

ASSESSMENT REPORT

Section 75W Modification Weston Aluminium Commercial Scale Processing of Spent Potlining

1. BACKGROUND

Weston Aluminium Pty Ltd owns and operates an aluminium dross recycling facility on 22 hectares of land at Kurri Kurri, in the Cessnock Local Government Area (see Figure 1).



Figure 1 – Site Location

The facility operates under two development consents:

- one issued by the Land and Environment Court in 1996 (10397 of 1995); and
- one issued by the then Minister for Planning in 2001 (DA-86-04-01).

Under these consents, Weston aluminium is permitted to process up to 40,000 tonnes of dross aluminium and 35,000 tonnes of scrap aluminium a year, for various industrial uses. Though more recently, Weston Aluminium has only been processing some 10,000-15,000 tonnes of dross aluminium per annum.

These consents have been modified on a number of occasions to:

- alter and extend various buildings;
- install a pre-processing facility within the western end of the existing approved ALDEX building;
- construct eight dross storage bays by extending a section of the approved ALDEX buildings to the south and to make the Minister's and the Court's consents consistent;
- relocate Bag House 3;
- undertake a short and then a longer term spent potlining processing trial; and
- construct and operate a briquetting plant to enable the Proponent to process and compress the Aldex dust generated on-site into briquettes.

The facility is also regulated through an Environment Protection Licence (EPL No. 6423) from the Environment Protection Authority (EPA).

Aluminium dross is a waste produced in the aluminium refining process. It can contain between 30-75 percent metallic aluminium, along with aluminium oxide, other metal oxides, traces of sodium aluminium fluoride and alloying metals. The dross is pre-processed to remove non-metallic material and impurities; it is then processed in rotary furnaces, prior to casting. Scrap aluminium is sorted and then remelted in a reverbaratory furnace prior to casting.

The facility receives aluminium dross from the Tomago Aluminium Smelter which is approximately 20 kilometres east of the site. The Hydro Aluminium Smelter, which is located approximately 2km to the north, has a buffer zone which extends to the northern boundary of Weston Aluminium's site. It also sends aluminium dross to this facility. However, Hydro has recently announced its Kurri Kurri Smelter's impending closure which will result in a reduction of available dross.

The Weston Aluminium site is surrounded by vacant land acting as a buffer between the residential areas and the plant. The buffer area assists with the management of potential noise and air quality impacts.

The closest residential area is about 600m to the south east of the site, while the closest residence is 270m to the north (in the Hydro Aluminium Smelter buffer zone). Swamp Creek runs along the northern boundary of the site (see Figure 1).

Spent Potlining

Spent potlining (SPL) is a hazardous waste by-product of aluminium production (see Figure 2).

Aluminium is produced from alumina, in large electrolytic cells known as pots. Molten aluminium is regularly syphoned out of the pots and more alumina is then added to start the process again. Over time, the carbon lining of the pots deteriorates and becomes contaminated with a range of materials including aluminium, cyanide and fluoride. Pots are replaced every 6-7 years, with the nearby Tomago Aluminium Smelter producing approximately 10,000 tonnes of SPL material a year.

Both First Cut SPL (originating from the carbon cathode) and Second Cut SPL material (originating from the refractory lining) contain cyanide and fluoride and can react with water to give off explosive gases. The material is classified as environmentally hazardous waste and also a dangerous good (it has the same dangerous good classification as aluminium dross) and is not permitted to be sent to landfill.



Figure 2 – SPL

Historically, SPL material has been sent overseas for processing, due to the lack of available treatment technologies in Australia.

Spent Potlining Processing Trials

Weston Aluminium has been researching available technologies for the treatment of SPL material in Australia since 2005. Its research has included a series of trials undertaken to establish the suitability of its processing technologies and to confirm that Weston Aluminium's existing environmental controls are suitable.

The two most recent trials were undertaken at its Kurri Kurri facility.

- *Small scale trial August 2010*

On 5 August 2010, the Executive Director approved a modification application from Weston Aluminium to trial the processing of up to 40 tonnes of Second Cut SPL at its Kurri Kurri facility. The objective of this trial was to verify operations and to demonstrate emission control performance and compliance. The Department and the EPA recommended a range of conditions designed to monitor and report on the trial outcomes. The Department and EPA were satisfied that the recommended conditions would minimise any potential impacts.

The trial was undertaken on 14 August 2010 where approximately 8 tonnes of Second Cut SPL sourced from Tomago Aluminium, was processed in one of the existing rotary furnaces.

As with the process for treatment of Aluminium Dross, emission control performance was monitored continuously throughout the trial by real-time stack emissions monitoring for fluoride and particulate matter. In addition, samples were sent to a NATA accredited laboratory and tested for a range of other parameters including cyanide.

Weston Aluminium's Monitoring and Verification Report, submitted in accordance with the conditions of approval, concluded that the trial was successful. All of the measured emission concentrations were below regulatory compliance limits and the laboratory results showed negligible discharge concentrations.

- *Large Scale Trial November 2011*

On 25 October 2011, the Acting Director-General approved another modification application from Weston Aluminium for a second, larger scale trial.

Commencing in December 2011, over a 3-month period, Weston Aluminium processed some 200 tonnes of Second Cut SPL within the existing rotary furnaces. The objective of this larger trial was to confirm processing requirements and explore potential beneficial end use opportunities for the treated material within different industrial processes.

SPL material was sourced from Tomago Aluminium and processed through a series of 2.5-3.5 tonne batches, identical to the process employed for the small-scale trial.

The EPA and the Department were satisfied with the post approval verification (received in accordance with the post approval requirements), which concluded that:

- cyanide was thermally-destroyed at process temperatures achieved;
- there were low pollutant discharge concentrations; and
- gaseous fluoride and particulate emission concentrations satisfied the regulatory compliance limits throughout the Trial.

2. PROPOSED MODIFICATION

With Hydro Aluminium's impending closure (and an expected subsequent drop in available dross) and following the successful trials, Weston Aluminium is seeking to diversify its business to permanently process SPL. As such, on 23 February 2012, Weston Aluminium requested a modification to both the Minister's and Court's consent under 75W of the EP&A Act.

Weston Aluminium is seeking to modify its consents to allow the processing of up to 40,000 tonnes per annum of 2nd Cut SPL material for the commercial market. Weston Aluminium is not seeking to increase its current approved processing capacity, the combined total quantity of SPL and aluminium dross would not exceed 40,000 tonnes. The purpose of the processing would be to thermally oxidise the cyanide from the SPL while retaining its mineralogical value.

At this stage, Weston Aluminium is only seeking approval to process Second Cut SPL. The processing of First Cut SPL may be the subject of a later modification application.

As per the trials, the SPL material would be sourced from local aluminium smelters.

The SPL would be delivered either pre-crushed or uncrushed, and stored on the premises in accordance with the Australian Dangerous Goods Code. The treatment process would include:

- primary crushing (where necessary);
- controlled blending with other additives, as required;
- fine milling;
- thermal treatment in which the existing furnaces would attain temperatures of between 600°C and 750°C to ensure any cyanide within the SPL is effectively destroyed during the heating operation;
- cooling in a new rotary cooler; and
- crushing and mixing (as required) and distribution to end markets.

This process is identical to that of the approved dross treatment and uses the same facilities, plant and equipment (see Figure 3 for the existing and proposed site layout). However, as the recycling of dross and SPL produce different end products, the treatment of both materials will be conducted independently as dedicated campaigns.

Construction activities would be undertaken over one to two months and would include upgrading the crushing plant, installing a new rotary cooler, and reducing Baghouse 3 to service the new cooler.

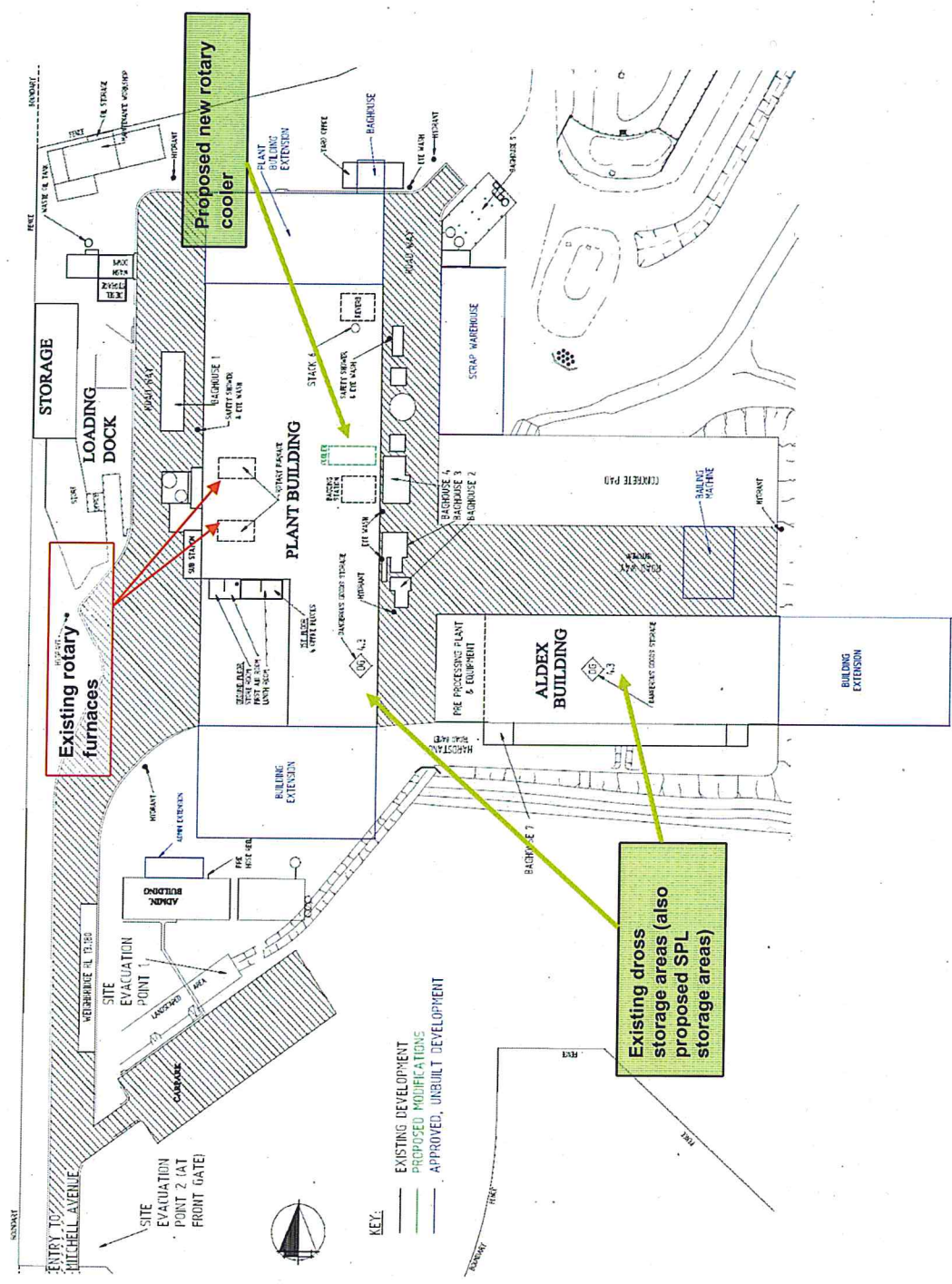


Figure 3: Existing and proposed site layout

3. STATUTORY CONTEXT

Approval Authority

This application proposes to modify consent DA 86-04-01 granted by the then Minister under Part 4 of the *Environmental Planning and Assessment Act 1979* (the Act) and consent 10397 of 1995 granted by the Land and Environment Court under Part 4 of the Act.

Under clause 8J (8) of the *Environmental Planning and Assessment Regulation 2000*, this consent is taken to be an approval under Part 3A of the Act and can be modified by the Minister under section 75W of the Act.

Section 75W of the Act as in force immediately before its repeal on 1 October 2011, and as modified by Schedule 6A, continues to apply to this development consent in accordance with Clause 12 of Schedule 6A of the Act.

The Minister has delegated his functions to determine Section 75W modifications to the Department where:

- the council has not made an objection;
- there are less than 10 public submissions objecting to the proposal; and
- a political disclosure statement has been made, but only in respect of a previous related application.

There has only been one submission received from the public objecting to the proposal and Council has not made an objection to the proposal. The Department notes that the Proponent has made political donations, however, not in respect of the current application.

The Department is satisfied that the application meets the terms of the delegation and that the Deputy Director-General may determine the application under delegated authority.

Section 75W – EP&A Act 1979

Under Section 75W of the EP&A Act, the Minister is obliged to be satisfied that what is proposed is indeed a modification of the original proposal, rather than being a new project in its own right.

The Department has reviewed the scale and nature of the proposed modification, and is satisfied that it can be characterised as a genuine modification to the original project as:

- it would use existing plant to process a waste product from the aluminium refining process as for the existing approval; and
- the modification would not increase the total volume of material allowed to be processed under the consent.

4. CONSULTATION

Under Section 75W of the EP&A Act, the Department is not required to formally notify or exhibit the application. However, due to the potential public interest in the proposal, the Department exhibited the application from Monday 28 May 2012 to Tuesday 12 June 2012:

- on the Department's website;
- at the Department's Information Centre;
- at Cessnock City Council's offices; and
- at the Nature Conservation Council's offices.

The Department also advertised the public exhibition in the Maitland Mercury, and sought comment from the Environment Protection Authority (EPA) and Cessnock City Council.

Following the exhibition period, the Department received six submissions on the proposal: one from the public, three from public authorities and two from local Aluminium Smelters (see Appendix B).

A summary of the issues raised in these submissions is provided below.

The EPA raised some concerns over the fluoride predictions in the Air Quality Impact Assessment. Namely, its failure to include the 30 day averaged fluoride prediction and the fact that the fluoride results approach the criteria values adopted in the assessment. However, these concerns were addressed by the Proponent's response to submissions. The EPA subsequently advised that it was satisfied that fluoride emissions from the proposed modification can meet relevant air quality impact assessment criteria and it accepts that compliance with existing air emission concentration and load limits on the EPL can be achieved. The EPA also provided recommended conditions of approval.

Council raised no objections.

One submission was received from the public objecting to the proposal. Two submissions were received in support, one from Tomago Aluminium and one from Hydro Aluminium.

The key issues raised in the public submission include:

- health impacts; and
- hazard and risk.

The Department has fully considered the issues raised in submissions in its assessment of the project and has incorporated the EPA's requests into the recommended conditions.

5. CONSIDERATION

The Department has assessed the merits of the proposed modification. During this assessment, the Department has considered the:

- environmental assessment and Director-General's assessment report of the original project application;
- existing conditions of approval;
- environmental performance of the facility, particularly the two trials;
- documentation supporting the proposed modification;
- submissions received;
- relevant environmental planning instruments, policies and guidelines; and
- requirements of the EP&A Act, including the objects of the Act.

The Department considers that the key issue associated with the proposed modification is air quality. An assessment of all other issues is provided in Table 2. These same issues were previously assessed for the 2010 and 2011 trials, the outcomes of which help to quantify the expected impacts of the proposal.

Air Quality

Weston Aluminium is located within an industrial area, the nearest residential receiver being some 270 metres to the north of the facility. The air quality in the area is typical for an industrial area.

The EA included a detailed Air Quality Impact Assessment (AQIA) prepared in accordance with DECCW'S *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

The AQIA determined that the modification has the potential to emit a range of air pollutants including particulate matter (PM₁₀ and total suspended particulate), carbon monoxide, cyanide, chlorine, fluoride/hydrogen fluoride, heavy metals, hydrogen chloride, nitrogen dioxide, oxides of sulphur and volatile organic compounds. Emissions could occur from the delivery, transfer and storage of SPL on site as well as operation of the reveratory and rotary furnaces in which the processing of SPL would be undertaken.

The facility has a range of air quality management measures already in place, including seven stacks which operate to control emissions. The stacks operate to control emissions from the following parts of the facility:

- Stack 1: Rotary furnace;
- Stacks 2 - 4: capturing fugitive dust within the processing plant;
- Stack 3 (Baghouse 3): proposed to service the new Rotary Cooler;
- Stack 5: Reveratory furnace;
- Stack 6: Gas combustion side of the reveratory furnace; and
- Stack 7: Pre-processing plant and briquetting plant.

The bag-house units are fitted with high differential pressure alarms, spare bag sets as well as bag breakthrough detection.

Air Quality Impact Assessment

The AQIA was undertaken to compare existing stack emissions (which have been found to comply with the relevant assessment criteria) against expected stack emissions associated with the proposed modification.

The dispersion model AUSPLUME was used to estimate maximum ground level concentrations of the above pollutants. The model was run under two scenarios, one which represented existing worst-case operating conditions (dross processing), the second which represented proposed worst-case operating conditions where emissions from Stack 1 represented the emissions associated with SPL.

The modelling predictions indicated that emissions from the dross and SPL processing were similar, with the exception of carbon monoxide (with higher concentrations emitted by SPL) and cyanide (which is not emitted by aluminium dross processing). Notwithstanding, the predicted ground level pollutant concentrations from both dross and SPL processing were below the relevant assessment criteria at all nearby receivers. Predicted ground level concentrations (GLC) of key pollutants are shown in Table 1.

Table 1: Predicted ground level pollutant concentrations for SPL processing

Contaminate	Averaging period	Predicted Maximum GLC (µg/m ³)	Assessment Criteria (µg/ m ³)
*Total Particulate Matter	Annual	2.4	30
Hydrogen fluoride (predicted at nearest sensitive receiver)	24 hours	1.35	2.9
*Total hazardous substances (metals)	Annual	0.0026	0.5
*Cyanide	1 hour	0.02	90

Note: *Predictions are maximum GLC within the modelling area and as such may be lower at a sensitive receiver

Furthermore, the modelling predictions are very conservative given that the baseline data used historical monitoring data that includes full scale operation of Hydro Aluminium's potlines. However, Hydro Aluminium's potlines are scheduled to fully shut down late 2012, this will dramatically reduce fluoride loads in both the local and regionally areas.

The EPA advised that it was satisfied with both the AQIA approach and its conclusions.

SPL Processing Trials

In addition to the modelling undertaken for the proposal, Weston Aluminium has undertaken a number of SPL processing trials to demonstrate, among other things, emission control performance and compliance.

Data collected from independent stack emission testing during both trials verified that air emissions generated during SPL processing activities could be controlled and maintained within existing regulatory limits (see Table 2 for the results of both trials compared with Weston Aluminium's existing Licence limits). Both of the trials showed that cyanide is readily oxidised to carbon monoxide and oxides of nitrogen.

Table 2 – Results of the 2010 short and the 2012 longer trial of SPL processing

Contaminate	Short Trial	Longer Trial	Licence limit
Total Particulate Matter	8.9	0.23	25
Gaseous fluoride	0.38	0.16	2
Total hazardous substances (metals)	0.017	0.025	10
Cyanide	<0.0061	<0.0082	NL
Gaseous Fluoride (one hour average from real time monitoring)	0.6	<0.6	1.4

Conclusion

The Department is satisfied that the trials and the modelling undertaken by AECOM have shown that emissions of cyanide are unlikely to exceed the EPA criteria and that the emissions of cyanide, fluoride and other potential emissions of concern would be appropriately managed through the existing conditions and management measures, including those mentioned above.

The existing conditions include emission limits for a range of pollutants, the requirement for an Air Quality Monitoring Program and the requirement to maintain a continuous fluoride emission monitoring system. In addition, there are other conditions aimed at limiting dust emissions.

The EPA confirmed that it is satisfied that the proposal would comply with existing air emission concentrations in its EPL. No change to Weston Aluminum's existing Environmental Protection Licence (EPL) limits for fluoride or particulate matter would be required for the project.

However as emissions of cyanide are not currently produced at the facility the licence does not include concentration limits for these pollutants. As such the EPA has recommended an emission limit for cyanide. This has been incorporated into the emission limits in the recommended conditions and will be included in Weston Aluminium's Licence conditions. In addition, the Department recommends conditions requiring Weston Aluminium to update its Air Quality Monitoring Program.

Both the Department and the EPA are satisfied that air emissions would be minimised and managed to an appropriate level.

Table 2 – Other Issues

Issue	Consideration	Recommendation
Waste	- The existing conditions require that all waste is classified and disposed of at an appropriately licensed facility. - The Department is satisfied that existing and recommended conditions would ensure the waste is appropriately managed.	No additional conditions relating to Waste have been recommended.
Transport	- The modification would result in an additional 8 heavy vehicle movements per day. - Weston Aluminium advised that currently only 10 heavy vehicles enter the site a day (20 movements), which is less than half the number predicted in the original 2001 approval. - Council raised no issues relating to traffic. - A Transport Code of Conduct, required by the existing conditions of consent, has been prepared to manage traffic impacts associated with the site. In addition, the Applicant is also required to ensure that all parking generated by the development is accommodated on site and there is no queuing on the public road network. - The Department is satisfied that expected additional 8 truck movements would be managed by the existing conditions of approval and would not increase traffic impacts beyond those assessed and approved as part of the original application.	No additional conditions relating to Transport have been recommended.
Soil & Water	- SPL would be covered to prevent contamination of any stormwater. - All operations would be undertaken in enclosed buildings to reduce the likelihood of external spills. - Spill management procedures would be in place and existing onsite stormwater management infrastructure would capture any runoff from any spill residue or dust and this water would be treated and reused onsite.	Recommended Conditions require the Proponent to: appropriately bund the SPL.
Hazards	- SPL is a dangerous good and transport and storage of this material would need to be managed. - The current proposal does not seek to increase the overall quantity to be processed in the facility, nor an increase of the already approved storage area. - The EA included a Preliminary Hazard Analysis to estimate the potential risks associated with the storage, handling and processing of the SPL. - The PHA concluded that the proposal would not result in any additional off-site risks. - The Department reviewed the PHA and was satisfied with its findings. - SPL has the same dangerous goods classification as Aluminium dross, which is currently processed on site. Consequently SPL would be managed through Weston Aluminium's existing facilities and management practices. - The Department has recommended that the Proponent update components of its Operational Management Plan required under its existing	Recommended Conditions require the Proponent to: - not process more than a combined total of 40,000 tonnes of dross aluminium and second cut SPL and 35,000 tonnes of scrap aluminium metal per year; - update its Fire Safety Study, Emergency Plan and Safety Management System; and - not store more than 5,000 tonnes of combined SPL and Dross on site at any one time.

Issue	Consideration	Recommendation
	conditions, including the Fire Safety Study, Emergency Plan and Safety Management System. The Department has also recommended a condition limiting the volume of SPL and Dross to be stored and processed on site.	

6. CONCLUSION

The Department has assessed the modification application and found that the potential impacts can be appropriately managed.

The two trials undertaken by Weston Aluminium at its Kurri Kurri facility have provided important information and verification that the Project can successfully treat SPL and meet the relevant air quality objectives and criteria. In addition the Assessment has shown that the modification will not increase off-site risks.

The Department has recommended conditions requiring the inclusion of cyanide emissions monitoring in Weston Aluminium's existing emission monitoring regime. The Department is satisfied that the existing conditions along with the ones proposed above would minimise any impacts and the EPA has also indicated that it is satisfied with the proposal.

The Department is satisfied that the proposal represents a real opportunity to manage and reuse 2nd Cut SPL in Australia thereby providing a range of economic, social and environmental benefits.

Consequently the Department considers the proposal is in the public interest and should be approved, subject to conditions.

7. RECOMMENDATION

It is RECOMMENDED that the Deputy Director-General, as delegate for the Minister:

- approve** the application to modify the development consent under section 75W of the EP&A Act, subject to conditions; and
- sign** the attached notice of modification to the Ministerial development consent and to the Court consent (in Appendix C).

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