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KURRI KURRI ALUMINIUM SMELTER DECOMMISSIONING, DEMOLITION AND REMEDIATION ENERGY EFFICIENCY MANAGEMENT PLAN

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Description **Ramboll was engaged by Hydro Aluminium Kurri Kurri Pty Ltd to prepare a Remediation Works Environmental Management Plan (RWEMP) to describe how environmental management will be undertaken at the former Hydro Aluminium Kurri Kurri aluminium smelter at Hart Road Loxford, NSW and the surrounding land owned by Hydro. This Energy Efficiency Plan forms a component of the RWEMP.**

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ACRONYMS AND ABBREVIATIONS

EEMP	Energy Efficiency Management Plan
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
GHG	Greenhouse gas
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
kL	Kilolitre
kWh	Kilowatt hour
RWEMP	Remediation Works Environmental Management Plan
tCO ₂ e	Tonnes of carbon dioxide equivalent
WHS	Workplace Health and Safety

GLOSSARY

Council	Cessnock City Council
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
The Smelter	The former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter at Hart Road, Loxford.
Hydro Land	The land owned by Hydro Aluminium Kurri Kurri Pty Ltd which includes the Smelter and surrounding land.
Remediation	Remediation of contaminated land and soils at the Smelter and on Hydro Land, including the construction of a Containment Cell as addressed in the State Significant Development application to the Department of Planning and Environment SSD 6666.
Scope 1	Direct emissions created from sources owned and controlled by Hydro.
Scope 2	Indirect emissions created from purchasing energy (heat or electricity) consumed by the project. These indirect emissions are a consequence of the activities however arise from sources that are not owned or controlled by Hydro.
Scope 3	All other indirect emissions that occur in the value chain of the reporting organisation, including upstream and downstream activities.
Stage 1 Demolition	Demolition of Smelter buildings addressed in the development application 8/2015/399/1.
Stage 2 Demolition	Demolition of Smelter buildings, three concrete stacks, one water tower, subsurface structures to 1.5m below ground surface and operation of a concrete crushing plant addressed in the development application to Cessnock City Council 8/2018/46/1.
The Smelter	The former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter at Hart Road, Loxford.

1. INTRODUCTION

1.1 Background

This Energy Efficiency Management Plan (EEMP) has been prepared by Ramboll Australia Pty Ltd on behalf of Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to support the Remediation Works Environmental Management Plan (RWEMP) which addresses the decommissioning, demolition and remediation activities at the former Hydro Aluminium Kurri Kurri Smelter (the Smelter) at Hart Road Loxford and the management of the surrounding land owned by Hydro (the Hydro Land).

1.2 Objectives

The objectives of this EEMP are to:

- Identify sources of energy use at the Smelter.
- Outline relevant legislation and guidelines.
- Identify measures to minimise energy use at the Smelter.
- Establish the roles and responsibilities of all parties involved in energy efficiency.
- Establish supervision, monitoring, auditing and reporting framework for the EEMP.

1.3 Purpose and Scope

The purpose of the EEMP is to specify procedures for management of energy efficiency related issues and impacts during activities at the Smelter and on the Hydro Land.

The EEMP has been developed with reference to the following legislation and guidelines:

- *National Greenhouse and Energy Reporting Act 2007*
- *National Greenhouse and Energy Reporting Regulations 2008*
- Guidelines for Energy Saving Action Plans (Department of Energy, Utilities and Sustainability, 2005)

2. POTENTIAL IMPACTS

2.1 Emission Sources

Emissions associated with Smelter activities are described as Scope 1, 2 and 3 emissions in accordance with the GHG Protocol. These are defined as:

- Scope 1 emissions – direct emissions created from sources owned and controlled by Hydro.
- Scope 2 emissions – indirect emissions created from purchasing energy consumed by the activities. These indirect emissions are a consequence of the activities however arise from sources that are not owned or controlled by Hydro.
- Scope 3 emissions – all other indirect emissions that occur in the value chain of the reporting organisation, including upstream and downstream activities.

Scope 1 emissions are produced by the combustion of fuels such as diesel used by equipment and machinery for the demolition, remediation and construction works.

Scope 2 emissions arise from the consumption of electricity, in miscellaneous plant and equipment, office and contractor compounds and from temporary lighting that is owned and operated by Hydro.

All other emissions are defined as Scope 3 emissions as they are produced outside the Smelter, and Hydro does not have operational control of the facilities from which they originate. Hydro does not own or operate any of the vehicles that transport raw materials, plant, equipment, and machinery or contractor personnel to the site. As such, the emissions resulting from the combustion of fuels for this transportation are classified as Scope 3 emissions. However, these emissions have been included in this assessment as there will be considerable vehicle movements to and from the site that are considered appropriate to report.

2.1 Potential Impacts

Activities will use energy through the following:

- Electricity to power equipment at the office, amenities and contractor's compound/s (if required).
- Operation of machinery and equipment.
- Operation of the concrete and brick crushing plant.
- Operation of the leachate treatment plant (potential).
- Trucks transporting machinery, equipment and materials to and from the site.
- Trucks processing and sorting the demolition waste and transporting to the stockpile area and or Containment Cell.
- Trucks transporting gypsum to the site for treatment of the Capped Waste Stockpile material prior to placement in the Containment Cell.
- Trucks transporting the treated Capped Waste Stockpile material to the Containment Cell.
- Trucks transporting liquid waste to the onsite temporary water treatment plant or offsite for treatment.

This energy will be provided through either fuel (such as diesel) or electricity from the existing network. As parts of the Smelter electricity supply network will be decommissioned during the activities, some temporary alterations to the network or alternative supplies (such as diesel powered generators) will be required.

A summary of the emissions associated with demolition and remediation activities is provided in **Table 2-1**.

Table 2-1: Scope 1, 2 and 3 GHG Emissions Sources

Emissions	Emissions Sources
Scope 1	Diesel consumption by excavation equipment used on-site (including excavators, graders, dozers, rollers, compactors, backhoes, boom lifts, trucks, telehandlers, water trucks, service vehicles, prime movers) Diesel consumption by concrete crushing plant used on-site Waste placed in the Containment Cell
Scope 2	Electricity usage in administration offices, contractor compounds, temporary lighting and other electricity-powered machinery and equipment Consumption of purchased electricity for temporary water treatment plant
Scope 3	Diesel consumption in vehicles transporting scrap metal from the Smelter to its final destination Diesel consumption in vehicles transporting plant, equipment and machinery to and from the Smelter Unleaded petrol and diesel consumption in vehicles bringing Hydro and contractor personnel to and from the Smelter Diesel consumption in vehicles transporting Containment Cell construction materials and site establishment materials to the Project Site (such as sand, gravel, liner, filter fabric and security fencing) Diesel consumption in vehicles transporting gypsum to the Smelter to treat the Capped Waste Stockpile material prior to placement in the Containment Cell

2.1.1 Predicted Emissions

Demolition and remediation activities are predicted to result in Scope 1 and 2 emissions of 85,350 tCO₂e all of which is due to the consumption of diesel for equipment and machinery use. Greenhouse gas emissions during demolition and remediation are presented in **Table 2-2**.

Table 2-2: Demolition and Remediation – Scope 1 and Scope 2 GHG Emissions

Emission Source	Quantity	Units	Scope 1 Emissions (tCO ₂ e)	Scope 2 Emissions (tCO ₂ e)	Total Emissions (tCO ₂ e)
Stage 1 Demolition					
Diesel	846.56	kL	2,280.45		
Electricity	0	kWh			
Total Stage 1 Demolition			2,280.45	0.00	2,280.45
Stage 2 Demolition and Remediation					
Diesel	3072.008	kL	8,140.61		
Electricity	22,940,972.00	kWh		19,729.24	
Waste	276,000.00	tonnes	55,200		
Total Stage 2 Demolition and Remediation			63,340.61	19,729.24	83,069.84
Total Demolition and Remediation			65,621.06	19,729.24	85,350.29

Scope 3 emissions associated with demolition and remediation are presented in **Table 2-3**. Total Scope 3 emissions for demolition and remediation are estimated to be 664 tCO₂e.

Table 2-3: Demolition and Remediation – Scope 3 GHG Emissions

Emission Source	Quantity	Units	Scope 3 Emissions (tCO₂e)
Stage 1 Demolition			
Diesel – equipment delivery	0.34	kL	0.91
Diesel – scrap metal recycling	21.58	kL	58.16
Petrol – personnel travel	36.33	kL	83.14
Total Stage 1			142.21
Stage 2 Demolition and Remediation			
Diesel – equipment delivery	5.56	kL	14.97
Diesel – scrap metal recycling	9.25	kL	24.92
Diesel – waste oil disposal	0.32	kL	0.86
Diesel – Containment Cell construction material delivery	28.2	kL	75.99
Petrol – personnel travel	177.12	kL	405.36
Total Stage 2 Demolition and Remediation			522.10
Total Demolition and Remediation			664.31

Approximately 87% of the Project's Scope 1 emissions will be attributed to the wastes encapsulated in the Containment Cell and the remainder due to emissions from on-site equipment and machinery use. Approximately 78% of the Scope 3 emissions will be attributed to personnel travelling to and from the Project Site.

3. IMPLEMENTATION

3.1 Roles and Responsibilities

Key personnel responsible for implementation of this EEMP are in **Table 3-1** and consistent with the overall RWEMP.

Table 3-1: Hydro Personnel and Environmental Management Responsibilities

Position	Responsibilities
OVERALL SITE MANAGEMENT	
Managing Director	Make certain that the Hydro Team and contractors are implementing this EEMP.
	Provide adequate resources and funding for the implementation of this EEMP.
	Review and approve RWEMP (including this EEMP).
Principal Environmental Consultant	Provide advice on and assistance in implementation, monitoring and auditing of environmental management and performance.
	Review and modify the EEMP as directed by the Managing Director and/or Project Manager.
Principal Communications Consultant	Manage the mechanisms available for the community to receive information and to make enquiries or complaints about activities.
SMELTER DECOMMISSIONING AND DEMOLITION ACTIVITIES	
Project Manager	Make certain that any proposed works or changes to existing activities, that may have an impact on the environment or the community, have the necessary legislative approval prior to the commencement of works.
	Make certain that the environmental aspects and issues, associated with proposed works or changes to existing activities, are adequately addressed in the EEMP.
	Review and approve the EEMP on an annual basis or when changes to activities at the Smelter occur.
	Facilitate implementation of the EEMP.
Construction Manager	Verify that the work of contractors and Hydro personnel on the Project are undertaken in accordance with this EEMP, relevant environmental management plans, procedures and standards.
	Provide appropriate training to contractors and Hydro personnel on the Project regarding environment and community requirements and responsibilities.
	Review and approve the contractors' environmental management documentation prior to commencement of activities and inform contractors of changes to the EEMP.
Contract Administrator	Provide relevant environmental legislative, regulatory and management requirements in tender documentation.
	Verify that the work of contractors is undertaken in accordance with this EEMP and other relevant environmental procedures and standards.
Work Place Health and Safety (WHS) Manager	Provide Hydro personnel with the necessary tools and training to enable effective implementation of the RWEMP.
	Implement and maintain an induction package to be provided to all personnel working at the Smelter and Hydro Land, which will include information relevant to the environmental and community management.
	Undertake a weekly inspection of the Project activities at the Smelter, for the duration of the Project.
	Maintain a record of personnel induction and training records.

Position	Responsibilities
Demolition Contractor	<p>Comply with the requirements of the EEMP as it applies to Smelter demolition activities.</p> <p>Implement the environmental measures and actions as described in the EEMP through a Demolition EMP and supporting sub-plans and specific procedures that comply with this EEMP.</p> <p>Develop and implement procedures for self-checking environmental management compliance with the Demolition Contractor’s procedures and this EEMP.</p> <p>Report potential or actual environmental incidents associated with demolition activities at the Smelter, and assist as required in the investigation, implementation of corrective actions and recording of the incident.</p>
Remediation Contractor	<p>Comply with the requirements of the EEMP as it applies to Smelter and relevant Hydro Land remediation activities.</p> <p>Implement the environmental measures and actions as described in the EEMP through a Remediation EMP and supporting sub-plans and specific procedures that comply with this EEMP.</p> <p>Develop and implement procedures for self-checking management compliance with the Remediation Contractor’s procedures and this EEMP.</p> <p>Report potential or actual environmental incidents associated with remediation activities at the Smelter and relevant Hydro Land, and assist as required in the investigation, implementation of corrective actions and recording of the incident.</p>
CARE, MAINTENANCE AND HYDRO LAND MANAGEMENT ACTIVITIES	
Environmental Officer/ Hydro Land Manager	<p>Coordinate and implement the environmental monitoring program</p> <p>Verify that the work of contractors and Hydro personnel on Hydro Land are undertaken in accordance with this EEMP and relevant environmental procedures and standards.</p> <p>Undertake a weekly inspection of activities on the Hydro Land that will occur for two weeks or more.</p>
ALL AREAS AND ACTIVITIES	
Contractors	<p>Comply with the requirements of the EEMP as it applies to site environmental management and control.</p> <p>Implement the environmental measures and actions as described in the EEMP through procedures and management plans that comply with this EEMP.</p> <p>Develop and implement procedures for self-checking management compliance with Contractor’s procedures and this EEMP.</p>
All Personnel	<p>Implementation of the relevant environmental measures described in this EEMP applicable to their activities.</p>

3.2 Management Measures

Hydro will implement a number of controls to manage energy efficiency for activities at the Smelter. The energy efficiency management measures to be implemented at the Smelter are outlined in **Table 3-2**.

Table 3-2: Energy Efficiency Management Measures

Management Measures	Actions	Timing / Frequency	Responsibility	Further Detail
Energy efficiency control measures will be implemented to mitigate potential impacts	Undertake a review of vehicles and machinery to ensure energy efficient vehicles are procured or used, where possible.	Prior to and during activities	Project Manager Site Services Manager	
	Lighting systems (if required) will be located and designed to minimise light spillage.	Prior to and during activities	Project Manager Site Services Manager	
	Vehicles and machinery will be turned off or throttled down when not in use where practicable.	Prior to and during activities	Project Manager Site Services Manager	
	Energy efficient inverter split system units will be installed in contractor compounds where practical and timers set so that air conditioning systems are switched off after hours.	Prior to and during activities	Project Manager Remediation Contractors Demolition Contractors	
	Personnel will be instructed to turn off lights and office equipment when these are not in use such as before and after the working day.	Prior to and during activities	Site Services Manager Remediation Contractors Demolition Contractors	
	Personnel will be encouraged during the site induction to travel to and from the Smelter by carpooling.	Prior to and during activities	Project Manager Site Services Manager Remediation Contractors Demolition Contractors	
Modern and fuel efficient vehicles and machinery will be used during the Works wherever possible. Equipment will be inspected and maintained in accordance with manufacturer's requirements.	Undertake regular preventative maintenance of all vehicles and machinery.	Prior to and during activities	Project Manager Site Services Manager Remediation Contractors Demolition Contractors	
	The potential for use of biodiesel blend fuels in its vehicles and machinery will be investigated.	Prior to and during activities	Project Manager Site Services Manager Remediation Contractors Demolition Contractors Remediation Contractor	
Minimise the exposure of the waste material to moisture during the stockpiling, transport and placement activities to reduce the potential for generation of methane emissions.	Implementation of the measures described in the Soil and Water Management Plan.	Prior to and during remediation activities		Section 3.2 of the SWMP
Carry out regular site inspections to monitor compliance with the EEMP, record inspection results, and make an inspection log available to the Department of Planning and Environment, the EPA or Cessnock City Council upon request.	Undertake inspection of activities to assess effectiveness of energy efficiency control measures and compliance with the EEMP.	Monthly	Project Manager Site Services Manager	Section 5.2 of the RWEMP (inspections)

4. MONITORING AND REVIEW

4.1 Monitoring

Hydro will undertake regular monitoring to ensure activities are not causing a detrimental environmental or community impact and to maintain compliance with relevant approvals and licences.

Records of electricity and fuel consumption for the activities will be recorded on a monthly basis.

4.2 Reporting

All internal and external environmental reporting requirements will be undertaken in accordance with the EMP.

Reporting will also be undertaken in accordance with relevant legislation, guideline and notification requirements, as outlined in **Section 1.3**.

4.3 Non-conformances

The need for preventative or corrective action arises from the identification of non-conformance with environmental legal requirements, Hydro environmental requirements or the potential for non-conformances to occur.

Non-conformances will be resolved and recorded in accordance with Section 3.5.5 of the RWEMP.

4.4 Complaints

Community Complaints are considered environmental incidents and are investigated and documented accordingly. This will include any complaints relating to energy efficiency at the Smelter.

Investigations will be conducted by the Environment Officer, including provision of feedback to the complainant. Corrective actions will be documented and regularly reviewed until completion and signed off.

Handling of complaints will be undertaken in accordance with Section 3.5.6 of the RWEMP.

4.5 Review and Improvement

Continual improvement of the EEMP will be achieved by the continual evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The Environmental Officer is responsible for ensuring that a regular review of the RWEMP and specialist management plans is undertaken.

Reviews will be recorded in the document control section of this plan.

5. REFERENCES

Department of Energy, Utilities and Sustainability. 2005. *Guidelines for Energy Saving Action Plans*.

Ramboll Environ (2015) *Statement of Environmental Effects - Demolition of Former Aluminium Smelter Buildings at Kurri Kurri*

Ramboll Environ (2016) *Environmental Impact Statement: Former Hydro Aluminium Kurri Kurri Smelter Demolition and Remediation*

Ramboll (2018) *Environmental Impact Statement: Former Hydro Aluminium Kurri Kurri Smelter Stage 2 Demolition*

Ramboll (2020) *Response to Submissions Report: Former Aluminium Kurri Kurri Smelter Remediation*

6. LIMITATIONS

Ramboll Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Pty Ltd dated 20 July 2018 and in accordance with our understanding and interpretation of current regulatory standards.

Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and Ramboll Australia Pty Ltd disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll Australia Pty Ltd's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll Australia Pty Ltd's knowledge as at the date of the assessment.

Ramboll Australia Pty Ltd did not independently verify all of the written or oral information provided to Ramboll Australia Pty Ltd during the course of this investigation. While Ramboll Australia Pty Ltd has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll Australia Pty Ltd was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

6.1 User Reliance

This report has been prepared exclusively for Hydro Aluminium Pty Ltd. It may not be relied upon by any other person or entity without Ramboll Australia Pty Ltd's express written permission.