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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 14, 1994

Mr. W. R. Robinson, Vice President
Shearon Harris Nuclear Power Plant
Carolina Power & Light Company
Post Office Box 165 - Mail Code: Zone 1
New Hill, North Carolina 27562-0165

SUBJECT: AUXILIARY RESERVOIR DAM SAFETY AUDIT AT THE SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

Dear Mr. Robinson:

This letter is to confirm arrangements for a safety audit to be performed by the Nuclear Regulatory Commission (NRC) staff and our technical advisor, the Federal Energy Regulatory Commission (FERC), for the auxiliary reservoir dam at the Shearon Harris Nuclear Power Plant. The audit is scheduled for January 23-25, 1995. The dates and scope of the audit have been coordinated with Mr. Lewis Rowell of your staff.

The audit will focus on the safety of the dam, including the operation, maintenance, and any emergency planning aspects based on the potential dambreak hazard downstream of the facility. The audit will evaluate conformance of the facility to various NRC guidance documents relevant to dam safety, and other documents incorporated into the Proposed NRC Dam Safety Program, April 1991 (Enclosure 1), such as NRC Regulatory Guide 1.127, "Inspection of Water-Control Structures Associated With Nuclear Power Plants."

The audit team will consist of approximately six to seven members, including personnel from the Office of Nuclear Materials Safety & Safeguards (NRC Dam Safety Program coordinators), Office of Nuclear Reactor Regulation, Region II Office and FERC. The audit will focus on the auxiliary reservoir dam, service water intake structure, and the surrounding areas. Access will not be required to other areas of the plant.

An entrance meeting will be held with your representatives the afternoon of January 23, 1995, to discuss the design, operation, maintenance, inspection, and performance to date of the auxiliary reservoir dam. It is requested that a representative be available who is knowledgeable in these areas. Following this entrance meeting, the team will perform a field examination beginning on January 24, 1995. Certain documents related to the dam should be available for the team on January 23, 1995. These would include copies of the full size drawings used in the original construction with any as-built changes noted. These would include plans, elevations and sections showing the borings made during original design and construction; the embankment and its construction sequence and materials, including quality control aspects. Also included would be drawings of any inlet, intake or discharge structures or systems of the reservoir. Information related to construction, and any construction difficulties or field changes made during construction, should be made

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available, including construction photographs, if available. Drawings or other information describing in-place instrumentation and the data and data evaluations performed since construction was completed should also be available. Any annual or other periodic inspections that have been performed on the auxiliary reservoir system, whether done internally or by outside consultants, should be available. FERC personnel will be utilizing still photography and the NRC staff will also use video recording during the audit activity.

The audit is anticipated to be completed in one day depending on the length of the entrance meeting and the field activities. At the completion of the audit, an exit meeting will be held with your site personnel to discuss the results of the team's review. It is anticipated that the exit meeting will occur the morning of January 25, 1995.

If there are any questions, please contact me.

Sincerely,

Original Signed By:

Ngoc B. Le, Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures: 1. Proposed NRC Dam Safety Program
2. Definitions

cc w/enclosures: See next page

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PROPOSED
U.S. NUCLEAR REGULATORY COMMISSION (NRC)
DAM SAFETY PROGRAM PLAN
APRIL 1991

INTRODUCTION

This plan describes the manner in which NRC will implement the "Federal Guidelines for Dam Safety" (Federal Guidelines), dated June 25, 1979, directed for implementation by the President of the United States on October 4, 1979. This plan defines the general methodology and mechanisms that will be used to fully initiate and maintain a Dam Safety Program consistent with the Federal Guidelines. Portions of the plan adopt existing NRC guidance documents, procedures, and approaches that conform with the Federal Guidelines. Once the plan is implemented, portions of the plan may need to be expanded where existing NRC policy is identified as not fully meeting the Federal Guidelines.

ORGANIZATION AND ADMINISTRATION

To meet the objective of ensuring that management and technical decisions during all project stages give proper recognition to safety considerations, it is necessary to have an organization and management philosophy that continuously strives to improve practices and procedures associated with the regulation of dam planning, engineering, construction, testing, inspection, operation, maintenance, re-evaluation, and emergency planning and procedures.

NRC will have a Dam Safety Officer (DSO), appointed by the Executive Director for Operations (EDO) and reporting to the Director, Office of Nuclear Material Safety and Safeguards, responsible for ensuring implementation of the Dam Safety Program, in conformance with the Federal Guidelines. The DSO will be responsible for developing guidance documents, procedures, training programs, and other aspects necessary for adequate program implementation. The individual Office Directors will be responsible for implementing the program by regulating their specific licensees. These responsibilities will be carried out through the efforts of Office Directors' representatives to the Dam Safety Advisory Group. The group's membership will consist of individuals from the affected NRC offices, and will include regional office representation where a significant need exists for coordination or implementation. Each office represented as a result of that office's responsibility for the regulation of licensees who design, construct, own, or operate dams shall have a manager, at least a branch chief, designated by the Office Director/Regional Administrator as the responsible manager, within that office, for implementation of the

program. In addition, each office shall have a technical member, on the Advisory Group, who is trained in one of the basic disciplines related to dam safety. The DSO will ensure that all necessary disciplines related to dam safety are represented on the Advisory Group. Additionally, the General Counsel shall designate a representative from that office to provide legal guidance to the DSO. The Advisory Group will meet together at least four times annually and meet with the EDO at least once annually. The charter for the NRC DSO is provided as Attachment A.

The execution of the details necessary to ensure compliance with the Federal Guidelines is expected to be carried out with the aid of the Federal Energy Regulatory Commission (FERC), through a Technical Assistance effort. A Memorandum of Agreement (MOA), between FERC and NRC, will provide for FERC assistance, through its Office of Hydropower Licensing, so that NRC can proceed to fully implement the Federal Guidelines. Attachment B provides an example of such an MOA that has been executed between the FERC and the Department of Energy (DOE), to ensure that the inventory of DOE dams will be reviewed against the Federal Guidelines.

Under such an agreement, NRC staff will provide the project management function by completing such activities as setting forth criteria and guidelines, defining candidate dams/impoundments for review, setting priorities for work activities and directing FERC activities, including coordination with NRC licensees. FERC will perform dam safety inspections and evaluations of dams identified by NRC to determine any areas of non-compliance. Additionally, FERC will perform consulting work, including criteria review and followup inspections. In general, FERC activities will be in accordance with the FERC program for the safety of water power projects, as modified in NRC criteria and guidance.

To execute this program, NRC staffing will generally consist of one individual in each affected NRC office being responsible for identifying the dams to be reviewed and for interfacing with the FERC personnel executing the detailed work. (In some cases, the review conducted may be only to determine whether a specific dam should be considered under the Federal Guidelines.) It is recommended that these NRC individuals also be the same individuals designated by each of the affected offices to serve as the technical representative to the Dam Safety Advisory Group. Based on the experience of FERC, one individual for each 5 to 10 dams appears to be a necessary resource level to fully execute a program on an annual basis, consistent with the Federal Guidelines. It is expected that the combined NRC and FERC resource needs should reflect a similar level.

NRC program-implementation personnel will use the Training Aids for Dam Safety (TADS) Program, initiated by the Interagency Committee on Dam Safety. This will consist of a study-training program directed by the NRC DSO. In addition, NRC personnel involved in program implementation will be encouraged to attend dam-safety training offered through other government agencies, professional groups, and universities.

The FERC personnel who may be involved in support of the NRC program implementation will be drawn from a staff that FERC believes is fully competent in the fields of hydrology, hydraulics, geology, and geotechnical and structural design, as well as in field inspections and investigations. Currently, training of FERC personnel combines the use of TADS, and courses by other Federal agencies, by professional organizations and universities, and by outside consultants, for agency use.

DAM INVENTORY AND HAZARD CLASSIFICATION

NRC has provided, in NUREG-0965, a basic inventory of dams associated with nuclear power plants and uranium mill-tailings dams. That information was current as of February 1, 1982; changes in the actual inventory have occurred mainly as a result of power plant cancellations and uranium mill closings. Dams or impoundments associated with the facilities used by various other NRC licensees were not addressed. Certain dams may constitute dams that should be considered under the Federal Guidelines either on the basis of dam height, impounded water volume, or potential significant downstream hazard. Attachment C provides the definition of the term "dam," based on the Federal Guidelines. The definitions of "hazard" and "hazard classifications" are also in Attachment C and reflect a composite of the definitions being used by the Federal Guidelines, FERC, and the Bureau of Reclamation of the Department of Interior.

Based on these definitions, it will be necessary for the NRC to query or inspect the various licensees, to ascertain whether a dam or impoundment exists, at their licensed utilization facilities, that is radiologically safety-related, and integral to the operation of the facility. In addition, it will be necessary to determine if any other dams exist for the facility or the process that are non-radiologically safety-related. The results of this effort and any subsequent followup will be used to update the NRC Dam Inventory to define those dams that should be considered under the Federal Guidelines and to define the responsible regulatory agency, if any. The initial information needed to determine whether a dam should be considered under the Federal Guidelines, as well as relevant information on the regulatory authority for the dam, if any, will be obtained from various licensees. This survey will be conducted over a period of time, on the bases of the type of facility and the type of license the licensees possess.

Once a list of radiologically safety-related dams and tailings dams that should be considered under the Federal Guidelines has been established, priority groupings of the facilities will be established, based on the currently available information. These groupings will be used as guidance in the scheduling of the reviews and inspections under the Federal Guidelines and the NRC Dam Safety Program. The priority assigned to a specific dam will be based on considering such items as the downstream hazard, age of the dam, type of dam, information on the design and designers, and past performance history, as well as any operational or inspection information. Owner information on State or local regulation of the dam may also be used in prioritization.

CRITERIA AND TECHNICAL GUIDANCE

Currently, NRC uses regulatory guides, standard review plans, and branch technical positions to provide the necessary detail to ensure that the existing regulations are met and that dams (radiologically safety-related) designated as seismic Category I or for use as retention systems for uranium mills are designed, constructed, inspected, and operated to the safety level expected by NRC. Included in these documents are guidance documents such as the following:

- Regulatory Guide 1.59, "Design Basis Floods for Nuclear Power Plants," Rev. 2, 8/77, with Errata published 7/30/80.

- Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," Rev. 1, 12/73.

- Regulatory Guide 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants," Rev. 1, March 1978.

- Regulatory Guide 3.11, "Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills," Rev. 2, 12/77.

- Regulatory Guide 3.11.1, "Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mill Tailings," Rev. 1, 10/80.

These guidance documents will be evaluated for consistency with the Federal Guidelines, as well as with the supplemental technical guidance documents that have been published by Interagency Committee of Dam Safety (ICODS). The evaluation will address the design bases for the dam, the design, construction, testing, and inspection processes, as well as the operation, maintenance, and surveillance programs that must function during the life of the facility. The specific ICODS technical guidance to be used in evaluating current NRC guidance will consist of the following two documents:

- "Federal Guidelines for Selecting and Accommodating Inflow Design Floods for Dams," by ICODS, and published by FEMA (undated).

- "Federal Guidelines for Earthquake Analysis and Design of Dams," by ICODS and published by FEMA, as FEMA 65/March 1985.

Whenever instances of conflict are identified and the current NRC requirements or guidance documents are less restrictive than those of the Federal Guidelines, NRC will consider changing its requirements and/or guidance to be consistent with the Federal Guidelines. If the Federal Guidelines are not met and no changes are made, NRC will provide a justification for the lesser margin of safety.

If changes from current NRC regulatory requirements or guidance result from this process, the various NRC licensees will be appropriately notified and given a timetable for the implementation of the Dam Safety Program and any revisions thereto.

INSPECTION AND REHABILITATION

Once the criteria and guidelines have been clearly defined, or redefined, it will be necessary for NRC, as the regulator of radiologically safety-related dams and mill tailing dams, to conduct inspections of the licensees' dams, related programs, and actions taken by the licensees, as well as to review documents and data important to the safety of the dams. The inspection criteria, frequency, and scope of the inspections shall, as a minimum, meet the Federal Guidelines.

The frequency and scope of the inspections will be the resultant of those inspections conducted by the dam owners, combined with those of NRC, as the regulatory agency and those conducted by a State, if conducted under an acceptable dam-safety program. Recognition of State dam-safety programs as the regulatory control will only be made after a formal Memorandum of Understanding has been executed between a specific State and NRC.

Where inspection findings and any subsequent analyses define inadequate margins of safety regarding dam failure, NRC will require the owner to undertake a rehabilitation program to upgrade the safety of the dam. The schedule for completion of such upgrades will stem from case-by-case review.

EMERGENCY ACTION PLANNING

All licensees with radiologically safety-related dams or mill tailings dams that are to be addressed under the Federal Guidelines and that are classified as significant- or high-hazard dams shall develop emergency action plans for them. The plans, as a minimum, shall conform with the Federal Guidelines and any other guidance NRC may provide.

NRC, in defining what is necessary for adequate emergency planning, will use the "Emergency Action Planning Guidelines", issued by ICODS in February 1985. To the extent possible, emergency action plans for dam safety will use elements of existing radiological emergency action plans that have been developed by the various licensees.

Emergency action-plan elements shall address: determination of the mode of failure of a dam; definition of the inundation zone, and classes of danger within the inundation zone; time available for response; notification methods and requirements; evacuation plans; availability of men and material for remedial actions; provisions for increased frequency of inspection/observations; the consideration of various predefined action statements; and the necessary training of operation personnel.

REMEDIAL ACTION AND DAM FAILURES

NRC will maintain a data base of instances where remedial action was necessary, as well as any cases of operational incidents and dam failures. The DSO will define the data necessary for inclusion in the data base, but as a minimum, the following information shall be available in the data base:

- Dam identification and location
- Dam owner and operator
- Date of occurrence
- Precursory events such as rainfall, seismic event, etc.
- Description of event
- Time scenario of event
- Actions taken
- Losses in terms of dollars, injuries, and deaths
- Cause of event
- Relationship of event to Dam Safety Program
- Future actions needed

INDEPENDENT REVIEWS AND MANAGEMENT REVIEWS

Under this program, independent reviews, at various stages in the life cycle of a dam, from inception to subsequent removal, will be a necessary. By nature, the concept of the owner performing the major functions of, and addressing the elements of, a dam-safety program, with regulatory agency overview, will meet the goal of the Federal Guidelines. For existing dams, the Federal Guidelines prescribe formal inspections at intervals not to exceed five years. For this program, owners will have to have such reviews and inspections conducted by a team of qualified individuals, with a majority of the members being independent of the owner's organization.

The effectiveness of the NRC Dam Safety Program in implementing the Federal Guidelines will be assessed by NRC management. Additionally, the EDO, in preparation for, or as a result of, the annual meeting with the Dam Safety Advisory Group, may conduct management reviews on the status of program implementation.

DAM-SAFETY PROGRAMS OF STATE AGENCIES

This program recognizes the existence of dam-safety programs under the jurisdiction of various States' designated agencies for State dam safety. It will be necessary for NRC to enter into a Memorandum of Understanding with any State for a dam that has been incorporated into the NRC Dam Safety Program, if NRC is to accept the State's dam-safety program and actions taken under it. NRC will provide a basis for the acceptability of the State's program. In cases where a State is an NRC Agreement State, the necessary provisions for addressing dam safety can be incorporated into the agreement documents.

For those licensees whose license is for a utilization facility, it is necessary that the governing requirements for dam safety of a radiologically safety-related dam be those defined in this program. Section 274c(1) of the Atomic Energy Act, 42 U.S.C. 2021(c), prevents NRC from relinquishing any authority to a State for the regulation of the construction or operation of a utilization facility. Therefore, the regulatory framework of this program would govern. States could, however, after entering into a Memorandum of Understanding with NRC, conduct such inspections and evaluations as defined in this program. In this situation, NRC would have to take any remedial or enforcement actions precipitated by a State inspection.

SPECIAL INITIATIVES ON DAM SAFETY

The DSO will be responsible for annual review, of and identification to the EDO of, any dam-safety areas that are part of this program, where special emphases or initiatives are necessary to improve dam safety.

Based on agency-wide priorities for resources and an evaluation of the relative needs in the total NRC programs and budget, the EDO will authorize any justified special initiatives in dam safety. The DSO will develop a schedule and plan for completion of any initiatives and report at least annually, to the EDO, on the status of the efforts and the target completion date.

REVISIONS TO THIS PLAN

The DSO will be responsible for advising the EDO and the Commission on the need for revisions to this plan. Evaluation of the need for revision shall be conducted at intervals not to exceed two years and shall incorporate consideration of comments received from the Federal Emergency Management Administration (FEMA), on program implementation, based on the most recent biennial report by FEMA. There may be shorter times between revisions, if necessary.

DEFINITIONS

The following definitions apply to the NRC Dam Safety Program.

DAM: A dam is any artificial barrier, including appurtenant works, which impounds or diverts water and meets any one of the three conditions provided below. This definition applies whether the dam has a permanent reservoir or is a detention dam for temporary storage of floodwaters or water associated with some industrial type activity that is used for cooling, a settlement or dewatering basin, or other processes within the facility.

A dam is considered by the NRC Dam Safety Program if it is:

(1) greater than or equal to 25 feet in height with a storage capacity greater than 15 acre-feet, or

(2) has a storage capacity greater than or equal to 50 acre-feet and is greater than 6 feet in height, or

(3) there is a potentially significant downstream hazard.

The height of a dam is the vertical distance measured from the natural bed of the stream or water course measured at the downstream toe of the barrier, or from the lowest elevation of the outside limit of the barrier if it is not across a stream channel or watercourse, to the maximum water storage elevation. The impounding capacity at maximum storage elevation includes storage of floodwaters above the normal full storage elevation of the facility.

DAM FAILURE: A dam failure is characterized by a catastrophic type of failure produced by the sudden, rapid, and uncontrolled release of impounded water. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters which adversely affect a dam's primary function of impounding water is properly considered a failure. Such lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. They are, however, normally amendable to corrective action.

HAZARD: A hazard is present if there is a potential for loss of life or property damage downstream of a dam from floodwaters released at the dam or waters released by partial or complete failure of the dam or overtopping of the dam whether that results from flooding or rim slides into the reservoir. Hazards are classified with respect to their severity; however, hazard classification is not associated with the existing condition of a dam and its appurtenant structures or the anticipated performance or operation of a dam. Rather, hazard classification is a statement of potential adverse impact on human life, downstream property, or improvements from a large water flow or release from any cause. The hazard classification assigned to a dam is based on consideration of the effects of a dam failure during both normal and flood flow conditions. The cost of the dam, related facilities (e.g., pump stations, canals, pipelines, etc.), and the related project losses are not considered in downstream hazard classification. Also, the consequences of a rapid reservoir drawdown, due to a dam failure, on persons upstream from the dam are not considered in downstream hazard classification. Only the <u>direct</u> effects of a flood on persons, property, or improvements <u>downstream</u> from the dam are considered.

Hazards are classified as follows:

DOWNSTREAM HAZARD CLASSIFICATION SYSTEM

Classification	Lives-in-Jeopardy	Economic Loss	Downstream Area Characterization
Low	0	Minimal	Rural, agricultural area with uninhabited structures, local roads, minor improvements, and no outstanding natural features that could be damaged.
Significant	1-6	Appreciable	Rural, agricultural area with scattered homes, small industry or employment sites traversed with secondary highways and minor railroads which if subjected to the hazard could cause the loss of, or interruption of public utilities. Area may contain natural features that may have minor impacts.
High	More than 6	Excessive	Urban area including residential, business, industry, agricultural, recreational and other centers of work and residence containing important public utilities, main highways, railroads and schools. Natural features may be heavily impacted.

LIVES-IN-JEOPARDY: Lives-in-jeopardy is defined as all individuals within the inundation boundaries who, if they took no action to evacuate, would be subject to dangers of varying extremes. The level of danger is based on the degree of protection afforded by the structure the person may be in, the size of the person, the depth of water flow, the velocity of water flow, the time of year, time of day, and the season of the flooding. Whether the people are within the inundation area on a permanent basis vs. a temporary basis will also be a factor in determining lives in jeopardy.

ECONOMIC LOSS: Economic loss is that loss resulting from damage to residences, commercial buildings, industries, croplands, pasturelands, utilities, roads and highways, railroads, etc. Consideration should also be given to economic loss resulting from damage to outstanding natural resources within officially declared parks, preserves, wilderness areas, etc. Also, if a toxic or harmful substance is known to be present in significant quantities in the impoundment, the effect of its dispersion on downstream areas (with respect to economic loss only) should be considered in the downstream hazard classification.