



Ministry of Forests, Lands and  
Natural Resource Operations  
and  
Ministry of Environment

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**NAME OF POLICY:** Dam Safety Audit Program

**APPLICATION:** This policy applies to all dams that are regulated under the British Columbia Dam Safety Regulation.

**ISSUANCE:** Director, Water Management Branch Ministry of Forests Land and Natural Resource Operations and Executive Director, Water Protection and Sustainability Branch Ministry of Environment

**IMPLEMENTATION:** Dam Safety Officers and MFLNRO staff.

**REFERENCES:** British Columbia Dam Safety Regulation (B.C. Reg. 108/2011), *Water Act* (Ch. 483, RSBC 1996) and the Water Regulation (B.C. Reg 108/2011).

**RELATED POLICIES AND PROCEDURES** Dam Safety Compliance Strategy, September 17<sup>th</sup>, 2002. The 1998 Policy and Procedures Manual, Section 7, subsection 07.01.04 – Risk Based Classification and Monitoring.

**RELATIONSHIP TO PREVIOUS POLICY:** Disaster Potential Classification 07.01.04, the Dam Inspection Schedule 07.01.05 from the 1986 Policy Manual.

**POLICY AMENDMENT:** Any formal request for amendment to this policy is to be directed in writing to the Director, Water Management Branch Ministry of Forests, Lands and Natural Resource Operations.

Glen Davidson  
Director  
Water Management Branch  
Ministry of Forests Land and  
Natural Resource Operations

13/11/26

Date

Lynn Kriwoken  
Executive Director  
Water Protection and Sustainability Branch  
Ministry of Environment

13/11/27

Date:

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**EFFECTIVE DATE:** September 1, 2009  
**AMENDMENT NO:** 3 (December 1, 2013)

**FILE:** 76940-00 and 76915-09

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<b>APPROVED AMENDMENTS:</b>		
Effective date	Briefing Note /Approval	Summary of Changes:
September 1, 2009	BN 109249 July 20, 2009	<p>Changes made are as a result of updating water policies.</p> <p>The draft 2006 policy has been updated to provide minor improvements to the Dam Audit Check Sheet as indicated in Appendix 1.</p>
October 1, 2011	BN 144699 August 15, 2011	<p>This policy has been amended in order to change the Dam Consequence Classification to match the new Schedules 1 and 2 in the amended British Columbia Dam Safety Regulation (Reg 108/2011, June 9<sup>th</sup>, 2011).</p> <p>Revisions to this policy include the: Dam Audit Check Sheet and the Dam Risk Level Chart in Appendix 1.</p> <p>A new Dam Failure Probability Rating Guideline has also been added in Appendix 2.</p>
December 1, 2013	BN198391 September 30, 2013	<p>This policy is amended in order to change to the Risk Level Chart (Appendix 1, page 4) for an extreme consequence dam. The Chart would be amended for dams which are classified with a moderate failure probability rating, such that the risk level would be reduced from Level 1- Alert: immediate attention required to Level 2 - Caution: considerable work to do</p>

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## 1. POLICY STATEMENT

Extreme (E), Very High (VH) and High (H) Consequence Classification dams will be audited at least every 5 years. Significant (S) Consequence Classification dams will be audited at least every 10 years and the Low (L) Consequence Classification dams will not be included in the audit program at this time.

## 2. DEFINITIONS

Relevant terms are defined in the [British Columbia Dam Safety Regulation](#) as well as in the [Water Act](#).

## 3. PREFACE

The Dam Safety Audit Program was developed by Land and Water BC Inc. in 2003 as an additional dam safety compliance tool under the Dam Safety Compliance Strategy. This policy updates the Strategy by including a revised Dam Audit Check Sheet.

In all cases, dam owners are clearly responsible for the inspection, safe operation and maintenance of their dams. English common law, on which our legal system is based, considers dams to be “inherently dangerous structures” and those who own dams are liable for damages that are caused by the dam.

Under the authority of British Columbia Dam Safety Regulation, the Ministry of Forests, Lands and Natural Resource Operation operates a dam safety program to regulate dam owners to ensure that their structures are designed, constructed and maintained according to acceptable standards for public safety. The Ministry also has a “duty of care” responsibility to regulate dam owners under the *Water Act* of British Columbia.

The Audit Program has been developed to determine whether dam owners are in compliance with the British Columbia Dam Safety Regulation.

It is important to note that the Dam Safety Audit Program is not designed as a method for correcting deficiencies. Deficiencies will be addressed using the existing Risk Based Classification and Monitoring procedure. The Dam Safety Officer will give a copy of a “Dam Audit Check Sheet” to the owner (see Audit Procedure below).

**Appendix 1** provides the revised Dam Audit Check Sheet.

**Appendix 2** provides the Dam Failure Probability Guideline.

#### 4. STRATEGIC PRINCIPLES

- 1) **Owner Responsibility** – Dam owners are responsible for the inspection, safe operation and maintenance of their structures.
- 2) **Consequence Classification** – Dams with higher downstream consequence classifications, as defined in Schedule 1 of the [British Columbia Dam Safety Regulation](#), will be audited more frequently than those with lower classifications.
- 3) **Balanced Priorities** – Implementation of the audit program must be balanced with other dam safety priorities. Dam Safety Officers spend between 50% and 100% of their time on dam safety work. As a guide, no more than 30% of their dam safety work time should normally be used to conduct audits.

#### 5. AUDIT PROCEDURES

Dam Safety Officers will create an annual audit schedule as part of their personal work plan. Dam Safety Officers will schedule audits of dams in the same area and combine the audits with other work to maximize the use of field time.

Dam Safety Officers will complete a “Dam Audit Check Sheet” (see Appendix 1) and will provide a copy to the owner on site. Also, when possible Dam Safety Officers should complete a dam inspection with the owner while on site

Audit information will be entered into the dam registry in E-Licensing and the dam file upon return to the office. Consequence classification, probability of failure and risk level will be reassessed and entered into the dam registry (Appendices 1 and 2).

The Dam Safety Officer will send a follow up letter to the dam owner outlining the findings of the audit including, compliance with the British Columbia Dam Safety Regulation, site observations and recommendations.

If a hazardous condition is uncovered during an audit, the Dam Safety Officer will attend to the situation immediately.

The Dam Safety Compliance Strategy, September 17<sup>th</sup>, 2002 and the 1998 Policy and Procedures Manual, Section 7, subsection 07.01.04 – Risk Based Classification and Monitoring are still in effect.

Also, Dam Safety Officers should also be familiar with the Dam Failure Probability Guideline (Appendix 1 and 2).

**Appendix 1: Dam Audit Check Sheet**



**DAM AUDIT PROGRAM**  
**DAM AUDIT CHECK SHEET**

Dam : \_\_\_\_\_

Date : \_\_\_\_\_

Failure Consequence Rating:	E	VH	H	S	L
Failure Probability Rating :	Lrg	Mod	Sm	VSm	

Risk Level : (see over)				
1	2	3	4	5

**This Audit is not an Inspection of the dam. The dam owner is responsible for dam inspections.**  
**DAM SAFETY REGULATION REQUIREMENTS**

	Yes	No	N/A	Follow Up?
Consequence Rating Appropriate?				
Alterations or Hazards occurred recently?				
Owner Reported any recent alterations or hazards?				
Emergency Plan Prepared?				
Emergency Plan Submitted and Updated?				
OMS Plan Prepared?				
OMS Plan Submitted?				
Reservoir Operation as per OMS Manual?				
Maintenance Suitable?				
Surveillance Suitable?				
Annual Inspection Suitable?				
Sign posted on dam? (Crown land only)				
Dam Safety Review Status Acceptable?				

Comments & Site Observations: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Dam Owner / agent present for audit? Y  N  Copy given to Dam Owner / agent? Y  N

Printed Name of Dam Safety Officer	Signature	Date
Printed Name of Dam Owner / agent	Signature	Date

Appendix 1, continued

**FAILURE PROBABILITY RATING GUIDELINES**

RATING	GENERAL GUIDELINES FOR ALLOCATING RATINGS (NOTE: Apply highest rating, only one bullet required)
LARGE	<ul style="list-style-type: none"> <li>Uncorrected design, construction, structural and/or operational deficiencies that could clearly lead to uncontrolled reservoir release. If the dam owner is actively working on an approved project to correct the deficiency the rating can be reduced to MODERATE.</li> <li>Owner exhibits reluctance to operate in a safe and timely manner, or is incapable of doing so; all unlicensed dams are allocated this rating.</li> </ul>
MODERATE	<ul style="list-style-type: none"> <li>Uncorrected design, construction, structural and/or operational deficiencies that could potentially lead to uncontrolled reservoir release.</li> <li>Owner exhibits reluctance to undertake and report on annual inspection, or is incapable of doing so.</li> <li>Design and operation lacks redundancy, e.g., no back-up power for electrical gates.</li> </ul>
SMALL	<ul style="list-style-type: none"> <li>Design and/or performance deficiencies may exist, but are actively monitored and are not expected to significantly increase failure potential over the near term.</li> <li>Design and operation exhibits redundancy</li> </ul>
VERY SMALL	<ul style="list-style-type: none"> <li>Dams that are breached, partially breached, reservoir drained or otherwise safeguarded.</li> <li>Failure modes analysis indicates very low probability of failure (e.g., robust concrete gravity dam).</li> </ul>

**RISK LEVEL CHART\***

Failure Probability Rating	Failure Consequence Rating <sup>1</sup>				
	Extreme	Very High	High	Significant	Low <sup>2</sup>
Large	1	1	1	2	3
Moderate	2	2	2	3	4
Small	3	3	4	4	5
Very Small	3	4	4	5	5

- ALERT (immediate attention required):**  
Enhanced monitoring / consultants involved / repairs ASAP / may restrict reservoir operation / EPP reviewed / CWR or RWM notified, possible Order
- CAUTION (considerable work to do):**  
Increased monitoring / planning for rehab / may modify reservoir operation / EPP reviewed / may request submission of Inspection Report (perhaps weekly), OMS, or early DSR / CWR or RWM made aware of situation
- STABLE:**  
Regular owner inspections plus monitoring operation under peak loading / rehab hazardous conditions / may request submission of Annual Inspection Report, OMS, or early DSR / may audit on an increased frequency
- NO CONCERNS:**  
Included in regular audit program to identify any changes / normal operation
- EFFECTUAL (significant and low consequence dams ONLY):**  
Significant consequence dams included in regular audit program to monitor failure consequence only / normal operation

\*Note: The risk level chart is only a guide. If the Dam Safety Officer deem the risk level of the dam to be different than that prescribed by the risk level chart, the rationale for the variation should be provided by the Dam Safety Officer in the Comments & Site Observations field on the first page.

<sup>1</sup> Schedule 1, Dam Safety Regulation, BC Reg. 108/2011  
<sup>2</sup> Low consequence dams are not included in the audit program at this time.

**Appendix 2: Dam Failure Probability Rating Guideline**

RATING	GENERAL GUIDELINES FOR ALLOCATING RATINGS  (NOTE: Apply highest rating, only one bullet required)
LARGE	<ul style="list-style-type: none"> <li>• Uncorrected design, construction, structural and/or operational deficiencies that could <i>clearly</i> lead to uncontrolled reservoir release. If the dam owner is actively working on an <i>approved</i> project to correct the deficiency the rating can be reduced to MODERATE.</li> <li>• Owner exhibits reluctance to operate in a safe and timely manner, or is incapable of doing so; all unlicensed dams are allocated this rating.</li> </ul>
MODERATE	<ul style="list-style-type: none"> <li>• Uncorrected design, construction, structural and/or operational deficiencies that could <i>potentially</i> lead to uncontrolled reservoir release.</li> <li>• Owner exhibits reluctance to undertake and report on annual inspection, or is incapable of doing so.</li> <li>• Design and operation lacks redundancy, e.g., no back-up power for electrical gates.</li> </ul>
SMALL	<ul style="list-style-type: none"> <li>• Design and/or performance deficiencies may exist, but are actively monitored and are not expected to significantly increase failure potential over the near term.</li> <li>• Design and operation exhibits redundancy</li> </ul>
VERY SMALL	<ul style="list-style-type: none"> <li>• Dams that are breached, partially breached, reservoir drained or otherwise safeguarded.</li> <li>• Failure modes analysis indicates very low probability of failure (e.g., robust concrete gravity dam).</li> </ul>