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20 September 2018

The University of Newcastle
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7 Canberra Street
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Attention: Mark Maund

REVISED ODOUR MODELLING - PROPOSED BIORESOURCES FACILITY
UNIVERSITY OF NEWCASTLE, CALLAGHAN CAMPUS

1   INTRODUCTION AND BACKGROUND

RCA Australia (RCA) was requested by de Witt Consulting on behalf of the University of Newcastle to revise the odour modelling for the Odour Impact Assessment previously conducted for a proposed Bioresources facility located at Callaghan NSW. RCA understands that the University of Newcastle proposes to construct a new two storey Bioresources facility at their Callaghan Campus.

The requested amendment was due to revised design details proposed at the facility:

- All stack heights to be 3.1m above the roof plant parapet.
- Additional stacks that may be producing significant odours (previously only 2 stacks, see below) and representative locations of these stacks on the roof.
- Representative flow rates and stack diameters.

As such, RCA have revised the odour modelling to incorporate these modifications and to determine if there are any changes to the predicted ground level odour concentrations.

This odour model still follows the full odour impact assessment as carried out by RCA in April 2018 (Ref [1]).

2   METHODOLOGY

RCA used the same modelling approach as used in the previous April 2018 assessment which is in accordance with NSW EPA methodology (Ref [2]). It is not the intention of this report to reproduce all of the modelling methods and assumptions used in the revised odour modelling, however the modified design details that RCA included in the revised model configuration were:

- Eight (8) stacks positioned on the roof (and instead of the two (2) stacks previously modelled by RCA, Ref [1]). These were comprised of significant odour sources from autoclaves (3 stacks) and animal rack processes (5 stacks).
- Some other exhaust odours were not included (i.e. exhausts other than the eight mentioned above) as their odour contributions to the external environment were considered to be of low significance (due to the low odour rates expected and the intermittent running times) for example the rack washing process.
- The eight (8) stacks used in the revised modelling were positioned at the locations shown in a drawing supplied to RCA (drawing no. M-0R-001, April 2018). Representative flow rates and diameters provided in that drawing were also used in the modelling parameters.

For this assessment, the modelling inputs that were not changed since the initial assessment (Ref [1]) were:

- The odour rates from the previous study (Ref [1]) were still used in this revised assessment and to provide a worst case odour modelling scenario.

- The same maximum number of autoclave cycles from the previous study; total of 56 and over a full week, (Ref [1]) were used in this revised assessment and allocated between the three (3) autoclave stacks.

3   RESULTS OF REVISED ODOUR MODELLING

The results of the revised odour modelling, for operations from the proposed facility at the Callaghan NSW site, are shown in **Table 1** below. For the purposes of comparison, the results of the previous odour modelling carried out by RCA (Ref [1]) are also shown.

Table 1   *99th Percentile Model Results, Ground Level Odour Concentrations*

Receptor Number (Ref [1])	99th percentile Peak to Mean Ground level odour concentration incremental modelling for *proposed operations – revised modelling*	99th percentile Peak to Mean Ground level odour concentration incremental modelling for *proposed operations – previous assessment (Ref [1])*	Impact assessment criteria
Residences outside of campus and to west:			
R1	**0.5**	0.6	2.0 (note 1)
R2	**0.7**	0.8	2.0 (note 1)
R3	**0.4**	0.4	2.0 (note 1)
Ground level locations within the campus:			
R4	**2.3**	0.6	N/A (note 2)
R5	**1.8**	0.7	N/A (note 2)
R6	**2.1**	1.6	N/A (note 2)
R7	**2.9**	1.8	N/A (note 2)
R8	**4.3**	0.7	N/A (note 2)

Note: 1 From Ref [2], the criteria applies *at the nearest sensitive receptors*, and is based on the population of the community (more than 2,000 people in the Callaghan area).

2 N/A: Not applicable. For locations within the campus this criteria does not apply but it can be used a guide, see discussion below.

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The modelling results indicate that for the proposed operations and using worst case odour emission data the ground level odour concentrations are unlikely to exceed the odour impact criteria of 2.0 odour units (OU's) for the three residential receptors nominated. Furthermore, this criterion is considered unlikely to be exceeded at any other residences in the vicinity of the campus.

The results are similar to those obtained in the previous study (Ref [1]), which indicates that the revised design details will not adversely impact on odours experienced at ground level and at residences.

These outcomes are based on the following important assumptions and considerations:

- All stack heights to be 3.1m above the roof plant parapet.

- All "animal rack" processes being exhausted to the external environment are running at the same time.

- Odour data used as per the previous study (Ref [1]), i.e. odour rates used in the modelling were considered "worst case" from all animal processes to be consistent with the conservative approach previously adopted.

It should be noted that the odour criteria applies at nearest sensitive receptors *outside the site boundary* (Ref [2]). For the receptor locations *within* the campus, the criterion of 2.0 OU does not apply but it can be used as a guide because the criteria "*have been designed to take into account the range of sensitivity to odours within the community and to provide additional protection for individuals with a heightened response to odours*" (Ref [1]).

RCA provides the following discussion about the odour results within the campus:

- Odour levels are likely to be just noticeable by a person and not offensive or objectionable.

- The odour levels that are detected are likely to be mostly in close proximity to the proposed facility or during 'worst case' weather conditions such as a cold, still morning.

4   CONCLUSIONS

RCA Australia (RCA) was requested by de Witt Consulting on behalf of the University of Newcastle to revise the odour modelling for the Odour Impact Assessment for a new two storey Bioresources facility to be located at Callaghan NSW. This follows the full odour impact assessment carried out by RCA in April 2018 (Ref [1]) and a request to revise the odour modelling based on to revised design details such as stack heights.

The results of the revised odour modelling showed the operations within the proposed Bioresources facility will not adversely impact odour levels at the nearest sensitive receptors (i.e. the residences) with the incorporation of the revised design details such as stack heights at 3.1m above the above the roof plant parapet. This modelling outcome was achieved by using worst case data and a conservative approach throughout and the expected significant odour emissions. Further, odour levels within the campus were predicted to be, at worst just noticeable by a person and not offensive or objectionable.

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Yours faithfully
RCA AUSTRALIA

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REFERENCES

[1]   *Odour Impact Assessment, Proposed Bioresources Facility, University of Newcastle, Callaghan Campus*, RCA report number 13342-401/1, 16/4/2018.

[2]   NSW EPA Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, January 2016.