Ref: L05016/BH/15-176

22 February 2016

Abernethy Nominees Pty Ltd
C/- Adams & Sparkes Town Planning & Development
PO BOX 1000
BUDDINA QLD 4575

Attention: Mr Pete Sparkes

Dear Pete

Re: Response to Sunshine Coast Council Request for Additional Information - Air Quality Impact Assessment - Proposed Cremator – 139 - 159 Wises Road, Maroochydore

Further to your request I have reviewed the Sunshine Coast Council ("**SCC**") Request for Additional Information[1] in relation to air quality. MWA Environmental has previously prepared the report *Air Quality Assessment – Proposed Cremator – 139-159 Wises Road, Buderim* (28 January 2016) ("**the *Air Quality Assessment* report**").

The specific additional information requested by SCC as a result of a technical review undertaken by Katestone Environmental Pty Ltd is as follows:

> *"Deposition rates of mercury were quantified in the assessment assuming that 4% is in the particle phase. This assumption was based on the UK report Particulate and Heavy Metal Emissions from Industrial Processes produced for the UK Department of Environment, Food and Rural Affairs (DEFRA Report). The DEFRA report refers to stringent particulate matter controls of modern incineration plant whilst saying in the case of cremators, particulate matter abatement is less good. The MWA Environmental Report has not demonstrated the applicability of the assumption of percentage of mercury in the particle phase in relation to effectiveness of controls for the proposed cremator. Therefore, more information should be provided. Whilst Katestone agrees that the percentage of mercury in the particle phase is likely to be relatively low due to the high vapour pressure of mercury, it is also the case that the outcome of the assessment is sensitive to the assumption that 4% is in the particle phase."*

As per **Section 2.3** of the *Air Quality Assessment* report, reference has been made to the *UK Particulate and Heavy Metal Emissions from Industrial Processes*[2] produced for the UK Department for Environment, Food and Rural Affairs ("**the DEFRA report**") for the purpose of assessing the expected percentage of Mercury emissions in the particle phase (i.e. Mercury that may be deposited from the atmosphere to land surface).

---

[1] Per email Mr Marc Cornell (Sunshine Coast Council, Principal Development Planner), 19 February 2016
[2] Passant, N. et al (2002) Report Number AEAT-6270 *UK Particulate and Heavy Metal Emissions from Industrial Processes, Issue 2*, DEFRA

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 15, 241 Adelaide St, Brisbane GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084

The DEFRA report includes a section addressing the speciation of Mercury[3] from 'Waste incineration and cremation' sources, as follows:

> **Waste incineration and cremation**
>
> Pacyna *et al* 2001 suggest that 60% of mercury is in the form Hg^{2+}, with 20% present as Hg^0 and as Hg(p). Lee *et al*, 2000, suggest 22% for Hg^0 and Hg(p), with 56% as Hg^{2+}. The percentage suggested for particulate-bound mercury in both these sources seem very high given the stringent particulate matter controls at modern incineration plant. In the case of crematoria, particulate matter abatement is less good and so higher levels of Hg(p) might be expected. We would also suggest that the proportion of Hg^{2+} might be higher than the 60% given by Pacyna *et al*, 2000, due to the highly oxidising conditions with excess air. We therefore propose to use the following profiles:
>
> | | |
> |---|---|
> | Crematoria | 95% Hg^{2+}, 4% Hg(p), 1% Hg^0 |
> | Other incineration | 95% Hg^{2+}, 1% Hg(p), 4% Hg^0 |

Relevant to the SCC request for additional information is that the DEFRA report notes that particulate controls for crematoria are "less good" than for incineration plant and on this basis proposes a particle phase Mercury percentage for crematoria 4 times higher[4] than for other incineration plant. It is evident that the recommended particle phase Mercury percentage for crematoria does account for the less effective particulate control of cremators compared to waste incineration plant. It is therefore considered by MWA Environmental that the 4% particle phase Mercury assumption is applicable to crematoria in accordance with the DEFRA report.

It is noted that the highest off-site Mercury deposition rate predicted in the Air Quality Assessment report based upon the DEFRA report 4% Hg(p) for crematoria was 64% of the TA Luft[5] 'trigger level'. The highest Mercury deposition rate predicted at a residential land use was 24% of the TA Luft 'trigger level'.

It is also noted that the particulate emission control for the proposed "Ener-Tek – IV Plus" cremator may be better than typical as the emissions testing information presented in Attachment 2 of *the Air Quality Assessment* report relates to particulate emission rates of 0.0076 grams per second which is significantly lower than the PM_{10} emission rate determined based upon standard emission factors in accordance with the following references:

- *National Pollutant Inventory Emission Estimation Technique Manual for Crematoria* (Environment Australia, March 2011).
- Lee, C. *Bay Area Air Quality Management District (BAAQMD) Permit Handbook Chapter 11.6 – Crematories* (2009)

[3] Particle phase Mercury is referenced as "Hg(p)"
[4] i.e. 4% particle phase Mercury for crematoria compared to 1% for other incineration plant
[5] German Federal Ministry for Environment, Nature Conservation and Nuclear Safety *TA Luft First Federal Administrative Regulation Pertaining to the Federal Immission Control Act (Technical Instructions on Air Quality Control - TA Luft)*

Abernethy Nominees Pty Ltd, c/- Adams & Sparkes 22 February 2016
Re: Response to Sunshine Coast Council Request for Additional Information - Air Quality Impact Assessment - Proposed Cremator – 139 - 159 Wises Road, Maroochydore L05016/BH/15-176

Based upon the above review it is considered that the additional information request may be responded to as follows:

1. The DEFRA report 4% particle phase Mercury assumption is applicable specifically to crematoria.
2. Using the 4% particle phase Mercury assumption the predicted deposition rates are well below the TA Luft 'trigger level' guideline at sensitive receptors.
3. Emissions testing for the "Ener-Tek – IV Plus" cremator indicates that particulate emissions may be lower than would be determined based upon standard emission factors published by Environment Australia and the Bay Area Air Quality Management District.

The Air Quality Assessment undertaken demonstrates that the proposed development can operate without causing adverse air quality impacts at surrounding sensitive land uses. It is recommended the cremator be approved with relevant and reasonable conditions.

Yours sincerely

Ben Hyde
Environmental Engineer