

Reclamation Manual

Directives and Standards

Subject: Review of Operation and Maintenance (RO&M) Program Examination of Associated Facilities (Facilities Other Than High- and Significant-Hazard Dams)

Purpose: To provide program requirements and procedures for uniform Bureau of Reclamation implementation of the periodic reviews/examinations of Reclamation water-related associated facilities. These reviews/examinations are integral in protecting the Federal investment (asset management) and public interests related to these facilities.

Authority: Reclamation Act of 1902 and Amendatory and Supplementary Acts.

Contact: Maintenance Services Office, D-5700

1. **Definitions.** In lieu of the historic division of Reclamation facilities under the RO&M Program of “major” and “minor” facilities, features will be separated into two groups:

A. **High- and Significant-Hazard Dams.** All dams presently classified as such under Reclamation's Safety Evaluation of Existing Dams (SEED) Program, where failure or misoperation of the dam would probably cause loss of human life or would cause appreciable economic, environmental, or lifeline losses (rural area with notable agriculture, industry, work sites, or outstanding natural resources). For these dams, a single formal examination will be conducted, meeting the objectives of both the RO&M and the SEED Programs. The Directives and Standards (D&S) governing the examinations (facility reviews) of these dams are outlined in Reclamation Manual FAC 01-07 (<http://www.usbr.gov/recman/fac/fac01-07.pdf>).

B. **Associated Facilities.** All remaining Reclamation facilities other than high- and significant-hazard dams, as outlined in this D&S. The name “associated” is not to infer association, in all cases, with the dams within the first group. Each region has the option of dividing this group of facilities to allow for clarification of office roles and responsibilities.

2. Program Implementation.

A. **Listing of Facilities.** Each area office will maintain a comprehensive inventory or listing to confirm that all Reclamation facilities (either by ownership or included as part of an authorized Reclamation project) are examined regularly under the RO&M Program. These facilities should include:

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- (1) Carriage, distribution, and drainage (CD&D) systems.
- (2) Pumping and pump-generating plants.
- (3) Powerplant structures.
- (4) Tunnels/pipelines.
- (5) Diversion and storage dams (low hazard).
- (6) Type 2 bridges.
- (7) Regulating reservoirs (low hazard).
- (8) Fish passage and protective facilities, including hatcheries.
- (9) River channelization features.
- (10) Rural/municipal water systems.
- (11) Desalting and other water treatment plants.
- (12) Maintenance buildings and service yards.
- (13) Facilities constructed under past loan programs (until paid out).
- (14) Recreation facilities (reserved works only).

B. Clarification of Certain Facilities.

(1) **Pumping and Pump-Generating Plants.** All pumping plants and pump-generating plants, with the exception of reserved works' pump-generating plants (to be covered under the Power Review of O&M [PRO&M] Program), will be covered under the Associated Facility RO&M Program. This will include determining examination frequency, examination scheduling, applicable funding, distribution of examination report, tracking of recommendations, etc.

(a) **For those plants having a total plant capacity of 2500 Hp or more,** each of the plants and installed equipment will be examined as part of the regularly scheduled RO&M examination of the related facilities. In some cases, due to their size and complexity, a separate RO&M examination of some of the larger plants may be necessary.

This site visit will include a review of O&M related to the structural, electrical, mechanical, and operational aspects of the plant.

These plants will be examined at least once every 6 years. Each responsible area and/or regional office will determine the frequency based on the following factors:

- O&M condition of the plant and installed equipment.
- Adequacy of O&M by responsible operating entity.
- Relative size and complexity of plant and installed equipment.
- Criticality of plant operation (impacts, consequences, etc.).

Each responsible area and/or regional office will determine the appropriate technical expertise to include on the examination team. For some of the larger pumping and pump-generating plants, it may be appropriate to request the assistance of specialized PRO&M personnel on the team. In such cases, close coordination is encouraged to secure the necessary resources and to coordinate the examinations with those being conducted on plants in the same geographical area, to the extent possible, for efficiency purposes.

(b) **For those plants having a total plant capacity of less than 2500 Hp**, depending on the number involved, it may not be feasible to examine each and every plant and its installed equipment as part of the regularly scheduled RO&M examination of related project facilities. If not feasible, a representative number of these plants will be reviewed during the examination, which will be performed at least once every 6 years. As such, an attempt will be made to rotate the examination amongst the plants to include a different set of representative plants during each future examination.

(2) **Powerplants.** “Structural” features of powerplants will be covered under the Associated Facility RO&M Program, unless covered alternatively under the PRO&M Program. Each region has the responsibility to coordinate this aspect of the reviews between the two programs. When covered by the PRO&M Program, the review team is to include specialized “water O&M review” personnel to address these structural features. All other aspects of powerplants (i.e., electrical, mechanical, operations, and management) will be covered explicitly under the PRO&M Program (Reclamation Manual D&S FAC 04-01 [<http://www.usbr.gov/recman/fac/fac04-01.pdf>]).

(3) **Low-hazard dams/regulating reservoirs.** Examinations of low-hazard dams and regulating reservoirs will include a review of changed downstream site conditions which could possibly affect the dam’s/reservoir’s hazard classification. As appropriate, the following statement is to be included in the report: “There have been no significant changes to affect the low-hazard classification.” Otherwise, the report will document any changed conditions and the Dam Safety Office will be notified of any appreciable observations downstream of these

dams/reservoirs that could result in the need for a reassessment of the hazard classification (to a high- or significant-hazard classification).

(4) **Type 2 bridges.** A comprehensive bridge inventory will be maintained within each region for all bridges outlined in the Reclamation Manual D&S for the Bridge Inventory and Inspection Program. All Type 1 bridges (Reclamation-owned bridges located on a public road) will receive an inspection separate from RO&M examinations under the Bridge Inventory and Inspection Program. The review of Type 2 bridges (Reclamation-owned bridge that is not located on a public road [i.e., access to the road/bridge is restricted by some physical device(s) or barrier(s)]) will be included as part of regularly scheduled RO&M examinations of associated facilities, as applicable. (Where it is impractical to include the inspection of all Type 2 bridges as part of the RO&M examination because of the number involved, refer to the Bridge Inventory and Inspection Program D&S for the alternative approach.) All observations, results, and recommendations related to these bridges will be detailed in the corresponding RO&M examination report for that particular associated facility. If a more thorough bridge inspection is required, this inspection will also be conducted similar to other associated facilities within this D&S; however, the results of any follow-up (special) bridge inspections are encouraged to be documented in a report format similar to that used for Type 1 bridges.

(5) **Recreational facilities** (reserved works only). These facilities are to be included as associated facilities in order to obtain information and data to use in establishing an FCI (Facility Condition Index) for them. Reviews of these facilities will be made by a region/area office recreation specialist, accompanied by other technical specialists, if so requested. For efficiency purposes, these reviews are to be made in conjunction with the RO&M examinations of other associated facilities, as part of a facility review, or as a separate site visit. The recreation specialist will be responsible for coordinating report preparation (with appropriate input from team members) and the tracking of related recommendations. These recreation facilities and any resulting recommendations from these reviews/examinations are to be entered into Dam Safety Information System (DSIS) for tracking purposes.

C Funding.

All program costs related to the conducting of regularly scheduled RO&M examinations of associated facilities (including coordination, scheduling, examination preparation, travel, per diem, site examination, report preparation, and transmittal costs) will be considered non-reimbursable and funded accordingly.

(1) **Rationale.** Reclamation has a responsibility to ensure that its water-related facilities (Federally funded facilities and those included as part of an authorized Reclamation project) are effectively operated and maintained. Whether or not O&M have been transferred to a water user organization, Federal investment and ownership in these

facilities has an inherent liability (design/construction) and there is a need to safeguard related public interests relative to their operation. To adequately protect these interests, and for responsible asset management purposes, a periodic review of the condition and associated activities of these facilities is necessary. Based on these intended purposes and benefits, program costs are to be funded non-reimbursably.

(2) **Exceptions.** Any review activities performed at the time of the RO&M examination that are not considered to be related to the evaluation of the O&M aspects will be funded with or by other review program funding or cost recoverable similar to other project O&M activities. Additionally, expenses incurred by the operating entity, as applicable, in participating in the RO&M site examination will be borne by the operating entity.

(3) **Special inspections.** The term “special inspection” is considered to mean any other site visit (beyond the regularly scheduled RO&M examination) to evaluate a particular concern(s) or problem(s) and provide assistance relative to any corrective action (either as a follow-up to an RO&M examination or when requested by the water user organization). When such a special inspection of a specific structure or facility is conducted, it will be made by representatives of the regional and/or area office(s) and, if requested, by appropriate technical personnel from the Technical Service Center (TSC). All such special inspections will be funded non-reimbursably, similar to the funding of regularly scheduled RO&M examinations.

(4) **Requested work/O&M activities.** Requests by a water user organization for consultations, design services or modification reviews, and the completion of any O&M activities identified in the formal recommendations resulting from the examination (unless otherwise noted) are to be funded as project O&M costs and reimbursable to the extent of current project O&M allocations.

(5) **Contract language.** General contract language varies considerably regarding the reimbursement of periodic inspections of Reclamation facilities. The use of nonreimbursable funding to cover the costs of RO&M examination activities, as described under this D&S, will take precedence over this general contract language, except where the contract specifically requires the reimbursement of “RO&M Program” costs.

3. Examination Purposes and Content.

A. **Purposes.** RO&M examinations will be conducted to:

- (1) Ensure facilities continue to provide authorized project benefits.
- (2) Ensure facilities are operated effectively (excluding powerplants).
- (3) Protect public interests, safety, and the environment.
- (4) Minimize liability to the Federal Government.

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- (5) Improve water management/conservation.
- (6) Monitor effectiveness of other program issues related to O&M of the facilities.
- (7) Promote technical exchange of information.
- (8) Maintain familiarity with facilities/training of staff.
- (9) Verify compliance with contract provisions.

B. Content. As illustrated by the following list, the examination is expected to be representative of both the traditional O&M activities and more contemporary (environmental and public interest) types of issues. Examination content will encompass the following issues, as applicable, with the primary focus being on the traditional O&M activities:

- (1) Condition of the facilities.
- (2) Emergency and replacement reserve fund status and adequacy (as may be contractually required).
- (3) Water operations.
- (4) Water management and conservation.
- (5) Operating personnel safety requirements and procedures.
- (6) Hazardous materials management.
- (7) Operational problems (e.g., urbanization, crossings, right-of-way encroachment).
- (8) Maintenance management/practices.
- (9) Operating procedures/documentation.
- (10) Operator training (adequacy/needs).
- (11) Emergency preparedness/management, including contingency plan documentation and notification procedures.
- (12) Handicapped access.
- (13) Public safety and site security.
- (14) Pest management.

- (15) Inventory of Government-furnished equipment.
- (16) Endangered species.
- (17) Habitat/wetlands.
- (18) Environmental impacts.
- (19) Compliance with mitigation.

C. Coordination with Other Programs. To avoid unnecessary duplication of review activities of some of the above issues by other existing programs, coordination will be made as necessary by involved staff between the RO&M Program and other pertinent programs including, but not limited to, asset management reviews for the purpose of establishing performance metrics and other measures.

Comment [KS1]: Are there others we'd like to specifically recommend?

D. Emphasis. In order to provide a proper blend of O&M aspects during these examinations, an increased emphasis is to be placed on the "operations" aspects, especially how the operations involve public interests, and where the existence of the facility could potentially impact public safety and/or personal property in the event of failure of the facility (e.g., canal breach above a housing development). Other issues, such as hazardous materials management, pest management, public safety and awareness, and a review of written emergency operating instructions will be addressed to the extent determined by the examination team's experience and knowledge of those issues, and the relevance to the examination. When known and deemed appropriate, specialized expertise will be requested and utilized as part of the examination process.

4. Examination Procedures.

A. Conducting Office. Examinations will be conducted by at least one office removed from the operating office/entity or, by other means, an independent review will be made. For associated facilities operated and maintained by a water user entity, examinations will generally be conducted by the area office. If more impartiality is necessary, options are to use the TSC, regional office, or another area office. For associated facilities operated and maintained by Reclamation, examinations will be conducted by the regional office; however, this can be delegated to an area office upon mutual agreement between the Regional Director and the Area Manager. The regional office and area office may also agree to allow examinations to be conducted by the TSC, another area office, or another regional office, provided that the conducting office is one office removed from the operating office. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**

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B. Job Hazard Analysis. To help ensure the safety of personnel conducting the examinations, the responsible area/field office will prepare a Job Hazard Analysis (JHA) for each facility/system to be examined. The JHA will address all potential safety hazards for activities anticipated and correspondingly provide acceptable methods, procedures, and/or equipment to safely accomplish the activities. The JHA will also address any applicable Hazardous Energy Control Procedures as required by the Hazardous Energy Control Program (HECP, FIST Volume 1-1). Personnel and resources are not to be considered protected until HECP procedures have been implemented. All examination team participants are to be trained with a working knowledge of HECP and local, site-specific procedures prior to entering areas controlled under a designated HECP procedure. The JHA will be provided to each examination team participant prior to the time of the examination to allow review of it and to obtain necessary safety equipment. The JHA will be reviewed by the examination team members at the facility site during the entrance briefing for the examination and signed by all participants in the examination. Signing the JHA will indicate acknowledgment of the provisions and intention to comply with the JHA during the examination. Any non-Reclamation participants declining to sign the JHA will be so noted on the JHA. Should unforeseen circumstances arise during the examination that are not specifically covered in the JHA or where an interpretation is required, the responsible area/field office representative participating in the examination (in consultation with the operating entity, as applicable) will have final authority on whether and how to proceed. Ultimately each individual has responsibility for his/her own safety.

C. Duration/Exception. Examinations will continue on these associated facilities as long as the Federal Government holds title or the facilities remain an integral part of an authorized Reclamation project. However, if all of the following conditions are satisfied, an exception may be made and the examinations can be terminated:

- (1) The construction repayment contract is fully paid out.
- (2) Applicable contracts with water user entity do not specifically require that examinations be performed on a periodic basis.
- (3) The facilities do not involve any significant public interests (operational liability, public access and safety, water operations for environmental purposes, water deliveries for international water users, water deliveries to multiple water users, etc.) which require Reclamation oversight.
- (4) There are no outstanding (incomplete) category 1 and 2 RO&M recommendations.
- (5) There is mutual agreement between the water user entity and Reclamation to terminate the examinations.

If such conditions are met and termination of future examinations is agreed upon by the water user entity and Reclamation (regional and area office), the decision will be

documented and distributed to all involved parties and Reclamation offices, including the Office of Program and Policy Services, Attention: D-5700.

D. Frequency. Examination frequency may vary from 1 to 6 years, as recommended by the responsible Reclamation office, but will not exceed 6 years. Where possible, for efficiency purposes, the frequency may be set to accommodate other required field evaluations/reviews, such as a water conservation plan review (i.e., every 5 years). Factors to be considered in recommending the next examination date (year) include:

- (1) The overall condition of the facility.
- (2) The use of proper O&M practices and procedures.
- (3) The number and seriousness of new and previous incomplete recommendations.
- (4) The operating entity's/office's effort and sincerity in attempting to complete the recommendations, taking into consideration the resources available.
- (5) The existence of significant public interests relative to the facility's operation.

E. Guidance. Applicable portions of the current version of the "RO&M Field Examination Guidelines" will be used as the basis for conducting these examinations. Additional guidance in the operation, maintenance, and management of water-related facilities and systems can be obtained by attending Reclamation's annual Water Management Workshop and from the American Society of Civil Engineers (ASCE) Manual on the Management, Operation, and Maintenance of Irrigation and Drainage Systems (Manual No. 57, 1991), which was developed as a joint effort between ASCE and Reclamation.

5. Examination Reports.

A. Content. Content will encompass applicable issues listed previously under Section 3, Examination Purposes and Content. Some of the listed issues (e.g., hazardous materials management, pest management, etc.) need only be reported to the extent that they were reviewed/addressed during the examination. A qualifying statement should be included within the examination report to indicate that the examination was not intended to be a full and comprehensive evaluation/assessment of these issues. As a minimum, the examination report will include:

- (1) The author(s) and associated office(s).
- (2) The date(s) of the examination.
- (3) The names and offices of all participants in the examination.

- (4) Operational and weather data at the time of the examination which may have an impact on field observations.
- (5) Status of previous recommendations (those made during last examination and any others remaining incomplete at that time).
- (6) Listing of new recommendations made as a result of the examination.
- (7) Definitions of the recommendation categories.
- (8) Brief description of facilities examined.
- (9) Narrative/text to describe conditions and deficiencies observed during the examination which support the recommendations made.
- (10) Documentation of recommendations that have been completed since the last examination.
- (11) Conclusion statement or paragraph summarizing observations made on the condition of the facilities, including a recommended timeframe/year for next examination.
- (12) Representative photographs of the facility which document pertinent conditions and deficiencies for future reference.

B. Format. Report format will be flexible to accommodate each region's/area office's needs and the content of the examination. However, a simplified standard format is to be developed and used by each office.

C. Peer Review. A peer review will be made of the examination report's technical content by appropriate personnel participating in the examination or by the supervisor of the report's primary author.

D. Report Transmittal/Distribution.

- (1) Examination reports will be transmitted as soon as practical following the examination, but within 120 days of the actual examination date, unless justifiable delays exist and are documented.
- (2) Assuming most examination reports will be distributed by the responsible area office, minimum distribution will consist of one copy to the Director, Technical Service Center, Attention: D-8470; and one or more copies to the responsible Regional Director and other involved parties in the examination, such as the responsible operating entity (as applicable). The Chief, Dam Safety Office, D-1440, is to receive a copy of examination reports on low-hazard dams and regulating reservoirs.

6. Recommendation Categorizing and Tracking.

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A. **Categorizing.** Current recommendation categories will be used as presently defined:

(1) **Category 1.** Recommendations involving the correction of severe deficiencies where immediate and responsive action is required to ensure structural safety, operational integrity of a facility, or operating personnel/public safety.

Based on the severity of the deficiency and the condition of the structure/facility at the time of the examination, the examination team will mutually prescribe an appropriate timeframe for completion of the recommendation. Suggested remedial measures will be discussed by the team at the time of the examination and included in the examination report. Within 30 days following transmittal (depending on office conducting the examination) of an examination report containing one or more category 1 recommendations, the responsible Regional Director will notify all concerned offices (i.e., Director, Office of Program and Policy Services, Attention: D-5700 and the Director, Operations, Attention: W-6000) of the operating office or entity's plans for accomplishing the work and a scheduled completion date.

(2) **Category 2.** Recommendations covering a wide range of important matters where action is needed to prevent or reduce further damage, preclude possible operational failure of the facility, or reduce safety risks to operating personnel/public.

(a) Such recommendations are intended to be acted upon as soon as practicable following receipt of the corresponding examination report by the operating office or entity. It is desirable that those recommendations that can be included, scheduled, and accomplished as part of the normal O&M Program be undertaken as soon as weather or water conditions allow quality remedial actions. Some recommendations may require a longer time to accomplish because of the need to budget funds, complete designs, or secure equipment, materials, or personnel. In such cases, the related planning and budgeting is to be initiated in a timely manner.

(b) Any past category 2 recommendations remaining incomplete at the time of the examination will be addressed during that examination and within the corresponding examination report.

(3) **Category 3.** Recommendations covering less important matters but believed to be sound and beneficial suggestions to improve or enhance the O&M of the project or facility. The status of each category 3 recommendation will be provided in the subsequent examination report. If the recommendation is still applicable, the current year designation will be reassigned to the recommendation number.

B. **Tracking.** Relative to the tracking of recommendations resulting from the RO&M examinations of associated facilities:

(1) **Category 1.** Status updates on these recommendations will be provided by the responsible Area Manager/Regional Director within DSIS and to the Director, Office of

Program and Policy Services, Attention: D-5700 and the Director, Operations, Attention: W-6000, every 6 months (January 1 and July 1) until completed.

(2) **Category 2.** Status updates on these recommendations will be provided by the responsible Area Manager/Regional Director within DSIS on an annual basis.

(3) **Category 3.** Status updates on these recommendations are not required for these recommendations. More frequent tracking of category 3 recommendations is at the option of each responsible area/field office.

C. Recommendations in DSIS. The “O&M Recommendations Table List Form” in the DSIS will be used to maintain the information related to the required tracking/status reports on category 1 and 2 recommendations. Each area office within each region will maintain a current listing of recommendations and their status. Within DSIS, regions will designate each recommendation as an “O” or an “M” to identify them as being “operation” or “maintenance” related. For deferred maintenance reporting purposes, all maintenance-related recommendations on reserved works facilities are to have a current status (including scheduled completion date and estimated cost) entered into DSIS by September 1 or sooner each year. If such recommendations do not include a scheduled completion date 1 year after the date of the recommendation, the related maintenance activity will automatically be reported as deferred maintenance.

D. Annual Summary Report. A summary report for the prior calendar year will be provided by each region to the Office of Program and Policy Services, Attention: D-5700, by June 15 on an annual basis. The report will summarize the accomplishments and status of each region’s Associated Facilities RO&M Program. This report is to include documentation of related examination scheduling and completion; related report preparation; and the effectiveness in accomplishing category 1 and 2 recommendations related to the associated facilities.

Reclamation Manual

Directives and Standards

- Subject:** Review/Examination Program for High- and Significant-Hazard Dams
- Purpose:** To ensure that Reclamation's Facility Review Program and related site inspections and examinations for high- and significant-hazard dams are effectively and consistently implemented throughout Reclamation.
- Authority:** Reclamation Project Act of 1902 and Supplementary Acts; and Departmental Manual Part 753 – Dam Safety Program Federal Guidelines for Dam Safety, 1979, as directed by Presidential memorandum dated October 4, 1979.
- Contact:** Water Resources Office, D-5500
Dam Safety Office, D-6600

1. **Program Goals.** Reviews/examinations of these dams are to be conducted to satisfy the following purposes to ensure that:

- A. No dams create an unacceptable risk to public safety and welfare, property, the environment, or cultural resources.
- B. All dams continue to provide authorized project benefits and other current public benefits.
- C. Each dam is operated and maintained properly and effectively.
- D. Operating and emergency management procedures are adequate and current.
- E. Liability to the Federal government is reduced.
- F. The effectiveness of other program issues related to Operation and Maintenance (O&M) activities is monitored.
- G. Technical exchange of information is promoted.
- H. Familiarity with the dam is maintained and adequate training is provided to operating staff.
- I. Compliance with contract provisions related to safe and reliable operation of the dam is verified.

2. **Program Implementation.**

- A. **Listing of Dams.** A comprehensive and current listing of significant- and high-hazard dams (Reclamation dams either by ownership or included as part of an authorized Reclamation project) will be maintained by the Dam Safety Office (or its designate) within the Dam Safety Information System (DSIS). Review of Operation and Maintenance (RO&M) examinations of all low hazard dams (as part of the periodic reviews of "associated facilities" conducted by regional and area offices) will include a review of any changed downstream site conditions which may affect the dam's hazard classification. The Dam Safety Office is to be notified of any significant observations downstream of these

dams that could result in the need for a reassessment of the hazard classification. The related inventory of significant- and high-hazard dams will then be updated to reflect any changes.

- B. **Funding.** Unless otherwise noted within this directive, the costs associated with the reviews/examinations performed on significant- and high-hazard dams for dam safety purposes will be nonreimbursable. The costs associated with the review of the O&M practices and procedures are considered to be an integral part of evaluating the structural condition and performance of the dam and for providing for the safety of the downstream public; therefore, these costs will also be nonreimbursable.
- C. **Variances.** Because of shared programmatic responsibilities related to the reviews of dams, variances from this directive will not be allowed unless prior approval is received by the responsible Regional Director, Area Manager, and the Chief, Dam Safety Office.

3. **Review/Examination Procedures.** The review/examination program for all significant- and high-hazard dams will consist of annual site inspections, periodic facility reviews, comprehensive facility reviews, examinations of normally inaccessible features, and special examinations.

A. **Annual Site Inspection.**

- (1) **Scope/Content.** The inspection will consist of a general assessment of the condition of pertinent features of the dam using a checklist developed specifically for that dam. The checklist is to be combined with or augmented by, as appropriate, the information and recommended observations outlined in the onsite visual inspection checklist, developed as part of the Performance Parameters Technical Memorandum (TM).
- (2) **Site Inspection Preparation.** Preparation for conducting the annual site inspections will consist of reviewing applicable material and completion of a Job Hazard Analysis as outlined in paragraph 4B(4) of this directive.
- (3) **Frequency/Schedule.** The frequency will be annual, with the schedule for conducting these inspections at the discretion of the operating (area) office and/or operating entity. Consideration should be given to conducting these inspections at varying loading conditions (i.e., reservoir levels). Conditions identified in the Performance Parameters TM may provide additional basis for the timing of the inspection. Annual site inspections are **required** to be performed during the years when periodic and comprehensive facility reviews are not performed. These inspections are **recommended** to be performed

during those years and/or at the time when periodic and comprehensive facility reviews are performed.

- (4) **Personnel Involvement.** Conduct of annual site inspections is the responsibility of, and is generally conducted by personnel from the responsible area office. The inspections may be conducted by the responsible operating organization; however, Reclamation representation is required on all such inspections. Additionally, as part of the preparation or review of the Performance Parameters TM, particular expertise (e.g., a senior geotechnical engineer) to address particular concerns on these inspections will be identified and coordinated amongst all offices involved. It may be necessary that extra attention be given to a concern by persons with particular expertise at times other than the annual inspection. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**
- (5) **Training/Experience.** Personnel involved in conducting or participating in annual site inspections are to have an understanding of principles related to the design, construction, operation, maintenance, and safety of a dam and have reviewed the Training Aids for Dam Safety (TADS) modules related to the inspection of dam features. Additionally recommended: attendance at Safety Evaluation of Existing Dams (SEED) Seminar or other similar dam safety/O&M technical workshops; review of relevant TADS modules every 5 years; attendance at dam tender training sessions every 3 years.
- (6) **Documentation.** The documentation will consist of a completed checklist with accompanying photographs, as stated on the general checklist format provided to the regions. Photographs will only be required for identified areas of concern and of those areas requested in the Performance Parameter TMs. The completed checklists are to be distributed within 30 days of the inspection to appropriate operating offices/entities, area and regional offices, Dam Safety Office (D-5600), as well as to the Technical Service Center (TSC), attention: D-8470, for inclusion within the Dam Safety Document Management System (DSDAMS).
- (7) **Costs.** Expenses incurred by Reclamation in conducting or participating in these annual site inspections will be considered nonreimbursable costs (e.g., nonreimbursable O&M) and funded by

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the responsible regional or area office. Expenses incurred by the responsible operating entity in conducting annual site inspections will be borne as a project O&M cost.

B. Periodic Facility Review (PFR).

- (1) **Scope/Content.** To be conducted as a combined RO&M/SEED examination, fulfilling the purposes of both examination programs relative to dam safety concerns. Content will encompass the following issues, **as applicable**:
 - (a) Structural integrity and performance of the dam, foundation, abutments, and appurtenant structures.
 - (b) Structural behavior and instrumentation.
 - (c) Emergency preparedness/management.
 - (d) Operating procedures/documentation.
 - (e) Operator training (adequacy/needs).
 - (f) Maintenance management/practices.
 - (g) Operating personnel safety requirements and procedures.
 - (h) Operational problems (e.g., utility crossings, right-of-way encroachment).
 - (i) Floodplain management issues (e.g., safe downstream channel capacity).
 - (j) Special examination needs and frequency (e.g., underwater, dewatered, technical climbing).
 - (k) Public safety concerns.

- (2) **Frequency/Schedule.** These reviews will be performed every 6 years, alternating every 3 years with the Comprehensive Facility Reviews (CFRs). The team leader from the regional office, or designate, will coordinate with all involved offices to develop the schedule for these PFRs. Site visits for Safety of Dams technical studies [i.e., Modification Decision Analysis (MDA), Corrective Action Studies (CAS), etc.] will be combined with these reviews whenever practical for efficiency purposes on a case-by-case basis; however, funding for those involved in these technical studies will remain separate from the funding for these reviews.

- (3) **Personnel Involvement.** Team leader will be from the regional office; however, this can be delegated to an area office upon mutual agreement between the two offices, provided that the area office is one office removed from the operating office/entity (to provide an independent review); regional office can also request TSC to provide a team leader/members for this review. Team size will be limited to the minimum number of personnel required to adequately review the structure. Generally, this will consist of an **area office** representative,

a regional office representative, and those selected by the team leader for specified technical expertise. Additionally, pertinent operating personnel are required to be onsite as part of the review. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**

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(4) **Site Examination Preparation.** Preparation will include a review of the following:

- (a) History of facility (if not already familiar).
- (b) Recent (since last formal facility review) annual site inspection checklists completed for the facility.
- (c) Previous RO&M and SEED examination reports (and facility review reports, including Report of Findings) and related correspondence.
- (d) Past RO&M/O&M and Safety of Dams (SOD) recommendations and their current status of completion.
- (e) Applicable operating criteria and procedures (i.e., Design Summaries, Designers' Operating Criteria, Standing Operating Procedures, Emergency Action Plan).
- (f) Structural behavior/instrumentation reports and performance parameter TMs.
- (g) Past and ongoing dam safety analysis and construction work. Additionally, to help ensure the safety of personnel conducting the site examination, the responsible area office will prepare a Job Hazard Analysis (JHA) for each dam to be examined. The JHA is to address all potential safety hazards for activities anticipated and correspondingly provide acceptable methods, procedures, and/or equipment to safely accomplish the activities. The JHA will be provided to each examination team participant prior to the time of the examination to allow review of it and to obtain necessary safety equipment. The JHA will be reviewed amongst the examination team members at the dam site during the entrance briefing for the examination.

(5) **Training/Experience.** The team leader is required to have a thorough knowledge of principles related to operation, maintenance, and safety of a dam; have significant experience in the inspection of dams; have reviewed TADS modules related to the inspection of applicable dam features; have reviewed RO&M Field Examination Guidelines; have

attended the SEED Seminar; and have regularly attended workshops developed for facility review team leaders.

- (a) Other review team participants are recommended to conform to the above described training/experience.
 - (b) The team leader for these reviews is required to be a licensed professional engineer **or** the corresponding review report will be peer reviewed and signed by a licensed professional engineer. As an equivalent substitute for this professional engineering requirement, personnel who have 10 years of experience in the area of dam review/inspection are "grandfathered" into the requirement (as of 1/98).
- (6) **Documentation.** Documentation will consist of a detailed report that includes information normally documented within historic RO&M and SEED examination reports. (A recommended report format has been distributed, and is available from the TSC, attention: D-8470, as guidance to follow in providing a consistent Reclamation-wide approach in the documentation of these reviews.) As a minimum, the report will include:
- (a) The author(s) and associated office(s).
 - (b) The date(s) of the examination.
 - (c) The names and offices of other participants in the review/examination.
 - (d) Operational conditions and weather data at the time of the review/examination (including any occurrence of precipitation prior to or during the facility review) which may have an impact on field observations.
 - (e) Status of previous RO&M/O&M and SOD recommendations (those made during last review/examination and any others remaining incomplete at that time).
 - (f) Listing of new O&M and SOD recommendations made as a result of the review/examination.
 - (g) Brief description of the dam examined.
 - (h) Narrative/text to describe conditions of the dam and all appurtenances; items as described previously under paragraph B(1); and deficiencies observed during the review/examination which support the recommendations made. Include any significant events (i.e., operational incidents, historic high reservoir levels and releases, etc.) which have occurred since the last facility review.
 - (i) Statement as to the need for any special site examinations or special monitoring requirements.
 - (j) Description and results of equipment test operated (exercised).

- (k) Representative photographs of all features of the facility and identified concerns, and drawings, maps, and/or sketches of the dam features or dam site which document pertinent conditions and deficiencies for future reference purposes.
 - (l) Signatures of those (team leader/peer reviewers/participants) directly responsible for preparing/reviewing the report.
- (7) **Summary of Recommendations.** For informational purposes, a summary of **known and proposed** recommendations resulting from each periodic facility review will be transmitted (either by formal memorandum or LAN message) by the team leader within 2 weeks following the actual review/examination date, upon request by the regional or area office. This summary will be transmitted to all team participants and pertinent Reclamation offices, including the Dam Safety Office. Distribution of the summary to the operating entity will be the responsibility of the area/field office.
- (8) **Report Transmittal.** Periodic facility review reports will be transmitted as soon as practical following the review/examination, but within 120 days of the actual review/examination date, unless justifiable delays exist and are documented. Reports are to be distributed to appropriate operating offices/entities, Area and Regional Offices, the applicable State dam safety office, Reclamation's Dam Safety Office, as well as to the TSC, attention: D-8470, for inclusion within the DSDAMS. A current distribution list will be periodically updated by the Dam Safety Office and provided to all pertinent Reclamation offices.
- (9) **Recommendation Data Entry.** Beginning, January 1, 1998, formal O&M and SOD recommendations resulting from these reviews will be entered into the DSIS by the office producing the report.
- (10) **Funding.**
- (a) Beginning in FY 96, all associated costs (including preparation, travel, per diem, field review, and report preparation costs) will be considered nonreimbursable and funded within each region.
 - (b) Funding will be provided within regional and area offices' budgets to cover regional and area office participation in the PFR, as well as any other staff requested or approved by the team leader for technical expertise, irrespective of office location.
 - (c) Any review activities performed at the time of this review that are **not** considered to be related to the evaluation of the safety of the dam/downstream public are to be funded under other

review program funding or cost recoverable similar to other project O&M costs.

- (d) Expenses incurred by the operating entity, as applicable, in participating in the PFR will be borne as an O&M cost to that facility.

C. Comprehensive Facility Review (CFR).

- (1) **Scope/Content.** This review will consist of:

(a) **State-of-the-Art Review and Performance Parameters TM Development.** This will include a review of the dam and its performance and previous studies/analysis and decisions relative to current state-of-the-art design, loading, structural response and downstream consequences, and construction practices. Included will be a review of the Performance Parameter TM for potential failure modes and a revision/development of monitoring requirements.

(b) **Site Examination.** This site examination will have essentially the same scope as for a periodic facility review, with some additional focus on items as determined by the state-of-the-art team and review process (including participation by a Senior Dam Engineer.) Special focused discussions regarding the Performance Parameter TM will be held with operating personnel during the site examination. Additional emphasis will be placed on the operational adequacy and reliability of mechanical equipment and features. A JHA is to be prepared by the responsible area office for each dam to be examined (as directed for PFR site examinations).

(c) **Examination of Normally Inaccessible Features.** As part of the comprehensive facility review process, examinations of normally inaccessible features are to be scheduled and accomplished within the year preceding, or in conjunction with, the corresponding site examination. Refer to paragraph 4D of this directive for related requirements and procedures regarding these examinations.

(d) **Report of Findings (ROF).** A report will be prepared containing a summary of the findings and conclusions drawn from the results of the above CFR review/examination activities, including an assessment of risk.

- (2) **Frequency/Schedule.** These reviews will be performed every 6 years, alternating every 3 years with the PFRs. The Dam Safety Office (or designated representative) and the regional/area offices will coordinate the scheduling of performing these reviews. Site visits for ongoing SOD technical studies (MDA, CAS, etc.) will be combined with these reviews, whenever practical, for efficiency purposes on a case by case basis.

- (3) **Personnel Involvement.**

- (a) **State-of-the-Art Review and Performance Parameter TM Development.** Overall team leader for these activities will typically be a Senior Dam Engineer from the TSC, as designated by the TSC and approved by the Dam Safety Office. Team participants will be selected by the TSC and regional/area offices. The operating entity, as applicable, may choose to participate on this review team; however, this will be at its own expense. Team size will be limited to the minimum number of personnel required to adequately review and evaluate the structure.
- (b) **Site Examinations.** For the CFR site examination, there will be co-team leaders, one from the regional office and one from the TSC (D-8470). Participants, in addition to the co-team leaders and the designated Senior Dam Engineer, will be limited to those required to adequately review and evaluate the structure. Generally, this will consist of an area office representative, a regional office representative, and those requested by the state-of-the-art review team and the co-team leaders for specialized technical expertise. The co-team leaders, during the early stages of coordinating the site examination, will mutually decide on examination and reporting responsibilities. Unless otherwise justified, all CFR site examinations will include the involvement of mechanical engineering expertise to verify the condition and operational reliability of all pertinent mechanical equipment associated with the dam. Personnel involved in the site examination will be those adequately crosstrained in the O&M of the various types of mechanical equipment to be encountered at the dam. If the timing is not conducive to participate at the time of the actual CFR site examination (due to access or operational constraints), the mechanical inspection portion of the CFR will take place at a mutually agreeable time determined by the responsible regional and area offices, sometime within the year preceding the CFR. For efficiency, the mechanical inspection is to be combined with other onsite activities, where feasible, such as with the annual site inspection or onsite dam operator's training. When conducted at a time other than the actual CFR for the dam, resulting documentation of the mechanical inspection will be made a separate report and appended to the CFR site examination report.
- (c) **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate**

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Reclamation member of the team will determine the final recommendations.

(4) **Training/Experience.**

(a) **State-of-the-Art Review Team.** The Senior Dam Engineer and other team members are to possess current state-of-the-art practice and/or knowledge in the related technical field, have at least 10 years' experience in the related technical area, be currently licensed as a professional in the related field of technical expertise, and have an extensive knowledge of dam incidents and dam safety concerns and deficiencies. (Note: Seismology and Geology do not have a licensing program.) If the Senior Dam Engineer and members do not possess the above-described experience/qualifications, then it is required that a corresponding peer reviewer be required to possess these experience/qualifications. In addition to these minimum requirements, the Senior Dam Engineer will be approved by the Dam Safety Office.

(b) **Site Examination Team.** The same training/experience as that required/recommended for a periodic facility review team leader and/or participants as outlined in paragraph B(5) of these directives.

(5) **Documentation.** Documentation for the CFR will consist of a report "package" consisting of the site examination report, the performance parameter technical memorandum, and the report of findings. The report of findings will address all dam safety issues in a risk context. (Guidance on activities to be performed, issues to be addressed, and recommended formats/language related to these CFR documents is contained within a document entitled *Comprehensive Facility Review Process, Procedures, and Responsibilities*.) As a minimum, the report package will contain the following:

- (a) Signatures of applicable team leaders/peer reviewers/participants directly responsible for preparing/reviewing the various included reports and any appropriate management concurrence. Refer also to TSC peer review guidelines.
- (b) Results of the background data/information review of the dam and its performance, and previous analysis and decisions relative to current state-of-the-art in design, loading, and construction practices.
- (c) Report from site examination (see below).
- (d) Analysis/evaluation of instrumentation data compiled.
- (e) Results of assessments of risk performed.
- (f) Evaluation of visual and instrumented structural performance.
- (g) Conclusions regarding dam safety and continued safe operation.
- (h) Updated performance/operating parameters.

- (i) Any recommended actions resulting from the review, including:
 - ! SOD recommendations
 - ! O&M recommendations
 - ! Schedule for instrumentation readings
 - ! Additional analytic studies (based on an assessment of risk)
 - ! Additional data gathering, including instrumentation or special monitoring needed (based on an assessment of risk)
 - ! Need for and frequency of special site examinations
 - ! Need for comprehensive assessment of risk
- (j) Updated bibliography of reference documents.
- (k) Photographs, drawings, sketches, etc.
- (l) Documentation for the site examination for the comprehensive facility review is to conform to the requirements as outlined previously in paragraph B(6) of these directives for a periodic facility review report. To indicate mutual consensus on the review and report, both team leaders and the Senior Dam Engineer will sign the site examination report.

- (6) **Summary of Recommendations.** For informational purposes, a summary of **known and proposed** recommendations resulting from the CFR site examination will be transmitted (either by formal memorandum or LAN message) by the team leader within 2 weeks following the actual examination date, upon request of the regional or area office. This summary will be transmitted to all team participants and pertinent Reclamation offices, including the Dam Safety Office. Distribution of the summary to the operating entity will be the responsibility of the area/field office.
- (7) **Report Transmittal.** CFR reports will be transmitted as soon as practical following the site examination, but within 120 days of the actual examination date, unless justifiable delays exist and are documented. If it is expected that there will be a significant delay in transmitting the entire CFR document "package," the CFR site examination report will be transmitted separately. Reports are to be distributed to appropriate operating offices/entities, area and regional offices, the applicable state dam safety office, Reclamation's Dam Safety Office, as well as to the TSC for inclusion within the DSDaMS.
- (8) **Recommendation Data Entry.** Formal O&M and SOD recommendations resulting from these reviews will be entered into the DSIS by the TSC.
- (9) **Funding.** All associated costs (including state-of-the-art review, site examination preparation, travel, per diem, site examination, and report preparation costs) will be considered nonreimbursable and funded in accordance with the following:

- (a) Funding for preparation and participation in the examination and associated report by a representative from each of the responsible regional and area offices, as well as examinations of normally inaccessible features associated with the review, will be the responsibility of each regional or area office.
- (b) The remainder of the costs associated with the CFR (i.e., those costs incurred by TSC personnel) will be funded under the SEED Program by the Dam Safety Office.
- (c) Any review activities performed at the time of this review of features that are **not** considered to be related to the evaluation of the safety of the dam/downstream public will be funded under other review program funding or cost recoverable similar to other project O&M costs.
- (d) Expenses incurred by the operating entity, as applicable, in participating in the CFR will be borne as an O&M cost to that facility.

D. Examinations of Normally Inaccessible Features.

- (1) **Purpose.** Regular evaluation and visual examination/monitoring of such features are necessary to ensure safe and reliable dam operation. During the course of regularly scheduled PFRs and CFRs, there is a need for the review teams to address those features that are normally inaccessible much of the time due to reservoir or tailwater conditions, operational commitments, and/or access constraints.
- (2) **Applicable Typical Features.**
 - (a) Stilling basins (spillways/outlet works).
 - (b) Intake structures (spillways/outlet works).
 - (c) Gate structures (spillways/outlet works).
 - (d) Certain portions of bridges.
 - (e) Tunnels/conduits/pipelines (spillways/outlet works).
 - (f) Abutments/faces of concrete dams.
- (3) **Frequency.**
 - (a) **Evaluation.** Similar to the way “readily accessible” features are evaluated while conducting PFRs and CFRs of all significant- and high-hazard dams, all normally inaccessible features associated with the dam require at least minimal level of evaluation every 3 years to determine the appropriateness for any further in-depth field examination, design analysis, and/or nondestructive testing. This type of evaluation is necessary to assert that past visual examination extent (or lack thereof) and frequency of these types of features are appropriate.

(b) **Visual Examination.** Unless sufficient justification is provided the facility review team, based on the factors, process and referred guidelines contained in paragraph D(4) below, the maximum time interval between visual examinations (considered "hands on" or essentially equivalent) of all normally inaccessible features at significant- and high-hazard dams will be 6 years. Additionally, normally inundated outlet works features are to be examined whenever facility operating conditions permit an examination with little additional provision or expense, such as when a low reservoir pool occurs.

(4) **Evaluation.**

(a) **Factors.** The following factors are to be considered in determining the extent and frequency for examining these features.

- Results of previous "hands-on" or essentially equivalent examination.
- Relative progression of changed conditions that are noted about the feature.
- Operational history and performance of the feature since its previous examination.
- Relative costs for providing access for examination of the feature, including costs associated with lost water and power revenues.
- Age of the feature.
- Critical function of the feature.
- Any site conditions which exist that may compromise the safety of the feature.
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(b) **Process.** Based on the factors listed above, an evaluation is to be made by the facility review team of the appropriate frequency and extent to which the feature should be examined. This will vary from examination to examination based on recent information. Facility review personnel making the evaluation should begin by evaluating whether 6 years is an appropriate frequency for a "hands on or equivalent" visual examination. Appropriate recommendations resulting from the evaluation performed by facility review personnel will be presented in the report of findings (in a CFR) for consideration by the decisionmakers. If practical to do so, this examination is to be scheduled during the year prior to the scheduled CFR or at the time of the CFR site examination itself.

(c) **Guidelines.** Refer to the *Review of Operation and Maintenance Field Examination Guidelines* for additional guidance. As noted in the guidelines, suspected conditions for outlet works features are outlined further in ACER Technical Memorandum No. 6, *Guidelines for Determining Whether Normally Inundated Outlet Works Features Should be Examined* (1985).

(5) **Documentation.**

(a) **Evaluation.** Within the appropriate facility review report, documentation will be provided by the review team regarding the evaluation of the need and/or frequency related to the examination of normally inaccessible features. Sufficient rationale is required to support the determination of extending the frequency for examining any normally inaccessible feature beyond 6 years.

(b) **Examination.** Within the appropriate facility review report, a summary will be included of the latest examination performed and any resulting recommendations, as well as reference to applicable examination reports and dates. When examinations are performed on inaccessible features, a separate report will be prepared and contain a description of the findings, related recommendations, applicable photographs, marked-up drawings, and other pertinent information. Distribution of this examination report will be the same as that made for PFR and CFR reports.

(6) **Personnel Involvement.** Examinations of normally inaccessible features may require the use of individuals with specific technical expertise. Selection of technically qualified personnel to participate in the examination may prove to be valuable in determining the appropriate examination frequency of that particular feature in the future. Where appropriate and practical, a customer representative should also be involved on the review team.

(7) **Training/Experience.** Many of the examinations of these types of features will require specialized personnel, trained in the safe access and operations related to the examination (i.e. underwater dive teams, climbing teams, etc.). Where safety is an obvious factor in conducting the examination, personnel utilized are to conform to established training/experience required by applicable Reclamation standards. This will also apply to all contractors performing these examinations.

(8) **Examination Alternatives.** In some instances, there may be alternatives for accomplishing the examinations of these types of features. For example, for features normally submerged by reservoir or tailwater conditions, there may be several options to consider:

- ! Unwatering/dewatering
- ! Reclamation divers/contract divers
- ! Remotely operated vehicles with cameras and/or special instruments

The determination of the appropriate examination method is to be made by operation personnel based on both the associated costs and the quality/quantity of information to be obtained, given the site-specific conditions. Facility review personnel may provide guidance on a recommended examination method, as appropriate.

- (9) **Recommendation Data Entry.** Formal O&M and SOD recommendations resulting from these examinations will be entered into the DSIS by the responsible office authoring the examination report.
- (10) **Funding.** Examinations of these types of features are considered to be similar in scope and content as the facility reviews performed of other readily accessible dam features. Therefore, in a similar manner, these examinations are to be nonreimbursably funded. The regional and area offices will be responsible for funding the needed examinations of these features, as determined by the facility reviews conducted at each dam. Costs incurred by the operating entity (as applicable) for participating in or preparing for (e.g., dewatering a stilling basin) such examinations will be borne as an O&M cost for that dam.

E. Special Examinations.

- (1) **Purposes.** These examinations will be conducted on an as-needed basis for the following purposes. In general, the need for these special examinations can be satisfied by performing the required annual site inspections, PFRs, and CFRs.
 - (a) Those concerns identified during the preparation or review of the Performance Parameters TM or site examinations of the facility (i.e., ongoing seepage or stability concerns), although, generally will be performed and documented in conjunction with the annual site inspection.
 - (b) Following natural phenomena events (unusual loading events such as earthquakes or major floods).
 - (c) Site visits resulting from SEED analysis activities (CAS, MDA, etc.).
 - (d) Site visits to investigate an instrumentation anomaly or a visually observed anomaly.
 - (e) Special unscheduled exposure of dam features that are advantageous to examine because of existing site/reservoir conditions or planned operations.
 - (f) Examinations for which personnel with specialized technical expertise are required.

- (g) Special inspections/monitoring of a dam where exceeding maximum reservoir level is considered part of "first fill" procedures (historical high reservoir elevation). More rigorous inspections and monitoring, as typically outlined in the Standing Operating Procedures and/or Performance Parameters TM, is generally required when new historic reservoir levels are attained. If "first fill" procedures are not available or were developed prior to 1980, a review is necessary by the Dam Safety Office and the TSC to determine whether new or revised procedures are appropriate.
- (2) **Scope/Content.** These examinations will be very site-specific and concentrate only on those features identified as being of concern.
- (3) **Personnel Involvement.** For these examinations, except for those performed following natural phenomena events, the determination of participation from which offices and how the examination can be accomplished in conjunction with other scheduled reviews/examinations/inspections will be made mutually amongst the area/regional offices and the Dam Safety Office. For those field examinations specifically associated with a natural phenomena event, regional and area office personnel will decide upon and coordinate any needed participation from their offices and the TSC. Where appropriate and practical, a customer representative should also be involved on the review team.
- (4) **Training/Experience.** Training and experience necessary for personnel participating in these special examinations will be as outlined for periodic facility reviews in paragraph B(5) of these directives, unless accomplished as part of an annual site inspection or the completion of a performance parameter checklist.
- (5) **Documentation.** With the exception of the special examination needed in the case of natural phenomena, all other special examinations/reviews will be documented in a Special Examination Report. As a minimum, the content of the report will include the following information:
- (a) The author(s) and associated office(s).
 - (b) The date(s) of the examination.
 - (c) The names and offices of other participants in the examination.
 - (d) Operational and weather data at the time of the examination (including precipitation during or prior to the examination) which may have an impact on field observations.
 - (e) Brief description/background of the particular concern and the need for the special examination.

- (f) Narrative/text to describe conditions and deficiencies observed during the review/examination.
- (g) Any resulting recommendations for future actions based on the examination and an assessment of risk, including a statement regarding the scheduling of the next needed examination.
- (h) Representative photographs, drawings, etc., of the concerned features which document pertinent conditions and deficiencies for future reference purposes.
- (i) Signatures of those team leader/participants directly responsible for preparing the report.
- (j) A checklist, which can be the same as that used for the annual site inspections, will be completed for documenting any special examination conducted following a natural phenomena event.
- (k) Distribution of special examination/review reports or completed checklists will be made in the same manner as that outlined for the distribution of other facility review documentation within these directives.

- (6) **Recommendation Data Entry.** Formal O&M and SOD recommendations resulting from these examinations will be entered into the DSIS by the responsible office authoring the examination report.
- (7) **Funding.** Generally, these special examinations/reviews, with the exception of those for natural phenomena events, are considered to be similar to other SEED Program activities (i.e., specific purpose of the examination/review is dam safety related) and the costs thereof are considered to be nonreimbursable. The costs associated with examinations/reviews related to natural phenomena events will be treated similar to other project O&M costs.

4. O&M Recommendation Categorizing and Tracking.

A. **Categorizing.** Current recommendation categories as outlined under the existing RO&M Program will be used as presently defined:

- (1) **Category 1.** Recommendations involving the correction of severe deficiencies where immediate and responsive action is required to ensure structural safety and operational integrity of a facility.
 - (a) Based on the severity of the deficiency and the condition of the structure/facility at the time of the examination, the examination team will mutually prescribe an appropriate timeframe for completing the recommendation. Suggested remedial measures will be discussed at the time of the examination and included in the examination report. Within 30 days following preparation or receipt (depending on office conducting the examination) of the

examination report containing a category 1 recommendation, the responsible Regional Director will notify all concerned offices (i.e., Director, Program Analysis Office, attention: D-5500; the Director, Operations, attention: W-6300 and D-6600; and the Director, Technical Service Center, attention: D-8470) of the operating office or entity's plans for accomplishing the work and a scheduled completion date.

- (2) **Category 2.** Recommendations covering a wide range of important matters where action is needed to prevent or reduce further damage or preclude possible operational failure of the facility.

(a) Such recommendations are intended to be acted upon as soon as practicable following receipt of the corresponding examination report by the operating office or entity. It is desirable that those recommendations that can be included, scheduled, and accomplished as part of the normal O&M program, be undertaken as soon as weather or water conditions allow, to permit quality remedial actions. Some recommendations may require a longer time to accomplish because of the need to budget funds, complete designs, or secure equipment, materials, or personnel. In such cases, the related planning and budgeting should be initiated in a timely manner.

(b) Any category 2 recommendation remaining incomplete at the time of the following examination will be addressed during that examination and within the corresponding examination report.

- (3) **Category 3.** Recommendations covering less important matters but believed to be sound and beneficial suggestions to improve or enhance the O&M of the project or facility. The status of each category 3 recommendation will be provided in the subsequent examination report. If the recommendation is still applicable, a current year designation should be used.

B. Tracking. Relative to the tracking of O&M recommendations resulting from the facility reviews conducted on dams:

- (1) **Category 1.** Status reports will be provided by the responsible Area Manager and corresponding Regional Director and to the Director, Program Analysis Office, attention: D-5500, every 6 months (January 1 and July 1) until the recommendation is complete.
- (2) **Category 2.** Status reports will be provided by the responsible Area Manager to the corresponding Regional Director on an annual basis.
- (3) **Category 3.** Status reports on an annual basis are not required for these

recommendations.

C. **Database.** The DSIS database will be used to maintain the information related to the required tracking/status reports on Category 1 and 2 recommendations.

- (1) Through the DSIS, the status of all recommendations can be accessed by all Reclamation offices. Each Area or Regional Office will update the status of any O&M recommendations (that are already entered into DSIS) at the frequency indicated for each recommendation category under paragraph B above.
- (2) All current and historically completed O&M recommendations will be included within the DSIS.

D. **Annual Summary Report.** The Commissioner's Office (D-5500) will prepare an annual report summarizing the effectiveness in accomplishing Category 1 and 2 recommendations related to these dams. This report will be based on the data and completion status of all current recommendations entered into DSIS by the regional and area offices.

5. Safety of Dams Recommendations.

A. **Purpose.** SOD recommendations will be used to document the need for data collection, analyses, and decisionmaking associated with dam safety issues for identified and potential dam safety related deficiencies. These recommendations are not to be used in identifying O&M type activities that will ultimately be funded with project O&M funds and accomplished as part of a facility's O&M program; these types of activities will be identified by the above-described O&M recommendations. All SOD recommendations are important to the safety of the dam. Hence, they should be accomplished as soon as practical, but within 6 years, unless otherwise justified and documented. Critical SOD recommendations should be accomplished in a timely manner.

B. **Tracking.** The completion status of SOD recommendations will be formally tracked every 3 years in conjunction with each periodic facility review and comprehensive facility review. The current status of each recommendation will be provided within each corresponding examination/review report. The status on the SOD recommendations will be updated annually within DSIS by the Dam Safety Office (or designated representative), as status information on specific recommendations become available.

C. **Database.** Based on the status of recommendations provided within each examination/review report, the Dam Safety Office (or its designee) will update the existing database of recommendations within the DSIS. Through the DSIS, the status of all recommendations can be accessed by all

Reclamation offices. All current and historically completed SOD recommendations will be included within the DSIS.

6. **Guidance.** In addition to the recommended training/experience cited earlier in these directives, the following are referenced as recommended guidance for personnel to assist them in conducting the various reviews/examinations and inspections:

- ! Review of Operation and Maintenance (RO&M) Field Examination Guidelines
- ! Safety Evaluation of Existing Dams (SEED) Manual
- ! Guidelines for Safety Evaluation of Mechanical Equipment
- ! Comprehensive Facility Review Process, Procedures, and Responsibilities
- ! Training Aids for Dam Safety (TADS) Program
- ! Federal Guidelines for Dam Safety
- ! Association of State Dam Safety Officials – membership or affiliation
- ! USCOLD Committee on Dam Safety – membership or affiliation"

Reclamation Manual

Directives and Standards

- Subject:** Power Review of Operation and Maintenance (PRO&M) Program
- Purpose:** Provides periodic assessment of each power facility to evaluate the application and effectiveness of the Power O&M Program. The program evaluates the local O&M program performance and accomplishments against measurable program goals and performance standards.
- Authority:** Reclamation Project Act of 1902, other applicable laws, Executive orders, judicial decisions, policies, and regulations.
- Contact:** Power Resources Office, D-5400
-

1. Program Goals.

- A. Facilities will be operated effectively, economically, and commensurate with Reclamation and industry standards.
- B. Facilities will be managed to provide optimal value to customers and stakeholders.
- C. Facilities will be managed to protect the Federal investment.
- D. Facilities will be operated and maintained to provide reliable service.
- E. Facilities will be operated and maintained in adherence to applicable safety and environmental requirements and do not create unacceptable risks to public safety, property, the environment, or cultural resources.
- F. Facilities will be operated and maintained in compliance with legal and contractual provisions, associated environmental agreements and constraints, and within project authorizations.

2. Program Implementation.

A. Responsibilities.

- (1) It is the responsibility of each regional office to maintain a comprehensive inventory of the power facilities within its jurisdiction. In addition, each regional office will clearly define which facilities will be reviewed under these directives and those to be reviewed under the Reclamation Manual, *Directives for the Review of Operation and Maintenance (RO&M) Program Examination of Associated Facilities* (FAC 01-04). Each regional office will ensure that all power facilities receive Annual and Periodic PRO&M's as required in these

Reclamation Manual

Directives and Standards

directives and standards. The Director of Operations sponsors the Comprehensive Reviews. Implementation of new or revised directives and standards may have an impact on the labor-management relationship. For example, if a new procedure changes existing conditions of employment or establishes a new personnel policy or practice at the local level of recognition, consultation and/or negotiation with the exclusive representative may be required. The labor-management relations specialist for your region will be able to provide help and guidance if you have a question or concern.

- (2) Each area office will have the authority and responsibility to act on any and all recommendations developed within the PRO&M.

B. **Funding.**

- (1) Reclamation PRO&M will be funded by each facility with costs distributed in the same manner as other O&M costs. Actual Office of Policy and Technical Service Center costs associated with conducting a Comprehensive Review will be charged to the appropriate facility only in the year the review takes place.
- (2) Annual costs incurred by the Office of Policy and the Technical Service Center in maintaining the core program and meeting reporting requirements which cannot be allocated to individual facilities will be funded via Power Program Services funding distribution.

C. **Coordination With Other Programs.** Whenever possible, the reviews associated with this directive will be coordinated with other review programs. Such programs include, but are not limited to, the RO&M Program Examination of Associated Facilities and the Review/Examination Program for High- and Significant-Hazard Dams.

D. **Variance.** Variances from these directives will not be allowed unless approval is received in writing from the Regional Director.

3. **Review Procedures.** The review procedures for power facilities will consist of the following:

A. **Annual Review.**

- (1) **Scope.** The intent of the Annual Review is to ensure that the facilities are meeting the minimum standards of the Power O&M Program through review by the local operating office. A detailed overview of the power facility is performed using a checklist developed specifically for that power facility. This checklist will provide standards for maintenance and operations against which

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the facility's performance can be measured. A general checklist will be provided by D-5400. The checklist is to be modified by each area office to reflect local conditions, maintenance and operations practices, and recommendations.

- (2) **Frequency.** Annual Reviews should be conducted on an annual basis, excluding years when Periodic or Comprehensive Reviews are performed.
- (3) **Responsibility.** Annual Reviews will be coordinated and directed by the Area Manager. The Regional Director will ensure that all power facilities receive Annual and Periodic PRO&M.
- (4) **Content.** The review content will be documented on checklists developed specifically for each plant being reviewed.
- (5) **Personnel.** Annual Reviews will be conducted by the facility operating office or other entity as determined by the Area Manager. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**
- (6) **Reviewer Qualifications.** Personnel involved in Annual Reviews must have an understanding of O&M of power facilities.
- (7) **Documentation.** Annual Reviews will be documented by completing facility specific checklists, identifying new recommendations, and providing the status of any outstanding Periodic or Comprehensive Review recommendations or incident evaluation recommendations. The completed checklists will be signed by each member of the review team and submitted to the Area/Facility Manager and Reclamation's Maintenance Program Officer, D-5000. The completed checklists will be maintained in the operating offices and area offices.
- (8) **Recommendations.** Recommendations made in Annual Reviews will be primarily for the use of the area office. However, these recommendations may be adopted in the upcoming Periodic and Comprehensive Reviews.

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B. Periodic Review.

- (1) **Scope.** The intent of a Periodic Review is to ensure that facilities will be meeting required standards of the Power O&M Program. Periodic Reviews will be broader in scope, broader in review team composition, and more detailed in content than the Annual Review. In addition to review of the

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annual checklists, Periodic Reviews will entail interviews with plant personnel, visual inspections of equipment, and spot-checking maintenance records to ensure full compliance with standards. The Periodic Review will cover the full scope of the O&M program including, but not limited to, O&M management practices; facility operations; facility condition assessment; electrical, mechanical, and civil maintenance; security; communications; safety; contractual compliance; public safety; and status and schedule of rehabilitation, life extension, and/or modernization work.

- (2) **Frequency.** Periodic Reviews will be conducted at each facility every 6 years and will be scheduled to alternate with the Comprehensive Reviews so that either a Periodic or Comprehensive Review takes place once every 3 years.
- (3) **Responsibility.** Periodic Reviews will be coordinated and directed by the Regional Director.
- (4) **Content.** As a minimum, the review will encompass the following items:
 - (a) Evaluation of the Annual Review Program and checklists to ensure they meet the specific needs of the facility.
 - (b) Identification of problem areas.
 - (c) Review of selected test results and records.
 - (d) Status of review or incident recommendations.
 - (e) Visual inspection of facility and equipment.
 - (f) Interviews with selected facility staff.
 - (g) Evaluation of the overall state of the facility's program in relation to Reclamation and industry standards.
 - (h) Formal documentation of review findings and recommendations.
 - (i) Evaluation of management practices.
 - (j) Review of rehabilitation work items and schedules.
 - (k) Confirmation of completion of Safety and Health Evaluation and Inspection.
 - (l) Review of contracts and authorizing legislation to confirm compliance.

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- (m) Evaluation of maintenance practices and records to verify compliance with Reclamation and industry standards.
- (n) Verification that the project is being managed to protect the Federal investment.
- (o) Confirmation of completion of Annual Security Assessment Report.
- (p) Confirmation of completion of Environmental Review.
- (q) Confirmation that facilities will continue to provide dependable and sustainable service to authorized project beneficiaries.
- (r) Ensurance that facilities adhere to applicable safety and environmental requirements so that they do not create an unacceptable risk to public safety and welfare, property, environment, or cultural resources.
- (s) Recognition of exceptional and/or innovative practices and approaches.
- (t) Review of maintenance management practices.
- (u) Verification that power facilities adhere to condition assessments based on Reclamation established criteria (reference *Power O&M Review Guidebook*, Appendix J, *Power Facility Condition Assessment Instructions and Worksheet*) and provide a facility condition assessment indicator based on area office documentation.

(5) Personnel.

- (a) Periodic Reviews will be conducted by a team designated by the Regional Director or another office and at least one office removed from the area office. The review team will provide a balance between internal and external representation, normally consisting of a representative from the area office, a representative from the regional office, and other specialists as determined by the needs of the facility. Reclamation's Maintenance Program Officer may elect to participate in reviews. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**
- (b) Upon completion of the onsite review, an exit briefing will be conducted with appropriate facility and area office staff to review the findings and

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proposed recommendations.

- (6) **Reviewers' Qualifications.** The review team is required to have a thorough knowledge of operation, maintenance, and safety of power facilities. Team members will have a strong background in power O&M or have specialized expertise as required by the needs of the facility.
- (7) **Documentation.**
 - (a) A formal report will be prepared detailing the findings and recommendations of the Periodic Review. A recommended report format will be provided separately from these directives and standards. The report will include the status of previous recommendations, recommendations from incident evaluations, details and reasoning for new recommendations, narrative describing conditions found, and representative photographs or illustrations that document conditions.
 - (b) Periodic Review reports will be completed and transmitted to the appropriate local operating office, Area Manager, Regional Director, and Reclamation's Maintenance Program Officer preferably within 60 days but no later than 120 days following the actual review date.

C. Comprehensive Review.

- (1) **Scope.** The Comprehensive Review expands the scope of the Annual and Periodic Reviews to an extensive Power O&M Program audit of the power facilities. Comprehensive Reviews will provide a corporate perspective on the review of the Power O&M Program, including liaison to upper management that will highlight problems and successes.
- (2) **Frequency.** Comprehensive Reviews will be conducted at each facility every 6 years and will be scheduled to alternate with the Periodic Reviews so that either a Periodic or Comprehensive Review takes place once every 3 years.
- (3) **Responsibility.**
 - (a) Comprehensive Reviews will be sponsored by the Director of Operations and coordinated and directed by the Office of Policy.
 - (b) The Regional Director's appointee will provide periodic updates on the status of the recommendations to the Power Resource Office.
- (4) **Content.** Specific technical content of Comprehensive Reviews is the same as the Periodic Review; however, Comprehensive Reviews will focus on two aspects:

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- (a) **Corporate Perspective.** This provides local managers a corporate perspective on the Power O&M Program. This aspect is concerned with application of technical standards and power program practices. This aspect is achieved by performing the Comprehensive Review using Technical Service Center and Office of Policy staff from Denver. This participation ensures:
- (i) An audit of the implementation of the Power O&M Program according to Reclamation standards.
 - (ii) Achievement of the local Power O&M Program goals as they relate to Reclamation goals.
 - (iii) An exchange of information derived from the corporate perspective that can directly improve the local Power O&M Program.
- (b) **Management Liaison.** This provides upper-level Reclamation managers information and liaison to facilitate understanding of problems and successes that will result in improvements in the Power O&M Program. This aspect is achieved through the Review Report, including recommendations, and the periodic briefing of managers by the Power Resources Office.
- (5) **Personnel.** Comprehensive Reviews will be conducted by a team designated by the Office of Policy (Power Resources Office, D-5400). Participants include Reclamation's Maintenance Program Officer, Technical Service Center staff, Office of Policy staff, and regional office power specialists in addition to area office and facility staff and non-Reclamation entities. **The Area Manager should invite at least one representative of customers with responsibility for all or part of facility O&M costs to participate, at their own expense, as a member of the team conducting the review. This individual should be involved in the review process from start to finish, including in the development of recommendations. The appropriate Reclamation member of the team will determine the final recommendations.**
- (6) **Reviewer Qualifications.** Qualifications of facility, area office, and regional office participants in Comprehensive Reviews will be the same as for Periodic Reviews. Technical Service Center and Office of Policy staff from Denver must have all of the following qualifications:
- (a) Must have thorough knowledge, skills, and abilities in the area they are reviewing.
 - (b) Must have full-time Reclamation employment in an area of responsibility

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directly related to the area they are reviewing.

(c) Must have attended "Power O&M Workshop" within the last 5 years.

(7) **Documentation.** Comprehensive Reviews will result in a published report to the appropriate Regional Director, the Director of Operations, and the Maintenance Program Officer. The report will contain all official recommendations prioritized by urgency. Recommendations will be developed mutually by all participants and the review report will be published by the Power Resource Office. The report will be signed by the Manager, Power Resources Office, and co-signed by the team members. Format, distribution, and specific content are defined in the *Power O&M Review Guidelines*. The report will include the status of recommendations from previous reviews or incident evaluations for recommendations which have not been completed.

(a) Upon completion of the onsite review, an exit briefing will be conducted with appropriate staff to review the findings and proposed recommendations.

(b) The Regional Director will provide to the Power Resources Office, as described in paragraph 4C, status of the incomplete review recommendations.

(c) The Power Resources Office will publish a summary report annually on the Comprehensive Reviews for the Director of Operations, Regional Directors, and Reclamation's Maintenance Program Officer.

(d) Comprehensive review reports will be completed and transmitted (within 60 to 120 days) to the appropriate Area Manager, Regional Director, Director of Operations, and Reclamation's Maintenance Program Officer.

4. Annual Reporting of Power Facility O&M.

A. **Scope.** Annual reporting requirements are intended to promote the collection of factual input and objective evidence to assess the effectiveness of the power O&M program, including accomplishments, goals, and adequacy of technical standards; O&M business practices; review program; power improvement program; and safety, security, environmental, and associated programs.

B. Responsibility.

(1) **Regional Director.** Regional Directors will conduct an annual power O&M meeting with each Area Manager in their region with power facilities.

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- (2) **Area Managers.** Each Area Manager will prepare an annual power O&M report. The Area Manager will present and discuss power O&M issues, activities, and accomplishments at a meeting attended by the Regional Director, Area Managers, Reclamation's Maintenance Program Officer, and a representative from the Power Resources Office.

C. **Content.** The annual power O&M report will focus on three primary areas:

- (1) **Accomplishments.** The report will include replacements; major repairs; enhancements; production/consumption; benchmarking against Reclamation and industry standards; performance measures; and status of previous recommendations from reviews, incidents, travel reports, or other sources.
- (2) **Goals.** The report will be used to help facilitate goals including: development of performance measures, upcoming repairs, life extension or modernization, any unique or difficult issues, and operational anomalies or constraints.
- (3) **Evaluation of Existing Power O&M Program.** The report will include any unique or challenging issues, effectiveness of the PRO&M, Power Improvement Program, adequacy of business practices, and adequacy of technical standards and procedures.

D. **Recommendations.** Any recommendations developed from or agreed to at the meeting will be documented as Category 1, 2, or 3 recommendation and tracked by the Power Review Information System as described below.

5. Categorizing and Tracking Recommendations and Dispute Resolution.

A. Recommendations.

- (1) Recommendations resulting from Periodic and Comprehensive Reviews will be included in the review report and tracked to completion.
- (2) Recommendations pertaining to associated programs outside of power O&M programs will be forwarded to the appropriate program office.

B. **Categorizing.** Recommendations will be of the following categories:

- (1) **Category 1.** Recommendations involving correction of severe deficiencies where immediate and responsive action is required to ensure structural, safety, and operational integrity of a facility.
 - (a) Based on the severity of the deficiency and the condition at the time of the examination, the review team will prescribe an appropriate timeframe for

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completing the recommendation. Suggested remedial measures will be discussed at the exit briefing and included in the examination report.

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Within 30 days following preparation or receipt (depending on office conducting the review) of the report, the responsible Regional Director will notify the Director, Office of Policy, D-5000; the Maintenance Program Officer, D-5000; the Power Resources Office, D-5400; the Director, Operations, W-6000; and the Director, Technical Service Center, D-8400, of the plans for accomplishing the work and a scheduled completion date.

- (2) **Category 2.** Recommendations covering a wide range of important matters where action is needed to prevent or reduce further damage or preclude possible operational failure of the facility.
 - (a) Recommendations will be acted upon as soon as practicable following receipt of the report. It is desirable that those recommendations that can be included, scheduled, and accomplished as part of the normal O&M program be undertaken as soon as weather or water conditions allow. Some recommendations require a longer time to accomplish because of the need to budget funds; complete designs; or secure equipment, materials, or personnel. In such cases, the related planning and budgeting should be initiated in a timely manner.
 - (b) Any Category 2 recommendation remaining incomplete at the time of the following examination will be addressed during that examination and within the corresponding examination report.
 - (3) **Category 3.**
 - (a) Recommendations covering less important matters but believed to be sound and beneficial suggestions to improve or enhance the O&M of the project or facility.
 - (b) The status of each Category 3 recommendation will be provided in the subsequent examination report. If the recommendation is still applicable, a current year designation should be used.
- C. **Tracking.** Recommendations will be entered into the Power Review Information System by the area/regional office. Area offices will be responsible for updating the completion status of all current recommendations.
- (1) **Annual Summary Report.** A summary report, providing an indication of effectiveness in accomplishing Category 1 and 2 recommendations related to the power facilities, will be prepared annually by the Power Resources Office. The summary report will highlight Reclamation Power O&M Program

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problems and successes, status of recommendations, and recommendations appropriate for Reclamation management action.

- D. **Dispute Resolution.** Disagreement with report findings or disputed recommendations will be documented in writing by the Regional Director to the Director of Operations within 90 days of report publication. Disputes will be resolved by the Reclamation Dispute Resolution Process as defined in the *Conflict Management Guidebook* published in August 1998.