Capacity Increase at the Regain Spent Potlining Facility at Tomago

Summary

A world-leading technology has been developed in the Hunter Valley to deal with the problem of aluminium smelter Spent Potlining (SPL) waste. The Regain SPL Solution provides innovative technology is to transform waste from the aluminium industry into valuable feed material for the cement industry. The risks from the hazardous SPL are eliminated with on-site processing technology and final consumption of all of the SPL material in cement making. There are no discharges or residual materials from the technology. The products made from processed SPL deliver energy savings and greenhouse gas (GHG) emission reduction for cement makers. More than 350,000 tonnes of waste from aluminium smelters has been recycled with this technology.

Regain has operated an SPL Facility within the Tomago smelter where the technology was first developed since 2002. Industry and Government requirements for a sustainable solution to the SPL problem mean that there is a demand for increased rates of processing SPL. There is also an unmet demand from the international cement industry for the products of the technology. It is proposed that the throughput capacity of the Regain SPL Facility at Tomago would be expanded to respond to the present-day needs for dealing with SPL and the demand for products derived from SPL.

The increase in throughput would be achieved with a modified facility layout while retaining the physical size and scale of the originally approved project. An Environmental Assessment has assessed the potential impacts that may arise as a result of the proposed expanded capacity and concluded that this expansion would not significantly change the risk profile or the environmental impacts of the existing approved development.

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About Regain

Regain is a Hunter-based company which has developed the world-leading technology to make Spent Potlining (SPL) waste safe and recover minerals from it which can be used to make valuable products used in cement making.

Following 14 years success in the Australian market, Regain now exports its products to cement makers in Asia and South America.

The SPL Problem

Aluminium smelters have had a problem with hazards in waste materials such as SPL. With the hazards removed, these materials can be used for beneficial energy savings and lower greenhouse gas (GHG) emissions in cement manufacture.

Aluminium production is a continuous process where molten aluminium is produced within a refractory lined 'pot'. During the production process, the potlinings become contaminated with materials such as aluminium, cyanide, fluoride and sodium.

The contaminated potlining is regularly replaced as part of the periodic individual rebuilding of the pots. The SPL is classified as a Dangerous Good and an Environmentally Hazardous Waste. It requires careful handling and disposal in accordance with regulatory requirements.

A 2016 Australian Federal Government report identified significant quantities of SPL wastes currently being stockpiled.

The Regain SPL Solution

Regain's technology eliminates the cyanide and explosive gas hazards in materials generated by aluminium smelters. The detoxified materials are then used in Regain processes for manufacturing high quality products that are safe to use and deliver energy savings and GHG emission reductions for cement manufacturers.

The processing technology and effectiveness of Regain products in cement and brick making have been proven over 20 years with more than 350,000 tonnes of residual smelter material incorporated into these products.

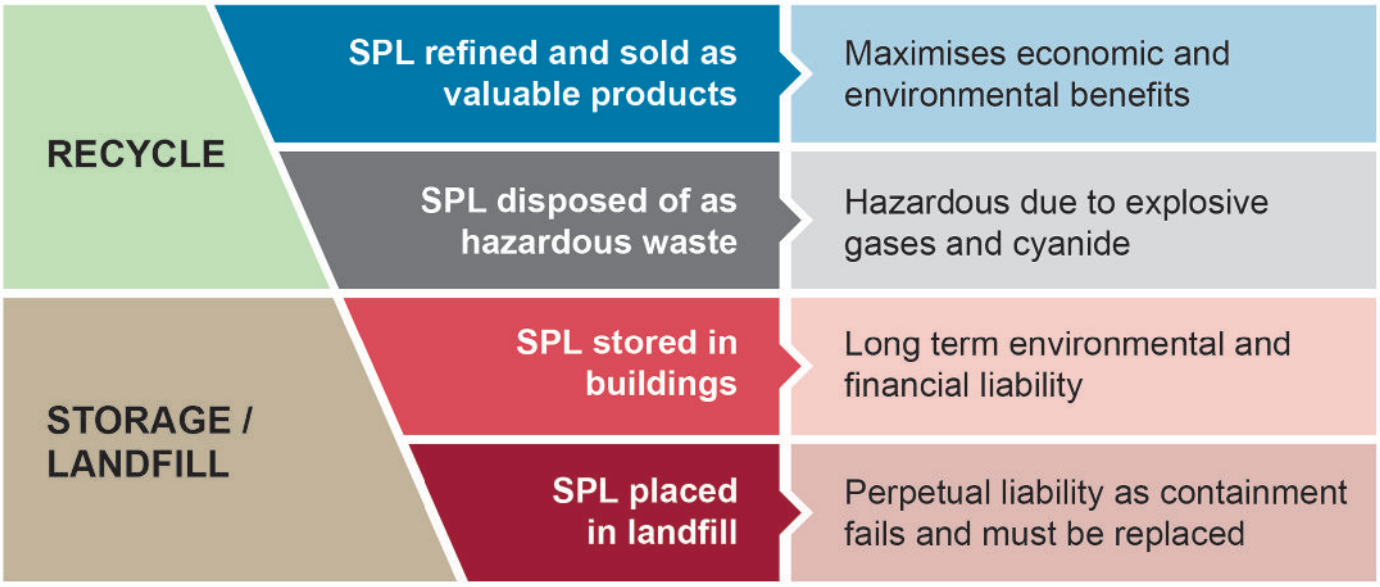
The Regain solution for hazardous wastes from aluminium smelting and the underlying process technology have been subject to rigorous review by leading aluminium smelting organisations and by government hazardous waste regulators.

Environmental regulators in a number of countries recognise that the energy saving and GHG reduction makes products manufactured using Regain technology are inherently valuable products and do not require these products to be subject to hazardous waste controls.

Regain's aims are to:
- Achieve zero waste of by-products from the aluminium smelting process;
- Contribute to a positive impact on the environment;
- Provide an affordable option for re-processing; and
- Achieve a 100% beneficial re-use of the by-products with no leftover residue.

The benefits from the Regain technology are:
- Landfilling of waste is eliminated;
- Accumulation of toxic waste in storage is eliminated; and
- There is real value flowing from the smelter derived products.

The Regain SPL Solution represents best available technology. It enables disposal of SPL in the best position in the waste management hierarchy as shown in the following figure.



The Waste Management Heirarchy and SPL Disposal

The Application

An Environmental Assessment has been prepared for Regain Services Pty Ltd (Regain) to accompany an application under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act) to modify its existing Project Approval 06_0050. The modification would allow Regain to increase the capacity at Regain's existing SPL Facility at Tomago.

The existing Regain-operated facility is a proven success. In November 2017 Tomago Aluminium celebrated the successful treatment of the last of the company's SPL that had been stored in purpose-built long-term storage facilities on site.

Historically SPL had been shipped internationally for processing. Regain has worked with a number of aluminium smelters in Australia to recycle minerals from a range of smelter wastes to develop products that would be valuable to other industry sectors.

The Proposal

Regain is proposing to increase the handling capacity of the facility from 20,000 tpa to 60,000 tpa using improvements to the existing proven technology, in order to respond to market demand. An Environment Assessment shows that this expansion would not significantly change the risk profile or the environmental impacts of the existing approved development. This provides the opportunity to assist in the processing of SPL wastes currently stockpiled, as well as decreasing the time taken to reduce these stockpiles.

The Regain SPL processing facility is located within the footprint of the Tomago Aluminium smelter site which is approved to produce up to 600,000 tpa of aluminium.

To achieve a 60,000 tpa processing rate, an additional thermal treatment plant capable of processing up to 40,000 tpa would be installed along with additional stormwater control and associated infrastructure. The original plant configuration would be rationalised, recognising improvements in technology and a simplified product inventory. With this approach, the proposed modifications are within physical scale of the previously approved plant configuration.

Existing site practices would remain generally unchanged with current material handling practices and environmental controls either remaining in place or being improved. As the Regain facility is located within the smelter, a number of facilities are shared, including site access points, stormwater systems and services. The Tomago Aluminium smelter operates a comprehensive environmental monitoring program which is commensurate to the scale of the operation.

Environmental Assessment

Air Quality
The Environmental Assessment (EA) concluded it was unlikely that the small potential emission increase associated with the project would adversely affect the condition of vegetation or soils in the Botanic Gardens (located approximately 2.6km from site), or water quality within the Tomago Sandbeds or surrounding areas within the buffer zone.

Hazard and Risk
A gap analysis and preliminary screening analysis concluded that the potential hazards associated with the Project are not anticipated to change the existing risk profile of the facility.

Human Health
A Human Health Risk Assessment concluded that under both typical operations and proposed maximum emission limit conditions the estimated health risks to humans from vapour and particulates emitted from the facility was considered low and acceptable.

Traffic and Transport
Heavy vehicles access the facility on the Tomago smelter site using the Pacific Highway which provides regional connectivity. When compared to existing traffic movements along the Pacific Highway, truck movements generated by the Project would account for approximately 0.03% of all total truck movements. There would be no additional passenger vehicle movements associated with operation of the modified facility, as the existing workforce is not expected to change. The facility would have minimal impact on existing traffic, intersection or road network capacity.

Soil and Water Quality
The project would provide improved opportunities for stormwater control through the expansion of the existing storm water catchment and recycling system . The project would not result in any substantial alteration to existing hardstand areas or impervious surfaces and would improve existing environmental controls and performance. The risk to surface water and groundwater quality is therefore considered low based on the additional environmental controls proposed.

Waste Recycling
All raw materials would be processed at the Facility. SPL materials and recycled products are currently stored on site within existing purpose-built buildings. Waste handling activities are undertaken in accordance with the site Environmental Management Plan which identifies specific material handling and processing procedures and controls to mitigate hazards and risks associated with handling an Environmentally Hazardous Waste.

Conclusion

The EA has assessed the potential impacts that may arise as a result of the proposed modifications. The increase in throughput would result in a modified layout while retaining the physical size and scale of the originally approved project.

It is considered that the modified plant would remain substantially consistent with existing site processes, as previously approved, and the environmental impacts and risk profile of the total development are not expected to change significantly. Additional specific mitigation measures have been identified where appropriate.
The EA demonstrates a number of positive environmental benefits associated with the SPL recycling process including:

- Substantial reductions in Scope 3 Greenhouse Gas Emissions within the cement industry
- Waste resource recovery benefits such as diverting waste from landfill and managing problem wastes in better ways
- Consistency with the objectives of the NSW Waste Avoidance and Resource Recovery Strategy 2010-2021.

The EA demonstrates a strong project need for the proposed increase in processing capacity based on substantial stockpiles of SPL which have accumulated in Australia. It is estimated that approximately 700,000 tonnes of SPL exists in storages around the country and around 36,000 tonnes of SPL is generated per year.