

# Reclamation Manual

## Directives and Standards

<b>Subject:</b>	Operating Practices and Procedures for High- and Significant-Hazard Dams <sup>1</sup> (and other facilities, as applicable)
<b>Purpose:</b>	To ensure that operating practices and procedures are uniformly applied for Bureau of Reclamation high- and significant-hazard dams (and for other facilities where specifically noted).
<b>Authority:</b>	Reclamation Act of 1902 and Amendatory and Supplementary Acts; and Departmental Manual Part 753, Dam Safety Program.
<b>Contact:</b>	Maintenance Services Office, D-5700

### 1. Standing Operating Procedures (SOP).

- A. **Requirements.** An SOP is required to be available for each high- and significant-hazard dam 1 upon transfer to Operation and Maintenance (O&M) status. Prior to transfer of the dam to operational status and initial filling of a reservoir, a draft copy of the SOP will be made available. The Regional Director will determine whether SOPs are needed for other dams and operating facilities.
- B. **Contents.** The SOP will include all applicable operating instructions to adequately, safely, and reliably operate the dam and its appurtenant structures and equipment. Recommended contents and format for the SOP are outlined within the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*, available from the Technical Service Center (TSC), Attention: D-8470. Access to this guide is available on the Water O&M Facilities Resources Intranet site.
- C. **Issuance.** All copies of the SOP will be issued by the regional office or the authorized operating office (i.e., area office) and kept current. The initial letter of transmittal will be dated and signed by the Regional Director (or assigned designee) to show that the SOP has been established as an official document. This letter will be retained in the SOP. Letters transmitting SOP revisions will not replace the initial letter of transmittal unless a completely new SOP is to be issued.
- (1) A record of the complete distribution list will be kept in the SOP by including the Letter of Transmittal, showing the complete distribution list (see the example below), and supplying a control number for each copy to each office. This will ensure that revised pages are furnished to all copyholders whenever revised instructions are distributed.

<sup>1</sup>High- and significant-hazard dams are defined as those dams presently classified under Reclamation's Safety Evaluation of Existing Dams (SEED) Program, where failure or misoperation of the dam will probably cause loss of life or would cause appreciable economic, environmental, or lifeline losses (rural area with notable agriculture, industry, work sites, or outstanding natural resources).

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(2) All SOP supporting documents will be listed or otherwise identified in the SOP.

D. **Distribution.** The regional office, unless delegated to the area office, has the responsibility for publishing and distributing official SOPs and related supporting documents. Distribution of official copies of the SOP will be restricted to offices, entities, or government agencies having operational responsibilities for the facility as determined by the Regional Director. In addition, official copies will also be distributed to the following:

- (1) At least one copy of the SOP will be made available at the dam site or adjacent power facility and kept in a secure and readily accessible location for use by operating personnel.
- (2) Two copies of the SOP are to be furnished to the Inspections and Emergency Management Group, Attention: D-8470, TSC.
- (3) If the SOP contains information on a Reclamation-operated power facility, a copy of the transmittal memorandum is to be sent to the Power Resources Office, Attention: D-5400.

Example - SOP Official Distribution List

Location <sup>2</sup>	Number of SOP copies	Other supporting documents transmitted with the SOP <sup>3 2</sup>	SOP copy control No.
Office at dam	1		
Water-user office	1		
Reclamation Field Office			
Reclamation Area Office			
Regional Office			
Technical Service Center, Denver CO			

<sup>2</sup>Give precise office name.

<sup>3</sup>Specifically name each document (e.g., Reservoir Regulation Manual, Water Control Manual, etc.)

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### E. Reviews/Revisions.

- (1) **Reviews.** The SOP will be kept current by reviewing and revising the document (if revisions are significant) at least annually. Reviews are to be made by key operating personnel at the dam, the field office, the area office, the regional office, and Facility Review team members, as necessary, to ensure that instructions are adequate.
- (2) **Responsibility of Revisions.** The Area Manager is responsible for ensuring the SOP is current. The Area Manager is to be made aware of significant revisions, particularly those which are drafted and transmitted by the area office to the regional office. Any changes made by the regional office to the draft revisions will be communicated back to the Area Manager or assigned staff.
- (3) **Transmittal of Revisions.** Revisions to the SOP will be transmitted to all official copy holders. The letter transmitting the revised pages of the SOP will be signed by the Regional Director (or assigned designee) or as delegated to the Area Manager, in consultation with the Regional Director, to indicate official approval of the changes. An SOP Revision Sheet will accompany the letter and a revision date and revision number will be noted at the bottom of each revised page, to ensure the latest revision has been filed. The old revision sheet will be discarded if the new revision sheet shows all previous revisions. SOP text are considered to be For Official Use Only (FOUO) information; therefore, all old SOP sheets are to be disposed of in accordance with established FOUO disposal procedures.
- (4) **Funding.** Reclamation's activities involved with reviewing, revising/updating, and transmitting of revisions to SOPs are considered to be "administrative in nature" by ensuring safe and effective management of the facilities, and are not deemed to be "project O&M or dam safety activities." Based on this rationale, these costs are considered to be non-reimbursable and are to be funded accordingly. All related costs incurred by operating entities, as applicable, will be borne by them.

F. **Deviations.** Operating procedures as stated in the SOP are to be strictly adhered to. If the need arises to deviate from the instructions stated in the SOP (unless during an emergency situation), deviations will be pre-approved by the responsible Regional Director, unless delegated to the Area Manager.

G. **Outside Requests.** If requests for SOPs or other operating documents are received from the general public [including Freedom of Information Act (FOIA) requests], or

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other Federal, State, or local agencies, only certain portions of these documents will be provided. Areas/sections to be removed from the operating documents prior to fulfilling such requests include:

- (1) Critical operating information related to equipment at the dam or powerplant (including equipment operating procedures and related drawings). (Pursuant to exemption 2 of the FOIA.)
- (2) Information related to access of operating areas of the dam or powerplant (including procedures, locations, and drawings). (Pursuant to exemption 2 of the FOIA.)
- (3) Communication information related to personal or restricted use telephone numbers, including any contained within an Emergency Action Plan. (Pursuant to exemption 6 of the FOIA.)
- (4) Operational drawings, designs, computer source code, communication/control procedures and protocols, along with other information related to the supervised remote control of dam, powerplant, and waterway systems. (Pursuant to exemption 2 of the FOIA.)

## 2. Dam Operator Training/Proficiency Review and Validation.

### A. Requirements.

- (1) As a minimum, two personnel at each dam are required to have the following outlined training, one as the primary dam operator and one as the designated alternate. In some cases, it will be necessary to include more than two personnel to adequately provide primary and backup coverage on the duties as outlined later for each of the onsite training/review requirements. For unattended dams with powerplants, participation by powerplant maintenance personnel in dam operator training is encouraged.
- (2) All new dam operators (and newly designated alternates) are required to receive **onsite** dam operator training prior to, or as soon as practical after (a few months of hiring after some on-the-job training), being on duty at the damsite. Additionally, new operators and alternates are to attend a classroom training session as soon as practicable.
- (3) All dam operators (and the designated alternates) are required to receive both refresher classroom and onsite training periodically, which will form the basis of a “proficiency review” program to validate their knowledge and abilities related to expected duties and responsibilities. The only exceptions to this requirement are the following:

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- (a) Control room operators for powerplants where adequate technical personnel are available to assist in operation, maintenance, and safety of dams activities as determined by the Area Manager.
  - (b) Dam operators employed by water districts that manage several high- and significant-hazard dams and have their own “proficiency review” program for dam operators, which is determined adequate by the Area Manager.
- B. **Frequency.** Each dam operator (and the designated alternates) is required to regularly attend:
  - (1) Classroom training no less than every three years, and
  - (2) Onsite training no less than every six years, unless more frequent training is needed because of operational complexities of the dam, dam operator proficiency, changes in mechanical equipment, instrumentation, following a Safety of Dams modification, etc. Determination of the appropriate frequency of onsite training (maximum frequency of six years) will be the responsibility of the regional or area office staff conducting the onsite training.
- C. **Responsibility.** The Regional Director, or as delegated to the Area Manager, is responsible for scheduling and providing both classroom and onsite dam operator training sessions, to meet the requirements of this directive.
- D. **Training Instructors.** The instructors for providing both the classroom and onsite training are to be experienced and have a thorough knowledge of the principles, practices, and procedures related to the operation, maintenance, and safety of a dam.
- E. **Content of Classroom Training.** Because classroom training typically is conducted for groups of dam operators (and their designated alternates) representing different facilities, the training will present a more generic discussion of the subject material. Classroom training is to accomplish the goal of providing the participants with a fundamental knowledge of the full range of operations required for dams of all sizes. Classroom training also provides an opportunity for operators to meet and to share information with other operators. As a minimum, the classroom training will cover the following topics:
  - (1) Purposes of Reclamation projects (and how the dams interrelate).
  - (2) Design and construction of safe dams.
  - (3) Awareness of dam failures and incidents.
  - (4) Instrumentation (purposes, types, locations, readings, and maintenance requirements).

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- (5) Dam tender/operator duties and responsibilities.
- (6) Emergency management.
- (7) Documentation (operating and reference).
  - (a) SOP, Emergency Action Plan (EAP), Designers' Operating Criteria.
  - (b) Reference material and supporting documents.
  - (c) Equipment manufacturers' instructions.
  - (d) Operating log.
- (8) Facility reviews/site examinations.
- (9) Hydrology and reservoir operations.

F. **Content of Onsite Training.** Onsite training will be conducted for dam operators (and their designated alternates) at their respective facility and will consist of a minimum of four hours of onsite instruction and discussion. Less than the minimum of four hours will be allowed, as an exception, at the discretion of the Area Manager, for a facility which is small and associated operations are considered simple. The goal of onsite training is to provide participants with site-specific information that is pertinent to all facets of their unique facility. As a minimum, the onsite training will cover the following topics specific to each facility:

- (1) SOP and other site-specific operating and reference documents.
- (2) Reservoir operating procedures.
- (3) EAP and emergency management responsibilities.
- (4) Operations related to major control gates/valves and other associated mechanical equipment.
- (5) Instrumentation purposes, locations, reading requirements and gathering, and maintenance.
- (6) Operating log.
- (7) Performance parameters and potential failure modes.
- (8) Maintenance management system and related documentation needs.

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- (9) Personnel safety procedures.
- (10) Communication, attendance, and access factors related to operations.
- (11) Other specific duties and responsibilities related to the dam.

G. **Guidance.** General guidance in providing classroom training can be found in the *Training for Dam Operators Instructors Manual*, available from the TSC, Attention: D-8470. Information on conducting onsite training is provided within the *Guidelines for Onsite Dam Operator Training*.

H. **Proficiency Review/Validation.**

- (1) Validation of each dam operator's (and the designated alternate's) knowledge and proficiencies related to their expected duties and responsibilities will be documented on the standard Reclamation form, Form 7-2533 (appendix A). Upon completion of the onsite training, the form will be signed and dated by both the dam operator (or their designated alternates) and the principal onsite instructor to verify the completion of the onsite training and note the attendance (date/location) of the most recent classroom training session. A separate form is to be completed for each individual being trained/reviewed. Copies of the form will be provided and maintained in the area and/or the regional office, and a copy provided to the operating entity, as applicable.
- (2) The standard form (appendix A) provides for documentation of any needed improvements in the proficiency of the dam operator (or the designated alternate) resulting from the onsite training. Timely efforts will be made by appropriate regional or area office personnel to assist the dam operators in addressing these needs and bringing the dam operator (or the designated alternate) to an acceptable proficiency level. To record these efforts, another completed form or other documentation is to be provided to indicate the improvement of the areas cited on the initially completed form.

3. **Operating Log (Logbook).**

A. **Requirements.** A bound operating log or logbook will be maintained at each high- and significant-hazard dam. Previously completed logbooks will be kept in a secure and dry location that will allow for ready reference by the dam operating personnel (or by Reclamation). Regardless of the attendance or site visit frequency, records will be kept of all activities. A permanent logged record (paper or electronic) will be maintained by either the operating official (dam operator) or the designated alternate on duty.

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- B. **Content.** The log will contain chronological entries of all events to provide a continuing record of operating activities for future reference. Entries in the operating log will include the documentation of the following activities, as a minimum:
- (1) Normal and emergency operation of outlet works and/or spillways including individual gate position changes (unless recorded on another database).
  - (2) Water elevations and discharges (unless reported on water supply forms or approved daily record).
  - (3) Startup and stopping of mechanical equipment.
  - (4) Test of standby equipment or gate controls.
  - (5) Test and exercise of outlet and spillway control devices (gates and valves).
  - (6) Minor and major maintenance activities, including scheduled maintenance.
  - (7) Reservoir surveillance.
  - (8) Initial acknowledgment of an emergency or unusual condition.
  - (9) Acts of vandalism or other security incidents.
  - (10) Request and concurrence to change from normal operation during an emergency or unusual conditions. Record deviation when prior approval cannot be obtained (i.e., no communications).
  - (11) Communications network checks and emergency exercises conducted.
  - (12) Record of names and addresses of all official visitors and all Reclamation facility review teams.
  - (13) Acknowledgment of SOP/EAP review by operating personnel and supervisor (in the case of a water user-operated dam, Reclamation may acknowledge as the supervisor).
  - (14) Verification of annual site inspections, facility reviews, ongoing visual inspection checklist (OVIC) completion, instrumentation data collection, and special examinations.
  - (15) Documentation of receipt of dam operator training (onsite and/or classroom).
  - (16) Miscellaneous items pertinent to operation, emergency, or unusual conditions at the structures.



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On larger facilities, some of the above items may be recorded through other means such as computerized maintenance management systems.

C. **Operating Log (Logbook) Entries.** All entries in the bound operating log will be made legibly in ink, dated, and signed. Neither erasures nor ink eradicators are to be used to make the corrections. Errors are to be lined out lightly, so that the incorrect notation is still legible after the correct entry is made. If electronic logs are used, they are to be password protected or other appropriate actions taken to prevent loss or alteration of past records.

D. **Forms.** "Water Supply Forms" and form 7-1792, Telephone Report of Water and Power Interruptions and Facility Failure (emergency or unusual conditions) or other approved daily record, where needed, will be considered part of the operating personnel's operating log. They will be available at all times, as practical. A listing of these additional forms will be recorded in the front of the operating log, as well as their location, if not maintained onsite.

#### 4. **General Operating Practices.**

A. **Outlet Works Gate/Valve Exercising.** Because of the different types of outlet works gates/valves and site conditions, site-specific exercising procedures will be developed and outlined within the facility's SOP, in accordance with the guidance set forth in the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*. General exercising requirements and procedures include:

- (1) Each gate or valve that releases reservoir water through an outlet works, including those designated as emergency (guard) and regulating gates or valves, will be exercised through a complete opening and closing cycle at least annually under a balanced-head condition.
- (2) A 10 percent unbalanced-head (flow) condition exercising of emergency (guard) gates and valves is to be performed on a 6-year frequency, in conjunction with the mechanical inspection portion of the CFR, if practical. (Exception: Unbalanced head exercising is not to be performed on butterfly valves to avoid damaging the valve seats.) All unbalanced-head (flow) condition exercising of emergency (guard) gates will be coordinated with area office personnel. Penstock emergency gates for powerplants are recommended for exercising about every 5 years but less than 10 years (refer to FIST Volume 2-8 for applicable procedures).
- (3) All gate and valve exercising operations will be documented in the operating log or other appropriate means (e.g., computerized maintenance management system) to serve as a permanent record for reference purposes. A copy of data related to unbalanced-head exercising of emergency (guard) gates and valves will be sent to the TSC, Attention: D-8450, for inclusion in a Reclamation-wide database for gate and valve tests. A gate testing form to collect necessary data, along with

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related testing guidelines, are available, upon request, from the TSC, Attention: D-8450.

- (4) Any site-specific variances from these exercise requirements will be reflected and documented in the SOP for the facility. Exercise requirements are also to include the use of emergency or backup power sources.

**B. Spillway Gate Exercising.** Because of the different types of spillway gates and site conditions, site-specific exercising procedures will be developed and outlined within the facility's SOP, in accordance with the guidance set forth in the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*. General exercising requirements and procedures include:

- (1) Spillway gates will be exercised annually to confirm that the gates will open and close satisfactorily.
- (2) Full travel exercising is to be performed at scheduled intervals (generally on an annual basis) under a balanced-head (unwatered) condition. However, in the event of a continuously high reservoir, which prohibits full travel exercising, exercising is to be postponed until conditions allow or stoplogs can be installed. Further guidance for verifying full-travel operation of spillway gates with continuously high reservoir levels is provided within the "Guidelines for Testing Gates and Valves at Major Facilities," published in the *Water O&M Bulletin No. 146, dated December, 1988*.
- (3) All gate exercising operations will be documented in the operating log or other appropriate means (e.g., computerized maintenance management system) to serve as a permanent record for reference purposes.
- (4) Any site-specific variances from these exercise requirements will be reflected and documented in the SOP for the facility; however, such variances will be subject to appropriate processes outlined in *Decisions Related to Dam Safety Issues* [Reclamation Manual FAC P02 (<http://www.usbr.gov/recman/fac/fac-p02.pdf>)] prior to documentation within the SOP.
- (5) Exercise requirements are also to include the use of emergency or backup power sources.

**C. Safety Procedures.** All Reclamation operating procedures will incorporate measures which fulfill the provisions of the most current publication of *Reclamation Safety and Health Standards*.

- (1) When Reclamation projects are not operated by Reclamation, the operating entity is subject to either Federal or State occupational safety and health requirements, or more stringent standards, if specified by contract with Reclamation.

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- (2) When safety and health standards require compliance with multiple and comprehensive safety and health program elements, procedures will be established which will allow for the safe and efficient accomplishment of the operations. Examples of operations which may require this degree of attention would include, but are not limited to: entry into confined spaces, rope-supported work, and operation and maintenance activities involving hazardous energy. For activities involving the control of hazardous energy, the procedures will comply with the Hazardous Energy Control Program (FIST Volume 1-1) and the area office's local hazardous energy control procedures.
- D. **Temporary Reservoir Surcharge.** Whenever possible, authorization must be received from the responsible Regional Director to store water in surcharge prior to the surcharge event. In an emergency situation, the Regional Director is to be informed of the surcharge storage as soon as possible. In lieu of seeking an individual authorization for each surcharge event, a more general authorization documented with the facility SOP or within a dam safety decision memorandum will serve as concurrence by the Regional Director.
- E. **Maintenance Management System.** A documented maintenance management system will be established at each dam to track all pertinent maintenance and inspection operations scheduled and accomplished at the facility.
- F. **Reservoir Capacity Allocations (RCA).** Up-to-date files of RCA sheets (Form 7-1686) will be approved and maintained for all reservoirs in which Reclamation has a demonstrated responsibility by reason of its involvement in the design, construction, operation, and/or ownership of the dam or appurtenant facilities. Initiation of updating the RCA sheets will be made by the area office. The RCA sheets will be approved and distributed by the Regional Director, or as delegated to the Area Manager, with a copy of the approved RCA sheet included in the SOP. However, prior to approval and distribution of an updated RCA sheet, where changes in reservoir storage levels or operations have a potential effect on dam safety, such actions will be subject to appropriate processes outlined in *Decisions Related to Dam Safety Issues* (Reclamation Manual FAC P02). General guidance in preparing RCA sheets can be found in the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*, available from the TSC, Attention: D-8470. Intranet access to this guidance is available on the Water O&M Facilities Resources Intranet site.