DOC16/445196-19; EF13/3847

Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001
Attention: Ms Emma Barnet

emma.barnet@planning.nsw.gov.au

Dear Ms Barnet

REQUEST FOR COMMENTS AND RECOMMENDED CONDITIONS
WESTON ALUMINIUM PTY LTD – PROPOSED MEDICAL AND OTHER WASTE THERMAL PROCESSING (SSD 15_7396)

I refer to your email to the Environment Protection Authority (EPA), dated 5 September 2016, seeking the EPA's comments and any recommended conditions in relation to the proposed thermal processing treatment of medical and other waste at the Weston Aluminium Pty Ltd (Weston Aluminium) facility, Kurri Kurri, application reference SSD 15_7396. The project relates to Weston Aluminium premises licensed under Environment Protection Licence 6423, located at 129 Mitchell Ave, Kurri Kurri.

Reference is also made to the documents '*Thermal Waste Processing Project – Environmental Impact Statement – SSD_15_7396*' (EIS) dated 26 August 2016 and prepared by AECOM Australia Pty Ltd.

Based on the EIS the EPA understands the application proposes the construction of a dedicated waste thermal treatment plant including:

- Solid waste loader and bin tippler;
- Primary and secondary combustion chamber;
- Ash discharge system;
- By-pass stack;
- Waste bin washing machine;
- Associated infrastructure and safety management control upgrades at the existing Weston Aluminium Site to support the project; and
- Processing of the following waste products – clinical and related wastes, pathogenic substances, cytotoxic substances, waste from pharmaceutical products, solvents and pants, pitch sludge, quarantine wastes, illicit materials, and miscellaneous scheduled wastes.

Based on the information provided in the EIS the EPA is currently unable to provide any recommended conditions of approval for the project until the matters identified below are addressed.

Air Quality

The EPA has undertaken a detailed review of the EIS in relation to potential air quality emissions and has determined that further information is required before the EPA can adequately provide any

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recommended conditions of approval in relation to air quality matters. The EPA's detailed comments on air quality assessment matters are at **Attachment A**.

The EPA's key issues in relation to air quality are listed below. The Air Quality Impact Assessment (AQIA), provided at Appendix E of the EIS should be revised to include the following:

a) assess emissions based on the maximum potential process rate of the proposed thermal waste treatment plant;
b) provide robust justification of estimated emissions. As a minimum, reference should be made to manufacturers' performance guarantees and reference plant stack test data and reports;
c) include analysis of the composition of the expected feedstock, and emissions adjusted accordingly. Emissions from expected fuels types should also be incorporated into the analysis;
d) assess Aluminium, Barium and polycyclic aromatic hydrocarbon emissions;
e) assess VOCs from all scenarios, and reference the Regulation limit;
f) include an assessment of 10 minute averaged SO_2;
g) include a particle size distribution that is more representative of emissions from a baghouse;
h) consider maximum emissions, consistent with a worst case scenario for all emission sources at the premises;
i) consider 100th percentile model results for toxic air pollutants;
j) assess potential emissions from the burnout hearth and any additional emission sources not currently assessed;
k) demonstrate that all emission concentrations will comply with regulatory requirements prior to dilution with excess air;
l) review of modelling data including:
    i. justify 2014 as a representative year for modelling;
    ii. quantitatively evaluate meteorological model performance, including a statistical evaluation;
    iii. confirm the model setup and account for missing data; and
    iv. justify the adopted background air quality data.
m) provide a thorough and rigorous benchmarking of the proposal with best practice process design and emission control, including comparison with applicable best practice reference facilities. Where the proposed plant is not consistent with best practice, the project should be modified to adopt additional emission control;
n) ensure compliance with Protection of the Environment Operations (Clean Air) Regulation 2010 limits and Approved Methods impact assessment criteria for all pollutants at all times; and
o) provide the input and output files of any revised modelling data to adequately assess the revised model.

In addition to the air quality matters identified above, the EPA also requests the proponent address the following information:

1. <u>Primary Chamber</u>
    - The EIS does not appear to identify the combustion temperature.
    - The EIS does not provide specific information about combustion air (i.e. whether starved (sub-stoichiometric) or excess air (above stoichiometric) condition burning is carried out).
    - There does not appear to be sufficient information provided on monitoring temperature and oxygen levels during the burning process, if proposed.

2. <u>Secondary chamber</u>
    - No explanation has been provided about how the 2 seconds residence time is determined.
    - The EIS has not included the gas flow rate and volume of the chamber.
    - There is no information on monitoring temperature and oxygen levels during secondary burning process provided.

3. <u>Waste types</u>
    - The waste types proposed to burn include waste types that are likely to contain dioxins and furans precursor chemicals such as chlorobenzenes and chlorophenols. Burning of halogenated hydrocarbon containing wastes will greatly increase the potential for

dioxins/furan formation and such waste must not be burned unless very high levels of consistent process and procedural controls are set in place.

Please note that Officers of the EPA are able to meet with Weston Aluminium and its consultants to further discuss the detailed information requirements included in this letter. Should Weston Aluminium wish to arrange such a meeting, or require any further information regarding this matter, please contact Emma Paull on 4908 6828 or by email to hunter.region@epa.nsw.gov.au

Yours sincerely

24/10/16

MICHAEL HOWAT
A/Head Regional Operations Unit - Hunter
Environment Protection Authority

Encl: Attachment A – EPA's Air Quality Impact Assessment Review

ATTACHMENT A

EPA'S AIR QUALITY IMPACT ASSESSMENT REVIEW (SSD 15_7396)

The EPA has reviewed the EIS and specifically the report at Appendix E of the EIS titled '*Weston Aluminium Thermal Waste Processing Project – Air Quality Impact Assessment*' (AQIA), dated 26 August 2016 and prepared by Aecom Australia Pty Ltd. The EPA's detailed comments on the AQIA are provided below.

1. Processing rate may be underestimated causing underestimation of emission rates

According to the EIS, 8,000 tonnes of clinical waste are proposed to be treated per annum. Assuming continuous operations, this requires waste to be treated at a rate of approximately 913 kg/hr. Since the operations will not be continuous (the thermal treatment process will not operate when the reverberatory furnace is in operation), the maximum rate of waste treatment could be higher than 913 kg/hr. However, emission rates used in the AQIA have been calculated assuming that waste is processed at a rate of 800 kg/hr. On this basis, emission rates used in the AQIA may have been underestimated leading to an under prediction of potential impacts.

Recommendation: The AQIA should be revised to assess emission based on the maximum potential process rate of the proposed thermal waste treatment plant.

2. Emission data and assumptions not adequately justified

Emission rates have been estimated using USEPA AP42 emission factors for incineration of biomedical wastes in rotary kilns.

Calculations of the emissions have assumed all feedstock to the primary combustion chamber is biomedical waste. However, the AQIA states that the feedstock to the combustion chamber can comprise approximately 15% of quarantine wastes, and 10% of other wastes. Since the composition of the feedstock is not completely comprised of biomedical wastes, the emissions should be conservatively adjusted to account for the variable composition of the feedstock.

The EIS advises that the proposed design utilises technology that has been proven in installations throughout the world and is similar to incineration sites operating in Brisbane, Melbourne and Perth. *"The Project has utilised the same design and equipment vendor to capitalise on this knowledge to produce a plant that will be appropriate for Australian conditions and is known to both local customers and regulators".*

The Approved Methods Modelling advises that emission factors should only be adopted when there is no other information available or when emissions can reasonably be demonstrated to be negligible. Based on the above, the use of emission factors is not considered appropriate where other more refined emission data is available, e.g. manufacturers performance specifications and test results for reference facilities.

Recommendation: The AQIA should be revised to provide robust justification of estimated emissions. As a minimum, reference should be made to manufacturers' performance guarantees and reference plant stack test data and reports.

3. Dioxin emission have not been adequately justified

Dioxins and furans are assumed to be emitted at a concentration of 10% of the Group 6 emission concentration specified in the Protection of the Environment Operations (Clean Air) Regulation 2010. Justification for this was based on emissions data from Daniels Health Pty Ltd (formerly Sterihealth Pty Ltd), however, no details and nor the emissions data was provided. Additionally, the AQIA notes differences between the Daniels Health plant and the proposed Weston Aluminium plant.

The EPA notes that Table 2.3-16 SD/Carbon Injection/FF of the USEPA AP42 document for incineration of biomedical wastes specifies an emission factor for dioxins in rotary kilns. This emission factor results in a discharge emission rate that is approximately 6 times that of the emission rate used

in scenario 1 (expected emissions scenario) in the AQIA. In order to use the lower emission rate specified in the AQIA, a more robust justification should be provided.

The Approved Methods Modelling requires that dioxin and furan model results be expressed as toxic equivalent. The AQIA does not discuss toxic equivalent calculations, therefore it is assumed that results have not been expressed in this manner.

Scenario 2 (maximum emissions) adopts a 'pollute up to goal' approach to deriving the maximum allowable emission of dioxins. The adopted approach is inconsistent with the requirements of the Approved Methods Modelling, which requires that principal toxic air pollutants (including dioxins) be minimised to the maximum extent achievable through the application of best practice process design and emissions control.

Recommendation: The AQIA should be revised to provide robust justification of estimated emissions and results presented. As a minimum, reference should be made to manufacturers' performance guarantees and reference plant stack test data and reports.

4. Aluminium, Barium and polycyclic aromatic hydrocarbon emissions do not appear to have been assessed

Emissions of Aluminium and Barium do not appear to have been assessed. USEPA AP42 lists Aluminium and Barium as expected pollutants during biomedical waste incineration.

Emissions of polycyclic aromatic hydrocarbon (PAHs) have not been assessed. The EPA advises that based on the proposed process and waste streams, there is potential for PAH emissions to be generated. Further, it is a requirement of the EPA's Energy from Waste Policy Statement (EfW Policy) to assess emissions of PAHs.

Recommendation: The AQIA should be revised to assess Aluminium, Barium and polycyclic aromatic hydrocarbon emissions.

5. VOC emissions not adequately assessed

Emissions of VOCs have not been considered in scenarios 1, 3 and 4. The EPA advises that, where not adequately controlled, emissions of VOCs could be significant from a facility that thermally treats waste.

The assessment assumes VOC emissions as benzene but provides no justification for the assumption. The concentration limit for VOCs is quoted as being 40 mg/m^3. The correct Group 6 concentration limit is $20mg/m^3$, where the emission material being treated contains a principal toxic air pollutant.

Recommendation: The AQIA should be revised to assess VOCs from all scenarios, and reference the correct limit in the POEO (Clean Air) Regulation.

6. 10 minute average SO2 not modelled

The Approved Methods Modelling lists SO_2 criteria for 10 minute, 1 hour, 24 hour and annual averaging periods. The AQIA does not appear to provide model results for the 10 minute averaging period.

Recommendation: The AQIA should be revised to include an assessment of 10 minute averaged SO_2.

7. Particle size distribution not representative

The ratios between PM_{10} and $PM_{2.5}$ emissions does not appear to be consistent with Table 2.3-15 of USEPA AP42, and may not be realistic for emissions from a baghouse. This is also reflected in the ratios in ambient concentrations.

Recommendation: The proponent should ensure the particle size distribution used in the AQIA is representative of emissions from a baghouse system.

8. Existing sources modelled based on average emissions

The AQIA advises that existing emission sources at the premises were modelled using average source emission data. The use of average emission data is not consistent with the EPA's Approved Methods Modelling requirements to model maximum emissions. The use of average emissions may lead to an underestimation of impacts from the premises.

Recommendation: The AQIA should be revised to consider maximum emissions, consistent with a worst case scenario for all emission sources at the premises.

9. Partitioning of metal emission species not adequately justified

In Scenario 2, Type 1 & Type 2 substances have been partitioned assuming that all have the same emissions, which is 1/13th of the total Type I and Type 2 emissions (there are 13 Type 1 and Type 2 substances). This is considered too simplistic. The EPA notes that USEPA AP42 estimates Hg emissions to be approximately 87% of all Type 1 and Type 2 emissions for incineration of biomedical wastes. Thus, the estimation of Hg impacts will have been significantly underestimated using the current approach.

Recommendation: The AQIA should be revised using more realistic partitioning of Type I and Type 2 emissions.

10. Adoption of 99.9th percentile model results for dioxins not adequately justified

The AQIA adopts 99.9th percentile model results for toxic air pollutants. The Approved Methods provides guidance on interpreting dispersion model results. Model results for refined (Level 2) assessments should be compared against 99.9th percentile predictions, whilst Level 1 assessments should be compared against 100th percentile predictions. The Approved Methods describes a Level 2 assessment as a refined dispersion modelling technique using site-specific input data.

The EPA notes that the AQIA adopted not site specific input data including emission factors. Further, site specific meteorological observations do not appear to have been used.

Recommendation: The AQIA should be revised to consider 100th percentile model results for toxic air pollutants.

11. Potential emissions from the 'burnout hearth' not assessed

The EIS (page 28) describes a burnout hearth, where thermally treated waste / ash material is discharged from the kiln and are maintained for a period of up to eight hours to ensure complete burnout of all carbonaceous matter. The AQIA does not appear to consider potential emissions from this part of the process.

Recommendation: The AQIA should be revised to assess potential emissions from the burnout hearth and any additional emission sources not currently assessed.

12. Duel fuel combustion operation not assessed

The EIS (section 6) identifies liquid fuel as a possible fuel type for both the primary and secondary combustor. The AQIA does not discuss or assess any option for liquid fuel. The EPA notes that fuel type can significantly alter the emission performance of combustion plant for some pollutants. Where a range of fuels are proposed for use, assessment of potential emissions and impacts for all the proposed fuels should be undertaken.

Recommendation: The AQIA should be revised to assess all fuel types proposed.

13. Emission concentrations do not appear to have been demonstrated as complying with the Regulation prior to dilution

Page 30 of the EIS advises that *"Air leaving the heat exchanger is reduced in temperature by several hundred degrees and is then injected with ambient air until it reached temperature of approximately 160°C".*

Based on the above, emission concentrating will be diluted by a potentially significant margin prior to discharge at the stack. The POEO (Clean Air) Regulation requires that emission concentrations apply at the point prior to air being added to the air impurities.

Recommendation: The AQIA should be revised to demonstrate that all emission concentrations will comply with regulatory requirements prior to dilution with excess air.

14. Meteorology and background air quality data not adequately evaluated and justified as representative.

The meteorology used in the dispersion modelling was generated by TAPM and Calmet for 2014. The synthetically generated meteorological data was qualitatively compared to meteorological monitoring that was undertaken at the Hydro Aluminium site between January 2014 and September 2014.

The AQIA provides no analysis and discussion which shows that 2014 is a representative year for meteorology and dispersion.

The monitored meteorological data was not assimilated into the generation of the synthetic data. The synthetically generated meteorology data was qualitatively compared to the measured on-site data, and claimed to be acceptable. However, as pointed out in the AQIA, the measured data indicated a significant amount of calms when compared to the synthetic data. An assessment of the measured data to assess the calms, and to determine whether they are real, or whether they are a result of a limitation in the monitoring equipment, was not undertaken. If the calms are considered to be real, the synthetic data should reflect a higher frequency of lower wind speeds than what is currently used. The EPA notes that the site is in a shallow basin, and it is possible that the calms are real.

Additionally, wind roses presented for the modelled meteorology dataset show 8735 hours of data. There are 8760 hours in a standard year. No explanation of the missing hours has been provided in the AQIA. The EPA notes that missing observations are not applicable in this instance, where a synthetic dataset 'no-obs' was used, which indicates a potential error in the model setup.

The background air quality data used in the AQIA for the cumulative assessment was sourced from the Office of Environment and Heritage (OEH) Beresfield monitoring station for the year 2015. No justification for the adopted data is provided. The EPA notes that the selected meteorology year and the background air quality year are not consistent, this is an atypical assessment methodology that has not been defensibly justified in the AQIA.

Recommendation: The AQIA should be revised to:

- justify 2014 as a representative year for modelling;
- quantitatively evaluate meteorological model performance, including a statistical evaluation
- confirm the model setup and account for missing data; and
- justify the adopted background air quality data.

15. Control technology has not been benchmarked against best practice process design and emission control

The control technology proposed includes a baghouse (existing), a dry lime injection system, and injected activated carbon. The secondary combustion chamber is designed to provide a retention time of 2 seconds at a temperature of 1100°C.

While the EPA's Energy from Waste Policy is not absolutely applicable to the proposal, general principals, including requirement for international best practice emissions control are relevant and should be observed. This is consistent with the requirement of the EPA's Approved Methods Modelling, which requires that principal toxic air pollutants be controlled to the maximum extent achievable through the application of best practice process design and emissions control.

A comparison to best practice control technology for similar plant (reference facilities) was not undertaken by the proponent. Further, the AQIA does not discuss emission available control techniques including but not limited to:

- NOx control – SCR and SNCR
- Acid gas scrubbing – dry and wet scrubbing arrangements
- Dioxin control – rapid quench

The project proposes to utilise a continuous emissions monitoring systems (CEMS) for O_2, CO and CO_2 to monitor the efficiency of the combustion chamber. This is in accordance with the Energy from Waste Policy. However, in order to be fully compliant with the policy, the site should also monitor pressure and temperature in the discharge stack, as well as water vapour content, NO_x, CO, particles (total), total organic compounds, HCl, HF and SO_2 of the exhaust gas.

Recommendation: The AQIA should be revised to provide a thorough and rigorous benchmarking of the proposal with best practice process design and emission control, including comparison with applicable best practice reference facilities. Where the proposed plant is not consistent with best practice, the project should be modified to adopt additional emission control.

16. Proposed bypass stack emissions do not comply with regulation limits and assessment criteria are predicted to be exceeded.

A bypass stack is proposed for use during upset/emergency conditions. The EIS does not explain in detail why the bypass stack is necessary. As discussed above, a comparison to best practice, as well as standard industry practice, is required. The EPA discourages the use of a bypass stack if there are other alternatives.

Emissions were determined from the maximum design stack concentration design limits provided by Advanced Combustion Engineering Pty Ltd. The AQIA assesses potential impacts from the bypass stack as assessment scenario 4. Emissions of VOCs, Be, Se and V were not considered in the analysis of dispersion from the bypass stack.

The bypass stack is proposed to have emission concentrations in excess of the Group 6 emissions standards, as specified in Schedule 2 of the POEO (Clean Air) Regulation. The proposed discharge concentrations are listed in the table below. Specifically, emission concentrations exceeded the Group 6 concentration limits for TSP, HCl, Type I & II substances, Hg and dioxins.

Pollutant	Proposed Emissions Concentration (mg/m^3)	POEO (Clean Air) Concentration Limits (mg/m^3)
TSP	73.8	50
SO_2	61.4	-
NO_x	123.1	350
HCl	615.0	100
HF	6.19	-
Type I & II[1]	3.43	1
Cd	0.143	0.2
Hg	0.619	0.2
Cu	0.333	-
Dioxins	$9.29\ 10^{-4}$	$1\ 10^{-7}$

Note: [1] This did not include Be, Se, V

Predicted ground level concentrations of dioxins and furans due to emissions from the bypass stack are specified in units of $\mu g/m^3$. This is likely to be a typographical error, and the correct units are ng/m^3. If the predicted concentrations are in ng/m^3, then the predicted ground level concentrations are 4 orders of magnitude higher than the impact assessment criteria specified in the Approved Methods. If the units are $\mu g/m^3$ then impacts are predicted to be even larger.

Recommendation: The AQIA should be revised and the proposal redesigned to ensure compliance with POEO (Clean Air) Regulation limits and Approved Methods impact assessment criteria for all pollutants at all times.