



Kleinfelder Australia Pty Ltd
ABN: 23 146 082 500
Level 1, 95 Coventry Street
South Melbourne VIC 3205
T| 03 9907 6000 F| 03 9907 6090
www.kleinfelder.com/australia

09 February 2017

Kieren McDermott
Environmental Specialist
Post Collection – Vic Landfills
Transpacific Cleanaway
46 Victory Road
Clarinda VIC 3169

**Subject: Response to Comments (7 January 2017)
Results of Flare Emissions Testing**
Cleanaway Landfills Ltd
Tullamarine Closed Landfill
Kleinfelder Doc No.: MLB16R50488

Dear Mr. McDermott,

At your request, Kleinfelder, Inc. (Kleinfelder) has reviewed the comments received from Graeme Hodgson on 07 January 2017 regarding the above referenced report relating to flare emissions testing (Report). To respond to those comments and to aid in the public's further understanding of the Report we offer the following information.

The commenter stated that a commitment had been made regarding the flare destruction efficiency in the stack of 99.9 % and referenced a Tullamarine Landfill Community Consultation Group meeting of 26 February 2014. The flare data shows the destruction efficiency of the flare for methane is 99.995 % and for average (mass weighted) VOCs is 99.9 % (Table 4.6 of the Report).

The commenter notes that the emission results shown in the Report from the 2016 sampling are more comprehensive (include a wider range of chemicals) and show different concentration readings than the prior testing completed in 2015. This is true, the 2016 sampling was undertaken using different sampling and analysis methods in an effort to provide a better picture of the flare operations to the public. We also observed the differences from the past results but cannot draw any direct conclusions on the cause of that variation. Sampling results typically vary around the "true" numerical value by some standard deviation based on the complex nature of the system being tested and the testing and analytical processes involved. In other words, both stack outlet emission data sets are valid and the variation is expected based on the processes involved in sampling.

The commenter appears to compare the in-stack concentrations of Dioxins and Furans found in the Report to the SEPP Schedule A limits (0.0037 ng/m³) and also to EU and USEPA criteria that the commenter states is 0.002ng/m³. There are several things to note regarding this comparison:

- SEPP Schedule A lists design criteria in terms of ambient air concentrations, and ambient air quality impact modelling is required in order to assess stack emission against these criteria. Direct comparison of stack concentrations to the SEPP Schedule A is inappropriate and not the intended use as prescribed by EPA Victoria. Dispersion modelling of the stack emissions observed during the 2016 testing shows that all SEPP Schedule A criteria are met at the point of highest potential impact as shown in Table 4.4 of the Report.
- The source of the commenter's reported EU and USEPA criteria (0.002 ng/m^3) could not be located, but the modelled result is well below that criteria as well in ambient air.
- Dioxins and Furans are below the SEPP Schedule A criteria and the 0.002 ng/m^3 ambient air standard. This result passes even when considering the upper bound concentration and does not correct for elevated concentration in the laboratory blank. In short, even taking the highest possible in-stack value and the most conservative worst case air modelling approach, the work still demonstrates that the emissions to the public are below the acceptable levels.
- For direct comparison of stack emission concentrations, the EPA Victoria provides SEPP Schedule D emission limits, which are promulgated in terms of the concentration of a substance in the flare (not the ambient air). The flare emissions test demonstrated the emissions are below these criteria as shown in Table 4.2 of the Report.

The commenter also states that arsenic, chromium, sulphur dioxide and acrolein emissions are many times greater than the allowable limits. This again appears to be a comparison of the in-stack concentrations found in the Report to the SEPP Schedule A limits. The same statements made above are applicable here as well:

- The SEPP Schedule A lists design criteria in terms of ambient air concentrations, and direct comparison of stack concentrations to the SEPP Schedule A is inappropriate. Dispersion modelling of the stack emissions observed during the 2016 testing shows that the SEPP Schedule A criteria are met at the point of highest potential impact as shown in Table 4.4 of the Report.
- SEPP Schedule D emission limits are promulgated in terms of the concentration of a substance in the flare (not the ambient air). The flare emissions test demonstrated the emissions are below these criteria as shown in Table 4.2 of the Report

The commenter raises a concern regarding the statement in the report that modelled concentrations were calculated at a point 235 metres from the flare. The modelling may not have been explained thoroughly enough in the Report text. When air dispersion modelling is completed, the stack emissions are modelled to determine the impact at all off-property points and then only the single point with the highest impact is reported. Thus, the reader is assured that all other off-site points have impacts that are less than the single reported point. This modelling determined that the single point with the highest potential concentrations is located 235 metres from the stack. Since that worst-case location demonstrated that the ambient air criteria were met, then this also validates the statements that all other off-site locations were modelled to meet those same criteria.

LIMITATIONS

Kleinfelder's work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of its profession practicing in the same locality, under similar conditions, and at the date the services are provided. Kleinfelder's conclusions, opinions, and recommendations are based on data provided by others and represented to us as complete and accurate. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

CLOSURE

Kleinfelder appreciates the opportunity to provide our services to you on this project. If you have any questions or require additional information, please contact us.

Respectfully submitted,
KLEINFELDER, INC.



Michael A. Sussman
Principal Engineer



David Corrigan
Senior Project Manager