



OceanaGold New Zealand Ltd

Fourth Quarter 2020 - Summary Report

Noise Levels in Waihi

Contents

- 1. Summary4
- 2. Introduction.....4
- 3. Methodology.....4
- 4. Results5
 - 4.1. General.....5
 - 4.2. Wind5
 - 4.3. Compliance.....6
 - 4.4. Complaints.....6
 - 4.5. Operations Assessment7
 - 4.5.1. Martha Pit.....7
 - 4.5.2. Mill.....7
 - 4.5.3. Underground Operations7
 - 4.5.4. Exploration/Drilling7
- 5. Mitigation7
 - 5.1. Mine & Exploration7

1. Summary

Compliance against the consented noise limit(s) and New Zealand Standards was achieved during the fourth quarter of 2020. Two mean corrected noise level (MCNL) assessments were made during the period; one had all contributory readings in suitable meteorological conditions as required by the measurement standards and both were within limits.

Seven single compliance readings were made during the quarter. Five single corrected measurement levels (SCML) were taken in suitable met conditions and all were compliant.

Adverse wind conditions (>3 m/s), as recorded at the Kenny St meteorological station, occurred on 14% of the monitoring occasions.

No marginal or non-compliant measurements were made during the period; this contributed to no yellow or red assessments (as per the Noise Management Plan – Noise Mitigation) being determined.

Seven single measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations; all were compliant. Day-time measurements had levels ranging from 42 to 44 dB and were dominated by residential activities, traffic and birds. Night-time measurements of stockpiling and processing operations recorded levels between 29 and 37 dB.

2. Introduction

This report provides a summary of noise measurements and assessments undertaken by OceanaGold (NZ) Ltd Waihi Operations (OceanaGold) for the fourth quarter of 2020. The report is prepared to comply with the requirements of five consents:

- Hauraki District Council (HDC) Land Use Consent (LUC) for Project Martha (LUC 202.2018.857.1, condition 26A) OceanaGold is required to submit quarterly summary reports to Council on representative noise levels.
- Under the Noise Conditions of the LUC for the Favona Underground Mine (No. 85.050.326.E, condition 9) a summary report is required at the end of each 3-month period from commencement to completion of work.
- Under the Noise Conditions of the LUC for the Trio Underground Mine (RC-15774, condition 6d) a summary report is required at the end of each 3-month period from commencement to completion of work.
- Under the Noise Conditions of the LUC for the Correnso Underground Mine (RC-202.2012, condition 11d) a summary report is required at the end of each 3-month period from commencement to completion of work.
- Under the Noise Conditions of the LUC for the Martha Drill Drive Project (MDDP) (LUSE-202.2017.664.001, condition 11d) a summary report is required at the end of each 3-month period from commencement to completion of work.

For exploration drilling operations, the conditions set out in section 8.3.1 of the Hauraki District Plan apply. Any monitoring of these activities is also included in this report.

3. Methodology

Sound measurements and assessments by OceanaGold comply with the consent conditions and the New Zealand Standards *NZS 6801:2008 Acoustics - Measurement of Environmental Sound* and *6802:2008 Acoustics - Environmental Noise*.

Compliance noise is measured for a minimum of 15 minutes as required under the consent conditions. Compliance readings cannot always be made on every site visit or check due to excessive wind conditions (i.e. greater than 5 m/s).

Monitoring checks are made in response to complaints whenever necessary; initially to verify the noise level and subsequently (if necessary) to determine the effectiveness of any mitigating actions and/or the effect of changing wind conditions (changing wind strength or direction influences noise transmission between the mine and the receiver).

OceanaGold uses noise monitoring procedures to ensure conformance to the above standards and consent conditions, and to support noise mitigation protocols documented in the site Noise Management Plan. The noise mitigation protocols require review of wind conditions that could potentially result in noise levels generating complaints. Monitoring has shown that wind speeds over 3 m/s (as measured at the OceanaGold meteorological station at Kenny St) are likely to increase mine noise downwind of an activity to levels that generate complaints. When such wind conditions occur, OceanaGold implements mitigating actions to reduce noise levels where practicable. During periods when high frequency sounds such as birds, cicadas and crickets become the controlling noise, a filter can be applied to noise measurements to exclude four and eight kHz (kilo-hertz) and enable analysis of the lower frequency noise levels (i.e. those usually associated with mine operations).

Wind has a significant influence on sound propagation. Sound measurement and assessment must take the effect of wind into account. Sound measurements are taken in conditions ranging from nil wind up to 5 m/s at the receiver (*NZS 6801:2008 Acoustics - Measurement of Environmental Sound*). Wind greater than 5 m/s is generally unacceptable for monitoring due to wind noise effects in the nearby environment (e.g. trees) and on the microphone.

Downwind, wind speeds of 3 - 5 m/s are considered marginal due to propagation of sound by wind from source to receiver. Conditions like those for which the compliance limits are set generally occur when wind speeds are less than 3 m/s (*Hegley, 2003: Evidence of Nevil Hegley – Favona Underground Project 2003 Final – 11/11/03*).

Wind speeds are recorded at the OceanaGold met station. These wind readings are assumed to represent the general wind conditions across Waihi and at the noise source (e.g. the mine).

Other meteorological factors influencing the overall sound environment include solar radiation, cloud cover, sunrise and sunset times, wind direction and the direction from source to receiver. These factors were also measured to derive a meteorological stability rating at the time of monitoring. Meteorological stability categories of 4 (neutral) or 5 (slightly positive) are considered suitable meteorological influences on sound propagation and are used to determine noise compliance (*NZS 6801:2008 Acoustics - Measurement of Environmental Sound* (HDC LUC 97/98-105, Condition 3.8 (e))).

4. Results

4.1. General

Monitoring activity for the period is shown in Table 1.

Table 1: Noise monitoring activity

	Number of days checked	Number of days measured	Number of checks (compliance & other)	Number of complaint days	Number of complaint checks
October	2	1	8	2	2
November	1	1	4	0	0
December	2	2	4	0	0
QR Total	5	4	16	2	2

4.2. Wind

Adverse wind conditions occurred at the met station for 14% (1/7) of the monitoring occasions (see Table 2). While it is the general prevailing wind condition as measured at the met station that primarily affects noise propagation, measurements may be made under adverse conditions if the wind at the receiver or at street level is generally more favourable for monitoring. Even then, representative noise measurements of mining activities are not always possible due to wind noise. Periods of high wind strengths during monitoring were similar to the previous quarter (9% adverse).

Table 2: Percentage of monitoring time average wind speeds greater or equal to 3 m/s.

	Receiver	Met Station
October	0%	33%
November	0%	0%
December	0%	0%
QR Total	0%	14%

71% (5/7) of the compliance measurements made in the reporting period were in suitable met conditions (as measured at the met station). Other conditions (wind direction, solar radiation, and cloud cover) also influence suitable met assessments. Monitoring in suitable met conditions occurred on five occasions during this reporting period, this result was the same as the previous quarter.

4.3. Compliance

No mine dominated SCML exceeded compliance levels in suitable met conditions during the reporting period (see Table 3).

Table 3: Summary of Single Corrected Measured Levels (SCML).

	Total SCML calculations	Mine-dominated SCML over (limit + 5 dB)	SCML in suitable met	Mine-dominated SCML over in suitable met
October	3	0	2	0
November	0	0	0	0
December	4	0	3	0
QR Total	7	0	5	0

Two MCNL assessments were made during the quarter. One assessment had all contributing measurements in suitable met conditions (see Table 4); this measurement was compliant with the consented noise limit.

Table 4: Summary of Mean Corrected Noise Levels (MCNL).

	Total MCNL calculations	Marginal MCNL	MCNL 5 dB over limit	MCNL in suitable met	MCNL over limit in suitable met
October	1	0	0	0	0
November	0	0	0	0	0
December	1	0	0	1	0
QR Total	2	0	0	1	0

4.4. Complaints

There were two noise complaints received by one complainant during the reporting period. The complaints related to noise from a suspected generator providing electricity at the Martha pit. Responders to the complainant reported the sound inaudible, however to mitigate any potential noise, sound barriers were installed around the generator to reduce the generator 'hum'. Subsequent noise monitoring confirmed the generator is compliant with noise limits.

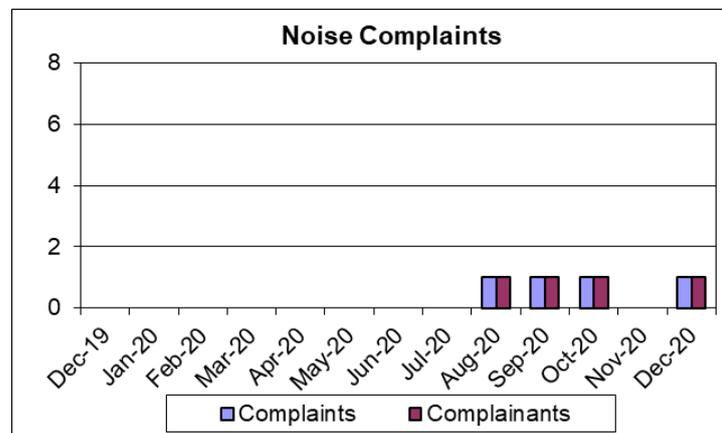


Figure 1: Noise complaint history

4.5. Operations Assessment

4.5.1. Martha Pit

No significant works were conducted in the pit during the quarter. The pit is essentially in 'lock-down' with only essential maintenance (drainage, weed control, and security) and low-impact geotechnical monitoring being undertaken.

4.5.2. Mill

The Mill resumed processing operations in October 2020. Night-time activities at the Mill were compliant, with levels remaining below 40 dB and ranging between 29 and 37 dB. The controlling noise for these measurements was trucks (Polishing Pond Stockpile works) and traffic noise.

4.5.3. Underground Operations

Seven compliance measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations during the quarter:

- All daytime measurements (monitoring the Trio Vent Shaft) were compliant; levels ranged from 42 to 44 dB. Future monitoring and active management will be continued to ensure compliance is maintained at this location. The dominant sounds were residential activities and birds.
- All night-time measurements were compliant (refer to section 4.5.2.)

4.5.4. Exploration/Drilling

Near-mine exploration and geotechnical drilling during the quarter continued in a diminished capacity in various locations: underground, and around the outside of the pit. Drilling near to private residences has been kept to daytime-only, recognising the activity is unlikely to comply with night-time noise restrictions. Due to the reduction of drilling activities in this quarter, noise monitoring for this purpose was not required. No night-time drilling was undertaken.

5. Mitigation

5.1. Mine & Exploration

Commitment to the management and mitigation of mine noise was sustained during the reporting period. In accordance with the Noise Management Plan (noise mitigation), no yellow assessments or red assessments were determined during the quarter.