

Dams Safety Committee

Annual Report

2009/2010



ANNUAL REPORT

NSW DAMS SAFETY COMMITTEE

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BUSINESS AND SERVICE HOURS ARE NORMALLY

9.30 am to 4.00 pm MONDAY to FRIDAY

Please note that the NSW Dams Safety Committee (DSC) only has a small number of technical staff who are often away from the office on inspections. Accordingly, technical questions may not be able to be answered immediately, although every effort will be made to pass on messages to ensure a prompt response.



Cover Picture: Hume Dam. Remedial works in the Spillway Southern Junction area to improve drainage and ground support at the junction of the concrete spillway and core wall of the main embankment.

NOTE: The Committee has prepared 250 copies of this report for distribution to Parliament, relevant organizations, and the public, at a cost of \$3,260.00 (i.e. \$13.00 per copy).

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Index

A	I
Activities, nature and range..... 6	Information Sheets.....16, 29
Address.....inside cover	L
Assets..... 7, 38	Legislation.....6
Auditor General's Certificate..... 36	M
B	Management Improvement Plans and Achievements3, 11
Business and Service Hours.....inside cover	Meetings, attendance at.....10
C	Members, appointment of members, name, position, qualifications.....7
Code of Conduct..... 34	Mining.....6, 11, 27
Committee, purpose, origin..... 6	O
Contacting the Committee.....inside cover	Objectives.....3
D	Organisational Chart.....7
Dams, prescribed, statistics..... 48	P
E	Performance Measures.....11, 12
Emergencies..... 7, 25	S
Equal Employment Opportunity (EEO)..... 34	Staff, name, position, qualifications.....9
Ethnic Affairs (including EAPs)..... 34	Sub-committees.....10
F	T
Freedom of Information..... 34	Telephone of Office..... inside cover



NEW SOUTH WALES

ABN 55 079 703 705

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Minister for Water
Parliament House
SYDNEY NSW 2000

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Our Ref: 10.102.007

Dear Mr Costa,

We have pleasure in submitting to you, for presentation to Parliament, the NSW Dams Safety Committee's Annual Report for the year ended 30th June 2010.

This Annual Report has been prepared in accordance with the *Annual Reports (Statutory Bodies) Act 1984* and the *Annual Reports (Statutory Bodies) Regulation 2005*.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'B Cooper'.

Brian Cooper
Chairman

A handwritten signature in black ink, appearing to read 'JRGleeson'.

Jeffrey Gleeson
Deputy Chairman

CONTENTS

Index.....	Inside Front Cover
-------------------	---------------------------

Overview by Chairman..... 3

Our Objectives	3
Targets	3
Highlights	3
Our People	4
Our Stakeholders	4
The Future.....	4

1. Charter 6

1.1. Why do we have a Dams Safety Committee (DSC) in NSW?.....	6
1.2. What Legislation defines our Functions?	6
1.3. What are the Functions of the DSC?	6

2. Access..... 6

3. Aims and Objectives..... 6

4. Management and Structure..... 7

4.1. Committee Members	7
4.2. Committee Staff	9
4.3. Sub-committees.....	10
4.4. Meetings	10

5. Summary Review of Operations..... 11

5.1. Major Achievements for 2009/2010	11
5.2. Performance Indicators.....	11
5.3. Budget Highlights.....	11

6. The Future 13

6.1. Dams Safety Management.....	13
6.2. Mining Management near Dams	14
6.3. Administration and Information Systems	14

7. Review of Operations..... 15

7.1. Dams Safety Management.....	15
7.2. Regulation of Mining near Dams	27
7.3. Information Systems.....	30

8. Stakeholders 31

8.1. Liaison with Stakeholders.....	31
8.2. Education and Training of Members & Staff	33

9. Administration and Human Resources 34

10. Finance 35

10.1. Dams Safety Committee Certificate	35
10.2. Auditor General's Certificate.....	36
10.3. Audited Financial Report	38
10.4. Internal Audit & Risk Management Attestation for the 2009/10 Financial Year	46
10.5. Dams Safety Committee 2009/2010 – Budgetary Information	47

Appendix A – Dam Owner Summary 30 June 2010 47

Appendix B – 2010-Current Prescribed Dams in NSW 48

LIST OF TABLES

Table 1	Budget Highlights.....	11
Table 2	DSC Performance Indicators.....	12
Table 3	Guidance Sheets for Dams Safety.....	15
Table 4	Dams Modified for Safety Upgrading	20
Table 5A	Status of Upgrading Activities for Dams under DSC Review	21

Table 5B	Status of Activities on Dams issued on S18 Show Cause Notices.....	21
Table 6	Guidance Sheets for Mining near Dams	29
Table 7	Mining in Notification Areas.....	29
Table 8	Monitored Approved Mining 2009/2010.....	29

Overview by Chairman

Our Objectives

Our objectives are defined in the Strategic Plan for 2009 to 2014 developed by the Dams Safety Committee (DSC) in 2009 and are summarized in our Mission Statement, Vision and Key Goals. The mission of the NSW Dams Safety Committee (DSC) is to ensure the safety of dams. The objectives of the DSC are aligned with the requirements of the *Dams Safety Act, 1978* which constitutes the DSC and defines its functions. How these functions are carried out is further described in the Strategic Plan. In order to achieve its mission, the DSC follows a goals-based approach to dam safety regulation. With goals based regulation, the means of achieving compliance is not specified but goals are set that allow alternative ways for achieving compliance. The responsibility for dam safety lies principally with the dam owner while the DSC has a challenge role.

The roles of the DSC are to:

- Protect the safety, welfare and interests of the community from dam failure by ensuring that risks from prescribed dams are tolerable;
- Ensure that DSC safety requirements are met, that risks are properly managed, are regularly reviewed, and are further reduced if reasonably practicable; and
- Protect the security of dams and their stored waters from the effects of mining or other activities.

The DSC is empowered with various enabling functions under the *Mining Act 1992* in its role of regulating mining under stored waters to fulfill the last mentioned role.

While there have been no failures of prescribed dams in NSW, there have been some safety-related incidents. There have also been dam failures in other States and in both developed and undeveloped countries overseas. It is therefore internationally recognized that systematic dam safety programs are needed which involve risk assessment, responsible operations, maintenance and emergency preparedness measures, regular surveillance, periodic safety reviews and implementation of required risk reduction measures.

For the effects of mining under stored waters or near dam structures, there is limited guidance from international practice. Over time, the DSC has extended the existing scientific knowledge of these effects through careful monitoring of mining in the vicinity of NSW dams. The resulting DSC requirements enable the extraction of coal and mineral resources from more extensive and challenging mining operations around and under dams, with minimal effects on the dams and their storages leading to significant economic benefit to the State.

Targets

The DSC's targets are presented in Sub-section 5.2, Table 2, of this report. The main focus is on the maintenance of the programs for Surveillance Reports and Dam Safety Emergency Plans, and on dam owners having schedules agreed upon with the DSC for activities leading to safety improvements on dams with significant deficiencies. In this way the DSC can monitor progress and follow-up issues in a timely manner. The targets stated in the DSC's Strategic Plan were substantially met.

Highlights

The DSC started implementing the strategies and programs presented in the Strategic Plan developed in 2009. The Strategic Plan contained a Business Plan for 2009/2010 and the DSC has been working in accordance with this Business Plan.

The highlight of the year was the seminar that the DSC held to explain its new and revised Guidance Sheets that had just been posted on the DSC's website. The seminar was attended by some 138 dam owners, their consultants and others involved in dam safety. The DSC expressed its gratitude to Minister Costa for opening the seminar and giving his thoughts on the importance of dam safety and dam safety regulation. Feedback indicated that the seminar was a success.

The major water storages in NSW remained at relatively low levels. There was no major flood inflow to these storages and no significant earthquakes. Consequently, the safety of these major storages was not threatened during the year. Some smaller dams did have significant rain on their catchments and were considered to be at a heightened level of risk.

The year 2010 saw the DSC issue its first Section 18 Notice under the NSW Dams Safety Act, 1978. On previous occasions, the DSC has issued dam owners with a 'show cause' as to why a Section 18 Notice should not be issued. On this occasion though, the urgency and seriousness of the situation demanded that the Section 18 Notice should be issued forthwith. The DSC appreciates the cooperation given to it by the dam owner and the local council, in resolving the issue to the DSC's satisfaction.

State Water Corporation embarked on the construction phase of its dam upgrade program. Construction at Blowering, Keepit, Hume and Burrendong Dams is underway with construction at Chaffey and Copeton Dams soon to start. The DSC thanks State Water Corporation for the cooperation it has given to the DSC in proceeding with its dam upgrade program.

Mid-western Regional Council has committed to complete a construction program for Redbank Creek Dam (a dam the DSC considers as having a high priority for safety upgrading). This program will provide an interim safety upgrade consistent with the DSC's attitude to progressive safety upgrades. Council will also investigate whether the upgrade will satisfy the DSC's requirements for a long term solution.

During the year, the DSC was made aware of small, non-prescribed dams that experienced piping incidents. This gave the DSC some concerns as to other dams that could pose a risk to downstream residents and should be prescribed. The DSC is following up this matter.

Mining continued around and under stored waters at a high rate throughout the year. Further notification areas around dams were established due to the additional numbers of mining applications made. Approximately 14.5 million tonnes of coal was extracted from near and under storages (water, tailings and ash storages). This was the same order as the previous year and over thirty times the tonnage extracted in 2003/2004. As an example of longwall mining within Notification Areas around major water storages, the Dendrobium Mine completed further extraction from Cordeaux Dam Notification Areas without adverse effects.

Our People

The DSC members kept their knowledge up-to-date by various professional technical activities external to the DSC including defensive driving and first aid courses. The DSC has members on the Board of the Mine Subsidence Technological Society and Engineers Australia, and continues to be involved in ANCOLD (Australian National Committee on Large Dams) and ICOLD (International Commission on Large Dams) matters with one member also on the ANCOLD Executive. Most DSC members and some technical staff attended the 2009 ANCOLD Conference on Dams in South Australia. ANCOLD Conferences provide valuable forums for exchange of information and updating on dam safety issues as well as providing the annual opportunity for dam safety regulators nationwide to meet and review pertinent issues. Other training for members and staff included attendance at various relevant seminars and refresher courses.

The new executive (Chairman, Deputy Chairman and Executive Engineer) worked through its first full year of operations. The DSC lost its Senior Geologist to the private sector, but the remaining geologists have stepped up to the mark. Once again, the DSC wishes to record its appreciation of the loyalty and dedication of its staff in meeting a large workload with few people.

Our Stakeholders

The DSC values a good working relationship with dam owners, mining companies, and their consultants. By this means the DSC can communicate its goals and requirements to engage co-operation in achieving dam safety. Once they understand the DSC's safety benchmarks, most dam owners and mining companies recognize their responsibilities and liability, and have a strong commitment to dam safety. Regular contact with dam owners and mining companies gives the DSC an opportunity to gauge the level of satisfaction of these key stakeholders.

Education of dam owners and operating staff is especially valuable in improving dam safety. The DSC has completed the revamp of its Guidance Sheets. The new Guidance Sheets have now been posted on the DSC's website. The DSC also assists stakeholders in obtaining relevant dam safety literature and, as in previous years, dam operator training courses were conducted by DSC staff and one member this year.

The Future

The DSC has effectively completed incorporating the safety principles of its new policy framework into its revised and new Guidance Sheets. Stakeholder consultation will continue in the coming year to gauge the success of the revised and new Guidance Sheets. The DSC will continue to engage with other NSW safety, environmental and economic regulators to ensure that the Guidance Sheets fit within a consistent regulatory approach.

Support of research on dam related matters will continue. The DSC will continue to financially support a number of dam safety related research projects being developed at the University of New South Wales.

As previously mentioned, the DSC is aware that a number of small dams may have bypassed its prescription process. Consequently, it will write to local government authorities asking for information on Development Applications. This information will help the DSC determine whether dams included in Development Applications and not separately advised to the DSC, should be prescribed under the NSW Dam Safety Act, 1978.

The DSC will continue to strengthen its information exchange program with other State dam safety regulators on those dams whose failure could adversely affect NSW communities and on allied regulatory matters.

The DSC's 2009/2014 Strategic Plan will be implemented progressively and efforts will continue in the search for a budgetary mechanism that can cope with marked fluctuations in mining activities. The Business Plan incorporated in the Strategic Plan will be updated for the 2010/2011 financial year. In addition, the DSC continues to investigate strategies for dealing with impending generational change impacts on the DSC. With the overhaul of the DSC policy framework and the development of detailed safety benchmarks and guidance completed, the DSC feels that New South Wales is now a world leader in dam safety management.

The risk imposed by dams in NSW, continues to be steadily reduced. Dam safety management programs are well established for all prescribed dams and will be further improved. One State owned corporation is well into a major construction program upgrading its dams. Because the consequences of failure for some dams would be catastrophic, the likelihood of their failure needs to be very low – in the order of one chance in a million per annum in some cases. All prescribed dams now have a quite low likelihood of failure but some still need further risk reduction as soon as reasonably practicable, in accordance with programs agreed with the DSC. With a new approach to dam safety reviews, risk assessments, and implementation of Dam Safety Emergency Plans, the status of dam safety in NSW now compares very favourably with that of the best dam safety programs world-wide.

The DSC's follow-up action together with streamlined approaches and with its new approach to external peer review, are expected to improve the processing of Surveillance Reports, design reviews and Dam Safety Reviews in the coming year.



Brian Cooper, Chairman



Minister for Water, The Hon. Phillip Costa DipEd MP opening the DSC's June 2010 Seminar on its new Risk Management Policy Guidance Sheets.

1. Charter

1.1. Why do we have a Dams Safety Committee (DSC) in NSW?

In the 1970's, international concern at several major overseas dam failures led to the Australian National Committee on Large Dams (ANCOLD) raising the need for dam safety regulation across Australia. There was also significant consideration by the NSW Government as to the extent of mining that should be permitted adjacent to Sydney's major water storages. Against this background, the NSW Government constituted the NSW Dams Safety Committee (DSC) under the *NSW Dams Safety Act, 1978*.

Similar legislation has been progressively implemented interstate and overseas on a basis best summed up by Jenny Bacon (UK Health and Safety Executive Director General, 1999) who noted that *"It is the nature of risk that, frequently, those who create the risk do not bear its consequences or the wider costs. So the market does not function properly as a distributive mechanism. The State must intervene to regulate risk"*.

1.2. What Legislation defines our Functions?

The DSC has statutory functions under the *Dams Safety Act 1978* and *Mining Act 1992*.

1.3. What are the Functions of the DSC?

Amongst other things, the DSC is required to *maintain a surveillance of prescribed dams, to examine and investigate the location, design, construction, reconstruction, extension, modification, operation and maintenance of prescribed dams, to obtain information and keep records on dams and to formulate measures to ensure the safety of dams in NSW*. It "prescribes" those dams with a potential for failure that could threaten downstream life, cause extensive property or environmental damage, or have a severe impact on the public welfare.

Currently there are 360 prescribed dams (see Appendix B and centre pull-out map).

For prescribed dams, the DSC adopts a monitoring role to ensure the owners of those dams, and organizations (eg mining companies) undertaking significant activities near their storages, conform to appropriate safety benchmark throughout each dam's life.

The DSC's aim is that the risks from dams to the community and to the environment will be tolerable low for prescribed dams. In this context, a "safe" dam, or associated activity, is one that complies with the DSC's safety benchmarks.

2. Access

The DSC's access details are outlined in the inside front cover of this report.

3. Aims and Objectives

In interpreting its legislative charter, the DSC has adopted as its mission "to ensure the safety of dams and for mining that could affect dams or their stored waters."

Relevant to this mission statement, the objectives of the DSC are to:

- Protect the safety, welfare and interests of the community from dam failure by formulating measures to ensure that risks from prescribed dams remain tolerable over the long-term, that the risks are regularly reviewed, and further reduced if reasonably practicable;
- Maintain an ongoing surveillance of prescribed dams and their safety throughout each dam's life;
- Keep up-to-date on all relevant aspects of dam safety management; and
- Protect the security of dams and their stored waters from the effects of mining or other activities.



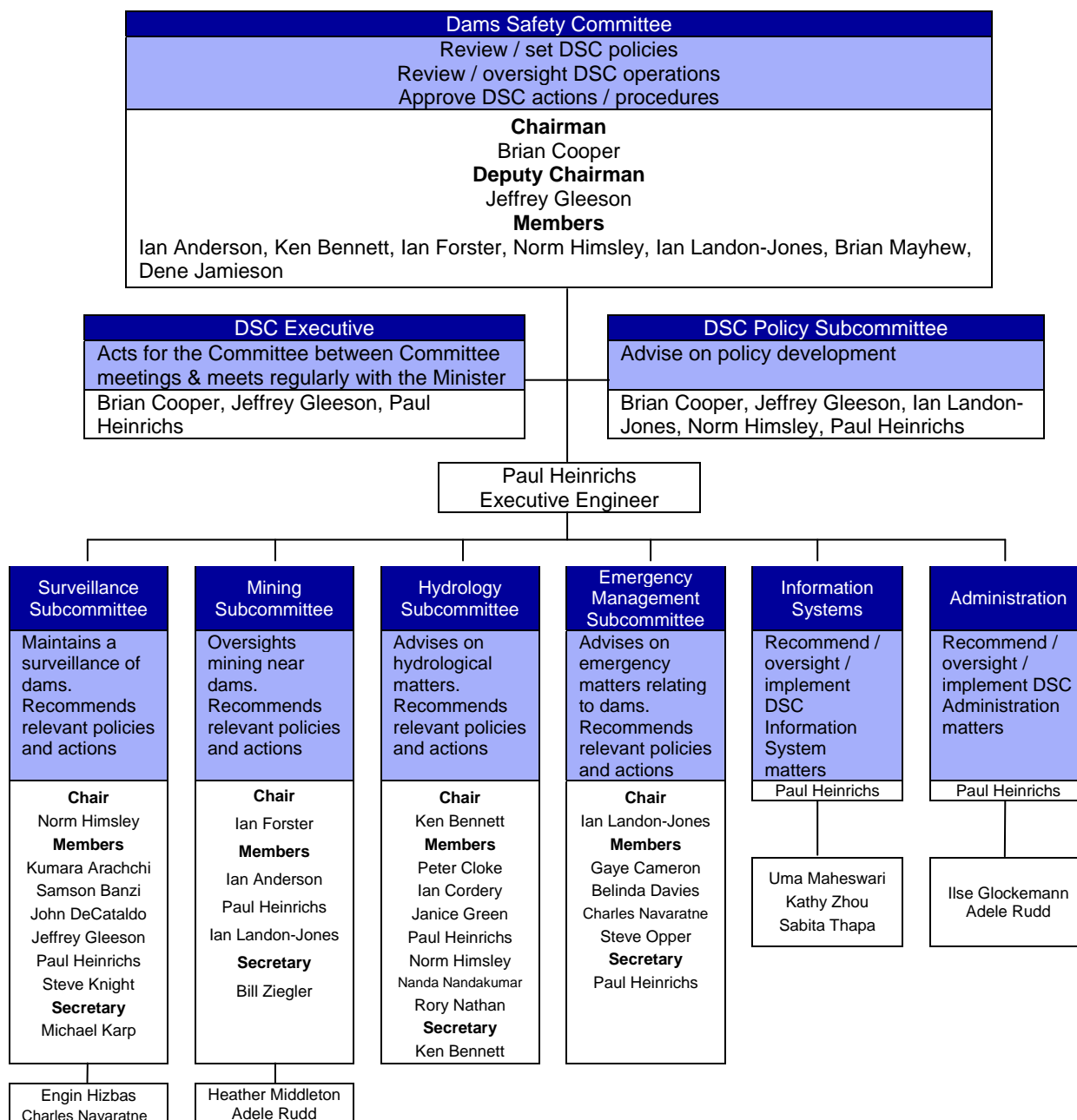
Lake Liddell Dam

This dam in the Hunter Valley is the key water supply storage for Bayswater and Liddell Power Stations. The DSC has Prescribed this dam and requires the owner to maintain a regular surveillance regime to ensure its continuing safety and functionality.

4. Management and Structure

The DSC is a small statutory body with negligible assets or property. It uses staff provided through the Department of Environment, Climate Change and Water (DECCW) and hires contract staff when required. It operates through two Standing Sub-committees (Dam Surveillance and Mining), along with ad hoc Advisory Sub-committees (Policy, Hydrology and Emergency Management). The following chart outlines its organization with most business dealt with initially by its Sub-committees, which report to Committee meetings.

Dams Safety Committee Organization Chart
(as at 30 June 2010)



4.1. Committee Members

The DSC's nine part-time members are appointed by the Minister for Water for four-year terms with eight members nominated for their experience in dams engineering and one for experience in coal mining. In routine matters, the Executive Engineer and standing Sub-committees act for the DSC, while its Executive deals with urgent business or emergencies between DSC meetings. Policy initiatives originate at any level, but are developed by the Policy Sub-committee before submission for DSC approval.



Brian Cooper



Jeffrey Gleeson



Ian Anderson



Ian Forster



Ian Landon-Jones



Brian Mayhew



Norm Himsley



Ken Bennett



Dene Jamieson

Committee membership during 2009/2010, with brief member biographies, was as follows:

Brian Cooper, BE (Hons), MEngSc, Grad Dip Eng Mgt, MIEAust, CPEng (appointed to December 2012). **Chairman** from 1 April 2009, Nominee of Engineers Australia. Initially appointed 1997. In 2006 Brian retired from his position as Principal Engineer, Dam Safety, with the Department of Commerce and now practices as a private dam safety consultant with over thirty years water industry experience including extensive dam design works with the Department of Public Works and Services and the Water Resources Commission.

Jeffrey Gleeson, BE Civil, FIEAust, CPEng (appointed to December 2013). Deputy Chairman, Nominee of Hunter Water Corporation. Initially appointed 1990. Jeff is Manager, Engineering with Hunter Water Australia. He has over twenty-five years experience in the water and waste-water field with involvement in various aspects of dam engineering and structural design. He is a member of the DSC's Surveillance Sub-committee.

Ian Anderson, BE (Hons1), ME (Mining), Certificated Coal Mine Manager, Undermanager & Mines Rescueman, Qualified Mine Ventilation Officer (appointed to June 2014). Nominee of the Minister for Mineral Resources. Initially appointed 1994. Ian is a Senior Inspector of Coal Mines with the Department of Primary Industries. He has over thirty years experience in coal mining and is a member of the DSC's Mining Sub-committee.

Ian Forster, BSc, MAIG, RPGeo (appointed to October 2011). Nominee of the State owned Electricity Generators. Initially appointed 1989. Ian is a specialist dam safety consultant with Aurecon responsible for the safety management of dams owned by the NSW State-owned power generators. Ian has over thirty years experience in dam safety management, geotechnical engineering and hydrogeology. He is Chairman of the DSC's Mining Sub-committee and a board member of the Mine Subsidence Technological Society.

Ian Landon-Jones, BE (Hons), MEngSc, MIEAust, CPEng, MAICD (appointed to December 2012). Nominee of Sydney Catchment Authority (SCA). Initially appointed 2001. Ian is General Manager, Technical Services with the SCA with over thirty years experience in the water and dams engineering fields, in the SCA and previously with Sydney Water, with involvement in various aspects of dam engineering and structural design. He is Chairman of the DSC's Emergency Management Sub-committee and a member of the Mining Sub-committee and Junior Vice Chairman of ANCOLD.

Brian Mayhew, BE (Hons1), GradDipMaths, MIEAust, CPEng (appointed to June 2011). Nominee of Snowy Hydro Ltd. Initially appointed 2007. Brian is the Manager, Civil Infrastructure and Dam Safety, with Snowy Hydro. His has over twenty-five years experience in the water and mining infrastructure fields.

Norm Himsley, BE (Hons), MEngSc, GradDipMgt, MIEAust, CPEng (appointed to June 2013). Nominee of Engineers Australia. Initially appointed 2009. In 2009 Norm retired from his position as Executive Engineer of the NSW Dams Safety Committee and now practices as a private dam safety consultant with over thirty five years experience in the water and construction industry and extensive involvement in the investigation, design and construction of dams.

Ken Bennett, BScEng (Civil), MIEAust, CPEng (appointed to March 2011). Nominee of the Water Administration Ministerial Council. Initially appointed 2009. Ken recently retired as the Dam Safety Manager of State Water Corporation with over thirty years dam investigation and design experience and is Chairman of the DSC's Hydrology Sub-committee.

Dene Jamieson, BE (Civil) (appointed to December 2012). Nominee of Minister for Commerce. Initially appointed 2009. Dene is a Senior Engineer in the Dams and Civil Section of the Department of Services, Technology & Administration with over thirty years experience in dams and the water industry.

4.2. Committee Staff

The Committee is assisted by a staff of eleven seconded from, or employed through the Department of Environment, Climate Change and Water with temporary staff assistance as required, primarily in recent years to cater for a burgeoning workload in mining related matters. Given the extensive workload of the DSC's activities, this small staff provides an effective and efficient service to the DSC's functions. During the year the DSC staff comprised:



Paul Heinrichs

Executive Engineer: Paul Heinrichs

BE, MEngSc, MIEAust, CPEng (seconded 2009). Paul has over thirty-five years, design, construction, surveillance and management experience in dams, water and structural engineering. He was formerly the Manager Dams Safety for the NSW Office of Water, managing the dam safety program for Local Water Utility dams.



Bill Ziegler

Surveillance Engineer: Michael Karp

BE (Hons), MIEAust (seconded 1999). Michael has over twenty-five years design, construction and surveillance experience in water and dams engineering.



Michael Karp

Engineering Geologist and Information Systems Coordinator:

Peter Reid (on extended leave since January 2009)



Heather Middleton

Manager Mining Impacts: David Hilyard

(resigned from the DSC in May 2010)

BA (Hons), MAppSci (started 2003). David has over thirty years mining and geological experience.



Peter Reid

Tailings Dam Engineer: Engin Hizbas

BE, MIEAust, CPEng (seconded 2003).

Engin has over twenty-five years of experience in investigation, design, construction and project management in civil engineering and dams.



Ilse Glockemann

Small Dams Engineer: Charles Navaratne

BScEng (Hons), CEng MIE (SL) (started April 2009).

Charles has over twenty-five years of experience in civil engineering design, construction and management.



David Hilyard

Mining Project Officer: Bill Ziegler

(Currently Acting Manager Mining Impacts). BE (started April 2008).

Bill has over 20 years of experience in NSW coal industry.



Uma Maheswari

Project Officer – Mining Regulation: Heather Middleton

(Currently Acting Mining Project Officer)

BSc (started May 2009). Heather has over fifteen years geological and geotechnical experience.



Engin Hizbas

Administrative Officer: Ilse Glockemann

(Seconded 1995).



Kathy Zhou

Information Systems Officer: Uma Maheswari

(Seconded 2001)



Adele Rudd

Database Support Officer: Kathy Zhou

(started December 2006).

Clerical Support Officer: Adele Rudd

(started April 2008).



Charles Navaratne

IT Support Officer: Sabita Thapa

(started July 2009)



Sabita Thapa

4.3. Sub-committees

There are two standing Sub-committees, one on Dam Surveillance and one on Mining. There are three ad-hoc Sub-committees, on Policy, Emergency Management and Hydrology, which meet as required. Membership of the Sub-committees is outlined in the DSC's organization chart (see page 6).

Mr Heinrichs has been appointed to each of the Sub-committees for his technical input, and to provide effective liaison between the Sub-committees and the Committee. He also provides an important role of liaison with dam owner personnel and other stakeholders.

4.4. Meetings

The Committee held eight normal meetings during the year, of which six were in Sydney and one each near Cabramurra and Mudgee, in association with dam inspections. Attendance at Committee meetings was as follows:-

• Mr. B. Cooper (Chairman)	attended 7 out of 8
• Mr. J. Gleeson (Deputy Chairman)	attended 6 out of 8
• Mr I. Forster	attended 7 out of 8
• Mr I. Anderson	attended 6 out of 8
• Mr I. Landon-Jones	attended 7 out of 8
• Mr B. Mayhew	attended 8 out of 8
• Mr. D. Jamieson	attended 6 out of 8
• Mr. K. Bennett	attended 8 out of 8
• Mr. N. Himsley	attended 7 out of 7

There were 8 Surveillance, 7 Mining, 2 Emergency Management, 4 Hydrology, 4 Policy and 4 Executive Sub Committee meetings during 2009/10.



DSC meeting at Mid Western Regional Council Chambers in Mudgee in June 2010. The DSC has two meetings each year in a regional centre.

5. Summary Review of Operations

“Management of a substantially increased workload largely due to the current mining boom”



Blowering Dam

A State Water dam near Tumut is in the process of being upgraded for upper level piping protection as well as spillway training wall modifications to increase the dam's flood security.

“Finalization and implementation on the DSC website of a suite of Guidance Sheets”

5.1. Major Achievements for 2009/2010

During the year the following milestones and deliverables were attained:

- Management of a substantially increased workload largely due to the current mining boom, a transfer of functions from the NSW Office of Water and the implementation of a risk based approach to dam safety management, within a modest budget;
- Finalization and implementation on the DSC website of a suite of Guidance Sheets to assist dam owners, and associated entities, in their incorporation of risk assessment practices into dam safety management in NSW, following the policy framework endorsed by the NSW Government in August 2006;
- Good progress in reducing the risks posed by deficient dams in NSW with the continuation of upgrading of Blowering Dam, completion of the upgrading of Rocky Creek Dam and finalization of the upgrading proposal for Redbank Creek Dam; and removal of the high risk Bulli Upper Rail Embankment (subject to S18 notice).
- Substantial compliance with core business activities, as in Table 2 following;
- Development of Risk based investigations and approvals for an unprecedented number of technically challenging applications for coal mining near dam storages;
- Running of three training courses for dam operators and assisting major dam owners in their training programs;
- Upgrading and consolidation of the DSC office and computer systems;
- Upgrading and documentation of DSC procedures;
- Provision of a new DSC website and upgrading the DSC's record and database systems, to comply with the State Records Act 1998.

5.2. Performance Indicators

During the year the DSC monitored performance indicators, which gauge the achievement of its objectives, as shown in the following Table 2 and Figure 1. These indicators illustrate how the DSC has effectively managed a marked increase in workload within its modest budgetary program. Due to the nature of the DSC's work, and the relatively small size of its organization, quantitative indicators are often not entirely appropriate and some of its significant indicators are therefore qualitative.

5.3. Budget Highlights

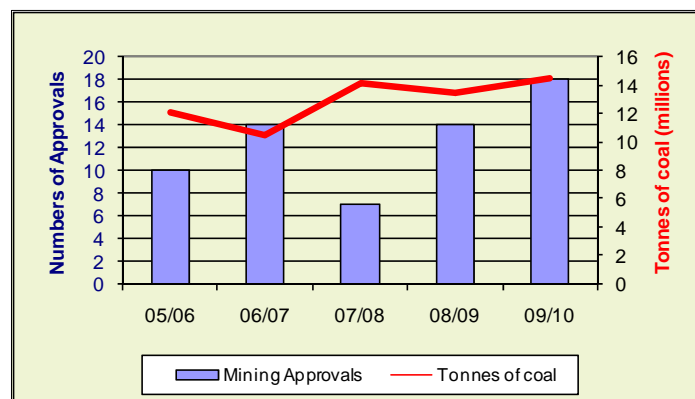
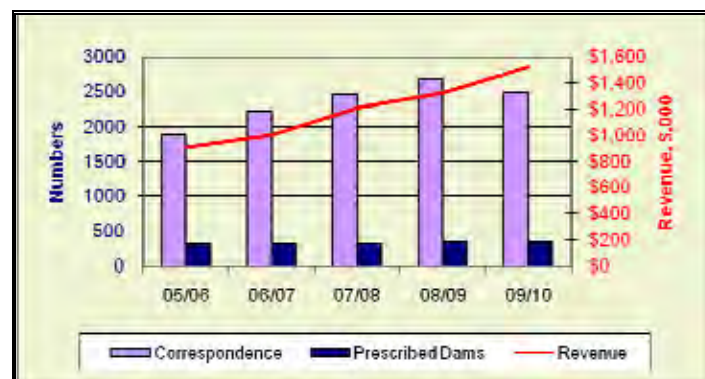
A summary of the DSC's financial performance is shown in Table 1 with full details given in Section 10 of the report. Budgeted expenditure is used, as the performance yardstick, as DSC expenses were met from DWE's funding allocation.

Table 1 – 2009/10 Budget Highlights

Item	\$
Budget	1,344,000
Actual Income	1,520,000
Actual Expenditure	1,499,000

Table 2 - DSC Performance Indicators

#	PERFORMANCE TARGET	PERFORMANCE INDICATOR	RATING
1	Owners programs, agreed by DSC, for safety improvements to significantly deficient dams	Percentage of significantly deficient dams with agreed programs	95% (Good)
2	Follow up action taken within 3 months	Percentage performance	80% (Satisfactory)
3	Reports/programs review & respond < 3 mths	Percentage performance	100% (Excellent)
4	Inspect significant risk dams (20) yearly	Number inspected this year	8 (Poor)
5	Inspect medium risk dams (15) every 2-3 years	Number inspected this year (average 6 per year)	6 (Average)
6	Inspect low risk dams (330) every five years	Number inspected this year (average 66 per year)	80 (Excellent)
7	Request programs for preparation of dam safety documentation for each dam	Percentage of dams with documentation requested	100% (Excellent)
8	Update DSC information material every 2 yrs	Time since last update issued	Website updated (Good)
9	Provide at least one dam safety education course in NSW each year	Number of courses this year	3 (Excellent)
10	Compliance with approved DSC budget	Percentage deviation	<1% (Excellent)
11	Surveillance Sub-committee	Subjective based on policy progression, reports reviewed (average 73 reports/yr) and follow ups	Good, given high workload (70)
12	Mining Sub-committee	Subjective based on monitoring compliance, matters followed up and mining impacts as predicted	Satisfactory, given high workload
13	Process of all Applications received	Percentage of applications received finalized	90 (good)
14	Review all monitoring data received	Percentage performance	95% (good)
15	Process all SMP / Part 3A / Titles	Percentage performance	95% (good)
16	Hydrology Sub-committee	Subjective based on policy progression, research oversight and updating of procedures	Satisfactory
17	Emergency Management Sub-committee	Subjective based on policy progression, coordination of matters and emergency plans implementation. Number of DSEPs required	Good
18	Compliance with Records Management Standards	Subjective based on progression in updating procedures and systems, and programs achieved	Good
19	Administration	Subjective, based on meeting HR, accounting and logistical needs of the DSC	Good

Figure 1-DSC Summary Statistics

6. The Future

“Implement its dam safety policy incorporating the 24 new Guidance Sheets on updated safety requirements”

“Work with NSW dam owners to ensure appropriate dam emergency and security arrangements are in place”



Orange Stormwater Harvesting Dam (Orange City Council)

DSC staff inspecting the seepage monitoring equipment on this newly prescribed dam.

6.1. Dams Safety Management

The DSC expects the number of prescribed dams in NSW will grow and existing dams will require safety improvements to meet community expectations. The DSC's main objective is to ensure that all prescribed dams present a tolerably low risk to downstream residents, property, the environment and associated community interests.

In particular, the DSC will:

- Implement its dam safety policy incorporating the 24 new Guidance Sheets on updated safety requirements (e.g. *Management of Dam Safety Risks and Demonstration of Dam Safety*).
- Continue to engage with other NSW safety, environmental and economic regulators, such as Department of Environment and Climate Change and Department of Planning to ensure that DSC requirements fit within a consistent regulatory framework;
- Continue liaison with dam safety regulators in other States;
- Continue to monitor activity programs for safety improvements to NSW dams identified as not meeting DSC safety requirements (Tables 5A/B);
- Continue to work with dam owners in assessing the priority and urgency of safety improvements and activities, in order to achieve the optimum risk reduction with the available resources;
- Continue to support research into dam safety risks, in particular methods for assessing the vulnerability of dams to piping (internal erosion);
- Work with NSW dam owners to ensure appropriate dam emergency and security arrangements are in place with Dam Safety Emergency Plans regularly updated and exercised. Liaise with the State Emergency Service (SES) to facilitate these arrangements;
- Continue to ensure dam owners have in place current Operation and Maintenance Manuals for their dams;
- Maintain liaison with NSW dam owners and continue the emphasis on education, including arranging training courses for dam owner's personnel. The DSC will also arrange staff and members presentations at meetings and conferences on relevant dam matters, and provide input to ANCOLD Guidelines;
- Continue to advise dam owners of the value of installing rainfall and flow monitoring equipment to enhance catchment/storage management and flood warning, and to assist in flood analysis and design. The DSC will continue to promote research into flood estimation and probability;
- Support expansion of the earthquake monitoring network in NSW and collaborate with other agencies in the development of improved dam seismic analysis, relevant to Australian earthquake characteristics;
- Review and update DSC internal management procedures; and
- Investigate the vast number of non-prescribed dams and retarding basins to determine if any of these dams present a risk to the community and thus need to be prescribed.

6.2. Mining Management near Dams

The current world economic situation has had no significant effect on the number of applications by coal mines in NSW, to mine within Dam Notification Areas. The number of applications to mine within Notifications has remained at historically high levels. As one mining project winds down, more major projects are planned to start. There is also a lag time between the cessation of mining and monitoring, so it is likely the current high workload will continue for some years.

The DSC's objective is to advise on mining regulation so as not to restrict extraction of NSW coal resources, within the constraint that risks to dams, and their stored waters, are tolerable. It continues to urge mine owners to develop a more scientific approach to prediction of the effects of mining, with the result there has been an increasing sophistication of mining applications reviewed by the DSC. At the same time, DSC staff have been developing more sophisticated risk analysis tools as an aid to managing the impacts of mining. In addition, improved knowledge and technology is resulting, over time, in the DSC having improved confidence to support the extraction of extra coal from under NSW storages, in situations where mining would not have been approved in earlier years.

The DSC's ongoing initiatives to achieve its objective are to:

- Investigate and progressively implement applications of risk management to various aspects of mining developments, and monitor practice and update guidelines accordingly;
- Revise its Guidance Sheets on administration of mining near prescribed dams, management of mining, and contingency and closure plans for mining;
- Ensure adequate protection of dam walls and stored waters by reviewing the maximum extent of ground movements induced by coal mining and, if necessary, increasing the size of Notification Areas;
- Push for adequate security deposits to be held by the State to allow for the timely implementation of dam safety mitigation works in the event that the safety of a prescribed dam or its storage is threatened by mining;
- Promote compliance within the mining industry, and understanding within other Government agencies, of the DSC's mining management requirements through SMP process involvement, and ongoing interaction with stakeholders;
- Explore the use of new equipment and techniques for prediction and monitoring, to provide a clearer picture of mining induced ground behaviour.

6.3. Administration and Information Systems

The DSC will maintain a commitment in 2010/11 to ongoing implementation of Total Quality Management principles into its business planning process, with procedures and practices formalized and updated progressively.

The installation of a Server and DSC database resulted in producing a number of products including Correspondence System, Dams Database, Files and Records management system. The DSC's Geographical Information System was extended to the user level. Desktop hardware and software were upgraded. Overdue Surveillance Reports are now tracked using the database.

Several training programs were conducted to facilitate effective and safe work practices.

New Guidance Sheets that were formulated based on risk based regulation were formatted and uploaded onto the website. A Risk Based Regulation Seminar was held in June to update dam owners and consultants on the essential features of these new Guidance Sheets. Better methods and procedures have been developed to track budget and payments.

“Progressively implement applications of risk management to various aspects of mining developments”



**Upper Cordeaux No. 2
(Sydney Catchment
Authority)**

There is a notification area around this dam within which the DSC has approved mining by Dendrobium.

“Installation of a Server and DSC database resulted in producing a number of products including Correspondence System, Dams Database, Files and Records management system”

7. Review of Operations

7.1. Dams Safety Management

7.1.1. What Dams are under Surveillance?

The DSC is required to *maintain a surveillance of prescribed dams, to examine and investigate the location, design, construction, reconstruction, extension, modification, operation and maintenance of prescribed dams, to obtain information and keep records on dams and to formulate measures to ensure the safety of dams* in NSW. The state has tens of thousands of dams, predominantly farm dams. Because the DSC interprets its charter as being to protect life and significant property, environmental and other community interests, it only “prescribes”, and maintains surveillance of the safety of those 360 dams with potential for significant failure consequences, as detailed in Appendix B.

7.1.2. Policies and Procedures that Apply to Dams Safety Management

After being informed of a proposed dam, the initial DSC decision is on the need, or otherwise, for prescription of the dam. These matters are outlined in the DSC’s Guidance Sheet - DSC1A. Then for prescribed dams, as shown in the chart below, the DSC has a range of policies and procedures that facilitate its interactions with dam owners and other affected organizations at all stages of the life of that dam.

Interaction of DSC Over Dam Life Cycle

Phase	Interaction
Investigation	Owners provide proposed dam details DSC decides on prescription and provides ongoing requirements (see DSC2B)
Design	DSC reviews suitability of design team DSC requires design report and reviews major design standards (does not review details)
Construction	DSC requires designer involvement during construction in particular to approve any changes DSC requires Construction Report and Construction Completion Certificate, certifying the designer’s agreement with changes during construction
Commissioning	DSC requires Surveillance Report one year after construction DSC requires Operation & Maintenance Manual DSC requires Dam Safety Emergency Plan if downstream lives at risk
Operation	DSC requires regular surveillance and reporting by the owner DSC conducts random checks of compliance DSC requires submission of Surveillance Reports at regular intervals (usually 5 yearly) DSC requires Safety Reviews at regular intervals (usually 15 to 20 year intervals) unless needed sooner
Modifications	DSC requirements similar to that for new dam
Decommissioning	DSC reviews proposal DSC requires decommissioning report

For further information on DSC dam safety regulation policies, refer to our Guidance Sheets listed below & available on our website www.damsafety.nsw.gov.au.

Item	Page
1 → Introduction	25
2 → DSC Internal Procedural Arrangements	25
3 → Notes on Flow Chart	25
4 → Information Flow during each Dam Project Phase	25
Flowchart - Information Flow over Dam Life Cycle	25

Item	Page
1 → Introduction	25
2 → Scope	25
3 → Owners Legal Liability for Dam Safety	25
4 → Owners Responsibility for Dam Operation, Maintenance and Surveillance	45
5 → Government Bodies involved in Dam Safety	45
6 → Responsibilities for Emergency Management of Dams	45

2 of the new24 DSC Guidelines

Table 3 - Guidance Sheets for Dams Safety

Document	Description	Update Date
DSC1A	DSC Background, Functions and Operations	June 2010
DSC1B	Background to DSC Risk Policy Context	June 2010
DSC2A	Dam Safety Management System (SMS)	June 2010
DSC2B	Documentation and Information Flow over Dam Life Cycle	June 2010
DSC2C	Surveillance Reports for Dams	June 2010
DSC2D	Demonstration of Safety for Dams	June 2010
DSC2E	Some Legal Considerations for Dam Owners	June 2010
DSC2F	Operation and Maintenance for Dams	June 2010
DSC2G	Emergency Management for Dams	June 2010
DSC2H	Dam Security	June 2010
DSC2I	Community Consultation and Communication (CC&C)	June 2010
DSC3A	Consequence Categories for Dams	June 2010
DSC3B	Acceptable Flood Capacity for Dams	June 2010
DSC3C	Acceptable Earthquake Capacity for Dams	June 2010
DSC3D	Reliability of Spillway Flow Control Systems	June 2010
DSC3E	Flood Retarding Basins	June 2010
DSC3F	Tailings Dams	June 2010
DSC3G	General Dam Safety Considerations	June 2010
DSC3H	Embankment Dams (being compiled)	
DSC3I	Concrete Dams (being compiled)	
DSC4A	Mining Near Prescribed Dams – Administrative Procedures	June 2010
DSC4B	Mining Near Prescribed Dams – Mining Applications	June 2010
DSC4C	Mining Near Prescribed Dams – Management and Monitoring Matters	June 2010
DSC4D	Mining Near Prescribed Dams – Contingency Plans	June 2010

7.1.3. Changes introduced in 2009/2010

During 2009/2010 the DSC:

- Completed its new Guidance Sheets (Table 3 above) to outline the new DSC approach to dam safety management and to assist dam owners in the implementation of risk management for their dams. This followed the Government's endorsement of the DSC's *Risk Management Policy Framework for Dam Safety*, which provides for implementation of risk assessment methodologies into dam safety management;
- Organised and ran a Seminar at the Menzies Hotel on 10 June 2010, to present the implications of the final versions of the Guidelines to the dams industry in New South Wales including dam owners, consultants and relevant Government agencies. The seminar was attended by 138 people and the opening address was delivered by the Minister for Water and Corrective Services, the Hon Phillip Costa MP.

“Organised and ran a Seminar at the Menzies Hotel on 10 June 2010, to present the implications of the final versions of the Guidelines to the dam industry”

7.1.4. 2009/2010 Dams Surveillance Matters

The DSC continually reviews its list of prescribed dams in the light of new proposals, changed conditions, staff inspections and information supplied, to ensure that only dams with the potential for significant failure consequences are prescribed. During the year 24 dams were prescribed and 7 dams were de-prescribed, giving a total of 363 prescribed dams at June 2010 (see Appendix B and centre pull-out map).

For proposed prescribed dams and dam modifications, the DSC requires dam owners to provide design information for its review before construction. In all, 34 such submissions were processed during 2009/2010. The DSC usually confines its review to assurance that major safety criteria (e.g. flood capacity, filter provisions) are satisfied, and that the designers are competent, though the DSC may challenge any design aspect that is of concern. The DSC also requires the submission of copies of design reports and it now also requires independent expert peer reviews of significant dam proposals.

The DSC requires designers' involvement in the dam construction process, to approve design changes so that the "as-built" design is sound. DSC staff also check on construction and maintain close contact with, and assistance to, the owner's personnel.

Upon completion of construction, the DSC requires dam owners to submit work-as-executed drawings and the "construction completion certificate" (certifying designer's approval of changes) for the DSC's records with 9 certificates received in 2009/2010.

At a reasonable time after completion of construction the DSC also requires dam owners to submit a Construction Report for future reference.

The DSC then requires Surveillance Reports summarising the behaviour of the dam since construction, to be submitted. The first report is to be submitted usually after first filling of the dam, which is a critical phase in dam safety, but no later than one year after construction. Thereafter, Surveillance Reports are required at not more than five yearly intervals (with annual update reports also required for mines tailings dams in the cases where substantial changes to the physical structure of the dam are occurring and 2.5 yearly intervals where no physical change to the dam is occurring).

These reports provide information on the safety status of existing dams and are checked in a staged process by DSC staff, its Surveillance Sub-committee and then the Committee. The reports enable the DSC to monitor whether dam owners are continuing with a responsible approach to their dams at all stages during the lives of those dams. The reporting extent varies, with comprehensive reporting required for extreme consequence category dams, down to brief pro-forma reports for low consequence category dams (see DSC2C).

During 2009/2010, the DSC reviewed 70 dam Surveillance Reports (Appendices A and B). This was about on target with the number that ought to be reviewed to avoid a backlog developing and to minimize the risks that a dam problem may go undetected. However, difficulty lies with timely submission of reports by the dam owners particularly for the mines tailings dams. The DSC has written to owners with a view to preventing a serious backlog developing. To expedite these matters with dam owners the Committee will issue notices to dam owners under Section 15 of the Act where Surveillance Reports are more than two years overdue without a valid reason.

Surveillance Reports are stored in the DSC's record system and progressively incorporated into the DSC database. Provision of electronic copies of each report is now a standing requirement. The DSC considers that the content and presentation of Surveillance Reports is now of a reasonably high standard and that the majority of owners are responding in a positive and responsible manner to its requirements.

Middle Cascade Dam Surveillance Report

July 2008



Surveillance Report

A typical 5 yearly dam
surveillance report
reviewed by the DSC
during 2009/10.

*"24 dams prescribed,
7 dams de-prescribed
and 34 dam designs
processed in
2009/2010"*

*"70 dam surveillance
reports reviewed in
2009/2010"*

“94 dams inspected during 2009/2010”



Redbank Creek Dam

DSC members and staff inspecting preliminary works installed to reduce the risk to the dam. Commencement of final risk reduction works will occur in 2010/11 by lowering the crest of the dam.



Quipolly Dam

DSC members and staff inspecting this dam. Final Option study for upgrading this deficient dam to meet the DSC's risk based spillway criteria is complete.

The DSC continued with and strengthened its regular programmed staff inspection of dams and discussion with owners, throughout the State. Inspections by DSC members in conjunction with country meetings of the DSC also continued (country meetings were held in Cabramurra and Mudgee). Overall 94 prescribed dams were inspected during the year (see Appendices A and B) against a target number of 92 dams. However, inspections of significant risk dams was still below target. But greater emphasis will be placed on staff inspections of these dams in future to ensure recommendations within Surveillance Reports are being carried out, and that mining activities within and near dams are not having adverse effects on the dams. These inspections and meetings are also essential in the long-term to check the general safety standard of each dam, its consequence category, and the actual performance of each dam owner in complying with DSC requirements. Any deficiencies detected are brought to the attention of the owner's representative, and any concerns discussed on site. The inspections also provide useful background knowledge and photographs, against which Surveillance Reports can be evaluated and assessed by the DSC.

7.1.5. Examination and Investigation of Dams Safety

Dam owners are legally responsible for the safety of their dams and to ensure the risks from their dams are tolerable. The role of the DSC is to ensure that dam owners discharge this responsibility and that community interests are adequately protected.

The DSC views the risk assessment approach of the national standard AS/NZS 4360:2004 (now replaced by ISO 30001) *Risk Management* as providing a framework for comprehensive examination and investigation of dam safety over the whole range of potential failure situations and a better understanding of relative risks and consequences. Accordingly, the Government endorsed in August 2006 a revised dam safety regulatory policy framework, *the Risk Management Policy Framework for Dam Safety*, which integrates the traditional engineering standards-based approach to safety with risk assessment methods in determining the safety status of dams.

The process of risk assessment will assist in evaluating the relative safety of each dam (see Figure 2 for DSC's Societal Risk requirements), to assess risk reduction options, and to assign priority and urgency to any remedial actions required. Risk assessment will better clarify safety and thus provide for more informed decision-making. Risk assessment requires that the analysis team work with the decision-maker, and communicate appropriately with the affected community, to arrive at an informed overall judgement of the safety requirements for a dam. In 2009/10 3 risk assessments have been carried out on deficient dams in NSW.

However, the DSC will continue its general policy to judge each case on its merits. It will consider any dam safety proposals from dam owners provided they are soundly researched, within the bounds of accepted practice, and would result in tolerable risks.

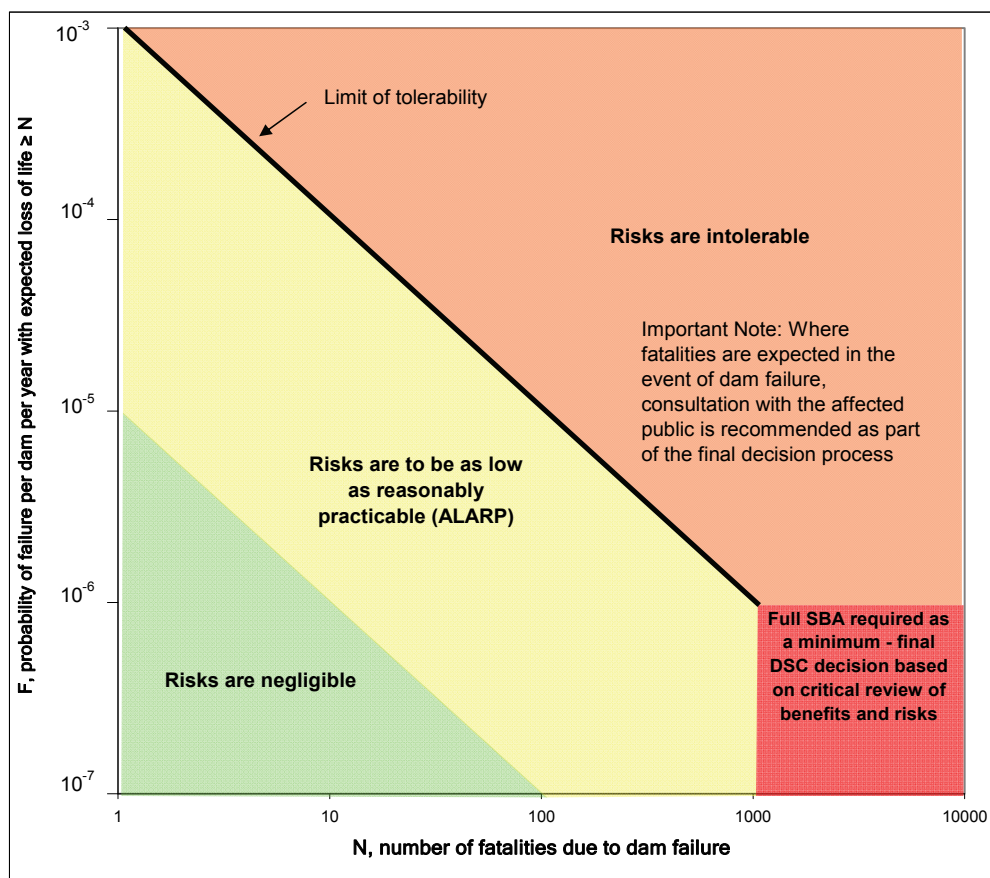
The new Guidance Sheet DSC1B, "Background to DSC Risk Policy" requires that a dam owner is to keep the risks of a dam under review. The safety of a dam is to be reviewed as a minimum whenever the DSC determines that a review is needed.

An owner is to submit its conclusions on a dam's safety, or proposals for dam safety improvements to the DSC for review. For all supporting data interpretations, analyses, calculations, judgements and conclusions, the DSC relies on the knowledge, skill and diligence of the owner's professional advisors. This policy will not prevent the DSC challenging the owner to justify any aspect of a proposal.

A dam owner is to bring risks into compliance with the DSC's safety requirements as soon as reasonably practical and is to keep the residual risks under review and is to maintain risks as low as reasonably practicable over time.

However, safety improvements required by the DSC may be implemented progressively where that would promote more effective risk reduction for the community as regards risks from dams.

Also, when required to do so, a dam owner is to demonstrate that risks to public safety and other interests of the community are tolerable. To be *tolerable*, a risk must be *as low as reasonably practicable (ALARP)*. For *public safety risks*, risk boundaries – the *limit of tolerability* and the *negligible* level of risk – are relevant in applying the *ALARP* test. See Figure 2.



**Figure 2 – DSC Societal Risk Requirements:
Existing Dams**

To provide background data needed for safety assessment studies, the DSC has continued to encourage dam owners and Government agencies to install and maintain rainfall/runoff and seismic monitoring equipment, and to support research into the estimation of piping risks, the derivation of extreme rainfall estimates, and the risk assessment of slopes.

The effectiveness of emergency response actions is also a consideration in judging the tolerability of risk.

A Dam Safety Emergency Plan (DSEP) is required by the DSC for any dam where lives are at risk from dam failure, to provide a core contribution to risk reduction. These plans apply from construction throughout the life of each dam and are aligned to SES planning for river and flash flooding. For dams with a significant safety deficiency, there is an additional contribution by the SES, where the DSC through its Emergency Management Sub-committee, has developed a protocol with the SES for the development of interim emergency response plans.

From information received on dams, the DSC identifies those with possible safety deficiencies and reaches agreements with owners on needed safety improvements, or the activities needed to clarify safety, and a timetable for actions. Once a significant safety deficiency is confirmed, the owner is to submit a program for safety improvement. To focus the attention of the DSC across owners, it regularly updates its provisional risk index ranking of dams and the SES is informed to guide them with interim flood planning downstream of deficient dams. However, the DSC listing is not exhaustive as there may be dams with undetected deficiencies to date. The DSC requirements for dam owners to undertake regular safety reviews has been implemented to minimize the risk of safety deficiencies going undetected.

With most attention on the dams of Tables 5 A and 5 B, the DSC then monitors activities against the safety improvement program, which can necessarily extend over many years to allow for detailed investigations and community consultation, financing and implementation. This process continued throughout the year.

Fifty deficient dams have now been modified for safety improvement following the DSC's establishment, as shown in Table 4. For some of these dams, there has been a series of improvements made.

Table 4 - Dams Modified for Safety Upgrading

Dam	Upgrade Cost Order(\$M)	Deficiency	Year Upgrading Completed	Nature Of Upgrading
Ben Chifley	10-100	Flood	2001	Dam raised and spillway post-tensioned
Burrinjuck	10-100	Flood	1996	Dam raised 15m and post-tensioned
Blackbutt	<1	Flood	1995	Spillway upgraded
Bonalbo	<1	Flood	1989, 2006	Spillway upgraded
Bulli Upper R'way Basin	<1	Flood	2010	Embankment removed and De-Prescribed
Captains Flat	1-10	Flood/Stability	1993	Dam post-tensioned
Cataract	10-100	Flood/Stability	1987	Dam post-tensioned
Cecil Park Basin 3A	<1	Flood/Stability	2008	Spillway enlarged, embankment stabilized
Chichester	1-10	Flood/Stability	1995, 2003	Dam post-tensioned, abutment stabilized
Coalcliff	<1	Flood/Stability	1999	Spillway enlarged, embankment upgraded
Company	<1	Flood	2006	Spillway enlarged, embankment raised
Cordeaux	<1	Flood	1988	Internal drainage improved
Dungowan	1-10	Flood	1992	Spillway augmentation, dam raising
Dunn Swamp	<1	O&M	1995	New outlet, wall repair
Emigrant Creek	1-10	Flood	2001	Dam post-tensioned, abutments raised
Foothills Rd	<1	Flood	1997	Embankment stabilized, new spillway
Glenbawn	10-100	Flood	1986	Dam raised, storage augmented, new spillway
Googong	10-100	Flood	1992	Dam raised, spillway stabilized
Grahamstown	10-100	Flood	2001, 2005	Dam core raised, face armoured, spillway upgraded
Green Meadows Basin	<1	Flood	2003	Embankment & crest stabilized, new spillway
Hamilton Valley Ret. Basin 5A	<1	Flood	2009	Embankment stabilised
Honeysuckle Ck	<1	Flood	1991	Post-tensioned and raised
Hume	10-100	Stability/Earthquake	1973, 2003	Embankments stabilized, gates/outlets upgraded
Jindabyne	10-100	Flood	2006	New spillway and outlets
Killara	1-10	Stability	1994	Embankment walls stabilized
Lyell	10-100	Flood	1996	Dam raised, spillway and storage augmented
Manly	1-10	Flood	1984	Dam post-tensioned
Mardi	1-10	Earthquake	1991	Embankment stabilized
Moolarben	<1	Flood	1993	Spillway augmented
Moore Creek	<1	Flood	2008	Dam buttressed
Nepean	10-100	Flood/Stability	1992	Spillway augmented, dam post-tensioned
Northmead Basin	<1	Flood	1994	Embankment raised, strengthened
Oberon	10-100	Flood	1996	Dam raised, additional spillway
Orange Agricultural	<1	Flood	1997	Spillway augmented
Palm Tree Grove	<1	Flood	1990	Embankment raised, strengthened
Pindari	10-100	Flood	1993	Dam raised, storage augmented, new spillway
Prospect	10-100	Earthquake	1997	Upstream dam embankment stabilized
Redbank Creek	1-10	Flood	2009	Outlet works installed for minor flood load
Rocky Creek	1-10	Flood/Piping	2010	Embankment upgrade to resist piping
Rydal	1-10	Stability/Flood	1993	Dam wall stabilised, spillway augmented
Rylstone	<1	Flood	1995, 2003	Auxiliary embankments removed
Sooley	10-100	Flood	2005	Dam raised and buttressed, new spillways
St Joseph Sch. Basin	<1	Flood	2001	Bank stabilization and new spillway
Tilba	<1	Flood/Stability	1997, 2003	Dam wall raised, toe drained
Tumbarumba	<1	Stability	1999	Embankment drainage installed
Warragamba	>100	Flood	2001	Dam post-tensioned, raised 5m, new spillway
Wentworth Falls	<1	Flood	1993, 2003	Dam raised, spillway augmented
Wellington	<1	Flood/Stability	1996, 2002	Dam demolished
Wollondilly Washery	<1	Flood	1998	Dam raised, emergency spillway installed
Woronora	<1	Flood	1988	Internal drainage improved

Based on current information available to the DSC, the dams identified as having apparent significant safety risks are listed in Table 5A and 5B, together with the year in which the apparent deficiency was determined, and the status of the safety improvement program for each dam. Dam owners have commenced safety deficiency studies, improvement options studies or design of improvement works for all of these deficient dams, and the DSC monitors their progress. If owners fail to achieve satisfactory progress, the DSC works with the owners to ensure an improved outcome. Should owners not respond positively, the DSC could issue a notice under Section 18 of the *Dams Safety Act*. The first such notice issued by the DSC was in March 2010 to the owners of the Bulli Upper Railway Embankment. In this case the upgrading requested by the DSC several years previously had not begun for a variety of reasons and when the DSC were subsequently informed of the very high risk of failure associated with the dam it took this unprecedented action. As a result the dam has since been removed and the risk to the population no longer remains. In future the DSC intends to be more rigorous in issuing S18 notices on dam owners with high risk dams on which no significant upgrading has occurred for unjustifiably long periods. In addition, the DSC is monitoring owners' progress in developing action programs for dams with minor deficiencies, and owners' investigations of several other dams to confirm their safety status (see Appendix B).

During 2009/10 further works continued on Hume Dam. The spillway southern junction upgrading construction works is underway, investigations into the southern training wall are nearing completion, and the long awaited hydrology/flood report was received by the DSC.

The DSC has continued to liaise closely with the NSW Treasury on the required upgrading of Bethungra Dam and with State Water on the reduction of risks at Keepit, Chaffey, Copeton, Split Rock and Wyangala Dams. At Keepit and Chaffey, Burrendong and Blowering Dams, interim safety improvements have been implemented and construction works is underway. For Copeton, Split Rock and Wyangala Stage 1 upgrading design will begin in 2010.

Work also continued, during the year, on a prioritised program to improve the safety of deficient dams in the portfolio of dams owned by local government councils. This program has been under the jurisdiction of the Department of Water and Energy. In 2007/8 investigations downgraded the risk status of Malpas Dam and design of safety improvement works for Redbank Creek dam were completed in 2009/10. Further investigations were underway on Lake Endeavour, Quipolly, Imperial Lake, Winburndale, Dumaresq, Tenterfield and Suma Park Dams.

Table 5A- Status of Upgrading Activities for Dams under DSC Review

Dam	Deficiency		2009/2010 Upgrading Progress
	Type	Identified	
Blowering	F	1996	Stage 1 upgrading works almost completed (FWA).
Burrendong	F,S	2003	Stage 1 upgrading works underway (FWA).
Chaffey	F	1995	Stage 1 upgrade works commencing in June 2010 (FWA).
Copeton	F	2006	Upgrading detailed design completed (FWA).
Dumaresq	F,S	2000	Risk investigation underway (FWA).
Hume	F, E, S	1994	Spillway Southern Junction construction underway (FWA).
Imperial Lake	F	2000	Awaiting concept design upgrade report (FWA).
Keepit	F	1995	Stage 1 upgrade construction underway (FWA).
Lake Endeavour	F,E,S	1995	Upgrading options being investigated (FWA).
Lake Rowlands	F	2009	Risk investigation underway (FWA).
Quipolly	F	1993	Upgrading Design Options Report completed (FWA).
Split Rock	F	2006	Upgrade detail design underway (FWA).
Suma Park	F	1984	Upgrading design to commence 2010 (FWA).
Talbingo	F, S	2005	Flood Study to be completed 2010 (FWA).
Tenterfield Creek	F, S	1995	Stability Analysis by December 2010 (FWA).
Winburndale	F	1995	Revised flood estimate completed (FWA).
Wyangala	F	2006	Stage 1 upgrade works underway (FWA).
F - Inadequate Flood Capacity			E - Inadequate Earthquake Structural Resistance
S - Structural Inadequacy under Normal Operating Conditions			FWA - Flood Warning Arrangements in place

Table 5B- Status of Activities on Dams issued on S18 Show Cause Notices

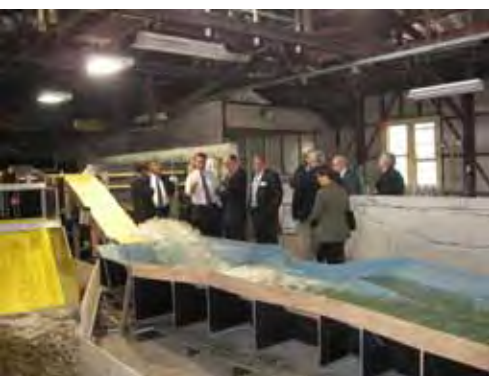
Dam	Deficiency		2009/2010 Upgrading Progress
	Type	Identified	
Bethungra	F, S	2000	Value/Risk Management Report expected in August 2010 to determine upgrading option.
Redbank Creek	F, E, S	1996	Alternative stabilization construction to be completed in early 2011.

“A record storm at Dapto in 1984 dumped 515 mm of rain in 6 hours” – a near PMP event



Stephens Creek Dam (near Broken Hill)

This dam filled from near empty to this spillway flow as a result of the 2010 floods. This indicates spillways must be able to handle severe floods even in the State's semi-arid region.



Manly Vale Hydraulics Laboratory

The Hon Phillip Costa DipEd MP, Minister for Water and DSC members and staff inspected the hydraulic model of the Tillegra dam spillway in March 2010.

7.1.6. Flood Capacity and Hydrology

The recent drought conditions in NSW have focussed dam owners attention on drought security and storage operation. However heavy floods can and do regularly occur as evident by torrential rain causing severe flooding on the NSW North Coast in October 2009 (370mm in 17 hours near Bellingen and 150mm at Coffs Harbour) and again in February and March 2010. Other areas hit by severe flooding during 2009/10 included the North West of the State (Coonabarabran etc) December 2009, the South East (Bega, February and May 2010) and many other areas throughout NSW. The DSC is therefore continuing strongly with its efforts to eliminate intolerable levels of flood capacity at prescribed dams throughout NSW as soon as practicable.

World wide inadequate flood capacity of dams remains one of the leading causes of dam failure. In 2009, in Jakarta Indonesia, over 100 residents tragically died when the Situ Gintung dam burst as a result of heavy flooding. During 2009/2010, heavy floods caused the failure of a number of dams in the USA. In Kazakhstan 35 people died when a dam broke due to torrential rain in March 2010. In Azerbaijan a dam reportedly failed in the Ku River, in Canada the Testalinden Lake Dam failed in June 2010 and dam bursts also occurred in Brazil in June 2010. It is therefore patently obvious that dams with inadequate spillway capacities can and do fail, even in rainfall events that would not normally be classified as extreme.

This is the experience in NSW also, as reflected in the dams under critical review by the DSC (Tables 5A/B). The main reason for the many dams with inadequate flood capacity is the steady advance in the understanding of extreme events by meteorologists and hydrologists. It is now recognized that flood estimates made some decades ago were generally too low. Because of advancing knowledge about floods, the DSC requires NSW dam owners to undertake regular reviews of the flood capacity of their dams to see if safety improvements are needed.

Initially, generalised Probable Maximum Precipitation (PMP) estimates are required to define extreme storm rainfalls for each dam. The Bureau of Meteorology sets the procedures for this work. These PMP events, while very rare, are plausible and several near PMP events have occurred (i.e. a record storm at Dapto in 1984 dumped 515mm of rain in 6 hours). Generalised procedures are now available in NSW for PMP storms of any duration and area.

Rainfall estimates then need to be converted to flood predictions by the dam owner's hydrologists, using approaches outlined in *Australian Rainfall and Runoff*, produced by Engineers Australia.

The DSC has put on its Internet site the new Guidance Sheet of its Acceptable Flood Capacity for Dams (DSC3B). This Guidance Sheet is provided for the guidance and direction of dam owners and their consultants in the preparation of proposals that demonstrate to the DSC the provision of acceptable flood capacity for dams. It supersedes DSC11, August 1992. It takes into account the latest requirements and developments in the Australian National Committee on Large Dam's (ANCOLD) guidelines on dam safety, including incorporation of the risk assessment process.

This Guidance Sheet is limited to guidance on the means by which dam owners are to demonstrate to the DSC that the flood risks posed by their dams to community interests are tolerable or will be made tolerable following improvements in safety.

In setting its requirements, the DSC has been guided by the advice of its Hydrology Sub-committee, which maintains a close liaison with ANCOLD, Engineers Australia, and with hydrologists from various authorities, and academia, throughout Australia.

In March 2010 the DSC held its monthly meeting at the Manly Vale Hydraulics Laboratory to enable it to inspect the Tillegra Dam spillway model and the model of the proposed upgrading of the Cotter Dam in the ACT. The inspection was also attended by the Minister for Water, the Hon Phillip Costa DipEd MP.

“Seismologists indicate that major earthquakes up to Magnitude 7.5 could occur anywhere in NSW”

In 2009/2010 the largest seismic event in NSW was a Magnitude 3.8 earthquake near Taree in August 2009”

“The largest national event was a Magnitude 5.0 earthquake near Kalgoorlie in Western Australia in April 2010



Wingecarribee Dam

This SCA dam has upgrading works to reduce the upper embankment level piping risk and to secure the dams spillway programmed for 2011.

7.1.7. Earthquake Capacity

Historically, several earthquakes up to Magnitude 7 have occurred in Australia and the 1989 Newcastle earthquake (Magnitude 5.4) provided a reminder that large damaging earthquakes can occur. Seismologists indicate that major earthquakes (e.g. up to Magnitude 7.5) could occur anywhere in NSW and that a Magnitude 7.5 earthquake has about 1,000 times the destructive power of the Newcastle earthquake.

Many overseas dams have survived nearby earthquakes up to Magnitude 8 as evidenced in the 12 May 2008 Sichuan Chinese earthquake (M 7.9, though that earthquake seriously damaged some dams. More recently (2010) a tailings dam in Chile failed due to liquefaction induced by the Maule earthquake (M 8.8). Experience however has shown that well-constructed concrete and earth/rockfill dams on good foundations are inherently stable during earthquake events. Fortunately, these types form the bulk of NSW prescribed dams.

The DSC initially directed its earthquake capacity concerns to the owners of the few vulnerable dams with the result that earthquake capacity improvement works were completed at Mardi, Prospect and Hume Dams. Whilst it is expected that few dams are vulnerable, earthquake stability reviews are required to be included in the regular safety reviews of all prescribed dams. To provide guidance for designers and reviewers, the DSC issued its new Guidance Sheet DSC3C, Acceptable Earthquake Capacity for Dams.

The DSC goal regarding the seismic safety of prescribed dams is to ensure they are appropriately designed (e.g. have adequate stability) and managed to result in tolerable risks to community interests.

It is for the dam owner to determine how this goal (including DSC requirements) will be achieved and to demonstrate to the DSC that the goal is achieved or will be achieved following safety improvements.

In 2009/2010 the largest seismic event in NSW was a Magnitude 3.8 earthquake near Taree in August 2009. The largest national event was a Magnitude 5.0 earthquake near Kalgoorlie in Western Australia in April 2010.

Scarcity of long-term seismic data in NSW to use as a basis for determining the earthquake design loadings for dams remains a concern for the DSC.

The seismic monitoring network, installed on Sydney Catchment Authority (SCA) dams in the early 1990s, has recorded evidence of minor seismicity in the area and has provided beneficial data for future design use on dams and other structures in the Sydney area.

The SCA network complements the Newcastle network installed after the 1989 earthquake, along with some seismic stations at State Water and Snowy Hydro dams, and the national grid installations of Geoscience Australia. The DSC has continued to support expansion of this seismic network throughout NSW.

7.1.8. Safety under Normal Operating Conditions

Dams are long life structures, with the oldest dam in Europe some three thousand years old, and the oldest prescribed dam in NSW, Lake Parramatta Dam, being over 150 years old. Given that the average age of major NSW dams is over 40 years, their structural safety under normal operating conditions is generally satisfactory by current methodology. Where deficiencies have been revealed, the DSC has required owners to undertake safety reviews and to implement any consequent improvement action.

Particular areas of concern to the DSC include:

- Older earth dams, without intercepting filters to control piping and seepage, which may require buttressing and/or supplementary drainage. Piping causes almost as many dam failures as inadequate flood capacity. Hume, Mardi, Tilba, Rydal, Tumbarumba and Rocky Creek Dams, and Cecil Park Basin 3A, have been upgraded in this regard. In addition, there appears to be no clearly recognized international practice on piping safety for old dams without modern filters. The DSC has Guidance Sheets (DSC3G) and plans in future to issue Guidance Sheet DSC3H to guide owners on safety against piping.

- The deterioration, with time, of unencased pressure conduits through embankments could lead to uncontrolled high-pressure leakage through the embankment, leading to washout and dam failure. A number of dams have failed from this cause overseas. The DSC requires dam owners to investigate and monitor their conduits. This is also covered in Guidance Sheet DSC3G.
- The need to better understand piping and slope instability risks of embankment dams. A research program initiated in 1996 by the University of NSW and sponsored by the DSC and several major dam owning organizations has developed valuable new understanding in this area. A procedure developed from this research is currently being trialled by the US Army Corps of Engineers and the US Bureau of Reclamation.
- The reliability of spillway control systems, given several serious incidents and dam failures world-wide involving gate failures. There are only a small number of gated dams in NSW and the DSC requires their owners to regularly review their gates' safety and to ensure high reliability through systems upgrades and proper operation and maintenance procedures. A DSC Guidance Sheet DSC3D on this aspect of dam safety is now available and the update of DSC11 issued as DSC3B sets out how gate reliability is to be considered in the assessment of a dam's flood capacity.
- The safety of tailings dams usually associated with mining. Many incidents overseas, including failures at Karamkan Russia and Huayuan China both with associated loss of life occurred during 2009 and some on prescribed tailings dams, have highlighted the special vulnerability of these types of dams. The DSC therefore concluded that there is a need to develop safety policies specific to tailings dams and Guidance Sheet DSC3F, Tailings dams, has been completed and placed on the DSC's website for dam owner guidance.



Talbingo Dam

This Snowy Hydro dam is the tallest dam in NSW (over 160m high) and currently has a flood study underway to assess the adequacy of the dam's spillway.

7.1.9. Operation, Maintenance and Surveillance

Dams require care throughout their lives to keep them in a safe condition, since materials, components and machinery deteriorate with time. Ongoing operation, maintenance and surveillance is essential and cost-effective, otherwise reduced life expectancy or failure could result (e.g. a near piping failure of a Hunter Valley tailings dam in 2003 was averted by timely detection). The rehabilitation works (e.g. Redbank Creek Dam), or decommissioning (e.g. Wellington Dam), found necessary for some older NSW dams illustrate the deterioration that can occur as dams age. Concepts developed in other industries, such as Failure Modes and Effects Analysis (FMEA) are now being introduced to dams to provide a more rational and better targeted basis for maintenance and replacement programs.

Dam safety specialists throughout the world recognize the necessity for systematic and documented operation and maintenance procedures. The ANCOLD *Guidelines on Dam Safety Management-2003* set out contemporary requirements in this area, based on industry best practice, and provide a basis for a uniform national approach to proper operation and maintenance. The DSC has adopted them as its requirements as outlined in its new Guidance Sheet DSC2F, Operation and Maintenance for Dams.

DSC2F requires dam owners to develop and maintain operation and maintenance (O&M) manuals, based on organized programs and systematic inspections. The DSC maintains an active education program in this area and audits performance through the owner's Surveillance Reports and by regular inspections of dams by DSC members and staff.

O&M Manuals should be prepared by appropriately qualified and experienced personnel including specialists such as Civil, Mechanical, and Electrical engineers as required by the type and complexity of the dam and its equipment.

Owners of prescribed dams are to ensure that there are appropriately trained and experienced personnel available to operate and maintain their dams in accordance with their O&M Manuals.

“Dams require care throughout their lives to keep them in a safe condition, since materials, components and machinery deteriorate with time”

“DSC2F requires dam owners to develop and maintain operation and maintenance (O&M) manuals”

7.1.10. Dams Safety Emergency Management

The DSC's primary objective is to protect the public from uncontrolled releases from dam storages so it requires that dam owners prepare Dam Safety Emergency Plans (DSEP) for dams posing a risk to downstream residents. The DSC has produced its new Guidance Sheet DSC2G (Emergency Management for Dams) to aid dam owners in the preparation of DSEPs. To date 113 out of 136 High and Extreme Consequence Category dams have DSEPs, and the DSC is working in conjunction with dam owners to ensure that all such dams have a DSEP in place.

DSEPs cover monitoring procedures, actions to be taken by the owner's personnel, pertinent advice to emergency management agencies, relevant information concerning the nature of dambreak flooding and communication protocols. These plans also take into account the general increase in security required world-wide for strategic assets such as dams (in 2008 a dam was destroyed by terrorists in Sri Lanka, and special security precautions have also been taken at dams in Iraq and Afghanistan). The DSC has prepared Guidance Sheet DSC2H (Dam Security) to assist owners in this regard.

To enable the DSEPs to function effectively the DSC requires that all High and Extreme category dams have telemetered storage level recorders, as well as alarms on the downstream seepage weirs to give warning of potential non-flood related failures.

Responsibility for developing and maintaining flood plans in NSW rests with the State Emergency Service (SES). The DSC looks to dam owners to liaise with the SES in developing flood plans and DSEPs to protect residents against the impacts of major floods that pass through their dams, including a potential dam failure. The value of these plans, even for dams that meet normal safety requirements, was demonstrated in 1999 with activation of the Lyell Dam DSEP, facilitating the timely evacuation of campers after the unexpected failure of the dam's inflatable spillway section. Further demonstration was also provided during the May 2009 Murwillumbah floods, with the timely evacuation of residents downstream of Clarrie Hall Dam.

During 2009/10 the DSC, in conjunction with the SES, ran 'desk top' DSEP test exercises in Lismore and Queanbeyan wherein a hypothetical dam failure was put to attendees of invited dam owners from the relevant regions for consideration. Feedback indicated the exercises were very useful and resulted in improvements to some existing DSEPs.

During 2009/10 tests of DSEPs were run by State Water and the SCA. The DSC will continue to encourage dam owners to test the DSEPs regularly, particularly with regard to sunny day failure, where failures could come with very little warning.

In May 2010 evacuations of residents downstream of the then high risk Bulli Upper Railway Embankment Basin took place by the SES as a precautionary measure when extreme rainfall was predicted by the Bureau of Meteorology for the region. The DSEP worked effectively in this case, and DSC staff and members played a useful role in dealing with the emergency. (DSC member Jamieson spent a night on the dam during the storm to ensure adequate warning of impending failure could be given to the SES in the event of an imminent failure).

Also during 2009/10, white or orange DSEP trigger alerts were implemented at Chichester, Cochrane, Rocky Creek, and Clarrie Hall Dams due to heavy localized flooding. The DSC was advised during these events, but no further action was required as the flood waters subsided before higher alert levels were reached.

The SES has continued to prepare and update flood plans for communities downstream of deficient NSW dams during the year. An important aspect of flood planning is early and comprehensive public awareness campaigns to inform affected residents of the details of these flood emergency plans.

To mesh the responsibilities of dam owners and the SES, the DSC's Emergency Management Sub-committee meets, as necessary, to review and monitor the procedures used by the agencies concerned. As a result, dam incident warning protocols have been implemented, with all of the emergency agencies. The Sub-committee also provides a channel for information exchange between the DSC and the SES, giving the SES regular updates on the safety status of dams in NSW.



Dam Safety Emergency Plan Exercise

DSC and SES staff jointly facilitating a Dam Safety Emergency Plan Exercise. The DSC has a policy of conducting such exercises on a regular basis.



Bulli Upper Railway Embankment

DSC staff inspecting this high risk dam. A Section 18 notice to remove the dam was issued to the owner in March 2010. Subsequently residents downstream were evacuated by SES when extreme rainfall threatened the dam. It has since been removed.

7.1.11. Flood Retarding Basins

Flood retarding basins can have great value in reducing flood magnitude in urban areas. Most are small, typically with an embankment only a few metres high, but they are usually situated in densely populated areas with drainage channels of limited flow capacity downstream. However, there are some large structures, such as the Loyalty Road Retarding Basin, upstream of Parramatta, which is formed by a concrete dam over 20m high.

During the short periods that these basins store water they act as dams, and their failure could be damaging to downstream areas. The DSC prescribes those basins that would pose a significant threat to downstream communities or the environment in the event of failure. The potential threat of retarding basins to a community can be as significant as that from a major dam since houses are often located immediately downstream. Because the embankments forming most basins are dry for long periods, their response to floods is as for the “first-fill” phase of dam life, a period known to be much more prone to dam failure than other periods. Accordingly, retarding basins need to be designed and constructed in accordance with good dam engineering practice.

Traditionally, retarding basins have been treated as an element within an urban drainage scheme. For such schemes, the focus has been on floods up to the 1 in 100 Annual Exceedance Probability (AEP) flood, which has been the typical *design flood*. In the past, few owners and stakeholders recognized that a greater flood could occur and would cause a sudden increase in discharge or, in the worst case, could fail the embankment to put those downstream in danger. The community at risk generally does not appreciate the potential for larger floods to occur. Recent examples of events exceeding the 1 in 100 AEP mitigation limit were the storm events in Mudgee (February 2003) and the several recent North Coast storm events (2009/10) and in the Newcastle area (June 2007). In addition, there is also the risk of piping through embankments by flood waters seeping through cracks in the basin embankments caused by drying out of the earthfill during the long dry periods between floods. The DSC has intervened to protect the community from these dangers and to educate all involved. These efforts are beginning to pay dividends in improved protection.

It should be noted that with several hundred basins in NSW, there is a strong possibility that one or more basins could be tested annually by an extreme storm.

The DSC’s requirements aim to ensure that basins will withstand appropriately large floods, or that basin failure does not involve a significant risk to life. The design needs to allow for the effects of future development in the area and the “domino effect” of basin failure if there are multiple basins in a cascade arrangement, as is commonly the case.

The DSC requires that the 74 existing and 13 proposed prescribed retarding basins are subject to relevant procedures regarding surveillance, inspection, operation and maintenance but continues to be concerned with the poor maintenance some basins receive. Inspections still reveal basins with partially blocked outlets, which can significantly reduce the basin’s flood capacity. This reinforces the need for basins to be inspected monthly, as part of their maintenance schedule, as well as after significant flood events.

The DSC continues to maintain close liaison with basin owners during the design stage, particularly to oversight urban drainage designers whose experience of dams engineering is often limited to small structures. DSC staff carry out regular basin inspections and the DSC has prepared a new Guidance Sheet, DSC3E (Flood Retarding Basins).

Owners, or their consultants, should inform the DSC of proposals for new basins (or unnotified existing basins) so that the DSC can consider their need for prescription. The DSC prescribes all basins whose failure could cause loss of life. The DSC also requires assessment of the incremental consequences of failure of the basin.

Owners are also required to develop an appropriate emergency plan in conjunction with the relevant emergency authorities outlining procedures for owners to follow to mitigate the effects of extreme flood events at their basins.



Hamilton Valley 5A Flood Retarding Basin in Albury

The downstream slope was reinforced during the year.

“In the past, few owners and stakeholders recognized that a greater flood could occur”

“Inspections still reveal basins with partially blocked outlets, which can significantly reduce the basin’s flood capacity. This reinforces the need for basins to be inspected monthly”



Minmi Road Retarding Basin near Newcastle

This basin system requires upgrading to allow it to safely handle floods required by the DSC’s Guidelines.

“The DSC ensures that risks to dams from mining are tolerable in terms of the community’s interests”

7.2. Regulation of Mining near Dams

7.2.1. Background

In NSW, legislation creates a system where the risks to dams from mining are independently assessed from a civil engineering perspective. Usually this is done under the *Mining Act 1992*, by the DSC advising the responsible Minister, but it may also be done directly by the DSC under the *Dams Safety Act 1978*. The DSC ensures that risks to dams and their reservoirs from mining are tolerable in terms of the community’s interests.

The most common regulatory mechanism involves declaration of Notification Areas around selected prescribed dams (see Prescribed Dams map). Mining within these areas requires Ministerial approval, acting on advice from the DSC, or the DSC may use its powers under the *Dams Safety Act 1978* to direct actions be undertaken to ensure the safety of a prescribed dam.

7.2.2. 2009/10 Overview

The mining projects considered by the DSC during the year were mainly for mining coal by underground or open-cut methods. There continues to be a strong interest in coal mining near dams and storages. Fourteen new applications were endorsed as follows:

Underground Mining

NRE (2)
Dendrobium (2)
Mannering (3)
Ashton
Clarence
Glennies (2)
Ravensworth

Open-cut Mining

Liddell
Ravensworth (Narama)

During 2009/10, under the DSC’s guidelines, over 14.5 million tonnes of coal were extracted near prescribed dams in NSW, either in Notification Areas or their equivalents, without reducing safety below limits. Prior to the formation of the DSC, some of these coal deposits would not have been mined due to the safety concerns of dam owners.

7.2.3. Details of New Applications and Currently Monitored Mines

Appin Colliery commenced longwall mining in 1988 near Broughtons Pass Weir, which is an important part of Sydney’s water delivery system. Initially minor cracking of the weir was recorded, although the safety of the structure was maintained at all times. Small movements, but no additional cracking, have been reported as mining progressively moves away from the dam.

Ashton Mine commenced longwall mining near Ravensworth Inpit Storage Dam in 2010. This Dam is part of Ravensworth Operations and has the Narama open cut to its west.

Clarence Colliery is to mine within the Notification Area of Lithgow No. 2 dam by first workings. This dam supplies water to Lithgow.

Dendrobium Colliery commenced mining a series of longwalls (currently mining longwall 6 in Area 3A) in February 2007, adjacent to Cordeaux Reservoir and Upper Cordeaux No. 2 Dam. Cordeaux Reservoir supplies water to the Sydney metropolitan area. Mining to date has indicated no significant impact on the stored waters although some localized minor inflows to the mine have occurred which appear rainfall related.

Drayton Mine implemented a management plan aimed at minimizing the blast vibration risk from its open-cut mining adjacent to Liddell Ash Levee. The levee is a dam, which retains ash from a nearby power station.



Lithgow No. 2

Clarence Colliery have applied to mine within the Lithgow No. 2 Notification Area.

“During 2009/10...over 14.5 million tonnes of coal were extracted near prescribed dams in NSW”



Antienne Lease Tailings Dam

Showing mining in Reservoir Pit with respect to Tailings Dam and existing Voids.



Camberwell Tailings Dam No. 2

DSC members and staff inspecting a shallow downstream slip, subsequently repaired by the owner.

“In 2009/10 United Colliery concluded its mining of a series of longwalls under Wambo Tailings Dam. The embankment has remained stable and monitoring continues”



Wambo NE Tails

Tailings appear to have dried out after decommissioning in 2004.

Duralie Colliery continued open-cut mining further away from its water supply dam. A management plan has been implemented to minimize the risk resulting from the active open-cut pit located near the dam

Glennies Creek Colliery commenced open cut mining within the Notification Areas of Possum Skin Dam and Camberwell Tailings Dam No. 2 during the year. While the Glennies Creek underground commenced longwall development within the Mt. Owen Notification Area.

Liddell Colliery undertook open-cut mining, near Antiene Lease Tailings Dam and Liddell Cooling Water Dam. Monitoring shows that mining activities are having no significant impact on the dams.

Mannering Colliery continued to mine by bord and pillar methods adjacent to Mannering Creek Ash Dam, which stores ash from a nearby power station. Monitoring to date indicates the continuing impacts on the dam are minimal.

Moolarben Mine commenced to mine by open cut methods adjacent to the Moolarben Creek Dam. The dam is owned by the neighbouring Ulan Mine.

NRE No. 1 Colliery is continuing to mine bord and pillar workings adjacent to, and under, Cataract Reservoir. Monitoring indicates some minor continuing surface movements but negligible impacts in the reservoir waters, which supply the Sydney metropolitan area. The Colliery has recently commenced development of drivages in the Wongawilli seam within the Cataract Notification Area.

Ravensworth Operations Narama Mine continued mining by open-cut methods within the Notification Area around their Ravensworth Inpit Storage Dam. During the year they applied to vary the conditions to mine within the Notification Area and to open cut mine closer to the dam.

Ravensworth Operations Underground Mine commenced longwall mining within the Notification Area around Ashton's Tailings Dam (Saddle Dam).

Ridgeway While a large subsidence bowl is developing over the underground mine, no impacts from this mining activity have been recorded at Cadiangullong Dam over 1km away.

United Colliery concluded its mining of a series of longwalls under Wambo Tailings Dam and near United Tailings Dam No. 2. Although disused, the Wambo Tailings Dam contains tailings which may still be able to flow and the risks, to an active open-cut pit immediately downstream, need to be managed. The embankment has remained stable and monitoring continues.

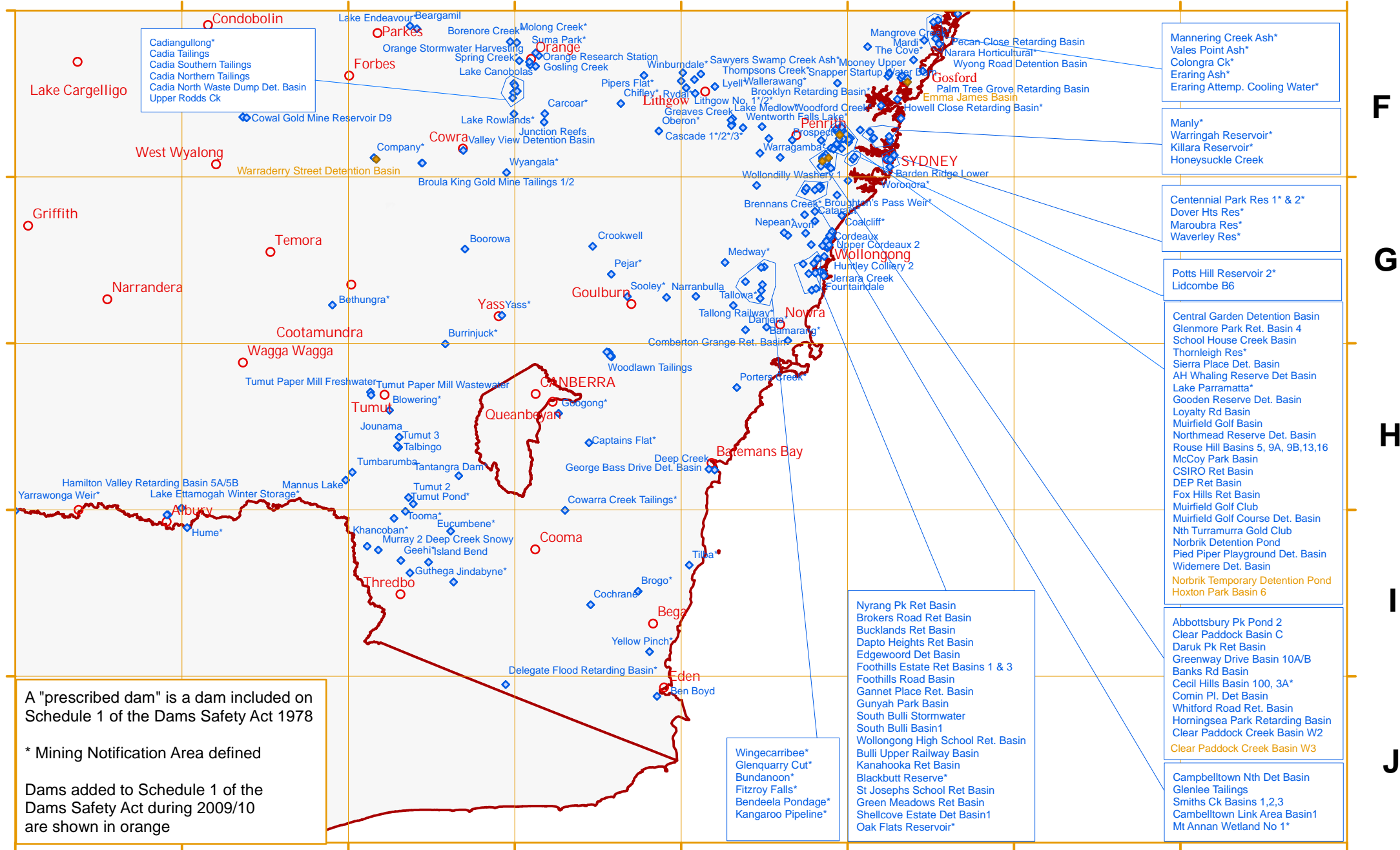
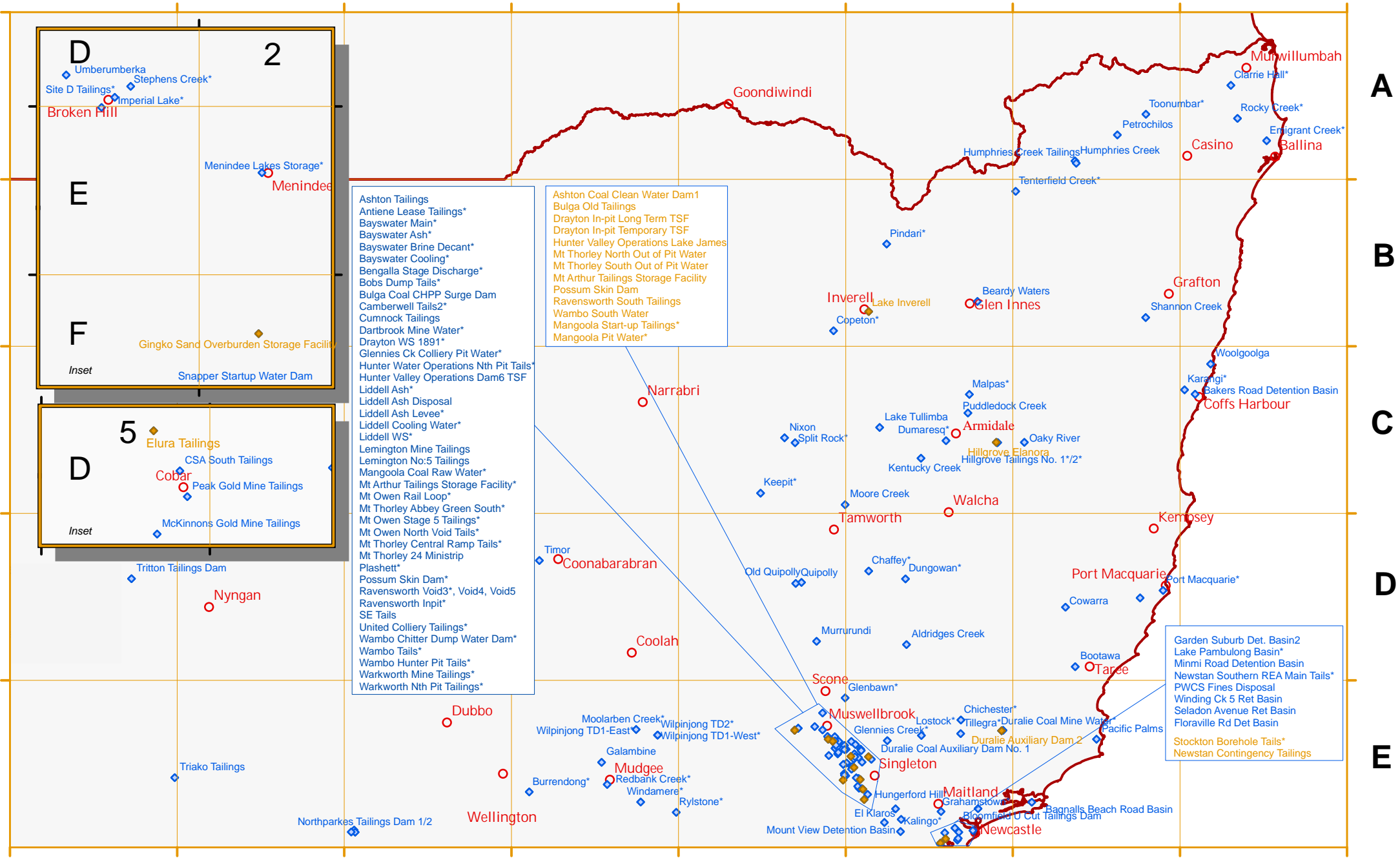
Wambo Colliery continued open-cut pit mining immediately downstream of Wambo Tailings Dam, which is also being undermined by United Colliery. In addition, further longwall mining is proposed near the dam, with a management plan implemented and development workings commenced.

7.2.4. Policies, Procedures and Organizational Updates

Resources employed during the year were matched by the continuing heavy operational workload. Existing policies are outlined in the new Guidance Sheets listed in Table 6 below and are available on-line on our web page (www.damsafety.nsw.gov.au).

An internal system for checking compliance with mining conditions operates. This is used for workload management and for reminders to mining companies to deliver material on time. There is already evidence that this system has improved the overall level of mining compliance under DSC oversight.

NSW Dams Safety Committee
PRESCRIBED DAMS IN NSW
JULY 2010



A "prescribed dam" is a dam included on Schedule 1 of the Dams Safety Act 1978

* Mining Notification Area defined

Dams added to Schedule 1 of the Dams Safety Act during 2009/10 are shown in orange

Table 6 –Guidance Sheets for Mining near Dams

Document	Title	Date
DSC4A	Mining Near Prescribed Dams – Administrative Procedures	June 2010
DSC4B	Mining Near Prescribed Dams – Mining Applications	June 2010
DSC4C	Mining Near Prescribed Dams – Management and Monitoring Matters	June 2010
DSC4D	Mining Near Prescribed Dams – Contingency Plans	June 2010

7.2.5. Mining Statistics**Table 7 - Mining in Notification Areas**

Item	2006/7	2007/8	2008/9	2009/10
Coal Removed from Notification Areas (million tonnes)	10.5	14.1	13.5	13
Current Approvals: Actively Mining	12	11	17	18
Actively Monitoring	15	13	16	23
Applications Processed	14	7	14	13
Variations to Existing Approvals	8	13	4	4
Titles Processed	17	151	72	162
Provide comments on SMP / Part3A applications				13
New Proposals Discussed	6	5	11	7
Site Inspections (person days)	16	18	25	28

Table 8 - Monitored Approved Mining 2009/2010

Approval	Mine	Dam	Mining Type	Active Mining	Possible Effect on Dam Storage	Dam Structure	Currently Monitoring
Bellambi-15	NRE#1	Cataract	1 st Workings	Yes	Yes	No	Yes
NRE#1-2	NRE#1	Cataract	Drift development	Yes	Yes	No	Yes
Wambo-1	Wambo	Wambo Tails	Open-cut	Yes	Yes	Yes	Yes
Wambo-2	Wambo	Wambo Tails	Longwall	Yes	No	Yes	Yes
Appin-2	Appin	Broughtons Pass Weir	Longwall	No	Yes	Yes	Yes
Dendrobium-2, 3, 4	Dendrobium	Cordeaux & Upper Cordeaux 2	Longwall	Yes	Yes	Yes	Yes
United-6	United	Wambo Tails	Longwall	Yes	Yes	Yes	Yes
Mannering-1, 3	Mannering	Mannering Ck Ash	1 st Workings	Yes	No	Yes	Yes
Duralie-1	Duralie Open-cut	Duralie Mine Water	Open-cut	Yes	Yes	Yes	Yes
Drayton-1	Drayton	Liddell Ash Dam Levee	Open-cut	Yes	No	Yes	Yes
Ridgeway-1	Ridgeway	Cadiangullong	Underground	Yes	Yes	Yes	Yes
Liddell-2	Liddell	Antiene Tails	Open-cut	Yes	No	Yes	Yes
Liddell-3	Liddell	Liddell Cooling Water	Open-cut	Yes	No	Yes	Yes

contin.

Approval	Mine	Dam	Mining Type	Active Mining	Possible Effect on		Currently Monitoring
					Dam Storage	Dam Structure	
Ravensworth-1, 2	Narama	Ravensworth In-pit	Open-cut	Yes	Yes	Yes	Yes
Ravensworth Underground-1	Ravensworth Underground	Ravensworth Void 4 Tailings Dam (saddle dam)	Underground	Yes	No	Yes	Yes
Ashton-1	Ashton Underground	Ravensworth Inpit Storage	Underground	Yes	Yes	Yes	Yes
Moolarben-1	Moolarben	Moolarben Creek	Open-cut	Yes	No	Yes	Yes
Glennies-1	Camberwell North Open-cut	Camberwell TD2 & Possum Skin	Open-cut	Yes	Yes	Yes	Yes
Glennies-2, 3	Glennies Creek Underground	Mt. Owen Rail Loop TD	Underground	Yes	No	Yes	Yes

7.3. Information Systems

Background

Information Systems group is a support team involved in gathering, processing, storing, distributing and using information and its associated technologies for the DSC and the general public. It maintains hardware, software, procedures and data. The main products include providing support for the Surveillance team during their analysis of dam life cycle including investigation, design, construction, operation, modifications and decommissioning of dams, providing support for the Mining team for processing mining applications considered by the DSC and providing support to the DSC in developing work processes and efficient use of available resources.

2009/2010 Overview

The DSC was involved in prescribing 24 dams and processing 13 mining applications during this period. Installation of a new server and new database application has resulted in taking up a number of projects including Correspondence System, Dams Database and GIS system.

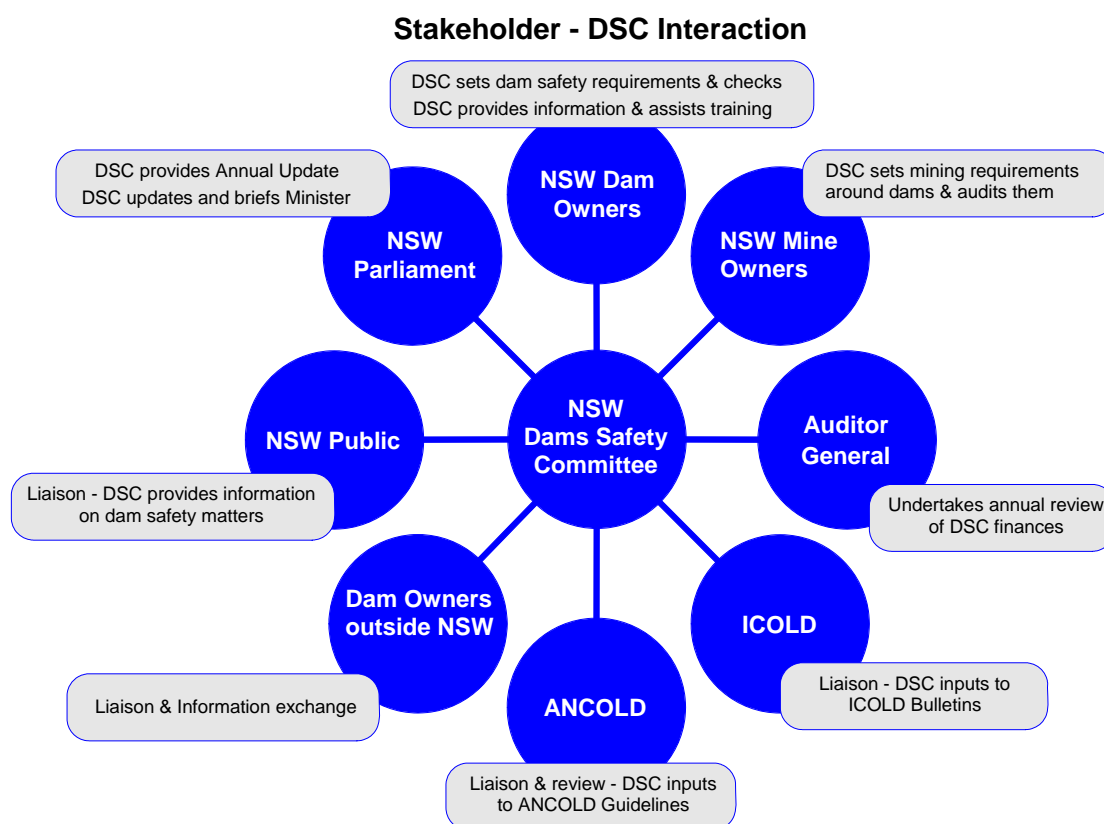
Some of the work outputs include:

- Processed incoming and outgoing data and kept them up to date in the database;
- Grouping and classification of data was done and better user permissions were assigned in order to maintain security of data;
- Maintaining records both in paper format and digital format;
- Digital data in the form of tapes were archived;
- Capture of metadata information was done;
- Desktop hardware and software were updated as per requirements;
- New Guidance Sheets that were formulated based on risk based regulation were formatted and uploaded onto the website.
- Assisted in conducting Risk Based Regulation Seminar in June to update dam owners and consultants on the essential features of these new Guidance Sheets.
- Assisted in organising various dams surveillance training programs across NSW.
- DSC Annual report designed and printed in-house.
- DSC IT infrastructure was maintained;
- SIX portals setup with DSC spatial data.

“In 2009/10 the DSC continued upgrading its databases and computer facilities”

8. Stakeholders

The DSC's role on dam safety in NSW requires interaction with a wide range of stakeholders as summarized in the following diagram:



8.1. Liaison with Stakeholders

In line with modern principles of good regulation, the DSC has adopted a goal of full *transparency* and continues to work toward having all its safety policies accessible to all stakeholders, by their incorporation into the new Guidance Sheets, now available on the DSC Internet site (<http://www.damsafety.nsw.gov.au>).

The DSC values a good working relationship with its key stakeholders, including affected communities, dam owners, mining companies and consultants. By this means the DSC can communicate its goals to engage co-operation in achieving dam safety. By understanding and recognizing their responsibilities and liability most dam owners and mining companies adopt a strong commitment to dam safety. The DSC maintains regular contacts with its key stakeholders to foster its dam safety roles and to give the DSC an opportunity to gauge their level of satisfaction.

The DSC also has a role to educate and inform dam owners on their responsibilities and on international standards, practice and technology. It communicates its objectives and concerns to dam owners and their representatives through various avenues, such as seminars, presentations and its Internet site. The DSC has also assembled a considerable library of publications and videotapes on various aspects of dams and their safety management. This material is available for loan to dam owners within NSW to assist in their management of dams.

“The DSC considers it essential to give all stakeholders an opportunity to comment on its policies”

“DSC staff were involved in running three dam safety training courses for NSW dam operators in 2009/10”

“Since 1992 over 1,000 operators have been trained in dam safety inspection, resulting in very notable improvements in the day to day dam owners’ inspection regime”



Stockton Borehole Tailings Dam

DSC staff and dams operators inspecting this dam as part of the DSC's Tailings Dams Inspection Course.

“DSC staff have also been very heavily involved in the development of the syllabus for the 5 dam units of competency within the Certificate III in the National Water Industry Operation Training Package NWPO7”

Close contact is maintained by the DSC with the NSW dam owners through meetings held during the year to discuss specific dam requirements, general procedures, and to ensure owners are able to communicate their concerns to the DSC. For example, during 2009/10 the DSC arranged for presentations from Mid Western Regional Council, State Water, Land & Property Management Authority and Clarence Colliery on Redbank Creek Dam, State Water's dam upgrading program Bethungra dam, and mining near Lithgow No. 2 Dam respectively.

The dam safety education of local government authorities, mining companies and private dam owners is of particular interest to the DSC, because their staff do not usually have specialist engineering knowledge of dams. Education of these owners is assisted by regular site visits by the DSC and/or its staff to meet owners' representatives to discuss relevant issues. Such meetings are invaluable in reaching a common understanding of the problems facing these owners in regard to asset management and responsibilities to the community, and obtaining feedback for enhancing the DSC's education role. DSC members and staff met with various dam owners and also addressed Council and community meetings on a number of occasions during the year.

The DSC ran its first dam safety training course in 1991 with the assistance of the Department of Public Works. Since then regular training courses for dam operators were set up and run by the Department of Public Works and later by the Department of Water and Energy's Water Utilities Performance (WUP) Dams Safety Management group with the assistance of DSC staff. Four-day courses for dam operators were run by the Department of Water and Energy (DWE) in November 2009 with 28 attendees at Port Macquarie as part of this program. Since then, with changes to the structure of WUP, and with the advent of the new DSC Executive Engineer, the DSC has taken over the organization and running of these courses, and the first such course was run at Port Macquarie in February 2010 with 30 attendees. Courses are always very well attended, and since 1992 over 1,000 operators have been trained in dam safety inspection, resulting in very notable improvements in the day to day dam owners' inspection regimes.

In addition, the DSC ran a three day course for tailings dam operators in April 2010 at Port Stephens attended by 32 operators.

The WUP, and DSC staff, have also been very heavily involved in the development of the syllabus for the 5 dam units of competency within the Certificate III in the National Water Industry Operation Training Package NWPO7, to ensure the needs of all sections of the dams industry are addressed, and to provide a more flexible Qualification Framework for the continuing development of structured accredited training arrangements.

The DSC is also currently in the process of developing an agreement with TAFE NSW whereby full accreditation of the DSC's courses will occur. Unfortunately however, at this time, although the dam units have been finalized for NWOP7, the other water units have not, and hence this agreement has been delayed.

Due to the very heavy demand on the normal surveillance inspection courses, the DSC ran a special course for State Water at the Hume Dam in February 2010 which was attended by over 20 State Water operators.

This work is a key part of the DSC's educational role for dam owners in NSW and, accordingly, the DSC runs these sessions on a cost recovery basis.

The increasing emphasis by the DSC on owner education in NSW has been reflected in numerous requests from dam owners outside NSW for educational assistance. Such involvement is of value to the DSC in broadening its experience of dam safety management issues and in benchmarking its own performance against the procedures and practices of similar authorities. DSC ran training courses in Queensland, New Zealand and South Australia during the year in this regard.

8.2. Education and Training of Members and Staff

The DSC's members and staff have extensive and varied experience in dam engineering and mining. However, it is essential in any organization to keep abreast of modern developments in all the technical and societal fields related to its functions. This is particularly important in the case of the DSC, because of the diverse technical knowledge required from its small staff. Accordingly, the DSC's members and staff attended relevant conferences and courses during the year.

In November 2009, the Chairman, Executive Engineer, Surveillance Engineer and Dams Engineer attended the ANCOLD Conference on Dams, and an associated workshop on Dams Safety Management issues, held at Adelaide, South Australia. Many of the other DSC members also attended, as representatives of their own organizations.

During the year, DSC staff also attended relevant local technical seminars and conferences to update their proficiencies including the Small Dams Engineer's, Charles Navaratne, attendance of the ANCOLD sponsored safety evaluation of existing dams course. The DSC mining monitoring staff group also attended relevant conferences, with Manager Mining Impacts, David Hilyard attending Australian Groundwater for Decision Makers Course in July 2009. Bill Ziegler (Mining Project Officer) attended the Australian Groundwater Course in May 2010 and Heather Middleton (Project Officer Mining Regulation) attended the Australian Groundwater Modelling Course in August 2009.

During the year the DSC's expertise in monitoring mining activities near dams was internationally recognized when the highly respected International Water Power and Dam Construction journal requested Hilyard to prepare a technical paper on risks to dams from mining activities titled "The Dam Safety Minefield", which was published in the May 2010 issue.

As the DSC is very heavily reliant on its staff, and as part of its Policy of Staff Development and to further increase staff efficiency the DSC approved its staff's attendance at a Corporate Risk Management Course, a Senior First Aid Course, an MS Office Upgrade Course, and a Conflict Management Course.

In May 2010, DSC member Ian Landon-Jones attended the ICOLD 78th Annual Meeting, and associated technical committee meetings, held in Vietnam. During the year the Executive Engineer, Paul Heinrichs travelled to China and gave presentations on New South Wales Dams Safety Management to dam safety managers in Guiyang, Sichuan and Hubei provinces. He also inspected in the accompaniment of senior Chinese dam safety officials, over 15 major Chinese dams, including the Three Gorges dam and the Zipinpu dam, which was under repair following the recent Sichuan earthquake. Whilst these attendances were not arranged or funded by the DSC, the knowledge gained benefits the DSC's policy development, and technical capacities and is encouraged by the DSC.

"DSC members and staff attended relevant conferences and courses during the year to keep abreast of modern developments"

DSC expertise in monitoring mining activities near dams has been internationally recognized

Hilyard wrote a technical paper "The Dam Safety Minefield" for International Water Power and Dam Construction journal

9. Administration and Human Resources

DSC members are subject to the Premier's Department Conduct Guidelines and the DSC staff is subject to the NSW Office of Water (NOW) Code of Ethics and Conduct. As an extension of those requirements, the DSC has established policies on Managing Conflicts of Interest and on Interactions with Stakeholders and the Public. The DSC has a policy of Delegated Authority, with a Schedule of Delegations, to guide members and staff.

The DSC rents office space with the NOW in Parramatta and, to maximize the effectiveness of DSC staff, reimburses that Department for its administration and human resources assistance, accounting, insurance scheme and legal services. In addition, ServiceFirst - NSW Department of Services, Technology & Administration (DoSTA) provided the DSC with financial processing support, maintaining the accounting system, the payment of invoices, and provision of payroll service, receipting, and the provision of taxation services for the 12 month period to 30 June 2010 and provided a letter of comfort at the conclusion of the year indicating satisfactory performance of DSC functions supported by ServiceFirst. Other authorities, that nominate members to the DSC, continue to provide technical assistance in specialised areas and the DSC wishes to acknowledge their assistance.

As part of the DSC's administrative alignment with the NOW, the DSC's Freedom of Information (FOI) statistics are published in that Department's Annual Report. A supplement, pursuant to the Annual Reporting Requirements issued by the Premier's Department on 27 June 1991, will accompany the DSC's statistics. There was only one request for information under FOI legislation during the year.

The DSC has adopted NOW's Occupational Health, Safety and Rehabilitation (OHS&R) practices, with necessary minor adaptations, to ensure the maintenance of appropriate standards of work practice in the DSC. Also DSC staff updated their first aid training to facilitate safe inspection practices. In relation to OHS&R there were no work injuries to DSC staff during the year. DSC staff also received various items of personal protective equipment for use at field inspections.

As part of its contracted administration assistance to the DSC, the NOW implement Equal Employment Opportunity (EEO) and Ethnic Affairs matters for, and with, the DSC. The DSC is aware of, and committed to, the principles of multi-culturalism, but all policies relating to this area are programmed under the NOW's overarching banner. The DSC employs a very culturally and ethnically diverse group of male and female staff as part of its Multicultural Policies and Services program.

The DSC is progressively implementing the Government's Waste Reduction and Purchasing Policy by implementing more electronic storage of information and use of recycled paper.



The DSC employs a culturally, ethnically diverse group of male and female staff as part of its Multicultural Policies.

10. Finance

10.1. Dams Safety Committee Certificate

DAMS SAFETY COMMITTEE **Certificate under Section 41C (1B) and (1C)** **of the Public Finance and Audit Act 1983**

Pursuant to the *Public Finance and Audit Act, 1983*, we declare that, in our opinion:

- a) The accompanying financial report exhibits a true and fair view of the financial position of the Dams Safety Committee as at 30 June 2010, and transactions for the year then ended.
- b) The report has been prepared in accordance with:
 - applicable Australian Accounting Standards (which include Australian Accounting Interpretations);
 - other authoritative pronouncements of the Australian Accounting Standards Board; and
 - the requirements of the *Public Finance and Audit Act 1983* and Public Finance and Audit Regulation 2005.
- c) There are no circumstances, which would render any particulars included in the financial report to be misleading or inaccurate.

For and on behalf of the Committee.



B. COOPER
CHAIRMAN
Dated: 12 October 2010



J. Gleeson
DEPUTY CHAIRMAN
Dated: 12 October 2010

10.2. Auditor General's Certificate



GPO BOX 12
Sydney NSW 2001

INDEPENDENT AUDITOR'S REPORT

Dams Safety Committee

To Members of the New South Wales Parliament

I have audited the accompanying financial statements of the Dams Safety Committee (the Committee), which comprises the statement of financial position as at 30 June 2010, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year then ended, a summary of significant accounting policies and other explanatory notes.

Auditor's Opinion

In my opinion, the financial statements:

- present fairly, in all material respects, the financial position of the Committee as at 30 June 2010, and its financial performance for the year then ended in accordance with Australian Accounting Standards (including the Australian Accounting Interpretations)
- are in accordance with section 41B of the *Public Finance and Audit Act 1983* (the PF&A Act) and the Public Finance and Audit Regulation 2010

My opinion should be read in conjunction with the rest of this report.

The Committee Responsibility for the Financial Statements

The members of the Committee are responsible for the preparation and fair presentation of the financial statements in accordance with Australian Accounting Standards (including the Australian Accounting Interpretations) and the PF&A Act. This responsibility includes establishing and maintaining internal controls relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I conducted my audit in accordance with Australian Auditing Standards. These Auditing Standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal controls relevant to the Committee's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Committee's internal controls. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the Committee as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

My opinion does *not* provide assurance:

- about the future viability of the Committee
- that it has carried out its activities effectively, efficiently and economically
- about the effectiveness of its internal controls.

Independence

In conducting this audit, the Audit Office of New South Wales has complied with the independence requirements of the Australian Auditing Standards and other relevant ethical requirements. The PF&A Act further promotes independence by:

- providing that only Parliament, and not the executive government, can remove an Auditor-General
- mandating the Auditor-General as auditor of public sector agencies, but precluding the provision of non-audit services, thus ensuring the Auditor-General and the Audit Office of New South Wales are not compromised in their role by the possibility of losing clients or income.



M T Spriggins
Director, Financial Audit Services

14 October 2010
SYDNEY

10.3. Audited Financial Report**Statement of comprehensive income for the year ended 30 June 2010**

	Notes	2010 \$'000	2009 \$'000
Revenue			
Government contributions	3a	1,333	1,260
Other revenue	3b	475	395
Total Revenue		1,808	1,655
Expenses excluding losses			
Personnel services expenses	2a	1,244	1,088
Depreciation and amortisation	2b	18	19
Finance costs	2c	-	-
Other operating expenses	2d	525	551
Total expenses excluding losses		1,787	1,658
SURPLUS/ (DEFICIT) FOR THE YEAR		21	(3)
Other comprehensive income		-	-
TOTAL COMPREHENSIVE INCOME		21	(3)

Statement of financial position as at 30 June 2010

	Notes	2010 \$'000	2009 \$'000
Current Assets			
Cash & cash equivalents	4	60	34
Receivables	5	59	80
Total Current Assets		119	114
Non-Current Assets			
Plant and equipment	6	39	28
Intangible assets	7	17	24
Total Non-Current Assets		56	52
Total Assets		175	166
LIABILITIES			
Current Liabilities			
Payables	8	82	109
Provisions	9	42	19
Other	10	8	8
Total Current Liabilities		132	136
Non-Current Liabilities			
Other	11	8	16
Total Non-Current Liabilities		8	16
Total Liabilities		140	152
Net Assets		35	14
EQUITY			
Accumulated funds	12	35	14
Total Equity		35	14

The accompanying notes form part of these financial statements.

Statement of changes in equity for the year ended 30 June 2010

	Notes	Accumulated Funds \$'000	Total \$'000
Balance at 1 July 2009		14	14
Surplus / (deficit) for the year		21	21
Other comprehensive income		-	-
TOTAL COMPREHENSIVE INCOME FOR THE YEAR		21	21
Balance at 30 June 2010	12	35	35
Balance at 1 July 2008		17	17
Surplus / (deficit) for the year		(3)	(3)
Other comprehensive income		-	-
TOTAL COMPREHENSIVE INCOME FOR THE YEAR		(3)	(3)
Balance at 30 June 2009		14	14

Statement of cash flows for the year ended 30 June 2010

	Notes	2010 \$'000	2009 \$'000
CASH FLOWS FROM OPERATING ACTIVITIES			
<i>Receipts</i>			
Receipts from government and customers		1,540	1,443
Interest received		1	2
Total Receipts		1,541	1,445
<i>Payments</i>			
Payments to suppliers, employees etc.		(1,493)	(1,411)
Finance costs		-	-
Total Payments		(1,493)	(1,411)
NET CASH FLOWS FROM OPERATING ACTIVITIES	13	48	34
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchases of plant and equipment		(22)	(2)
NET CASH FLOWS FROM INVESTING ACTIVITIES		(22)	(2)
NET INCREASE / (DECREASE) IN CASH		26	32
Opening cash and cash equivalents		34	2
CLOSING CASH AND CASH EQUIVALENTS	4	60	34

The accompanying notes form part of these financial statements

Notes to the financial statements

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

(a) Reporting Entity

The Dams Safety Committee (the 'Committee') was constituted in 1979, under the *Dams Safety Act 1978* to ensure the owners of the State's major dams conform to appropriate safety requirements in order to prevent uncontrolled loss of their storages with consequent effects on the community, environment and water supply.

The Committee operates in New South Wales, Australia. The office is located on Level 3, 10 Valentine Avenue, Parramatta, NSW 2150.

The Committee is a Statutory Body and separate reporting entity. There are no other entities under its control. The Committee is a not-for-profit entity (as profit is not its principal objective) and it has no cash generating units.

Notes to the financial statements

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

The financial statements have been authorised for issue by the Chairman of the Committee on 12 October 2010.

(b) Basis of Preparation

The Committee's financial report is a general purpose financial report which has been prepared in accordance with:

- applicable Australian Accounting Standards (which include Australian Accounting Interpretations) and
- the requirements of the *Public Finance and Audit Act 1983* and Public Finance and Audit Regulation 2010.

The financial statements are prepared in accordance with the historical cost convention.

Judgements, key assumptions and estimations management has made are disclosed in the relevant notes to the financial report.

All amounts are rounded to the nearest one thousand dollars and are expressed in Australian currency.

(c) Statement of Compliance

The financial statements and notes comply with Australian Accounting Standards, which include Australian Accounting Interpretations.

(d) Income Recognition

Income is measured at the fair value of the consideration or contribution received or receivable. Additional comments regarding the accounting policies for the recognition of income are discussed below.

1. Contributions from Government and other bodies are generally recognised as income when the agency obtains control over the assets comprising the contributions. Control over contributions is normally obtained upon receipt of cash.
2. Sale of Goods: Revenue from the sale of goods is recognised as revenue when the agency transfers the significant risks and rewards of ownership of the assets.
3. Rendering of Services: Revenue is recognised when the service is provided or by reference to the stage of completion (based on labour hours incurred to date).
4. Investment income: Interest revenue is recognised using the effective interest method as set out in AASB 139 *Financial Instruments: Recognition and Measurement*.

(e) Personnel Services

1. Personnel Services

Personnel Services liabilities in respect to salaries and wages (including non-monetary benefits), annual leave and paid sick leave that fall due wholly within 12 months of the reporting date are recognised and measured in respect of employee's services up to the reporting date at undiscounted amounts based on the amounts expected to be paid when the liabilities are settled.

Personnel Services liabilities covering long-term annual leave are measured at nominal value.

Unused non-vesting sick leave does not give rise to a liability as it is not considered probable that sick leave taken in the future will be greater than the benefits accrued in the future.

2. Long Service Leave and Defined Benefits Superannuation

The Committee has no liability for long service leave and defined benefits superannuation as personnel services are acquired from the NSW Office of Water. The liability of these items has been assumed by the Crown Entity.

(f) Insurance

The Committee's insurance activities are conducted through the NSW Treasury Managed Fund Scheme of self insurance for Government agencies. The expense (premium) is determined by the Fund Manager based on past experience.

(g) Accounting for the Goods and Services Tax (GST)

Revenues, expenses and assets are recognised net of the amount of GST, except:

- The amount of GST incurred by the Authority as a purchaser that is not recoverable from the Australian Taxation Office is recognised as part of the cost of acquisition of an asset or as part of an item of expense.
- Receivables and payables are stated with the amount of GST included.

The net amount of GST recoverable from or payable to the Australian Taxation Office is included as part of receivables and payables.

Cash flows are included in the statement of cash flows on a gross basis. However, the GST components of cash flows arising from investing and financing activities which is recoverable from, or payable to, the Australian Taxation Office are classified as operating cash flows.

(h) Acquisitions of Assets

The cost method of accounting is used for the initial recording of all acquisitions of assets controlled by the Committee. Cost is the amount of cash or cash equivalents paid or the fair value of the other consideration given to acquire the asset at the time of its acquisition, where applicable, the amount attributed to the asset when initially recognised in accordance with the requirements of other Australian Accounting Standards.

(i) Capitalisation Thresholds

Plant and equipment and intangible assets costing \$5,000 and above individually (or forming part of a network costing more than \$5,000) are capitalised.

(j) Revaluation of Plant and Equipment

Physical non-current assets are valued in accordance with the "Valuation of Physical Non-Current Assets at Fair Value" Policy and Guidelines Paper (TPP 07-1). This policy adopts fair value in accordance with AASB 116 *Property, Plant and Equipment*. Plant and equipment is measured on an existing use basis, where there are no feasible alternative uses in the existing natural, legal, financial and socio-political environment.

Non-specialised assets with short useful lives like plant and equipment are measured at depreciated historical cost, as a surrogate for fair value.

Notes to the financial statements

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**(k) Depreciation and amortisation of Plant and Equipment**

Depreciation is provided for on a straight-line basis for all depreciable assets so as to write off the depreciable amount of each asset as it is consumed over its useful life to the Committee. All depreciable assets are depreciated at 25 per cent per year. Leasehold improvements are amortised over the life of the lease.

(l) Intangible Assets

The Committee recognises intangible assets only if it is probable that future economic benefits will flow to the Committee and the cost of the asset can be measured reliably. Intangible assets are measured initially at cost. Where an asset is acquired at no or nominal cost, the cost is its fair value as at the date of acquisition.

The useful lives of intangible assets are assessed to be finite.

Intangible assets are subsequently measured at fair value only if there is an active market. As there is no active market for the Committee's intangible assets, the assets are carried at cost less any accumulated amortisation.

The Committee's intangible assets are amortised using the straight line method over a period of 4 years.

(m) Restoration Cost

The estimated cost of dismantling and removing an asset and restoring the site is included in the cost of an asset, to the extent it is recognised as a liability.

(n) Receivables

Receivables are recognised initially at fair value, usually based on the transaction cost or face value. Subsequent measurement is at amortised cost using the effective interest method, less an allowance for any impairment of receivables. Short-term receivables with no stated interest rate are measured at the original invoice amount where the effect of discounting is immaterial. An allowance for impairment of receivables is established when there is objective evidence that the entity will not be able to collect all amounts due. The amount of the allowance is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the effective interest rate. Bad debts are written off as incurred.

(o) Other Assets

Other assets are recognised on a cost basis.

(p) Payables

These amounts represent liabilities for goods and services provided to the Committee and other amounts, including interest. Payables are recognised initially at fair value, usually based on the transaction cost or face value. Subsequent measurement is at amortised cost using the effective interest method. Short-term payables with no stated interest rate are measured at the original invoice amount where the effect of discounting is immaterial.

(q) Other Liabilities

A distinction is made between finance leases which effectively transfer from the lessor to the lessee substantially all the risks and benefits incidental to ownership of the leased assets, and operating leases under which the lessor effectively retains all such risks and benefits. The leasing transactions of the Committee are restricted to operating leases of buildings. Lease payments are recognised as expenses over the lease terms. Operating lease payments are charged to the operating statement in the periods in which they are incurred. Lease incentives are shown as a liability and amortised via a reduction in lease expenditure over the life of the lease.

(r) New Australian Accounting Standards Issued but not effective

At reporting date, the following list of Australian Accounting Standards and Interpretations adopted by the Australian Accounting Standards Board had been issued, but were not yet operative. These accounting standards have not been early adopted by the Department on the basis that NSW Treasury Mandate (TC 09/03) precludes this.

Accounting Standard	Issue Date	Application Date for Annual Reporting Periods Beginning on or after
AASB 9 Financial Instruments	December 2009	1 January 2013
AASB 124 Related Party Disclosures	December 2009	1 January 2011
AASB 118 Revenue	May 2009	1 January 2010
AASB 2009-5 Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project	May 2009	1 January 2010
AASB 2009-9 First-time Adoption of Australian Accounting Standards	February 2010	1 July 2010
AASB 2009-11 Amendments to Australian Accounting Standards arising from AASB-9	December 2009	1 January 2013
AASB 2009-12 Amendments to Australian Accounting Standards	December 2009	1 January 2011
AASB 2010-2 Amendments to Australian Accounting Standards arising from Reduced Disclosure Requirements	June 2010	1 July 2013
AASB 2010-3 Amendments to Australian Accounting Standards arising from the Annual Improvements Project	June 2010	1 July 2010
AASB 2010-4 Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project	June 2010	1 July 2011

The Committee has assessed these new accounting standards and it is anticipated that, other than matters pertaining to presentation, there will be no material financial impact from their adoption in future periods on the financial statements.

Notes to the financial statements

2. EXPENSES EXCLUDING LOSSES

	2010 \$'000	2009 \$'000
(a) Personnel services expenses		
Salaries and wages (including recreation leave)	1,015	897
Staff on-cost	229	191
	1,244	1,088
(b) Depreciation and amortisation		
Depreciation - Computers	5	4
Depreciation - Intangible Assets	8	7
Depreciation - Low Value Assets	-	4
Leasehold improvement	5	4
	18	19
(c) Interest expense on makegood provision	-	-
	-	-
(d) Other operating expenses		
Auditor's remuneration	9	9
Committee Member's expenses	39	35
Contractors	46	48
Fees for services	9	35
Accommodation	77	116
Plant / Vehicle	16	13
Travel	33	35
Computer expenses	42	24
Telephones	3	4
Staff training	29	8
Maintenance contract – office equipment	-	2
Equipment	3	1
Entertainment & events	53	2
Printing	10	11
In kind expenses	140	160
Other	16	48
	525	551

3. REVENUE

(a) Government contributions		
Department of Water and Energy	1,333	1,260
	1,333	1,260
(b) Other Income		
Interest	1	2
Long Service Leave Liability – assumed by Crown	38	62
Superannuation – assumed by Crown	104	101
Pay-roll Tax – assumed by Crown	6	-
Committee Support In Kind Contribution	140	160
Other	186	70
	475	395

4. CURRENT ASSETS – CASH AND CASH EQUIVALENTS

Cash at bank and on hand	60	34
Closing Cash and Cash Equivalents	60	34

Refer Note 16 for details regarding credit risk, liquidity risk and market risk arising from financial instruments.

5. CURRENT ASSET - RECEIVABLES

Accrued income receivable	49	75
Goods and Services Tax recoverable from ATO	8	5
Corporate Cards – Recoverable	2	-
	59	80

Details regarding credit risk, liquidity risk and market risk, including financial assets that are wither past due or impaired, are disclosed in Note 16.

Notes to the financial statements

6. NON-CURRENT ASSETS – PLANT AND EQUIPMENT

	Plant and Equipment \$'000	Leasehold Improvement \$'000	Total \$'000
At 1 July 2009 – fair value			
Gross carrying amount	35	18	53
Accumulated depreciation	(18)	(7)	(25)
Net carrying amount	17	11	28
At 30 June 2010 – fair value			
Gross carrying amount	34	40	74
Accumulated depreciation	(23)	(12)	(35)
Net carrying amount	11	28	39

Reconciliation

A reconciliation of the carrying amount of each class of plant and equipment at the beginning and end of the current reporting period is set below.

	Plant and Equipment \$'000	Leasehold Improvement \$'000	Total \$'000
Year ended 30 June 2010			
Net carrying amount at 01 July 2009	17	11	28
Additions	-	22	22
Depreciation expenses	(6)	(5)	(11)
Net carrying amount at 30 June 2010	11	28	39
Year ended 30 June 2009			
Net carrying amount at 01 July 2008	25	13	38
Additions	-	2	2
Depreciation expenses	(8)	(4)	(12)
Net carrying amount at 30 June 2009	17	11	28

7. NON-CURRENT ASSETS – INTANGIBLE ASSETS

	Software \$'000
At 1 July 2009 – fair value	
Gross carrying amount	31
Accumulated amortisation	(7)
Net carrying amount	24
At 30 June 2010 – fair value	
Gross carrying amount	31
Accumulated amortisation	(14)
Net carrying amount	17

Reconciliation

A reconciliation of the carrying amount of software at the beginning and end of the current reporting period is set below.

Year ended 30 June 2010	
Net carrying amount at 01 July 2009	24
Additions	-
Amortisation expenses	(7)
Net carrying amount at 30 June 2010	17
Year ended 30 June 2009	
Net carrying amount at 01 July 2008	31
Additions	-
Amortisation expenses	(7)
Net carrying amount at 30 June 2009	24

8. CURRENT LIABILITIES - PAYABLES

	2010 \$'000	2009 \$'000
Accrued personnel services	13	10
Creditors	-	-3
Accrued expenditure	67	102
Other	2	-
	82	109

Details regarding credit risk, liquidity risk and market risk, including a maturity analysis of the above payables, are disclosed in Note 16.

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENT 2009-2010

9. CURRENT LIABILITIES - PROVISIONS

	2010 \$'000	2009 \$'000
Leasehold obligations - provision	42	19
	<u>42</u>	<u>19</u>

10. CURRENT LIABILITY - OTHER

Lease incentive	8	8
	<u>8</u>	<u>8</u>

11. NON-CURRENT LIABILITIES - OTHER

Lease incentive	8	16
	<u>8</u>	<u>16</u>

12. CHANGE EQUITY

	Accumulated Funds		Total Equity	
	2010 \$'000	2009 \$'000	2010 \$'000	2009 \$'000
Balance at the beginning of the year 1 July 2009	14	17	14	17
<u>Changes in equity – other than transactions with owners as owners</u>				
Surplus / (Deficit) for the year	21	(3)	21	(3)
Balance at the end of the financial year	<u>35</u>	<u>14</u>	<u>35</u>	<u>14</u>

13. NOTE TO CASH FLOW STATEMENT

Cash

For the purpose of the Cash Flow Statement, cash includes cash on hand and cash at bank. Cash at the end of the financial year as shown in the Statement of Cash Flows is reconciled to the Statement of Financial Position in Note 4.

Reconciliation of surplus / (deficit) for the year to net cash flows from operating activities

	2010 \$'000	2009 \$'000
Net operating result	21	(3)
Depreciation and amortisation	18	19
Changes in operating assets and liabilities		
(Increase) / decrease in accounts receivable	21	113
Increase / (decrease) in accounts payable & provisions	(12)	(95)
Net cash provided by (used in) operating activities	<u>48</u>	<u>34</u>

14. CONTINGENT LIABILITIES

The Committee is not aware of any material contingent liabilities.

15. COMMITMENTS FOR EXPENDITURE

	2010 \$'000	2009 \$'000
Operating lease commitments		
Future non-cancellable operating lease rentals not provided for and payable: not later than 1 year	90	98
later than 1 year, but not later than 5 years	86	173
	<u>176</u>	<u>271</u>

Commitments above include input tax credits of \$15,958 (2009: \$24,656) that are expected to be recovered from the Australian Taxation Office.

16. FINANCIAL INSTRUMENTS

The Committee's principal financial instruments are outlined below. These financial instruments arise directly from the Committee's operations or are required to finance Committee's operations. The Committee does not enter into or trade financial instruments for speculative purposes. The Committee does not use financial derivatives.

The Committee's main risks arising from financial instruments are outlined below, together with the Committee's objectives, policies and processes for measuring and managing risk. Further quantitative and qualitative disclosures are included throughout these financial statements.

The Committee members have overall responsibility for the establishment and oversight of risk management and reviews and agrees policies for managing each of these risk. Risk management policies are established to identify and analyse the risks faced by the Committee, to set risk limits and controls and to monitor risk.

Compliance with policies is reviewed by the Committee members on a continuous basis.

Notes to the financial statements

FINANCIAL INSTRUMENTS (continued)

(a) Financial instrument categories

Financial Assets	Note	Category	Carrying Amount 2010 \$'000	Carrying Amount 2009 \$'000
Class:				
Cash and cash equivalents	4	N/A	60	34
Receivables ¹	5	Receivables	59	75
			<u>119</u>	<u>109</u>
Financial Liabilities	Note	Category	Carrying Amount 2010 \$'000	Carrying Amount 2009 \$'000
Class:				
Payables ²	8	Financial Liabilities measured at amortised cost	82	109
			<u>82</u>	<u>109</u>

Notes:

¹ Excludes statutory receivables and prepayments (i.e. not within scope of AASB 7). Therefore, the 'receivables' total in the above table will not reconcile to the receivables total recognised in the Statement of Financial Position.

² Excludes statutory payables and unearned revenue (i.e. not within scope of AASB 7). Therefore, the 'payables' total in the above table will not reconcile to the payables total recognised in the Statement of Financial Position.

(b) Credit Risk

Credit risk arises from the financial assets of the Committee, including cash, receivable, and authority deposits. No collateral is held by the Committee. The Committee has not granted any financial guarantees.

Cash

Cash comprises cash on hand and bank balances. Interest is earned on daily bank balances at the monthly average NSW Treasury Corporation (Tcorp) 11am unofficial cash rate, adjusted for a management fee to NSW Treasury.

Receivables – trade debtors

All trade debtors are recognised as amounts receivable at balance date. Collectibility of trade debtors is reviewed on an ongoing basis. Procedures as established in the Treasurer's Direction are followed to recover outstanding amount. No interest is earned on trade debtors. Sales are made on 30 day terms.

The outstanding amount of debtors are all within payment terms and not past due. An allowance for impairment has not been established as it is considered by the Committee that all debts owing are recoverable.

(c) Liquidity Risk

The Committee manages its liquidity risk as much as practicable through the effective application of cash management practices. These practices aim to reduce the exposure to liquidity risk by ensuring the Committee has sufficient funds available to meet supplier obligations at all times. This is achieved by ensuring that minimum levels of cash are held within Committee's operating bank account so as to match the expected duration of the various supplier liabilities.

The liabilities are recognised for amounts due to be paid in the future for goods or services received, whether or not invoiced. Amounts owing to suppliers (which are unsecured) are settled in accordance with the policy set out in Treasurer's Direction 219.01. If trade terms are not specified, payment is made no later than the end of month following the month in which an invoice or a statement is received. Treasurer's Direction 219.01 allows the Minister to award interest for late payment. During the year there were no interest charges for late payment.

The table below summarises the maturity profile of the Committee's financial assets and liabilities, together with the interest rate exposure.

	Interest Rate Exposure			Maturity Dates		Total
	Weighted Average Rate	Non Interest Bearing	1 year or less	1 to 5 years	Greater than 5 years	
	%	\$'000	\$'000	\$'000	\$'000	\$'000
30 June 2010						
Financial Liabilities						
Payables	N/A	82	82			82
Total Financial Liabilities		82	82	-	-	82
30 June 2009						
Financial Liabilities						
Payables		109	109			109
Total Financial Liabilities		109	109	-	-	109

Notes to the financial statements

16. FINANCIAL INSTRUMENTS (continued)

(d) Market Risk

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. The Committee has no exposure to market risk as it holds no financial instruments that are impacted by market prices. The Committee has no exposure to foreign currency risk and does not enter into commodity contracts.

Interest rate risk

The Committee does not hold any interest bearing liabilities and is not exposed to interest rate risk in relation to financial liabilities. Therefore, for these financial instruments, a change in interest rates would not affect profit and loss or equity. For financial assets which are impacted by interest rate fluctuations a reasonably possible change of +/- 1% is used, consistent with current trends in interest rates. The basis will be reviewed annually and amended where there is a structural change in the level of interest rate volatility. The Committee's exposure to interest rate risk is set out below.

	Carrying Amount	-1% Profit	Equity	1% Profit	Equity
	\$'000	\$'000	\$'000	\$'000	\$'000
2010					
<i>Financial assets</i>					
Cash and cash equivalents	60	-	-	-	-
Receivables	59	-	-	-	-
<i>Financial liabilities</i>					
Payables	82	-	-	-	-
2009					
<i>Financial assets</i>					
Cash and cash equivalents	34	-	-	-	-
Receivables	75	-	-	-	-
<i>Financial liabilities</i>					
Payables	109	-	-	-	-

(e) Fair Value

The amortised cost of financial instruments recognised in the balance sheet approximates fair value, because of the short-term nature of those financial instruments.

17. AFTER BALANCE DATE EVENT

There are no known post balance date events that would have an effect on the Financial Report.

END OF AUDITED FINANCIAL REPORT

10.4 Internal Audit and Risk Management Attestation for the 2009/10 Financial Year

The Dams Safety Committee was unable to comply with Treasury's requirements to implement an *Internal Audit and Risk Management Policy for the NSW Public Sector*.

However we initiated actions to ensure that the new requirements are in place for 2010/11.

10.5 Dams Safety Committee 2009/2010 – Budgetary Information

Item	2009/10 Budget (\$)	2009/10 Actual (\$)	20010/11 Budget (\$)
Income			
Consolidated Fund	1,340,000	1,333,000	1,540,000
Interest Income	2,000	1,000	2,000
Miscellaneous (e.g. Training etc)	2,000	186,000	120,000
Total	1,344,000	1,520,000	1,662,000
Expenditure			
Administration (incl. Audit-\$9,000)	331,000	350,000	650,000
Dam Surveillance	548,000	657,000	700,000
Mining Investigations	465,000	492,000	312,000
Total	1,344,000	1,499,000	1,662,000
Operating Surplus / (Deficiency)	0	21,000	0

Appendix A – Dam Owner Summary 30 June 2010

Dam Owner	Prescribed Dams	Surv. Reports Rec'd 09/10	DSC inspections 09/10
Councils	139	16	48
Sydney Water / Catchment Authority	37	4	2
Delta, Macquarie Generation, Eraring Energy	19	2	4
State Water	22	3	2
Other State Authorities	10	1	2
Snowy Hydro	16	2	1
Non State Authorities	3	-	1
Mining Companies	97	39	31
Other Ownership	17	3	3
TOTAL	360	70	94

Appendix B – 2009-Current Prescribed Dams in NSW

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Abbotsbury Park Pond 2	F10		2004	TE	6		Western Sydney Parklands Trust
AH Whaling Reserve Detention Basin	F10		-				Baulkham Hills Council
Aldridges Creek	D11		1994	ER	23	1250	Consolidated Pastoral Company P/L
Antiene Lease Tailings	E11		2000	TE/ER	10.5	3100	Liddell Tenements Pty Ltd
Ashton Coal Clean Water Dam 1	E10		-	TE	14.5	362	Ashton Coal Operations Ltd
Ashton Tailings Dam*	E11		2004	TE	4.5	200	Ashton Coal Operations Pty Limited
Avon	G10		1927/71	PG/ ER	72	214360	Sydney Catchment Authority
Bagnalls Beach Road Basin	E12		1998	TE	3.5		Port Stephens Council
Bakers Road Detention Basin	C13		-	TE	6.5	200	Coffs Harbour Council
Bamarang	G10		1983	TE	26	3800	Shoalhaven City Council
Banks Rd Basin	F10		1997	TE	4	40	Liverpool City Council
Barden Ridge Lower*	F10		2007	PG	22	36	Sutherland Shire Council
Bayswater Ash	E10		1985	TE	39	22000	Macquarie Generation
Bayswater Brine Decant	E10		1986	TE	21.5	650	Macquarie Generation
Bayswater Cooling Makeup	E10		1984	TE	11.5	460	Macquarie Generation
Bayswater Main*	E10		1979	TE	27	1200	Hunter Water Australia
Beardy Waters	B11		1932/60	VA	8.5	480	Glen Innes Severn Council
Beargamil	F8		1914	TE	16	480	Parkes Shire Council
Ben Boyd	J9		1978	TE	29	800	Bega Valley Shire Council
Bendeela Pondage	G10		1973	TE/ER	17	1200	Sydney Catchment Authority
Bengalla Stage Discharge*	E10		2000	TE	10	280	Bengalla Mining Company
Bethungra*	G7	R	1895	PG	13	600	NSW Department of Lands
Blackbutt Reserve*	G10		1957/95	TE	6	17	Shellharbour City Council
Bloomfield U Cut Tailings Dam	E11		-	TE	14	4000	Bloomfield Collieries
Blowering*	H8	R	1968	TE/ER	112	1631410	State Water Corporation
Bobs Dump Tailings*	E10		-	TE/ER	25	2100	Coal & Allied Operations Pty Ltd
Boorowa	G8		1940	PG/TE	8	180	Boorowa Council
Bootawa	D12	I	1967	TE	25	2280	Midcoast Water
Borenore Creek	F8		1928	VA	17	200	Cabonne Shire Council
Brennans Creek*	G10		1976	DR	17	320	BHP Billiton - Illawarra Coal
Brogo	I9		1976	DR	43	8980	State Water Corporation
Brokers Road Retarding Basin*	G10		2000	TE	5	70	Wollongong City Council
Brooklyn Retarding Basin	F11		1995	ER	4.8	3.7	Rail Infrastructure Corporation
Broughton's Pass Weir	G10		1888	PG	6	50	Sydney Catchment Authority
Broula King Gold Mine Tailings	F8		-		18	25	Broula King Joint Venture Pty Ltd

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Broula King Gold Mine Tailings 2	F8		-	TE	18	25	Broula King Joint Venture Pty Ltd
Bucklands Retarding Basin	G10		1991	TE	5	1.8	Diane Ramsey
Bulga CHPP Dam*	E11		-	TE	13.5	3000	Bulga Coal Management
Bulga Old Tailings*	E11		1981	TE/Claylined (uncompacted overburden)	14	1750	Xstrata-Bulga Coal
Bundanoon	G10		1960	VA	35	2000	Wingecarribee Shire Council
Burrendong	E9	R	1967	TE/ER	76	1188000	State Water Corporation
Burrinjuck	H8		1928/56/96	PG	93	1026000	State Water Corporation
Cadia North Waste Dump Detention	F8		2003	ER	18	50	Cadia Holdings Pty Ltd
Cadia Southern Tailings Storage Facility	F8		2001-	TE/ER	72	91000	Cadia Holdings Pty Ltd
Cadia Tailings	F8		1997-	ER	48		Cadia Holdings Pty Ltd
Cadiangullong	F8		1997	PG	43		Cadia Holdings Pty Ltd
Camberwell Tailings 2*	E11		2002	TE/ER	33	3500	Integra Coal Operations p/l
Campbelltown Link Area Basin 1*	G10		2003	TE	5.7	26.1	Campbelltown City Council
Campbelltown, North Detention Basin*	G10		2001	TE	3	30	Campbelltown City Council
Captains Flat	H9		1939/93	PG	16	820	Palerang Council
Carcoar	F9		1970	VA	52	35800	State Water Corporation
Cascade 1	F10		1915	VA	15.2	159	Sydney Catchment Authority
Cascade 2	F10		1926	TE	26	318	Sydney Catchment Authority
Cascade 3	F10		1938	TE	30	1704	Sydney Catchment Authority
Cataract	G10		1907/87	PG	56	94300	Sydney Catchment Authority
Cecil Hills Basin 100	F10		2001	TE	4	30	Liverpool City Council
Cecil Park Basin 3A	F10		1992	TE	6.2	52	Landcom
Centennial Pk Res No. 1	F11		1899	PG	7	80.5	Sydney Water Corporation
Centennial Pk Res No. 2	F11		1925	PG/ TE	9.5	89	Sydney Water Corporation
Central Garden Detention Basin	G10		-	TE	3.25	27.81	Holroyd Council
Chaffey	D11	R	1976	TE/ ER	55.8	61800	State Water Corporation
Chichester	E11		1923/84/95	PG	44	21500	Hunter Water Corporation Ltd
Chifley	F9		1957	TE	34.5	30800	Bathurst Regional Council
Clarrie Hall*	A13	M	1982	DR	43	16000	Tweed Shire Council
Clear Paddock Creek Basin C	F11		2005	TE	5.5	70	Fairfield City Council
Clear Paddock Creek Basin W2	F10		2007		5.5	70	Fairfield City Council
Clear Paddock Creek Basin W3	F10		2010		5.5	70	Fairfield City Council
Coalcliff	G10		1971	TE	9	130	Illawarra Coke Company
Cochrane	I9		1958	TE	29	3085	Eraring Energy
Colongra Creek Ash	F11		1965	TE	6.7	5550	Delta Electricity
Comberton Grange Ret. Basin	G10		1990	TE	15	65	Shoalhaven City Council
Comin Place Detention Basin	F10		2000	TE	4.5	20	Fairfield City Council

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Company	F8		1867/2006	TE	5	95	Weddin Shire Council
Copeton	B10	R	1976	TE/ ER	113	1364000	State Water Corporation
Cordeaux	G10		1926/77/88	PG	56.5	93600	Sydney Catchment Authority
Cowal Gold Mine Reservoir D9	F7			TE	7	800	Barrick Gold Australia - Cowal Gold Mine
Cowal Northern Tailings Dam	F7			TE/ER	13	36000	Barrick Gold Australia - Cowal Gold Mine
Cowal Southern Tailings Dam	F7			TE/ER	13	36000	Barrick Gold Australia - Cowal Gold Mine
Cowarra	D12		2001	TE	41	10000	Port Macquarie Hastings Council
Cowarra Creek Tailings	H9	M	1986	ER	23	52	Dept. of Primary Industries - Mineral Resources
Crookwell	G9		1937	PG/VA	15	453.6	Upper Lachlan Shire Council
CSA South Tailings	D5		1960	TE	16	6000	Cobar Management Pty Ltd
CSIRO Retarding Basin*	F10		1990	TE	6	58	Stockland
Cumnock Tailings Storage Facility	E11		-	ER	10	1500	Ravensworth Operations Pty Ltd
Danjera	G10		1971	CB/ER	30	7800	Shoalhaven City Council
Dapto Heights Ret. Basin*	G10		1991	TE	6	16	Wollongong City Council
Dartbrook Mine Water*	E10		2000	TE	11	450	Anglo Coal (Dartbrook Management) Pty Limited
Daruk Park Retarding Basin*	F10		1987	TE	3	41	Liverpool City Council
Deep Creek	H10		1983	TE	32	4900	Eurobodalla Shire Council
Deep Creek Snowy	I8		1961	PG	21	8	Snowy Hydro Limited
Delegate Flood Retarding Basin	J8	M	1984	TE	7	7	Bombala Shire Council
DEP Retarding Basin	F10		1990	TE	8	120	Blacktown City Council
Dover Heights Reservoir	F11		1929	PG/ TE	8	85	Sydney Water Corporation
Drayton In-pit Long Term TSF	E10		-	ER	45	5000	Anglo Coal (Drayton Management) Pty Ltd
Drayton In-pit Temporary TSF	E10		-	ER	30	460	Anglo Coal (Drayton Management) Pty Ltd
Drayton Water Supply	E10		1980	TE/ ER	13	390	Drayton Coal Pty Ltd
Dumaresq	C11	R	1896	PG	12	380	Armidale Dumaresq Council
Dungowan	D11		1957/92	TE	31	6300	Tamworth Regional Council
Duralie Coal Auxiliary Dam No. 1	E11		2009	TE	20	500	Duralie Coal Pty Ltd
Duralie Coal Auxiliary Dam No. 2	E11		-	TE	30	2700	Duralie Coal Pty Ltd
Duralie Coal Mine Water	E11		2003	TE	18	1100	Duralie Coal Pty Ltd
Edgewood Detention Basin	G10		2002	TE	7	19.2	Illawarra Land Development
El Klaros	E11		1995	TE	25	198	Mawpalivier Pty. Limited
Elura Tailings	E11		1997	TE			Endeavor Mine
Emigrant Creek*	A13		1968/2001	TE/ PG	13	820	Rous Water
Emma James Basin	A13		-	TE	3.6	14	Gosford City Council
Eraring Ash	F11		1982	TE	25	20500	Eraring Energy
Eraring Attemperating Cooling Water	F11		-	TE	27	1400	Eraring Energy
Eucumbene	I8		1961	TE	116	4798000	Snowy Hydro Limited

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Fitzroy Falls	G10		1974	TE/ ER	14	23500	Sydney Catchment Authority
Floraville Road Det. Basin*	F11		1992	TE	3	20	Lake Macquarie City Council
Foothills Estate Ret. Basin 1*	G10		1994	TE	8.5	21	Wollongong City Council
Foothills Estate Ret. Basin 3*	G10		1995	TE	8	21	Wollongong City Council
Foothills Rd Basin	G10		1982/97	TE	4	24	Wollongong City Council
Fountaindale	G10	I	1915	VA	14.8	61	Kiama Municipal Council
Fox Hills Retarding Basin	F10		1990	TE	3	230	Blacktown City Council
Galambine	E9		1982	TE	15	227	Goree Park Pastoral Pty Ltd
Gannet Place Retarding Basin*	G10		1992	TE	10	5	Wollongong City Council
Garden Suburb Det. Basin No. 2*	E11		2000	TE	8	17	Lake Macquarie City Council
Geehi	I8		1966	ER	91	21100	Snowy Hydro Limited
George Bass Drive Det. Basin	H10		2000	TE	3	11	Eurobodalla Shire Council
Ginkgo Sand Overburden Storage Facility	F2		-	TE	9	11	Bemax Resources Limited
Glenbawn	E10		1958/86	TE/ER	100.4	750000	State Water Corporation
Glenlee Tailings	G10		1982-	ER	29.2	1500	Sada Services Pty Ltd
Glenmore Park Retarding Basin 4*	F10		1997	TE	5.5	265	Penrith City Council
Glennies Creek	E11		1983	DR	67	283000	State Water Corporation
Glenquarry Cut Control Structure	G10		1974	PG	18	34200	Sydney Catchment Authority
Gooden Reserve Detention Basin	F10		1997	PG	5	380	The Hills Shire Council
Googong*	H9		1977/1992	ER	66	124000	ActewAGL
Gosling Creek	F9	M	1890	PG	8	650	Orange City Council
Grahamstown	E11		1964/96/01	TE	15	185000	Hunter Water Corporation Ltd
Greaves Creek	F10		1942	VA	18.6	311	Sydney Catchment Authority
Green Meadows Retarding Basin*	G10		1981/93	TE	4	165	Shellharbour City Council
Greenway Drive Retarding Basin 10 A-B	F10		2000/3	TE	4.5	131.8	Liverpool City Council
Gunyah Park Basin*	G10		1992	TE	4	4.5	Wollongong City Council
Guthega	I8		1955	PG	33.5	1830	Snowy Hydro Limited
Hamilton Valley Retarding Basin 5B*	I6		1992	TE	2.3	62	Albury City Council
Hamilton Valley Retention Basin 5A*	I6		1993	TE	3.9	135	Albury City Council
Hillgrove Elanora	C11		-				Straits Hillgrove Gold
Hillgrove Tailings No. 1	C11	M	1982	TE	41		Straits Hillgrove Gold
Hillgrove Tailings No. 2	C11		2007	TE	40	1280	Straits Hillgrove Gold
Honeysuckle Creek	F11		1962/91	PG	9.3	12.2	Killara Golf Club Ltd
Horningsea Park Detention Basin	G10		-	TE	3	25	Liverpool Council
Howell Close Retarding Basin	F11		1986		2.5	4.6	Pittwater Council
Hoxton Park Basin 6	F11		-	TE	5	136.5	Liverpool City Council
Hume*	I7	R	1936/1967	PG/TE	51	3038000	Murray-Darling Basin Commission
Humphries Creek	A12		1988	TE	15	1100	Viretec International Ltd

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Humphries Creek Tailings	A12	I	1989	TE/ ER	17	1000	Virotec International Ltd
Hungerford Hill	E11		1970/2002	TE	7	300	Southcorp Wines Pty Ltd
Hunter Valley Nth Pit Tailings	E10		2003		50	20000	Rio Tinto Coal & Allied Hunter Valley
Hunter Valley Operations Dam 6 TSF	E11		-	PG/TE	10	3250	Rio Tinto Coal Australia
Hunter Valley Operations Lake James	E11		-	TE	8	775	Rio Tinto Coal Australia
Huntley Colliery 2*	G10		1973	TE	28	59.2	HTT Huntley Heritage Pty Ltd
Imperial Lake*	D1	R	1967	TE	8.2	700	Country Energy / Country Water
Island Bend	I8		1965	PG	48.8	3020	Snowy Hydro Limited
Jerrara Creek	G10		1955	TE	13	81	Kiama Council
Jindabyne	I8		1967	ER	71.6	689900	Snowy Hydro Limited
Jounama	H8		1968	ER	44	43500	Snowy Hydro Limited
Junction Reefs	F8		1898	MB	19	2500	NSW Department of Lands
Kalingo	E11	I	1920	TE	9	80.5	Austar Coal Mine Pty Ltd
Kanahooka Retention Basin	G10		1993	TE	1.5	20	Clisdells
Kangaroo Pipeline Control Structure	G10		1974	ER/PG	19	24000	Sydney Catchment Authority
Karangi	C13		1980/96	TE/ER	38	5600	Coffs Harbour City Council
Keepit	C10	R	1960	PG/ TE	55	423000	State Water Corporation
Kentucky Creek	C11		1944/984	PG	12.2	500	Uralla Shire Council
Khancoban	I8	M	1966	TE	18.3	21500	Snowy Hydro Limited
Killara Reservoir	F11		1931/94	PG/ TE	11	166	Sydney Water Corporation
Lake Canobolas	F9	M	1918	VA/PG	13	450	Orange City Council
Lake Endeavour	F8	R	1940	TE	21	2400	Parkes Shire Council
Lake Ettamogah Winter Storage*	H6		1993	TE	11	2100	Norske-Skog Paper Mills (Australia) Ltd
Lake Inverell	B11		1938	PG	11	1500	Inverell Shire Council
Lake Medlow	F10		1907	VA	19.8	297	Sydney Catchment Authority
Lake Pambulong Detention Basin	E11		2002	TE/ER	4.5	57.3	Hammersmith
Lake Parramatta	F11		1857/98	MB/VA	15	590	Parramatta City Council
Lake Rowlands	F9	R	1953	CB/TE	20	4000	Central Tablelands Water
Lake Tullimba	C11		1982	TE	18	1200	University of New England
Lemington Mine Tailings	E10		1991	TE/ ER	8	2500	Coal & Allied Operations Pty Ltd
Lemington No.5 Tailings*	E10		2000	ER	22	1800	Lemington Mine
Lidcombe Basin No. 6	F11		2003	TE/PG	3.6	10.8	Sydney Olympic Park Authority
Liddell Ash Disposal	E10		1971/82	TE	41	28500	Macquarie Generation
Liddell Ash Levee*	E10		2003	TE	12	19000	Anglo Coal (Drayton Management) Pty Ltd
Liddell Cooling Water*	E10		1968	TE	44	148000	Macquarie Generation
Liddell Water Supply*	E10		1970	TE	31	4500	Macquarie Generation
Lithgow No. 2	F10	I	1907	VA	25.5	440	Lithgow City Council

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Lithgow No. 1	F10		1896	VA	12	77	Lithgow City Council
Lostock	E11		1971	TE/ ER	38	20000	State Water Corporation
Loyalty Road Retarding Basin	F11		1995		30	1520	Upper Parramatta River Catchment Trust
Lyell*	F10		1983/96	ER	49.5	33500	Delta Electricity
Malpas	C11		1968	TE/ ER	31	13000	Armidale Dumaresq Council
Mangoola Coal Raw Water*	E10		-	ER	26	2500	XStrata Mangoola Pty Limited
Mangoola pit water dam*	E10		1968	ER	11	1500	XStrata Mangoola Pty Limited
Mangoola Start-up tailings dam*	E10		-	ER	24	6600	XStrata Mangoola Pty Limited
Mangrove Creek	F11	I	1983	DR	80	190000	Gosford City Council
Manly	F11		92/1922/84	PG	20	2000	Sydney Water Corporation
Mannerling Creek Ash	F11		1963	TE	12.2	12900	Delta Electricity
Mannus Lake*	F11	I	1986	TE	8	1500	Tumbarumba Shire Council
Mardi*	F11		1963/91	TE	25	7250	Wyong Shire Council
Maroubra Reservoir	F11		1966	PG/ TE	11.6	128	Sydney Water Corporation
McCoy Park Retarding Basin	F11		1989	TE	6	500	Parramatta City Council
McKinnons Gold Mine Tailings	D5		1996	ER	17	3032	McKinnons Gold Mine
Medway	G10		1964	VA	25	1300	Wingecarribee Shire Council
Menindee Lakes Storage	E2	M	1960	TE	15	2267000	State Water Corporation
Minmi Road Detention Basin*	E11		1995	TE	4.6		Newcastle City Council
Molong Creek	F9	I	1987	PG	16	1000	Cabonne Council
Moolarben Creek	E9		1957/93	DR	11.6	375	Ulan Coal Mines Limited
Mooney Lower	F11	I	1937	VA	13	150	Gosford City Council
Mooney Upper	F11		1961	VA	28	4600	Gosford City Council
Moore Creek	C10		1898	VA	19	220	NSW Department of Lands
Mount Owen North Void Tailings*	E10		-	TE	14	2000	Xstrata Mt Owen Pty Ltd
Mount Owen Rail Loop Tailings*	E10		2003	TE	11.5	5000	XStrata Mt Owen Pty Limited
Mount Owen Stage 5 Tailings Dam*	E10		-	TE	11	5000	XStrata Mt Owen Pty Limited
Mount View Detention Basin*	E10		-	TE	4	247	Cessnock City Council
Mt Annan Wetland No 1*	E11		-	TE	7	80	Landcom
Mt Arthur North Environmental*	E11			TE	16.5	1260	Mt. Arthur Coal, BHPBilliton
Mt Arthur Tailings Storage Facility	E11		-	ER	90	112000	BHP Hunter Valley Energy Coal
Mt Thorley 24 Ministrip Dam*	E11		2005	ER	50	2520	Coal & Allied Operations Pty Ltd
Mt Thorley Abbey Green South TSF	F11		2007	ER	10	5800	Coal & Allied Operations Pty Ltd
Mt Thorley Central Ramp Tailings*	F11		1993	ER	75	4700	Mount Thorley Operations
Mt Thorley North Out Of Pit Water	I8		1968	TE/ER	10	650	Rio Tinto Coal Australia Pty Ltd
Mt Thorley South Out Of Pit Water	D10		1984	TE/ER	20	1800	Rio Tino Coal Australia Pty Ltd
Muirfield Golf Club*	F11		1985	TE	7.25	19	Muirfield Golf Club Limited

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Muirfield Golf Course Detention Basin*	F11		1969	TE	7	11.62	The Hills Shire Council
Murray 2	I8		1968	VA	42.7	1760	Snowy Hydro Limited
Murrurundi	D10		1984	TE	10.4	180	Upper Hunter Shire Council
Narara Horticultural*	F11	M	1985	TE	9	43	NSW Dept. Primary Industries
Narranbulla	G9		1966	TE	7.3	1450	Narranbulla P/L
Nepean	G10		1935/92	PG	82	70170	Sydney Catchment Authority
Newstan Contingency Tailings	E11		1990/94	ER	20	78	Centennial Newstan p/l
Newstan Southern REA Main Tailings	E11		2007	TE	30	5160	Centennial Newstan p/l
Nixon	C10		1971	TE	16	220	J. Nixon
Norbrik Detention Pond*	F11		-		5		Norwest Land
Norbrik Temporary Detention Pond	F11		1956	TE	4	12000	Norwest Land
North Turramurra Golf Course	F11		2001	TE	5	10	Ku-ring-gai Council
Northmead Reserve Detention Basin	F10		1990/94	TE	6	15	Baulkham Hills Shire Council
Northparkes Tailings	E8		1993	TE	13	17000	Northparkes Mine
Northparkes Tailings Dam 2	E8		1993	TE	12	25000	Northparkes Mine
Nyrang Park Retarding Basin*	G10		1993	TE	3.5	20	Wollongong City Council
Oak Flats Reservoir	G10		1978	TE	11	56	Sydney Water Corporation
Oaky River	C12		1956	PG/ ER	18	2700	Country Energy
Oberon	F9		1949/96	CB	35.3	45000	State Water Corporation
Old Quipolly	D10		-	VA	19	850	Liverpool Plains Shire Council
Orange Research Station	F9		1993/97	TE	6.1	174	Orange Agricultural Institute
Orange Stormwater Harvesting*	F9		2009	TE	9.88	200	Orange City Council
Pacific Palms	E12		1970		6	8	Calmjoy P/L
Palm Tree Grove Retarding Basin	F11		1975/90	TE/ER	4	3	Gosford City Council
Peak Gold Mine Tailings	D5		1991-	TE	5.5	285	Peak Gold Mines
Pecan Close Retarding Basin	F11		1998/03	TE	5	100	Gosford City Council
Pejar	G9	I	1979	TE/ ER	23	9000	Goulburn Mulwaree Council
Petrochilos	A12		-	TE	13.3	55	Kyogle Council
Pied Piper playground Detention Basin	F11		-	TE	4.5	5.18	Blacktown City Council
Pindari	B11		1969/93	DR	85	312000	State Water Corporation
Pine Trees Detention Basin	Not in Map		-	TE	1.6	25	Lord Howe Island Board
Pipers Flat	F10	M	1920	TE	9	645	Centennial Coal (Ivanhoe Colliery)
Plashett	E10		1987	TE	46	65000	Macquarie Generation
Port Macquarie	D12		1980	TE	19	2500	Port Macquarie Hastings Council
Porters Creek	H10		-	PG/TE	17	1900	Shoalhaven City Council
Possum Skin Dam*	C11		1994	TE	13.5	1250	Glennies Creek Joint Venture
Potts Hill Res. 2	F11		1923	PG/TE	5	570	Sydney Water Corporation

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Prospect	F10		1888/1979/97	TE	26	50200	Sydney Catchment Authority
Puddledock Creek	C11	M	1928	VA	19	700	Armidale Dumaresq Council
PWCS Fines Disposal	E11		1990	TE	5	1750	Port Waratah Coal Services Limited
Quipolly	D10	R	1955	TE	21	5400	Liverpool Plains Shire Council
Ravensworth Inpit Storage	E11		1994	TE	13	1000	Ravensworth Operations Pty Ltd
Ravensworth South Tailings	F10		-	TE	55	11000	Ravensworth Underground Mine
Ravensworth Void 3	E11		2001	TE	20	12000	Macquarie Generation
Ravensworth Void 4 East Tailings - Saddle Dam*	E11		-	TE/ER	10	4500	Ashton Coal Operations
Ravensworth Void 5	E11		-		70		Macquarie Generation
Redbank Creek*	E9	R	1899	VA	16	180	Mid-Western Regional Council
Rocky Creek*	A13		1953	ER	28	14000	Rous Water
Rouse Hill Retarding Basin 13	F10		1994	TE	4.5	90	Sydney Water Corporation
Rouse Hill Retarding Basin 16 AB	F10		2000	TE	4	16.5	Sydney Water Corporation
Rouse Hill Retarding Basin 5	F10		1993	TE	4.6	140	Sydney Water Corporation
Rouse Hill Retarding Basin 9	F10		1993	TE	4.9	46	Sydney Water Corporation
Rouse Hill Retarding Basin 9B	F10		-	TE	8		Sydney Water Corporation
Rydal	F10		1957/96	TE	16	370	State Water Corporation
Rylstone*	E9		1953	VA	15	3320	Mid-Western Regional Council
Sawyers Swamp Creek Ash*	F10		1979	TE	40	8500	Delta Electricity
School House Creek Basin*	F10		1989	TE	7	65	Penrith City Council
SE Tailings Storage*	E10		2002-	ER	35		Coal & Allied Operations Pty Ltd
Seladon Avenue Ret. Basin*	E11		1993	TE	1.5	3	Newcastle City Council
Shannon Creek	B12		2007				Clarence Valley Council
Shellcove Estate Detention Basin 1	G10		2003	TE	7	27	Shellharbour City Council
Sierra Place Detention Basin	G10		1991/2001	TE/ ER	8	213	Baulkham Hills Shire Council
Site D Tailings	E1		1998	TE	26	13800	Perilya Broken Hill Limited
Smiths Creek Ret Basin 1*	G10		2001	TE	8.55	54.2	Campbelltown City Council
Smiths Creek Ret Basin 2*	C10		1996	TE	7.9	50.2	Campbelltown City Council
Smiths Creek Ret Basin 3*	F10		1996	TE	6.15	31.5	Campbelltown City Council
Snapper Startup Water Dam	F2		-	TE	23	4300	Bemax Resources Limited
Sooley*	G9		1930/61/2006	PG	13.4	3350	Goulburn Mulwaree Council
South Bulli Basin 1	G10		-	ER	6	50	Gujarat NRE Aust
South Bulli Stormwater	G10		1992	TE	9	62	Bellpac Pty Ltd
Split Rock	C10	R	1987	DR	66	397370	State Water Corporation
Spring Creek	F9		1931/47/69	TE/VA	16	4700	Orange City Council
St Josephs School Retarding Basin	G10		1990/2001	TE	5	17.1	Shellharbour City Council
Stephens Creek*	D1	M	1892/1909	TE	15	19900	Country Energy

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Stockton Borehole Tailings	E11		1982/1985	TE/ ER	21	360	Macquarie Coal Joint Venture
Suma Park*	F9	R	1962	VA	31	18000	Orange City Council
Talbingo	H8	R	1970	ER	161.5	921400	Snowy Hydro Limited
Tallong Railway	G10		1883/1975	MB	7	318	Blue Circle Southern Cement Ltd
Tallowa*	G10	M	1976	PG	43	0	Sydney Catchment Authority
Tantangra Dam*	H8		1960	PG	45.1	254000	Snowy Hydro Limited
Tenterfield Creek*	B12	R	1930/74	PG	15	1150	Tenterfield Shire Council
The Cove	F11		1972	TE	7	140	Old Sydney Town
Thompsons Creek	F9		1992	TE/ ER	53.5	27500	Delta Electricity
Thornleigh Reservoir	F11		1971	TE	14.3	406	Sydney Water Corporation
Tilba	I10		1970/97	TE	18	140	Bega Valley Shire Council
Tillegra	E11		-		70	450000	Hunter District Water Board
Timor	D9		1961	VA	19.5	1140	Warrumbungle Shire Council
Tooma	I8		1961	TE	67.1	28100	Snowy Hydro Limited
Toonumbar	A12		1971	TE/ ER	44	11000	State Water Corporation
Triako Tailings	E6		1989	TE	16	800	CBH Resources Ltd
Tritton Tailings Dam	D6		2004	TE	10	5500	Tritton Resources Limited
Tumbarumba*	H8		1972	TE	10	68	Tumbarumba Shire Council
Tumut 2	H8		1961	PG	46.3	2700	Snowy Hydro Limited
Tumut 3	H8		1971	PG	35	921400	Snowy Hydro Limited
Tumut Paper Mill Freshwater	H8		2001	TE	27	190	Visy Pulp & Paper Pty. Ltd.
Tumut Paper Mill Wastewater	H8		2001	TE	10	480	Visy Pulp & Paper Pty. Ltd.
Tumut Pond	H8		1959	PG	86.3	52800	Snowy Hydro Limited
Umberumberka*	D1		1914	PG/VA	41	8000	Country Energy trading as Country Water
United Colliery Tailings Dam 2	E10		2006	TE	12	400	United Collieries p/l
Upper Cordeaux 2	G10		1915	VA	21	1180	Sydney Catchment Authority
Upper Rodds Creek	F8		2001	ER/TE	31	3700	Cadia Holdings Pty Ltd
Vales Point Ash	F11		1984	TE	6	42000	Delta Electricity
Valley View Detention Basin	F8		2006		5	10	Cowra Shire Council
Wallerawang	F10		1978	TE	14.3	4300	Delta Electricity
Wambo Chitter Dump Water Dam	E11		-	TE	8.8	800	Wambo Coal Pty Limited
Wambo Hunter Pit Tails Dam*	E11		2005		50	8300	Wambo Coal Pty Limited
Wambo South Water	E11		-	TE	8	840	Wambo Coal Pty Limited
Wambo Tailings*	E11		2002	TE	40	3500	Wambo Coal Pty Limited
Warkworth Mine Tailings*	E11		1992/94	TE	23	4800	Warkworth Mining Ltd
Warkworth North Pit Tailings*	E11		1997	ER	45	9320	Warkworth Mining Ltd
Warraderry Street Detention Basin	E9		-	TE	2	10	Weddin Shire Council

Dam	Map Ref	Safety	Built	Type	Height (m)	Storage (ML)	Owner
Warragamba	F10		1960/92/02	PG	142	2031000	Sydney Catchment Authority
Warringah Reservoir	F11		1936/95	PG/TE	9.8	77	Sydney Water Corporation
Waverley Reservoir WS133	F11		1917	PG/TE	8.3	19	Sydney Water Corporation
Wentworth Falls Lake	F10		1906/93	TE	10	300	Blue Mountains City Council
Whitford Road Retarding Basin	F10		1997		1.6	38	Liverpool City Council
Widemere Detention Basin	F11		-	TE	6.5	152	Boral Recycling P/L
Wilpinjong TD1-East	E9		-	ER	2.14		Wilpinjong Coal Pty Ltd
Wilpinjong TD1-West	E9		-	ER	18		Wilpinjong Coal Pty Ltd
Wilpinjong TD2	E9		-	ER	13		Wilpinjong Coal Pty Ltd
Winburndale*	F9	R	1936	PG	22	1700	Bathurst City Council
Windamere	E9		1984	TE/ER	67	368000	State Water Corporation
Winding Creek 5 Retarding Basin	E11		1993	TE	5	82	Hunter Water Corporation Ltd
Wingecarribee*	G10	M	1974	TE/ER	19	34510	Sydney Catchment Authority
Wollondilly Washery 1	G10		1968	ER	18	66	Burraborang Valley Coal Pty Limited
Wollongong High School Retarding Basin	G10		2001	TE	3	77	Wollongong City Council
Woodford Creek	F10		1928/48	VA	16	854	Sydney Catchment Authority
Woodlawn Mine Evaporation No. 1	H9		1989	TE	6	750	Veolia Environmental Services
Woodlawn Mine Evaporation No. 2	H9		1989	TE	10	290	Veolia Environmental Services
Woodlawn North Tailings	H9		1977	TE/ ER	18	2100	Veolia Environmental Services
Woodlawn South Tailings	H9		1982	TE/ ER	17	2400	Veolia Environmental Services
Woodlawn West Tailings	H9		1989	TE/ER	35	2400	Veolia Environmental Services
Woolgoolga	C13		1967	TE	12	270	Coffs Harbour City Council
Woronora	G10		1941/88	PG	66	71800	Sydney Catchment Authority
Wyangala	F8	R	1971	TE/ ER	85	1220000	State Water Corporation
Wyong Road Detention Basin	F11		1975	TE	2.4	50	Wyong Shire Council
Yarrowonga Weir	I6		1939/2001	PG/TE	7	117550	Murray-Darling Basin Commission
Yass*	G8		1927	VA/PG	12	875	Yass Valley Council
Yellow Pinch	I9		1987	ER	40	3000	Bega Valley Shire Council

LEGEND:

*: DSC inspected – 2009/2010

Dams added to Schedule 1 of the Dams Safety Act 1978 are highlighted rows.

R:	Sig. Risk Dam	DR:	Decked rockfill	MB:	Masonry buttress
M:	Medium Risk Dam	PG:	Concrete Gravity	VA:	Concrete arch
I:	Dam under investigation	CB:	Concrete buttress		
TE:	Earthfill dam	ER:	Rockfill dam		



Chaffey Dam

Work to install an additional spillway to meet the DSC's requirements commenced in June 2010.



Tantangara Dam. *This Snowy Hydro dam was inspected by the DSC and staff in September 2009.*

Googong Dam *is located in NSW near Queanbeyan but is owned by ACTEW. The DSC has no statutory control over this dam but ACTEW's cooperation helps ensure the safety of residents of NSW.*

