OF DAM OWNERS, DAM SAFETY AUTHORITIES AND EMERGENCY MANAGERS: A NEW SOUTH WALES PERSPECTIVE

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In the wake of the mid-1980s revisions of Probable Maximum Precipitation and Probable Maximum Flood estimates and the discovery that certain dams may have problems relating to structural stability, planning for the protection of dams and the communities below them has assumed a high priority. Initially, this planning was conducted on an ad hoc basis, the rules which governed it developing case by case and with little clear codification or formalisation. Not surprisingly, uncertainty arose over several aspects of the process and numerous questions were posed. Who was responsible for the planning? What should be the scope of the plans themselves? For which dams were plans needed? What legislation should guide the planning process? What information was needed for meaningful plans to be prepared? Who were to be the players involved, and what were to be their responsibilities?

This paper focuses on the development of a NSW approach to answer these questions and to build a set of arrangements by which planning to protect communities below dams can proceed. In doing so, it will also comment briefly on the relationship between practice as it is developing in NSW and the planning guidelines which are being developed at a national level.

SOME HISTORY

During the 1980s, when the scale of the problem of flood deficiency of dams was becoming apparent in NSW, there were in Australia few clear principles to guide the planning work which was needed. As a result dam owners and dam safety authorities looked elsewhere for guidance as to how the planning should be carried out. In NSW the Dams Safety Committee, which was charged with setting standards and monitoring their observance to ensure the safety of dams, adopted the American approach which was to require dam owners to develop 'Emergency Action Plans' both to identify actual and potential emergency conditions at damsites and to prescribe procedures to minimise property damage and loss of life downstream in the event of dam failure. The Australian National Committee on Large Dams (ANCOLD) did likewise.

This approach led individual dam owners in NSW, among them the Water Board and the Department of Water Resources, to seek to produce plans for particular damsites and the valleys below them. Work was initiated to define the threat posed by individual dams and to involve other organisations - including the State Emergency Service - in the actual planning. By the late 1980s, a small number of plans had been produced and others were in the process of being prepared. This was happening despite the fact that the Dams Safety Act 1978 does not expressly empower the Committee to require a dam owner (or in fact any other party) to develop and maintain such plans, although legal opinion exists that this power was implied. Some plans were produced by dam

owners and others by the SES - a situation which hints strongly at the uncertainty which existed as to responsibility for plan development.

In 1989, two new acts came into existence in NSW - the State Emergency and Rescue Management Act and the State Emergency Service Act. Under the provisions of the State Emergency and Rescue Management Act the relevant Minister is responsible for:

1. Ensuring that adequate measures are taken by government agencies to prevent, prepare for, respond to and assist recovery from emergencies, and

2. Arranging for the preparation of a State Disaster Plan (DISPLAN) which must identify, in relation to each different form of emergency, the combat agency primarily responsible.

The Act also requires the development of disaster plans at regional level and for local government areas or combinations of them.

DISPLAN recognises that the SES is the combat agency for floods, as is spelled out in the State Emergency Service Act which states that one of the functions of the SES is to 'act as the combat agency for floods (including the establishment of flood warning systems) and to co-ordinate the evacuation and welfare of affected communities'. The Act places on the Director General of the SES the power, authority and duty to ensure that the Service is capable of carrying out the function. It provides the Director General with specific directions and authority in relation to planning and preparation for floods, granting power to require other agencies to advise on or assist with the task.

Importantly, neither the State Emergency and Rescue Management Act nor the State Emergency Service Act places a limitation on the SES's role with respect to type of flood, which means that the organisation must carry out its responsibility for all floods regardless of their scale or cause. Floods resulting from or exacerbated by dam failure (or indeed generated by spills or planned releases from dams) are therefore within its sphere of activity. Given this, and given the Director General's powers in relation to planning, it follows that the requirement to prepare a flood plan can be made under the authority of The SES Act. Such authority is also provided in the State Emergency and Rescue Management Act through the Minister's responsibility for ensuring that adequate preparations are made for emergencies.

The passage of these two acts created a degree of conflict between the Dams Safety Committee and the SES in terms of their approaches to the question of planning for the protection of downstream communities and in particular as regards their views as to where responsibility for the planning work should lie. Moreover, the new legislation established a new set of emergency management arrangements for NSW and it was apparent that the activities of the Dams Safety Committee and the Public Works Department, both of which had legislated authority to declare emergencies in relation to dams, would need to be integrated within these arrangements. For one thing, it would be necessary that any declaration of an emergency at a dam be passed to emergency management authorities so that appropriate responses (including the evacuation of downstream communities) could be initiated. For another, the Dams Safety Committee and the Public Works Department needed to be informed as to what resources could be brought to bear to assist them in managing the damsite problems which created the need for the declaration itself.

In 1990, the SES embarked upon a major program of planning for all flood prone communities within the state, and sought to include within individual plans the threats created by the existence of particular dams which had been identified by the Dams Safety Committee as being 'deficient' either in structural terms or because of a lack of ability to safely pass an extreme flood. Over the next three years the organisation produced flood plans for most of its divisions (regions) and for a number of individual local government areas or localities which had particularly serious flood problems. Some of these problems were related to the existence of 'deficient' dams, the number of which was increasing as the Dams Safety Committee continued its monitoring task.

Gradually, as the SES gained experience in flood planning, it began to clarify the potential areas of conflict with the Dams Safety Committee's approach and the need to integrate the emergency management activities of the Committee with those of the new emergency management structure in NSW. In 1992 the SES proposed to the Dams Safety Committee, on which no formal emergency management agency or expertise was represented, a sub-committee to advise it on emergency management matters. Concurrently the Dams Safety Committee pushed for a national workshop in an attempt to create a nationally-accepted set of guidelines in relation to planning for areas which were threatened by dam-failure flooding. This workshop, to which representatives of various dam owners, dam safety authorities and emergency management agencies were invited, took place at the Australian Emergency Management Institute in March, 1993. The results of its deliberations are presented in another paper to this conference.

THE ESTABLISHMENT AND PURPOSE OF THE EMERGENCY MANAGEMENT SUB-COMMITTEE OF THE NSW DAMS SAFETY COMMITTEE

In NSW, the key players in the dam safety field are the owners of dams, the Dams Safety Committee (the standard-setting and monitoring agency) and the State Emergency Service (the combat agency for floods and the relevant emergency management body). All three have places on the Emergency Management Sub-Committee. The Chairman represents the Department of Water Resources, which owns most of the state's major water supply dams, and the Dams Safety Committee. NSW Public Works owns other dams and at the same time has a legislated regulatory role in relation to the large number of local government organisations which operate dams.

The sub-committee, which first met early in 1993, acts as a conduit for the passage of information between the three groups and as a forum for the discussion of procedural arrangements to guide the planning process. More formally, its function is to ensure that the state approaches emergency management related to dams in a fully integrated and comprehensive manner. To achieve this, the sub-committee will have to perform the following tasks:

1. To advise the Dams Safety Committee and dam owners on emergency management matters,

2. To advise emergency management agencies in relation to dam safety matters, and

3. To develop the detailed procedural arrangements (including statements of responsibility) required to ensure that:

    (a) The SES is able to prepare for and respond to floods caused or made worse by dam

failure,

(b) The impacts of dam emergency procedures are recognised in flood plans for downstream communities, and

(c) Appropriate emergency operations controllers are able to assist dam emergency operations by co-ordinating support for them.

To date, the sub-committee has met on three occasions. It has agreed on its functions and tasks, reported to the Dams Safety Committee on this agreement and begun to develop an agenda whereby the tasks can be carried through. This agenda can best be understood by reference to the development of ANCOLD guidelines for dam owners (dealing primarily with the protection of dams themselves) and the national guidelines for planning for downstream communities (being produced as an output from the workshop held at the Australian Emergency Management Institute in March).

THE AGENDA OF THE EMERGENCY MANAGEMENT SUB-COMMITTEE

The relationships between the deliberations of the Emergency Management Sub-Committee on the one hand and the national guidelines being produced by ANCOLD and from the AEMI workshop are illustrated diagrammatically in Figure 1. In its simplest terms, the task of the Emergency Management Sub-Committee is to convert these guidelines into specific arrangements governing the activities of dam owners and emergency managers in NSW. National guidelines by their nature are inclined to be broad in a country with several state jurisdictions with differing emergency management structures and dam safety regulatory provisions, and much remains to be done to make these guidelines workable at state level. It must be stressed, too, that the various guidelines are still at only draft stage and that further development is possible pending final acceptance. That said, it does appear that the various drafting processes have progressed far enough for the principles they espouse to be utilised with some confidence and for specific developments relevant to individual states' requirements to proceed within them.

The draft ANCOLD Guidelines on Dam Safety Management include a chapter (Chapter 8) entitled 'Dam Safety Emergency Planning'. This chapter recognises that two types of emergency plans may be required to cope with emergencies arising at dams - dam safety emergency plans and disaster plans. The former, which would need to be developed by dam owners, deal primarily with the protection of dam structures. Such plans would identify emergency conditions at damsites, prescribe the procedures to be followed by dam owners to investigate dam failures and provide warning to appropriate emergency managers so that they can implement measures for the protection of downstream communities. The second type of plan, to be developed by emergency management agencies, is to detail these protective measures.

This demarcation makes it clear that the dam owner's responsibility for the **production** of a plan is restricted to planning for the protection of the dam structure itself. Beyond that, the dam owner must communicate with emergency managers so that the latter can develop **separate** plans to protect communities downstream. These plans go by the generic term 'disaster plan', which refers to the plan or hierarchy of plans developed by state emergency management agencies or authorities to

provide for the protection of communities downstream of a dam. Terminology differs between states and territories but such plans typically include arrangements for notification, and warning and evacuating those communities or parts of communities at threat from dam failure. The plans usually fall into one of the following broad categories:

1. **Disaster Plan/Emergency Management Plan**: This is a general plan to marshall the resources of a community (usually a local government area) to prepare for, respond to and recover from incidents, disasters or emergencies. It applies the 'all hazards' approach and contains a general set of management arrangements to cope with all identified hazards and may include dam failure as one of them.

2. **Flood Plan**: This is a specific-to-hazard plan (based on a local government area, river basin or part of a river basin) for a community to prepare for, respond to and recover from the hazard of flooding. It should cover all levels of flooding, including that caused or made worse by dam failure.

3. **Special Plan/Special Flood Plan/Dam Failure Plan**: This is a specific plan developed to protect a community against the effects of dam failure because this is more appropriate in some instances than including the special arrangements in a more general flood plan.

The guidelines being produced as an output from the AEMI workshop focus, in the main, on approaches to this downstream planning. They involve principles relating to the mapping of flood events (the establishment of inundation lines and warning times for dam-failure floods, for example) the assessment of community vulnerability, the implementation of community consultation programs and the need for close community involvement in the preparation of the plans themselves. In essence, these guidelines spell out the principles of best practice for the development of disaster plans for the areas downstream of dams, including inputs to the plans and styles of planning.

Much of the work of the Emergency Management Sub-Committee in NSW will involve converting these guidelines to precise specifications which fit within the state's emergency management arrangements, and ensuring that the procedures which are specified are appropriately integrated. These tasks are identified on the right-hand side of Figure 1, and some examples may be useful to identify how they could apply in practice.

In Dam Safety Emergency Plans the requirement will be identified that information will need to be passed from a dam at which an emergency could occur to the relevant emergency management agencies. The precise specification of this requirement could involve a definition of the kinds of information which would be needed, the means of passing it, and its destination agencies both within the time of an emergency actually occurring and beforehand. Surveillance reports, for instance, could be passed from a dam to the Dams Safety Committee and the SES out of 'emergency time', and in addition to the Local Emergency Operations Controller (the key emergency responder at local level) as a serious flood was rising or when cracks were first noticed in a dam wall.

In addition, the planning process could identify resources available from a downstream community which would be of value to a dam operator attempting to protect a dam. These resources could include, for example, engineering equipment to make repairs to structures, or communications networks to monitor areas around a dam as a flood was rising. Similarly, emergency services

personnel could be given the task of keeping open or restricting access routes to a damsite.

Equally, when the disaster plan was being prepared, it might be specified that the SES or the emergency management committee for a community below a dam would be involved in the definition of the threat - for example, in helping determine the length of river reach over which inundation mapping should be required.

Figure 1 provides in schematic form the framework within which such specifications as these can be made within the state sphere. Importantly, the state-level specifications should be linked by means of a feedback mechanism to the national guidelines so they can be informed and further developed by experience within the individual state jurisdictions.

In determining which organisations should perform which tasks and to what set of management arrangements, it is likely that the negotiations between the various players will need to be carried out in a spirit of compromise. On the NSW Emergency Management Sub-Committee an immediate point of disagreement between the dams safety authorities and those representing the emergency management community related to the question of **which** dams should be planned for. The Dams Safety Committee's long-held view is that plans should be written for all prescribed dams with either 'high hazard' or 'significant hazard' ratings. The SES view is that planning should be for dams which have been defined as 'deficient', that is, with known problems which could lead to failure. Under the Dams Safety Committee prescription a very large number of plans would be required and there is a real danger that the agency responsible for the downstream planning - in NSW the SES - would never get to many of them because other, more credible and more pressing threats would intrude and necessarily take precedence.

There is a danger here that detailed planning will be attempted for threats which are very poorly defined and which are therefore not capable of being planned for to the extent that is possible when the nature of the threat is clear. Such planning may lead to - indeed is perhaps driven by - an illusion. It is all too easy to believe that the existence of some sort of plan is an alternative to good engineering at the damsite and will provide legal protection to the dam owner. Such a belief may be based upon the misguided notion that the effectiveness of a plan can be measured **with precision** in advance and can therefore be used to compensate for a deficiency at the dam itself. The reality is that in the event of dam failure, the saving of life and the lessening of damage to property will relate more directly to the effectiveness of the response operation than to any plan produced beforehand. Although it is true that a well-developed and thoroughly tested plan should lead to a more effective response, the relationship should not be regarded as axiomatic. The mere existence of a plan, therefore, should not by itself be taken as necessarily giving protection in terms of reduced liability.

There is, of course, a compromise between these differing standards of the dams safety and SES people in NSW. It relates to the **detail** to which the planning is done. In the NSW case it may be that the final agreement will be that the planning be done in considerable detail for all dams with known and defined deficiencies, with warning systems, evacuation arrangements and other procedures being described in a flood plan or a special dam-failure plan. For other dams, by contrast, the planning could be much more restricted, involving perhaps only a mention in a general Disaster Plan along with agreements for the passage of information (including surveillance reports) between players also being specified in the relevant Dams Safety Emergency Plan.

CONCLUSION

The NSW experience shows how important it is to have clearly understood arrangements which identify unambiguously who must perform what tasks and under what overall management framework. This framework must integrate the functions of disparate agencies operating under different acts. Organisations such as the Dams Safety Committee and ANCOLD are not alone when it comes to the management of dams; rather they are important members of a wider family of organisations whose ranges of activities must be integrated.

The NSW experience shows that without proper definition and integration of responsibilities, confusion is likely to reign and the passage of information will be impaired. Definition and integration do not occur by accident. They have to be deliberately sought, as they have been in NSW by virtue of the setting up of the Emergency Management Sub-Committee. Once such a group as this has been set up the confusion is relatively easy to dispel and an improved channel of communications is available whereby the various agencies have a means of learning each other's roles by discussing and exchanging reports, plans and other information. In NSW the Dams Safety Committee appears to regard the Emergency Management Sub-Committee's input as valuable, and the sub-committee has recently been converted to 'standing' status, with a continuing role. Given the number of dams which have been identified as having deficiencies, it is likely that this role will be with us for some time to come.

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