

Before a joint hearing of the

Otago Regional Council
Waitaki District Council

RM 20.024

Under the Resource Management Act 1991

In the matter of applications by Oceana Gold (New Zealand) Limited for
resource consents for the Deepdell North Stage III Project

**Statement of evidence of Jeremy William Trevathan for Oceana Gold (New
Zealand) Limited**

4 August 2020

INTRODUCTION

- 1 My name is Jeremy Trevathan. I am an Acoustic Engineer and Director at Acoustic Engineering Services Limited, an acoustic engineering consultancy based in Christchurch.
- 2 I hold the degrees of Bachelor of Engineering with Honours and Doctor of Philosophy in Mechanical Engineering (Acoustics) from the University of Canterbury. I am an Associate of the New Zealand Planning Institute, and a Member of the Acoustical Society of New Zealand.
- 3 I have more than fourteen years' experience in the field of acoustic engineering consultancy and have been involved in a large number of environmental noise assessment projects throughout New Zealand. I have previously presented evidence at Council and Environment Court Hearings, and before Boards of Inquiry. I have acted on behalf of applicants, submitters, and as a peer reviewer for Councils.
- 4 Whilst this is not an Environment Court hearing, I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

ACOUSTIC CRITERIA

- 5 Based on a review of the District Plan, existing consent conditions for other OceanaGold activities in the area, and other relevant guidance, if noise levels from the Deepdell North pit are managed so that they are less than 40 dB L_{Aeq} during the night-time period at all neighbouring dwellings which have not provided Affected Parties Approval (in line with previous consent conditions for other OceanaGold activity) I expect the associated noise effects to be less than minor.
- 6 I understand that noise levels not exceeding 51 dB L_{Aeq} during the night-time period are required at the notional boundary of the C & M Howard dwelling as a condition of the Affected Parties Approval they have provided.
- 7 I also recommend the noise limit for blasting is 115 dB L_{peak} when received at the nearest neighbouring dwellings (including the C & M Howard dwelling), and a vibration limit of 5 mm/s for both blasting and general site activities.

SUMMARY OF EXPECTED NOISE LEVELS

- 8 My company has conducted measurements of the mining plant, equipment and heavy machinery operating at the existing Coronation North pit. This was to acquire data which could be used for predicting the noise levels from the Deepdell North mine – as the same equipment would be used. In addition, both attended and unattended noise monitoring has been undertaken at the C & M Howard dwelling to determine the noise emissions from trucks using the haul road.
- 9 SoundPlan environmental acoustics modelling software has then been used to calculate the propagation of noise from the site taking into account the topography of the area, downwind conditions, and sound power levels for each of the noise sources.
- 10 I note that the modelling is based on enhanced propagation representative of either moderate downwind conditions in every direction, or moderate ground-based temperature inversions to represent what can occur on a clear, calm night. Noise levels predicted under these conditions are typically taken as being the upper limit of the 'meteorological window' described in NZS 6801:2008 and NZS 6802:2008 where valid compliance assessments are possible.
- 11 Given the changing gradient of the haul road the trucks emit varying levels of noise as they travel up / down the road. To determine the relative noise source level of the trucks as they travel on the haul road, our model was calibrated using the results from extensive noise monitoring at the notional boundary of the C & M Howard dwelling.
- 12 Our modelling has also taken into account noise bunds alongside the haul road in the location shown in the image in our previous report (AES file reference: AC17347 – 13 – F1, and dated the 3rd of December 2019).
- 13 Once the bunds are established and the mine is operational there will be three elements of the activity which will generate noise – drilling holes in preparation for blasting, blasting to fracture the rock, and then the removal of extracted rock.

Drilling holes for blasting

- 14 The main noise source during the drilling process is from the drill itself. As the top portion of the pit is all waste, the waste drill will be the worst-case situation as it will be used at existing ground level.
- 15 Based on noise measurements of a drill operating on the overall OceanaGold site, during the drilling phase noise levels of less than 40 dB L_{Aeq} are expected at the notional boundary of all neighbouring dwellings.

Blasting

- 16 Numerous measurements have been undertaken by techNick Consulting of blasting events on other areas of the overall site. These measurements were at distances ranging from 800 metres up to 1500 metres (similar to the distance from the proposed Deepdell North Pit to the Howard dwelling). In all of these measurements the noise levels recorded were less than 100 dB L_{peak} .
- 17 I therefore expect that noise levels of less than 115 dB L_{peak} will be received at all neighbouring dwellings; however, there are a number of variables which effect the noise levels which are site specific. To ensure that a level of 115 dB L_{peak} is not exceeded, I recommend that noise monitoring is again undertaken to confirm compliance is being achieved. Provided blasting occurs between 0900 and 1730 hours Monday to Friday, 1000 to 1630 hours Saturday, Sundays and Public Holidays and neighbours are notified at least 24 hours before any blasting is to occur, I consider that the noise effects will be acceptable.

Removal of extracted rock

- 18 For the majority of the time, the only activity on the site will be the removal of the extracted rock. This activity will consist of excavators loading the material into haul trucks and the haul trucks transporting the rock, either to the Waste Rock Stack, or to the processing plant.
- 19 Measurements of these activities have been undertaken on other areas of the OceanaGold site. Based on the measurements from these sources, when operating on the Deepdell North mine site, I expect this activity to result in noise levels of less than 30 dB L_{Aeq} at the O'Connell dwelling and also those located further away. I therefore expect the associated noise effects at these properties to be less than minor. Noise levels of up to 42 dB L_{Aeq} are expected at the C & M Howard dwelling, complying with the condition of their Affected Parties Approval.

Cumulative noise levels

- 20 I understand that there will be a period of time when the Coronation North mine will be operating concurrently to the Deepdell North mine, and therefore I have also considered cumulative noise effects.
- 21 As outlined above, the proposed Deepdell North mine activities will result in the highest noise levels at the C & M Howard dwelling, and the noise levels are greatly reduced at other surrounding dwellings, with the expected noise levels well below the District Plan noise limits. I have therefore considered the cumulative noise levels at the C & M Howard dwelling to ensure the noise levels remain below level level of 51 dB L_{Aeq} specified in their Affected Persons Approval. Cumulative noise levels from

the activities when received at all other neighbouring dwellings would be less than 35 dB L_{Aeq}, and the associated effects would be less than minor.

- 22 The dominant noise source at the C & M Howard dwelling is from the haul trucks on the haul road. As stated above, unattended and attended noise monitoring has been carried out at the C & M Howard dwelling to capture the noise levels from haul trucks travelling on the haul road between the Coronation North mine and the processing plant. Based on the measurements and our previous analysis, noise levels of 49 dB L_{Aeq} are expected at the C & M Howard dwelling from the Coronation North activity.
- 23 In a scenario where the Coronation North activity occurs at the same time as the Deepdell North activity, noise levels would be expected to remain at 49 dB L_{Aeq} at the C & M Howard dwelling, due to the relative locations of the noise sources, and because the Deepdell North noise levels are low.

SUMMARY OF EXPECTED VIBRATION LEVELS

General pit activity

- 24 To determine the levels of vibration expected from the activity on site, vibration measurements were undertaken by my colleague Ms Clare Dykes at the Coronation North pit. Measurements were undertaken on the ground level within the pit while general pit activity was being carried out, and in a separate location in proximity to a drill.
- 25 Average vibration levels within the Coronation North pit during the removal of extracted rock at an average distance of 190 metres from the excavation, were 0.02 mm/s, with a maximum of 0.16 mm/s recorded when the dozer drove past.
- 26 Average vibration levels at approximately 30 metres from an exploration drill within this period were 0.04 mm/s, with a maximum of 0.23 mm/s recorded as the rods were drilled into the ground.
- 27 In both of these situations, given the significant increase in distance to the nearest dwelling (1500 metres away) I expect the vibration at all neighbouring dwellings to be significantly below 5 mm/s, and would be imperceptible.

Blasting

- 28 Numerous vibration measurements have been undertaken by techNick Consulting during blasting events on other areas of the overall site. These measurements were at distances ranging from 800 metres up to 1500 metres (similar to the distance from the proposed Deepdell North Pit to the Howard dwelling). The maximum vibration measurement recorded was 3 mm/s at a distance of 1000 metres, the other measurements ranged from 0 – 2.5 mm/s.

- 29 The range in the vibration values indicate how site specific the vibration measurements are, as they rely on the specific type of rock, terrain, layers or rock etc. I recommend that blasting is limited to between 0900 and 1730 hours Monday to Friday, 1000 to 1630 hours Saturday, Sundays and Public Holidays, and good practice methods adopted as part of a Blast Management Plan.

NOISE FROM CONSTRUCTION OF BUNDS

- 30 As outlined above, prior to the activity on the site, bunding will be installed alongside the haul road. It is appropriate and common to consider the noise from the construction of the bunds prior to an activity occurring against the noise limits outlined in NZS6803:1999. NZS6803:1999 *Acoustics – Construction Noise*. The noise limits in that Standard are more lenient than those typically adopted for operational, ongoing noise sources, as higher noise levels are tolerable for short term activities and construction is an inherent part of the progress of society.
- 31 Based on the use of the trucks and excavators to construct the bund, I expect noise levels of 47 dB L_{Aeq} at the C & M Howard dwelling (the closest dwelling to the site). Provided the construction of the bund was limited to 0630 – 2200 hours Monday to Friday, and 0730 to 1800 hours Saturday and Sunday, full compliance with the NZS6803:1999 noise limits would therefore be expected.

COMMENT ON SUBMISSIONS

- 32 I have reviewed the one opposing submission which mentions noise, from Macraes Community Incorporated.
- 33 In particular the submitter is concerned about the lack of compliance with previous Resource Consent conditions. Since being engaged to assist OceanaGold in 2017, our investigations have confirmed that noise emissions from the haul road did exceed the previous noise limits outlined in the consent conditions for the Coronation North mine at the C & M Howard dwelling. As a result, significant additional monitoring and modelling has been carried out at this dwelling to determine what noise levels were actually experienced, and why this differed from the levels which had been predicted during the more historic Consent processes. As outlined above the C & M Howard dwelling has now provided Affected Parties Approval.
- 34 I am confident that the situation is now well understood, and that the noise levels we have predicted for the Deepdell North activity are what will be experienced in reality. I also note that noise levels significantly less than 40 dB L_{Aeq} are expected at all dwellings, apart from the C & M Howard dwelling. For example, I understand that the majority of the Macraes Community lives within the Macraes Village. Noise levels of less than 30 dB L_{Aeq} are expected at all locations within the Macraes Township zone.

COMMENTS ON COUNCIL OFFICERS REPORT

- 35 Mr Purves has produced a section 42A report relating to the application for consent, to assist the Commissioners. Subsequent to the s42A report being completed, as above I understand that affected parties approval has now been received from the owners of the C & M Howard dwelling and as such the effects on this property cannot be taken into account.
- 36 Mr Purves concludes that as the predicted noise levels at all properties apart from the C & M Howard dwelling are expected to be considerably less than the District Plan night-time noise limit, and the noise effects are likely to be minor.
- 37 Tonkin & Taylor provided a peer review of the blasting and vibration assessment. While they were concerned about some aspects of the calculations, Mr Purves is comfortable that based on the previous measurements of mining activity on the site that the conditions that OceanaGold have proposed are appropriate to reduce any effects from the noise and vibration from blasting. I agree.

Jeremy William Trevathan