3.2 Compliance criteria

No significant adverse impact on the size of an important population of Category 1a and 1b fauna species as a result of interactions with the Olympic Dam TRS. *Note: Significant impact is as defined in the Significant Impact Guidelines and greater than predicted in the EIS.* (FA 2.7)

No species listed under the EPBC Act were observed within the TRS during FY15.

One dead and two alive Intermediate Egrets (*Ardea intermedia*), listed as Rare under the NPW Act, were observed within the TRS during FY15.

These represent low numbers of recorded individuals for the species.

4.3.3 Deliverables (FA 2.7)

An assessment of fauna activity and losses within the TRS.

A quantitative assessment of the numbers of waterfowl using local non-toxic water bodies and the TRS

An evaluation of the effectiveness of control measures and targets in reducing the number of listed migratory birds lost within the TRS. (State 17f, 17ki)

Fauna Activity within the TRS

During FY15, 33 different bird species and four other animal species were observed during the weekly monitoring of the TRS. A total of 212 live birds were observed throughout the year and 86 dead birds were observed, while one live non-avian fauna and five dead non-avian fauna were observed (Figure 4.3-1 and Figure 4.3-2).

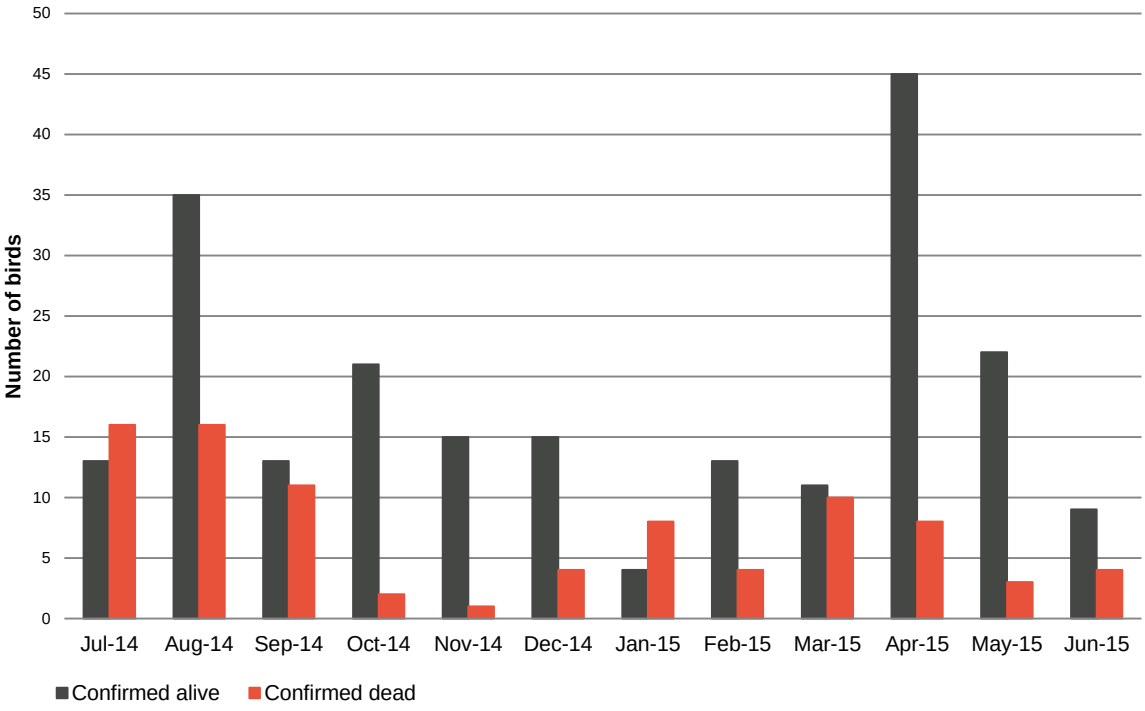

Figure 4.3-1: Monthly summary of weekly monitoring for FY15, showing total number of birds recorded within the TRS

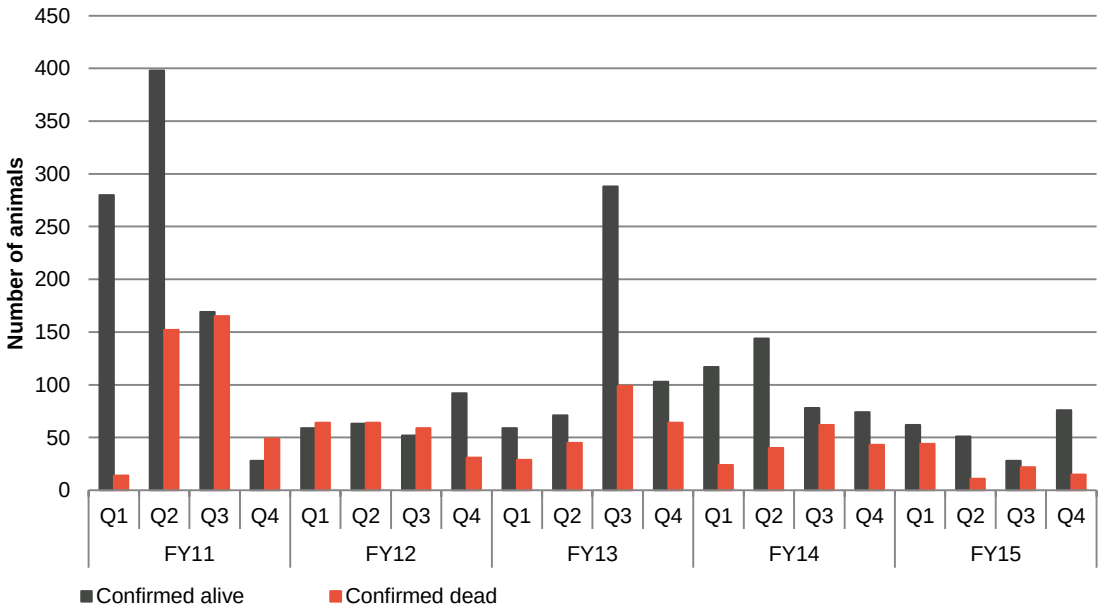

Figure 4.3-2: Quarterly summary of all weekly monitoring, showing total number of animals recorded within the TRS.

All fauna observed opportunistically (i.e. outside formal monitoring sessions) during FY15 are summarised in Figure 4.3-3. Opportunistic observations bias towards live animals, especially large flocks, hence more live animals than dead animals are usually observed.

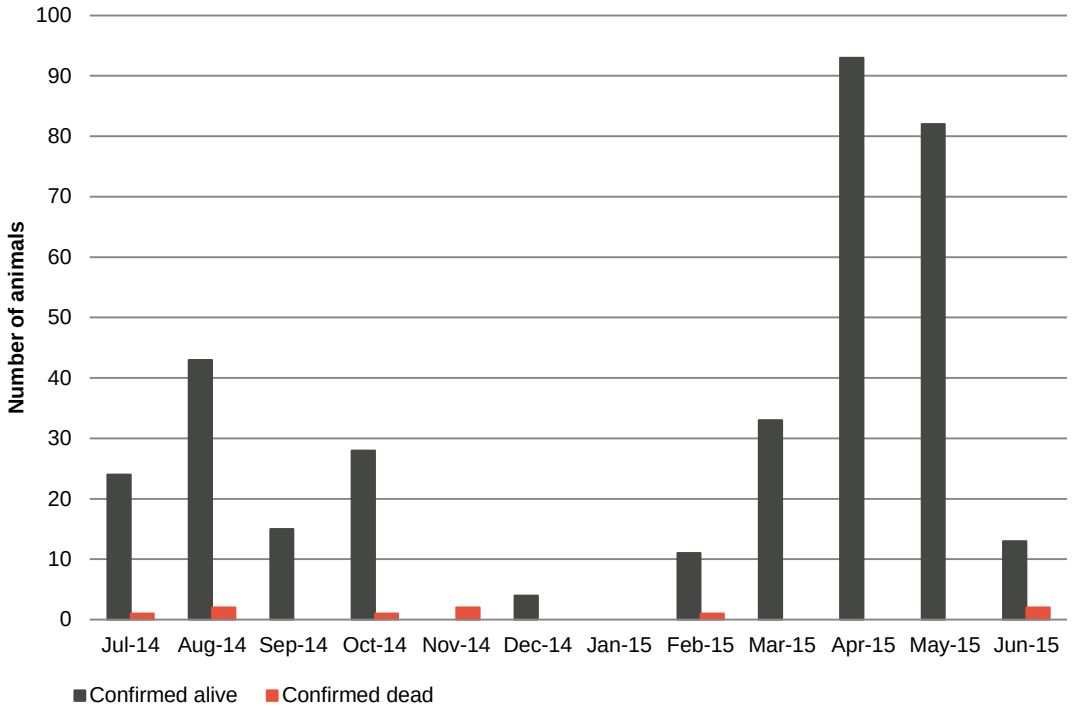

Figure 4.3-3: Monthly summary of opportunistic observations for FY15, showing total number of animals recorded within the TRS

The data presented indicates the number of fauna counted and does not represent total numbers. They are presented as an index only. A number of factors must be considered when interpreting and refining our monitoring and data analyses:

- Birds may be seen and recorded as alive on one day and subsequently may be observed as dead. The total includes both observations, leading to a possible overestimate;
- Scavenging by birds of prey and corvids means that some carcasses may be removed from the system prior to an observation being made;
- Carcasses floating in the liquor may sink and disappear before being recorded; and,
- Some fauna species may leave the system and die elsewhere.

The number of birds recorded dead at the TRS represent a small proportion of those that visited. Preventing and deterring visitations by large flocks of birds, particularly Banded Stilts, remains a focus of management efforts at the TRS.

In addition to weekly monitoring at the TRS, monthly monitoring of surrounding waterbodies and the TRS detected large numbers of birds at local non-toxic waterbodies relative to the TRS (Figure 4.3-4). This result suggests that far greater numbers of birds prefer to utilise non-toxic waterbodies in the local area instead of the TRS.

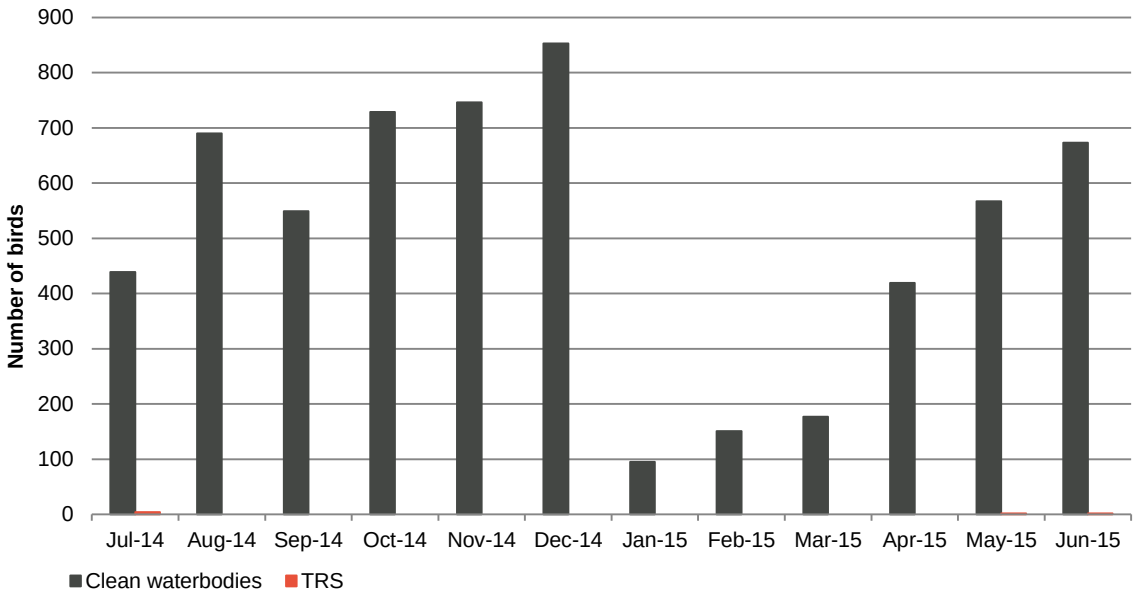

Figure 4.3-4: Monthly summary of number of water birds recorded at local non-toxic water bodies in comparison to TRS during FY15. (note: Observed TRS bird numbers for several months were very low (<5) and may not be visible at the scale of this graph)

An increase in the usage and associated deaths of fauna at the TRS was noted during 2004. This increase was reflected in much higher water bird numbers in regional clean water bodies and is thought to be largely due to increased bird traffic associated with seasonal flooding of the Lake Eyre Basin. A public disclosure about this matter was made by BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) in January 2005. The increase in observed fauna interactions prompted the commencement of a research project aimed at investigating risks to fauna resulting from interaction with the TRS. This project commenced in July 2004 and continued throughout the FY15 reporting period.

In FY15 bird deterrent control measures within the TRS included gas guns and rotating randomly activating spotlights which are distributed across the evaporation ponds and cells of the TRS. In addition, the trial of suspended overhead lines as a deterrent was conducted at an offsite facility to determine effectiveness. The trial concluded that lines spaced at 5m intervals and running parallel across the water body are effective at reducing the presence of waterfowl by 99.2%. Nylon builders line was installed over evaporation ponds to test for its durability, further products will be tested in FY16.

Literature suggests (Gorenzal and Salmon 2008, VRCRAC 2012, Tracey et al. 2007) that effective deterrent systems require a variety of methods to be successful, whether in combination or in rotation, as well as frequently changing the type, timing, and location of the equipment (Gorenzal and Salmon 2008, Tracey et al. 2007). However, gas-gun and light deterrent systems may have value for deterring non-resident bird species (i.e. migratory species and vagrants) from the TRS. The results of our weekly TRS fauna monitoring show that a large number of the bird fatalities resulting from interactions with the TRS are in fact nomadic or vagrant species. It is considered likely that a targeted (non-random) deterrent would be an even more effective method for deterring migratory and nomadic species from landing within the TRS than the existing methods (i.e. stationary gas-guns and lights). As mentioned above a deterrent system is currently being developed and trialled for use within the ODC TRS, however, until this system has been deemed effective and is in place, it is proposed to continue the use of the current deterrent systems (gas-guns and light deterrents).

4.3.4 Leading Indicators

- None applicable

4.3.5 Targets FY15

The total TSF environmental pond area target of 35 ha **or less is an aspiration target that is generally only obtainable during periods of average rainfall and under normal plant operating conditions. The area of the supernatant pond may exceed the environmental target following an accumulation of significant rainfall events and/or during significant disruptions to normal plant operations.**

During FY15 the total TSF supernatant pond area averaged 43.2 ha, 8.2 ha above the environmental target. Significant disruptions to normal operations in FY15 and inclement weather, with January, April and May 2015 receiving higher rainfall than average, has contributed to an increased TSF supernatant pond area during the reporting period. It is anticipated that the supernatant liquor pond will be returned to within target by the end of the first full summer and autumn (high evaporation period) following high rainfall last summer.

A minimum liquor depth on operating TRS evaporation ponds of 250 mm. ***Note: Operating ponds are those in normal operational use and excludes ponds that are out of service, ponds being dried for maintenance, embankment raising or other purposes, and ponds required for temporary management of excess liquids as a result of rain.***

The target for minimum liquor depth of the TRS evaporation ponds is 250mm. This depth is considered to reduce the evaporation ponds' resemblance to the natural preferred habitat of wading birds, and therefore reduce the amount of suitable 'habitat' available. Pond depth was measured monthly since February 2013, and the results were recorded as a 'Yes' if compliant with the minimum depth requirement, 'No' if non-compliant, and 'O/O/S' if the pond was out of service (Table 4.3-1). The target was met for each month that liquor depth was recorded.

Table 4.3-1: Compliance of evaporation ponds to minimum pond depth

Date	EP1	EP2	EP3A	EP3B	EP4A	EP4B	EP5A	EP5B
Jul-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Aug-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Sep-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Oct-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Nov-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Dec-13	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Jan-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Feb-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Mar-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	Yes
Apr-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	O/O/S
May-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	O/O/S
Jun-14	O/O/S	O/O/S	O/O/S	Yes	Yes	Yes	Yes	O/O/S

Notes: O/O/S = Out of Service, Yes = meeting target of minimum 250mm liquor depth, No = non-compliant

4.3.6 Action plan FY15

Continue the design and development of the on-demand SoundID deterrent system for testing at local waterbodies and the TRS.

The design and development of the SoundID technology was completed and deemed not suitable for use at the TRS.

Determine the efficacy of SoundID deterrent technology and potential for broad scale implementation.

The background noise at the TRS meant that not all of the birds could be heard in the recordings taken at the TRS. Therefore, the SoundID technology is considered not suitable for use at the TRS.

Where possible, incorporate deterrent measures listed as recommendation in the Deakin University research project on visual physiology of local species.

The Aversive Light Stimulus apparatus developed by Deakin University and BHP Billiton has the potential to be installed as a stand-alone deterrent system at the TRS. In 2015, three units were trialled on the Roxby Downs sewerage ponds with promising results to deter ducks from ponds during evening hours. Further testing of the units to deter birds from the TRS will take place during FY16.

Continue investigating and trialling alternative deterrent technologies when they become available.

Research into alternative deterrent technologies will continue in FY16. The suitability of drones as deterrents has been investigated and with the current level of the technology available in Australia, they are considered to be unsuitable.

4.4 Solid waste disposal

4.4.1 Environmental Outcome

No significant adverse impacts as a result of management of solid waste.

The Resource Recovery Centre (RRC) effectively manages solid waste as per the Waste Management Plan and the RRC Operations Manual. No evidence of material environmental harm was identified based on the results of groundwater sampling and routine auditing and reporting conducted. No significant adverse impacts resulted from the management of solid waste at Olympic Dam during FY15.

4.4.2 Compliance criteria

No site contamination leading to material environmental harm arising from the operation of the Resource Recovery Centre (WA 2.5, 2.6).

The RRC effectively manages solid waste as per the Waste Management Plan and the RRC Operations Manual so that no material environmental harm is caused. Waste must be minimised, stored, transported and disposed in a manner that controls the risk of adverse impacts to the environment and communities through implementation and maintenance of a Waste Management Plan. No evidence of material environmental harm was identified based on the results of groundwater sampling; routine auditing and reporting conducted.

Solid wastes that cannot be reused or recycled by the RRC and are not contaminated are disposed of into the landfill facility. All contaminated waste is stored in temporary locations approved by the EPA which incorporate controls to prevent liberation or dispersal to the environment.

4.4.3 Deliverables (WA 2.5)

Records of quantities of general and industrial waste disposed of to landfill.

Records of all general and industrial waste disposed of to landfill are maintained by the waste management contractor for the RRC. Total waste delivered to the RRC for FY15 was 52 878.88 m³, of this waste, 34 939.57 m³ was disposed to landfill and 17 939.31 m³ was diverted for recycling. This equates to 34% of waste diverted from landfill for FY15**,** an increase of 5% on FY14 amount of 29%. This is still below the target of 37% for waste to be diverted from landfill and be recycled.

A waste audit was conducted early in the year to ascertain all general waste going to landfill from each area across site. From the results we are still receiving too much paper, cardboard and plastic in the general waste that can be recycled. The plastic component was majority poly pipe and plastic crib containers. Three projects were initiated and targets put in place to reduce this waste going to landfill. The projects were to recycle poly pipe; replace plastic crib containers with permanent containers and to start a paper and cardboards recycling programme across site. To date the poly pipe has successfully been recycled.

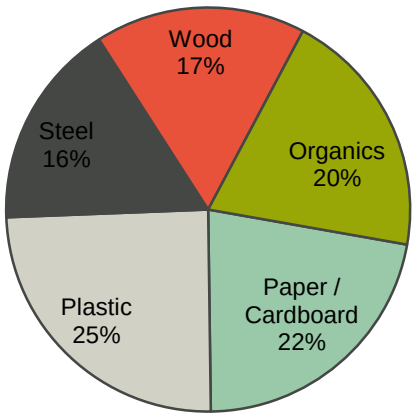

Figure 4.4-1: Composition of general waste from FY15 Waste Audit

Records of quantities of material recovered for reuse and recycling.

All records of reused and recycled materials are maintained by the waste management contractor for the RRC (Table 4.4-1). The total amount of recycling sent off-site for FY15 was 3,073 tonnes. This includes, approximately 502 tonnes of waste oil; 1 534 tonnes of mill liners; 628 tonnes of scrap steel and 143 tonnes of copper cable.

A dedicated project was undertaken this year to reduce the wood and polypipe recycling stockpiles at the RRC. 75 tonnes of poly pipe was successfully recycled, while the existing 30 000m³ wood stockpile was significantly reduced. Shredded wood was placed on the batters of the Landfill for dust suppression.

Planet Ark ink cartridge toner recycling boxes were also placed across site with a total of 11 tonnes of toner cartridges being sent off site for recycling this year.

Table 4.4-1: Historical waste data for Resource Recovery Centre

Year	Landfill Disposal (m^3)	Waste Oil (L)	Recycled Materials (Tonnes)
2003	30,622	156,300	193
2004	27,348	206,100	617
2005	14,578	152,740	510
2006	45,361	276,580	347
2007	47,964	311,400	685
2008	52,171	288,130	673
2009	40,898	358,000	936
2010	32,980	325,000	1,890
2011	37,511	342,300	1,735
2012	36,291	653,500	2,644
2013 (June)	17,739	157,200	1,248
2014	31, 433	371, 600	1, 232
2015	34, 939	502, 000	3, 073

4.4.4 Deliverables (WA 2.6)

Records of categories, quantities and location of hazardous waste materials disposed of within the SML.

Depending on the type of hazardous or contaminated material, quantities are measured in meters cubed (m^3) or tonnes (t). Records of hazardous and contaminated waste disposed of within the SML are shown in Table 4.4-2. Disposal is either in the Tailings Storage Facility (TSF) or the temporary Contaminated Waste Disposal Facility. All contaminated waste storage areas have controls for preventing liberation or dispersal of contaminated waste.

Records to provide evidence that listed waste is appropriately managed, specifically:

- **that listed waste is stored, contained and treated in a manner that does not cause environmental harm or nuisance or present risks to human health and safety;**
- **that all listed waste storage containers are of a suitable strength and durability, are clearly marked and contain appropriate safety warnings;**
- **that all listed wastes do not contact soils or stormwater, and that measures to prevent and recover spillages are implemented as necessary.**

The waste management contractor is responsible for maintaining hazardous and contaminated waste management records for the RRC. The location, type and quantity of hazardous and contaminated waste is recorded in an electronic register, as per all relevant regulations and site procedures. The transport of hazardous waste off site is documented through the EPA waste transport and tracking system, providing assurance to regulators that wastes are managed appropriately so as not to cause environmental nuisance or present a risk to human health and safety.

ODC complies with the requirements of EPA Licence 1301 pertaining to listed and controlled waste by adhering to the RRC operational manual and the waste management plan, which meet government and ISO 14001

requirements. Spill kits are available at all collection and loading points of listed waste (e.g. Waste Oil Facility and Distribution Centre).

Table 4.4-2: Record of hazardous and contaminated waste stored/disposed within the SML

Storage Location	Type of waste	Quantity of Waste	Units
Temporary Contaminated Waste Storage Facility	Contaminated Equipment	1 300.52	Tonnes
Mine Surface Workshop	Contaminated plant and equipment	75	Tonnes
Whenan Shaft Storage	Contaminated plant and equipment	865	Tonnes
Pilot Plant Storage	Laboratory waste	16	Tonnes
Tailings Storage Facility	Hazardous waste disposed	6975	m^3

4.4.5 Leading Indicators

- None applicable

4.4.6 Targets FY15

Increase the proportion of resources diverted from landfill from the FY13 baseline of 37%.

The FY13 proportion of resources diverted from landfill was 37%, which formed the baseline FY14 and FY15 target. The rolling average for resources diverted from landfill for FY14 was 29% and for FY15 saw an increase to 34% (Figure 4.4-2). Although this was below the target amount of 37% a significant amount of effort was employed to reduce existing recycling stockpiles.

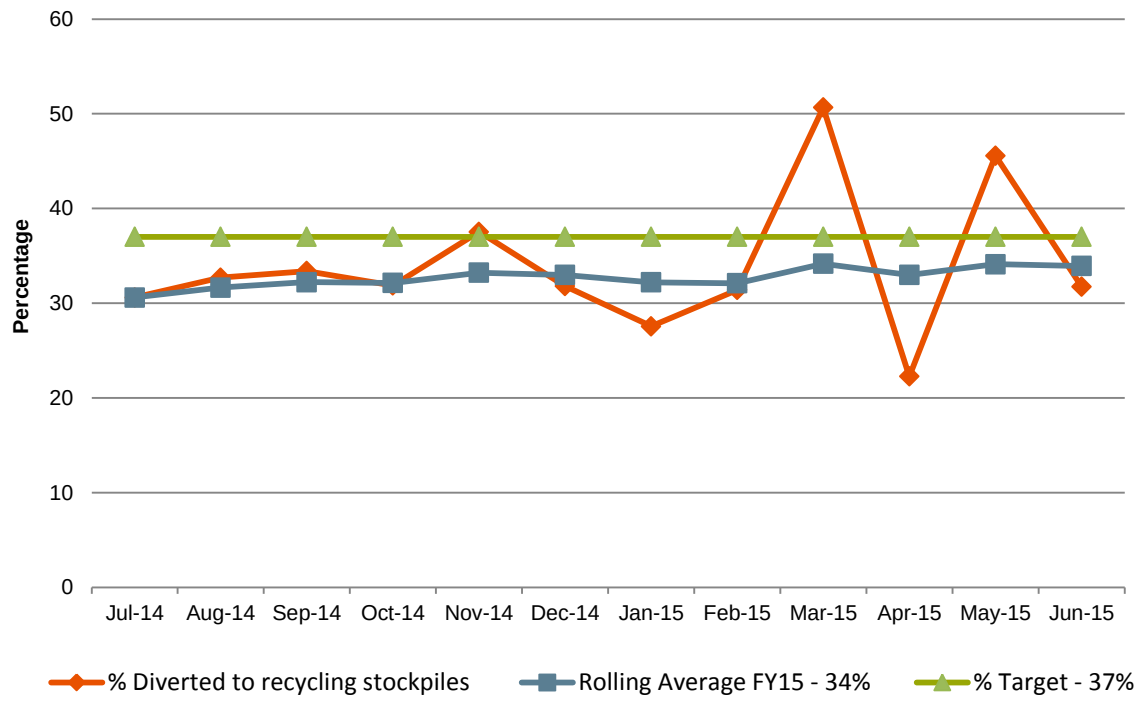

Figure 4.4-2: Total material diverted from landfill against 37% target

4.4.7 Action plan FY15

Expand the Waste Monitoring Program and Groundwater Monitoring Program to include assessment of specific impacts from the landfill operations.

A three week audit was conducted in FY15 at the RRC. All general waste bins coming to landfill where emptied and all waste was separated according to waste type. This was undertaken for all general waste across site. Although the audit results revealed that more recycling initiatives are required for paper; cardboard and plastic it also confirmed that minimal hazardous waste is being disposed to landfill. The hazardous waste recorded was in the form of oily waste (rags; steel and PPE). This hazardous waste attributed to approximately 5% of the total waste to landfill. The areas from site where majority of this waste originates from is shown in Figure 4.4-3. Oily waste bins will need to be placed in these areas and removed from site for disposal on a regular basis. This audit will be conducted every two years.

The annual ground water sampling included a sample from bore LT17 which is approximately 50m from the north-west corner of the landfill. The groundwater salinity measured as Total Dissolved Solids (TDS) was 41100mg/L slightly higher than surrounding bores and pH of 7.57 consistent with surrounding bores. Ammonia concentration was recorded at 0.53mg/L slightly higher than the guidelines for protection of freshwater ecosystems of 0.32mg/L. Nitrate as N and Nitrite plus Nitrate as N were measured at 20.6mg/L, higher than the guidelines of 0.017mg/L. This could be attributed to the previously unlined sewage ponds as well as leachate of organic compounds however it is inconclusive and this has not increased since 2011 but rather decreased by 0.09mg/L.

Slightly elevated levels of heavy metals such as chromium; copper, zinc and iron were detected. Concentrations of Total Recoverable Hydrocarbons (TRH) and Total Petroleum Hydrocarbons (TPH) were below detection limits this could be attributed to the small amount of hazardous waste being disposed to landfill and the efforts to reduce this waste from general waste.

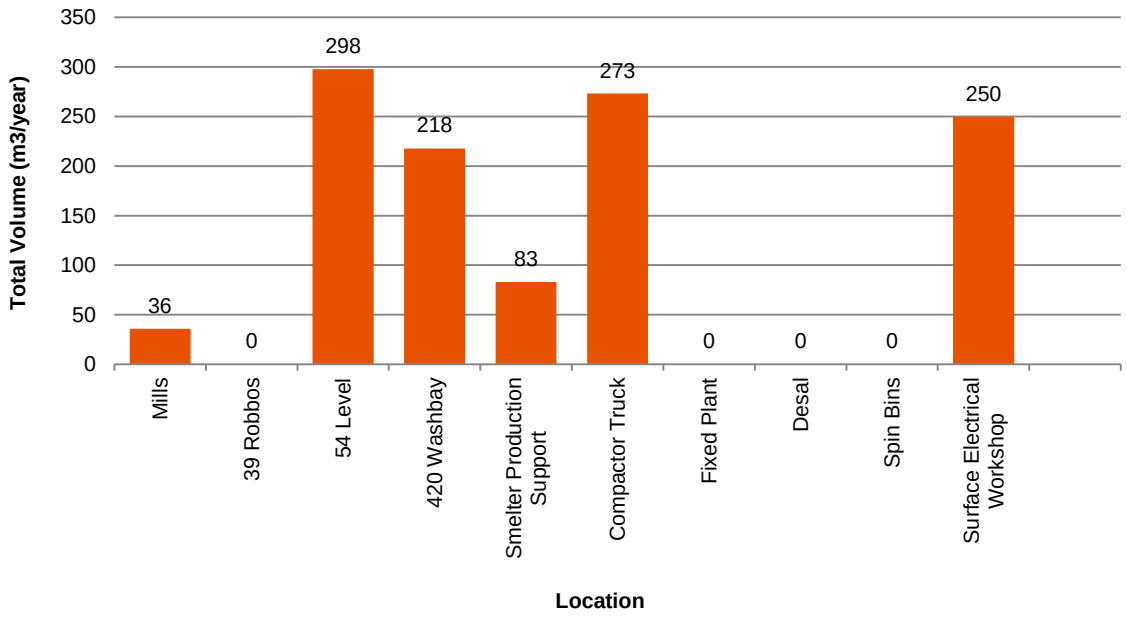

Figure 4.4-3: Hazardous waste across site

Progress a project to re - engineer the site sewage lagoons to minimise seepage

A voluntary Environmental Improvement Plan (EIP) was accepted by the EPA for the re-engineering of the site sewage lagoons to minimise seepage in FY15. The project included the construction of a new lined lagoon which was successfully completed and commissioned in FY15. An updated EIP with the final design and construction plans as well as the quality assurance and quality control (QAQC) plan was submitted to the EPA. This project has successfully been closed out.

4.5 Radioactive waste

4.5.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive waste from ODC's activities (State 34).

BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) has consistently operated in a manner that limits radiation dose to members of the public, from radioactive waste, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1mSv/yr limit. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at Olympic Dam.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive waste from ODC's activities (State 34).

There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at non-human biota assessment sites is used as an indicator of the potential exposure of listed species to radioactive waste. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

4.5.2 Compliance criteria

Radiation doses to members of the public of 1 mSv/y above natural background (State 34).

The total dose to members of the public at RDMS and OVMS (above natural background dose) was 0.015 mSv/yr and 0.023 mSv/yr, respectively. For more detailed information refer to section *3.5 Radioactive Emissions*.

Deposition of project originated ^{238}U less than 25 Bq/m^2/y at the non-human biota assessment sites.

Passive dust monitoring data for the FY 15 reporting period showed that project-originated ^{238}U deposition rates were between zero and 0.7 Bq/m^2/yr, depending on monitoring site. The results are well below the criterion of 25 Bq/m^2/yr. The average deposition rate of 0.4 Bq/m^2/yr is well below the 25 Bq/m^2/y. There have been no adverse impacts to the public or non-human biota.

4.5.3 Deliverables (WA 2.7)

Records of the categories, quantities and location of LLRW and contaminated material disposed of within the SML.

Systems are maintained by ODC that record categories, quantities and location of waste disposed of within the Special Mining Lease (SML), classified as Low Level Radioactive Waste (LLRW) or contaminated waste. Contaminated waste records were maintained by a waste management contractor during FY15. Depending on the type of material, quantities were measured in m^3 or tonnes (t). It is estimated that a total of 2256 Tonnes of contaminated waste is currently stored at the temporary contaminated waste storage areas. Total volumes of waste for each storage location are presented in Section 4.4 *Solid Waste Disposal* under part 4.4.4 Deliverables (WA 2.6).

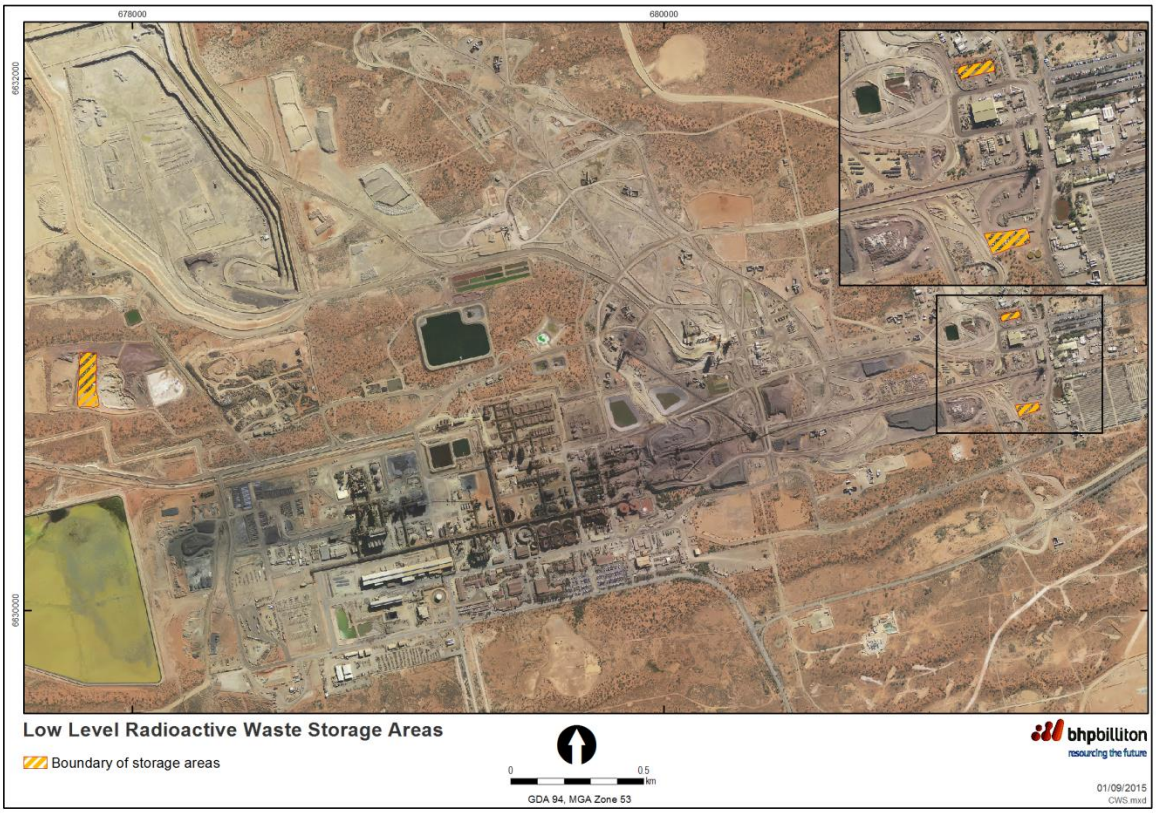

Figure 4.5-1: Approved Temporary Storage Areas for Contaminated Waste

The Radiation Protection branch of the Environmental Protection Authority (EPA) has temporarily approved areas within the SML for the storage of contaminated waste. The Old Mine Water Evaporation Pond (Figure 4.5-1) is situated between tailings storage facility (TSF) Cell 1 and the Resource Recovery Centre (RRC). The area has a compacted base, and is surrounded by an earthen bund. Access to the area is restricted and signage has been erected identifying the sites use.

A permanent contaminated waste disposal facility has been proposed and designed for construction in the existing quarry. A contaminated waste management plan explains what waste can be disposed to this area, the specific contamination limit, how to clean; prepare, test and dispose of the waste.

Contaminated material that meets strict criteria is disposed of into the TSF.

4.5.4 Leading Indicators

Indications that a dose constraint of 0.3 mSv/y to members of the public above natural background will be exceeded.

Indications that a reference level of 10 µGy/h for impact on non-human biota above natural background will be exceeded.

No leading indicators were triggered. Doses to members of the public are below the dose constraint of 0.3 mSv/yr. Similarly the reference level of 10 µGy/h for impacts on non-human biota have not been triggered.

4.5.5 Targets FY15

Maintain radiation doses as low as reasonably achievable, as assessed through the annual adequacy and effectiveness review.

Quarterly ODC radiation monitoring results, radiation dose calculations and occupational hygiene results are presented to the regulatory authorities for review. In addition, an annual adequacy and effectiveness review is completed each year confirming that doses are as low as reasonably achievable.

Ensure that all radiation waste is adequately contained and managed.

All contaminated waste is stored as described in section 4.5.3 above. A permanent contaminated waste facility will be constructed in the existing quarry during FY16.

4.5.6 Action plan FY15

Implement cleaning and recycling strategies in order to minimise radioactive waste generated.

The new contaminated waste management plan defines how certain waste from particular areas is to be cleaned. All equipment waste from controlled areas is washed and tested to ensure maximum waste is disposed for recycling.

Develop a solution for disposal of contaminated waste that cannot be disposed of in the TRS

A permanent contaminated waste facility has been approved for construction. The facility will be constructed in the existing quarry and managed by the site waste contractor. All contaminated waste will be managed in accordance with the approved Contaminated Waste Management Plan.

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5 Interaction with communities

5.1 Community interaction

5.1.1 Environmental Outcome

Residents in Roxby downs, Andamooka and Woomera trust ODC to act in their best interests (State 17b)

Responses to the 2014 Olympic Dam Community Perception Survey indicate that ODC is a trusted organisation within its local communities. In addition to this, ODC provides employment to local and regional communities, increasing its accessibility through the provision of a bus service to communities such as Port Pirie and Port Augusta.

5.1.2 Compliance criteria

Community concerns are tracked and all reasonable complaints are addressed where reasonably practical. (State 17c, 17kiii; SE 2.1, 2.2, 2.3, 2.4, 2.5, 2.6)

ODC has a process to receive and track community concerns through the company's stakeholder engagement management plan.

ODC received no complaints in FY15.

5.1.3 Deliverables (SE 2.1)

Updated list of key stakeholders, their interests in the current operation and expansion of Olympic Dam and engagement methods;

ODC maintains a Stakeholder Engagement Management Plan which outlines all of our key stakeholders, engagement methods and key areas of interest. The key stakeholder groups, their respective engagement methods and key areas of interest are summarised in Table 5.1-1.

Table 5.1-1: List of key stakeholders, their interests in the impacts of the Olympic Dam operation and methods of engagement

Stakeholder Group	Media	Community Events and tours	Community Perception Survey	Community Donations Program	Telephone briefings and meetings	Key areas of interest
Education (education providers and students in Roxby Downs, Andamooka, Woomera and Marree)	x	x		x	x	Population and demography; Family relationships and interactions; Education and training; Community health; Housing; Community relations
Women (women in Roxby Downs, Andamooka, Woomera and Marree)	x	x	x		x	Social character, culture and lifestyle; Family relationships and interactions; Social services and infrastructure; Community health; Gender and minority groups; Living costs; Community relations
Andamooka Community (general members of the Andamooka community)	x	x	x	x	x	Population and demography; Social services and infrastructure; Housing; Work; Gender and minority groups; Economic conditions and resources; Living costs; Community relations
Andamooka Business (businesses operating in Andamooka)	x	x				Population and demography; Housing; Work; Economic conditions and resources
Andamooka Government (Andamooka Town Management Committee)	x	x		x	x	Population and demography; Social character, culture and lifestyle; Family relationships and interactions; Social services and infrastructure; Education and training; Community health; Gender and minority groups; Housing; Work; Economic conditions and resources; Community relations
Far North Pastoralists (Pastoralists surrounding Roxby Downs and Marree, both BHP Billiton leased and privately owned)	x	x			x	Population and demography; Social services and infrastructure; Economic conditions and resources; Community relations
Roxby Downs Community (general members of the Roxby Downs community)	x	x	x	x	x	Population and demography; Social character, culture and lifestyle; Family relationships and interactions; Social services and infrastructure; Education and training; Community health; Gender and minority groups; Housing; Work; Economic conditions and resources; Living costs; Community relations
Roxby Downs Business (businesses operating in Roxby Downs)	x	x			x	Population and demography; Education and training; Housing; Work; Economic conditions and resources; Living costs
Roxby Downs Government (Municipal Council of Roxby Downs)	x	x			x	Population and demography; Social character, culture and lifestyle; Family relationships and interactions; Social services and infrastructure; Education and training; Community health; Gender and minority groups; Work; Economic conditions and resources; Living costs; Community relations
Woomera Community (general members of the Woomera community)	x	x	x	x	x	Community relations
Aboriginal Business (Aboriginal businesses operating in Roxby Downs)	x	x		x	x	Education and training; Housing; Work opportunities; Economic conditions and resources
Aboriginal Traditional Owners (Barngarla, Kokatha, Kuyani, Arabana, Dieri, Nukunu)	x				x	Population and demography; Social character, culture and lifestyle; Social services and infrastructure; Education and training; Gender and minority groups; Work; Economic conditions and resources; Community relations, Cultural heritage values.

Upper Spencer Gulf Community (general members of the Port Augusta, Port Pirie and Whyalla communities)	x	x		Population and demography; Education and training; Gender and minority groups; Housing; Work; Economic conditions and resources; Social services and infrastructure; Community relations. Interest in the expansion project, particularly the proposal for a desalination plant.
Upper Spencer Gulf Business (businesses operating in Port Augusta, Port Pirie and Whyalla, with ties to Olympic Dam)	x		x	Work; Economic conditions and resources
Upper Spencer Gulf Government (local government in Port Augusta, Port Pirie and Whyalla)	x		x	Population and demography; Education and training; Gender and minority groups; Work; Economic conditions and resources; Social services and infrastructure; Community relations

[1] Interests in the impacts of the current operation were determined through an impact assessment and subsequently form the focus of our engagement and investment activities.

- **Data showing the number and type of complaints reported to ODC about the current operations and expansion of Olympic Dam, and the actions taken to address them.**

  The actions and outcomes from stakeholder communication are measured by community complaints that are received and how the issues raised are addressed by ODC (State 14i).

  ODC received no complaints in FY15.

5.1.4 Deliverables (SE 2.2)

An annually calculated profile of the construction and operations workforce at Olympic Dam (employees, direct hires and agency contractors), to be calculated, including data in relation to the following:

- **the total number of positions (Olympic Dam and Adelaide);**

  On 30 June 2015, the total number of positions filled by persons employed by BHP Billiton Olympic Dam (Employee and Agency Contractors) was 2,841, with 2,581 personnel located at Olympic Dam and the remaining 260 located in Adelaide. There was no major construction activity at Olympic Dam during the reporting period, so construction workforce data are not provided.

- **the total number of contractors on-site at Olympic Dam;**

  The average number of Agency and Service Contractors on-site per day in the month of June 2015 was 1,204.

  This number includes all contractors who have passed through the Olympic Dam mine site access system per day during the month of June in the reporting year. This system does not take account of contractors who are engaged in Olympic Dam-related activities off-site (outside of the site access system) or do not travel to Olympic Dam as part of their work contract. Consequently, the total number of contract positions associated with Olympic Dam may be greater.

- **the number and percentage of positions filled by Aboriginal people (self-reported);**

  In FY15, the number of BHP Billiton positions filled by Aboriginal people, as recorded by our Aboriginal Participation Program, was 30 BHP Billiton employees and 34 Agency and Service Contractors. This represents 2.25% of the measurable Olympic Dam workforce. Olympic Dam's Aboriginal workforce in FY15 also included 66 Service Contractors.

- **the number and percentage of positions filled by women;**

  Distribution of the total workforce at Olympic Dam and Adelaide (BHP Billiton employees and Agency Contractors) according to gender is represented in Figure 5.1-1.

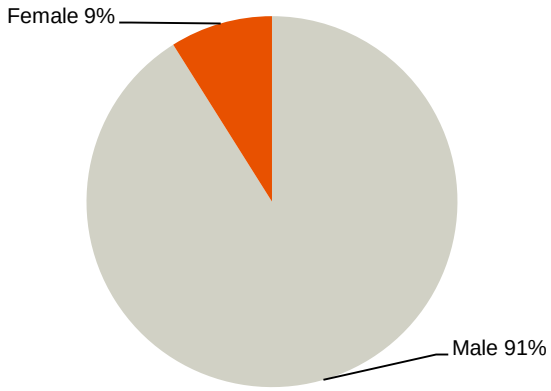

Figure 5.1-1: BHPB OD workforce gender distribution (source: Olympic Dam Human Resources)

- **the number and percentage of positions by age cohort;**

  Distribution of the total Olympic Dam workforce (BHP Billiton employees and Agency Contractors) according to age cohort is represented in Figure 5.1-2.

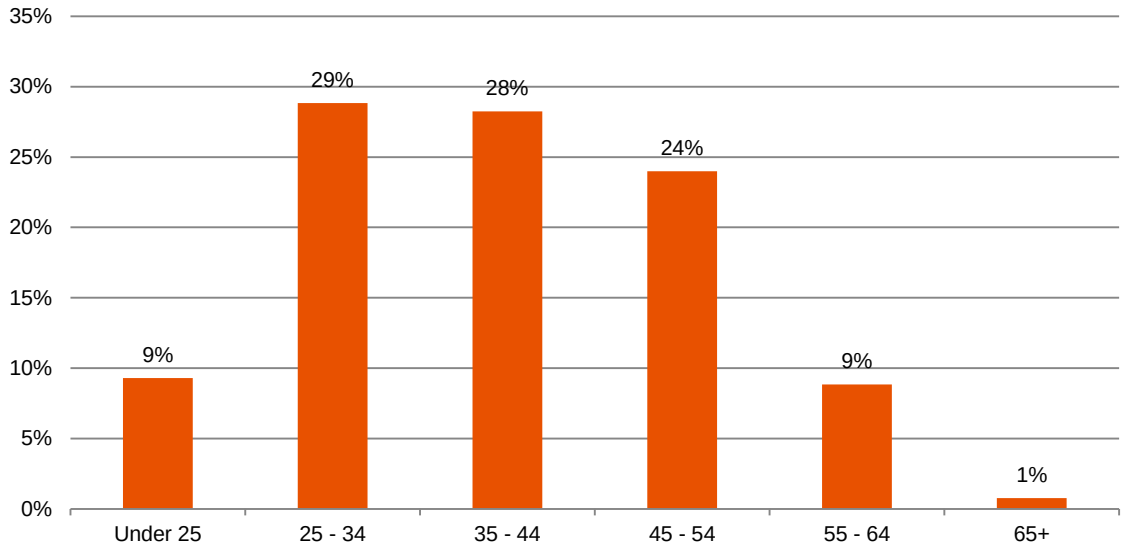

Figure 5.1-2: BHPB OD workforce (Employees and Agency Contractors) age distribution (source: Olympic Dam Human Resources)

- **the number and percentage of positions by functional area (including Mine, Services, Surface, Human Resources and Finance);**

  Distribution of the total Olympic Dam workforce (BHP Billiton employees and Agency Contractors) according to functional area is represented in Figure 5.1-3.

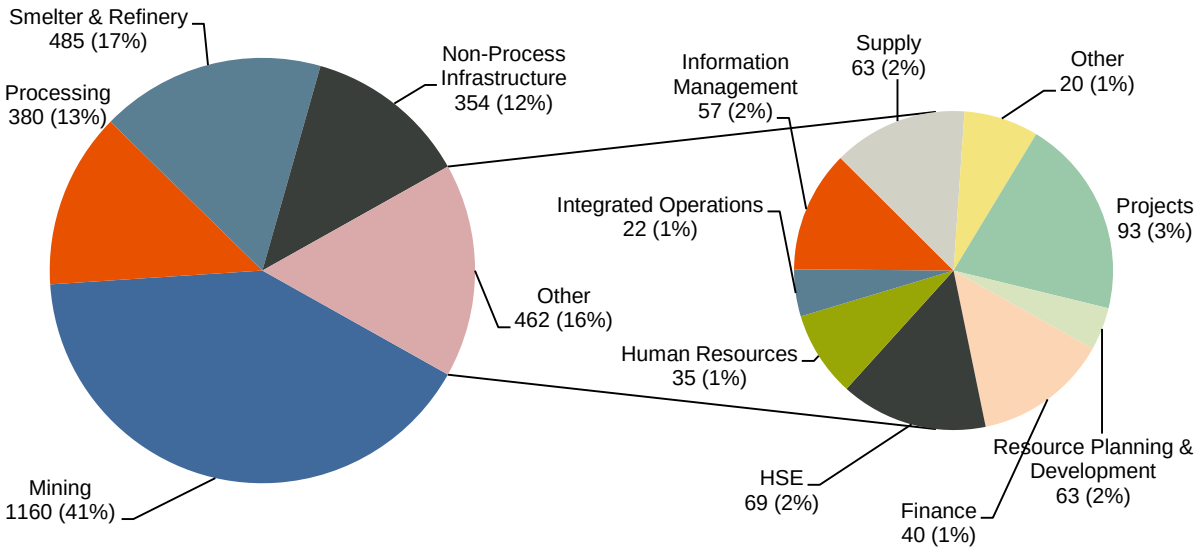

Figure 5.1-3: BHPB OD workforce functional area distribution (source: Olympic Dam Human Resources),

- **the number and percentage of BHP Billiton positions filled by South Australians, other Australians and International candidates;**

  The number of South Australian, other Australian and International people recruited to vacant positions at Olympic Dam and Adelaide (BHP Billiton Employee positions that self-reported) was as per Table 5.1-2.

Table 5.1-2: Number and percentage of South Australian, other Australian and International BHP Billiton employees (self-reported). Source: Olympic Dam Human Resources

Location	Number
South Australian	157
Other Australian	16
International	0
Total Offers Accepted	173

- **the number and percentage of graduates employed by ODC;**

  On 30 June 2015 BHP Billiton Olympic Dam had 48 employees in the Graduate Program, representing 1.87% of BHP Billiton Olympic Dam employee workforce (filled positions).

- **the number of long distance commute workers at Olympic Dam and the ratio of long distance commute workers to residential. (State 17f, 17ki, 17kii, 17kiv))**

  Long distance commute (LDC) workers are defined as those who are provided with camp accommodation by BHP Billiton and typically drive-in-drive-out (DIDO) or fly-in-fly-out (FIFO) during work breaks. LDC data are only available for BHP Billiton employees. The total number of LDC workers (BHP Billiton Employees) at Olympic Dam on 30 June 2015 was 680, with the breakdown represented in Figure 5.1-4. Workers represented as DIDO are supplied with a scheduled bus service which runs to and from Olympic Dam from Adelaide via Port Augusta, Port Pirie, and Port Wakefield, in line with the shift rosters at Olympic Dam.

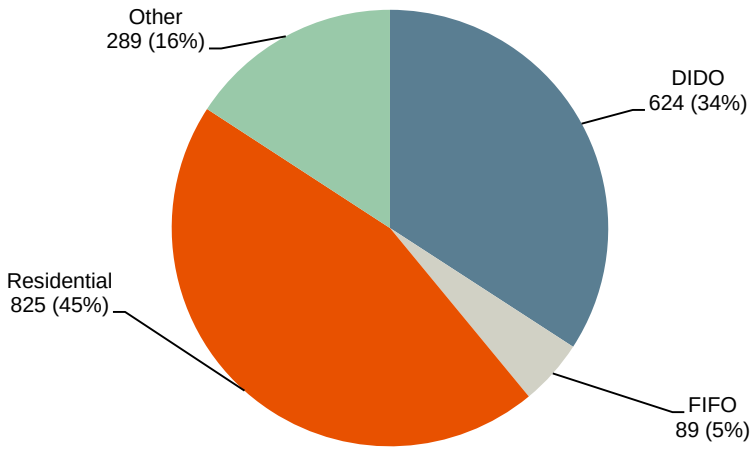

Figure 5.1-4: Number and percentage of long distance commute workers at Olympic Dam (source: Olympic Dam Human Resources).

5.1.5 Deliverables (SE 2.3)

Data for the annual calculation of the number and spend value of contracts awarded to South Australian and Aboriginal-owned businesses to deliver goods and services to Olympic Dam, (State 17f, 17ki, 17kii, 17kiv).

The analysis of business location is based on the postcode reported by the vendor to our Supply department, and therefore does not take into account businesses with a physical location in South Australia but which have reported the postcode of their head office or accounts department which may be outside of South Australia.

In FY15, the total spent under contracts with South Australian businesses was $584,335,449.

The total amount spent with Aboriginal-owned (>51%) businesses in FY15 was $8,800,883.

5.1.6 Deliverables (SE 2.4)

Data for quarterly calculation of median weekly rental costs on new bonds lodged in Roxby Downs and Andamooka.

Data for annual calculation and reporting of rental rates, rental availability and housing stress, including:

rental availability and vacancy rates in Roxby Downs and Andamooka (State 14a, 14c);

the number of people (18 years or older) receiving rent assistance from Centrelink in Roxby Downs and Andamooka as a measure of housing stress (State 14c). (State 17f, 17ki, 17kii, 17kiv)

Pressure on the housing market in Roxby Downs and Andamooka continued to decrease in FY15, as evidenced by Figure 5.1-5 and Figure 5.1-6 which show a steady decrease in rental costs and stable vacancy rates in these communities. Vacancy data for FY15 quarter 3 and 4 was not able to be provided by the data consultant.

Rental costs remained stable in Whyalla and Port August over the same period. Data on rental housing in Woomera is not available as most housing in Woomera is owned and managed by the Department of Defence.

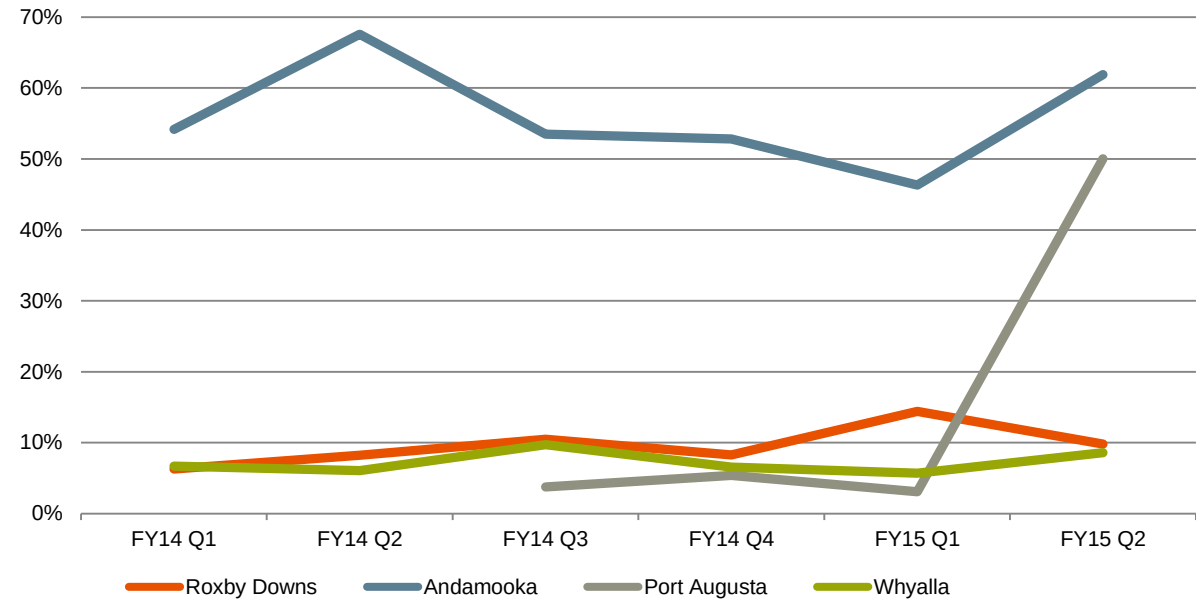

Figure 5.1-5: Rental vacancy rates at Roxby Downs, Andamooka, Port Augusta and Whyalla (source: Real Estate Institute of South Australia (REISA)). Note: no data was available for FY15 Q3 & Q4.

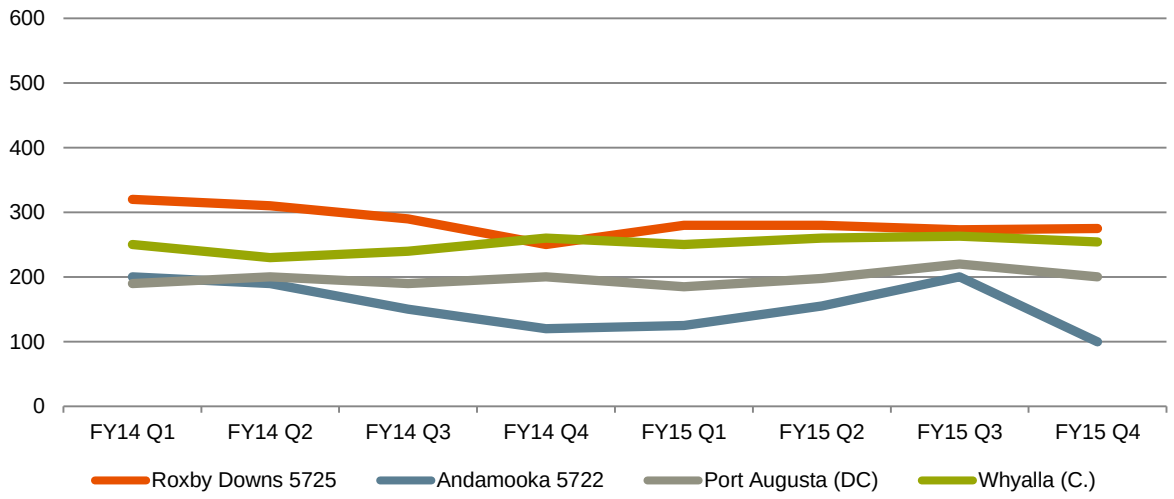

Figure 5.1-6: Median weekly rental costs based on bonds lodged with the Tenancies Branch (source: Housing SA)

The calculation of Housing stress, as shown in Table 5.1-3 is calculated as the total number of people receiving Centrelink Rent Assistance (sourced annually for the September quarter) as a percentage of the total number of rental properties (sourced from the 2011 Australian Census).

Andamooka shows more evidence of housing stress than Roxby Downs with both towns showing a minor increase from 2013 to 2014.

Housing stress as a percentage cannot be calculated for Woomera as the exact number of Centrelink Rent Assistance recipients is not specified by Centrelink.

The source data for the Centrelink Rent Assistance has changed, with the September quarter required for the calculation unavailable. However, when viewed with reference to the declining rents (Figure 5.1-7) and increased vacancy rates (Figure 5.1-6), that housing stress in Roxby Downs and Andamooka would remain at historical levels as per Table 5.1-3.

Table 5.1-3: Historical Housing stress in Roxby Downs and Andamooka (Source: Australian Bureau of Statistics, Centrelink)

	2012	2013	2014
Roxby Downs			
Total number of rental properties (A)	877	877	877
Total receiving Centrelink Rent Assistance (B)	31	45	64
Calculated housing stress (B as a percentage of A)	3.5%	5.1%	7.3%
Andamooka			
Total number of rental properties (A)	68	68	68
Total receiving Centrelink Rent Assistance (B)	30	31	34
Calculated housing stress (B as a percentage of A)	44.1%	45.6%	50.0%
Woomera			
Total number of rental properties (A)	76	76	76
Total receiving Centrelink Rent Assistance (B)	< 20	< 20	< 20
Calculated housing stress (B as a percentage of A)	-	-	-

5.1.7 Deliverables (SE 2.5)

A description of residents' perceptions about quality of life services and facilities, safety and social fabric in Roxby Downs, Andamooka and Woomera (reported triennially)(Ste 17ki, 17Kii, 17kiv)

ODC undertook a Community Perception Survey in 2014, with 417 respondents from the four communities surveyed (Roxby Downs, Andamooka, Woomera and Marree).

Andamooka, Woomera and Marree are represented as a single group, due to the small sample size (n=51).

	Roxby Downs	Andamooka, Woomera and Marree
Percentage of respondents who rated their overall quality of life as good	72%	71%
Percentage of respondents who agree they can get help from neighbours in needed	78%	86%
Percentage of respondents who agree people in their community trust each other	68%	67%
Percentage of respondents who agree people from different nationalities and cultures are made welcome	88%	88%
Percentage of respondents who agree it is safe for women to go out alone at night	83%	92%
Percentage of respondents who are satisfied with their personal safety	87%	92%
Percentage of respondents who are satisfied with their access to sports and recreation facilities	74%	32%
Percentage of respondents who are satisfied with their access to hotels/taverns/clubs	70%	57%
Percentage of respondents who are satisfied with their access to libraries/telecentres	66%	63%
Percentage of respondents who are satisfied with their access to local news and media	65%	43%

Percentage of respondents who are satisfied with their access to banking facilities and services	60%	33%
Percentage of respondents who are satisfied with their access to cinema	59%	33%
Percentage of respondents who are satisfied with their access to coffee shops/restaurants	58%	30%
Percentage of respondents who are satisfied with their access to medical facilities	58%	59%
Percentage of respondents who are satisfied with their access to children's schooling/education	49%	49%
Percentage of respondents who are satisfied with their access to religious services	43%	30%
Percentage of respondents who are satisfied with their access to supermarket/food shopping	42%	26%
Percentage of respondents who are satisfied with their access to art gallery	40%	16%
Percentage of respondents who are satisfied with their access to facilities for adult/vocational training	38%	14%
Percentage of respondents who are satisfied with their access to long day child care (for pre-schoolers)	30%	32%
Percentage of respondents who are satisfied with their access to out of school child care	26%	16%
Percentage of respondents who are satisfied with their access to community/youth centres	21%	35%
Percentage of respondents who are satisfied with their access to general retail (eg. clothing, sports goods)	9%	4%
Percentage of respondents who are satisfied with the quality of sporting facilities	66%	25%
Percentage of respondents who are satisfied with the quality of police services	61%	63%
Percentage of respondents who are satisfied with the quality of housing	60%	43%
Percentage of respondents who are satisfied with the quality of recreational facilities	57%	29%
Percentage of respondents who are satisfied with the quality of medical services	52%	57%
Percentage of respondents who are satisfied with the quality of coffee shops/restaurants	48%	25%
Percentage of respondents who are satisfied with the quality of community meeting venues	43%	59%
Percentage of respondents who are satisfied with the quality of children's services	38%	24%
Percentage of respondents who are satisfied with the quality of supermarket/food shopping	30%	24%
Percentage of respondents who are satisfied with the quality of youth services	17%	24%
Percentage of respondents who are satisfied with the quality of general retail (eg. clothing, sports goods)	12%	0%

ODC consults with local SAPOL representatives on a regular basis regarding crime and safety matters, and the questions posed regarding perceptions of crime prior to the survey being undertaken.

5.1.8 Leading Indicators

- None applicable

5.1.9 Targets FY15

A long-term desirable trend towards a minimum housing rental vacancy rate in Roxby Downs of 5%. (State 14a)

As described in section 5.1.6 above, pressure on the Roxby Downs housing market eased further in FY15.

Figure 5.1-7 shows that the rental vacancy rate in Roxby Downs reached the target rate of five per cent by the first quarter of FY14 and has remained above the target throughout FY14 to quarter 2 FY15 with this trend expected to continue.

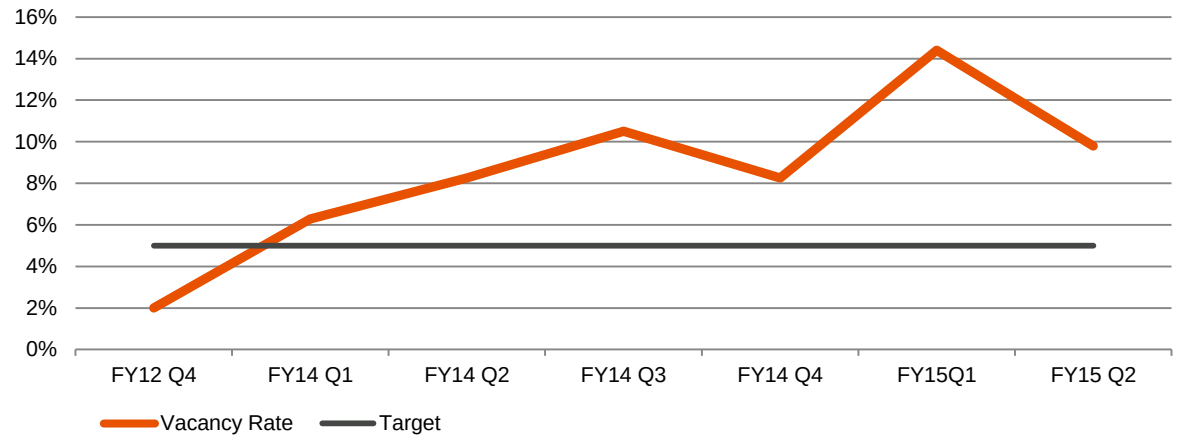

Figure 5.1-7: Rental vacancy rate in Roxby Downs (source: REISA)

5.1.10 Action Plan FY15

Undertake the triennial Community Perception Survey to monitor local community perceptions of ODC, and of local services and facilities.

The triennial Community Perception Survey was undertaken in 2014 to monitor local community perceptions of ODC, and of local services and facilities, as per the results above.

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7 GLOSSARY OF TERMS

ADU	Ammonium diuranate, commonly referred to as Yellowcake.
AHD	Australian Height Datum, a measure of elevation referenced from approximate sea level.
Agency Contractors	Personnel working on site employed by businesses other than BHP Billiton but filling a role within the BHP Billiton organisation structure.
ANCOLD	Australian National Committee on Large Dams
ANZECC	Australian & New Zealand Environment & Conservation Council.
Aquifer	Porous water bearing formation of permeable rock, sand, or gravel capable of yielding significant quantities of water.
APTS	Acid Plant Tails Stack
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BHPB	BHP Billiton.
Bq	Bequerel, a unit of radioactive decay.
$Bq/m^2/y$	Bequerels per cubic meter per year
CEMP	Carbon Emissions Management Plan
Ca	Calcium.
CAF	Cemented aggregate fill.
CBB	Crested Bellbird *Oreoica gutturalis*.
Closure	Permanent cessation of operations at a mine or mineral processing site after completion of the decommissioning process, signified by tenement relinquishment.
CD1, CD2	Concentrate Dryer 1, Concentrate Dryer 2
CO_2-e	Carbon dioxide equivalent
Cu	Copper.
CWDF	Contaminated Waste Disposal Facility.
Decommissioning	Activities carried out prior to closure of the site (as operating costs) which include flushing of lines, depressurisation of systems and vessels and removal of hazardous materials (excluding oils and greases) and radioactive sources unless noted otherwise in the site closure plan.
DIDO	Drive in, drive out
Domestic Water Use	Water used in the town of Roxby Downs or Olympic Dam Village.
DSD	Department of State Development
ED	Effective dose.
$KLED_{Rn}$	Effective dose attributable to radon decay products
ED_D	Effective dose attributable to radionuclides in dust
EEO	Energy Efficiency Opportunities – Federal government legislation

EIHCP	Environmental / Indigenous Heritage Clearance Permit
EIP	Environmental Improvement Plan
EIS	Environmental Impact Statement.
EMMR	Environmental Management & Monitoring Report – now known as the Annual EPMP Report.
EMS	Environmental Management System. The part of an organisation's management system used to develop and implement its environmental policy and manage its environmental aspects (Standards Australia / Standards New Zealand 2004). Note: A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives. A management system includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources.
Environmental Aspect	An element of the organisation's activities or products or services that can interact with the environment (Standards Australia / Standards New Zealand 2004).
Environmental Impact	Any change to the environment, whether adverse or beneficial wholly or partially resulting from an organisation's environmental aspects (Standards Australia / Standards New Zealand 2004).
EPA	Environmental Protection Authority
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999 (Cth).
EPMP	Environmental Protection and Management Program. Describes the environmental management and monitoring activities undertaken by BHP Billiton Olympic Dam for the purpose of quantifying any change in the extent or significance of its impacts, assessing the performance of control measures employed to limit impacts, and/or to meet legal and other obligations.
EPP 1994	Environment Protection (Air quality) Policy 1994
EPP 2003	Environment Protection (Water quality) Policy 2003
Evaporation Pond EP	A containment pond to hold liquid wastes to assist with disposal of liquor via evaporation.
FIFO	Fly in, fly out
Filled position	A BHP Billiton position that is filled by either a BHP Billiton Employee or an agency contractor.
FY	Financial Year
GAB	Great Artesian Basin
GIS	Geographical Information System
GHG	Greenhouse Gas
g/m^3	Grams per cubic metre – a measure of dust concentration in air.
Gy/h	Grays per hour – a measure of absorbed radiation dose.
ha	Hectare
ICRP	International Commission on Radiological Protection.
IFF	Insectivorous feeding flocks.
Industrial Water use	Water used in mining or mineral processing operations and excluding domestic water use.

kg CO_2-e	Kilograms of carbon dioxide equivalence – a standard measure of greenhouse gas emissions
kg CO_2-e/t	Kilograms of carbon dioxide equivalence per tonne of material milled – a measure of greenhouse gas emission intensity of ODC.
kL/t	Kilolitres per tonne of ore milled.
kt	Kilotonne
LDC	Long distance commute
Listed Species	Those species or communities that are listed as threatened or migratory under Commonwealth and/or relevant State or Territory legislation.
LNAPL	Light Non-Aqueous Phase Liquid
LLRW	Low level radioactive waste
mAHD	Elevation in metres with respect to the Australian Height Datum
mg/Nm^3	Milligrams per normal cubic metre
ML	Megalitres.
ML/d	Megalitres per day.
MP	Monitoring Program. A document which describes the environmental monitoring activities undertaken by BHP Billiton Olympic Dam for the purpose of quantifying any change in the extent or significance of its impacts, assessing the performance of the control measures employed to limit its impacts, and/or to meet its legal and other obligations.
Mt	Million tonnes
mSv/y	Millisieverts per year – a measure of equivalent radiation dose.
MWDP	Mine water disposal pond
NaCl	Sodium chloride (salt).
NEPM	National Environment Protection Measure.
NGER	National Greenhouse and Energy Reporting – Federal government reporting of greenhouse gas emissions and energy use and production
NHB	Non-human biota
NMOL	Normal Maximum Operating Level
Nm^3	Normal metres cubed, referring to volume at standard temperature and pressure
NO_x	Oxides of nitrogen
NPW Act	National Parks & Wildlife Act 1972 (SA)
NVMP	Native Vegetation Monitoring Program
ODC	BHP Billiton Olympic Dam Corporation Pty. Ltd.
OV	Olympic Village, the accommodation camp located at Olympic Dam township
OVMS	Olympic Village Monitoring Site
Pb	Lead
^{210}Pb	An isotope of lead, having mass number 82 and half-life 22.3 years
pH	A measure of acidity and alkalinity

PM_{10}	Particulate matter with an effective aerodynamic diameter less than or equal to 10 µm
$PM_{2.5}$	Particulate matter with an effective aerodynamic diameter less than or equal to 2.5 µm
Po	Polonium
^{210}Po	An isotope of polonium, having mass number 84 and half-life 138.38 day
ppm	Parts per million
PRH	Practical Reference Heads
Ra	Radium.
^{226}Ra	An isotope of radium, having mass number 88 and half-life 1599 years
RDMS	Roxby Downs Monitoring Site
Rehabilitation	The reclamation or repair, as far as practicable, of a facility to an appropriate or agreed state as required by law, or company self-regulation
Rn	Radon. Chemically inert radioactive gaseous element formed from the decay of ^{226}Ra as part of the ^{238}U decay chain
^{222}Rn	An isotope of radon, having mass number of 86 and half-life 3.8235 days
RRC	Resource Recovery Centre
RSF	Rock Storage Facility
SAP	Systems Applications Products
SEB	Significant Environmental Benefit
Service Contractors	Personnel working on site for businesses other than BHP Billiton and in roles which are not part of the BHP Billiton organisation structure.
Significant aspect	An environmental aspect that has or can have a significant environmental impact. Significance is determined by risk assessment.
SML	Special Mining Lease
SO_2	Sulphur dioxide
SO_4	Sulphate
SX	Solvent Extraction
t	Tonnes
TDS	Total dissolved solids
TP	Tapered Piezometers
TRS	Tailings Retention System. Incorporates all elements of the tailings delivery, deposition and storage system and elements associated with the collection and disposal or return of tailings liquor. The TRS includes the Tailings Storage Facility (TSF), Evaporation Ponds and Pipe Corridors including tailings delivery pipelines and liquor pipelines.
TSF	Tailings Storage Facility. Incorporates the tailings deposition and storage system, which currently comprises four storage cells.
Th	Thorium
^{230}Th	An isotope of thorium, having mass number 90 and half-life 7.54×10^4 years.

Total Industrial Water Use	Total water used including high quality (GAB) water and water recovered from other sources including abstraction of local saline water.
TSP	Total Suspended Particulates (dust)
U	Uranium.
^{238}U	The most common isotope of uranium, having mass number 238 and half-life 4.46×10^9 years.
µGy/h	Micro gray per hour
UOC	Uranium oxide concentrate, final uranium product at BHP Billiton Olympic Dam, consisting of 99% U_3O_8.
VOC	Volatile organic compound.
VWP	Vibrating Wire Piezometers

APPENDIX A: AMENDMENTS TO THE 2014 ENVIRONMENTAL PROTECTION AND MANAGEMENT PROGRAM (EPMP)

Jurisdiction that amendment applies	EPMP Doc.	Section No.	Description	Change Explanation
State Government	ID 1 – Land disturbance and rehabilitation	1.1.10	Two points form the management plan have been removed: • A program of ongoing archaeological investigations has been agreed by the Kokatha, Barngarla and Kuyani groups. The program includes the participation of Aboriginal archaeological field trainees nominated by the groups accompanying qualified archaeologists. • The Kokatha, Barngarla and Kuyani groups have agreed to a salvage program in areas where impacts to heritage sites are unavoidable.	Both of these actions have been completed.
State Government	ID 1 – Land disturbance and rehabilitation	1.3.12	One point removed: • The Stuart Shelf regional groundwater model, used to predict regional groundwater drawdown, is reviewed and updated every three years (State 26)	Modified as per gazette notice on 2 October 2014, pg 6018.
State Government	ID 3 – Operation of industrial systems	3.2	Entire section removed	Open pit activity has been suspended – no residual impact to environment. Monitoring conducted to date has verified no site noise impacts at Olympic Dam Village or Roxby Downs.
State Government	ID 4 – Generation of industrial waste	4.2	Entire section removed	Open pit activity has been suspended – there is no residual impact to environment.
State Government	Noise and vibration emissions MP		Entire MP removed	Open pit activity has been suspended. Monitoring conducted to date has verified no site noise impacts at Olympic Dam Village or Roxby Downs.

Jurisdiction that amendment applies	EPMP Doc.	Section No.	Description	Change Explanation
State Government	Containment of waste rock and seepage MP		Entire MP removed	Open pit activity has been suspended – there is no residual impact to environment.
State Government	Airborne Emissions MP	2.4.4	Monitoring frequency changed from 'Monthly' to 'Quarterly'.	Change in reporting frequency as approved by the EPA
State Government	Airborne Emissions MP	2.5.1	Removed reference to additional emission resulting from open pit mining	Open pit mining has been suspend
State Government	Airborne Emissions MP	6.1	Map updated to remove western background and Hiltaba compliance station from map	Stations have been decommissioned as approved by the EPA.
State Government	Great Artesian Basin (GAB) MP	2.3.4	Addition of definition for 'cold' pressure measurement	Clarification of monitoring technique
State Government	Environmental Radiation MP	1	Scope updated to reflect the cessation of expansion project related activities	Expansion project currently on hold
State Government	Environmental Radiation MP	1.4	Removed	Previous text provided background information for the expansion project which is now on hold
State Government	Environmental Radiation MP	3.1	Reference to the EMMR changed to annual EPMP report	EMMR terminology no longer in use
State Government	Environmental Radiation MP	7.1	Map updated to remove western background and Hiltaba compliance station from map	Stations have been decommissioned as approved by the EPA.
State Government	Groundwater MP	5.1	Change in level monitoring frequency for Olympic Dam existing operations bores	Frequency of level monitoring for wells in the existing operations areas has been reduced to bi-annually as a part of the program review. New frequency is considered sufficient monitoring to meet Groundwater MP objectives.
State Government	Groundwater MP	5.2	Monitoring of MAR bores ceased	Removed as the MAR licence exemption has been handed back to the EPA

Jurisdiction that amendment applies	EPMP Doc.	Section No.	Description	Change Explanation
State Government	Groundwater MP	5.2	Open pit depressurisation and dewatering monitoring bores now called Southern Mine Area Monitoring Bores	Matches name in current mine plans
State Government	Groundwater MP	5.2	Changed sample bares in Southern Mine Area Monitoring Bores	Sample bores have been revised as no activity is occurring in the open pit and groundwater levels have recovered. A smaller network of bores continues to monitor recovery and quality.
State Government	Groundwater MP	5.2	Regional monitoring bores and Yarra Wurta springs have been changed to triennial monitoring.	With the hand back of the MAR licence exemption, no drawdown is expected at the Yarra Wurta complex. Data collection will be for background only.
State Government	Waste MP	2.8	Removal of the rock storage facility section	With the suspension of open pit mining activities, further material will not be placed in the RSF. Management of material already placed is covered in ID 1.1 Land disturbance and rehabilitation.
State Government	Waste MP	3.2	Removal of requirement to monitor the quantity of material deposited on the RSF	With the suspension of open pit mining activities, further material will not be placed in the RSF during the period of the EPMP or the foreseeable future. If open pit mining resumes, this section will be reinstated.
State Government	Social Effects MP	2.1.3	Removal of references to monitor a list of key stakeholders, their interests in the current operation and expansion of Olympic Dam and engagement methods.	This item was removed in the Addendum A, Amendments to Environmental Protection and Management Program FY11-13.
State Government	Social Effects MP	2.1.3	Removal of references to data showing the number and type of complaints reported to ODC about the current operations and expansion of Olympic Dam, and actions taken to address them.	This item was removed in the Addendum A, Amendments to Environmental Protection and Management Program FY11-13.

Jurisdiction that amendment applies	EPMP Doc.	Section No.	Description	Change Explanation
State Government	Social Effects MP	2.2.3	Removed monitoring of employees by nationality.	This information does not indicate compliance with the Indenture; employees who have been long-term residents of South Australia may choose to report as foreign nationality based on their country of birth.
State Government	Social Effects MP	2.3.3	Modified reportable data from the “number and spend value of contracts awarded” to “amount spent with local businesses”.	This update to the monitoring program aligns with actual monitoring and data reported since 2013.

APPENDIX B: INDEX OF OUTCOMES, CRITERIA, DELIVERABLES, TARGETS AND ACTION ITEMS