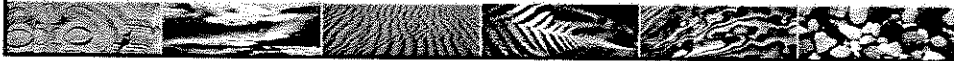


Central Plains Water Dam & Related Structures Safety

J.J. Eldridge
Tonkin & Taylor
26th August 2008



Senior Water Resources Consultant

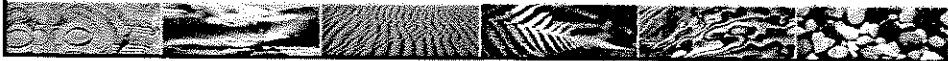
- Professional civil engineer 24 years
- BSc Civil Engineering
- MSc DIC Soil mechanics and engineering seismology (Imperial College)
- Professional institutions:
 - FICE, MHKIE, MCIWEM
- Environment Court code of conduct for expert witnesses – Practice note



Experience



- Dams and hydropower involvement in NZ since 2004
 - Safety reviews (NZSOLD)
 - Embankment dam, canal, hydroelectric design
 - Scoping studies, feasibility design
- Prior to arriving in New Zealand:
 - Hong Kong, Pakistan, Honduras, United Kingdom
 - Experience on dams, canals, irrigation, hydraulic structures (tunnels peripherally)



CPW involvement



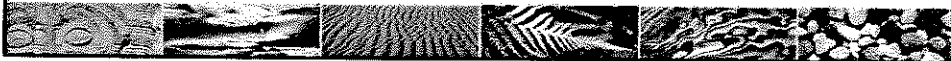
- Engaged by Selwyn DC and ECan to address matters of dam safety. Involved since early 2007 (Prior to 2007, other T&T colleagues involved from mid 2006)
- Prepared:
 - Civil Works Safety January 2008
 - Dam, conveyance canals, tunnel
 - Assessments of the Long Tunnel Option
 - Review of evidence prepared by Applicant
 - Review of responses by Applicant



Basic questions



- Are dam safety criteria presented?
- Are these compatible with NZ standards?
- Can these standards be achieved?
- Is a dam safety implementation process presented?
- How is this process incorporated in proposed consents?
- What are the further steps in the process?



CPW dam safety criteria



Applicant provides:

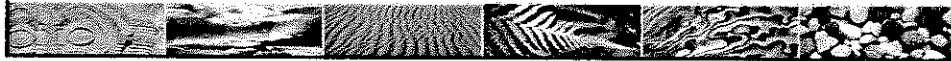
- Assessment of dam safety criteria
 - “High” PIC dam (NZSOLD criteria)
 - R R Davidson - discussion of safety criteria including specific criteria for the CPW dam
- Hypothetical dam break analysis
 - Common practice for this category of dam
- Risk assessment (ANCOLD and others)
 - Becoming common practice in NZ
 - R R Davidson – discussion of background and ALARP
- Concludes that CPW can meet the criteria



Dam safety criteria



- NZSOLD 2000 Dam Safety guidelines
- International dam safety guidelines
 - ANCOLD guidelines
 - International practice
 - Incorporation in NZSOLD guidelines by no specific reference



Achieving criteria



- Evidence presented (quoting out of context):
 - Murray D Gillon – “technically viablewithout resorting to extraordinary measures”
 - Richard R Davidson – “Multiple lines of defence are typically incorporated into the design”
- The works are technical viable and there is no apparent reason why applicable safety criteria cannot be met.
 - Dam
 - Conveyance canals
 - Tunnels



Safety Implementation



- Applicant indicates that the implementation of the design, construction and commissioning will be in accordance with NZSOLD guidelines



Consents



- Initial draft sub-clauses covered implementation of dam safety
- Suggested amendments (Jan 2008) – based around a Review Panel of engineers to oversee the design and implementation
- Lewthwaite (Feb 2008) indicates that these suggestions were generally in accordance with the intent
- The proposed clause CRC061845 omits consideration of design and implementation
- This may not be a matter for Resource Consents



Future process



- Building Act 2004, Regulations and Building Consents
- Building (Dam safety) Regulations
1st July 2008 – refers to NZSOLD guidelines
- Regulation Authorities responsibilities,
1st March 2009
- Drafting addendum to NZSOLD guidelines to link
provide the link to the Regulations and Act
- Enforcement of Regulations, 1st July 2010
- Interim period



Conclusion



- The relevant works can incorporate appropriate dam safety considerations
- There is an interim transition period for implementing the Building Act (Dam Safety) Regulations 2008
- Prudence suggests a CRC061845 Resource Consent reference to (regarding design and implementation):
 - Building Act
 - NZSOLD Dam Safety Guidelines
- Review wording of sub-clauses to CRC061845.

