

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of submissions and further submissions by **MERCURY NZ LIMITED** on the PROPOSED PLAN CHANGE 13 (AIR QUALITY) TO BAY OF PLENTY REGIONAL NATURAL RESOURCES PLAN

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**PROPOSED PLAN CHANGE 13 – AIR QUALITY**

**STATEMENT OF EVIDENCE OF JENNIFER SIMPSON**

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## INTRODUCTION

1. My full name is Jennifer Mary (Jenny) Simpson. I am a Technical Director in Environmental Engineering at Tonkin & Taylor Limited.
2. I hold the qualifications of Bachelor of Engineering (Chemical and Materials) and a Diploma in Environmental Management, both from the University of Auckland. I have 20 years' experience as an environmental engineer and was employed as a specialist in air quality management at Tonkin & Taylor in January 1998. I am an accredited Independent RMA Commissioner and am currently President of the NZ Branch of the Clean Air Society of Australia and New Zealand.
3. Although not a requirement of a Council Hearing, I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the Hearings Panel. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

## SCOPE OF EVIDENCE

4. My evidence will address Mercury NZ Ltd's (Mercury's) submission and further submission on Plan Change 13 (Air Quality) to the Proposed Regional Air Plan. In particular I will address:
  - i) Objective AQ 01 - protect air from adverse effects;
  - ii) Policy AQ P2 – hazardous substances;
  - iii) Policy AQ P3 – management of discharges;
  - iv) Policy AQ P4 – matters to consider;
  - v) Rules AQ R1 and AQ R22 (the general “catch-all” rules);
  - vi) Rule AQ R16 – spray painting; and
  - vii) New Rule AQ R23 – emergency diesel generators.

### **AQ O1 – Protect air from adverse effects**

5. Mercury's submission sought that AQ O1 be amended to refer to protecting human health against “significant” adverse effects. The s24a report rejects inclusion of the word significant because *“this implies that there is a point at which adverse effects on human health are*

*acceptable*<sup>1</sup>. I understand the point that the Officers are making, however the complexity arises because of the difference between threshold compounds where there is an identified “safe” level of exposure and non-threshold compounds such as PM<sub>10</sub> and other carcinogens. For non-threshold contaminants, the effects of a discharge are expressed on a risk basis and it is technically not possible to “avoid” adverse effects on human health at a population level. A conservative interpretation of AQ O1 could therefore be that any discharge of non-threshold compounds should be avoided.

6. Mr Graafhuis has suggested that, as an alternative, AQ O1 could refer to seeking to avoid “intolerable” effects. I consider that the word “intolerable” would be appropriate in this case because, for contaminants with no clear threshold of effects (such as carcinogens), air quality guidelines are expressed by the World Health Organization as “Tolerable Concentrations”. This recognises that, while there are effects at a population level from any increase in exposure, there is a concentration below which effects of lifetime exposure are considered tolerable or acceptable<sup>2</sup>.

## **AQ P2 – Hazardous Substances**

7. Mercury’s submission sought that AQ P2 be deleted in its entirety.
8. In relation to AQ P2, I disagree with the statement in the s42a report<sup>3</sup> that “*Where the use of a hazardous substance leads to a discharge to air, the plan change has a regulatory gap to fill.*”. In my opinion, the requirements of s15 of the Resource Management Act are clear and there is no distinction whether the activity that gives rise to a discharge of contaminants to air includes the storage, handling and use of hazardous substances, or is some other industrial or trade activity.
9. The s.42a report identifies two specific hazardous substances (methyl bromide and hydrogen cyanamide) that have been of concern in the region, as examples of why this policy is needed<sup>4</sup>. Methyl bromide is a fumigant and specific policy direction for fumigants is provided under AQ P9. Hydrogen cyanamide is an agrichemical used to induce bud break in kiwifruit vines and specific policy direction for agrichemicals is provided in AQ P8. Therefore an additional policy is not required to address the issues associated with either of these substances (or related substances).

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<sup>1</sup> Paragraph 154 of the s42a report, page 28

<sup>2</sup> For example, a concentration equivalent to an increased lifetime cancer risk of 1 in a million is generally considered to be tolerable

<sup>3</sup> Paragraph 247, page 40 of the s.42a report

<sup>4</sup> Paragraph 243, page 39 of the s42a report

10. I consider there is the potential for unintended consequences of this policy, particularly for hazardous substances that do not have human health effects. By way of example, I will use natural gas and LPG, which are hazardous substances under HSNO principally because of their flammable properties. Natural gas is mostly methane and LPG is a mixture of mostly propane and butane. These gases are all simple asphyxiants<sup>5</sup> and are not toxic to people. In my view, there is no particular reason to seek to avoid minor discharges of a substance that is essentially non-toxic (I note this is not a great example as the odorant added to natural gas and LPG means that discharges need to be managed to avoid odour effects).
11. On balance, I consider that this policy should be deleted as I do not agree with the Council's concern that there is a policy gap and I consider that the suite of policies (including AQ P3) provide sufficient policy guidance in relation to discharges of contaminants to air from storage, handling and use of hazardous substances. However, if the Panel is of a mind to retain AQ P2, then I consider the following wording would be appropriate (change shown in bold underline and double strikethrough):

**~~Adopt the best practicable option to avoid significant adverse effects of discharges~~**  
**~~air~~** ~~Seek to avoid discharges from~~ **the storage, handling and use** of hazardous substances  
~~and hazardous air pollutants to air and where avoidance is not possible, remedy or mitigate~~  
~~the discharges using the best practicable option.~~

12. The Officer's report explicitly rejects addition of the word "significant" to AQ O1<sup>6</sup> and I will therefore briefly comment on why I consider it is appropriate in the context of AQ P2. With respect to AQ O1, the Officer's reasoning is based on consideration that no effects on human health are acceptable. As AQ P2 refers to all effects, including effects on air quality *per se*, it is important to include some qualification. This is because every discharge to air, regardless of scale, will cause some effect on localised air quality. However the resulting concentration of air pollutants may be at an acceptable, or tolerable, level. Therefore, it is only discharges that cause a significant (as opposed to insignificant) effect on air quality that need to be avoided.

### **AQ P3 – Management of discharges,**

13. Mercury's submission sought changes to AQ P3, including removing reference to "contributing to" exceedances in clause (b) which seeks to avoid discharges that "...may

<sup>5</sup> Methane, butane and propane are not toxic but can cause asphyxiation if they are present at concentrations high enough to displace oxygen

<sup>6</sup> Paragraphs 152 to 158, pages 28 to 29 of the s42a report

*contribute to, or cause an exceedance or breach of the ambient air quality standards in the National Environmental Standards for Air Quality ...*".

14. The s.42a report states<sup>7</sup> that "...in areas where an ambient standard is either already in breach, or is likely to be, there are no insignificant effects. Any activity that discharges the contaminant in question, is contributing to the cumulative effect." This approach is considerably more conservative than the National Environmental Standards for Air Quality (NESAQ) in relation to discharges of PM<sub>10</sub>, carbon monoxide, oxides of nitrogen and volatile organic compounds, which provides (in regulations 17 and 20):
- i) A significance test for PM<sub>10</sub> discharges, that the discharge should not cause an offsite concentration of greater than 2.5 µg/m<sup>3</sup> (24-hour average); and
  - ii) For discharges of carbon monoxide, oxides of nitrogen and volatile organic compounds, that the discharge is not likely to be a "principal source" of these contaminants in the airshed<sup>8</sup>.
15. Where provisions of a Plan Change are more restrictive than national standards, the Council is required to consider whether the restriction is justified given the circumstances of the region (s32(4)). The relevant section of the s32 report (Section 7.10.6, page 192) indicates that the Officer considers there are no restrictions more restrictive than any national standards in this topic. This suggests a misunderstanding of the impacts of the policy and rule framework.
16. In my opinion policy AQ P3 (b) is overly onerous and unjustified because it does not appropriately direct consideration of the scale of the contribution of a discharge to an exceedance and it seeks to avoid discharges even where they might have trivial effects (and meet the requirements of the NESAQ). On this basis I suggest the following wording (my changes shown in bold underline and double strikethrough):
- (b) *avoid the discharge of contaminants at a rate or volume that ~~may contribute to, or cause an exceedance or breach of the ambient air quality standards~~ **are inconsistent with the requirements** of the **National Environmental Standards for Air Quality (or its replacement or amendment)** ~~or exceed the health based values of the AAQGs.~~*

#### **AQ P4 – matters to consider**

17. Mercury's submission sought changes to Policy AQ P4 to ensure, amongst other things, that the Ambient Air Quality Guidelines (AAQG) were recognised as a matter to be considered

<sup>7</sup> Paragraph 20, page 44 of the s.42a report

<sup>8</sup> For discharges of sulphur dioxide there is no equivalent significance test or principal source provision in the NESAQ (regulation 21)

rather than a compliance threshold for individual discharges. This has largely been achieved through the changes recommended by the Officers to the introduction to the policy. However there is still a particular issue for Mercury as their activities include discharges to air of hydrogen sulphide (H<sub>2</sub>S) in geothermal areas in the Bay of Plenty region that already have high background levels of H<sub>2</sub>S, in exceedance of the AAQG.

18. The AAQG sets out two types of guideline values:
  - i) Chapter 2 – Health-Based Guideline Values; and
  - ii) Chapter 4 – Ecosystem based Guidance
19. The status of H<sub>2</sub>S under AQ P4 is potentially ambiguous as H<sub>2</sub>S is addressed in Chapter 2.8 (i.e. under the Health-Based Guideline Values) of the AAQG<sup>9</sup>, which includes a discussion of the health effects of exposure to H<sub>2</sub>S. However, the AAQG also states that *“Unlike other guideline values, the value for hydrogen sulphide (H<sub>2</sub>S) is based on preventing odour annoyance and the resulting impacts on well-being rather than specific health effects.”*
20. In other words, the AAQG for H<sub>2</sub>S could strictly be considered to be a health-based value because it is listed under Chapter 2, however the particular guideline value in the AAQG has been set at a level that is intended to manage odour impacts in non-geothermal areas. The guideline value is not relevant to the assessment of H<sub>2</sub>S discharges in geothermal areas with high background H<sub>2</sub>S concentrations, either in terms of potential health impacts or odour amenity.
21. Given the presence of geothermal areas in the Bay of Plenty region, I consider that if reference to the AAQG is retained in AQ P4, then the status of the AAQG for H<sub>2</sub>S warrants specific clarification. This could be achieved by way of a note excluding the AAQG for H<sub>2</sub>S from AQ P4 on the basis that it is not a health based guideline.

### **AQ R1 – General activities and new Rule AQ R22**

22. Mercury sought deletion of clause (c) of Rule AQ R1, as notified, to provide a general permitted activity rule for discharges to air from industrial or trade premises where the effects are minor. The Officers have recommended deleting clause (c) but have included a new Rule AQ R22 that appears to have a very similar effect to the original AQ R1 of making almost all discharges to air from industrial or trade premises that are not otherwise specifically provided for, a discretionary activity. This impact does not appear to be properly recognised

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<sup>9</sup> Ministry for the Environment. Ambient Air Quality Guidelines. 2002 Update. May 2002

in the Officers report, which indicates that AQ R22 has been introduced because AQ R1 was “too broad”<sup>10</sup>.

23. AQ R22 does not capture discharges of “conventional” pollutants (other than fine particulates), such as sulphur dioxide and oxides of nitrogen, which are not listed as hazardous air pollutants by the US EPA<sup>11</sup> or Ministry for the Environment<sup>12</sup>. It is not clear to me whether this gap in coverage is intentional but, in my opinion, there is no justification to exclude these contaminants or treat them differently. Rather than identify specific contaminants that trigger the requirement for a discretionary consent (which has the risk of either inadvertently capturing or excluding some discharges), I consider the rules should relate to the effects of the discharge. This could be achieved by deleting clause (c) from AQ R1 (as sought by Mercury) without the need to include new Rule AQ R22.
24. AQ R22 would require a discretionary activity consent for all discharges of particulates, odorous compounds and hazardous air pollutants from industrial and trade premises that are not provided for by another rule. I will briefly outline how each of these contaminants can be managed by AQ R1 (with clause (c) deleted).
25. Coarse particulate matter (dust) can be emitted from a variety of industrial or trade premises that are not subject to specific rules, such as handling of compost or aggregate at a landscape or trade supplies yard. While large scale bulk handling activities can cause nuisance dust beyond the boundary, small scale activities are unlikely to cause adverse effects in most circumstances. These discharges would be adequately managed as a permitted activity under Rule AQ R1, which requires the discharge not to have offensive or objectionable effects of dust.
26. Similarly, odour can be generated by industrial or trade premises such as fast food restaurants (KFC for example). Again, I consider that these discharges can be adequately managed under AQ R1, and the Council would have the ability to require consent (or compliance with the permitted activity conditions) to address the infrequent situations where these odours cause offensive or objectionable effects.
27. Discharges of conventional and hazardous air pollutants, including PM<sub>10</sub> and PM<sub>2.5</sub> particulate, are also adequately managed under Rule AQ R1, which requires that the discharge does not cause noxious or dangerous effects.

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<sup>10</sup> Paragraph 437 of the s42a report, page 65

<sup>11</sup> <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications>

<sup>12</sup> Appendix 3 of Ministry for the Environment. Ambient Air Quality Guidelines. 2002 Update. May 2002

28. In my view, new rule AQ R22 should not be included in the plan as it is unnecessary and potentially problematic. However, if the Panel were of a mind to include AQ R22 then, to achieve a workable general permitted activity rule for discharges to air from industrial or trade premises (albeit effectively duplicating AQ R1), it could be amended as follows (my changes shown in bold underline and double strikethrough):

*The discharge into air from industrial or trade premises that is not otherwise provided for by any other rule of this Air Quality chapter **and that cannot comply with the conditions of Rule AQ R1***~~and includes any of the following contaminants:~~

~~(a) particulates~~

~~(b) odorous compounds~~

~~(c) hazardous air pollutants~~

### **AQ R16 – Spray painting**

29. Mercury's submission on AQ R16 sought amendments to provide for a best practice method for outdoor spray painting as a permitted activity. This relief was sought in tandem with Mercury's submission on AQ R1, which sought a permissive "catch all" rule for discharges to air where effects are minor (not accepted by the Officers). Although the particular submission in AQ R16 was accepted, the inclusion of new Rule AQ R22 means that the overall relief sought by Mercury in relation to spray painting is not achieved.
30. Rule AQ R16 specifically addresses spray painting using di-isocyanates, organic plasticisers (recommended to be deleted) and anti-fouling paint. These paint systems have a greater potential for adverse effects compared to other types of paint applied by spray coating.
31. Common solvents used in paint include xylene and toluene, which are listed as hazardous air pollutants by the US Environmental Protection Agency (EPA)<sup>13</sup>. The Officers have recommended deleting organic plasticisers from AQ R16 because "almost all paints contain organic plasticisers<sup>14</sup>". Organic plasticisers are typically phthalates, which are also listed as hazardous air pollutants by the US EPA. There is no specific rule that addresses spray painting using other types of paint. Therefore, most "conventional" spray painting (not using di-isocyanates or antifouling) would require a discretionary activity consent under new Rule AQ R22, even if it adopted the same best practice required for more hazardous paint systems in AQ R16.

<sup>13</sup> <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications>

<sup>14</sup> Paragraph 493 of the s42a report, page 72

32. This anomaly with respect to spray painting provides a further reason why AQ R1 (c) should be deleted as requested in Mercury's submission and new Rule AQ R22 should not be included.

### **Suggested change to new Rule AQ R23**

33. The Council's failure to accept Mercury's submission on AQ R1 and inclusion of new rule AQ R22 also has implications for discharges from the use of diesel generators (and other internal combustion equipment) at geothermal drilling sites. Although I consider it would be preferable to make the changes already discussed, this issue could alternatively be addressed by changes to new Rule AQ R23.
34. As outlined in Mr Graafhuis' evidence, installation and repairs to geothermal wells can require the rapid deployment of a variety of portable diesel-fired internal combustion equipment, such as electricity generators and pumps. Under the Operative Regional Air Plan, the discharges to air from these activities have been managed under the general permitted activity Rule 17. However, as currently recommended by the Officers, these discharges would require a discretionary consent under Rule AQ R22 (because of the discharge of particulate). This is based on my understanding that activities related to geothermal power generation would be considered industrial or trade activities and therefore the land on which these activities is carried out meets the definition of an industrial or trade premise (even though it might otherwise be considered productive land).
35. Mr Graafhuis has suggested changes to new Rule AQ R23 that provide a permitted activity framework for discharges from the temporary operation (less than 3 months) of generators and pumps (less than 5000 kVA<sup>15</sup> installed cumulative electrical output) associated with geothermal electricity generation sites and geothermal drilling activities provided a 200 m separation distance is maintained to sensitive areas.
36. I understand that geothermal drilling activities typically occur in relatively remote, rural areas located some distance from residential dwellings or areas where people will be present for extended periods of time. Background air quality in rural areas is generally good (with the exception of intermittent discharges from rural activities such as outdoor burning).
37. The exhausts from portable electricity generators and pumps are typically short vertical or horizontal vents. Because of this configuration, the emissions are not well dispersed compared to tall stacks, resulting in relatively high concentrations close to the source that drop off rapidly with distance. I have not undertaken specific dispersion modelling in relation to these discharges but, based on other studies that I am familiar with, and taking into account

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<sup>15</sup> Equivalent to 4 MW assuming a power factor of 0.8

the rural nature of the areas where these discharges occur, I consider that it is very unlikely there would be exceedances of the NESAQ or AAQG beyond the suggested separation distance of 200 m.

38. Based on this, I suggest the following changes to AQ R23 (my changes shown in bold underline and double strikethrough):

~~Emergency **and mobile** diesel generators **and pumps**~~

~~The discharge of contaminants to air from the internal combustion of diesel in any emergency generator with a maximum load of 600 kilovolt-amperes is a permitted activity provided the following conditions are met:~~

~~(a) **For the internal combustion of diesel in any mobile or emergency generator or pump with an electrical output of less than 600 kilovolt-amperes, or equivalent, the discharge is a permitted activity provided:**~~

- ~~i. The discharge must not occur for more than 48 hours within 50m of a sensitive area; and~~
- ~~ii. Fuel used in the **emergency** generator/**pump** must comply with the Engine Fuel Specifications Regulations 2011; and~~
- ~~iii. The discharge must not be noxious or dangerous, offensive or objectionable beyond the boundary of the subject property.~~

~~(b) **For the internal combustion of diesel in any mobile or emergency generator or pump with a total combined electrical output of less than 5000 kilovolt-amperes, the discharge is a permitted activity provided:**~~

- ~~i. The discharge is associated with geothermal electricity generation activities, including geothermal drilling; and~~
- ~~ii. The discharge must not occur for a period of more than 3 months per well head or generation site; and~~
- ~~iii. The discharge must not occur within 200m of a sensitive area, excluding discharges to air from pumps which may be located adjacent to water bodies and buildings that are defined as a sensitive activity and are uninhabited for the duration of the activity; and~~
- ~~iv. Fuel used in the **emergency** generator/**pump** must comply with the Engine Fuel Specifications Regulations 2011; and~~
- ~~v. The discharge must not be noxious or dangerous, offensive or objectionable beyond the boundary of the subject property or into any water body.~~

Jennifer Simpson

16<sup>th</sup> October 2018