environment SOUTHLAND
Te Taiao Tonga

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File Note

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Subject: ***Environmental and Compliance Risks at the Tiwai Aluminium Smelter Related to Site Closure***

Introduction

This report relates to the closure of the Tiwai Point Aluminum Smelter from an Environment Southland perspective.

Environment Southland was asked to provide its perspective on the key matters that should be addressed in the remediation of the Tiwai Point site.

This report addresses what is required for site remediation and outlines the legislation covering the remediation of contaminated sites. This report is a summary of the matters, noting we hold significant information on the site.

History:

NZAS holds eight current resource consents from Environment Southland. **NB** there are likely to also be resource consents issued by Invercargill City Council:

1. AUTH-203376 – to discharge treated sewerage to land.
2. AUTH-203379 – to discharge treated effluent to the coastal marine area.
3. AUTH-203373 – to discharge of water which may include contaminants to the coastal marine area (stormwater drain discharges).
4. AUTH-203375 - to occupy the coastal marine area with an outfall pipe.
5. AUTH-203378 - to discharge contaminants to air from the aluminium smelter.
6. AUTH-202196 - to discharge contaminants onto or into land (landfill).
7. AUTH-202727 - to discharge stormwater and process water to land.
8. AUTH-202958 - to take and use groundwater.

Figure 1: Aerial image of the Tiwai site (Google Earth, dated 13/01/2018?. Red areas show known and potential sites of soil or groundwater contamination.

Known contaminated sites:

1. Discharge of contaminants from the current landfill (AUTH-202196) to groundwater and Foveaux Strait: (High Concern)

    - *Landfilled waste includes general waste from the smelter, Haysom's dross, carbon fines, asbestos, hydrocarbon contaminated soils, cleanfill.*
    - *Some groundwater monitoring bores on the south side of the landfill show some high levels of contamination for a number of contaminants including several nitrogen species and fluoride, and minor levels of heavy metals and polycyclic aromatic hydrocarbons.*
    - *Susceptible to coastal erosion.*

2. Spent cathode lining storage pad: (High Concern)

    - *Storage facility is east of the main plant (see Figure 1).*
    - *Leachate is high in fluoride and cyanide. This is treated and discharged to coastal marine area (AUTH-203379).*
    - *The area around the leachate pad has a legacy of poor management and may have residual groundwater contamination of fluoride from the failure of the storage system in the 1990s (A603026).*
    - *Susceptible to coastal erosion.*

3. 1991 diesel spill site: (Moderate Concern)

    - *Approximately 800,000L of diesel was spilled, initially contaminating 4.5 hectares.*
    - *120 groundwater recovery wells were installed. 520,000L were recovered*
    - *The remainder was left for bioremediation and was monitored.*
    - *Report from 2006 (A603025) indicates a much-reduced halo of contamination around the original spill site, with residual contamination.*

4. Sewage dispersion field (AUTH-203376): (Moderate Concern)

    - Sewage on site is discharged by a sub-surface dispersion field east of the plant.
    - There may be soil or groundwater contamination as a result of the discharge of sewage. This may include heavy metals and other contaminants associated with human wastewater.

5. Other potential sites of soil or groundwater contamination: (Unknown)

    - Neither ES nor ICC have a register of the amount or types of hazardous substances stored at the Tiwai Aluminium Smelter, as it is located in a "Smelter Zone" under the District Plan, making this a permitted activity. NZAS stores large quantities of heavy fuel oil, pitch and petroleum coke.
    - The historic transformer sites are a high risk of PCB (polychlorinated biphenyl) contamination. This is a toxic environmentally persistent contaminant.

- Carbon bake refractory bricks have, at various times, been temporarily stored to the east of the main plant and may have leached small amounts of contaminants to the soil or groundwater.
- There is a wash-down site north of the main plant. This is used for vehicles and wash-down of the cell linings. The cell lining wash-down water is transported to the cathode treatment plant. Other wash-down water is discharged to land (AUTH-202727).
- Former staff of the smelter report burying of spent cell linings or contaminated material in various parts of the Tiwai site, particularly prior to the RMA. It is likely that a number of unmapped or unconsented contaminated sites exist as a result of these uncontrolled activities.

Environmental implications of closure and associated risks:

1. The Tiwai site is a highly contaminated HAIL site. It is desirable to avoid dispersion of these contaminants around the site or to other locations. Any unconsented discharge of contaminated soils within or outside the site may constitute a breach of the RMA or the proposed Southland Water and Land Plan.

2. Environment Southland has not had access to the company's remediation plan or wider closure plan. Resource consents will be required from Environment Southland and Invercargill City Council.

    - Decommissioning of the plant will likely trigger the need for a resource consent with the Invercargill City Council under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health and a detailed site investigation will be required.
    - The NZAS landfill will not have capacity for demolition waste from the whole of the site, nor is it consented for it. NZAS may require consent from Environment Southland to landfill demolition waste and contaminated soils on/off site as per rules 45 or 46 of the proposed Southland Water and Land Plan.

3. The implications of sea level rise and potential coastal erosion and inundation need to be factors when considering the long-term legacy of the plant and the remediation of the site. The area is very low lying and subject to strong tidal and wave action from Foveaux Straight, and the geology is almost exclusively unconsolidated sand and gravels. This increases the risk of erosion of the site and there is particular concern regarding the exposure of the landfill.

Remediation requirements

Environment Southland would have the minimum requirements set out below, regarding environmental remediation of the site. The objective we seek is that following remediation, the land, all surface infrastructure and material stockpiles should be rehabilitated to achieve an end land use capability. The remediation plan should be co-designed with Environment Southland, Invercargill City Council, iwi and government agencies. We expect that key stakeholders and possibly the public may wish to be consulted in the development of this

plan. The remediation plan should include the risk of sea level rise and coastal erosion, particularly of the landfill as key matters.

a. The remediation plan should follow best practice for contaminated sites of this scale and would be expected to include:

    i. Environmental risk assessment, informed by detailed investigation of the site
    ii. Strategies to manage and mitigate impacts and risks
    iii. Identification of indicators, being
        1. Surface water quality
        2. Groundwater quality
        3. Air quality
        4. Soil quality
        5. Vegetative cover

b. The remediation plan should include an assessment of the impact of sea level rise and potential coastal erosion and inundation on the site, particularly the landfill. It would be expected to include:

    i. Environmental risk assessment, informed by detailed investigation of the site
    ii. Options and strategies to manage and mitigate impacts and risks including removal of material from the landfill, protection of the site and landfill.