11 November 2020

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| Jerel Kwek  jerel@Addictionfoods.com  Addiction Foods NZ Ltd | Our ref:  Your ref: |

Dear Jerel

Addiction Foods s92 Response  
Response to s92 letter

# Introduction

GHD Limited (GHD) is engaged by Addiction Foods NZ Ltd (Addiction Foods) to provide a response to the Request for Further Information (s92 letter), dated 3 September 2020 and issued by Bay of Plenty Regional Council (BOPRC) regarding Addiction’s current resource consent application to discharge contaminants to air (Application Ref – RM19-0556) at their pet food manufacturing site – 242 Jellicoe Street, Te Puke.

This letter provides a response to each of the items outlined within BOPRC’s s92 letter, with the exception of item 6, regarding the development of an Odour Management Plan. GHD understands that Addiction Foods will be responding to this item.

The responses outlined in this letter should be read in conjunction with the Pattle Delamore Partners Ltd report, *Pet Food Manufacturing, Discharges to Air - Assessment of Environmental Effects, Draft 2 (26 August 2019).*

# Responses

## Meteorological data

Comparison of a wind rose based on observations at the Te Puke AWS with a wind rose based on wind speed/direction data for the site from the modelling meteorological dataset.

BOPRC has requested a comparison between the CALMET modelled wind field predicted at the Addiction Foods site and the wind field at the NIWA EWS at Te Puke, approximately 5 km to the south. A comparison of key wind velocity statistics is provided in Table 1. The statistics show that wind velocity predicted by CALMET at the Addiction Foods site is significantly greater than at Te Puke EWS, with an average wind speed twice as fast, and the frequency of ‘calm’ winds (<0.5 m/s) ~15% less.

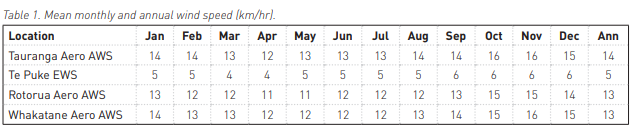
Table Wind velocity statistics at Te Puke EWS

| Statistics | Te Puke EWS (2014-2018) | CALMET output (2014-2016) |
| --- | --- | --- |
| Average wind speed (m/s) | 1.5 | 3.0 |
| Minimum wind speed (m/s) | 0.0 | 0.0 |
| Maximum wind speed (m/s) | 9.3 | 11.6 |
| Percentage of winds <0.5 m/s (%) | 17.5 | 2.4 |

The Te Puke EWS is located approximately 5 km south of Te Puke town centre, within high-density crop production. A significant land use feature within this area is the presence of tall hedges throughout, separating property and crop boundaries. The Te Puke EWS is located within close proximity (<50 m) from one such row of hedges and a number of large trees (<30 m). It is expected that the influence of this vegetation provides a significant blocking effect at the anemometer location, and consequently a reduction in the observed wind speeds, and the frequency of winds from certain directions.

A NIWA report on *The Climate and Weather of Bay of Plenty (2013)* states that the site at “Te Puke is very sheltered”, as is demonstrated by the significant difference between wind speeds observed at Te Puke in comparison to other locations within the Bay of Plenty. This is demonstrated through the monthly and annual wind speeds for stations in Bay of Plenty, presented in Figure 2‑1.

Figure ‑ The Climate and Weather of Bay of Plenty (NIWA, 2013) - Table 1



Consequently, observations at Te Puke EWS are not considered representative of the wider Te Puke area and that the BOPRC meteorological dataset utilised provides the most appropriate characterisation of the wind field at Addiction Foods.

## Portable olfactometer

Further information on the reliability of odour emission measurements using a portable olfactometer, including the level of confidence that maximum odour emission concentrations from the wet scrubber will not exceed 2,000 OU/m3. If available, this should include information (e.g. comparative emission measurements or research papers) evaluating measurements conducted with the portable olfactometer compared to standard methods (such as AS/NZS 4323.3).

Portable olfactometery

Odour sampling was carried out to inform understanding of current odour emission rates from the facility during production of the various formulations. The odour measurements were valuable to the assessment as they identified specific product formulations which were significantly odorous, for which production was subsequently halted.

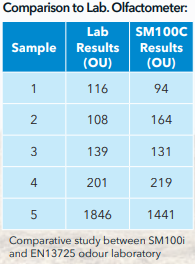
The method for source odour measurement was dynamic dilution olfactometry (DDO) as discussed in the Ministry for the Environment’s *Good Practice Guide for Assessing and Managing Odour* (2016). Specifically, the following methodology was carried out:

* At least six odour samples where collected from both the inlet and outlet of the scrubber. Samples were extracted from the stack and collected in Teflon bags.
* The sample was transported to AECOM offices for analysis by DDO within 24 hours of sample collection.
* DDO was carried out using the Scentroid SM100i Intelligent Olfactometer, with four (4) panellists who had been previously screened using the n-Butanol screening procedure.

The SMI100i allows for full odour analysis in accordance with the international EN13725 standard. Whilst the SMI100i is marketed as a portable/field olfactometer due to its compact nature, it utilises the same principals as a ‘laboratory’ olfactometer. Sample air is drawn from the sample bag via Venturi pump and diluted between 2-30,000 times using untainted (odourless) air from a compressed air tank.

The SMI100i shows good agreement between traditional laboratory olfactometry, as shown in Figure 2‑2.

Figure ‑ SMI100i performance against EN13725 odour laboratory[[1]](#footnote-2)



Furthermore, AECOM has provided GHD with the results of internal comparative testing, where they undertook direct odour measurement from a point source at the same time three bag samples were being collected for analysis and analysed by Watercare Laboratory Services in accordance with AS/NZ 4323.3:2001. The results of this testing are summarised below and GHD consider that there is excellent agreement between the two sampling methods.

* Portable olfactometer ranged between 2,211 OU and 2,926 OU - Geomean value of **2,427 OU**.
* Laboratory analysis ranged between 1,790 OU and 2,810 OU - Geomean value of **2,123 OU**.

In summary, DDO utilising the SMI100i is considered an appropriate methodology for characterisation of existing odour levels at Addiction Foods, and to inform design of the proposed odour control system.

Wet scrubber odour emission concentration

The scrubber supplier has provided guarantee that the equipment will achieve a 97% reduction of NH3 and H2S concentrations, which are identified as primary constituents within the odour. Whilst the associated reduction in total odour (OU) may be less than 97%, it is expected to be of a similar magnitude. Conservatively, the 2,000 OU target for discharge odour concentration represents an approximate 67% odour reduction for existing products, which, based on the sampling, are likely to have pre-treatment odour concentrations of less than 6,000 OU.

The 2,000 OU target is supported in part by the findings of a scrubber trial which was carried out in conjunction with the odour sampling as presented in Table 7 of the PDP report. The odour scrubber trial involved treatment of some portion of the discharged air via wet scrubber technology similar to that proposed. Post-treatment odour sampling for the trial scrubber found odour concentrations less than 1,750 OU for all products measured, including ‘FOAD’, a product with a pre-treatment odour concentration of >41,000 OU, for which production has since ceased.

In conclusion:

* Odour sampling indicates that for all products currently being produced, the maximum pre-treatment odour concentration is likely to be less than 6,000 OU.
* Odour sampling during a scrubber trial suggests that the post-treatment odour concentration will remain below 2,000 OU for all products.
* Whilst no guarantee can be provided that the discharge concentration will be constantly below 2,000 OU, the maximum ground level odour concentration for Phase 2 presented in the PDP report is 0.47 OU, approximately 4x less than the criteria of 2 OU. Consequently, and subject to the limitations associated with air dispersion modelling, the discharge (post-treatment) odour concentration would need to be greater than 8,000 OU for ground level concentrations to exceed the criteria value.
* Regardless of the above, as part of the commissioning testing of the scrubber, Addiction Foods will carry out odour monitoring through olfactometry in accordance with AS/NZS 4323.3:2001 to demonstrate performance of the installed odour control system. Odour sampling will be carried out on the product with the highest odour generation potential and results of the sampling can be made available to BOPRC on request.

## Worst case meteorological conditions

Confirmation that the worst-case meteorological conditions for dispersion of odour remains neutral to stable conditions for the new, taller stack.

The PG-stability classes during worst-case (99.5th percentile) odour concentrations for then new taller stack (Phase 1) was extracted at all gridded receptor locations for the project. This extract is visualised in Figure 2‑3, whereby:

* A **red** cell, indicates that the 99.5th percentile odour concentration at this location was predicted during unstable atmospheric conditions.
* A **yellow** cell, indicates that the 99.5th percentile odour concentration at this location was predicted during neutral atmospheric conditions.
* A **green** cell, indicates that the 99.5th percentile odour concentration at this location was predicted during stable atmospheric conditions.

The figure shows that the overwhelming majority of worst case (99.5th percentile) odour concentrations occur during periods of neutral or stable atmospheric conditions. Consequently, GHD considers that worst-case meteorological conditions for dispersion of odour remains neutral to stable for the new, taller stack.

Figure ‑ Spatial variation of PG-stability class during 99.5th percentile odour concentration



## Continuous odour emission rates

Confirmation that the odour modelling scenarios assume continuous (i.e. 24 hours per day) operation.

All modelling scenarios assumed a constant emission rate for all hours of the CALPUFF simulation. In other words, emission variability associated with hour of day, day of week, wind speed/wind direction are NOT included in the model configuration.

## Scrubber performance

Design and operational parameters relevant to the performance of the proposed scrubber

BOPRC has asked for clarifications regarding the proposed scrubber design and operational parameters. As this information is considered commercially sensitive, GHD has provided the information in a separate response where it is expected to remain confidential.

# Closure

Should you require any additional information please don’t hesitate to contact the undersigned.

Sincerely

# Limitations

This report has been prepared by GHD for Addiction Foods Limited and may only be used and relied on by Addiction Foods Limited for the purpose agreed between GHD and Addiction Foods Limited as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Addiction Foods Limited arising in connection with this report.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Addiction Foods Limited and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work.

GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Site conditions may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

AECOM New Zealand Limited (AECOM) has made available to GHD the CALPUFF modelling data that formed the basis of the assessment which supported the resource consent application. GHD has relied on the results of the model to respond to the relevant questions, however no attempt has been made to validate the model.

1. Scentroid, SMI100i Intelligent In-Field Odour Measurement, <https://www.scentroid.com/wp-content/uploads/2019/12/SM100i-Intelligent-Infield-Odour-Measurement.pdf> [↑](#footnote-ref-2)