

July 24, 2001

Mr. Joe M. Allbaugh  
Office of the Director  
Federal Emergency Management Agency  
500 C Street, SW  
Washington, DC 20472

Dear Mr. Allbaugh:

In a letter dated December 22, 2000, Director James L. Witt requested information from the NRC for the biennial report on the status of the Federal agency implementation of the "Federal Guidelines for Dam Safety" (FGDS). Our report, which discusses the progress on implementation of the FGDS from October 1999 through September 2001 (FY00 and FY01), is enclosed.

During this period, NRC continued to utilize the technical assistance of the Federal Energy Regulatory Commission (FERC) to assist with dam safety inspections at NRC licensee facilities. This cooperative effort is the result of the Interagency Memorandum of Agreement signed in September of 1992. During this biennial period, FERC personnel, accompanied by NRC staff, completed inspections at ten licensee facilities, three of which are associated with the extraction of uranium, and seven of which are nuclear safety-related dams at nuclear-powered electric generating facilities. Since initiation of NRC's Dam Safety Program, all 19 dams under NRC jurisdiction have had an initial inspection and at least two follow up inspections. Also, during this 2-year reporting period, the staff continued to receive additional training in the geotechnical and hydraulic disciplines related to the performance of embankment dams.

Having received positive feedback in the 1998-99 Progress Report, no action items required response. NRC has, however, continued with an aggressive dam inspection program and with the training of personnel. We have also determined that at least one additional reclaimed tailings embankment that remains saturated is considered to be a dam, and this structure will be added to our program.

In the upcoming biennial period, we expect to keep the Federal Emergency Management Agency informed of further progress in the implementation of the FGDS through the quarterly meetings of the Interagency Committee on Dam Safety. Mr. Daniel Rom, Geotechnical Engineer, Uranium Recovery Section, Fuel Cycle Licensing Branch, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, was named the NRC Dam Safety Officer in July of 2001.

J. Allbaugh

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room). If you have any questions concerning this letter, please notify the NRC point of contact, Mr. Daniel Rom, at (301) 415-6704 or e-mail [dsr@nrc.gov](mailto:dsr@nrc.gov).

I trust this letter and enclosure are fully responsive to your request.

Sincerely,

/RA/

Martin J. Virgilio, Director  
Office of Nuclear Material Safety  
and Safeguards

Enclosure:  
Twelfth Biennial Report

J. Allbaugh

-2-

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**THE U.S. NUCLEAR REGULATORY COMMISSION  
2000-2001 PROGRESS REPORT TO THE FEDERAL EMERGENCY MANAGEMENT  
AGENCY  
IMPLEMENTATION OF THE FEDERAL GUIDELINES FOR DAM SAFETY**

Twelfth Progress Report  
Reporting Period - October 1999 through September 2001

September 2001

## I. INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) was created as an agency, authorized to regulate and license nuclear facilities and nuclear materials, and to conduct research in support of licensing and the regulatory process. The Commission does not plan, design, construct, or operate such facilities, nor does it control the land on which the facilities are constructed. The legal authority for the Commission in the realm of dam safety is derived from the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). NRC has regulatory authority only over: 1) uranium mill tailings dams, 2) storage water pond dams at in-situ leach mining facilities, and 3) those dams integral to the operation of licensed facilities, or the possession and use of licensed material, that pose a radiologically safety-related hazard should they fail. No changes in dam safety responsibilities have occurred during this reporting period.

## II. PROGRESS ON IMPLEMENTATION OF THE FEDERAL GUIDELINES FOR DAM SAFETY

### A. Organization, Administration, and Staffing

The only organizational change for the administration of the dam safety program was the naming of a new Dam Safety Officer (DSO). The program is implemented through a matrix organization focused on the NRC DSO. None of the personnel associated with the program are associated full-time to the effort. Under this arrangement, NRC is able to define specific tasks for each dam facility that is to undergo a review and inspection by NRC with the technical assistance of FERC. The personnel involved in the implementation of the dam safety program report to the NRC DSO, who is currently the Geotechnical Engineer, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards. The DSO is directly responsible to the Director, Office of Nuclear Material Safety and Safeguards, who is responsible to the Executive Director for Operations (EDO) of NRC. The EDO is directly responsible to the Chairman of NRC.

The DSO is Chairman of the Dam Safety Advisory Group (DSAG) that provides coordination among the various NRC offices. DSAG provides for the consolidation of the interdisciplinary technical resources from within NRC that are necessary for an effective program. The management representatives to DSAG are responsible for the coordination of the implementation of the dam safety program in that particular office of NRC. A representative from the Office of Nuclear Regulatory Research also serves on the DSAG.

The procedures that guide the implementation of the program are the procedural elements described in the Commission paper on the Dam Safety Program Plan, SECY-91-193 (June 25,

1991), the Dam Safety Program Plan (July 1991), and the Charter of the Dam Safety Officer (October 1990).

NRC has found that the organizational structure is fully adequate and capable of implementing the currently defined dam safety program. With regard to the adequacy of available staff to execute the program, it is necessary to focus on the combined resources of 0.5 FTE and contractual dollars that have been available. Since the initial round of dam safety inspections was completed, NRC has found that the allocated total of FTE and contractual dollars has been sufficient to address the dam safety program, despite other higher priority items within NRC. In the current reporting period, the target level has been met at a personnel effort slightly below 0.5 FTE. Consequently, the target level of work to be completed under the program has been reached. Despite initial concern that the impact of decreasing resources would extend the time that will pass prior to NRC completing one review cycle of included dams, changes have not been instituted in the manner of implementing the program plan. To date it has not been necessary to adopt a plan that would eliminate direct NRC inspection activities and rely on the licensee or the licensee's consultants for the inspections related to existing facilities. This and other resource-conserving alternatives may be considered in the future; however, the need to make major changes to the plan in the next reporting period is not anticipated.

No deficiencies in NRC's program implementation plan were identified in the previous report, thus, no specific actions have been required to address FEMA concerns.

#### B. Dam Safety Training Activities

NRC as an Agency has not sponsored in-house dam safety-related training during the reporting period. The Agency has supported such training through the Interagency Committee on Dam Safety (ICODS) and has had Agency staff participate in that training. During the period, the Deputy Dam Safety Officer attended the two-day, February 2001, ICODS Technical Seminar on "Inspection, Evaluation, and Follow up," which was held in Emmitsburg, Maryland.

Additional formal and informal training has been received by the engineers who perform the dam safety program support through attendance at short courses and by the personal use of the series of video tapes produced at previous ICODS Technical Seminars on a range of applicable topics.

Personnel involved in the support of the dam safety program continue to have direct access to the series of manuals, Training Aids for Dam Safety, that are available for use, and all personnel maintain knowledge of current relevant literature and the state-of-the-art on dam safety

#### C. Dam Inventories

NRC continues to verify the inventory of all dams for which the Agency has regulatory authority by providing information necessary to complete the basic fields in the National Inventory of Dams (NID) database. At the present time, NRC utilizes existing hard copy records and an electronic data base within the Agency to generate the input necessary for NID and then uses the actual dam inspections to verify the data that relate to the status of the dam, and the hazard classification to define the associated risks.

No new dams, meaning new dams being designed, constructed, and put into operation, have come under the regulatory jurisdiction of NRC during this reporting period. However, one pre-

existing reclaimed tailings embankment which contains significant amounts of saturated slimes has been classified as a "dam" and is slated to be added to the inventory. Any new dams that come under NRC regulatory jurisdiction would be added to the dam inventory and the information provided to NID during a subsequent update. One tailings dam in the program has been substantially reclaimed and will be removed from the program in the future.

Land use changes downstream of dams is one of the important items that is included in NRC dam inspections because the initial hazard classifications were made based on information existing at the time the facility with a dam was licensed by NRC. To date, no revisions to hazard classifications have been necessary as a result of land use changes.

#### D. Independent Reviews

Since NRC is a regulatory agency, it is not an owner of dams and, consequently, any reviews completed by NRC of a licensee's facility are independent. During the current reporting period, no design or construction activities were underway for dams that are or would be under the regulatory authority and Dam Safety Program of NRC. In conjunction with the routine inspections conducted during this period at the twelve facilities as operational inspections, certain design and construction elements were part of the review. For example, issues such as the design basis precipitation and flooding events were discussed and reviewed, as well as the control of materials during construction.

As noted previously, these activities are carried out with the technical assistance of FERC working for, and in conjunction with NRC during the inspection process. In the case of the reclaimed embankment at Sherwood, in Washington, the activities were conducted by the Department of Energy (DOE) as part of its annual site inspection activities. The DOE dam safety inspection items are equivalent to those in a FERC inspection. From the standpoint of the owner (NRC licensee), these are considered to be independent reviews. To date, NRC has not used external consultants in the Dam Safety Program except the interagency support from FERC as previously noted.

#### E. Inspection Programs

The number of dam safety inspections conducted at NRC licensees' facilities during this reporting period is ten, seven of which were nuclear-powered electric generating facilities, and three of which were mill tailings sites. The inspections were conducted by FERC with NRC personnel under a technical assistance agreement between NRC and FERC. NRC has had no problems associated with these inspections related to the quality, experience, training or the number on the inspection teams' staff.

No unsafe dams or other conditions, and no improper classifications have been identified. With regard to responses and actions following the inspections, NRC sends the final report and a list of actions to be completed, along with a schedule, to the licensee for action. This process has been effective in obtaining corrective action on the items NRC has identified to the licensees.

#### F. Dam Safety Rehabilitation Programs

No regulated dams within the NRC Dam Safety Program were involved in rehabilitation programs during this reporting period and none are scheduled. NRC has to date not identified any facilities requiring rehabilitation.

## G. Management Effectiveness Reviews

No management effectiveness reviews have been performed either by internal management or the General Accounting Office.

## H. Dam Failures and Remedial Actions

No failures or incidents have occurred during this reporting period.

## I. Emergency Action Planning

All 19 dams under NRC's purview are *low-hazard* structures. Further, it is unlikely that the hazard status of these 19 structures will be elevated. For these reasons NRC does not have an emergency action planning program for dam safety. Since the NRC Dam Safety Program Plan must provide for significant or high-hazard structures should any be included in a future inventory, we have made arrangements with FERC for technical assistance with emergency action plans (EAPs) should the need arise. The NRC Dam Safety Program Plan states that all radiologically safety-related dams or mill tailings dams under NRC jurisdiction, and classified as high or significant hazard dams, shall have emergency action plans that conform to FGDS. At this time we do not foresee the need to write EAP's for any of the structures within our program.

Should the need to write an EAP be identified in the future, NRC intends to allow licensees to use elements of the existing radiological EAPs that are associated with the facility. Thus, the basic organization, methodology, and interfaces with State and local governments already exist. These facts will aid in the development of any necessary additional elements for dam safety EAPs.

## J. Application of ICODS Technical Guidance

### Emergency Action Planning Guidelines for Dams:

Due to the low-hazard nature of all structures in the program, there are currently no plans for NRC to adopt these guidelines, but they will be considered if an EAP must be developed for dam safety.

### Federal Guidelines for Earthquake Analysis and Design of Dams:

NRC's criteria for seismic design of safety-related structures at nuclear power reactor sites, which include dams involving radiological safety, are incorporated in the "Standard Review Plan" (SRP), Sections 2.5 and 3.7, and in Regulatory Guide 1.127. NRC staff has concluded that these guidance documents for power reactors meet the intent of the Federal Guidelines. Regulatory Guide 3.11, for mill tailings embankments (dams), also addresses seismic issues and implements the seismic siting requirements for impoundments in Criterion 4(e) of Appendix A to 10 CFR Part 40. These criteria are comprehensive and should produce safe seismic designs.

### Selecting and Accommodating Inflow Design Floods for Dams:

NRC's criteria for selecting and accommodating the design flow are embodied in Section 2.4 of the SRP, for nuclear power reactor sites, and the "Standard Review Plan for UMTRCA Title I Mill Tailings Remedial Action Plans," for inactive tailings embankments(dams). These criteria are quite conservative and are consistent with the Federal Guidelines. Regulatory Guide 3.11 also addresses upstream catchment requirements of Criterion 4(a) of Appendix A to 10 CFR

Part 40, for UMTRCA Title II sites, and is equivalent to the Federal Guidelines. Regulatory Guide 1.59, which addresses the design basis floods for nuclear power plants, also addresses consideration of flood conditions that could be caused by dam failures from earthquakes.

#### Hazard Potential Classification System for Dams:

All 19 dams within NRC's program are low-hazard structures based on hydraulics and remoteness of site. For this reason, there has been no action required to address reclassification of the structures. Should the overall Hazard Classification System be redefined to include factors other than hydraulics and potential loss of life from structural failure, then each structure will be reviewed to determine if a change in hazard classification is warranted.

#### K. State Dam Safety Agency Involvement

NRC generally contacts the agencies involved in dam safety in various states as the review and inspection process of the NRC Dam Safety Program is implemented. In addition, NRC will maintain liaison with the dam safety agencies in the various states to avoid duplications in efforts and inventory data. During the reporting period NRC had discussions with representatives of the State of Washington's Dam Safety Program regarding the potential classification as a dam of an embankment retaining saturated tailings. Since all dams associated with a nuclear power plant are not necessarily radiologically safety-related, coordination between NRC and the states is done to ascertain that no dams are excluded from the National Inventory of Dams. At this point in time, there has been no direct relationship with the various states in the area of training.

#### L. Research and Development and Special Initiatives

No new initiatives, research, technology transfers or special studies were instituted during this period. Efforts were focused during this period on the necessary basics of inspection for the dam safety program.

#### M. Public Concerns

No dams under NRC jurisdiction for regulatory control have been the subject of public concern. NRC procedures relative to licensing facilities that could include any new dams that would be constructed require that the licensing action be in the public view with provisions for public participation. If the public were to desire participation in issues relative to the operation of a regulated dam, it would be necessary for the public to petition for involvement.

### III. IMPACT ON AGENCY OPERATIONS

The implementation of FGDS has necessitated the specific identification of the Dam Safety Program for internal budget purposes. This has, in turn, required a deliberate decision process of weighing various risks in other programs which NRC is directly responsible for against the risks associated with dam safety. In the era of the shrinking budgets, the Dam Safety Program becomes another responsibility to be addressed with fewer resources, since the existence of a Dam Safety Program has not been the basis for additional funding. In this sense, the Dam Safety Program has meant redirecting funds from other areas. With across-the-board reductions, the ability to redirect funds becomes more limited. NRC is somewhat unique in that the focus of its main regulatory responsibility, namely nuclear materials and their applications, has the potential for significant impact on a large population if safety is compromised, similar to what might be expected to the failure of a very large high hazard dam. Consequently, when

NRC considers risk and cost benefits, there is a good understanding of the implications of changing the level of resources devoted to one or another safety programs. Nevertheless, available resources have been directed to ensuring safety of existing dams through inspection.

Funding for the Dam Safety program for FY00 and FY01 reflected a separate commitment to the dam safety program for a dedicated 0.5 full-time equivalent (FTE) and \$40,000 (FY00) and \$40,000 (FY01) of technical assistance funding. The contract funding is solely for technical assistance from FERC in program implementation. In FY02 the program will be at a similar level to that of FY01. This level of effort has been found satisfactory since the initial round of safety inspections was completed.

#### IV ADDITIONAL OBSERVATIONS

NRC continues to implement dam safety actions under the NRC Dam Safety Program Plan that was adopted in July 1991. The plan describes the manner in which NRC will implement the FGDS. Due to funding limits dictated by the small number of dams under NRC's purview, a programmatic decision was made to emphasize the performance of dam safety inspections. Inspections were conducted by trained and experienced personnel from the Federal Energy Regulatory Commission (FERC), using NRC's standard Operational inspection procedures. During the inspections, all of which were made with accompaniment of an NRC civil engineer, no significant safety issues were identified.

NRC guidance regarding the documentation of the design record, construction record, reservoir filling and surveillance records, operation and maintenance records, and the permanent files, are being updated concurrently with safety re-inspections. The elements of hazard evaluation, downstream effects, and warning systems have been reviewed and evaluated with respect to the NRC program. NRC guidance has been reviewed and evaluated for conformance to FGDS for the elements of operating responsibility and procedures, maintenance procedures, periodic inspection program, deficiency correction and documentation, emergency action planning, and elements on the scope and completion of internal and external reviews. These tasks have been accomplished despite a reduction of Agency resources for dam safety and the decision to utilize the limited available resources in direct inspection efforts using FERC personnel.

All 19 dams under NRC's purview are on a two- to three-year inspection cycle as advised by FERC. Further, the hazard classification has been reconfirmed as "low" for all 19 structures, thus, preparation of emergency action plans (EAP) has not been required. NRC has, however, made arrangements to receive technical assistance from FERC should the need to prepare EAP's develop.