MEMORANDUM

TO: Paul Antony

COMPANY: Cleanaway

CC:

FROM: Steven Hayes & Terry Schulz DATE: 26/03/18

JOB NO: N2216-01

SUBJECT: ODOUR MODELLING – SORT LINE AT ERSKINE PARK TRANSFER STATION

BACKGROUND

The Odour Unit (**TOU**) was engaged by Cleanaway in December 2017 to carry out further modelling work to consider the addition of a sort line at Erskine Park Transfer Station (**EPTS**). Prior to this, TOU had consulted with Cleanaway's contractor Commercial Industrial Property (**CIP**).

In October 2017, TOU issued a Technical Memorandum to CIP reviewing the design data of the EPTS odour management system. The objectives were:

- to evaluate the appropriateness of the odour emission data used in the odour dispersion modelling by SLR Consulting Australia Pty Ltd (**SLR**) in its Air Quality Impact Assessment and Management report (**AQIM**); and

- to provide initial comments on the appropriateness of the proposed odour management system for the facility

The review identified irregularities in the odour dispersion modelling that resulted in a significant over-estimation of the odour emission rates from EPTS and an over-projection of the extent of ground level odours in the local area.

The objective of the further modelling work is to consider addition of a sort line at EPTS for an operational scenario at the approved 300,000 tpy with 30% of incoming dry material waste fraction diverted for resource recovery.

This memorandum summarises the results and findings of the further odour modelling.

SCOPE

TOU used the SLR odour model that was supplied for the previous CIP engagement. CALMET meteorology was used unaltered, however CALPUFF key model parameters were adjusted to be consistent with recommended parameters contained within the NSW EPA document *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'*. Namely:

- Minimum turbulence velocities (SVMIN) changed from default setting to 0.2 m/s for each stability class over land and water.

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Other changes included:

- An increase of point sources from two stack outlets to three stack outlets (i.e. Tri-Stack);
- An adjustment to point source stack heights from 14.9 m agl to 17.2 agl;
- An increase to point source stack exit velocities from 36.3 m/s to 42.0 m/s;
- A re-run of BPIP to incorporate the updated stack parameters;
- Minor adjustments to volume source parameters for consistency with designed Reception and Transfer Building location and dimensions.

The original model used in the SLR AQIM examined the facility operating at its future maximum capacity and used an odour emission rate (**OER**) of 503.1 ou.m^3/t.s of waste on the floor. This rate was based on TOU published data, adjusted upwards for reasons we did not agree with. TOU's subsequent re-run used its original published OER of 113.5 ou.m^3/t.s.

The inclusion of a sort line into the EPTS design would increase the odour generation potential of the waste within the Transfer Building through agitation and liberation. Dry material fractions are proposed to be sorted at EPTS such that, in TOU's opinion, a two-fold increase would be a genuine worst-case scenario.

Unfortunately, TOU does not have quantitative data from a transfer station with waste being sorted within (only from facilities that containerise unsorted MSW by compaction). As a result, TOU is restricted to providing an expert opinion drawn from its experience, and from modelling scenarios that consider iterative increases to overall Tri-Stack and fugitive emissions from EPTS.

The odour model was re-run with the following scenario:

1. Increased overall Tri-Stack and fugitive (i.e. fast-action doorway) OERs from EPTS, with emission factors set at:
    - 227 ou.m^3/t.s (two-fold increase); and
    - One of three Tri-Stack discharges treated with odour control at an odour destruction efficiency of at least 90% (30% overall abatement).

The EPTS was assumed operational at the approved 300,000 tpy. Tri-Stack abatement (i.e. bypass and entrained flow) was accounted for by the very high stack exit velocity – greatly enhancing dispersion.

TOU has assumed the veracity of the unaltered components of the SLR odour model and bases all comments on the understanding that the meteorological modelling and the calculation of hourly variable fugitive emissions from the fast-action doorways is without fault. TOU modelled only the 99th percentile, 1 second scenario, as set by NSW EPA. This permits assessment against the EPA guideline criterion of 2 ou at the nearest sensitive receptor to be determined.

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MODELLING FINDINGS – SORTING OPERATIONS

Figure 1 shows the projections for ***Scenario 1 – Sorting*** displaying the 2 ou (99%. 1-second) contours. The baseline scenario (no sorting) has the 2 ou criterion virtually achieved at the EPTS site boundary. A doubling of the OER factor (i.e. Sorting Only) would see the adjacent industrial neighbour to the north forecast to be at marginally higher risk of adverse odour impact.

Figure 1 – Proposed Operational Scenarios (Tri-Stack and Fugitive Emissions)
All contours indicate 2 ou (99%, 1-sec) impact assessment criterion
BLACK = No sorting (113.5 ou.m^3/t.s),
GREEN = Sorting (227 ou.m^3/t.s)

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MODELLING FINDINGS – FUGITIVE EMISSIONS ONLY

Figure 2 gives the result for only the fugitive emissions (i.e. from fast action doorways) for ***Scenario 1 – Sorting***. The fugitive emissions account for almost all the forecasted impact towards the north of the EPTS. This indicates that the Tri-Stack design, specifically the very-high stack exit velocity of 42 m/s, is in theory highly effective at dispersion of odour.

Figure 2 –Fugitive Emissions ONLY
All contours indicate 2 ou (99%, 1-sec) impact assessment criterion
PURPLE = Sorting (227 ou.m^3/t.s)

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MODELLING CONCLUSIONS

TOU has assumed the veracity of the unaltered components of the SLR odour model. It bases all comments on the understanding that the meteorological modelling and the calculation of hourly variable fugitive emissions from the fast-action doorways is without fault. TOU modelled only the 99th percentile, 1 second scenario, as set by NSW EPA.

Based on the above modelling projections with EPTS operational at the approved 300,000 tpy line and one of three Tri-Stack discharges treated with odour control at an odour destruction efficiency of at least 90% (30% overall abatement):

- Odour emissions from EPTS with the addition of a sort line would increase the risk of adverse odour impacts being experienced at the adjacent industrial receptor to the north. A doubling in emissions is assumed to representative although this would need to be confirmed; and

- In theory, the Tri-Stack concept is most effective at dispersion of odour, due to the very high stack discharge velocities in its design, and does not contribute significantly to the overall projected impact.

Therefore, based upon the above modelling findings in isolation, it could be concluded that the Tri-Stack is most effective in theory, and that the focus should be on maximising fugitive emission containment and treatment prior to dispersion. This could be achieved by use of the proposed rapid acting roller doors, proposed Stage 1 wet scrubber and airflow management through the Tri-Stack. If more enhancement to containment is verified as a requirement post odour audit during the operational period, then there is the ability to implement further containment controls, for example, an airlock-style system such as air curtains or other appropriately engineered systems. The modelling indicates full compliance with the EPA 2 ou criterion at nearest residential receptors.

Interpreting beyond the modelling results, some odour impacts could still be possible, particularly given the acute awareness and sensitivity the Erskine Park community has to odours. Cleanaway has decided to install a scrubber and allow retrofitting of additional scrubbers into the design of the extraction stack system, which would provide added levels of contingency.

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