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# Containment Cell

## Gas Monitoring Plan

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## GAS MONITORING PLAN

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Date           **3/09/2024**  
Made by       **J Auld**  
Checked by    **K Greenfield (CEnvP Site Contamination Specialist SC40104)**  
Approved by   **F Robinson (CEnvP Site Contamination Specialist SC40100)**  
Description    **The purpose of this document is to describe the ongoing management and monitoring plan of landfill gas to occur at the Containment Cell located off Hart Road, Loxford.**



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D1	01/02/2024	J Auld	K Greenfield	F Robinson	Draft for client review
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Ramboll Australia  
The Arc, 45a Watt Street  
Newcastle NSW 2300  
T +61 2 4962 5444  
www.ramboll.com

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GLOSSARY

GMP	Gas Monitoring Plan
Ramboll	Ramboll Australia Pty Ltd
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
LTMP	Long Term Management Plan
Engineered Containment Cell	The constructed Engineered Containment Cell at the former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter at Hart Road, Loxford.

## 1. INTRODUCTION

### 1.1 Background

This Gas Monitoring Plan (GMP) has been prepared by Ramboll Australia Pty Ltd on behalf of Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to support the Long-Term Management Plan (LTMP) and to provide a basis for management and monitoring of landfill gas from the Engineered Containment Cell (ECC) at the former Hydro Aluminium Kurri Kurri Smelter located off Hart Road, Loxford New South Wales (NSW).

The ECC comprises a fully lined cell used for the emplacement of operational wastes generated during the operation of the former Aluminium Smelter. Following closure of the cell, monitoring of gas generated from the wastes is required. Gas is referred to as 'landfill gas' though it is recognised that the gas source relates to industrial wastes generated from the aluminium smelting process, as differentiated from municipal landfill waste. Wastes within the ECC are not putrescible and only gas generating when in contact with moisture.

### 1.2 Purpose and Scope

This GMP addresses items relating to gas monitoring in Condition B33 under 'Part B Specific Environmental Conditions' in the State Significant Development (SSD) 6666 Conditions of Consent, which states the following:

*Condition B33*

*Two months prior to the completion of filling of the containment cell, the Applicant must prepare a Gas Monitoring Plan (GMP) to the satisfaction of the Secretary. The GMP must form part of the LTMP required by Condition B7. The GMP must:*

- (a) describe the location, frequency and duration of gas monitoring;*
- (b) outline trigger levels for the implementation of contingency measures; and*
- (c) contain a range of contingency measures to respond to exceedances of the trigger levels.*

## 2. Monitoring and Review

### 2.1 Location of the Engineered Containment Cell

The ECC has been constructed in the north-western portion of the former Hydro Aluminium Kurri Kurri Smelter off Hart Road Loxford NSW. The ECC contains one gas vent for monitoring located in the centre of the final capping. Detailed design drawings and the construction design details for this vent were prepared by the cell designer, GHD Pty Ltd (GHD, 2019).

The location of the ECC and the gas vent in the centre of the ECC are shown in **Figure 1, Appendix 1**.

### 2.2 Landfill Gas Monitoring Program

The gas monitoring program of the landfill gas vent at the ECC is to be completed as follows in accordance with a Safe Work Method Statement prepared by the Containment Cell Advisor, and reviewed and endorsed by the Containment Cell Owner:

- On a quarterly basis
- For methane (% v/v) and ammonia (ppm)
- For a period of five years

Quarterly gas monitoring will be completed as follows:

- Utilise a multi-gas analyser or equivalent instrument that detects methane (% v/v) and ammonia (ppm) from a rental supplier of environmental monitoring instrumentation
- Retain and file the calibration certificate provided at the time of use
- Access the hatch in the central gas vent
- Turn the multi-gas analyser on and complete the fresh air calibration as indicated by the instrument
- Attach the multi-gas analyser to the gas sampling port using flexible tubing
- Record the initial, maximum and steady concentrations of methane and ammonia
- Record pressure and flow rate.

The gas monitoring program is outlined in **Table 2-1**.

**Table 2-1: Landfill Gas Monitoring Commitments**

Monitoring Details	Frequency	Locations	Parameters	Person/s Responsible
Visual inspection of the condition of the ECC gas vent	Quarterly (during gas monitoring) OR in response to a report of potential damage.	Where gas vent is installed	Determine if the gas vent is working or if it requires maintenance, repair or replacement	ECC Advisor
Monitoring of the gases generated from the ECC	Quarterly for 5 years, then annually for 5 years and cease after five years of complying with trigger levels	Where gas vent is installed	Methane (% v/v) Ammonia (ppm)	ECC Advisor

### 2.3 Landfill Gas Trigger Levels

Landfill gas trigger levels have been developed to identify conditions that should be met to support a reduced monitoring frequency. **Table 2-2** describes these trigger levels.

**Table 2-2 Trigger Levels**

Monitored analytes	Trigger Level
Methane	< 100% LEL or 5 % v/v (5000ppm) as per LTMP
Ammonia	< 50 ppm as per LTMP

### 2.4 Reporting

All internal and external environmental reporting requirements will be undertaken in accordance with the LTMP. Reporting will also be undertaken in accordance with relevant legislation, guideline and notification requirements, as outlined in the LTMP.

At the completion of four monitoring events over a 12 month period, a report is to be prepared for the landfill gas vent monitoring that includes:

- Tabulated results for analytical data
- Trend analysis of monitored analytes
- Assessment of the measured analytes compared against trigger levels discussed in **Section 2.3**
- Conclusion and recommendations from the assessment and continual monitoring of the landfill gas

### 2.5 Review of Gas Monitoring

After the period of five years of quarterly landfill gas monitoring, if landfill gas levels remain below trigger levels, monitoring frequency will be revised to occur annually.

After an additional five years, a review of frequency and continuance of monitoring depending on results will be undertaken and monitoring will cease if compliance with trigger levels is determined.

### 2.6 Non-conformances and potential responses

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.

Table 4-2 of the LTMP identifies the potential non-conformances that could occur in relation to gas generation:

- Monitoring identifies:
  - LELs for any gases are reached or exceeded OR
  - Ammonia concentrations are  $\geq 15\%$  overall gas discharges AND
  - Concentrations have increased over four monitoring rounds as determined by a statistical test
- Monitoring identifies that gas concentrations and/or volume is increasing outside of naturally expected variations as determined by a statistical test.

Table 4-2 of the LTMP also identifies the potential sources for such non-conformances:

- Moisture remains within the Containment Cell
- Gas capture and ventilation system damaged

Table 4-2 of the LTMP notes that the Contingency Process described in Section 4.3 of the LTMP would be implemented, with the following identified as potential contingency responses:

- assess risk to human health and the environment as well as containment cell performance. This would include:
  - inspection of the containment cell cap and surrounds to assess if there is damage that could result in water leaking to the contained material
  - monitoring of the leachate, groundwater, and leak detection sumps to check if leachate and/ or groundwater levels could be sufficient to be in contact with contained material
  - consideration as to whether the concentrations at the surface of the containment cell represent a risk to containment cell maintenance and monitoring personnel, and if measures (such as suitable personal protective equipment) need to be used by these personnel
- maintain prohibition of public access to the top of the Containment Cell
- installation of new (taller) gas ventilation stack

The final response/s to be implemented would be confirmed on completion of the Contingency Process described in Section 4.3 of the LTMP.

## **2.7 Review and Improvement**

Continual improvement of the GMP 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 LTMP and specialist management plans including the GMP will be reviewed in accordance with the review schedule outlined in the LTMP.

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



### 3. References

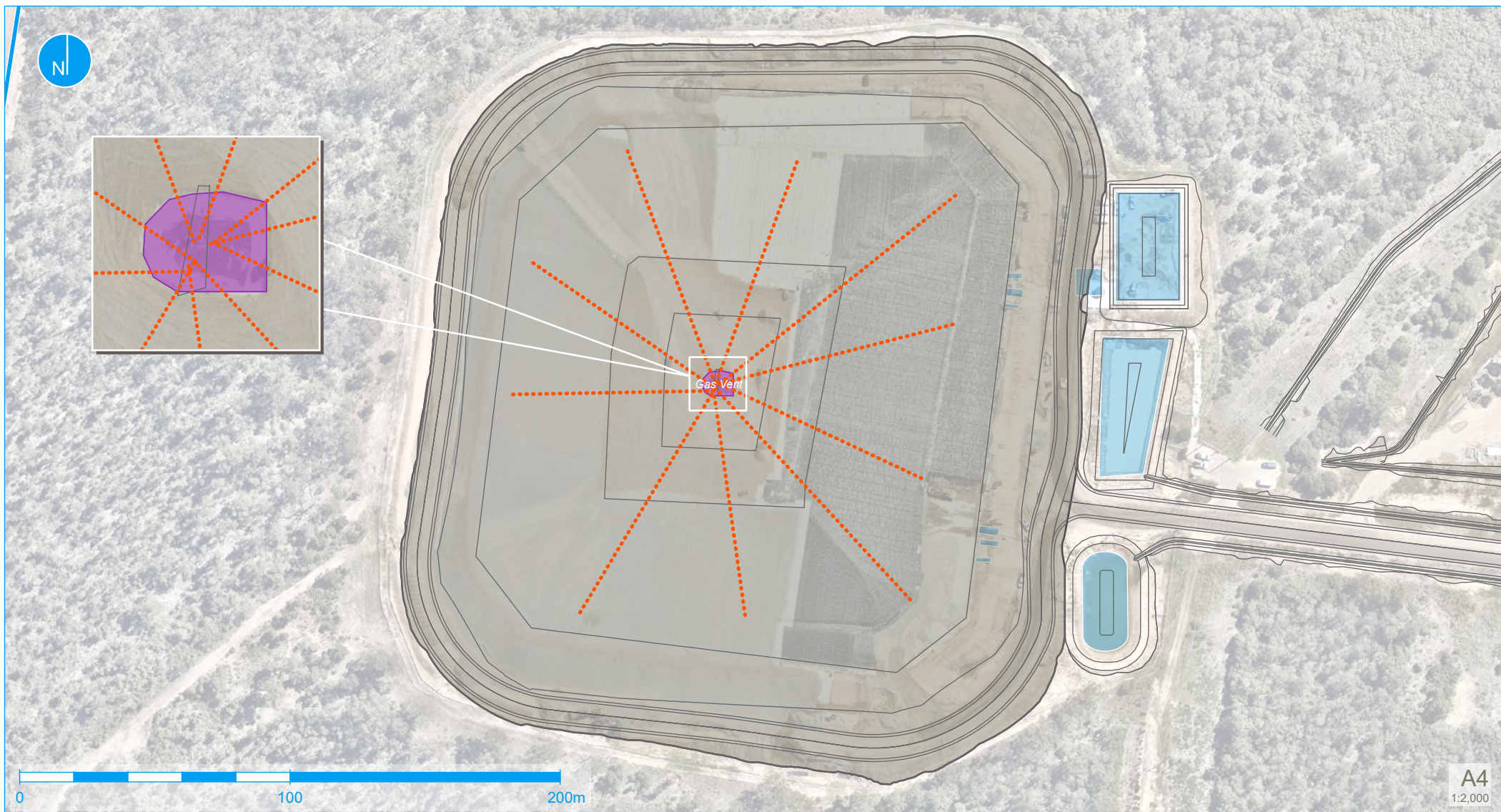
GHD (2019) *Containment Cell Design Report*

NSW EPA (2012) *Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases*

Ramboll (September 2024) *Containment Cell Long Term Management Plan*

## APPENDIX 1

### FIGURES



Aerial photography by Nearmap, flown 26.02.2024

### Legend

- Engineered Containment Cell (ECC)
- Design contours (GHD/Daracon)
- Horizontal gas trench (adapted from Daracon survey)



Figure 1 | Location of the ECC and Centre Gas Vent