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Garbis Simonian
Managing Director
Weston Aluminium Pty Ltd
Via email: gsimonian@westonal.com.au

**RE: Response to issues raised by DP&E regarding Pharmaceutical and Illicit drug waste processing (commercial scale) at Weston Aluminium (DA-86-04-01 MOD 12)**

Dear Garbis,

Previously, in a letter dated 11 April 2017[2018], Todoroski Air Sciences (TAS) presented addressed issues related to a trial of Pharmaceutical and illicit drug waste (commercial scale) processing, hereafter referred to as MOD12.

Please note that the TAS April letter also considered the SSD Project and MOD11. The SSD project is for proposed Thermal Treatment of Medical & Other Waste (and also includes processing of Pharmaceutical & Illicit Waste). The SSD project is for new plant and is significantly different to MOD12 which utilises existing plant. It appears possible that some potential confusion between the two projects may have affected some of the DPE comments.

The two key issues related to MOD12 that were addressed in the 11 April letter are as follows:

1. The nature of the process and the applicability of any oxygen corrections to the air discharge stream; - at a meeting on 26 March 2018, photographs of the existing rotary furnaces and fume hood arrangement were circulated. It was also made clear that the MOD12 project relates primarily to co-processing of small amounts of pharmaceutical or illicit drugs waste with dross in the existing rotary furnaces (noting that any liquid wastes can only be processed separately from the dross due to safety issues of adding liquid in the presence of molten material).

   The fume hood captures mostly fresh air, and thus it was concluded that it would not be appropriate to apply an oxygen correction.

2. Whether the project would cause any material change in the emissions to air; - A graphical and statistical analysis was provided containing all of the pre and post-trial monitoring data. The analysis showed no statistical difference between the pre and post-trial emissions. It was noted that there were no pre-trial dioxin measurements available, but that the post-trial dioxin emission levels were well below the regulatory limit.

The conclusions were that operation of MOD12 would not have any tangible effect on air emissions and thus there is no driver to move to a Group 6 classification.

**Current position**

Additional issues related to MOD12 are set out in an email to Weston Aluminium from DPE dated 8 August 2018.

The DPE issues appear to be residual issues from 6 December 2017 that for some reason have not been addressed before now. It is not clear if the DPE issues relate directly to the latest information as there appears to be some confusion regarding what the trial and proposed MOD12 entail, and possible further confusion in relation to concurrent application for the SSD Project.

The various issues and a response to each issue is set out below:

**DPE Issue 1:** - This appears to relate to a previous AECOM response regarding storage of materials as opposed to emissions of air pollutants. The following AECOM and DPE correspondence outlines the issue;

*"AECOM: As detailed in Table 1 of the EA, the modification in isolation would not lead to the storage of any DG material in either amount or location that is considered potentially hazardous in accordance with Applying SEPP33. Therefore no update to the PHA is necessary.*

*DPE: On the basis of the aluminium dross processing, the facility is hazardous. The source of hazard is emissions and the possible impact is the exposure to toxic gas. Refer to pg12 SEPP33, "SEPP 33 would also apply if the proposed modifications are not potentially hazardous in themselves, but interact with the existing facility in such a way that cumulative hazards (or offence) from the existing facility may be significantly increased".*

Response to DPE Issue 1; Whilst TAS acknowledges that it is not an expert Hazard Risk Assessment company, it is noted that DPE considers the key hazard issue is "emissions and the possible impact is exposure to toxic gas", which is an area of TAS expertise.

In this regard therefore, the pre and post-trial monitoring analysis (see TAS letter dated 11 April 2017[2018]) shows there is no tangible difference in the emissions of air pollutants (toxic gases), and in the case of dioxins where there is no pre-trial data, that the dioxin emissions would be less than 10% of the regulatory limits. This indicates there would be no tangible change to the existing facility's emission profile should MOD12 proceed.

It is also noted that it is possible that some of the pharmaceutical wastes that may arrive for processing may be toxic (i.e. some toxic cancer treatment drugs; DG Class 6). It is however noted that these drugs are also packaged to allow for their safe handling by doctors, nurses and pharmacists, and would be present in hospitals, pharmacies etc. in larger quantities than may reasonably be expected to arrive at the Project site. It is also noted that no such wastes were encountered during the trial.

**DPE Issue 2:** This appears to be an issue that may possibly stem from some misunderstanding of what the trial and MOD12 entail. The following AECOM and DPE correspondence outline the issue;

*1. AECOM: Similarly due to the unchanged nature between the trial and proposed modification of the materials being processed there is no change to hazards associated with the processing material that would necessitate an update to the PHA i.e. the hazard profile remains unchanged.*

*DPE: A trial is based on a small scale process, when the scale of incineration of pharmaceutical waste for processing is increased to full scale within a dross processing, the composition mix of incineration and emissions will vary and increase thereby the hazard profile will change."*

Response to DPE Issue 2: The trial involves the same equipment, and waste feed rates that are proposed to be used in the commercial scale operation of MOD12.

Whilst there may be a greater annual throughput than during the trial, the air pollutants of most concern have 1-hour average limits. Irrespective of there being any change or not in the potential annual throughput, the trial results are considered representative of the full scale operation of the proposed plant, at the proposed feed rates.

The trial results importantly also show that the operation does not lead to any material change (or increase) in emissions at any time, and thus the hazard profile (for any potential toxic gas exposure) will not change on an hourly or annual basis.

**DPE Issue 3:** - This issue appears to stem from a misunderstanding of MOD12 relative to the SSD Project, which is a separate project. The following AECOM and DPE correspondence outlines the issue;

*"AECOM: The trial referred to in the current PHA was for the processing of illicit and pharmaceutical wastes in an existing rotary furnace. Waste to be processed by SSD_7396 would be via a new and separate rotary kiln. Similarly due to the unchanged nature of the materials being processed there is no change to hazards associated with the processing of material that would necessitate an update to the PHA i.e. the hazard profile remains unchanged.*

*DPE: SSD_7396 does not include incineration with aluminium dross, which will have additional reaction factors between chemicals producing other potential toxins."*

Response to DPE Issue 3. There does not appear to be any issue.

The trial relates to MOD 12, and MOD 12 entails co-processing of pharmaceutical and illicit drug wastes with dross in the existing rotary furnaces.

The SSD Project relates to waste processing (including pharmaceutical and illicit wastes) but in a separate new kiln, without dross co-processing.

**DPE Issue 4**; The following AECOM and DPE correspondence outlines the issue;

*AECOM: It is important to note that while the modification seeks to increase the total amount of illicit and pharmaceutical materials processed per year it would still be processed at a similar rate as undertaken during the trials due to the furnace capacity. There is not expected to be a significant change/increase in the flue gas production as a result of the modification.*

*DPE: Please provide composition and weight ratios of the trial incineration processes and corresponding outputs, emissions. Also provide detail on what controls will be in place to ensure that the rates will remain consistent with trial inputs.*

Response to DPE Issue 4. The analysis of the trial data shows that there would not be any tangible change in emissions when MOD 12 operates.

The materials that are processed are all weighed prior to processing. This is part of the WA quality control and materials inventory control process and would be used to ensure that no more than 5% by mass of material would be co-processed (apart from liquid materials that are processed separately as they cannot be co-processed with molten aluminium due to safety issues).

The following aspects of the facility also inherently work to ensure that the MOD12 processing rates would be commensurate with those in the trial:

- The great majority of the pharmaceutical waste arrives as packaged drugs and has a low weight relative to volume (nominally 200kg per cubic metre pallet, by way of comparison, aluminium weighs approximately 1,800 kg/$m^3$). Even the occasional bulk powdered pharmaceutical materials have a similar density. Thus it is not physically possible to "overload" the furnace with any potential excess mass of pharmaceutical wastes as there isn't enough room in the furnace to do so.

- The illicit drugs arrive in smaller quantities and only up to 5% by mass would be co-processed at any time with dross. The largest load of illicit drugs was a full truck load of cannabis weighing 480kg, similar to the pharmaceutical waste, it is not possible to fit this into the furnace at a rate that may overload it. However, more typically, illicit drugs arrive in small quantities of 10 kg or so, and thus even if it all was processed in a batch there would not be any overloading.

  Also, there is no commercial driver to co-process these wastes at a higher rate as they arrive ad-hoc and there is ample time to process the small quantities in a short period i.e. if these waste are processed quickly, there will not be any additional wastes available to process and hence there is no incentive to overload these materials into the process.

It is re-iterated, that despite these inherent drivers to prevent possible overloading, the materials being processed are all pre-weighed to ensure no more than 5% by mass of wastes would be processed (apart from separate processing of liquid wastes).

Further information regarding the composition and weight ratios, as requested is provided in **Table 1** below setting out the proportions and weights of the pharmaceutical and illicit drugs processed during the trial emissions monitoring events. The data indicate that between 4.0% and 4.5% (average of 4.4%) of the mass of the material processed during the trial was comprised of waste materials.

The trial was specifically designed to test the actual likely rates of waste processing for the full scale operation. The composition tested is within 10% of the indicated range of up to 5% of wastes to be processed by mass, and is thus considered to reasonably represent the likely worst case that may be processed. Note that liquid wastes cannot be co-processed with molten aluminium as there is an explosion hazard. The wastes are however readily combustible and are compatible with the plant process technology, which is a key reason these wastes were chosen over other potential waste materials for processing in this plant.

The waste material is processed in batches, with up to 200kg of waste material being co-processed with approximately 4 tonnes of dross (i.e. up to 5% waste by mass per batch). All materials charged to the furnaces for processing are weighed and recorded as part of the WA quality control and stock tracking system.

**Table 1: Quantity of wastes and co-processed material during trial emissions monitoring events**

| Emissions Testing Event | Quantity of Pharma Waste Processed during Testing (tonnes) | Quantity of Illicit Waste Processed during Testing (tonnes) | Co-processing Material Type | Co-processing Quantities (tonnes) | Proportion of Conventional Inputs (%) |
|---|---|---|---|---|---|
| 16-Dec-15 | 1.35 | 0 | Dross | 29.71 | 4.54 |
| 18-Mar-16 | 1.37 | 0 | Dross | 31.015 | 4.42 |
| 30-Jun-16 | 1.32 | 0 | Dross | 32.565 | 4.05 |
| 28-Sep-16 | 1.44 | 0.015 | Dross | 32.055 | 4.54 |
| 8-Jun-17 | 1.16 | 0.06 | Dross | 27.855 | 4.38 |

Further information was previously provided by WA in the report *"Monitoring and Verification Report - Trial Destruction of Pharmaceutical and Illicit Drug Wastes"* dated 10 November 2017.

Please also refer to TAS Letter dated 11 April 2017[2018] for the analysis of the trial data, and also the above response to DPE Issue 2.

**DPE Issue 5** – The DPE is concerned that an insufficient quantity of material was tested too infrequently. The following AECOM and DPE correspondence outline the issue;

*AECOM: Trial results are provided at Schedule 6. These were used in the AQIA as a basis for development of the emissions inventory. These results are based on actual data from the trial processing of the same materials proposed to be processed by the modification and are representative of the performance of the modification.*

*DPE: The actual trial volumes processed (141 tonnes of pharmaceutical and 1.9t illicit drug waste vs approved 1,000 tonnes pharmaceutical and 200t respectively) are too small to provide a solid basis for the development of an emissions profile (ie only 5 monitoring and reporting events across 24 months was collected).*

Response to DPE Issue 5. The DPE comment is incorrect. In regard to the development of a representative emission rate for the operation, the key aspect is that the rate of waste processing in the trial is equivalent to that for the proposed MOD12 and also that the analysis of the trial data includes several different statistical significance tests, and these show that valid, statistically significant information can be drawn from the trial data. The analysis also shows that the results can be validly evaluated for comparison with the available pre-trial data, and are consistent with the pre-trial data.

**Concluding comments**

The above responses should allow the DPE to finalise appropriate conditions and licence limits for MOD 12.

It is noted that presently the wastes in question are incinerated in NSW facilities with poorer emissions performance, or are being transported to other states. Thus approval of the MOD12 project would improve NSW air emissions, and would also reduce hazard risks and greenhouse gas emissions arising from unnecessary long distance transport of wastes.

Please feel free to contact me directly to discuss or clarify any aspect of this report.

Yours faithfully,

Todoroski Air Sciences

Aleks Todoroski