Before a hearing held by Environment Southland

Under the Resource Management Act and the Proposed Southland Water and Land Plan

in the matter of

An application by Meridian Energy to excavate a channel in the bed of the Waiau Arm of Lake Manapouri/Lower Waiau River. Application AP 20233670.

Notes for Meridian Hearing Sept 17-18

Dr Sue Bennett, for the Waiau Working Party

1. The evidence presented on behalf of the applicant has helpfully outlined the extent to which water quality in the Mararoa delta channels will be compromised by this project, with "a substantially increased risk of phytoplankton exceeding 2 mg/m3 in the new and existing channels ... compared to the existing channels. Specifically, there is a predicted increase of three to five times the number of days under high-risk conditions in the channels following excavation" (Dr Hogsden's evidence, Paragraph 100).

2. Additionally, "The shallow depths in the new and existing channels may further increase the risk of blooms because of the risk of warmer temperatures at times when water velocities are low" (Dr Hogsden's Paragraph 101) and we note that the exacerbating effects of such warmer temperatures are not considered in the three to five fold effects just outlined above.

3. The purpose of the excavation project is to improve the conveyance and reliability of downstream flushing flows through the MLC from the current provision of 30% of these flows to 70% provision. Currently, there is an average of 1.5 flushing flows per season, so this predicted increase represents an average of just two additional flushing flows per season (WWP calculations), possibly 2.5 (NIWA calculations).

4. The WWP submit that there is insufficient certainty that this limited number of additional flows will be sufficient to mitigate the magnitude of increased risk of elevated phytoplankton levels, and the evidence presented on behalf of the applicant has not persuaded us otherwise.

5. Regarding the releases currently provided - the 1.5 flushing flows plus the monthly recreational flows - we note that the applicant's evidence refers to these in terms of their potentially being lake water flows up to certain lake levels (Dr Hogsden's paragraph 85), whereas the reality is that all these flows have components of Mararoa river water as well as lake water. Indeed, the flushing flows are often timed to piggy back on rising Mararoa flows - and the Mararoa component of any flow does not contribute to the flushing of the Waiau Arm and channels.

   Further, the release of any lake water is monitored by the Electricity Authority, and Meridian will be in breach of its own industry standards if they release water without good reason – so releases need to be made a condition of consent.

6. Whilst the applicant has offered a limited-duration water quality monitoring programme to mitigate the uncertainty surrounding the effectiveness or otherwise of the additional flushing flows, it is our submission that this is still an insufficient gesture and we seek that the provisions made for water quality monitoring will endure for the full term of the resource consent.

   We have learnt from experience the unpredictability of hydrological inflows in this catchment beyond more than a few days of forecasting, and thus recognise the importance of monitoring on a long-term basis to detect water quality issues as they arise.

   In recent years, post 2020, the Waiau catchment has experienced a succession of low hydrological inflows and this has resulted in reduced water quality and clarity being recorded in the Waiau Arm - as evidenced via the existing Waiau Arm water quality monitoring programme, instigated via the MTAD consents following earlier low water quality observations in 2003, and stakeholder concerns thus raised.

   We note that these Waiau Arm water quality issues are not evident in all seasons, and there have been numbers of years when water quality issues have not arisen. Given that seasons of concern typically cannot be identified until after the fact however, we reiterate the need for long-term monitoring.

   For these reasons, accepting a limited-term water quality monitoring programme as a condition of consent is not, in our opinion, a prudent measure, and we request that a robust and long-term water quality monitoring programme be made a condition of consent - with explicit provision for additional flushing flows to be released in response to instances of poor water quality, to maintain satisfactory high water quality standards for the full duration of the term of consent.

7. The waters of the Waiau Arm, including the existing and proposed channels, are, since impoundment by the MLC, a contiguous part of Lake Manapouri. Lake Manapouri itself is a high quality, pristine lake environment in a microtrophic to oligotrophic state (ES SOE data), i.e. with a water quality corresponding to a chlorophyll *a* level of less than 2 mg/m3.

8. Since impoundment of the Waiau Arm, water in the Arm can be diverted either away from or towards Lake Manapouri, depending on prevailing hydrological and operational conditions. It is therefore necessary to maintain a high standard of water quality in the arm - given that it is a contiguous part of the lake - and it is also relatively straightforward to flush any poor quality water out via the MLC before a major water quality issue or phytoplankton bloom develops.

   The WWP have requested a definitive record of the Waiau Arm flows that flow towards the lake as part of an in-preparation review of the existing Waiau Arm water quality monitoring programme, and we expect this information to include the actual frequencies and durations of these flows, as well as the factors that determine when such flows take place.

   At the time of the MTAD hearing, it was predicted that Waiau Arm flows would show an increase in the frequency and duration of "parked" (stagnant water) events and an increase in the duration of Mararoa River flows towards Lake Manapouri.

   Unfortunately however, the information to corroborate this prediction is not available to us at this time so it cannot inform our present submission. Rather, we must seek that a detailed, long-term water quality monitoring programme be made a condition of this consent, for the full term of the consent duration.

9. Regarding the water quality of the receiving environment, we note that the threshold level of chlorophyll *a* that defines the upper limit of an oligotrophic body of water is 2 mg/m3 (see Table A-2, paragraph 100 and Table 1 in Dr Hogsden's evidence), and it is the submission of the WWP that this is the appropriate trigger level for the chlorophyll *a* component of the proposed water quality monitoring programme. We note that the applicant proposes a threshold level of 5 mg/m3, which corresponds to the threshold between mesotrophic and eutrophic states, but we submit that this is not sufficiently robust in the context of the microtrophic / oligotrophic Lake Manapouri receiving environment.

10. Finally, we offer a couple of adjustments to the consent condition suggestions we originally provided, and can now confirm that we are happy with two additional monitoring sites to be set up in the new and existing main channels, as per the applicant's request - Condition 15 d in Attachment B to the Statement of Evidence in Chief of Daniel James Murray - Page 10 of 13 - rather than the three sites we originally requested.

    This adjustment replaces the reference to "three Representative Sites" in Condition 11 b of our earlier evidence: also the reference to "two sites in the existing channels" in Condition 11c should be replaced by "one site in the existing main channel".

For the avoidance of doubt, we do not agree that the chlorophyll *a* trigger level should be set at 5 mg/m3 (Condition 15, clauses e and f of the applicant's proposed conditions). Our request and rationale for imposing a 2 mg/m3 trigger level remain.

Neither do we agree that the condition relating to the proposed water quality monitoring programme should be limited to any period shorter than the full term of the consent (Condition 15 c of the applicant's proposed conditions). Again, our request and rationale remain.

11. To conclude, we accept the applicant's assessment of the Magnitude of Effects of the proposal on water quality and phytoplankton levels, as outlined in Dr Hogsden's Paragraphs 100 and 101.

    However, we do not share the applicant's confidence that the limited number of additional flows is sufficient to mitigate the increased risk of adverse effects posed by the construction and operation of a parallel channel.

12. We recognise that the waters of the Waiau Arm, including the existing and proposed channels, are a contiguous part of Lake Manapouri – a high quality, pristine lake environment existing in a microtrophic to oligotrophic state. Further, we note that the waters of the Waiau Arm may flow either towards or away from Lake Manapouri, so the highest standards of water quality should be maintained.

    Consequently it is our submission that a chlorophyll *a* trigger level of 2 mg/m3 is the appropriate trigger level for the proposed water quality monitoring programme.

13. We further recognise that the inflows to the Waiau catchment are highly variable and difficult to predict, and that in seasons of low inflows, Waiau Arm water quality can be compromised to the extent that additional flushing flows may be required. Thus, given the unpredictability of inflows and the potential magnitude of adverse effects, particularly in low inflow seasons, we are seeking that a robust and long-term water quality monitoring programme and management response plan be attached to this consent to ensure that Waiau Arm water quality is consistently and appropriately addressed for the duration of consent.

14. We agree to there being two Representative Monitoring Sites for the purposes of the water quality monitoring programme associated with this consent – one in the existing (main) channel and one in the parallel channel as requested by the applicant – rather than three Representative Sites as originally submitted..

Sue Bennett (PhD)