



APPENDIX G

Updated Discharge Monitoring
Schedule

1.3 Compliance and monitoring schedule to apply to discharge consents RM20.XXX.(1.4), RM20.XXX.(1.5), RM20.XXX.(1.6) and RM20.XXX.(1.7).

1.	General Provisions
1.1	This schedule describes monitoring and sampling required pursuant to consent numbers RM20.XXX.(1.4), RM20.XXX.(1.5), RM20.XXX.(1.6) and RM20.XXX.(1.7) in addition to any monitoring specified in those consents.
1.2	The design of all monitoring and sampling programs shall be to the satisfaction of the Otago Regional Council. Where the consent to which the monitoring programme relates, directs that an Operations and Management Plan shall be prepared then the monitoring programme shall be incorporated into that plan.
1.3	The parameters analysed, site locations and frequency of sampling shall be reviewed as part of the annual review of the management plan for the consent(s) to which this monitoring relates. New parameters, sites and frequencies may be approved by the Otago Regional Council under an application by the consent holder for a change of conditions for monitoring made pursuant to Section 127 of the Act.
1.4	All sampling procedures, including collection, transportation of samples and laboratory analyses undertaken in accordance with this consent must be performed to IANZ registered standards, or otherwise as specifically approved by the Otago Regional Council.
1.5	Reporting shall be quarterly unless specified otherwise. A quarterly consolidated report containing all sampling and monitoring results shall be submitted to the Otago Regional Council within one month of the end of the quarter being reported. This report shall highlight any particular features arising from monitoring and sampling and shall provide appropriate commentary on such features.
1.6	Where a monitoring location is destroyed, made redundant or unusable for any other reason, the consent holder shall, in consultation with the Otago Regional Council: <ul style="list-style-type: none"> a) Discuss and determine whether an alternative monitoring location is required and if so where it should be located; and b) Assign a timeframe for establishment of the new monitoring location.
2	Reporting of non-compliance
2.1	Any non-compliance with any compliance criteria shall be reported to the Otago Regional Council within 24 hours of the non-compliance first being detected.
3	Compliance criteria
3.1	The following describes the compliance criteria pursuant to consent numbers RM20.XXX.04 (1.4) and RM20.XXX.05 (1.5). <ul style="list-style-type: none"> (a) Narrative Standard for Receiving Waters The waters of the Deepdell Creek and Highlay Creek shall at all times be free of contaminants attributable to mineral processing and associated activities in concentrations which adversely affect directly or indirectly water uses or which adversely affect humans, animals, plants and/or aquatic life. (b) Numerical Compliance Criteria <ul style="list-style-type: none"> (i) Highlay Creek, Deepdell Creek and Shag River

Surface water within Deepdell Creek at the Deepdell Creek Compliance Point (DC08), within Highlay Creek at the Highlay Creek Compliance Point (HC02) and in the waters of Shag River at the Shag River at Loop Road Compliance Point shall not exceed the following water quality compliance criteria (where the metals standards are all soluble determinations), unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities:

Constituent	DC08 Standard ^b	HC02 Standard ^b	Shag River at Loop Road Standard ^b
Arsenic	0.15	0.15	0.01
Cyanide _(WAD)	0.1	0.1	0.1
Copper ^a	0.009	0.009	0.009
Iron	1.0	1.0	0.2
Lead ^a	0.0025	0.0025	0.0025
Zinc ^a	0.12	0.12	0.12
Sulphate	1000	1000	250
pH (range)	6.0 - 9.5 pH units	6.0 - 9.5 pH units	7 - 8.5 pH units
Nitrate	3.5	3.5	3.5
Dissolved Reactive Phosphorous (DRP)	0.03	0.03	0.021

^a Note: Copper, lead and zinc standards are hardness related limits in accordance with an assumed hardness value of 100g/m³ CaCO₃ and will vary depending on actual hardness according to established calculation methodologies:

^b (g/m³) unless stated otherwise

(ii) Waste Rock – ANC/MPA Ratio

The acid neutralising capacity to maximum potential acidity (ANC:MPA) ratio, as referred to in California Administrative Code Article 7, 1992, shall be greater than 3:1 in rock discharged into the Waste Rock Stack.

MONITORING

(a) Surface Waters

The consent holder shall collect monthly representative water samples from the following surface water sites (as shown on Appendix XX attached):

- (i) Deepdell Creek at DC08
- (ii) Deepdell Creek at DC01 (Upstream of mine activities);
- (iii) Shag river compliance point 1 (Shag River- Loop Road)
- (iv) Highlay Creek at HC02 (Immediately upstream of the confluence with Deepdell Creek)
- (v) Highlay Creek at HC01 (Immediately upstream of Horse Flat Road)

All surface water sampling shall occur on the same day.

Samples taken for the monitoring points listed above shall also be analysed for the following parameters monthly:

- Calcium

- Magnesium
- Potassium
- Sodium
- Bicarbonate
- Carbonate
- Chloride
- Sulphate
- pH
- Electrical conductivity
- Arsenic
- Copper
- Iron
- Lead
- Zinc
- Cyanide (WAD)
- Total inorganic nitrogen
- Nitrate
- Nitrite
- Ammonia
- Dissolved Reactive Phosphorous (DRP)

With the prior written approval of Otago Regional Council, the consent holder may reduce the frequency of monitoring or the number of contaminants being monitored in accordance with the list above where it is demonstrated that maintenance of the original monitoring programme is not required. The Otago Regional Council may, by notice in writing at any time, require the consent holder to resume the full monitoring program as set out above.

(b) Waste Rock Stack Seepage

The consent holder will obtain representative samples of groundwater seepage from the toe of the Deepdell East Waste Rock Stack. These samples will be collected at the following points:

- (i) Highlay Silt Pond 1;
- (ii) Highlay Silt Pond 2;
- (iii) Deepdell South Silt Pond; and
- (iv) Deepdell North Silt pond.

Commencement of monitoring of groundwater seepage will be dependent on a) waste rock being deposited in the catchment of each seepage collection point and there being sufficient seepage water discharged to allow a sample to be collected.

Samples taken will be analysed for the following parameters monthly:

- Calcium
- Magnesium
- Potassium
- Sodium
- Bicarbonate
- Carbonate
- Chloride
- Sulphate
- pH

- Conductivity

Samples will be analysed for the following parameters quarterly:

- Copper
- Iron
- Lead
- Total Inorganic Nitrogen
- Arsenic
- Dissolved Reactive Phosphorous (DRP)

(c) Aquatic Biological Monitoring

The consent holder shall engage a suitably qualified and experienced freshwater biologist to design and undertake an aquatic biological monitoring programme and the requirements of this program will commence in the first year of this consent being exercised.

Biological monitoring shall be undertaken at the following sites as shown on Appendix XX attached:

- DC01 Deepdell Creek
- DC08 Deepdell Creek
- HC01 Highlay Creek immediately upstream of Horse Flat Road
- HC02 Highlay Creek immediately above the confluence with Deepdell Creek

Monitoring of macro-invertebrates and periphyton shall be carried out at each of the sites on one occasion during each of the following periods each year:

- December to February inclusive;
- March to May inclusive;
- June to August inclusive; and
- September to November inclusive

(unless there are insufficient flows to support any significant aquatic community). A flow reading shall be completed on each monitoring occasion.

Macroinvertebrate sampling shall include calculation and consideration of Macroinvertebrate Community Index (MCI) and its semi-quantitative variant (SQMCI).

An annual electric fishing survey shall be carried out at each of the sites (unless there are insufficient flows) during the period 1 February to 31 March inclusive. A flow reading shall be completed at each site.

Electric fish surveying shall be consistent with the method developed and documented under Compliance and Monitoring Schedules for the Consent Holders existing resource consents. This method shall be followed for all fish surveys undertaken in accordance with this schedule.

All aquatic biology monitoring shall be undertaken during low or stable flows.

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Components to be Monitored:

1. Benthic macro-invertebrates - the taxonomic composition and abundances shall be monitored at all sites.
2. Fish - the taxonomic composition and abundances of fish shall be monitored by an electric-fishing survey at each of the sites.
3. Benthic Algae – a qualitative assessment of the height and percentage cover of dominant species of benthic algae shall be made at all sites.
4. A visual estimation from the stream bank of the habitat length (m) and the percentage of stream bed within the wetted with covered by sediment <2mm in size, for each riffle, run and pool present and take a representative photograph.

(d) Groundwater monitoring

- (i) Water levels will be measured and recorded monthly at groundwater monitoring bores DDB01 – DDB06.
- (ii) The consent holder will measure and record groundwater quality at bores DDB01 – DDB06.

Samples taken will be analysed for the following parameters monthly:

- Calcium
- Magnesium
- Potassium
- Sodium
- Bicarbonate
- Carbonate
- Chloride
- Sulphate
- pH
- Conductivity

Samples will be analysed for the following parameters quarterly:

- Copper
- Iron
- Lead
- Total Inorganic Nitrogen
- Arsenic

With the prior written approval of Otago Regional Council, the consent holder may reduce the frequency of monitoring or the number of contaminants being monitored in accordance with the list above where it is demonstrated that maintenance of the original monitoring programme is not required. The Otago Regional Council may, by notice in writing at any time, require the consent holder to resume the full monitoring program as set out above.