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Document Title	**Environmental Management Program Targets, Actions and Major Changes 2019**		
Area	Olympic Dam Shared Services	**Issue Date**	27 July 2018
Major Process	Environment	**Sub Process**	Environment
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1 SCOPE

This document outlines the Environmental Management (EM) Program targets, actions and continuous improvement opportunities which are updated annually (where required) as part of the Environmental Protection and Management Program (EPMP) review process and forms part of the EPMP. Progress in achieving these targets and actions is reported in the annual EPMP Report.

Targets, Actions and Continuous Improvement Opportunities as used in this EPMP are defined below.

Targets – are to reflect either a level of environmental impact that is as low as reasonably achievable (ALARA), or to indicate a long-term aspirational goal, or an interim target leading to a long-term goal. Failure to meet a target is not a breach of compliance.

Actions – are derived from the continuous improvement opportunities that have been identified for the relevant environmental aspect. Actions should be achievable within the EPMP review period (1-3 years) or may form part of addressing a more complex improvement opportunity. Where the environmental impact is ALARA, actions may not be applicable.

Continuous Improvement Opportunities – are activities that have been previously identified to either reduce operational impact on the environment or improve the way in which an environmental aspect is managed or monitored.

This document also provides a summary of any major changes to the Environmental Management Manual (EMM), EM Program and Monitoring Programs (MPs) that have resulted from the annual EPMP review process.

2 INTERPRETATION

This document should be read in conjunction with the EMM (Olympic Dam Document Number 2617), EM Program (Olympic Dam Document Number 49329) and MPs (Olympic Dam Document Numbers 2663, 2664, 2788, 2789, 2790, 2791, 2792, 49329, 110687 that form the Olympic Dam EPMP.

3 CONTINUOUS IMPROVEMENT OPPORTUNITIES, ACTIONS & TARGETS 2019

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
ID1 USE OF NATURAL RESOURCES			
ID 1.1 LAND DISTURBANCE AND REHABILITATION	Limited management of short-term surface rehabilitation has occurred on site due to the small areas involved, planned areas for expansion of the operations, and the low level of risk associated with these areas. Rehabilitation requirements of short-term surface disturbance, permitted under the Olympic Dam EDP System, including backfill areas, sand acquisition facilities, exploration areas, temporary storage facilities, temporary access routes and maintenance facilities. All other rehabilitation requirements are addressed through the Olympic Dam Rehabilitation Strategy. • Opportunity: Implement actions as identified in the Olympic Dam Rehabilitation Strategy. The Olympic Dam Mine Closure and Rehabilitation Plan was reviewed and submitted to government in September 2013. Risk workshops have been conducted annually using BHP's Risk Management methodology to evaluate the closure risks for all operational areas, and the accounting provision for closure is recalculated each year. • Opportunity: Clarify closure risks and assumptions identified in the Olympic Dam Mine Closure and Rehabilitation Plan. Considerable work has been undertaken to formalise weed monitoring and management at Olympic Dam. • Opportunity: Continue to undertake a regional approach to weed management through the coordination of annual workshops with Arid Recovery, Roxby Downs Council, Kingoonya NRM District Group and relevant pastoralists and contractors.	• Continue to implement actions and identify progressive rehabilitation opportunities in the Mine Closure Plan. • Review closure risks and assumptions through annual workshop. • Align pest plant and animal control with SAALNRM objectives	• None Applicable

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	• Opportunity: Contribute to a regional database, in collaboration with the wider SAAL NRM, to record areas of known weed infestations and management actions. Declared plant species under the NRM Act are present on ODC owned land within the Roxby Downs township (e.g., Buffel Grass). • Opportunity: Implement highest standard of vehicle hygiene in collaboration with the SAAL NRM Board where development is planned in known weed infestation locations. • Opportunity: Continue to progress control of Buffel Grass within the SML and Roxby Downs Municipality through ongoing control in the weeks following rain. • Opportunity: Actively engage with SAAL NRM and implement actions from the State Buffel Grass Strategic Plan: 2012 to 2017 where appropriate. • Opportunity: Continue to improve community and BHP employee knowledge about the impacts of pest plants and animals in the Roxby Downs region.		
ID 1.2 AQUIFER LEVEL DRAWDOWN	Within the GAB, pastoral abstraction may influence the reported drawdown. The elimination of pastoral flow at Jackboot Bore has resulted in drastically reduced drawdown, previously incorrectly attributed to Wellfield B operations. Some of the declining trends observed in current reported drawdown at D2 and Tarkanina 2 may also be influenced by antecedent pastoral flow and temperature effects. • Opportunity: Eliminate or minimise the influence of pastoral flow on reported drawdown. Within the deeper GAB the combination of high temperatures (> 60°C) and the depth of the aquifer (north of Wellfield B > 700 m) makes the monitoring of GAB groundwater heads challenging. Opportunities	• Continue implementation of water use conservation and recycling initiatives. • Continue substitution of saline water for high quality water where possible.	• Maintain an industrial water efficiency of 1.16 kL/t at the budgeted production rate. • Maintain a domestic water use target of 3.2 ML/day average.

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	exist for improving the quality of data collected and the accuracy of interpreted drawdown by reviewing the methods used for measurements and the way drawdown is calculated.		
ID2 STORAGE, TRANSPORT AND HANDLING OF HAZARDOUS MATERIALS			
ID 2.1 CHEMICAL / HYDROCARBON SPILLS	An audit of all existing bunds was undertaken in FY13 to determine compliance against the EPA Guidelines. Based on the audit a risk based approach and review is being applied to bund management. Process controls are implemented when bund capacity is inadequate or there is a risk that bunds will be insufficient to contain a spill if it is found that a spill is likely to occur. • Opportunity: Ensure bunds are continuously maintained and process controls are implemented such as safe fill levels and Citect alarms when a risk has been identified. The controls must be captured in the site aspect and impact register against the functional location of the bund.	• Maintain a register of recordable chemical and hydrocarbon spills and corrective actions. *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.* • Continue to implement environment improvement plans for areas of concern, as identified through the annual Aspects and Impacts risk register review	• Corrective actions for all reportable spills of chemicals and hydrocarbons are implemented in a timely manner and do not result in material environmental harm (as defined in the EMM). • Note: Spills are reportable if they result in potential or actual material environmental harm in accordance with the EP Act 1993
ID 2.2 RADIOACTIVE PROCESS MATERIAL SPILLS	The majority of spill events occur in areas within secondary and tertiary containment systems and have minimal potential to cause significant **environmental impact**. The data from these incidents are reviewed to identify root causes and reduce the potential for further spill events. • Opportunity: Review data to identify actions to be included in the area Environmental Improvement Plans. An audit of all existing bunds has been undertaken to determine compliance against EPA Guideline –Bunding and Spill Management (2007).Based on the audit a risk based approach and review is being applied to bund management. Process controls are implemented when	• Maintain a register of recordable spills of radioactive process material resulting from operations at Olympic Dam. *Note: Reportable and recordable spills of radioactive process material as defined by the Criteria and Procedures for Recording and Reporting Incidents at SA Uranium Mines (DEM), known as 'Bachmann Criteria'* • Continue to implement environment improvement plans for areas of concern as identified in the annual Aspects and Impacts risk register review	• No spill of Radioactive Process Material into an undisturbed environment • Corrective actions resulting from a reportable spill of radioactive process material are executed in a timely manner to ensure no adverse impacts to human health

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
	bund capacity is inadequate or there is a risk that bunds will be insufficient to contain a spill if it is found that a spill is likely to occur. • Opportunity: Ensure bunds are continuously maintained and process controls are implemented such as safe fill levels and Citect alarms when a risk has been identified.		
ID 3 OPERATION OF INDUSTRIAL SYSTEMS			
ID 3.1 PARTICULATE EMISSIONS	None Applicable	• Implement an Environmental Improvement Plan should any significant increase of operationally contributed PM_{10} 24-hour average of 50 µg/m^3 occur over the year.	• None applicable
ID 3.2 SULPHUR DIOXIDE EMISSIONS	Continue a watching brief on sulphur dioxide emission reduction technology.	• None Applicable	• Capture approximately 99 per cent of all SO_2 generated during the smelting process.
ID 3.3 SALINE AEROSOL EMISSIONS	Continue a watching brief on saline emission reduction technology.	• Install and maintain controls as per the design standard around raise bores.	• Monitor the deposition of salt from saline aerosol emissions at the edge of the SML against background levels of 20 mg/m2/day.
ID 3.4 RADIOACTIVE EMISSIONS	International and national standards, guidance and codes are subject to change from time to time, to ensure effective protection of humans and the environment from the harmful effects of radiation. Any new recommendations or revisions should be reviewed and implemented as necessary. • Opportunity: Maintain a watching brief on ICRP and IAEA recommendations and any new or revised national Codes and implement as necessary.	• None applicable	• Maintain radiation doses as low as reasonably achievable, as assessed through the annual Radiation Management Plan Review

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
	• Opportunity: Consider impacts of potential changes to ICRP recommended dose conversion factors for radon decay products and implement as required.		
ID 3.5 GREENHOUSE GAS EMISSIONS	• Continue to identify and implement energy efficiency projects for the existing operation, particularly those identified opportunities that do not require capital expenditure.	• None applicable	• None applicable
ID 4 GENERATION OF INDUSTRIAL WASTES			
ID 4.1 EMBANKMENT STABILITY OF TSF	Several contingency options exist to maintain slope stability and reduce the risk of potential piping failures. • Opportunity: Identify, design and install contingency options as required. Regular audits of the TRS operation are undertaken as described in the Waste MP. • Opportunity: Ensure improvement actions and recommendations from audits are documented and where appropriate implemented in a timely manner.	• Undertake periodic (2-3 year) CPTu testing of tailings to confirm strength parameters used in stability analysis.	• None applicable
ID 4.2 TAILINGS SEEPAGE	Regular inspections around the perimeter of the TSF identify any new areas of lateral seepage. Existing perimeter features are also monitored to determine if there is any change in size, location and appearance. • Opportunity: Install a liquor interception system where seepage of liquor has potential to impact native vegetation.	• Identify and install additional liquor interception systems as required.	• None applicable

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
ID 4.3 FAUNA INTERACTION WITH TAILINGS RETENTION SYSTEM	The TRS fauna project was instigated after an increase in numbers of birds interacting with the TRS became apparent in 2004. This project manages research, on-ground work and monitoring relating to the interaction of fauna with the TRS. • Opportunity: Identify new opportunities to reduce fauna mortalities through ongoing research into management practices relating to fauna interaction with tailings storage systems. Opportunistic and standardised monitoring of fauna interactions at the TRS has occurred since the implementation of the TRS fauna project. • Opportunity: Continue to assess the impact to fauna and the efficacy of various management tools through monitoring.	• Continue investigating and trial alternative deterrent technologies when they become available.	• None applicable
ID 4.4 SOLID WASTE DISPOSAL	The opportunity to reuse and recycle materials would be greater if more waste materials were segregated at their source. Segregation reduces contamination and double handling and enable more accurate tracking of waste streams. Waste segregation has been rolled out across site however still needs improvement and extension to the mine and underground mine. • Opportunity: Improve at source segregation and improve mine end waste segregation system. No site-standard recycling program exists for office-based waste. • Opportunity: Develop an office-based recycling program to enhance recycling of paper/cardboard and refundable drink containers. One of the largest volumes of waste generated on site is rubber tyres. Used tyres are already reused on site where possible, as road berms and for area demarcating. Reducing the quantity of waste tyres is key to reducing the volume of landfill. Investigations regarding initiatives to increase tyre life will be progressed during detailed design of the project (DEIS	• Implement a site wide paper/cardboard recycling programme with bailing and off site removal/recycling.	• Increase at source waste segregation to reduce waste to landfill.

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
	5.6.3; SEIS 5.4.3). • Opportunity: Investigate ways to increase tyre life for haul trucks.		
ID 4.5 RADIOACTIVE WASTE	International and national standards, guidelines and codes are subject to change from time to time, to ensure effective protection of humans and the environment from the harmful effects of radiation. Any new recommendations or revisions should be reviewed and implemented as necessary. • Opportunity: Maintain a watching brief on ICRP and IAEA recommendations and any new national Codes of Practice and implement as necessary. **ALARA** is built into the design of the operation. This means that all reasonable efforts are made to ensure that radiation and radioactive emissions are controlled and managed in the design of new plant. Radiation protection design criteria have been established and are mandatory for all facilities. An optimisation (**ALARA**) study will be conducted for all phases of any future expansion with findings incorporated into designs. • Opportunity: Develop and implement optimisation in design process. Olympic Dam produces waste of various streams as a result of normal operations. A permanent facility specifically designed for disposing contaminated waste has been established. Maximising the capacity whilst minimising the volume of waste deposited at the facility, is a key factor in reducing the environmental impact through land disturbance and improved resource recovery. • Opportunity: Continue to develop, update and implement a strategy towards managing radioactive waste produced at the site (including waste minimisation strategy).	• None applicable	• Maintain radiation doses as low as reasonably achievable, as assessed through the annual Radiation Management Plan Review.

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
ID 5 EMPLOYMENT AND ACCOMMODATION OF PEOPLE			
ID 5.1 COMMUNITY INTERACTION	• Olympic Dam provides opportunities for employment and businesses locally, regionally and state-wide and for specific target groups such as Aboriginal people. These opportunities would increase with any future expansion at Olympic Dam. ODC is also committed to increasing Aboriginal employment in the Olympic Dam workforce and to enabling Aboriginal enterprises from the Northern Region of South Australia to secure contracts at site. • Opportunity: Maximise opportunities for South Australian and Aboriginal employment and business participation at Olympic Dam: o Develop and implement a local procurement plan with targets to maximise the participation of local, regional and State businesses and employment in supplying goods and services to Olympic Dam; and o Continue to explore opportunities to build the capacity of Aboriginal people and businesses to participate in Olympic Dam. • ODC is committed to maintaining and enhancing the amenity and lifestyle of Roxby Downs. This requires a good understanding of the social and economic environment and the factors that influence amenity, such as the social cohesion, living costs, housing and social services. It is also recognised that responsibility for some social matters lies outside of the authority of ODC, and as such, will need to be managed collaboratively with the State Government and other key stakeholders. • Opportunity: Maintain and enhance the amenity and lifestyle of Roxby Downs as a desirable place to live and work:	• Undertake the triennial Community Perception Survey to monitor local community perceptions of ODC, and of local services and facilities.	• None applicable.

EM Program ID	CONTINOUS IMPROVEMENT OPPORTUNITIES	ACTIONS	TARGETS
	o undertake a regular (five-yearly) assessment (social baseline study) of Roxby Downs, Andamooka and Woomera; o continue to build on best practice and learnings from other remote Australian mine sites to enhance liveability and build sustainable relationships between the residential community and non-resident workforce; o in collaboration with the South Australian Government and key stakeholders, identify indicators to assist in planning, delivering and monitoring social infrastructure provision; and o work collaboratively with the South Australian Government and key stakeholders to investigate and deliver appropriate social services and infrastructure.		

4 SUMMARY OF AMENDMENTS TO THE EPMP 2018

Document	Section	Description of Change	Change Explanation
All	All	Reference to the Mine Closure and Rehabilitation Plan (2013) has been changed to Closure Management and Rehabilitation Plan (2018)	The Mine Closure Plan was reviewed and updated in 2018. The draft was submitted to State Government on the 17th January 2019.
EM Program	1.1.8	Removed Compliance Criteria in regards to land clearing limits.	The Compliance Criteria applied to the 2011 open pit expansion approval, which we do not operate under because the open pit expansion is not operational..
EM Program	1.1.12	Remove control/Management Action: '4. A 500 metre (m) buffer is maintained between the mining (RSF) and processing operations and the existing footprint of Arid Recovery (DEIS 9.7.2).'	This buffer was based on modelling completed for the Open Pit Expansion. Not relevant for current activities.
EM Program	3.1.12	Remove control and management action: "A 500 m separation between the RSF and Arid Recovery to minimise direct impacts from particulate matter (DEIS 13.3.4). "	This is not relevant to current operations.
EM Program	3.2.13	Amended "Emissions from the Acid Plant Tail Gas Stack may exceed 3,000 mg/Nm3 of total acid gases for a period of less than five hours during cold plant start-up" to "Emissions from the Acid Plant Tail Gas Stack may exceed 3,000 mg/Nm3 of total acid gases during cold plant start-up and abnormal or emergency situations".	This has been updated to reflect the updated EPA 1301 licence and revocation of exemption licence 3014.
EM Program	3.3.8	Updated compliance criteria with the inclusion of "due to habitat loss: No loss of an important population of Plains Rat (*Pseudomys australis*) due to habitat loss.	Saline emissions from raise bores without engineering controls could impact vegetation causing habitat loss which could impact Plains Rat.
Annual Targets and Actions	Table 3 ID 3.2	Removed Continuous Improvement "Sampling has identified Acid Plant bypasses as being the emission most likely to result in **environmental impact**. Opportunity: Investigate threshold levels for effects of sulphur dioxide (SO_2) on flora in the region of Olympic Dam.	This was completed through a Masters Research Program and reported to the EPA through the annual EPMP Report.
Annual Targets and Actions	Table 3 ID 3.2	Included "Continue a watching brief on sulphur dioxide	Previous continuous improvement was completed.

Document	Section	Description of Change	Change Explanation
		emission reduction technology."	
EM Program	4.4.10	Updated the TRS Waste Management Plan document number.	A Tailings Retention Storage Waste Management Plan has been compiled which details waste disposal into the facility.
EM Program	4.4.12	Updated that any leachate from sludge and biosolids must be directed to the waste water management system.	Updated to reflect the wording of the updated EPA 1301 Licence.
EM Program	4.5.10	Updated to include the TRS Waste Management Plan, Document 159188.	A Tailings Retention Storage Waste Management Plan has been compiled which details waste disposal into the facility.
EM Program	3.5.3	Wording additions to management strategy.	Better describe BHP climate change strategy.
EM Program	3.5.8	Compliance criteria	Minor modification to better reflect BHP group-wide approach.
EM Program	4.3.3	Remove Management Strategy: '• Committing to not constructing further evaporation ponds.'	This is misleading as further evaporation ponds will be required for the operation of the TRS, however, older ponds will be decommissioned accordingly.
Flora MP	2.4.2	Remove purpose statement '• Ensure that the total area of vegetation cleared does not exceed the total area indicated in the EIS (2009; 17,269 ha) and that the area of SEB is sufficient.'	This statement is no longer relevant as clearances are no longer being completed as described under the 2009 EIS, because this related to the open pit expansion which is not operational.
Energy Use and Greenhouse Gas Emissions MP	2.2	Minor wording change to background (2.2.1) and deliverables (2.2.3)	Make consistent with minor changes to EM Program ID 3.5
Groundwater MP	Table 5-1 Table 5-2	Addition of replacement groundwater bores	Monitoring bores LT18A, LT39A and LT40B added to table 5-1 as replacements for LT18, LT39 and LT40 which have been decommissioned due to operational projects. LT39A added to table 5-2.
Groundwater MP	Table 5-1	Removal of groundwater bores	• LT45 bore has been decommissioned as part of TRS operations. • RD169 has been decommissioned for operations reasons • RD3514P1 and RD4462 have been removed due to both wells being within SMA operational areas and decommissioned.

Document	Section	Description of Change	Change Explanation
GAB MP	Table 8.2	Removal of GAB 15 and GAB 15s from monitoring program	• GAB 15 has not been used or monitored for several years. Headworks have been removed other than main shut in valve. Well is due to be decommissioned in FY20 as no longer required.
GAB MP	Table 8.3	The priority Q1, Q3-Q4 monitoring change to meet business cycle.	• The change was to align the Q1,2,3,4 with the BHP business cycle. Wells are still monitored at the same frequency. BHP works on a financial year – the table was calendar year based.