

**ATTACHMENT A: WESTON ALUMINIUM THERMAL WASTE PROCESSING PROJECT
(SSD 15_7396): DETAILED REVIEW OF JUNE 2017 RESPONSE TO SUBMISSIONS AND
REVISED HUMAN HEALTH RISK ASSESSMENT**

Summary

C&R have reviewed the most recent submissions from AECOM¹. Most of the issues with the Human Health Risk Assessment (HHRA) previously identified by the OEH Contaminants and Risk Team (C&R)² have been satisfactorily resolved. However, some outstanding issues remain. These are discussed below with recommendations provided to address them. Detailed discussion is in **Attachment A**.

C&R notes there is still uncertainty associated with the proposed facility, including whether it can meet the emission levels incorporated in the revised HHRA. Emission controls proposed upon analysis of Best Available Technology will need to be implemented as a minimum, because a suitable reference facility does not exist. As such, while the performance of the proposed facility cannot be well defined for assessment purposes, WA appear to have undertaken a rigorous analysis to inform their mitigation strategy and show that the revised HHRA demonstrates facility emissions at the levels incorporated into the assessed scenarios will result in acceptable health risk outcomes. C&R notes that a Project of this nature will require more active operational phase measures to assess the validity of assumptions made, and review implemented mitigation and safeguards. Therefore, the operational phase will be the most opportune time to require the evidence-base to support the assertion that the facility will indeed pose a low risk of harm.

C&R also notes for various contaminants that will be emitted by the facility, such as particulate matter and lead, there is little or no evidence to suggest there is a safe level for human exposure. Consequently, reducing such emission as much as possible should be a focus of the Project.

To address the remaining issues of concern, and uncertainties regarding facility performance, operation and other aspects, C&R has provided additional recommended Approval Conditions that are discussed below and compiled in **Attachment B**. In particular, the risk of harm from acute exposure risk due to the operation of the Emergency bypass stack, and the requirement for WA to demonstrate operational efficiency of the proposed facility, including as a minimum the combustion technology are addressed. These enhance the previously provided Approval Conditions² which included the development and implementation of comprehensive and detailed plans and strategies to ensure and demonstrate the Project is consistent with the EIS and international best practice, and will meet all relevant Project, environmental and health goals.

Recommendations 1-8 have been made to support C&R position on the above-mentioned issues. While many of these recommendations are addressed through suggested revised text for the Approval Conditions, C&R notes that Recommendations 2-3 are to be noted for appropriate action by DP&E. **Recommendation 2** highlights the inconsistencies between various submissions regarding the waste material to be processed at the proposed facility. **Recommendation 3** highlights the 'boundary conditions' that apply to the proposal in terms of the quantities and types of materials to be processed, provided by AECOM in their most recent HHRA. C&R recommends these boundary conditions will be critical to ensuring the project will indeed pose a low risk of harm.

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AECOM submission	Description
60486360_LTR02_20170630	Response letter to OEH-C&R
WA_SSD_EIS_HHRA_Rev_1_30.06.17	Revised Human Health Risk Assessment (HHRA)
WA_SSD_EIS_PHA_Rev_2_30.06.2017	Revised Preliminary Hazard Analysis (PHA)
SSD_7369 WA Med Waste_RTS_03.07.17_Rev3	Collective Response to Submissions (RTS)
WA_SSD_EIS_AQIA_Rev_0_30.06.17	Air Quality Impact Assessment (AQIA)

² DOC17/276967 - Weston Aluminium Thermal Waste Processing Project (SSD 15_7396): C&R comments on March 2017 Response to Submissions and revised Human Health Risk Assessment

Review comments

The issues listed below are in the same order and under the same headings as those previously identified by C&R². Information is included on the issue and whether it has been adequately addressed. Recommendations are provided on how outstanding issues may be managed.

1. The revised HHRA does not clearly consider and assess all potential Project health risks

This issue has been partially resolved.

C&R recommended that the HHRA and PHA be amended to clarify that for each fugitive emission scenario, specific and appropriate safeguards are proposed to prevent or mitigate hazardous incidents occurring.

In response, the amended HHRA:

- 1) States that the existing WA facility would continue to see its previously approved and implemented safety and hazard management systems in place.
- 2) Refers to *Section 6, PHA* where numerous safeguards are proposed for application to the project design, construction, operational and decommissioning phases to prevent such events from occurring or mitigating the possible effects if these do occur.
- 3) Includes *Section 7.2 Hazardous Incident Scenarios*, where safeguards applicable to toxic gas formation scenarios have now been linked to previously identified safeguards (Table A1, PHA).

C&R deems this response sufficient and notes that WA is being pro-active to managing the proposed facility fugitive emissions. However, it is not possible at this point of the project to predict the adequacy and efficiency of the proposed controls. C&R notes that the facility operational phase should be insightful in determining the adequacy of planned/implemented safeguards, and will likely present additional fugitive emission scenarios not perceived/planned for.

As such, a project of this nature will also need a 'reactive' approach to adequately respond to unforeseen/unplanned issues once the facility is operational. As the facility, operational phase will be a critical stage of this project, the Proponent must be equipped with necessary information and records to support ongoing refinement of additional mitigation to best navigate this. Such evidence base will also support long-term facility issues management. Critically, if the project were to cause amenity issues (e.g. odorous emissions), having a systematic approach to issues management will facilitate community engagement. See Recommendation 1.

Recommendation 1

C&R recommends WA be required to, on a regular basis (at least quarterly), assess the adequacy and efficiency of fugitive emission controls at the facility, including as a minimum, odorous emissions. WA should be required to:

- **Develop and maintain a live register of issues encountered during facility operations phase. This documenting system, as a minimum, should serve as a fugitive emission register for the facility.**
- **Undertake odour/risk assessment should there be public amenity issues resulting from facility operational phase activities.**

C&R recommends this be noted as recommended text to enhance previously provided Condition of Consent 1 (Attachment B).

C&R notes that WA consider that the Project does not *pose a significant risk* based on the proposed safeguards presented in the revised PHA (Table A1 and Section 6). C&R notes that the PHA does not include all assumptions made (and therefore committed to by WA) in the HHRA to support this conclusion.

For example, while WA claim to *discuss each hazard scenario and applied safeguards* in PHA Table A1 the following assumptions from Section 2 HHRA are not included in the PHA:

- a. *To permit the incineration of cytotoxic wastes ... the kiln feeding process is both automated and maintained under negative pressure to eliminate direct contact with wastes or process emissions.*
- b. *The shredder... operated under negative pressure to prevent fugitive... emissions during waste transfer for shredding process. Air drawn from the shredder...directed back into the incineration process air stream and treated accordingly as part of the plants emission control systems.*

In addition, Section 6 PHA states: *Baghouse No. 5 is the proposed emission control system...Exhaust gases from the furnace are directed to Baghouse No. 5 for treatment prior to release to atmosphere.* This statement does not indicate that the Proponent will commit to (per HHRA Section 2.5): *Bag house*

5's existing scrubber system proposed to be upgraded to incorporate an activated carbon dosing system, with the activated carbon injected at the baghouse entry point. See Recommendation 2.

Recommendation 2

There are critical gaps in the PHA with respect to fugitive and direct emission mitigation design and safeguards assumed in the HHRA, and thereby the project being deemed “low risk”. C&R recommends that WA need to ensure that there is consistency between the HHRA and PHA and that all relevant information be included in the PHA.

3. Critical parameters and assumptions regarding the facility and its operations are not adequately considered

This issue has been partially resolved.

C&R had previously noted that emissions data used for the HHRA were not specific to this project, i.e., ‘assumed’ parameters were applied for material types, process specifications, and air pollution control technology and operating efficiency. Consequently, there remained considerable uncertainty concerning the emissions performance of the proposed facility due to two key factors:

- the extent of materials to be treated by the Project
- the range of facility operating conditions which have the potential for acute exposure (assessing maintenance, start-up, shut-down and upset conditions).

C&R recommended that the HHRA should be revised to include information on the composition of the wastes and fuel mixes, such as the expected and potential range of contaminants and contaminant concentrations that may be treated. The information provided should clarify that all potential input materials and variability in contaminant levels have been adequately assessed.

In response to this recommendation, WA has indicated the following ‘boundary’ conditions on the proposed facility will apply in terms of types of materials to be handled:

- 1) The Project will not process electronic waste (E-waste) such as hard drives or other secure electronic storage devices.
- 2) The Project will not accept halogenated organic solvents (G150).
- 3) The ratio of waste types will be 75% medical wastes, 15% quarantine wastes, and 10% other wastes.
- 4) The ‘other waste’ would potentially comprise of a mixture of the following:
 - Pitch sludge’s (4%);
 - Solvents & paints (2%); and
 - Oily rags (2%);
- 5) WA will obtain a licence under the *Biosecurity Act 2015* (Commonwealth). Quarantine waste will be subject to inspection and subsequent handling and processing procedures in accordance with licencing requirements from Biosecurity Australia.

WA also stated that regardless of the final ratio of proposed wastes, WA will operate in accordance with its emissions limits as enforced through its Environmental Protection Licence (EPL). WA will verify their emissions performance through the regular independent, NATA-accredited stack emission testing to demonstrate EPL compliance.

Recommendation 3

C&R recommends that to ensure the project will indeed pose a low risk of harm, the-above mentioned boundary conditions for this project should be noted and required for licensing purposes, or through other appropriate means of enforcement/compliance, if not already considered.

4. It is unclear if all relevant and significant data gaps in the HHRA have been identified and appropriately evaluated

This issue has been partially resolved.

C&R commented previously that the HHRA had additional data gaps not discussed in the original HHRA. The previous C&R identified data gaps and comments, and AECOM responses are provided in the revised HHRA. These are summarised, with C&R comments, in the table below, which also includes any additional recommendations made.

Data Gap	Addressed in revised HHRA	Previous C&R Comments	<i>AECOM reponse (Jun 2017)</i>	<i>C&R response current review</i>
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<p>2. Emission data not available for all chemicals that may be present within the processed waste or generated and emitted during the incineration process.</p>	<p>A review of emission data from comparable facilities was conducted, however as operational information was not available during these tests the emission data was considered unsuitable for use in the assessment.</p> <p>Emission factors from the USEPA (AP42) for incineration operations were adopted in the air modelling assessment. These emission factors are considered to be conservative and robust of the expected emissions from the facility.</p>	<p>Significant data gaps remain with respect to emission data for the Project. For example, the AP42 emission factors have not been demonstrated as representative for the Project.</p> <p>Emissions are likely to vary depending on the specific plant design and operation, the waste input into the plant and other factors.</p> <p>Recommendation: the HHRA include additional information to demonstrate the factors and assumptions used (associated with emissions and plant operations and performance) are robust and conservative.</p>	<p><i>There are a range of contaminants of potential of concern (CoPC) that may be emitted from this type of facility (all emitted through Stack 5 for the Weston operations). The CoPC have been identified through an approach that examined a range of data sources including the following:</i></p> <ul style="list-style-type: none"> • <i>Publicly available emission factor sources (AP42 Chapter 2, Section 3);</i> • <i>Publicly available stack emissions data from similar facilities (Sterihealth stack emissions data from the company website);</i> • <i>Relevant publicly available NSW EPLs for similar facilities (Sterihealth EPL 6156); and</i> • <i>Advice from manufacturers experienced in the construction and operation of Thermal Treatment facilities for Medical Waste (Advanced Combustion Engineering). It should be noted that direct data from other medical waste facilities could not be utilised or referenced in this report due to data on emissions being commercial in confidence for the other facilities. Designers of the system are highly experienced and have designed and installed most of the medical</i> 	<p>Justification will be required to demonstrate that the facility meets the assumptions used. C&R Conditions of Consent were earlier provided to address this.</p> <p>Recommendation 4: WA be required to:</p> <ol style="list-style-type: none"> Implement the proposed upgrades to Baghouse 5-injected with lime and activated carbon with Dry Fabric Filter; and, Demonstrate operational and emission control efficiency of the emission control system. <p>This recommendation is suggested as additional text to be incorporated into Condition 9 (Attachment C).</p>
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			<p><i>waste facilities in Australia.</i></p> <ul style="list-style-type: none">• <i>The proposed thermal waste processing plant would operate interchangeably with the operation of the existing reverb furnace. As such emissions from Stack 5 would either be attributed to the thermal waste processing plant or reverb furnace at any one time.</i>	
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3. Emissions data is not available to assess odour emissions	<ul style="list-style-type: none"> The HHRA does not quantitatively assess Project odour emissions. Rather in the Project AQOA, volatile organic compound emissions (VOC) were modelled at the Clean Air Regulation limit and were showed to comply with ambient VOC limits, which by inference (that VOCs are the most common cause of odour concerns) addresses the concerns relating to odours. The HHRA notes that fugitive emissions have not been quantitatively assessed and are expected to be minimal. Emissions from all major sources have emission control systems. 	There is some potential for odour and fugitive emissions associated with waste receipt, storage, handling and processing (such as when waste is exposed to air for example during shredding and waste preparation). Various mitigation measures relevant to fugitive odour and air emissions are included in the Project, such as waste operations undertaken within a building, and no freestanding waste stockpiles or waste stored in the open air. However the building is not proposed to be operated under negative pressure which would largely eliminate the release of fugitive emissions.	<p><i>The rationale for the omission of odour and fugitive emissions relates to the receipt and handling of the medical waste. Certain medical wastes with the highest potential to generate odour (e.g. biomedical wastes) would typically be received from pre-bagged in sealed bins. If temporary storage is required on site this would be in sealed cold storage, preventing odour generation. The waste would then be sent to the shedder which is maintained under negative pressure with air directed to the thermal treatment process for use as combustion air (effectively scrubbing any low level odour that may be generated). Shredded waste is then either directed to the combustion chamber for treatment or returned to the on-site cold storage area for processing at a later time. These procedures are not expected to allow for the generation of significant quantities of odour and as such odour has not been considered in this assessment. Table 4 (Section 3.6) of the HHRA has been updated based on the above response.</i></p>	<p>AECOM maintain that odours such as those due to ammonia will be limited during waste handling and processing activities due to sealed enclosures such as sealed cold storage preventing odour generation. While most of the measures appear appropriate, it cannot be envisaged that the cold storage will not require air exchange and thereby generate potential odour. There is no clarity on how the cold storage itself will be maintained for occupational safety. Ongoing measures need to be implemented to document issues, and subsequently monitor and evaluate this potential risk.</p> <p>C&R considers that the issue of fugitive and odorous emissions be addressed through additional conditions provided in Recommendation 1 and subsequently integrated into Condition 1.</p>
4. Emissions data not available to assess fugitive emissions		C&R notes detailed Project management plans will be required to ensure aspects related to waste receipt, storage, handling and processing, and the generation of fugitive and point source emissions will be comprehensively managed.		

<p>8. No assessment of air-to-leaf transfer of chemicals to edible plants or dust deposition onto plants</p>	<p>The HHRA notes that air to leaf transfer is not considered to be a significant contaminant transport pathway due to the non-volatile nature of the bio-accumulative air contaminants. Dust deposition onto plants was considered to be negligible, and in addition dust would be washed off fruit and vegetables prior to consumption.</p>	<p>C&R notes not all fruit and vegetables may be washed prior to consumption. In addition, it is noted that uptake of dioxin (TCDD) air to leaf transfer can be significant for leafy vegetables compared to contamination due to root uptake³</p> <p>Recommendation: the HHRA include additional information to justify bioaccumulation of contaminants by plants has been appropriately assessed.</p>	<p><i>AECOM have added dust-to-leaf transfer as a potential contaminant transport pathway in the HHRA. Further justification: "Vapour-to-leaf transfer was not considered to be a significant accumulation pathway as bio-accumulative CoPC considered in the multiple pathway assessment are not volatile (based on the henry's law constant and vapour pressure) and therefore unlikely to be present in 'air' in the vapour phase. This is further supported by the dispersion modelling results whereby negligible concentrations of non-volatile CoPC (e.g. metals and dioxins/furans) were reported in air across the grid. Therefore, with negligible concentrations of bio-accumulative CoPC in air, this is not likely to be a significant pathway of concern."</i></p> <p><i>Additionally, the potential contaminant transport pathways have updated in Table 9, Section 4.5 of the revised HHRA.</i></p>	<p>This issue has been resolved.</p>
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³ Health Effects of Municipal Waste Incineration, Hattemer-Frey et. al. 1991.

6. It is unclear if the emissions considered in the assessment are appropriate

This issue has been partially resolved.

C&R had earlier noted that it was unclear if the flue gas treatment system will be able to effectively control all significant air pollutants to the levels required to ensure compliance with project requirements. This is due to the potential variability of waste in the feed material.

In response, the revised HHRA indicates that hard drives will not be in the feed material. The facility will also be equipped with a scrubber system injected with activated carbon and lime for fabric filter collection (dry injection Fabric Filter), which is one of the three technologies with a high uptake for thermal treatment processes. See Recommendation 5.

Recommendation 5

C&R recommends that WA demonstrate the adequacy and effectiveness of the proposed Baghouse 5 emission control system as part of the ongoing monitoring program. See recommended additional text for Condition 9 (Attachment B).

12. The selection and characterisation of COPC is not adequately justified

- i. C&R recommended the HHRA be revised to clarify the potential chemicals and hazardous substances associated with the proposed wastes and those that may be emitted from processing these wastes.

Refer to Items 3 and 4.

- ii. C&R recommended the HHRA be revised to provide details and further justification of how the COPC were identified and selected.

C&R had previously noted that ammonia waste was not considered to be a COPC as no selective non-catalytic reduction (SNCR) was proposed for the facility in the updated RtS.

Refer to Items 3 and 4.

- iii. C&R recommended the HHRA be revised to justify why COPC were excluded from further consideration or assessment.

This issue has been partially resolved.

Several potential chemicals may be present in the processed waste or generated during the incineration process (e.g. barium, silver, zinc, molybdenum, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), hexachlorobenzene, individual volatile organic compounds, or other hydrocarbons or chlorinated compounds). C&R had previously noted that due to a lack of emissions data for certain chemicals of potential concern, the odour assessment and subsequently HHRA were lacking. C&R had required the HHRA be demonstrated as comprehensive.

In response, AECOM state that *“this list of pollutants ... represent the major pollutants of potential concern. There is always the potential for small quantities of other compounds to be generated during the waste process, but from the perspective of the medical waste facility, these compounds are not expected to be of concern and have not been assessed e.g. PCB, PAH, individual VOC etc.”*

C&R maintains that it will be critical that the plant combustion operations minimise toxic emissions from the various hazardous input materials that will be received by the facility. Thus, the combustion efficiency of the proposed incineration system will need to be optimal, and WA must be required to demonstrate efficient system performance with respect to the combustion process. See Recommendation 6.

Recommendation 6

Efficiency performance reporting on the combustion systems be required including the:

- (1) reverb furnace (emitting via Stack 5) and,**
- (2) rotary furnace (Stack 1).**

In addition, performance of the emissions control system (Baghouse 5 equipped with dry carbon injected) should be required.

The above is recommended as additional text into Condition 9 (Attachment B).

- iv. C&R recommended the HHRA be revised to include discussion on the implications of uncertainties in COPC and COPC emission concentrations.

See response to Item 4.

- v. C&R recommended the HHRA be revised to demonstrate the HHRA has been conducted conservatively with respect to the COPC and emission concentrations used.

See response to Items 3, 4 and 7.

19. The screening criteria used to assess chronic exposure are not adequately justified

This issue has been resolved.

Exceedance of the residential screening criteria for sulfuric acid was noted previously, though not considered a potential health risk due to following reasons:

- the grid maximum concentration was found to occur on commercial/industrial land;
- the concentration did not exceed the selected chronic Tier 1 screening criteria for commercial workers.

C&R previously recommended that additional justification be provided for the screening criteria to demonstrate that they are appropriate. In response, AECOM have revised their screening approach by adding the Californian Ambient Air Quality Standards (AAQS) to the hierarchy of Tier 1 screening criteria, citing these are more suitable due to containing applicable averaging periods and protection of sensitive individuals.

With the adoption of these guidelines, 24-hour maximum and grid maximum concentrations of sulfuric acid were reported below the selected Tier 1 screening criterion under Scenario 1 and Scenario 2.

C&R considered that recommended emissions performance testing of the air pollution control system can be used to demonstrate that these assumptions are achievable. As such, proof of performance measures has already been required in the Conditions of Consent.

20. Justification for the use of the selected screening criteria for lead is required

This issue has been partially resolved.

The HHRA had adopted the less conservative NEPM Ambient Air Quality standard for lead (0.5 µg/m³), and not the more stringent US EPA (2016) RSL (0.15 µg/m³). Noting 'no safe levels' for this contaminant, and given the proximity of the Project site to the battery recycling facility nearby, C&R recommended the HHRA include additional information to justify the screening criteria used for lead.

AECOM have updated the HHRA noting that the *24-hour maximum and grid maximum concentrations of lead under Scenario 1 and Scenario 2 were below both criterion. Additionally, estimated blood lead concentrations remained below the NHMRC recommended blood lead level for all modelled scenarios, including Scenario 2.*

C&R is of the position that it has been sufficiently addressed considering the screening criteria were not exceeded and the modelling indicated that there is no issue

23. Stack concentrations used for emergency bypass operation modelling require justification

This issue has been partially resolved.

C&R recommended that the HHRA include, or provide a reference to, the design limit values specified by the equipment and process design engineer for the Bypass stack emissions. C&R further noted that performance specifications or other justification for the maximum concentration design limits were not provided.

AECOM have indicated the following:

- *Design limit values are specified at Appendix B of the AQIA.*
- *The emergency bypass stack will be for hot combustion gases to be directly vented from the plant to atmosphere during incidents, power failure or other emergency situations; due to operating in emergency or 'upset' conditions only, it is not subject to emission limits under clause 56 of the Protection of the Environment Operations (Clean Air) Regulation 2010.*
- *The Project engineer reviewed Baghouse 5 specifications and designed the proposed emissions controls to allow WA to achieve compliance with regulatory limits for the types and quantities of wastes proposed to be processed, and considers the proposed emissions assumptions appropriate for a facility of this type and scale.*

While relevant information has been provided as requested, C&R notes that for the purposes of assessing health risks due to this facility, the use of Stack 8 presents an acute exposure scenario that has not been assessed. It therefore remains uncertain if use of the emergency bypass stack emissions would present risk of exposure at sensitive and vulnerable receptors particularly during poor dispersion conditions. Thus C&R advises that regulated emission limits not be the only criteria to manage emissions from a hazardous waste facility.

See Recommendation 7.

Recommendation 7

C&R recommend stringent management of the emergency bypass stack be required to ensure that potential acute health risks are managed.

C&R recommends that conditional use of the emergency bypass stack be required. WA should be required to identify critical facility operational scenarios that will require the use of Stack, and based on the outcomes of this investigation:

- Integrate into the operational protocols, documented procedures on optimal facility conditions and operational procedures designed to limit the use of Stack 8.
- Define 'emergency' scenarios and identify options (to using Stack 8), should identified 'emergency' situations occur.
- Implement documented procedures to guide the safe and restricted use of Stack 8 (e.g. limiting use under optimal conditions of dispersion, if at all required).

Identify other opportunities/options/avenues available to address the undefined yet inevitable risk scenario that the use of Stack 8 presents

Above has been included as additional suggested text for the new Condition 11 (Attachment B).

24. The HHRA should include assessment of emissions at in-stack concentrations

This issue has been resolved.

C&R noted that the previous HHRA did not include an assessment of risk to human health to demonstrate acceptable risk for emissions at the proposed facility at maximum permissible concentrations (i.e. worst-case Scenario 2). Acknowledging that it was unrealistic to assess chronic health risk based on ongoing worst-case facility emissions, C&R recommended that the HHRA demonstrate for licencing purposes, what the chronic health risk impacts associated with the facility emission limits will be.

AECOM have included in the revised HHRA: *a quantitative chronic health assessment of Scenario 2 (EPL operating conditions) using 24-hour maximum and grid maximum concentrations and annual average dust deposition rates*. The chronic health assessment of Scenario 2 showed *that the potential risk to off-site residents was predominantly driven by the inhalation of cadmium and nickel in air and consumption of cadmium contained in breast milk*.

C&R notes that the quantitative chronic health risk assessment for Scenario 2 was based on a conservative assumption that the sensitive receptor is exposed to maximum ground level concentrations 24 hrs/day, 365 days/year, and for 29 years (for adults). As such, the resulting *exposure point air concentrations* assumed for the quantitative risk assessment are deemed conservative. It is also noted that Scenario 2 is an unlikely emission scenario however, has been modelled to assess feasible emission limits, and is relevant given that WA states that *“both Stacks 1 and 5 may ultimately be operated concurrently for part of the month”*.

C&R considers the worst-case exposure scenario modelled while showing unacceptable risk, is highly unlikely.

26. Representative exposure point concentrations appear to be based on Scenario 1 emissions estimates (normal operating conditions) rather than Scenario 2 (operating continuously at stack emission limits)

This issue has been resolved.

C&R noted the previous version of the HHRA (Section 6.1) incorrectly referred to Scenario 1 (the normal operating scenario) as *operating continuously at stack emission limits*, while the RTS stated that it would not be appropriate or representative to assess chronic health risks under theoretical ‘worst case’ operating conditions. Clarification of this issue was requested.

In the most recent submission this editorial issue has been rectified by confirming that *Scenario 1 is the standard operating condition and not stack emission limits (Scenario 2)*.

29. It is unclear how exposure point concentrations for chromium(VI) were estimated

This issue has been resolved.

Footnote has been added to Table 15 of the revised HHRA clarifying that total chromium is assumed to comprise 100% hexavalent chromium. AECOM also notes that the toxicity values for Cr(VI) were presented in Table 14 of the HHRA.

30. It is unclear if the Project applies best available techniques and best environmental practices

This issue has been partially resolved.

C&R previously noted that while a best available techniques (BAT) analysis was undertaken and presented, due to the nature of the Project there was still considerable uncertainty on the emissions performance of the proposed facility over the extent of materials to be treated and range of facility operating conditions. In response, the revised HHRA presents a brief review of the different process gas treatment options available for the various pollutants expected from the *Medical and Other Waste Facility* (particulates, acid mist, NO_x, Dioxins and Furans (PCCD/F) and mercury). The review shows that there are multiple practices that may be considered reasonable and feasible control technology options for both primary and secondary pollution reduction, and WA consider *Dry with Fabric Filter* control equipment to be a good combination of these practices and reasonably best practice for their operations.

C&R notes that while there is adequate justification provided as outlined above, the use of BAT does not in itself guarantee minimal health risks due to exposure from the facility. Efficient operations of

these facility components will be required to minimise toxic emissions, irrespective of the nature of the input material into the incineration system. Thus, the efficiency performance on various system components of the facility should be required. See Recommendation 8.

Recommendation 8

C&R recommends the WA be required to monitor the efficiency of the emissions control system (Baghouse 5-injected with lime and activated carbon with Dry Fabric Filter).

See recommended revised Condition 9 (Attachment B).

ATTACHMENT B – Recommended Approval Conditions

OEH Contaminants and Risk Team's (C&R's) recommended approval conditions are based on findings discussed in:

- Attachment A of the previous advice provided (DOC17/276967).
- **Attachment A of the current advice. Additional conditions of consent are in grey font.**

C&R notes the recommended approval conditions as listed may significantly overlap. The conditions can be combined within relevant general and specific environmental performance, management and reporting conditions.

(From Item 1)

- 1) The Applicant to develop and implement comprehensive and detailed management plans that:
 - a. will ensure the effective management of all potential hazards, including hazardous materials, operations and plant.
 - b. include contingency measures to be implemented if control measures are ineffective at appropriately mitigating or preventing site emissions.
 - c. ensure plant and operations are consistent with those described and incorporated into the EIS.

Additional recommended text for Condition 1 from Recommendations 1 and 4

C&R recommends WA be required to, on a regular basis (at least quarterly), assess the adequacy and efficiency of fugitive emission controls at the facility, including as a minimum, odorous emissions. WA should be required to:

- **Develop and maintain a live register of issues encountered during facility operations phase. This documenting system, as a minimum, should serve as a fugitive emission register for the facility.**
- **Undertake odour/risk assessment should there be public amenity issues resulting from facility operational phase activities.**

(From Item 3)

- 2) The Applicant to develop and implement management plans and strategies that:
 - a. will ensure and demonstrate facility operations, plant and emissions are consistent or superior to those used to assess potential Project impacts.
 - b. identify, monitor and characterise:
 - i. all critical parameters, including process inputs and outputs (such as emissions), aspects to ensure proper and efficient plant design, operation and maintenance; and
 - ii. the variability associated with these parameters, including to capture: each different operating scenario (including treatment of different wastes), normal and abnormal operations, and changes over time.
 - iii. include a robust commissioning, performance and operational test program. The program should include:
 - o to demonstrate the performance of the incineration system over stages for:
 - i. treating the various waste types, ratios and mixes to be accepted and processed at the facility; and
 - ii. controlling air emissions.
 - o proof of performance tests and operational compliance tests.

(From Item 4, Issue 2)

- 3) The Applicant to
 - a. ensure the detailed plant design and design specifications incorporate all necessary elements to ensure the plant performance is consistent with or better than that used in the Project EIS.
 - b. develop and implement a commissioning program to demonstrate each element of the plant is operating according to design requirements and specifications.
 - c. include comprehensive trials and testing in Project management plans and strategies to ensure emissions are consistent with those used in the assessment of Project impacts.

(From Item 4, Issue 3)

- 4) The Applicant to develop and implement Project design plans, specifications, and management plans (including a waste management plan and an air quality management plan) that will contain elements that will ensure aspects related to waste receipt, storage, handling and processing, and the generation of fugitive and point source emissions will be comprehensively managed. The actions, mitigation measures, practices, procedures and methods referred to in the plans must be clear, measurable and auditable.

(From Item 4)

- 5) The Applicant to:
- develop and implement Project management plans and strategies that will ensure and demonstrate facility operations, plant and emissions are consistent or superior to those used to assess potential Project impacts;
 - ensure the detailed plant design and design specifications incorporate all necessary elements to ensure the plant performance is consistent or superior to that used in the Project EIS;
 - develop and implement Project plans for commissioning that will demonstrate each element of the plan is operating in accordance with the Project and plant design requirements; and
 - develop and implement Project plans that include comprehensive trials and testing (proof of performance) to demonstrate the plant's performance under the range of potential operating conditions, including the various waste types, compositions, mixtures and contaminant loadings into the incinerator.

(From Item 7)

- 6) The Applicant to ensure the facility is designed and demonstrated to meet current international best available techniques and best environmental practices, particularly with respect to:
- process design and control;
 - emission control equipment design and control;
 - emission monitoring with real-time feedback to the controls of the process;
 - arrangements for the receipt of waste; and
 - management of residues from the incineration process.

(From Item 20)

- 7) The Applicant to ensure Project related emissions are prevented or minimised to the maximum extent achievable through the implementation of best practice process design, emission controls and environmental management.

(From Item 20)

- 8) The Applicant to develop and implement a comprehensive community consultation plan.

(From Item 24)**Additional recommended text for Condition 9 from Recommendations 5, 6, and 8**

- 9) The Applicant to develop and implement a Validation and Verification Plan (VVP) to be in force **over at least the first 5 years** of facility operations. The VVP must include a program:
- to demonstrate compliance with the emission concentrations used for the chronic exposure assessment in the HHRA
 - that includes regular and ongoing evaluation of emissions to ensure any potential trend towards non-compliance, ie. above the average source emission data used for the assessment, is identified within the relevant averaging period.
 - that requires the Proponent undertake emissions monitoring (including odour) at a regular frequency, under worst-case operating conditions and using different waste streams; and ensure adequate resourcing to monitor and action any exceedances of emission limits.**

- d. that requires the Proponent to undertake the following at Project demonstration phase, and as part of the ongoing facility monitoring program:
- i. Investigate and implement best practice industry standards at the facility to ensure efficient operation of the following facility systems/processes:
 - waste handling process controls implemented for managing odorous and hazardous emissions from “non-stack” or fugitive sources;
 - combustion process efficiency for the reverb furnace (emitting via Stack 5) and rotary furnace (Stack 1);
 - at-stack emission control (stacks 1 and upgraded Bag house 5 scrubber system (dry activated carbon and lime injection Fabric Filter));
 - bottom ash or “residue” disposal system;
 - ii. Define ‘efficiency’ measures for each of these systems/processes;
 - iii. Demonstrate ‘efficiency’ of these systems/processes at the facility based on (ii) above.

- 10) The Applicant to arrange for and commission an independent environmental audit/s of the Project. The audit/s must be conducted by suitably qualified, experienced and independent team of experts. The audit/s should be designed to:
- assess and demonstrate the performance of the development and its compliance with relevant approvals;
 - review the adequacy of project strategies, plans and programs; and
 - recommend measures or actions to improve the environmental performance of the development and project strategies, plans and programs.

11)

Recommended text for Condition 11 from Recommendation 7

The Applicant be required to identify critical facility operational scenarios that will require the use of Stack 8, and based on the outcomes of this technical analysis:

- Integrate into the operational protocols, documented procedures on optimal facility conditions and operational procedures designed to limit the use of Stack 8.
- Operationally define ‘emergency’ scenarios and identify options (to using Stack 8), should identified ‘emergency’ situations occur.
- Develop, document and implement procedures to guide the safe and restricted use of Stack 8 (e.g. limiting use under optimal conditions of dispersion, if at all required).
- Identify other opportunities/options/avenues available to address the undefined yet inevitable risk scenario that the use of Stack 8 presents.