

ASSESSMENT REPORT

Section 75W Modification Weston Aluminium Trail Processing of Mixed Spent Potlining Material

1. BACKGROUND

Weston Aluminium Pty Ltd (Weston Aluminium, the Applicant) 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.

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

- alter various buildings;
- install a pre-processing facility within the western end of the existing approved ALDEX building;
- construct eight dross storage bays in an extension to the approved ALDEX building and to undertake some administrative amendments to allow for the Minister's and the Court's consents to be consistent;
- relocate Bag House 3;
- undertake spent potlining (SPL) processing trials;
- construct and operate a briquetting plant to enable the Proponent to process and compress ALDEX dust generated on-site into briquettes; and
- allow for the processing of up to 40,000 tonnes of second cut SPL on a permanent basis.

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

Aluminium Dross

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 and second cut SPL from the Tomago Aluminium Smelter which is located around 20 kilometres (km) east of the site. Historically, the now closed Hydro Aluminium Smelter, which is located approximately 2km to the north, also sent aluminium dross to this facility.

Weston Aluminium's site is surrounded by vacant land which acts 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 around 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. It is generated from the periodic de-lining of electrolytic cells (ie pots). In its raw form, SPL varies in size from fine dust to pieces up to one metre in length (see Figure 2).



Figure 2 – SPL

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, culminating in the need to replace the pots every 6-7 years. It is estimated that the nearby Tomago Aluminium Smelter produces approximately 10,000 tonnes of SPL material a year.

SPL is divided into two portions, first cut and second cut. Second cut spent potlining is the refractory insulation lining (brick liner from aluminium reduction cells) whereas first cut originates from the carbon cathode (See Figure 3).

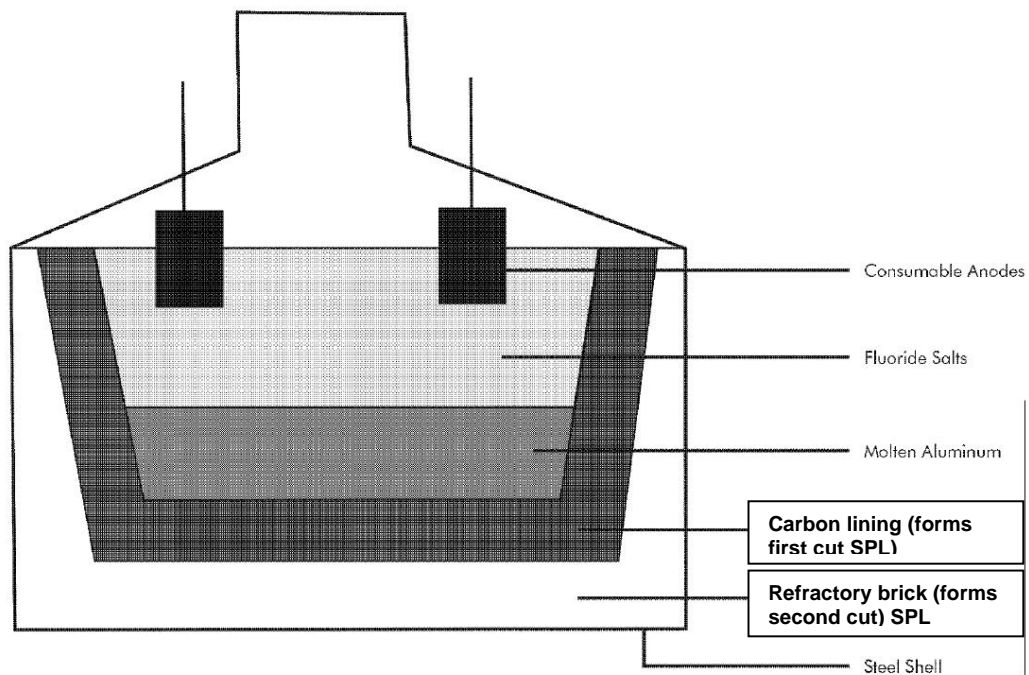


Figure 3: Simplified diagram of a typical pot (source: USA EPA)

Both first cut and second cut SPL material contain cyanide and fluoride, and can react with water to give off explosive gases. However, second cut SPL may contain slightly higher levels of cyanide and fluoride than first cut. SPL 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 disposed of to landfill.

Separation and Storage of SPL

Primary aluminium smelters traditionally separate first cut SPL from the second cut SPL to assist with finding end-use markets for the treated products. However, prior to the mid-1990s, segregation was limited, and legacy stockpiles of mixed SPL have remained in storage on smelter sites without a viable treatment and reuse solution.

Hydro Aluminium has indicated that it has between 100,000 – 180,000 tonnes of mixed SPL stored on its former Kurri Kurri smelter site.

SPL Processing Trials and Previous Modification Approvals

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 of mixed SPL (August 2010)*

On 5 August 2010, the Executive Director (under the Minister's delegation) approved a modification application from Weston Aluminium to trial the processing of up to 40 tonnes of mixed 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 and minimise any potential impacts.

The trial was undertaken on 14 August 2010 where approximately 8 tonnes of mixed 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 consent, 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 of Second Cut SPL (November 2011)*

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

Commencing in December 2011, Weston Aluminium processed some 200 tonnes of second cut SPL over a 3-month period, within the existing rotary furnaces. The objective of the 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 results in the post approval verification report (received in accordance with the consent 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.

- *Commercial Scale Second Cut SPL Processing*

On 7 September 2012, the Deputy Director-General (under the Minister's delegation) approved a modification to allow Weston Aluminium to process of up to 40,000 tonnes of second cut SPL material per annum.

Weston Aluminium commenced processing second cut SPL on 27 November 2012.

2. PROPOSED MODIFICATION

In response to Hydro Aluminium's closure and its strategy in relation to the management and treatment of its legacy mixed SPL, Weston Aluminium is seeking approval to trial the processing of up to 3,000 tonnes of mixed SPL. Consistent with previous trials, Weston Aluminium aims to develop end use market opportunities for the mixed SPL treated material.

As such, on 3 December 2012, Weston Aluminium lodged an application to modify both the Minister's and Court's consents under 75W of the EP&A Act to trial the processing of up to 3,000 tonnes of mixed SPL over a 12 month period.

The components of mixed SPL can be highly variable due to varied proportions of first and second cut SPL and the presence of other components, such as anodic material (carbon) and aluminium dross. As such, Weston Aluminium is seeking approval for a larger scale trial (in terms of tonnage) than those previously undertaken, which had only processed between 8 and 200 tonnes of SPL. This would allow for the evaluation of the performance of the proposed treatment sequence, and the determination of whether any additional processes are required to achieve a consistent product suitable for end-use market consumption.

The trial would be consistent with previous trials. The mixed SPL would be sourced from local aluminium smelters, transported to Weston Aluminium's Kurri Kurri facility by a licensed Dangerous Goods contractor and stored on-site in accordance with the Australian Dangerous Goods Code 2007. The treatment process would include:

- input characterisation;
- raw material crushing;
- thermal treatment;
- crushing and blending; and
- dispatch to customers.

Existing plant and equipment, and associated controls (see Figure 4), currently used for the storage, handling and processing of aluminium dross and second cut SPL, would be used for the trial.

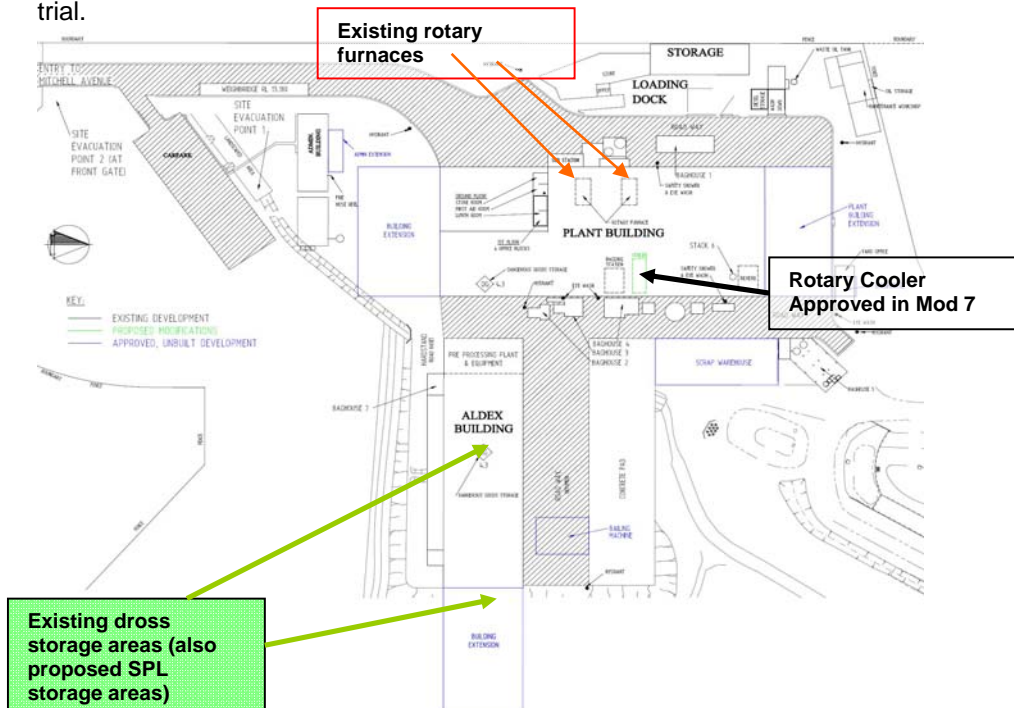


Figure 3: Existing site layout

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 have been no submissions 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 trial the processing of a waste product from the aluminium refining process as for the existing approval.

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 Thursday 6 December 2012 to Thursday 20 December 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.

During the exhibition period, the Department received four submissions on the proposal: two from the public and two from agencies (see Appendix B). The two public submissions (from a steel fabrication company) expressed support for the proposal.

The EPA raised no objections to the proposal and provided recommended conditions of approval. Council also raised no objections.

The Department has considered the 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 impact statement and Director-General's assessment report of the original development application;
- existing conditions of approval;
- environmental performance of the facility, particularly the two previous 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. This issue is considered in detail below. An assessment of 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

The delivery, transfer and storage of SPL material on site has the potential to generate dust emissions. While the proposed processing of SPL material also has the potential to generate air pollutants such as fluoride and cyanide emissions which would need to be controlled.

In relation to dust, deliveries of SPL material would be transferred to existing enclosed storage bays and would be covered to minimise dust. Existing baghouse filters (Stack 7) would also be in place to control particulate emissions from the storage area.

In relation to air emissions emanating from the processing of SPL, as an existing facility, Weston Aluminium already has in place a range of controls to manage air emissions from all components of its operations. As well as baghouse filters to control emissions from the storage area, the facility has six additional stacks which 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: Reverbatory furnace; and
- Stack 6: Gas combustion side of the reverbatory furnace.

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

SPL Processing Trials

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 has verified that air emissions generated during SPL processing activities could be controlled and maintained within existing regulatory limits. Table 1 below shows the results of the two previous trials compared with Weston Aluminium's existing Environmental Protection Licence (EPL) limits. As the table below illustrates, cyanide is clearly destroyed in the treatment process and meets the relevant EPA limit.

Table 1 – Results of the 2010 short and the 2012 longer trial of SPL processing

Contaminate	Short Trial	Longer Trial	Licence limit
	Concentration (mg/m ³)		
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	0.5
Gaseous Fluoride (one hour average from real time monitoring)	0.6	<0.6	1.4

The ground level concentrations are expected to be lower than these point source emission levels as gases are directed to a 12m high stack and dispersed into the atmosphere where they would be diluted.

Weston Aluminium's EPL contains emission limits for both fluoride and cyanide, no change to Weston Aluminium's Licence limits would be required for the trial. Weston Aluminium would undertake real-time monitoring of fluoride emissions, as for the previous trials. However, Weston Aluminium is unable to undertake real time monitoring of cyanide levels. As per normal operation, samples would be taken and sent away for analysis.

The Department has recommended conditions to ensure that should monitoring results indicate that fluoride or cyanide emissions exceed the levels prescribed in the EPL, then processing must cease. This should ensure that any impacts would be minimised.

The EPA did not raise any concerns regarding air emissions and confirmed it has no objection to the proposal subject to the following recommended conditions which require Weston Aluminium to:

- notify the EPA one week before the commencement of the trial;
- record all process conditions for the trial;
- undertake detailed monitoring of emissions (with the exception of continuous gaseous fluoride monitoring) and other parameters during the trial in accordance with the EPL; and
- report on the air emissions from the trial.

The Department agrees with the EPA's recommended conditions and has incorporated them into the recommended modification instrument.

With the implementation of such conditions, 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	<ul style="list-style-type: none"> 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 of consent would ensure the waste is appropriately managed. 	Recommended conditions require the Applicant to report on the outcomes of the trial and include a requirement to demonstrate the trial products have been appropriately disposed of.
Soil & Water	<ul style="list-style-type: none"> 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. Existing conditions require Weston Aluminium to appropriately bund the SPL. 	No additional conditions relating to Soil and Water have been recommended.
Hazards	<ul style="list-style-type: none"> The existing consent already allows for the transport and storage of SPL. Consequently, the mixed SPL would be managed through Weston Aluminium's existing facilities and management practices which have been recently updated to include the commercial scale processing of SPL. Notwithstanding, the Department recommends that the volume of mixed SPL that is allowed to be stored on-site at any one time be limited to 1,000 tonnes. The Department is satisfied that hazards would be managed appropriately by the existing and proposed conditions. 	Recommended conditions require the Applicant to not store more than 1,000 tonnes of mixed SPL on site at any one time.

6. CONCLUSION

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

The two previous trials undertaken by Weston Aluminium at its Kurri Kurri facility have provided important information and verification that the facility can successfully treat SPL and meet the relevant air quality objectives and criteria.

As with the previous trials, the Department has recommended conditions to limit the duration of the trial and to ensure that should an exceedance of the current emission limits in the Environmental Protection Licence be identified, the trial cease. The Department is satisfied that with the implementation of both the existing and proposed conditions, any residual impacts would be appropriately managed. The EPA has also indicated that it is satisfied with the proposal. Weston Aluminium has reviewed and accepts the recommended conditions.

The Department is satisfied that the proposal represents an opportunity to manage and reuse mixed 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.

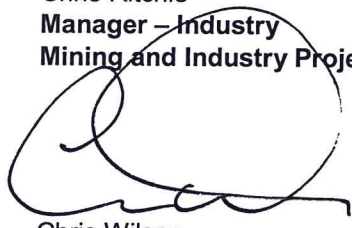
7. RECOMMENDATION

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 (DA-86-04-01 Mod 8) and to the Court consent (10397 of 1995 Mod 6)(in Appendix C).

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APPENDIX A – WESTON ALUMINIUM’S REQUEST

APPENDIX B – SUBMISSIONS

**APPENDIX C – NOTICE OF MODIFICATION AND CONSOLIDATED
APPROVAL**
