



18 March 2021

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Dear Rubie

NCI DISCHARGE TO AIR: TECHNICAL REVIEW OF ODOUR INVESTIGATIONS AND MITIGATION RECOMMENDATIONS

1.0 Background

NCI Packaging (NZ) Limited (NCI) has applied to Greater Wellington Regional Council (GWRC) under the application WGN190198 to renew an existing discharge to air permit that expired on 2 August 2019 (GWRC consent number WGN110219). NCI manufactures and prints aluminium and steel cans in a plant located at 62-66 Montgomery Crescent, Upper Hutt. These processes result in the discharge of volatile organic compounds (VOCs) and odour to air. GWRC engaged Pattle Delamore Partners Limited (PDP) to undertake a technical review of the assessment of environment effects submitted as part of NCI's resource consent application.

PDP completed the review of the AEE and provided this to GWRC¹ in July 2019. Following PDP's technical review of the AEE, GWRC elected to process the NCI application via the limited notification pathway. The application was notified on 16 August 2019. A total of seven submissions were made, four in opposition, one in support and two neutral. Two submitters wished to be heard.

Following a number of odour complaints that occurred in January 2020, PDP recommended NCI review the need for additional odour mitigation measures by reconsidering the approaches previously considered and assessing two additional measures suggested by PDP.

NCI provided GWRC with a report "Review of Odour Control Techniques"² which PDP reviewed. The objective of our review was to answer two questions posed by GWRC as follows:

- ✦ Does PDP consider NCI has adequately covered off all reasonable mitigation options?
- ✦ Does PDP agree with the risk and benefits of each option?

¹ NCI Discharge to Air: Technical Review of Assessment of Environmental Effects. PDP letter to Clair Baldwin 9 August 2019.

² Review of Odour Control Techniques. Rhys Kevern, NCI 18 June 2020.



PDP's review³ of the odour control report concluded that NCI had presented an accurate and helpful description of all reasonable mitigation options and the associated advantages, disadvantages and any other relevant issues.

In May 2020, NCI's General Manager confirmed that NCI had engaged external scientific and legal specialists to help progress the company's consent application, and to further consider alternative odour mitigation options. In July 2020, Tonkin and Taylor (T+T) reviewed⁴ the odour issues at the NCI Upper Hutt packaging plant and recommended the following:

- ∴ A programme of odour field observations be undertaken to better characterise the effects of the emission from the site and identify other possible sources;
- ∴ Implementing a biofilter trial and evaluating its effectiveness; and
- ∴ Undertaking a sensitivity analysis of odour dispersion for differing stack heights using air dispersion modelling.

In January 2021, NCI provided a letter, "*NCI Packaging, Upper Hutt – Summary of further odour investigations and recommendations*⁵" to update GWRC on the outcomes of the three action items from T+T's July 2020 review. GWRC has engaged PDP to review the findings of the T+T investigations and associated further recommendations from T+T.

GWRC and PDP staff undertook a site visit to the NCI plant on 11 March 2021. The purpose of undertaking the site visit was to allow GWRC and PDP staff to re-familiarise themselves with the location of the plant, its processes, the type and method of contaminant discharges and the sensitivity of the receiving environment. GWRC and PDP staff also took this opportunity to discuss the outcomes of the T+T report (January 2021) with NCI. This letter confirms matters as discussed onsite.

2.0 Scope of Technical Review

GWRC defined the scope of the PDP review of the T+T report on the findings from the further investigations (January 2021) as:

1. Does PDP consider that the proposed approach would be adequate for mitigating effects to an acceptable level?
2. Does PDP think that they have investigated all reasonably practical options?

This letter presents the outcomes of PDP's review in accordance with the requested scope.

3.0 Key Outcomes of T+T Report

This section presents a brief summary of the key outcomes from the T+T further investigations report.

3.1 Odour field observations

NCI commissioned a short-term programme of odour field observations, which was undertaken over 17 days between 10 August to 8 September 2020. A detailed set of results from the odour field observations is presented in Appendix A⁶ of the T+T report. PDP considers that the method used to

³ NCI review of odour mitigation techniques - PDP review. Email Jeff Bluett (PDP) to Claire McKeivitt (GWRC) 13 August 2020.

⁴ NCI Packaging, Upper Hutt, Review of odour issues. Jenny Simpson, T&T, 17 July 2020.

⁵ NCI Packaging, Upper Hutt – Summary of further odour investigations and recommendations. Jenny Simpson, T&T, 27 January 2021.

⁶ Odour Field Observations, Rhys Kevern, NCI 8 October 2020.

undertake the odour field observations as appropriate and assumes that the person engaged was suitably experienced to provide field odour observations.

T+T's evaluation of the odour observation data indicates that solvent type odours are likely to be occurring at sufficient intensity, frequency and duration to constitute an odour nuisance particularly around the end of Mountbatten Road (adjacent to the NCI site). Analysis of the wind data at the times odour was observed indicates that NCI was the likely source of the odour for three of the four odour observations. T+T considered that odour from the fourth event was likely from a business on Montgomery Crescent.

While it is not explicitly stated in the T+T report, PDP considers that the findings from the odour observation programme support the need for NCI to further explore odour mitigation options.

3.2 Biofilter trial

NCI installed a pilot scale biofilter in June 2020 as a trial to treat a side-stream of discharge gas from the aerosol can lacquer curing oven. The purpose of the trial was to determine whether biofiltration would be a suitable odour treatment method for the NCI site discharges. T+T note that performance of the biofilter was evaluated by recording observations at the inlet (untreated) and above the biofilter (treated) using NCI staff to make parallel observations using an odour intensity scale of 0 to 6, as used for the ambient odour observations. Based on the outcome of the trial T+T concluded that a biofilter designed in accordance with recommended criteria can effectively control the type of odours discharged at the site. Comments made by NCI staff on their observations of the odour trial to PDP during the recent site visit, supported the findings presented by T+T.

PDP consider the performance evaluation process undertaken by NCI is best described as semi-quantitative. While providing a useful indicator, the evaluation does not quantify the performance of the biofilter. As this was an initial trial, PDP consider the evaluation process used provides a useful indicative result.

PDP is familiar with treatment of odours using biofilters for biological process emissions (such as from composting and wastewater). However, PDP is aware of only one biofilter used to treat odours from chemical processes in New Zealand. This is at Pacific Wallcoverings based in Porirua which uses a biofilter to treat the discharge of volatile organic compounds (VOCs) contained in wallpaper adhesives. PDP understands that audits of this site show the biofilter works reasonably well at this site.

Because the use of biofilters to treat VOCs from chemical processes is not currently common practice in New Zealand and because the NCI trial was semi-quantitative, PDP suggest NCI further investigate the potential efficacy of biofilters for odour control at their site before installing a full-scale system. PDP also notes that the odour discharged from NCI is not continuous. Intermittent biofilter operation may negatively impact performance over the longer term, for example, difficulty in maintaining adequate levels of microorganisms. PDP suggest that this issue should be investigated as part the NCI investigation into the potential efficacy of biofilters at their site.

3.3 Odour emissions monitoring

NCI commissioned odour emission monitoring in December 2018 to measure odour discharge rates from the Line 2 Main Stack (aerosol cans) and the Assembly Stack (tinplate cans). The odour emission monitoring results, as reported by T+T, suggest that the Assembly Stack discharges slightly more odour than the Line 2 Main Stack. In discussions with the plant manager during the recent site visit, he described that the most significant odour sources were ducted to Line 2 Main Stack and stated that he considers the vast majority of the odour discharged from the site comes from the Line 2 Main Stack. This is inconsistent with the odour discharge information presented in the T+T report. Having observed the sources and ducting to Line 2 Main Stack on the recent site visit, PDP consider that the amount of odour discharged

from this stack should be higher than that from the Assembly Stack. PDP recommend NCI reconcile the differences between the opinion of the site manager and the odour test emission results on which stack is the major source of odour. This is an important point for NCI to confirm because if the Line 2 Main Stack discharges significantly more odour, then it could become the principal target for any stack height increase that was implemented as part of the Stage 2 mitigation programme (see Section 3.5).

The odour emissions from the individual sources, which contribute to the Line 2 Main Stack discharges, were also tested to identify the predominant odour source/s. The basecoat application, and curing were identified as the predominant odour sources (72% of total odour emissions from Line 2 Main stack). PDP understand that NCI are planning to capture the high odour emission sources and divert these to the biofilter, with the remaining sources going up the stack. As such, PDP considers this information is useful for NCI's odour mitigation planning as it clearly identifies the key sources for odour treatment that would contribute to reduced impacts offsite.

3.4 Further dispersion modelling

T+T provides a commentary on a dispersion modelling assessment that was undertaken by Jacobs⁷ to evaluate variable stack heights and the predicted impact on ground level concentrations of odour around the site. Both the main odour stacks are currently 25 metres high. The modelling assessed the impact of increasing stack heights to 27 and 30 metres. T+T used the modelling results to show that ground level concentrations of odour around the site would decrease by about 40% for a 27 metre high stack and about a 50% reduction for a 30 metre stack. T+T noted that the decrease would be approximately halved if the height of only one stack was increased. PDP believe this may not be the case if it is shown that the Line 2 Main Stack discharges more odour than the Assembly Stack.

PDP considers that using dispersion modelling to assess the potential impact of increasing stack heights on ground level concentrations of odour is useful and appropriate. The conclusions drawn by T+T from the modelling assessment are in line with PDP's experience with similar sites and processes.

3.5 Discussion and conclusions

Based on the information summarised in sections 3.1 to 3.4 above T+T has recommended a staged approach to further odour mitigation at NCI as follows:

- ∴ Stage 1: Install a biofilter to treat odour emissions from the aerosol can basecoat processes; and
- ∴ Stage 2: If needed, increase the heights of the Line 2 Main Stack and the Assembly Stack to 27 metres.

T+T suggests this staged approach to odour mitigation can be integrated into the site's Adaptive Management Odour Plan (AMOP) and/or incorporated into consent conditions.

PDP agrees that the recommendations made by T+T align with and make good use of the information summarised in sections 3.1 to 3.4 above and that the staged recommendations could be effectively implemented through the AMOP and/or consent conditions.

4.0 Mitigating Odour Effects to an Acceptable Level

PDP considers that T+T's proposed approach for mitigating odour effects has the potential to reduce the frequency, intensity and duration of adverse odour effects that currently occur in the area around the site and specifically at the end of Mountbatten Road.

⁷ Appendix B – Sensitivity analysis of odour dispersion modelling predictions to stack height. Supplementary air dispersion modelling, Jacobs 19 August 2020.

PDP is concerned that there is inadequate data to support how much odour reduction will be achievable with a full scale biofilter to treat the odour emissions from the basecoat application and curing for the aerosol cans.

While the results of the biofilter trial are encouraging, PDP's knowledge of biofilters being used successfully to mitigate large scale discharges of VOCs in New Zealand is limited. We therefore recommend that NCI further investigate the potential efficacy of biofilters at their site.

Given the uncertainty that remains with using a biofilter in this application, we recommend that NCI reviews international literature and experience of biofilters being used to treat odours from discharges of VOCs before committing to this technology and investment.

The proposed stage 2 mitigation of increasing the stack height will reduce the frequency, intensity and duration of adverse odour effects that currently occur in the area around the site. The only potential negative of this approach is increasing odour impacts at other locations such as the houses on Montgomery Heights. PDP recommend that NCI consider the potential for increased odour impacts at elevated receptors before committing to raising the site's stack/s.

In summary, PDP concludes the proposed two stage approach will certainly reduce the frequency, intensity and duration of adverse odour effects that currently occur in the area around the site, especially at the end of Mountbatten Road. Given the current impacts as indicated by the complaint record, and considering the results of NCI and GWRC odour observation campaigns, on balance PDP consider that the odour effects are likely to fall to an acceptable level once the proposed mitigation has been implemented.

5.0 Investigation of All Practical Odour Mitigation Options

NCI has invested significant time and effort into investigating odour mitigation options for the site as evidenced by the following reports:

- ∴ Review of Odour Control Techniques. Rhys Kevern, NCI 18 June 2020;
- ∴ NCI Packaging, Upper Hutt, Review of Odour issues. Jenny Simpson, T+T, 17 July 2020;
- ∴ Odour Field Observations, Rhys Kevern, NCI 8 October 2020;
- ∴ Supplementary air dispersion modelling, Jacobs 19 August 2020; and
- ∴ NCI Packaging, Upper Hutt – Summary of further odour investigations and recommendations. Jenny Simpson, T+T, 27 January 2021.

PDP has reviewed each of these documents for GWRC. Having done this, PDP concludes that NCI has provided an accurate and helpful description of all practical odour mitigation options for the site and their advantages and disadvantages. Subject to installation of a well-designed, operated, maintained and effective biofilter, PDP is comfortable with the recommended mitigation options that T+T has identified for NCI. Should the consent be granted by GWRC, PDP recommend that the proposed two stage mitigation programme is incorporated into the consent conditions and the site AMOP.

6.0 Closing

Thank you for the opportunity for PDP to assist GWRC with the review of NCI's "*Further Odour Investigations and Recommendations*". We trust the review meets GWRC's needs, expectations and will be helpful to the decision-making process. Please let us know if you have any questions or comments on the review.

7.0 Limitations

This report has been prepared by PDP on the specific instructions of Greater Wellington Regional Council for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

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Yours sincerely

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