

**Australian National Committee  
on Large Dams Incorporated**

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Ian Landon-Jones  
**Secretary**  
James O'Keefe

Dams Safety Review  
NSW Trade and Investment  
GPO Box 5477  
Sydney NSW 2001

**Re: New South Wales Dams Safety Review**

The Australian National Committee on Large Dams (ANCOLD) welcomes the opportunity to respond to the call for public comment on the NSW Dams Safety Review.

ANCOLD is the Australian National Committee of the International Commission on Large Dams (ICOLD). It is a non-government, non-profit voluntary association of organisations and individual professionals with a common interest in dams. ANCOLD's core purpose is to disseminate knowledge and provide guidance in achieving Australian best practice in all aspects of dam management.

As part of its role in knowledge building and developing capability in the dams industry, a series of technical guidelines have been published by ANCOLD. It is noted that the ANCOLD Guidelines on Risk Assessment (2003) is referred to in the KPMG final report. This guideline was prepared by experts from various professional disciplines and was thoroughly peer reviewed nationally and internationally. ANCOLD guidelines are not standards but are used in that way in some jurisdictions where there are no state-based regulatory arrangements or where the state-based regulations call up the guidelines.

With regard to the above brief background, ANCOLD makes the following points in relation to the call for public comment:

**What should be the Objective of the Act?**

*"An issue on which community views would be appreciated is whether this objective should explicitly include not only acceptable levels of public safety risk, but also acceptable levels of downstream risk to economic and environmental assets."*

ANCOLD strongly supports the NSW Government continuing to be explicit on tolerable levels of public safety risk and also providing guidance for tolerable risk for downstream economic and environmental assets.

The ANCOLD guidance on tolerable levels of societal and individual risk was based on careful study and analysis of practice in setting tolerable risk levels in Australia and other

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jurisdictions at that time. The suggested tolerable risk levels are certainly not subjective and further information is given in the Guidelines.

As a risk-based approach is supported by the report, ANCOLD also suggests that the NSW Government provide guidance for dam owners on how to address 'As Low as Reasonably Practicable' (ALARP) considerations when risks are reduced below the tolerable levels of economic and environmental risks.

ANCOLD has provided guidance on applying ALARP considerations once public safety risks are below the limit of tolerability and it is understood that the Dams Safety Committee has adopted this guidance. ANCOLD would support additional guidance being provided.

### **The role of the Dam Safety Regulator**

*"Public safety risks arising from dams depend on a number of factors other than the structural integrity of the dam, such as dam operations, changes in downstream development and emergency management procedures."*

The ANCOLD Guidelines on Dam Safety and the Guidelines on Risk Assessment provide a range of activities and actions that a dam owner should undertake to ensure that risks are minimised to an ALARP condition. As ANCOLD understands that the DSC has adopted these Guidelines with some modification, it is not clear why dam owners would not have been adopting a wide range of risk reduction activities for their dams.

*"...to apply benefit cost analysis to identify the most efficient dam safety risk reduction strategy....."*

The ANCOLD Guidelines on Risk Assessment includes a Cost-to-Save-a-Statistical-Life calculation as one measure for determining whether risks are ALARP. This approach is based on the work undertaken by the United States Department of Transport (Value to Save a Life) combined with avoided monetary losses and a measure of disproportion as used by the Health and Safety Executive (HSE) in the United Kingdom. It is a form of cost-benefit analysis.

Determining whether risks are ALARP within a tolerability of risk framework is a decision that is made once risks are reduced below the adopted tolerable risk levels. To do otherwise would negate the purpose of adopting tolerable risk guidelines. ANCOLD advises in the Guidelines on Risk Assessment that the following range of considerations be taken into account in making a judgement on whether risks are ALARP.

- cost-to-save-a-statistical-life (CSSL) is a consideration for life safety risks;
- whether good practice is met is a consideration;
- the level of the existing risk is a consideration;
- societal concerns are a consideration;
- affordability is not a consideration for life safety risks;
- duration that the risk applies may not be a consideration for some life safety risks.

ANCOLD also recommends consideration of whether all community risks – such as, life safety, monetary loss, environmental and public health - are ALARP. As mentioned above, Government guidance on the tolerability of risk and ALARP considerations for economic and environmental risks would be very helpful for dam owners.

### **The Form of the Regulator**

ANCOLD notes the approaches proposed and suggests that whatever arrangement is finally adopted that the Regulator has access to high level expertise in dam safety management with understanding and involvement in national and international developments in dam safety. The Dams Safety Committee has been very highly regarded in this respect.

### **Reform Options for the NSW Government**

*“...in some cases only very small gains in public safety are being achieved relative to public expenditure on dam safety.”*

ANCOLD understands that the NSW Dams Safety Committee has adopted the ANCOLD Guidelines on Risk Assessment with some modifications to the suggested tolerability limits to accord with other regulatory arrangements in NSW. In ANCOLD’s opinion, the adoption of a risk-based approach should result in optimising the expenditure on dam safety, provided that the Government accepts the suggested tolerability limits. The report has not been clear as to why there is a perception that this is not the case.

ANCOLD makes the following submission in relation to the KPMG Report:

### **ANCOLD Guidelines on Risk Assessment**

The report refers extensively to the Guidelines on Risk Assessment, published in 2003. Until recently ANCOLD was the only National Committee of ICOLD to publish such guidelines. At the time they were published, risk assessment practice for dams was restricted to a few jurisdictions internationally. In publishing the guidelines, ANCOLD put forward leading edge practice in risk assessment. More jurisdictions are now using similar risk assessment practices to manage dam safety, but internationally the standards based approach to dam safety remains widespread. For example the Probable Maximum Flood (PMF) remains the most common criterion for assessing dam safety.

Three key sources were followed in developing the risk assessment framework set out in the Guidelines:

- The Generic Process – The national standard The Australia/New Zealand Standard on Risk Management AS/NZS 4360: 1999 (SA/SNZ, 1999);
- The Framework for Control of Risks in Hazardous Industries in Australia – The National Occupational Health and Safety Commission Standard and Code, NOHSC:1014 (1996) and NOHSC:2016 (1996). Also the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Regulatory Assessment Principles,

in particular ARPANSA (2001), provide a basis for comparison with these guidelines. And the PlanningNSW approach and tolerability criteria;

- The Decision-making and Tolerability of Risk Framework – the United Kingdom Health and Safety Executive document Reducing Risks, Protecting People (HSE, 2001a).

The Guidelines on Risk Assessment have been either in whole or part adopted by regulators around Australia and by owners where there are no regulations. Whilst the guidelines put forward risk assessment processes as a supplement to a standards based approach, most jurisdictions and owners have taken a progressive, cost-effective improvement approach to risk reduction, where major risks have been reduced stage by stage. In this regard it is noted that the Dams Safety Committee has allowed that the final dam safety status can be determined on a risk basis except for dams with very high life safety risk.

Approaches similar to that taken by ANCOLD in adopting a tolerability of risk framework and the application of ALARP below tolerable risk levels have been adopted in other jurisdictions such as the United States, Canada and Spain.

ANCOLD is currently reviewing the Guidelines on risk assessment as practice has developed over the past ten years. Two important issues being considered are the horizontal truncation in the suggested Societal Risk Guidelines and use of risk assessment to determine final safety status of dams (as put forward by the Dams Safety Committee).

The ANCOLD horizontal truncation was included for particular reasons that are given in the Guidelines, Commentary on Guideline G10-1: Tolerable Risk Policies, page 113:

*The horizontal truncations of Figs 7.4 and 7.5 are without precedent, but represent ANCOLD's present judgement of the lowest risks that can be realistically assured in light of:*

- *Present knowledge and dams technology;*
- *Methods available to estimate the risks.*

*In the case of existing dams, many were built long ago using very poor technology. Whilst some aspects of safety can be improved, it is simply impracticable to bring such dams fully up to the safety levels of a well designed and constructed modern dam. The choice is either to accept the horizontal truncation or to abandon the dam. Since dams are of significant benefit to society, it is considered that the horizontal truncation is justified.*

Whilst the review of the Guidelines is in progress and no final position has been determined, certainly practice in the estimation of risks has improved over the past ten years and this would indicate that a key reason for suggesting the truncation no longer applies.

## Regulation of Dam Safety

The Regulation of very low frequency / high or extreme consequence hazardous industries presents challenges because of the potential for high life loss and economic consequences from single events.

These consequences can sometimes be of national importance.

Where risk assessment is used to regulate such industries, the “tolerability of risk” approach used by the HSE is usually adopted as a basis, particularly in countries with a similar legal system. This approach recognises society’s aversion to multiple fatalities in single incidents and the need to demonstrate an ALARP risk position once risks are reduced below the established tolerable risk criteria. ALARP is achieved by demonstrating gross disproportion between the effort to reduce risks further and the amount of risk reduction achieved and importantly also by addressing the other factors for determining an ALARP position described above.

ANCOLD looks forward to the consideration of its comments and to the conclusions of the Review.

Submitted on behalf of ANCOLD



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