

R655. Natural Resources, Water Rights.

R655-12. Requirements for Operational Dams.

R655-12-1. Authority and Applicability.

The following rule is established under the authority of Title 73, Chapter 5a. The procedures constitute minimum operational requirements for dams. Additional procedures may be required to comply with any other governing statute, federal law, federal regulation, or local ordinance. These rules apply to any dam constructed in the state with the exception of those specifically exempted by Section 73-5a-102, and those dams not requiring plans as outlined in Section 73-5a-202.

R655-12-2. Definitions.

Definitions are as outlined in R655-10-4.

R655-12-3. Initial Filling.

All high and moderate hazard dams will require initial filling plans for their first cycle of complete filling and draining following construction, enlargement, or repairs which involve substantial excavation of the dam. The initial filling plan must be approved by the State Engineer prior to filling.

R655-12-3A. Content of Initial Filling Plans.

Initial filling plans should include the following information:

1. The rate, in vertical feet per day, that the reservoir should be filled or drawn down. Instructions on what steps should be taken in the event inflow exceeds the established rate. Rates and criteria can vary with reservoir elevation.
2. The frequency at which the dam will be observed or inspected and who is responsible. A checklist should be provided so critical features are observed.
3. The frequency at which all instrumentation is to be read and how the readings are to be distributed to interested parties. Predicted performance of instrumentation should be included and a reporting procedure established to review unexpected readings in a timely manner.
4. Reference to the Emergency Action Plan should be given so the inspector or engineer understands emergency procedures and contacts to be made when unusual conditions, or possible failure, are observed.
5. A procedure should be outlined whereby the data and observations obtained following the first cycle of filling can be included to supplement or modify the Standard Operating Plan.
6. The Initial Filling Plan should include a requirement that any project features that did not function as designed must be re-evaluated with provisions for mitigation work provided when necessary.

R655-12-3B. Reporting Requirements.

All information generated during the initial filling should be submitted to the State Engineer on a frequency to be determined by the State Engineer for each project. All analyses and reports produced as per R655-12-3A must also be submitted and approved by the State Engineer.

R655-12-4. Operation and Maintenance.

All dams that require submission of plans pursuant to Section 73-5a-202 must have a standard operating plan approved by the State Engineer. The owners of all dams shall operate and perform maintenance necessary to keep the dam and appurtenant structures in satisfactory condition. Operation and maintenance shall be performed in accordance with a Standard Operating Plan approved by the State Engineer, reports provided to the owner following safety inspections by the State Engineer, and accepted standards of the industry.

R655-12-4A. Standard Operating Plan Content.

The standard operating plan must include the following:

1. General information on the dam and reservoir including the history, a description of the project, persons responsible, agreements with other entities, and the purpose of the project.
2. Inspection list detailing what items should be inspected routinely by the owner or his agent.
3. Routine maintenance schedule and procedures such as rodent removal, vegetation control, floating debris removal, lubrication, painting, grading, riprap repair, and erosion repair.
4. Outlet and spillway operation including operation and maintenance of any mechanical, hydraulic, or electrical systems used. Emergency or back-up procedures should be included.
5. Instrumentation operation including threshold values, reading schedules, reporting procedures, and maintenance.
6. Reservoir operation including descriptions of controlling floatable debris, monitoring unstable soils, control of sediment, public access, and inundation areas.
7. Safety and health hazards and procedures to mitigate the hazards.
8. Recordkeeping and reporting procedures including necessary forms and examples.
9. A copy of the record or as-constructed drawings shall be included.

R655-12-4B. Reporting Requirement.

Dam owners shall maintain records of all operation and maintenance of the dam and appurtenant structures. Copies of these records must be submitted to the State Engineer, upon his request, within 30 days.

R655-12-4C. Instrumentation Monitoring and Reporting.

The following monitoring and reporting requirements are applicable to all instrumented dams under normal, long term operating conditions, unless otherwise approved by the State Engineer. Under unusual conditions, the State Engineer may require additional criteria. Instrumentation requirements for new dams should be outlined in the Initial Filling Plan as per R655-12-3A. The type of instrumentation required is presented in R655-11-10.

1. Seepage in the vicinity of any dam shall be monitored, typically including lateral extent, turbidity and flow rate. Collection in a properly designed drainage system as outlined in R655-11-6E may be required.

2. All piezometers and drains shall be monitored at least monthly when the reservoir exceeds 50% of the hydraulic height. Where reservoir elevations vary substantially over an irrigation season, readings shall be obtained on a weekly basis when the reservoir exceeds 90% of the hydraulic height. Readings can return to a monthly frequency four weeks after the reservoir level peaks, provided measurements are stable and within anticipated ranges. In all cases, instrumentation should be monitored at the beginning of the reservoir filling season, at the peak reservoir elevation, and at the maximum reservoir drawdown.

3. The elevation of the reservoir shall be recorded at the time of all readings as described in 2. above.

4. All dam instrumentation (including piezometers, drains, reservoir gage, survey monuments, and any other dam instrumentation) shall be monitored immediately following an earthquake where ground motions are felt in the area or the owner is informed of seismic activity in the vicinity. Results of the inspection and instrumentation readings should be immediately sent to the State Engineer.

5. Copies of all instrumentation monitoring data should be forwarded to the State Engineer, on a monthly basis, following collection of the data. It is the responsibility of those obtaining the data to know if readings are within normal historical and/or design operating parameters. Emergency conditions should be assumed if readings exceed normal historical and/or design operating parameters and immediate notification of the State Engineer is required.

6. All instrumentation shall be documented by plotting locations on a plan view of the dam and by assigning a unique, identifiable name. A table for all instruments which provides base line data shall also be prepared. Piezometer data should include the name, location, monitoring location (e.g., zone 1, zone 2, foundation), top elevation, total depth, and depth of porous interval. Drain data should include the name, location, collection interval, and flow rate monitoring methods. Survey monuments should include the name, location, and vertical and horizontal coordinates. The reservoir storage gage should be marked in at least one foot intervals and an elevation datum provided that is consistent with all other dam instrumentation.

7. The data required for any other dam instrumentation (inclinometers, temperature probes, chemical composition), will depend on the type and purpose of the instrumentation.

R655-12-5. Minimum Standards for Existing Dams.

The following minimum standards are applicable to existing high hazard dams. In the event compliance with the following standards may not be cost effective, the State Engineer may consider other alternatives such as risk-based assessments, acquisition of habitable structures, acquisition of downstream easements, installation of early warning systems, construction of levees, or other means to diminish the threat to human life. Dams with a hazard rating upgraded to high hazards shall be subject to minimum standards for existing dams.

R655-12-5A. Hydrologic Requirements.

All sections of R655-11-4 that apply to high hazard dams shall be considered to be the minimum standards for hydrologic requirements for existing dams.

R655-12-5B. Seismic Requirements.

All sections of R655-11-5 shall be considered the minimum seismic standards for existing dams with the exception that an analysis for the Operating Basis Earthquake (OBE) will not be required.

R655-12-5C. Embankment Requirements.

Provisions of R655-11-6A shall apply to existing dams. Remaining portions of R655-11-6 shall apply to existing dams if the State Engineer feels compliance with these sections, or any part thereof, is necessary for the safety of the structure.

R655-12-5D. Outlet Requirements.

Provisions of R655-11-7C, with the exception of subsections D, G and H, shall apply to existing dams unless the State Engineer specifically exempts the dam from compliance in writing.

R655-12-5E. Spillway Requirements.

Provisions of R655-11-8, with the exception of subsections D,F and I, shall apply to existing dams.

R655-12-5F. Other Requirements.

Provisions of R655-11-9 shall apply to existing dams if, in the opinion of the State Engineer, compliance is necessary for the safety of the structure.

R655-12-5G. Instrumentation.

Provisions of R655-11-10 shall apply to existing dams unless exempted in writing by the State Engineer.

R655-12-6. Emergency Action Plans.

All owners of high hazard and moderate hazard dams that require submission of plans pursuant to section 73-5a-202 shall prepare, maintain, and exercise an emergency action plan.

R655-12-6A. Content.

- A. The emergency action plan shall include the following:
1. A notification flowchart for informing emergency support agencies, downstream interests, and the State Engineer.
 2. A dam failure inundation map of a suitable scale and with sufficient topographical information which can be easily used by emergency support people. The map should be understandable by the public at large since persons which may be responsible for evacuation may have minimal training in reading maps. The State Engineer may waive the requirement for inundation maps if it can be shown that written descriptions of evacuation zones are clearer and easier to follow.
 3. Procedures to identify possible emergencies, at what level an emergency action is initiated, and who is responsible for making necessary contacts.
 4. A list of available materials, equipment, and manpower which can be activated on short notice to deal with possible emergencies or to mitigate damage following a dam failure.
- B. All emergency action plans must be approved by the State Engineer. All persons included on the notification flowchart should receive copies and understand their role in the plan.

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