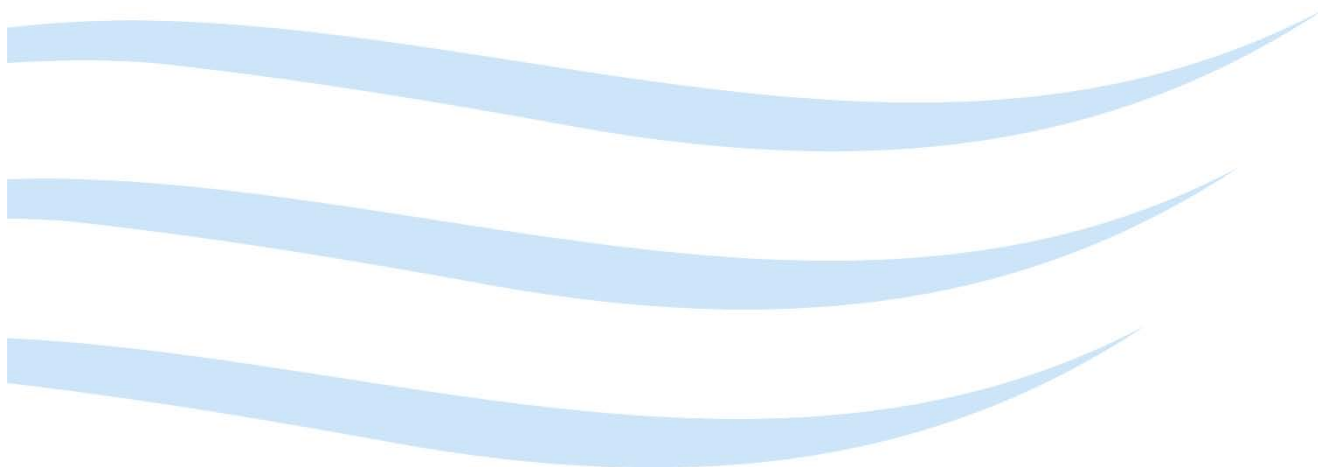


GUIDELINES FOR 5 YEAR DAM SAFETY SURVEILLANCE REPORT



May 2013



TABLE OF CONTENTS

1. BACKGROUND	3
1.1 Introduction	3
1.2 Qualifications of persons preparing surveillance report	3
1.3 Limitations	3
2. CONTENTS OF SURVEILLANCE REPORT	3
2.1 Stand-alone Report Format	3
2.2 Surveillance Report Proforma for Low Consequence Category Dams	4
3. NOTES TO ASSIST IN THE PREPARATION OF THE 5 YEAR SURVEILLANCE REPORT	5
3.1 Consequence Category	5
3.2 Detailed Visual Assessment of the Dam	6
3.3 Spillway Capacity	6
3.4 Geological Desk Study	6
3.5 Geotechnical Investigations	7
3.6 Dam Safety Emergency Management Plans (DSEMP)	7
3.7 Recommendation to Undertake Remedial Works	7
4. GENERAL INFORMATION	8
APPENDIX 1 - SURVEILLANCE REPORT PROFORMA	9

1. BACKGROUND

1.1 Introduction

These guidelines have been produced to assist dam owners and consultants in the preparation of 5 year comprehensive surveillance reports as required by the *Water Management Act 1999* (“the Act”) and the *Water Management (Safety of Dams) Regulations 2011* (“the Regulations”).

The Regulations require that dam works and related activities, including the preparation of surveillance reports, must be undertaken in accordance with the relevant provisions of guidelines issued by the Australian National Committee on Large Dams (ANCOLD).

Compliance with these guidelines is not mandatory. However, following the guidelines as far as practicable will assist in ensuring that relevant matters are covered to efficiently meet the Department’s requirements.

There are two basic formats for the preparation of the surveillance report:

- A stand-alone report for dams that have consequence categories assessed as Significant, High A, B, C or Extreme. The person preparing the surveillance report may also use the stand-alone report format for Very Low and Low consequence category dams.
- A Proforma for Very Low and Low consequence category dams (see Attachment 1).

1.2 Qualifications of persons preparing surveillance report

Five year surveillance inspection and report must be undertaken by a person/s of the relevant competency standard as required in the Regulations.

1.3 Limitations

These guidelines indicate the minimum standard for 5 year surveillance report for acceptance by the Department of Primary Industries, Parks, Water & Environment. A surveillance report that does not address the basic requirements of these guidelines will generally be referred back to the dam owner for revision.

2. CONTENTS OF SURVEILLANCE REPORT

2.1 Stand-alone Report Format

The following items must be detailed in the 5 year comprehensive surveillance report and they are included here as suggested headings for the format of the report:

- Introduction and dam dimensions table.
- Detailed assessment of the consequence category and outcome of the assessment. (*See 3.2 Consequence Category*)
- Detailed visual assessment of the dam and recording of any observed defects. (*See 3.3 Detailed Visual Assessment of the Dam*)

- Description of the local geology and whether there are fossilised or active landslips, potentially dispersive soils etc at or around the dam site.
- Detailed assessment of the geotechnical conditions encountered at the dam site and their likely impact on the structural integrity of the dam. This may include undertaking subsoil probing such as drilling, backhoe test pits, ground penetrating radar or other methods considered suitable for determining the overall condition of the dam.
- A detailed hydrological assessment and review of the sizing of the spillway.
- Detailed assessment of the condition of the outlet pipe and any other appurtenant works which may impact on the structural integrity of the dam.
- Advice on any monitoring equipment that should be installed on the dam including 'V' Notch weirs, particularly for higher hazard category dams.
- Detailed recommendations, including timeframes for completion of any work required to bring the dam to an acceptable safety standard.
- Appendix:
 - Geotechnical logs and test certificates, if any.
 - ANCOLD Consequence category spreadsheet and description of flood impacted areas.
 - Spillway calculations.
 - Photographic record.

2.2 Surveillance Report Proforma for Low Consequence Category Dams

A Proforma for surveillance report for Very Low and Low consequence category dams is available on the Department's website. (see Appendix 1)

3. NOTES TO ASSIST IN THE PREPARATION OF THE 5 YEAR SURVEILLANCE REPORT

These notes are designed to be used for dams with a consequence category of “Significant” or higher for a stand-alone surveillance report.

3.1 Consequence Category

It is critical that the consequence category of the dam is assessed as the first step in the preparation of the surveillance report. The Consequence Category will determine the required level of competency of the person carrying out the surveillance reporting in accordance with the Water Management (Safety of Dams) Regulations 2011.

In undertaking a consequence category assessment for the purposes of completing the Surveillance Report the following points must be considered.

- Any previously assessed consequence category must not be automatically adopted for the purposes of undertaking the Surveillance Report, as conditions downstream of the dam may have changed since the last consequence category assessment was undertaken.
- Changes to downstream conditions may have resulted in increased probability of the occurrence of active people movement or increased development downstream of the dam; such changes should be assumed to lead to an associated increased consequence of resulting potential loss of life or damage from a dam failure.
- For example, where construction of new houses, roads or other dams in the flood impact zone downstream of the dam may have taken place, this infrastructure becomes part of the suite of assessable risks along with the expected increase in the Public at Risk (PAR) scenario.
- The consequence category assessment must be undertaken using the Australian National Committee on Large Dams (ANCOLD) Damage and Loss Severity Spreadsheet as published by ANCOLD Inc. An electronic copy is available on the Department’s Website or by request from the Department. (See contact details at the end of these Guidelines).
- In assessing the consequence category of the dam, the ANCOLD Guidelines assessment of (PAR) is as follows:
“Includes all those persons who would be directly exposed to flood waters within the dam break affected zone if they took no action to evacuate”
Noting that:
“Flood depths and velocities are relevant in estimating PAR (generally, an inundation depth of 0.3 metres or more can be used as an indication of the area where the population is at risk)”
- Currently ANCOLD does not publish criteria for assessing potential for loss of life in a dam breach. Therefore the consultant, on a case by case basis, must take into account the location of any roads, houses, itinerant people movement and damage to the environment combined with potential flood depths and velocities when assessing potential for loss of life.

- It is also important to note that where there are multiple dams in a catchment; the consequence category of the dam should take into account the presence of other dams upstream and downstream of the dam in question.

The assessment must follow the ANCOLD Guidelines “*Guidelines on the Consequences Categories of Dams*” 2012.

3.2 Detailed Visual Assessment of the Dam

The overall condition of the dam needs to be assessed. Some items for consideration to be inspected include the following:

- The overall condition of the dam’s embankment, including any movement, cracking, or slumping;
- Trees, rabbit or wombat holes on the embankment which might impact on its structural integrity;
- Deficiencies in the spillway capacity (see below) or whether the spillway has become blocked;
- Condition of the spillway and the return slope;
- Condition of the outlet pipe, gate valve and any appurtenant works that might impact on the structural integrity of the dam;
- Seepage from the dam and any wet spots on the dam embankment;
- Erosion due to wave action; and,
- Debris inside the storage area that could block the spillway or damage the embankment.

3.3 Spillway Capacity

As part of the 5 year comprehensive surveillance report, the size of the spillway must be assessed for its capacity to pass the Annual Exceedance Probability (AEP) flood size recommended in ANCOLD’s “*Guidelines on the Selection of Acceptable Flood Capacity for Dams*” 2000 for the determined consequence category of the dam. Based on these criteria, if the spillway capacity is found to be deficient, then a recommendation must be made to address this issue, such as increasing the size of the spillway to meet the required capacity.

3.4 Geological Desk Study

An understanding of the geology at the dam site is important in obtaining an understanding of the overall condition of the dam. For example, is the dam constructed in an area or on a soil type prone to instability, landslip, or a soil type with high shrink-swell characteristics?

3.5 Geotechnical Investigations

In determining the overall condition of the dam, it may be necessary to undertake a detailed geotechnical investigation to establish whether there are any adverse geotechnical conditions in the dam and foundations. This may include but is not necessarily limited to a visual assessment, excavation of test pits, drilling of bore holes and undertaking associated laboratory testing. Adverse geotechnical conditions may include the identification of highly reactive, highly erosive or dispersive soils, unstable soil conditions and high water tables.

Note: Where relevant;

- All soils must be classified according to the *Unified Soil Classification System (USCS)*.
- All soil testing must be carried out to AS 1289 Methods of Testing Soils for Engineering Purposes.
- All reporting including test pit or borehole logs must be carried out to *AS 1726 Geotechnical Site Investigations*. Logs sheets and test certificates must be contained within the appendix of the report.

3.6 Dam Safety Emergency Management Plans (DSEMP)

The ANCOLD "*Guidelines on Dam Safety Management*" August 2003 states the following:

"Dam Safety Emergency Plans should exist for all dams where there is potential for loss of life in the event of dam failure"

When assessing the consequence category, the person undertaking the assessment will need to determine whether there will be potential for loss of life and therefore the need to prepare a Dam Safety Emergency Management Plan to cover the action that should be taken in a dam safety incident. However, it is the Department's policy to require a DSEMP for all dams of significant or higher consequence category, unless there are specific and agreed reasons why a DSEMP is not required for a particular significant or higher consequence category dam.

During the assessment of the consequence category, if there are any changes then these will need to be incorporated into any existing DSEMP.

3.7 Recommendation to Undertake Remedial Works

The engineer must provide in the 5 year surveillance report either:

- a statement that the dam is in an acceptable condition, requiring no work to be undertaken to meet relevant safety standards; *or*
- clear recommendations on the action required to be undertaken to bring the dam up to an acceptable safety standard.

Any recommendations must include a timeframe in which the actions must be completed and the timeframe should reflect the urgency of the various actions.

4. GENERAL INFORMATION

Five Yearly Surveillance Report must be submitted to the:

Co-ordinator (Dam Safety Program)
Water Management Branch
Department of Primary Industries, Parks, Water & Environment
GPO Box 44
HOBART TAS 7000

Or; hand delivered to:

Water Management Branch
Department of Primary Industries, Parks, Water & Environment
Marine Board Building
1 Franklin Wharf
HOBART TAS 7001

Enquiries:

Sam Ditchfield – Dam Safety Engineer
Phone: (03) 6233 3347 or 0419 057 862
Email: Sam.Ditchfield@dpipwe.tas.gov.au

Julian Johnstone – Co-ordinator Dam Safety Program
Phone: (03) 6336 2414 or 0427 838 841
Email: Julian.johnstone@dpipwe.tas.gov.au

Other Links and Contacts

- The Water Management (Safety of Dams) Regulations 2011 and the *Water Management Act 1999* are available at:
<http://www.thelaw.tas.gov.au/>
- ANCOLD
<http://www.ancold.org.au/>

ANCOLD Publications

ANCOLD publications referred to in this information sheet are available from:
ANCOLD, c/- Goulburn-Murray Water, PO Box 165, TATURA, VIC 3616,
Phone: 03 5833 5644; e-mail: ancold@g-mwater.com.au

APPENDIX 1 - SURVEILLANCE REPORT PROFORMA

(ONLY TO BE USED FOR LOW CONSEQUENCE CATEGORY DAMS)

DAM SURVEILLANCE REPORT - TYPE 3

(Please complete all relevant sections of this form)

1. Details of Permit to Undertake Dam Works

Dam Permit No:

--	--	--	--	--

Dam Name:

--

(if applicable)

Issue Date:

--	--	--	--	--	--	--	--

Construction Date:

--	--	--	--	--	--	--	--

2. Details of Dam (please check the following details of the dam)

Embankment Height:

--	--	--

metres

Maximum Storage Capacity:

--	--	--

megalitres (ML)

Maximum Surface Area of Storage:

--	--	--

ha

3. Location of Dam

Water Resource:

--

(River, Rivulet, Creek, Brook)

1: 25 000 Map:

Sheet Name:

--

Sheet No:

--	--	--	--

Grid Reference:

East:

--	--	--	--	--	--

North:

5

--	--	--	--	--	--

4. Details of Dam Owner

Dam Owner:

(Individual or company)

Residential Address:

(Number) (Road, Street, Lane)

(Suburb, Town, City)

Postcode:

(State)

Postal Address:

(Number) (Road, Street, Lane)

(Suburb, Town, City)

Postcode:

(State)

Telephone:

Business:

Residential:

Mobile:

Facsimile:

Type of Dam (Please indicate by marking appropriate box with a X)

Embankment:	Homogenous earth fill:	<input type="checkbox"/>	Concrete or Masonry:	Gravity:	<input type="checkbox"/>
--------------------	-------------------------------	--------------------------	-----------------------------	-----------------	--------------------------

Zoned earth fill:	<input type="checkbox"/>
--------------------------	--------------------------

Arch:	<input type="checkbox"/>
--------------	--------------------------

Earth and Rock fill:	<input type="checkbox"/>
-----------------------------	--------------------------

Buttress:	<input type="checkbox"/>
------------------	--------------------------

Rock fill with impervious face (e.g. concrete):	<input type="checkbox"/>
--	--------------------------

Combination of these or other types (<i>brief description</i>)
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

REPORT

Note:

Please supplement report with sketches and photographs
Include explanatory notes where space provided is insufficient.
Provide a comment in each section to confirm all features are inspected (including - not applicable, nil, etc. if appropriate).

Conditions at time of inspection:	
Weather:	
Storage level:	Metres below Full Supply Level (FSL)
Date of most recent rain:	

A. Consequence Category

Current Consequence Category:	
Reviewed Consequence Category:	

5. Reasons for recommending consequence category (refer ANCOLD Guidelines 2012 and attach Consequence category spreadsheet):

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

B. Embankment Dam

6. General condition of up-stream face:

.....
.....
.....
.....
.....
.....

7. Location and extent of any cracks, slips, erosion, or subsidence in earth/rock materials:

.....
.....
.....
.....
.....
.....

8. Location and extent of any cracks or other defects in concrete/bitumen or other impervious face:

.....
.....
.....
.....
.....
.....

9. General condition of downstream face:

.....
.....
.....
.....
.....
.....

10. Describe any cracks, slips, erosion, or subsidence in earth/rock materials leakage/seepage through dam, foundations or abutments (give location, quantity, clear or coloured):

.....
.....
.....
.....
.....
.....

C. Concrete or Masonry Dam

11. Location and extent of any defects (such as cracks, surface deterioration, etc):

.....
.....
.....
.....
.....
.....

12. Describe any leakage/seepage through dam, foundation or abutments (give location, quantity, clear or coloured):

.....
.....
.....
.....
.....
.....

13. Provide details of any drains in the dam and state whether they are open or blocked. Are they flowing?

.....
.....
.....
.....
.....
.....

D. Spillway

14. Type of spillway and nature of discharge channel (e.g. grassed, rock, concrete lined, etc.):

.....
.....
.....
.....
.....
.....

15. Width of spillway channel around end of dam:		metres
---	--	---------------

16. Depth of spillway channel below top of dam:		metres
--	--	---------------

17. Outlet width of return slope channel at return to natural streambed:		metres
---	--	---------------

18. Location and extent of any spillway erosion, head cuts or movement:

.....
.....
.....
.....
.....

19. Location and extent of any obstructions to flow (Note flood spillways must be kept clear of obstructions at all times and must not be reduced in capacity by piping, bridging, screening, etc.):

.....
.....
.....
.....
.....
.....

20. Location and extent of any defects in concrete or masonry:

.....
.....
.....
.....
.....
.....

21. Give number, size, type and condition of any gates or stop-logs (including operating facility):

.....
.....
.....
.....
.....
.....

22. If available, provide information on the highest flood (and date of occurrence) passed by the spillway including height relative to crest of dam:

.....
.....
.....
.....
.....

E. Outlet works

23. Outlet Pipe:

Material:		Diameter:		mm
------------------	--	------------------	--	-----------

24. Out Valve:

Material:		Diameter:		mm
------------------	--	------------------	--	-----------

25. State whether outlet works are in good working order, if not, give details:

.....
.....
.....
.....
.....
.....

F. Other Matters

26. Are there any other matters within the owner's knowledge which could affect the safety of the dam?

.....
.....
.....
.....
.....
.....

27. Is the dam considered to be in a safe condition? Indicate any measures necessary to make the dam safe.

.....
.....
.....
.....
.....
.....

CERTIFICATION

This is to certify that the information submitted in this report is true and is based on a recent inspection of the dam and its associated works and is, to the best of my knowledge, true and correct.

<u>Name of person making inspection:</u>				
<u>Occupation:</u>				
<i>(eg Civil Engineer, Manager)</i>				
Contact Address:				
<i>(Number) (Road, Street, Lane)</i>				
<i>(Suburb, Town, City)</i>				
			Postcode:	
<i>(State)</i>				
Signature:				
Date:				

<u>This is to certify that I have read the above report and accept the findings.</u>				
Name of Owner/or Authorised Representative:				
Signature:				
Date:				