

chapter S-3.1.01, r. 1

Dam Safety Regulation

Dam Safety Act

(R.S.Q., c. S-3.1.01, ss. 6, 14, 15, 16, 17, 19, 20, 21, 24, 29, 31, 36 and 37)

The fees prescribed in the Regulation have been indexed as of 1 January 2013 pursuant to the notice published in Part 1 (French) of the Gazette officielle du Québec of 5 January 2013, page 8. (ss. 64, 65, 66, 67, 68, 69)

## CHAPTER I GENERAL

1. This Regulation applies to all dams governed by the Dam Safety Act (chapter S-3.1.01).

O.C. 300-2002, s. 1.

2. The height of a dam is the vertical distance between the lowest point of the natural surface of the ground at the downstream toe of the dam and the uppermost point of the top of the dam.

O.C. 300-2002, s. 2.

3. The impounding capacity of a dam is the total volume of water stored in the reservoir measured at the full supply level. Where bathymetric surveys or other site surveys to measure the impounding capacity with greater precision are unavailable,

(1) the impounding capacity of a dam built across a watercourse is equal to the product of the backflow length multiplied by one-half the reservoir depth and by the average width of the body of water formed by the dam; and

(2) the impounding capacity of other dams is equal to the product of the surface area of the reservoir multiplied by the reservoir depth.

The reservoir depth is the vertical distance between the lowest point of the natural surface of the ground at the downstream toe of the dam and the full supply level.

O.C. 300-2002, s. 3.

4. For the purposes of this Regulation, unless the context requires otherwise,

“existing dam” means a dam completely constructed by the date of coming into force of the Act or under construction on that date, as well as a dam construction project for which the developer had, on the date of coming into force of the Act, obtained the required approval under the Watercourses Act (chapter R-13); (barrage existant)

“full supply level” means the maximum normal operating water surface level of a reservoir; (niveau maximal d'exploitation)

“project” means the complex of structures impounding the water of a single reservoir that are owned by the same person; (aménagement)

A reservoir includes any lake referred to in the Banque de noms de lieux du Québec.

O.C. 300-2002, s. 4.

## CHAPTER II REGISTER OF DAMS

5. The register of dams established under section 31 of the Act must contain the following information and documents:

(1) the official name of the dam as established by the Commission de toponymie and the particulars of its location;

(2) the name and address of the dam owner;

(3) the year the dam was constructed and, where applicable, the year any structural alterations were made to the dam;

(4) the dam uses;

(5) a description of the dam that includes the dam type, foundation type, dam height, impounding capacity and reservoir depth;

(6) the hydrologic and hydraulic data in respect of the dam, including discharge capacity, in the case of a high-capacity dam, reservoir surface area and backflow length, reference to any upstream or downstream structures and, where a dam is part of a project, reference to the other structures forming part of the project;

(7) the seismic zone in which the dam is located with reference to the seismic zone map in Schedule I; and

(8) 1 or more photographs of the dam.

In respect of high-capacity dams within the meaning of section 4 of the Act, the following information must also be entered in the register of dams:

(1) the dam classification under Division I of Chapter III;

(2) the dam failure consequence category as determined under sections 17 and 18;

(3) the year of a planned safety review and the year it was effectively carried out; and

(4) the year in which there was any change in the use of the dam likely to affect its safety and, where applicable, the year of a permanent or temporary stopping of its operation.

The dam failure consequence category of an existing dam shall not be entered in the dam register until it has been reviewed pursuant to section 19.

O.C. 300-2002, s. 5; O.C. 17-2005, s. 1.

6. The dam owner shall, within 3 months of the dam commissioning date, send the information or documents required for the preparation of the register of dams to the Minister, unless an application for authorization or a declaration has been filed under the Act with respect to the construction of the dam.

Every offence against any provision of this section renders the owner liable to a fine of not less than \$2,000 and not more than \$200,000.

O.C. 300-2002, s. 6.

7. The dam owner shall notify the Minister as soon as possible of any change affecting the accuracy of the information recorded in the register of dams. The owner shall also, within 3 months of receiving a request to that effect, send to the Minister any information or document required to update the register of dams.

Every offence against any provision of this section renders the owner liable to a fine of not less than \$2,000 and not more than \$200,000.

O.C. 300-2002, s. 7.

8. The public shall have access to the register of dams through the Internet, excluding access to the names and addresses of owners who are natural persons.

O.C. 300-2002, s. 8.

### CHAPTER III HIGH-CAPACITY DAMS

#### DIVISION I DAM CLASSIFICATION

9. Every dam must be classified on the basis of the degree of risk it poses to persons and property, measured by multiplying the numerical value of its vulnerability (V) calculated under section 12 by the numerical value of the potential consequences of a dam failure (C) determined under section 16, to which “P” is the assigned value in the formula “ $P = V \times C$ ”.

O.C. 300-2002, s. 9.

10. Following are the classes of dams based on the values determined under section 9, in addition to the class referred to in the second paragraph:

“P” Value	Dam Class
$P \geq 120$	A
$70 \leq P < 120$	B
$25 \leq P < 70$	C
$P < 25$	D

A dam in the Very Low Consequence category under sections 17 and 18 is a Class E dam if the “P” value determined under section 9 is less than 70.

If a dam consists of more than 1 section, each section must be assessed individually and the dam class shall be that of the section with the highest “P” value.

O.C. 300-2002, s. 10.

11. A dam shall be classified by the Minister prior to authorization for the construction of the dam, subject to the special provisions in section 74 relating to existing dams.

A dam owner may, at any time, apply for a review of the classification of the structure if a supporting report or study made under the responsibility of an engineer is submitted with the application.

O.C. 300-2002, s. 11.

Dam vulnerability (V)

12. The vulnerability (V) of a dam is measured by multiplying the arithmetic mean value of the constant physical parameters by the arithmetic mean value of the variable parameters.

O.C. 300-2002, s. 12.

13. The constant physical parameters to be considered are the dam height, dam type, impounding capacity and dam foundation type. The points to be assigned to each parameter based on the characteristics of the dam are set out in Schedule II.

If there is more than 1 foundation type in a section of a dam, the points to be assigned to the foundation type parameter for that section of the dam must be the highest of the points assigned to the different foundation types in that section.

O.C. 300-2002, s. 13; O.C. 17-2005, s. 2.

14. The variable parameters to be considered are

(1) the dam age, which is the number of years since its construction or, as the case may be, as determined by the engineer in charge of the safety review on the basis of the useful life of the dam;

(2) the seismic zone in which the dam is located according to the seismic zone map in Schedule I;

(3) the dam condition, which is assessed by considering the physical state and structural condition of the dam, the quality and effectiveness of maintenance, aging, possible effects of external factors such as frost or earthquakes and any dam design or structural defects. At the completion of the assessment, the dam condition is rated “very good”, “good”, “acceptable”, “poor” or “undetermined”; and

(4) the reliability of the discharge facilities of the dam, which must be capable of passing the inflow design flood. The reliability is assessed on the basis of the design of the discharge facilities and the procedures established by the owner to ensure that they operate effectively during floods. At the completion of the assessment, the reliability of the discharge facilities is rated “satisfactory”, “acceptable”, “unsatisfactory” or “undetermined”.

The points to be assigned to each variable parameter based on the characteristics of the dam are set out in Schedule III.

O.C. 300-2002, s. 14; O.C. 402-2011, s. 1.

15. For the purposes of the assessment of the reliability of discharge facilities, the sections of a dam that do not contain such facilities are given the same rating as the section that does. If there are discharge facilities in more than 1 section of the dam, the lowest rating given to any section also applies to every other section of the dam. The same rule applies if there are discharge facilities in every section of a dam.

If there is more than 1 dam on the rim of a single reservoir, the structures that are not equipped with discharge facilities are given the same rating as the dam that is so equipped. If more than 1 dam is equipped with discharge facilities, the lowest rating given to any such dam or to a section of one of those dams also applies to every other dam on the rim. The same rule applies if there are discharge facilities in every section of each dam.

O.C. 300-2002, s. 15.

#### Dam failure consequences (C)

16. For the purposes of section 9, the numerical value of the consequences of a dam failure (C) is based on the failure consequence category of the dam determined under sections 17 and 18. The points assigned to each category are set out in Schedule IV.

O.C. 300-2002, s. 16.

17. The dam failure consequence category is determined on the basis of the characteristics of the downstream area, barring exceptions, that would be affected by the dam failure and takes into account, from among a number of dam failure scenarios, the one that would result in the highest consequence category. Those characteristics are assessed in terms of population density and the extent of downstream infrastructure and services that would be destroyed or severely damaged in the event of a dam failure. The consequence categories and a description of the characteristics used to determine each category appear in Schedule V.

O.C. 300-2002, s. 17.

18. The delineation of the area that would be affected by a dam failure and identification of the characteristics of the area are based on a dam failure analysis that includes inundation maps. That analysis, using recognized methods, consists of a detailed evaluation of the consequences of a dam failure by means of an accurate delineation of the affected area and identification of the characteristics of the area. The analysis involves an examination of various dam failure scenarios under normal conditions and in flood conditions. It includes a description of the assumptions and procedures that were used to select the scenarios examined and to determine the dam break flood wave, flood wave arrival times and the extent of the affected area. For scenarios in which the dam fails during a flood, the affected area would be the area that would be inundated due entirely to the dam failure.

If, in the opinion of the engineer in charge, the dam failure consequence category is “moderate”, only rough inundation maps showing the area that would be affected by a dam failure are required. This mapping consists of a rough assessment of the consequences of a dam failure by means of a delineation of the affected area on topographical maps and identification of the characteristics of the area. The mapping is established on basic hydrologic and hydraulic calculations, such as flood flows and breach flows, as well as on a rough analysis of the downstream watercourse profile and cross-sections. For the purposes of the mapping, the extent of the affected area is determined by adding the breach flow to the 1000-year flood flow to a point of attenuation or restriction, such as confluence with a large lake or river or another dam.

If, in the opinion of the engineer in charge, the dam failure consequence category is “very low” or “low”, only a characterization of the area that would be affected by the dam failure is required. That characterization consists of a conservative estimate of the consequences of a dam failure by means of a rough delineation of the affected area and a general description of the characteristics of the area. For the purposes of the characterization, the extent of the affected area is established by adding the reservoir depth to the 100-year flood level to a point of attenuation or restriction, such as confluence with a large lake or river or another dam.

The dam failure analysis, rough mapping and characterization referred to in this section must be carried out under the responsibility of an engineer.

O.C. 300-2002, s. 18.

19. The dam failure consequence category shall be determined by the Minister prior to authorization for the construction of a dam, subject to the special provisions in section 74 relating to existing dams.

The category determined under the first paragraph shall be reviewed in the following circumstances:

- (1) following a dam safety review;
- (2) prior to authorization for the permanent or temporary stopping of the operation of the dam, such as results on full seasonal opening of the dam's discharge facilities; and

(3) prior to authorization for the structural alteration of a dam or a change in use likely to affect its safety, including changes involving putting a dam back into operation or partially stopping its operation, where carrying out the project for which the authorization is sought would enlarge the area that would be affected by a dam failure.

However, a dam owner may at any time apply to the Minister for a review of the dam failure consequence category of the dam, with the supporting dam failure analysis, rough maps or characterization required under section 18 for the consequence category the owner believes is applicable to the structure.

O.C. 300-2002, s. 19; O.C. 17-2005, s. 3.

DIVISION II  
MINIMUM SAFETY STANDARDS

§1. Flood resistance

20. For the purposes of this subdivision, unless the context requires otherwise,

“erodible dam” means a dam with an earthfill or rockfill component that is not designed for overflow and the erosion of which would cause a dam failure in a flood; (barrage susceptible d'érosion)

“safety check flood” is the flood that a dam must be capable of withstanding under extreme conditions while continuing to operate safely, accepting some damage and a reduction in safety factors but without causing dam failure. (crue de sécurité)

O.C. 300-2002, s. 20.

21. Subject to sections 23 and 24, the characteristics of every dam must ensure that it can withstand as a minimum the safety check flood described in the table below that corresponds to the failure consequence category of the dam under sections 17 and 18. However, if the dam failure consequences were assessed on the basis of a dam failure analysis, the category to be considered for the purposes of the table is the highest consequence category resulting from the examination of dam failure scenarios in flood conditions.

---

Consequence Category	Safety Check Flood (Recurrence Interval)
----------------------	---

---



Very Low or Low	1:100 years
Moderate or High	1:1,000 years
Very High	1:10,000 years or ½ PMF
Severe	Probable maximum flood (PMF)

O.C. 300-2002, s. 21.

22. For a dam of which at least half the inflow during floods is controlled by another dam operated upstream, the safety check flood is, subject to sections 23 and 24, the greater of

- (1) the safety check flood determined under section 21; and
- (2) the lesser of the 10,000-year flood and the inflow equivalent to the discharge capacity of the upstream dam together with the local inflows.

If more than 1 dam is located on the same watercourse upstream of the dam in question, the flow to be considered is the flow equivalent to the discharge capacity of the upstream dam with the greatest discharge capacity, taking the local inflows and the flood routing by the other dams into account. This rule also applies if the upstream dams are located on different watercourses; however, in that event, the flow that must be considered is the total flow obtained by adding, for each watercourse, the flow equivalent to the discharge capacity of the upstream dam with the greatest discharge capacity, taking the local inflows and flood routing into account.

This section does not apply to existing dams in the Very Low or Low Consequence categories under sections 17 and 18.

O.C. 300-2002, s. 22; O.C. 402-2011, s. 2.

23. Subject to section 24, the safety check flood determined under section 21 or 22 may be less, but it may not be less than a 100-year flood if it is shown that a dam failure during such a flood would cause a consequence category lower than that used for the purposes of section 21.

O.C. 300-2002, s. 23; O.C. 17-2005, s. 4; O.C. 402-2011, s. 3.

24. Only 1 safety check flood shall apply to all the dams located on the rim of a single reservoir and it shall be that of the dam with the highest safety check flood determined under section 21, 22 or 23, as the case may be.

O.C. 300-2002, s. 24.

25. The crest of an erodible dam at its lowest point must not be less than 1 m above the safety check flood level, unless the owner demonstrates to the Minister's satisfaction that all hydrologic and hydraulic uncertainties and flood management uncertainties have been taken into account in the determination of the safety check flood.

The factors that the Minister shall consider include the extent of sampling periods and the reliability of the source data, the methods and models used, the accuracy of the calculations, the catchment basin lag time and the routing of the safety check flood as well as the dam's capacity to manage it, in particular with respect to response and operating time, the reliability of discharge facilities and the impounded water management plan.

This section does not apply to dams designed to withstand a “probable maximum flood”.

O.C. 300-2002, s. 25; O.C. 402-2011, s. 4.

26. Any impervious component of an erodible dam must be at least as high as the safety check flood level.

This section does not apply to existing dams.

O.C. 300-2002, s. 26.

27. Realistic and conservative assumptions and methods based on good practice must be used to estimate the safety check flood for a dam and to assess the dam's capacity to manage it.

O.C. 300-2002, s. 27.

## §2. Earthquake resistance

28. Every dam must be designed to remain stable during the earthquake loading to which it may be subjected in the zone in which it is located.

O.C. 300-2002, s. 28.

29. Realistic and conservative methods and assumptions based on good practice must be used in the calculations demonstrating the structural and foundation stability of a dam in earthquake conditions. Calculations must be based on the full supply level and be accompanied by the opinion of the engineer in charge on the liquefaction potential of the dam and its foundation and the data on which that opinion is based.

The seismic coefficients (k) to be applied in the pseudostatic analysis vary according to the seismic zone in which the dam is located and are indicated on the map appearing in Schedule I. The coefficients may also be determined, for each dam site, from peak ground acceleration data established by the Geological Survey of Canada for a return period of 2,500 years.

O.C. 300-2002, s. 29; O.C. 402-2011, s. 5.

## DIVISION III OPERATION

### §1. Impounded water management plan

30. An impounded water management plan must be drawn up for every dam or project before its commissioning. The plan must describe all the procedures to be followed by the owner for the safe management of the impounded water, in particular during situations in which persons or property located upstream or downstream are at risk, excluding the emergency action plan procedures.

The plan must include

- (1) a description of the hydrographical network upstream and downstream of the dam, including flood estimates and the catchment basin lag time as well as, where applicable, reference to other structures in the network that may affect the operation of the dam or whose operation the dam may affect and a quantification of any such impact;
- (2) operational constraints relating to the safety of persons or property located upstream or downstream of the dam during normal operation and during floods;
- (3) the full supply level;
- (4) the flow and level of the safety check flood;
- (5) the level or depth at which the reservoir overflows at its lowest point;
- (6) the reservoir storage curve, if available;
- (7) the discharge curve;

(8) if there are any inhabited areas near the dam, the upstream and downstream flood limits;

(9) a description of the measures that will be taken by the owner to manage the reservoir when the flow reaches the lower flood level, that is, the flow at which property may be affected by the discharged water; and

(10) where applicable, a description of the communications strategy for providing information on potential hazards to the civil protection authorities, other dam owners in the hydrographic system, enterprises and inhabitants that will ultimately be affected by the implementation of the impounded water management plan.

O.C. 300-2002, s. 30.

31. The owner is required, at all times, to make all necessary amendments to the impounded water management plan in the event of any change affecting the procedures set out in the plan or the information contained therein.

O.C. 300-2002, s. 31.

32. The impounded water management plan must be updated and reviewed

(1) when a dam safety review is conducted;

(2) (paragraph revoked);

(3) prior to authorization for the structural alteration of the dam or for a change in use likely to affect its safety, including changes involving putting a dam back into operation or partially stopping its operation, if carrying out the project for which the authorization is sought would modify the impounding capacity, the full supply level or the discharge capacity of the dam. This rule also applies if the structural alteration would require modifying the safety check flood.

O.C. 300-2002, s. 32; O.C. 17-2005, s. 5.

33. As soon as possible after the preparation or amendment of an impounded water management plan, the dam owner shall send a summary of the plan as drawn up or amended to the local municipality within whose territory the dam is located. If the dam is located in unorganized territory, the plan summary shall be sent to the competent regional authority or to

the Minister of Public Security, as provided in section 8 of the Civil Protection Act (chapter S-2.3).

The management plan summary must include the particulars listed in subparagraphs 2 to 5 and 8 of the second paragraph of section 30 and a summary of the descriptions referred to in subparagraphs 9 and 10 of the same provision.

O.C. 300-2002, s. 33.

34. This subdivision does not apply to Class E dams as described in section 10.

O.C. 300-2002, s. 34.

## §2. Emergency action plan

35. An emergency action plan must be drawn up before the commissioning of any dam. The plan shall set out the procedures to be followed for the protection of persons and property upstream or downstream of the dam in the event of an actual or imminent dam failure or to mitigate the effects of the disaster.

The plan must include

(1) the name of the local municipality, regional county municipality or any other regional body whose territory would be affected by a dam failure;

(2) a list of the conditions that could lead to a dam failure;

(3) a general description of the area that would be affected by a dam failure, including the principal infrastructures that would be destroyed or severely damaged;

(4) a description of the internal and external human, material and organizational resources that would be available in the event of a disaster; and

(5) a description of the monitoring and warning procedures in the event of an actual or imminent dam failure that have been established by the owner, including

(a) a description of the prevention, potential dam failure detection and mitigation measures established by the owner;

(b) warning and dam personnel mobilization procedures for the various conditions that may lead to a dam failure;

(c) the procedure for warning civil protection authorities and, where applicable, residents; and

(d) the operation and decision centre.

The inundation maps referred to in the first paragraph of section 18 must be appended to the emergency action plan. The maps must indicate the dam break flood wave travel time in the event of a dam failure in normal conditions and during floods and take into account, for the latter eventuality, the water elevation equal to the safety check flood for the dam. Only rough maps that comply with the second paragraph of section 18 are required for dams in the Moderate Consequence category under sections 17 and 18.

O.C. 300-2002, s. 35.

36. The owner must provide for the training of all dam personnel involved in the emergency action plan and, in particular, of the person in charge of implementing the plan. The owner must also make sure that drills to test the implementation of the plan are held periodically and when specifically requested by the civil protection authorities.

O.C. 300-2002, s. 36.

37. The owner is required, at all times, to make all necessary amendments to the emergency action plan in the event of any change affecting the procedures set out in the plan or the information contained therein, in particular with respect to the resources available in the event of a disaster.

O.C. 300-2002, s. 37.

38. The emergency action plan must be reviewed

(1) when a dam safety review is conducted;

(2) prior to authorization for the permanent or temporary stopping of the operation of the dam; and

(3) prior to authorization for the structural alteration of the dam or for a change in use likely to affect its safety, if carrying out the project for which authorization is sought would enlarge the area that would be affected by a dam failure.

O.C. 300-2002, s. 38.

39. As soon as possible after the preparation or amendment of an emergency action plan, the dam owner shall send a summary of the plan as drawn up or amended to the local municipality within whose territory the dam is located. If the dam is located in unorganized territory, the plan summary shall be sent to the competent regional authority or to the Minister of Public Security, as provided in section 8 of the Civil Protection Act (chapter S-2.3). The Minister shall be notified whenever such a plan summary is sent.

The emergency action plan summary must include the particulars listed in subparagraph 1 and subparagraphs c and d of subparagraph 5 of the second paragraph of section 35. It must also include a summary of the particulars referred to in subparagraph 3 and subparagraphs a and b of subparagraph 5 of that provision. As the case may be, the inundation maps or the rough maps referred to in the third paragraph of section 35 must be appended to the summary.

O.C. 300-2002, s. 39.

40. This subdivision does not apply to dams in the Very Low or Low Consequence category under sections 18 and 19.

O.C. 300-2002, s. 40.

### §3. Monitoring

41. The monitoring of a dam by the owner includes

(1) site inspections, which consist of routine visual inspections of the dam and are carried out to detect and monitor more apparent deficiencies and determine the general condition of a dam following major events such as floods, earthquakes and windstorms;

(2) regular inspections, which consist of visual examinations of the dam and its main components and may include, if required, the taking of measurements, and are carried out to ensure continuous monitoring of the dam in order to detect or monitor any deficiency or deterioration; and

(3) formal inspections, which consist of comprehensive visual examinations of the dam and of each of its components or parts and may include, if required, the taking of measurements, and are carried out to monitor the behaviour of the dam and to determine the condition of each of its components or parts.





Site				-	1/M	-	1/2M	-	3/Y	-
2/Y	1/Y	1/Y								
<hr/>										
Regular					1/M	4/Y	1/2M	3/Y	3/Y	2/Y
2/Y	1/Y	-	1/5Y							
<hr/>										
Formal					1/Y	1/Y	1/Y	1/2Y	1/2Y	1/5Y
1/3Y	1/8Y	1/5Y	1/10Y							
<hr/>										
<hr/>										

Legend: I: first years of the dam's operation when its behaviour is not stabilized

II: subsequent years of operation when its behaviour has stabilized

M: month

Y: year

Inspections that must be carried out yearly shall be carried out as evenly as possible over the 12 months of the year.

O.C. 300-2002, s. 42; O.C. 17-2005, s. 6.

43. Notwithstanding section 42, the monthly site inspections may be omitted for the months of December to April inclusively for a dam in the Very Low, Low or Moderate Consequence category under sections 17 and 18 unless the dam has deficiencies that require that the inspections be maintained. Where the operation of a dam has been temporarily stopped, subject to the conditions of the authorization issued by the Minister, the site inspections and regular monthly inspections may also be omitted for the months during which the stopping of the operation of the dam has been authorized.

O.C. 300-2002, s. 43; O.C. 17-2005, s. 7.

44. For the purposes of section 42, the inspection carried out during a safety review counts as a formal inspection, regular inspection and site inspection for the year in which it is carried out.

O.C. 300-2002, s. 44.

45. The qualification requirements for carrying out and, as the case may be, supervising a site inspection, regular inspection or formal inspection vary according to the type of inspection and the dam class as determined under Division I of Chapter III.

Site inspections shall be carried out by a person who is familiar with the dam; site inspections of a Class A or Class B dam shall be carried out under the supervision of a civil-engineering technician or an engineer.

Regular inspections shall be carried out by a civil-engineering technician; regular inspections of a Class A or Class B dam must be carried out under the supervision of an engineer. Regular inspections of a Class C, D or E dam may also be carried out by a person familiar with the dam, provided that the inspection is carried out under the supervision of a civil-engineering technician or an engineer.

Formal inspections of any class of dam must be carried out by an engineer.

For the purposes of this section, “civil-engineering technician” means a person who holds a diploma in Civil Engineering Technology, or a person who has completed equivalent training. The persons who, on 11 April 2002, were already performing the duties of such a technician may also carry out site inspections under the authority of a civil-engineering technician.

O.C. 300-2002, s. 45; O.C. 17-2005, s. 8; O.C. 402-2011, s. 6.

#### §4. Logbook

46. Every dam owner must, from the dam commissioning date, establish and maintain a logbook in which activities and important events relating to the safety of the dam are recorded in chronological order.

In addition to the information required under section 21 of the Act, the logbook must contain

- (1) a brief description of all inspection activities carried out, indicating the reservoir level at each inspection;
- (2) a brief description of every safety review conducted; and
- (3) a description of any maintenance, repair or structural alteration work to the dam.

The logbook must also contain, where applicable,

- (1) a description of unusual natural events, such as earthquakes, a flood with a 20-year or more recurrence interval, rainstorms or windstorms, landslides, floating islands, and ice conditions;

(2) a description of events caused by human activity, such as vandalism or sabotage or work carried out near the dam, that could affect its stability;

(3) any deviation from operational constraints relating to dam safety established at the time of dam design or in a safety review, in particular with respect to the full supply level and to filling and drawdown speeds;

(4) a description of special activities, such as behaviour tests or investigations; and

(5) a description of operations that have been carried out, excluding regular flow controls.

The owner of an existing dam must enter in the logbook, to the best of the owner's knowledge, the actions that have been taken and the significant events that have occurred from the dam commissioning to the date of coming into force of the Act.

O.C. 300-2002, s. 46.

47. The project owner may elect to establish and maintain more than 1 logbook. Where a logbook pertains to more than 1 dam, each entry in the logbook must identify the dam to which it refers.

O.C. 300-2002, s. 47.

#### DIVISION IV DAM SAFETY REVIEW

48. The purpose of a dam safety review is to evaluate the safety, stability and functionality of a dam, the conformity of its design and construction with good practice and safety standards and to determine, where required, appropriate remedial measures. The review includes

(1) checking the condition and behaviour of the dam by means of

(a) a comprehensive inspection of every structural component;

(b) an analysis of the compiled results of every inspection carried out since the last safety review or, in the absence of such a review, during the period considered appropriate by the engineer in charge of the review;

(c) where applicable, a check of the instrumentation and an analysis of the readings since the last safety review or, in the absence of such a review, during the period considered appropriate by the engineer in charge of the review; and

(d) a check of the functionality and reliability of the discharge facilities;

(2) verifying the dam design by means of

(a) a reappraisal of the design criteria, namely, the data, assumptions and analysis methods considered at the time of dam design, in particular with reference to hydrology, hydraulics, structure, discharge capacity and flood routing; and

(b) a validation of the stability of the dam and foundation, including, if the engineer in charge considers it appropriate, geotechnical investigations and static stability calculations or, where required, pseudostatic or dynamic stability calculations, of the structure and foundation of the dam based on dam design criteria in use at the time of the safety review, establishing new safety factors. The validation includes, if the engineer considers it appropriate, a characterization of the dam materials.

(3) where applicable, checking the safety devices with which the dam is equipped, namely, emergency systems, emergency detector systems and back-up systems;

(4) reviewing the dam's classification, which includes

(a) validation of the parameters used to determine the vulnerability of the dam, in particular, the dam age, dam condition and reliability of discharge facilities; and

(b) validation of the dam failure consequence category determined under sections 17 and 18; and

(5) reviewing the impounded water management plan, if such a plan is required under Subdivision 1 of Division III for the dam undergoing the safety review.

O.C. 300-2002, s. 48.

49. The report documenting the dam safety review must set out the procedure followed by the engineer in charge of the review and include, depending on the component in question, the

engineer's comments, opinions and recommendations. The report must also contain the data, methods and design assumptions on which the analyses and checks were based. The report must include

(1) a brief description of the instrumentation if the dam is so equipped, an assessment of their condition and their effectiveness and the opinion of the engineer in charge on the readings;

(2) a description of the maintenance and repair work carried out since the last safety review or, in the absence of such a review, for the period considered appropriate by the engineer in charge;

(3) the opinion of the engineer in charge on the functionality and reliability of the discharge facilities;

(4) a description of the compiled observations and deficiencies discovered, including comments on them, as well as the opinion of the engineer in charge on the condition of the dam and on the impact of the work that was carried out on the safety of the dam;

(5) the opinion of the engineer in charge on the adequacy of the dam design in relation to good practice and to the minimum safety standards;

(6) a description of the safety devices, checks and tests that have been carried out, as well as the opinion of the engineer in charge on their functionality and adequacy;

(7) a summary of the results of the verifications carried out under subparagraphs 1, 2 and 3 of section 48, an analysis of the results and the opinion of the engineer in charge on the structural and functional safety of the dam;

(8) the recommendations of the engineer in charge in respect of remedial measures that must be implemented to ensure that the dam is safe and complies with good practice and with the minimum safety standards, the time required to implement those measures and, where applicable, the work or temporary measures that must be carried out to ensure that the dam remains safe until the remedial measures are implemented; and

(9) the recommendations of the engineer in charge in respect of the appropriate class and dam failure category for the dam. Where required, the dam failure analysis, rough maps or characterization referred to in section 18 applicable to the consequence category considered appropriate by the engineer must be appended to the report.

The report must also include

- (1) the official name of the dam as established by the Commission de toponymie, and the particulars of its location;
- (2) the name and address of the dam owner;
- (3) the name and position of the owner's representative responsible for dam safety;
- (4) a brief description of the dam and its geometric size;
- (5) a description of available data pertinent to the dam safety review, such as the catchment hydrologic and hydraulic characteristics at the time of dam design, the geology, geotechnics and seismicity of the zone in which the dam is located and the characteristics of the foundation and the materials used to build the dam;
- (6) the name and address of the engineer in charge of the dam safety review;
- (7) where applicable, the date on which the last dam safety review was carried out; and
- (8) a list of the reference documents used in the dam safety review.

If the review of the impounded water management plan results in the drawing up of a new plan, a summary of the plan that complies with the second paragraph of section 33 must be appended to the report.

O.C. 300-2002, s. 49.

49.1. Where the owner of a dam intends, within 5 years, to remove it, reconstruct it or make a structural alteration to it that affects all parts of the dam or that, because of the scope of the work, is equivalent to reconstructing the dam, the dam safety review may be limited to the following:

- (1) a check of the condition and behaviour of the dam by means of a comprehensive inspection of every structural component; and
- (2) a check of the functionality and reliability of the discharge facilities.

The report documenting the dam safety review must include

(1) the report of the most recent formal inspection carried out pursuant to section 42; and

(2) the opinion of the engineer in charge on the structural and functional safety of the dam and, where applicable, on the measures proposed to prevent the risks of dam failure until the planned work is carried out.

The report must also contain the information referred to in subparagraphs 1 to 4 and 6 of the second paragraph of section 49.

Paragraph 1 of sections 32 and 38 and subparagraph 1 of the first paragraph of sections 76 and 77 do not apply to a dam whose safety review is conducted under this section.

O.C. 402-2011, s. 7.

50. A dam safety review must be conducted, and the attendant report sent to the Minister, every 10 years. That frequency is increased to 15 years and 20 years for dams in the Low and Very Low Consequence category, respectively.

Where a dam undergoes a structural alteration that affects all parts of the structure or that, because of the scope of the work, is equivalent to reconstructing the dam, the schedule of reviews and reports is moved forward, the period for the next review and report being computed from the year of completion of the work.

O.C. 300-2002, s. 50; O.C. 17-2005, s. 9.

51. Subject to the provisions of sections 78 to 80 respecting an existing dam, the first dam safety review must be conducted not later than in the tenth year following the year of dam commissioning. That deadline is postponed to the 15th year and the 20th year for dams in the Low and Very Low Consequence category, respectively.

For the purposes of section 50 and this section, the year of dam commissioning and the year of completion of the work are the years during which the Minister must be advised of the completion of the work as provided in section 10 of the Act.

O.C. 300-2002, s. 51; O.C. 17-2005, s. 9.

52. The Minister's decision under section 17 of the Act in respect of an owner's planned remedial measures and implementation schedule must be rendered within 6 months after receipt of the outline and schedule submitted by the owner.

O.C. 300-2002, s. 52.

## DIVISION V SAFETY PROGRAMS

53. The Minister may approve a safety program on the condition that the program has been in effect, under the responsibility of qualified persons, for at least 5 years and covers all the dams belonging to the owner of at least 10 high-capacity dams.

In addition, a safety program shall not be approved unless the application for approval of the program complies with section 55.

O.C. 300-2002, s. 53.

54. A safety program must, for every dam or structure covered by the program, provide for

(1) management of the impounded water, in particular the content of a management plan and plan updating procedures;

(2) emergency preparedness in respect of any dams covered by the program that are subject to the requirement of an emergency action plan under Subdivision 2 of Division III, in particular the content of an emergency action plan and plan updating procedures;

(3) the frequency, nature and content of monitoring activities and the qualification requirements for carrying them out;

(4) a dam safety review, in particular the content and frequency of the review;

(5) the content of the logbook referred to in section 21 of the Act; and

(6) dam maintenance.

The program must also provide for the administration of the safety program, in particular with respect to the persons in charge of its implementation, their training and their respective responsibilities.

O.C. 300-2002, s. 54.

55. An application for the approval of a safety program must contain

(1) the name and address of the dam owner;

(2) the name and position of the owner's representative in charge of administering the safety program;



(3) the names of the dams concerned and the particulars of their location;

(4) a summary of the content of the program under section 54; and

(5) a demonstration that the program's resulting level of safety is at least equal to the level that would be obtained with the implementation of the prescribed standards for which alternatives are proposed, with a reference to those regulatory provisions.

O.C. 300-2002, s. 55.

56. The Minister's decision under section 23 of the Act in respect of a safety program must be rendered within 4 months after receipt of the proposal.

O.C. 300-2002, s. 56.

## DIVISION VI APPLICATION FOR AUTHORIZATION

57. The following information and documents, in addition to those required by the Act, must be submitted with an application for authorization for the construction of a dam or for a structural alteration that affects all parts of the structure or that, because of the scope of the work, is equivalent to reconstructing the dam:

(1) the appropriate hydrological and hydraulic studies;

(2) the recommendation of the engineer responsible for the dam project plans and specifications in respect of the failure consequence category of the dam under sections 17 and 18, to which is appended the dam failure analysis, rough maps or characterization required under section 18 for the consequence category the engineer considers appropriate for the dam;

(3) the impounded water management plan summary if such a plan is required under Subdivision 1 of Division III for the dam to be constructed;

(4) a description of emergency preparedness procedures in the event of a dam failure or failure of the temporary structures during the construction referred to in the application, if an emergency action plan is required under Subdivision 2 of Division III for the dam to be constructed;

(5) the structural and foundation stability studies for the dam to be constructed, including geotechnical investigations;

(6) seismic stability calculations for the dam to be constructed, unless the dam failure consequence category under sections 17 and 18 is Very Low or Low, but in the latter event, only if the dam is situated in seismic zone 1, 2 or 3;

(7) a topographic analysis of the reservoir rim with respect to the safety check flood, if applicable; and

(8) detailed cost estimates of the planned work.

A \$200 deposit on the fees prescribed in section 64 must accompany the application for authorization. The deposit is not refundable under any circumstances.

O.C. 300-2002, s. 57; O.C. 17-2005, s. 10; O.C. 402-2011, s. 8.

58. In addition to the information and documents required by the Act, the following information and documents adapted and prepared specifically in relation to the proposed alteration must be submitted with an application for authorization for the structural alteration of a dam that is not an alteration under section 57:

(1) the structural and foundation stability studies for the modified dam, including geotechnical investigations;

(2) seismic stability calculations for the modified dam, unless the dam failure consequence category under sections 17 and 18 is Very Low or Low, but in the latter event, only if the dam is situated in seismic zone 1, 2 or 3;

(3) a topographic analysis of the reservoir rim with respect to the safety check flood, if applicable;

(4) a description of emergency preparedness procedures in the event of a dam failure or failure of the temporary structures during the structural alteration work for which the authorization is sought, if an emergency action plan is required for the dam under Subdivision 2 of Division III;

(5) if the proposed structural alteration would enlarge the area that would be affected by a dam failure, the recommendation of the engineer in charge of drawing up the plans and specifications for the proposed alteration in respect of the dam failure consequence category under sections 17 and 18, to which is appended the dam failure analysis, rough maps or characterization required under section 18 for the consequence category the engineer considers appropriate for the dam; and

(6) detailed cost estimates of the planned work.

In addition to the information and documents referred to in the first paragraph, if the structural alteration would change the safety check flood, the impounding capacity, the full supply level or the discharge capacity of the dam, the following documents must also be appended to the application for authorization:

(1) the appropriate hydrologic and hydraulic studies; and

(2) the impounded water management plan summary as revised for the purpose of the application for authorization if such a plan is required for the dam under Subdivision 1 of Division III.

A \$200 deposit on the fees prescribed in section 64 must accompany the application for authorization. The deposit is not refundable under any circumstances.

O.C. 300-2002, s. 58; O.C. 17-2005, s. 11; O.C. 402-2011, s. 9.

59. An application for authorization for the complete removal of a dam, or its partial removal if as a result the dam is no longer a high-capacity dam, must include

- (1) the geographic coordinates and geometric size of the dam;
- (2) a description of the planned work; and
- (3) a description of the impact of the dam removal on the natural characteristics of the watercourse, its bed and its shores.

An application for authorization for partial removal must also include

- (1) the name and address of the dam owner;
- (2) the plans and specifications of the altered dam, drawn up by an engineer, and the hydrologic and hydraulic data and assumptions considered; and
- (3) the new impounding capacity of the dam.

O.C. 300-2002, s. 59; O.C. 402-2011, s. 10.

60. The following information and documents must be submitted with an application for authorization for a change in use likely to affect the safety of the dam, including changes involving putting a dam back into operation or partially stopping its operation,

- (1) an assessment of the effects of the proposed change on dam safety;
- (2) the project engineer's certification respecting the structural and foundation stability of the dam and the functionality and reliability of the discharge facilities; and
- (3) if carrying out the project referred to in the application for authorization would enlarge the area that would be affected by a dam failure, the recommendation of the project engineer in respect of the dam failure consequence category under sections 17 and 18, to which is appended the dam failure analysis, rough maps or characterization required under section 18 for the consequence category the engineer considers appropriate for the dam;

(4) the impounded water management plan summary, as revised for the purpose of the application for authorization if such a plan is required for the dam under Subdivision 1 of Division III.

O.C. 300-2002, s. 60; O.C. 17-2005, s. 12.

61. The following information and documents must be submitted with an application for authorization for the permanent or temporary stopping of the operation of a dam:

(1) if the application is for a permanent stopping:

(a) a description of the measures that will be taken to terminate the operation of the dam;

(b) the project engineer's recommendation respecting the dam failure consequence category under sections 17 and 18, to which is appended the dam failure analysis, rough maps or characterization required under section 18 for the consequence category the engineer considers to be appropriate for the dam once the operation has stopped; and

(c) if the dam condition is "poor" or "undetermined" or if the dam failure consequence category reviewed under section 19 is "Moderate", "High", "Very High" or "Severe", the project engineer's certification respecting the structural and foundation stability of the dam; and

(2) if the application is for a temporary stopping, such as results on full seasonal opening of the dam's discharge facilities,

(a) the year or, where the stopping of the dam's operation is recurrent, the years for which the authorization is applied for and details on the time and duration of each anticipated period of temporary stopping; and

(b) a description of the measures that will be taken to temporarily stop the operation of the dam.

O.C. 300-2002, s. 61; O.C. 17-2005, s. 13; O.C. 402-2011, s. 11.

62. The Minister's decision under section 5 of the Act in respect of the construction or structural alteration of a dam must be rendered within 6 months after receipt of the application for authorization.

The Minister's decision under section 5 of the Act in respect of the complete or partial removal, a change in use or the permanent or temporary stopping of the operation of a dam must be rendered within 2 months after receipt of the application for authorization.

The Minister's decision under section 9 of the Act in respect of a modification to the plans and specifications must be rendered within 10 days after receipt of the application.

O.C. 300-2002, s. 62; O.C. 402-2011, s. 12.

63. The time limits referred to in section 62 run from the date on which the file on the application is complete.

O.C. 300-2002, s. 63.

**DIVISION VII  
FEES**

64. The application processing fee for authorization for the construction or structural alteration of a dam is based on the [following table](#), taking into account the cost estimated by the project engineer to perform the work requiring the authorization:

Cost of Work	Fee
Less than \$25,000	\$1,066
\$25,001 to \$100,000 plus \$40 for thereof	\$1,066 for the first \$25,000, each additional \$1,000 or part
\$100,001 to \$500,000 plus \$10 part thereof	\$4,066 for the first \$100,000, for each additional \$1,000 or
\$500,001 to \$1,000,000 plus \$4 for thereof	\$8,066 for the first \$500,000, each additional \$1,000 or part

\$1,000,001 to \$10,000,000 \$1,000,000, plus \$2 part thereof	\$10,066 for the first for each additional \$1,000 or
\$10,000,001 to \$40,000,000 \$10,000,000, plus \$1 part thereof	\$28,066 for the first for each additional \$1,000 or
\$40,000,001 and up \$40,000,000, plus \$1,000 or part	\$58,066 for the first \$0.10 for each additional thereof

The cost of the work includes the engineering fees and costs relating to the plan design and specifications, work supervision, quality control and materials, machinery and labour costs to carry out the dam construction or structural alteration work.

O.C. 300-2002, s. 64.

65. The application processing fee for authorization for a change in use likely to affect the safety of a dam is [\\$250](#) per application for all classes of dams.

O.C. 300-2002, s. 65; O.C. 17-2005, s. 14.

66. The application processing fee for authorization for the complete or partial removal of a dam is [\\$1,244](#) for a Class A dam, [\\$623](#) for a Class B dam and [\\$310](#) for a Class C, D or E dam.

O.C. 300-2002, s. 66; O.C. 402-2011, s. 13.

67. The file processing fee for the approval of the outline of remedial measures an owner intends to implement for a dam and the implementation schedule is [\\$4,978](#) for a Class A dam, [\\$3,113](#) for a Class B dam and [\\$1,244](#) for a Class C, D or E dam.

O.C. 300-2002, s. 67.

68. The application processing fee for the approval of a safety program submitted under section 23 of the Act is [\\$12,448](#) per owner. The fee for the renewal of a program is [\\$3,113](#).

O.C. 300-2002, s. 68.

69. The annual fee payable by a dam owner to cover the costs incurred in the administration of the Act is [\\$1,058](#) for a Class A or B dam, [\\$218](#) for a Class C or D dam and [\\$124](#) for a Class E dam.

The annual fee payable by the owner of a dam covered by a safety program under section 23 of the Act is 75% of the annual fee established in the first paragraph for each dam covered by the program.

The fees prescribed in this section cover the period from 1 April to 31 March of each year. A change in a dam's classification shall not generate a fee adjustment for the year in which it occurs.

O.C. 300-2002, s. 69.

70. The fees prescribed in sections 64 to 69 must be paid within 30 days of the invoice date by certified cheque made payable to the Minister of Finance.

O.C. 300-2002, s. 70.

71. The fees prescribed in sections 65 to 69 shall be adjusted on 1 January of each year on the basis of the percentage change in the Consumer Price Index for Canada published by Statistics Canada, which is calculated by determining the difference between the average monthly index for the 12-month period ending on 30 September of the preceding year and the average monthly index for the same period of the second preceding year.

The adjusted fee shall be reduced to the nearest dollar if it contains a dollar fraction under \$0.50 and it shall be increased to the nearest dollar if it contains a dollar fraction of \$0.50 or more.

The Minister shall inform the public of the annual adjustment by a notice published in the Gazette officielle du Québec and by any other means the Minister may consider appropriate.

O.C. 300-2002, s. 71.

#### CHAPTER IV LOW-CAPACITY DAMS

72. A declaration of the construction or structural alteration of a dam must contain

(1) the name and address of the owner and the particulars of the dam location, including geographic coordinates;

(2) the impounding capacity of the dam;

(3) the hydrologic and hydraulic data and assumptions considered at the time of dam design; and

(4) the project description.

The project plans and specifications drawn up by an engineer must be submitted with the declaration.

O.C. 300-2002, s. 72.

73. A declaration of the removal of a dam must contain

(1) the name and address of the owner and the particulars of the dam location, including geographic coordinates; and

(2) a description of the proposed work.

O.C. 300-2002, s. 73.

## CHAPTER V

### SPECIAL PROVISIONS RELATING TO EXISTING HIGH-CAPACITY DAMS

74. On the date of coming into force of the Act, the Minister shall classify all existing dams in accordance with Division I of Chapter III, subject to the following:

(1) an existing dam shall not be classified as a Class E dam unless the owner applies for that classification and submits a supporting report or study prepared under the responsibility of an engineer. The same rule applies for the discharge facilities of the dam to be given an “acceptable” rating; and

(2) the dam failure consequence category of an existing dam shall be determined on the basis of the characterization of the area as established by the Minister pursuant to the third paragraph of section 18.



O.C. 300-2002, s. 74.

75. Every existing high-capacity dam with characteristics that do not comply with the minimum safety standards under Division II of Chapter III on the date of coming into force of the Act must be brought into conformity with those standards

(1) when the dam undergoes a structural alteration that affects all parts of the structure or that, because of the scope of the work, is equivalent to reconstructing the dam; or

(2) not later than by the completion date stated in the outline of remedial measures and implementation schedule approved by the Minister under section 17 of the Act.

In addition, if structural alterations other than those referred to in subparagraph 1 are made to a dam before either of those times, the dam must be brought into conformity with the various safety standards respecting the work, the parts of the dam or the characteristics of the dam being altered or affected by the alterations to the structure of the dam.

O.C. 300-2002, s. 75; O.C. 17-2005, s. 15.

76. The owner of an existing dam shall, within the earlier of the following time limits, prepare an impounded water management plan pursuant to Subdivision 1 of Division III of Chapter III if such a plan is required under that subdivision for the dam in question:

(1) the time limit applicable to the dam under section 78; and

(2) prior to authorization for

(a) a structural alteration to the dam if it affects all parts of the structure or, because of the scope of the work, the structural alteration is equivalent to reconstructing the dam; or

(b) any change in use likely to affect dam safety, in particular a change involving putting the dam back into operation or partially stopping its operation.

An impounded water management plan summary under the second paragraph of section 33 must be appended to the first dam safety review study or to an application for authorization referred to in subparagraph 2 of the first paragraph, as the case may be.

The owner shall also forward the plan summary to the local municipality within whose territory the dam is located as soon as possible after the preparation of the impounded water management plan.

O.C. 300-2002, s. 76; O.C. 17-2005, s. 16.

77. The owner of an existing dam shall, within the earlier of the following time limits, prepare an emergency action plan pursuant to Subdivision 2 of Division III of Chapter III if such a plan is required under that subdivision for the dam in question:

(1) the time limit applicable to the dam under section 78; and

(2) prior to authorization for

(a) a structural alteration to the dam if it affects all the parts of the structure or, because of the scope of the work, the structural alteration is equivalent to reconstructing the dam; or

(b) any change in use likely to affect dam safety, in particular a change involving putting the dam back into operation or partially stopping its operation.

The owner shall also send a plan summary that complies with the second paragraph of section 39 to the local municipality within whose territory the dam is located as soon as possible after the preparation of the plan. The Minister must be notified that the plan has been sent.

Notwithstanding the foregoing, a preliminary emergency action plan that includes rough inundation maps must be prepared within 12 months following the date of coming into force of the Act for every dam covered by this section. The plan must contain a brief summary of the information referred to in section 35, if it is available at the time. A preliminary plan summary must be sent to the local municipality within whose territory the dam is located and the Minister notified thereof.

O.C. 300-2002, s. 77; O.C. 17-2005, s. 17.

78. Subject to the provisions of sections 79 and 80, the first dam safety review of an existing high-capacity dam must be conducted, and the attendant report sent to the Minister, within the time limit indicated below, computed from the date of coming into force of the Act; the time limit varies according to the dam failure consequence category under sections 17 and 18 and the dam condition and discharge facilities reliability ratings under subparagraphs 3 and 4 of the first paragraph of section 14 and section 15.

For a Very High or Severe Consequence dam, the time limit is

(1) 3 years, if the condition of the dam is rated acceptable, poor or undetermined or if the reliability of the discharge facilities is rated unsatisfactory or undetermined; or

(2) 4 years, if the condition of the dam is rated good or very good and the reliability of the discharge facilities is rated satisfactory or acceptable.

For a Moderate or High Consequence dam, the time limit is

(1) 5 years, if the condition of the dam is rated acceptable, poor or undetermined or if the reliability of the discharge facilities is rated unsatisfactory or undetermined; or

(2) 6 years, if the condition of the dam is rated good or very good and the reliability of the discharge facilities is rated satisfactory or acceptable.

For a Low Consequence dam, the time limit is

(1) 10 years, if the condition of the dam is rated acceptable, poor or undetermined or if the