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Document Title	**Monitoring Program – Energy Use and Greenhouse Gas Emissions**		
Area	HSE	**Issue Date**	
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Authoriser	Jacqui McGill – Asset President Olympic Dam	**Version Number**	9

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1 SCOPE

This Monitoring Program (MP) describes the activities undertaken by BHP Billiton Olympic Dam Corporation Pty Ltd (ODC) to monitor and reduce energy use and greenhouse gas (GHG) emissions. It outlines the data collection methodologies and reporting requirements. To address the challenge of climate change, ODC is required to comply with corporate and regulatory requirements associated with energy efficiency and GHG emissions.

This MP addresses a number of distinct elements of energy and greenhouse gas emission monitoring. For each element, the MP sets out some background information, the purpose of the monitoring and the deliverables which are produced as a result of the monitoring The MP also includes a description of the methods for measuring achievement of **compliance criteria** and the movement of trends towards **leading indicators** (where applicable).

This MP considers the Scope 1 and Scope 2 emissions from Olympic Dam which emanate from the following areas:

- Mine;
- Processing;
- Smelter and refinery; and
- Other miscellaneous areas and processes.

Scope 1 emissions are direct emissions from sources within the boundary of an organisation (e.g. fuel used on site). Scope 2 emissions are indirect emissions from the consumption of purchased electricity.

Scope 3 emissions are also considered, providing information that may influence purchasing decisions and reduce the overall emissions footprint of the operation. Scope 3 emissions are all other indirect emissions associated with the activities of an organisation.

Energy use and GHG emissions are reported in gigajoules (GJ) and metric tonnes carbon dioxide equivalent (t CO_2-e) respectively, per unit of production. CO_2-e is used because CO_2 is the dominant greenhouse gas. CO_2-e is the universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gases, expressed in terms of the GWP of one unit of carbon dioxide. The GWP is a factor relating the radiative forcing impact (contributing to the warming of the atmosphere) of one tonne of a given greenhouse gas relative to one tonne of carbon dioxide.

Calculating GHG emissions takes into account all six groups of direct GHGs listed in Annex A of the Kyoto Protocol (United Nations 1998) as well as in the National Greenhouse Gas and Energy Reporting (NGER) Regulations 2008 (Australian Government, 2008). Emissions of each type are weighted according to their GWP to give a carbon dioxide equivalent emission value in units of t CO_2-e.

The other five direct GHGs listed in the NGER Regulations 2008 are:

- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (specified) (CHF_2FCF_3);
- Perfluorocarbons (specified) (CF_4 and C_2F_6); and
- Sulphur hexafluoride (SF_6).

Emissions of N_2O from Olympic Dam operations are unlikely, and emissions of CHF_2FCF_3 and SF_6 are negligible. Emissions of CF_4 and C_2F_6 are not relevant to Olympic Dam - they are mainly associated with aluminium smelters.

Various indirect GHGs such as carbon monoxide (CO), oxides of nitrogen (NO_x), oxides of sulphur (SO_x), and non-methane volatile organic compounds (NMVOCs) are also recorded in ODC's reporting process, but they are not used in the calculation of carbon dioxide equivalent emissions because they have no GWP.

1.1 Responsible ODC personnel

The Olympic Dam Asset President is responsible for ensuring that all legal and other requirements described in this MP are met.

ODC employs sufficient staff with experience and qualifications to fulfil the requirements of this MP.

1.2 Review and modification

The Olympic Dam Asset President is responsible for ensuring that all legal and other requirements described in this MP are met.

2 DETAILED PROCEDURE

2.1 Greenhouse gas emissions

2.1.1 Background

Historically, the most significant source of GHG emissions associated with Olympic Dam has been indirect emissions associated with purchased electricity. Reporting emissions to the Olympic Dam workforce helps focus attention on the issue and drive behaviour towards reducing GHG emissions.

2.1.2 Purpose

- Monitor and report the GHG emissions arising from the Olympic Dam operation.

2.1.3 Deliverables

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

2.1.4 Method

All calculations and data sources are traceable in accordance with the audit requirements of the **National Greenhouse and Energy Reporting Act 2007** (Australian Government 2007).

The Clean Energy Regulator produces guidelines for complying with the requirements of the Act. These allow for both direct GHG emissions monitoring, as well as methods for the estimation of GHG emissions. Estimates are made through the tracking of observable, closely-related variables such as fossil fuel consumption, with subsequent application of a supplied emission factor to provide an estimate of greenhouse gas emissions from that source.

2.2 Greenhouse gas and energy reduction

2.2.1 Background

GHGs, including water vapour, carbon dioxide and methane, contribute to global warming and climate change. Reducing GHG emissions and energy usage can therefore assist in mitigating climate change, and is consistent with international, national and state policy. In addition, these reductions fulfil ODC's commitments and policy obligations.

The goal of reducing GHG emissions will be achieved by identifying, and where possible implementing, emission reduction opportunities and initiatives. These may include improving energy efficiency, using renewable energy and promoting other greenhouse gas abatement measures.

2.2.2 Purpose

- Provide data for the calculation of GHG emissions, and for tracking and reporting of progress toward GHG reduction targets.

2.2.3 Deliverables

- An annual ‘road map’ that quantifies emission reduction opportunities and achievements.

2.2.4 Method

Carbon reduction opportunities are reviewed and updated annually to determine viable, cost-effective opportunities and possible timeframes for implementation. Carbon reduction achievements are reported annually.

3 COMMITMENTS

3.1 Reporting

The results and a discussion of the findings and progress against targets are presented in the annual EPMP report as outlined in the **Environmental Management Manual** (EMM).

ODC is required to report monthly to BHP Billiton Corporate on the quantum of direct greenhouse gases by type and the energy sources associated with the emissions.

ODC is responsible for submitting the annual NGER report direct to the Federal Government in accordance with the relevant legislation.

3.2 Summary of commitments

Table 3.1: Summary of commitments

Action	Parameter	Frequency
Assess	Scope 1 and 2 GHG equivalent emission intensities	Annually
Update	Road map of carbon reduction opportunities and achievements	Annually
Report	Road map and monitoring results in the annual EPMP report to the Indenture Minister	Annually
Review	The Energy Use and GHG MP and modify as appropriate	Annually

4 DEFINITIONS AND REFERENCES

4.1 Definitions

Throughout the EPMP some terms are taken to have specific meaning. These are indicated in bold text in the documentation and are defined in the glossary in section 5 of the EMM. Defined terms have the same meaning wherever they appear in bold text. Some other terms and acronyms are also defined in the glossary, but do not appear in bold text.

4.2 References

United Nations 1998, Kyoto Protocol to the United Nations Frames Convention on Climate Change, United Nations, Geneva.

Australian Government, National Greenhouse and Energy Reporting Act 2007, Australian Government, Canberra.

Australian Government, National Greenhouse Gas and Energy Reporting (NGER) Regulations 2008, Australian Government, Canberra.

Department of Climate Change and Energy Efficiency (DCCEE) 2011, National Greenhouse and Energy Reporting System Measurement – Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia - July 2014, Australian Government, Canberra.