**Section 3702.40 Requirements for Approval of Permits for Construction of New Dams and Major Modifications of Existing Dams**

a) The following are OWR requirements which must be met in order to obtain a permit for construction of a new dam or major modification of an existing dam. Applicants are encouraged to submit to OWR a preliminary report for approval of concept prior to completion of the permit application form. The preliminary and all subsequent plans and reports shall be prepared under the direction of an engineer or other qualified personnel. The engineer or qualified personnel may be assisted by other professional personnel applying the disciplines of hydrologic engineering, hydraulic engineering, soil mechanics, structural engineering, or engineering geology.

b) OWR staff will be available for consultation prior to initiation of design studies, and at any time during the development of the permit application if questions should arise.

1) Structural and Geotechnical Design Requirements

 The basis for OWR review and approval of the structural and geotechnical design requirements of Class I, II and III dams is the Corps Guidelines subject to modification as indicated in this Part. The criteria for structural and geotechnical design contained in the Corps Guidelines are minimum criteria. Variations from the criteria may be required or allowed by OWR for special physical conditions at the proposed site as necessary or appropriate to meet the interest of the overall structural and geotechnical requirements of this Part. Technical publications, other than the Corps Guidelines, may be used by OWR to assure the use of current and applicable data for the structural and geotechnical review of the dam design.

2) Hydrologic and Hydraulic Design Requirements

 The basis for OWR review and approval of the hydrologic and hydraulic design requirements for Class I, II and III dams is the Corps Guidelines, subject to modifications as indicted herein. Technical publications other than the Corps Guidelines may be used to assure the use of current and applicable data for the hydrologic and hydraulic review of dam design.

A) Proposed Dams

 The following minimum spillway design floods shall be used for proposed structures:

i) Principal Spillway Design Flood

|  |  |  |
| --- | --- | --- |
| CLASSIFICATION | SIZE | PRINCIPAL SPILLWAY DESIGN FLOOD |
| Class I | All | 100-yr. |
| Class II | All | 50-yr. |
| Class III | All | 25-yr. |

ii) Total Spillway Design Flood

|  |  |  |
| --- | --- | --- |
| CLASSIFICATION | SIZE | PRINCIPAL SPILLWAY DESIGN FLOOD |
| Class I | Small | 0.5 PMF |
|  | Intermediate | 1.0 PMF |
|  | Large | 1.0 PMF |
| Class II | Small | 100-yr. |
|  | Intermediate | 0.5 PMF |
|  | Large | 1.0 PMF |
| Class III | Small | 100-yr.\* |
|  | Intermediate | 100-yr. |
|  | Large | 0.5 PMF |

\*For proposed Class III dams where the dam height multiplied by the impounding capacity is less than or equal to 300, no specific total spillway capacity is required.

iii) For all proposed Class II or III dams, a determination of alternatives for increasing the total spillway capacity to accommodate the PMF shall also be submitted to OWR. The initial dam design shall provide for the capability of increasing the spillway capacity. Future downstream land use, land use controls, and growth projections will be considered in the review of the spillway capacity design.

B) Existing Dams

The minimum spillway design flood for modifications to existing dams built after September 2, 1980 shall be the same as the criteria for proposed dams. The minimum spillway design flood for modifications to existing dams that were constructed and in service on or before September 2, 1980, are as follows:

i) Principal Spillway Design Flood

|  |  |  |
| --- | --- | --- |
| CLASSIFICATION | SIZE | TOTAL SPILLWAY DESIGN FLOOD |
| Class I | All | 100-yr. |
| Class II | All | 50-yr. |
| Class III | All | No specific requirement. |

ii) Total Spillway Design Flood

|  |  |  |
| --- | --- | --- |
| CLASSIFICATION | SIZE | TOTAL SPILLWAY DESIGN FLOOD |
| Class I | Small | 0.3 PMF |
|  | Intermediate | 0.6 PMF |
|  | Large | 0.6 PMF |
| Class II | Small | 100-yr. |
|  | Intermediate | 0.3 PMF |
|  | Large | 0.6 PMF |
| Class III | Small | 100-yr.\* |
|  | Intermediate | 100-yr. |
|  | Large | 0.3 PMF |

\*For modifications to existing Class III dams where the height multiplied by impounding capacity is less than or equal to 300, no specific total spillway capacity is required.

iii) The Department may approve total spillway design capacities for existing dams other than the spillway design floods listed above. A total spillway design capacity less than the 100-yr. flood will only be allowed for small size, Class III structures with dam height multiplied by impounding capacity less than or equal to 300. Any submittal for variation from the above-listed spillway design flood must include a detailed hydraulic risk assessment that shows that additional spillway capacity will not provide a decrease in potential loss of life or property damage or a detailed economic risk assessment that shows that the chosen spillway design alternative provides the minimum rehabilitation costs plus damage losses; a detailed early warning and emergency evacuation plan coordinated with the local ESDA; and a list (with mailing addresses) of all persons living within the dam breach wave inundation area.

iv) All hearings regarding variation from the above-listed spillway design criteria shall be in accordance with Section 3702.170 of this Part.

C) For Class I and II dams, a dam breach wave analysis for downstream impacts from failure during the total spillway design flood and impoundment initially at normal pool shall be required for:

i) a nearly instantaneous total failure and

ii) should the applicant so desire, a failure to the degree and timing believed reasonable by the applicant.

D) Dewatering Capabilities

i) All new Class I and II dams, all new Class III dams unless exempted by OWR for functional reasons, and existing Class I and II dams requiring major modifications shall have a capability for dewatering the reservoir within a reasonable period of time. In determining a reasonable time period, OWR shall consider the damage potential posed by possible failure, risk and nature of potential failure, purpose of the dam and reservoir, capability and stability of available drainage courses to convey the waters released in the event of an emergency dewatering, and influence of rapid drawdown on stability of the dam. Although each permit must be considered based on its individual circumstances, in general, a reasonable time to dewater 50% of the normal pool storage volume is 7 days for Class I dams, 14 days for Class II dams and 30 days for Class III dams.

ii) No dewatering capability shall be required for any existing Class III dam or for any existing Class I or II dam which OWR determines to require no major modifications thereto under this Part.

E) Specific requirements for minimum freeboard allowances are not appropriate because of the many factors involved in such determinations. The applicant must assess the factors affecting the individual project and develop the appropriate minimum freeboard allowance. Many projects are reasonably safe without freeboard allowance because they are designed for overtopping, or because other factors minimize possible overtopping. Conversely, freeboard allowances of several feet may be necessary to provide a safe condition for some dams. Factors that should be considered include the duration of high water levels in the reservoir during the design flood; the effective wind fetch and reservoir depth available to support wave generation; the probability of high wind speed occurring from a critical direction; the potential wave runup on the dam based on roughness and slope; and the ability of the dam to resist erosion from overtopping waves.

F) The applicant must provide stilling basins or other appropriate structures or devices capable of dissipating the energy created at the outlet of the principal spillway and at dewatering outlets for all flows.

3) Erosion Protection Requirements

A) As a minimum the applicant shall adequately protect by structural or nonstructural means the upstream face of earth embankment dams from an elevation below normal pool of two feet or 0.50 times the anticipated wave height (if greater than 2.0 feet) up to the minimum freeboard elevation. In addition, if normal pool water surface varies, the upstream face shall be protected within the range of variation.

B) The applicant shall vegetate or otherwise protect from erosion the downstream face and top of earth embankment dams. The applicant should design earth embankment dams to provide a dam section which can be easily maintained.

C) The applicant shall provide riprap or other appropriate protection as necessary at dam abutments, dam slope toes (the line of the dam embankment slopes where it intersects the natural ground at the upstream or downstream edge), spillways, stilling basins, and at other locations which, if left unprotected, could lead to damage to, or failure of the dam.

D) If the spillway design of the dam requires that an earth emergency spillway pass any portion of the 100-year flood, the applicant shall protect the earth emergency spillway against erosion consistent with the dam classification and physical characteristics of the dam site. The applicant must construct all earth emergency spillways on in situ material or on well compacted cohesive materials that will be stable during design flows.

E) The applicant shall submit plans for control of erosion and water pollution during the anticipated construction or major modifications, including plans for adequate measures to limit the erosion of the soil from exposed slopes after completion of construction. Such plans shall indicate that adequate control measures will be taken during construction to protect the quality of stream flow below the project site, and during the estimated time for filling.

4) Operating Requirements

An applicant for a Class I or II dam shall submit an operational plan specifying the method and schedule for the operation of the dam and the routine operating procedures to keep the dam in good working order, including an emergency warning plan. The emergency warning plan must outline the procedures to be followed during major storm events or other emergency situations. Under this plan, a person designated by the dam owner would monitor dam conditions, and would warn appropriate state and local officials if major problems require immediate repairs and would indicate how the owner plans to accomplish the needed repairs, and indicate if evacuation of persons in areas downstream of the dam may be necessary.

5) Maintenance Requirements

As a condition of each permit, dam owners shall submit a maintenance plan detailing the procedures and schedules to be followed to maintain the dam and its appurtenances in a reasonable state of repair. The maintenance plan shall include but not be limited to the following:

A) Class I and II Dams

The dam owner shall retain an engineer or other qualified personnel to make an initial inspection and report and subsequent inspections and reports as required by this Part. The owner of a Class I dam shall submit the report annually on forms furnished by OWR. The owner of a Class II dam shall submit the report every three years on forms furnished by OWR. In the intervals between the engineer or other qualified personnel reports on Class II dams, the owner shall file with OWR an annual statement on forms furnished by OWR stating that he is maintaining the dam in accordance with the maintenance plan prepared by his engineer or other qualified personnel and indicating any change in land use which may have occurred in the 100-year flood plain within the previously accepted limits downstream of the dam. The reports shall outline modifications made to the dam, any deficiencies found, detail the remedial measures necessary, and the method and time the owner will use to correct the deficiencies found. The dam owner may be required to provide additional inspections and reports by an engineer or other qualified personnel, following unusual storms or seismic events; provided such inspection procedures are required as a part of the maintenance plan approved by OWR in issuing a permit. A sketch showing land use in the flood plain downstream of the dam shall be included in the reports. The extent of downstream land use to be reported is dependent upon factors such as slope and width of the 100-year flood plain and the density and intensity of downstream development. The extent downstream will not exceed 2 miles unless otherwise indicated by OWR. The owner may provide information for review by OWR indicating that an extent downstream which is shorter than 2 miles may be appropriate.

B) Class III Dams

The owner of a new Class III dam or owner of an existing Class III dam qualifying under the provisions of Section 3702.30 (relating to the major modification of existing Class III dams), shall retain an engineer or other qualified personnel to make an initial inspection and report and subsequent inspections and reports on a 5-year interval, in accordance with this Part. The dam owner shall submit to OWR on forms furnished by OWR the engineer's initial report and subsequent fifth year reports. The reports shall include a description of flood plain land use downstream of the dam. In the intervals between the engineer's reports, the owner shall file with OWR an annual statement on forms furnished by OWR stating that he is maintaining the dam in accordance with the maintenance plan prepared by his engineer or other qualified personnel and indicating any change in land use downstream of the dam. The extent of downstream land use to be reported is dependent upon factors such as slope and width of the 100-year flood plain and the density and intensity of downstream development. The extent downstream will not exceed 2 miles unless otherwise indicated by OWR.

6) Financial Responsibility of Owner

A) For Class I and II dams, the owner shall document that he has the financial capability to adequately maintain or breach his dam in a safe condition. This may be established by showing that the applicant has the resources and the authority to obtain funds in the amount required to safely breach the dam within 10 days of receipt of notice of the need to breach or repair. For public bodies, this may be done by showing taxing power or other revenue generating ability and passage of an appropriate ordinance or resolution indicating the authority to take such action if necessary. If the owner cannot adequately demonstrate this financial capability, OWR may require the applicant to post a performance bond. The amount of the bond will be that estimated by OWR as reasonably necessary to safely breach the dam in an environmentally sound manner if the condition of the dam becomes a threat to life or property. The owners shall notify OWR when each performance bond has been renewed or extended in time.

B) Except in emergencies, should the cost of repair to place the dam in a safe condition be less than the cost of breaching, the performance bond may be used to pay for repair, rather than breach of the dam.

7) Other Requirements

A) The owner shall grant the State the right of access to inspect the dam site and immediate vicinity before, during and after construction and for the life of the dam and appurtenances. Except under emergency conditions, such as when the dam is in imminent danger of failure or is in the process of failing, the State shall notify the owner at least 10 days in advance of any inspection.

B) For Class I and II dams, the owner shall notify OWR prior to initiating foundation preparations, including cut-off trench excavation.

C) For Class I and II dams, OWR will require the owner to have continuous inspection during construction. The construction shall be under the direction of an engineer, or other qualified personnel. For Class III dams, OWR may require the owner to have continuous inspection during construction if foundation conditions have not been completely determined or if the dam has been designed with minimal factors of safety.

D) For Class I and II dams – prior to commencing filling operations, or refilling operations after a drawdown, the applicant shall request OWR inspection of the dam, and must receive authority from OWR before commencing filling. When drawdowns are performed on a frequent basis as a part of the approved operation plan, the authority is not necessary.

E) If OWR has not acted to grant or deny the authorization to fill within 30 days after receipt of request, the owner may proceed with filling or refilling operations.

F) For all new dams, or for major modifications to existing dams, the dam owner shall

i) own or have permanent flood easements for all land that will be inundated in the reservoir up to the proposed 100-year frequency flood pool elevation, or

ii) submit hydraulic computations showing that, for floods up to the 100-year frequency flood, the pool elevation will not be increased above existing conditions.

(Source: Amended at 11 Ill. Reg. 1941, effective January 13, 1987)