

In the Matter of the Resource Management Act 1991

and

In the Matter of applications for Resource Consents by TrustPower
Ltd for the Wairau Hydro Electric Power Scheme

BRIEF OF EVIDENCE ON CONDITIONS OF ROBIN MARK DAWSON

1 INTRODUCTION

1.1 My full name is Robin Mark Dawson. I have the following qualifications

- a Bachelor of Engineering degree with first class honours in civil engineering from the University of Auckland;
- Chartered Professional Engineer;
- member of IPENZ (Civil and Geotechnical practice); and
- member of the New Zealand Geotechnical Society.

1.2 I am a Senior Water Resources Engineer with Tonkin & Taylor Ltd. I have had over 12 years experience in the fields of geotechnical, water resources and civil engineering. During that time I have been involved in the assessment of, and remediation for, numerous landslide projects, building foundations, large cuts and fills, and a wide range of other geotechnical projects.

1.3 More specifically to dam engineering and dam safety, I have been lead designer for four dams, three of which are constructed and operating, and one of which is currently being commissioned. These dams are up to 22m in height and up to 1.3 million cubic metres in storage. Two are medium Potential Impact Category (PIC) and two are low PIC. The largest of these was Delta dam, recently constructed in Marlborough, in a highly seismic region of New Zealand. I have designed and supervised remedial works to the 50m high concrete arch Karapiro dam on the Waikato River. I have participated in numerous dam safety reviews, and was lead safety reviewer for the 2005 review of the 67m high Tooma dam, and 2006 review of the 150m high Talbingo Dam, both part of the Snowy Mountains hydro scheme in New South Wales, Australia.

1.4 I have read the Code of Conduct for Expert Witnesses (Rule 330A, High Court Rules and Environment Court Practice Note) and agree to comply with it. I have complied with the Code in the preparation of this statement of evidence.

2 SCOPE OF EVIDENCE

2.1 This evidence addresses the key issues raised by submissions to the proposed conditions of consent for the Scheme, where they relate to safety and construction. The key issues that I cover are:

- Potential Impact Classification of the Scheme

- Peer review requirements for design and construction
- Monitoring and Surveillance requirements during the operational phase
- A Civil Defence Management Plan for the Scheme
- Emergency discharges into Keirnan Creek
- Requirements of the Community Liaison Group
- Monitoring of fault activity
- Monitoring flow take into the canal.

2.2 Each of these areas is dealt with systematically in my evidence.

3 POTENTIAL IMPACT CLASSIFICATION

3.1 Some submitters (Nancy and Peter Sherwood, Eric Parr, Alison Parr, Pauline Doyle, Eric Parr) have requested that the whole scheme be designed to High Potential Impact Category (PIC) standards under the NZSOLD Dam Safety Guidelines (2000) regardless of the actual downstream potential impact.

3.2 Design of the scheme to higher PIC standards than impact assessment shows is not in line with currently accepted national and international best practice. The assessment of PIC is ongoing throughout the life of the scheme and current conditions are appropriate to cater for any future changes prior to and following detailed design and construction. Therefore, in summary, conditions SD1-6 are sufficient to ensure that the design and monitoring standards for the Scheme are consistent with the Potential Impact Category.

4 PEER REVIEW FOR SCHEME

4.1 Some submitters (Nancy and Peter Sherwood, Pauline Doyle) have requested international peer review for design of the fault crossings.

4.2 Given the interaction of the scheme with the Wairau fault, conservative and robust engineering solutions have been applied, and this will need to be continued through detailed design. The inclusion of a condition for International Peer Review of critical scheme design concepts is unnecessary given the new condition SD6 which requires the appointment of a peer reviewer who is a "recognised engineer" under s149 of the Building Act 2004.

5 MONITORING AND SURVEILLANCE

5.1 One submitter (Pauline Doyle) sought an extremely high level of monitoring, which would exceed that required for most very large schemes throughout the world.

5.2 The submitter has requested that following a 1 in 10 rainfall event the whole scheme be surveyed to 1cm accuracy to check for any deformation. Further, the whole canal should be monitored on a weekly basis for piezometric surface, seepage and deformation. In addition, a surveyor should continuously monitor the canal on a monthly basis in the areas of any seepage.

5.3 The requested monitoring regime is well in excess of that currently adopted internationally even for extremely large dams. The appropriate condition is that monitoring and surveillance should meet the recommendations in the NZSOLD Dam Safety Guidelines for the appropriate PIC as set out in condition SD4.

6 CIVIL DEFENCE MANAGEMENT PLAN

6.1 Some submitters (Alison Parr, Pauline Doyle, Hugh Steadman) sought the requirement for a civil defence management plan. This is essentially covered by the Emergency Action Plan that would be required under the NZSOLD Dam Safety Guidelines. Accordingly, condition SD4 which requires conformance with the recommendations in the Dam Safety Guidelines (and now also specifically refers to the preparation of an Emergency Action Plan) will meet this objective.

7 EMERGENCY DISCHARGES INTO KIERNAN CREEK

7.1 One submitter (Judith Hebbard) requested more clarity around the potential for emergency discharge into Kiernan's Creek. This clarity included:

- Specification of a maximum allowable discharge
- That there be agreed documentation of conditions prior to any discharge
- That there be at least 24 hours notice prior to discharge

7.2 I agree that the rate of discharge should be notified to potentially affected parties and not exceeded during a discharge event. I also agree that that inspections before and after discharge should be documented and the records held by the consent holder and supplied to affected parties.

- 7.3 However, in an emergency situation a delay in dewatering the canal may not be appropriate. I have recommended that the condition be reworded to include notification to affected parties as early as practicable following the identification of a need to dewater (refer condition SP5).

8 MONITORING OF FAULT ACTIVITY

- 8.1 One submitter (Pauline Doyle) has requested that more base line data should be collected on the fault activity prior to construction.
- 8.2 Installation of additional seismic instrumentation is unlikely to provide significant data in the short term due to the infrequency of significant events. The existing seismic network managed by GNS provides very good information on this (and other) fault activity. Prior to construction there will be more physical investigation of the fault to help characterise its properties to meet the requirements of the NZSOLD Dam Safety Guidelines. This will be more than adequate and consequently I do not recommend additional specific fault activity monitoring.

9 MONITORING FLOW TAKE INTO THE CANAL

- 9.1 Some questions have been raised around monitoring flows in the river and in the canal. Mr Mitchell's evidence primarily covers this area, but a note is provided here regarding measurement of flow take into the canal.
- 9.2 A section of the canal will be shaped and calibrated at various flow rates and water levels so that measurement of water levels in this region will allow flow to be evaluated. The exact location of this section will be evaluated during detailed design, but will need to be somewhere upstream of the first power station.

10 CONCLUSION

- 10.1 In conclusion, I have recommended conditions for inclusion with the consent. These conditions provide adequate measures to ensure that the safety of the canal is managed in accordance with current practice best practise in New Zealand and overseas.