

NEW ZEALAND DAM SAFETY GUIDELINES 2000

SUMMARY OF CHANGES

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ABSTRACT

The New Zealand Dam Safety Guidelines were released in 1995. A full review has been completed for release in November 2000. The update conforms with current international practice in Dam Safety, and New Zealand legislation relating to dams. Responsibilities under the Resource Management Act are described. Potential impact of loss of the dams including environmental effects has been used to define guideline requirements.

Keywords: dams; safety; guidelines; legislation; environment; potential impact.

1.0 Introduction

The New Zealand Dam Safety Guidelines are a living document, responsive to changes in international practice in dam safety assurance, and to the legislative and ownership responsibilities with New Zealand.

The five years that have passed since the Guidelines were first prepared have seen widespread changes in dam ownership, with the development of future facilities moving away from local and central government to private institutions and owners.

Dam safety has made headlines on several occasions since the Guidelines were first published, notably with the identification and repair of problems beneath the tailings dam at Golden Cross Mine, upgrading of Matahina dam, increased precautions for the operation of Cosseys dam, and the failure during construction of the Opuha dam.

There has been increased awareness of the implications of the Resource Management Act upon the management and operation of dams, with many existing use consents ceasing in operation after 2001, requiring renewal under the RMA.

2.0 Dam Safety Guidelines 2000

The New Zealand Dam Safety Guidelines have been prepared for the guidance of New Zealanders associated with the industry - owners, operators, designers, developers, contractors, planners and regulators.

They differ from overseas publications, as they reflect New Zealand's existing legislation, geology, landforms and climate. They are not a cookbook, but guidance is provided on suitable references for normal issues related to the selection, design, construction, operation and decommissioning of dams.

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The document encapsulates the recommendations that have been made by users of the original 1995 Guidelines to the New Zealand Society On Large Dams (NZSOLD). Alterations have been suitably identified to facilitate the review of the revised document by peer review within the industry, with input from owners, designers, regulators, and emergency service providers.

The first issue of the Guidelines assumed that there would be specific legislation in place for dam safety assurance shortly after the issue of the document. The 2000 issue has been prepared without any reliance upon future legislation. The Guidelines will be appropriately amended in the future when required by changes in existing legislation, or any best practice changes in the international dam engineering industry.

The Dam Safety Sub Committee has addressed each of the main issues targeted for review in the document, and the document has been reviewed for compatibility with existing rather than future legislation. A raft of editorial amendments have been processed into the original document.

3.0 Broad Areas of Amendments

This section covers the broad areas of changes to the existing guidelines, and the philosophy employed in judging whether or not a revision is warranted.

3.1 Guidelines Or Standards

Some international practice has lead to the production of guidelines elsewhere that are prescriptive, and have become the “minimum standards of care” in the design, construction, and operation of dams.

This document has remained “guidelines” with references given to the many suitable references already available for specific issues.

The guidelines set out the procedures, resources, and responsibilities that must be taken into account to achieve an acceptable level of dam safety assurance for New Zealand’s dams and appurtenant structures.

3.2 Legislative Aspects

An improved understanding has been developed on the application of existing legislation to dam safety assurance.

References are drawn from Roy Somerville’s paper at the NZSOLD 1995 Symposium on the implications of dam ownership.

The proposed changes to the guidelines draw upon the capacity of the existing legislation to provide for dam safety assurance, rather than building on the expectation of the development of specific dam safety legislation.

During the past five years there has been a move by Regional Councils to use the powers of the Resource Management Act to require owners to have in place adequate procedures and resources in terms of dam safety assurance in order to alleviate or mitigate the effects of the potential downstream effects of dams.

The Councils have introduced dam safety assurance requirements to the conditions of resource consents, without the need for further legislation to be put in place.

The dam industry has, in effect become “self regulating”. This outcome was envisaged for resource sectors when the RMA was introduced. This is a major achievement.

3.3 Classification of Dams

The changes to the classification of dams are based on the potential impact of a dam failure. The categories consider **incremental losses**, being those losses that might occur over and above the losses that would have occurred if the dam was not in existence.

The previous classification included a focus on the potential energy of the stored material retained behind the dam. Concentration on the potential hazards at / or behind the dam does not reflect the consequences of dam ownership, as the downstream environment changes, both ecologically and through land development.

Dam safety assurance is about protecting people, property, and the environment that could potentially be adversely affected by the presence of that dam.

Consequently, the classification table now refers to **“Potential Impact”**, rather than the hazard presented by the dam.

The classification has been extended to a fourth category to cover those structures which may be excluded from the Building Act, or be constructed as a permitted use in terms of the Resource Management Act.

It is important that those dams which have a “low potential impact” rating are considered in review, as they may be located in areas subjected to significant future downstream development, (e.g. Rosedale Dam on Auckland’s North Shore) with associated significant potential loss of life or damage as the land use in the downstream catchment changes.

3.4 Appendices

In Appendix A, the numerous references to specific clauses or excerpts from legislation have been deleted, and replaced with a discussion on the legislation affecting dam safety assurance, and the liability of those involved in the industry.

In Appendix B, Section 6 has been rewritten with reference to factors of safety developed internationally and used in the latest Canadian Dam Association (CDA) Dam Safety Guidelines.

3.5 Design and Build Projects

Consideration has been given to the inclusion of guidelines pertaining to the Design and Build development of dams. The conclusions have been that the same technical requirements are required for whatever form of design and construction are employed. It is important in a Design and Build contract that the owner is aware of his responsibilities. The owner must ensure that the design philosophy is taken into consideration in any amendments to the design of the dam, the building of and maintenance of dam safety works associated with the construction period, and in the commissioning of the dam. Controlling authorities also need to ensure that adequate assurance of performance is provided.

3.6 Emergency Action Plan

The Emergency Action Plan was covered in the latter part of the Operation, Maintenance & Surveillance Appendix (E), to which it is associated.

This section has now been elevated to its own Appendix F, as the Emergency Action Plan is equally important during the construction phase of the life of the dam, and may be included as a mitigating measure in the AEE for the resource consents used to progress the dam to life. It is essential that this document is maintained as a living document throughout the life of the dam, and this includes the construction and commissioning phases of the life, where the document may need updating, and the appropriate resources require continued training in its use, to ensure the safety of life and property at all times.

3.7 Performance Schedule

Appendix H - Performance Schedule - is included to summarise compliance requirements for dam owners.

3.8 Risk Assessment

Reference is given to the use of risk assessment as one of the tools that an experienced practitioner and responsible dam owner will use in the management of dams. It is not to be promoted as providing the best or only answer on the safety assurance of a particular dam. Risk assessment is a compliment to traditional standards based engineering associated with dams.

4.0 Conclusion

The NZSOLD 2000 Guidelines will provide guidance to New Zealand dam owners and practitioners on management of dams in accordance with current legislation. The guidelines enable the dam industry to achieve the Resource Management Act objective of “**Self Regulation**”. The NZSOLD Management Committee is very pleased to have achieved this objective.