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May 28, 1981

Docket No. 50-348

Director, Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. S. A. Varga

JOSEPH M. FARLEY NUCLEAR PLANT - UNIT 1
TECHNICAL SPECIFICATION UPGRADE

Gentlemen:

In accordance with discussions with Mr. Ed Reeves of your staff, enclosed as Attachment I is the Unit 1 Technical Specification upgrade package. This package reflects Alabama Power Company (APCo) comments on the NRC draft version of the upgrade package with proposed changes indicated by a bar on the side of the page. The intent of this proposed package is to upgrade the Unit 1 Technical Specifications to the Unit 2 version to address outstanding licensing issues and requirements as they relate to Unit 1. Certain items from the Unit 2 Technical Specifications were not included in this package because these items have not been generic issues on operating reactors and do not form a part of the licensing bases for Farley Unit 1. In addition, changes have been proposed to the Unit 2 version which will require further discussions with the NRC staff. These changes have been brought about as a result of experience gained by using the Unit 2 specifications.

In an effort to clarify APCo concerns, a discussion of the significant differences between the Unit 1 Technical Specification upgrade package and what is presently in the Unit 2 Technical Specifications is provided in Attachment II. This attachment contains 22 items which have been divided into two categories based upon action APCo wishes to take on each of them. These categories are as follows:

I. Major item affecting plant availability without enhancing plant safety - not generic requirement for operating reactors.

II. Item which requires clarification between the NRC and APCo on the design, licensing, and operational aspect of Unit 1.

APCo proposes to defer any action on Category I items at this time. It is requested that the current provisions of the Unit 1 Technical Specifications remain in effect for the Category I items. For the Category II items, APCo has proposed these changes in Attachment I and wishes to discuss these items as part of the Unit 1 Technical Specification upgrade effort.

The Environmental Protection Plan (Appendix B to O.L.) which addresses non-radiological aspects of plant operation was submitted to the NRC in APCo letters dated May 19, 1980 and August 7, 1980.

APCo requests that the Unit 1 Technical Specification upgrade license amendment be made effective in the following manner:

Section	Effective Date
Appendix A to O.L.	
1. Definitions	Prior to startup following the third refueling outage.
2. Safety Limits and LSSS	Prior to startup following the third refueling outage.
3/4 LCOs and Surveillance	
3/4.1 thru 3/4.10	Prior to startup following the third refuleing outage.
3/4.11 and 3/4.12	January 1, 1982
5. Design Features	Sixty days after issuance of license amendment.
6. Administrative Controls	Sixty days after issuance of license amendment.
Appendix B to O.L.	
Environmental Protection Plan	January 1, 1982

The Plant Operations Review Committee has reviewed the above proposed changes and has determined that the changes do not involve an unreviewed safety question as shown in the safety evaluation in Attachment 1. The Nuclear Operations Review Board (NORB) will review the final upgrade package prior to issuance of the license amendment by the NRC. The results of the NORB review will be forwarded at that time.

The Class of this proposed amendment is designated in accordance with 10 CFR Part 170 as a Class III change in that is deemed not to involve a significant hazard consideration. Since APCo has submitted twenty-eight thousand dollars in fees to cover the outstanding technical specification change requests which are incorporated in this upgrade, no additional fees are enclosed.

In accordance with 10 CFR 50.30(c)(1)(i), three (3) signed originals and thirty-seven (37) additional copies of this proposed amendment are enclosed.

Should you have any questions, please advise.

Yours truly,

F. L. Clayton, Jr.

FLCjr/BDM:rt

Attachments

cc: Mr. R. A. Thomas
Mr. G. F. Trowbridge
Mr. E. A. Reeves
Mr. J. P. O'Reilly
Mr. W. H. Bradford

SWORN TO AND SUBSCRIBED BEFORE ME THIS 28th DAY OF May, 1981.

Notary Public

My Commission Expires:
2-15-82

FEB [illegible] 1981

MEMORANDUM FOR: Robert Jackson, Chief
Geosciences Branch
Division of Engineering

THRU: Jerry Ha[illegible]bour, Chief
Site Safety Research Branch
Division of Reactor Safety Research

FROM: Andrew Murphy
Site Safety Research Branch
Division of Reactor Safety Research

SUBJECT: RECOMMENDATION OF MAXIMUM RESERVOIR-INDUCE[illegible]
EARTHQUAKE AT THE V. C. SUMMER NUCLEAR STATION

The purpose of this memorandum is to convey my comments on the FSAR for the V. C. Summer Nuclear Station and recommendations for the maximum reservoir-induced earthquake at that site. These comments and recommendations were formulated after reviewing the pertinent information for the Geosciences Branch, NRR, as requested in a memorandum from R. J. Mattson to T. E. Murley, dated March 3, 1980 and answered on March 14, 1980.

The comments and recommendations are included as Enclosure 1.

/s/

Andrew Murphy
Site Safety Research Branch
Division of Reactor Safety Research

Enclosure: as stated

ENCLOSURE 1

Dr. Andrew Murphy of the NRC Office of Nuclear Regulatory Research has assisted in the review. He believes that the maximum reservoir-induced earthquake of M_L = 4.0 as proposed by the applicant and M_L = 4.5 as recommended by LASL are not sufficiently supported by the arguments currently presented. Instead he believes that at Monticello Reservoir the maximum induced earthquake should be M_L = 5.3 until further supporting information is provided. These are his arguments:

1. The applicant has not provided sufficient data to establish that the maximum dimension of geological structures within the immediate vicinity of this reservoir is 1 km or less and that the maximum stress drop is less than 25 bars.

2. After assuming that the maximum earthquake to be associated with Monticello Reservoir will have MM intensity VI as maximum intensity because MM intensity VI is the maximum intensity observed to date at Piedmont reservoirs, the applicant has employed a series of calculations and interpolations to relate the area of MM intensity VI shaking and local magnitude. This method has not previously been used for southeastern U.S. earthquakes and the applicant has not established the validity of the method for southeastern U.S. events or the level of conservatism associated with the method. The method is less conservative than the method of Nuttli and Herrmann, 1978.

Dr. Murphy supports his first argument with the following points:

1. The applicant has attempted to show that the size of the area available for rupture can be limited to 1 km or less. However, the applicant has not given sufficient weight to the observation that the clusters of seismicity as identified by the applicant are at least as large as 3 km.

2. The use of the 25-bar stress drop in the Brune model was justified on the basis of an abstract by Fletcher (1980) in which he reported a 17-bar stress drop for the August 27, 1978 earthquake that occurred at Monticello Reservoir. The conservatism gained by the applicant's use of 25 bars over the observed 17 bars may have been invalidated when Fletcher presented the paper at the American Geophysical Union Meeting, December 1980. At that meeting, he presented his updated results which show that the stress drop for the earthquake was about 17 bars on one horizontal axis but about 90 bars on the other horizontal axis.

3. Although the seismicity may be spatially associated with the surficial boundaries of the plutons, there is no reason to state that all the seismicity is only relieving local stress around the plutons because another observation can be made. That is the spatial occurrence of several clusters of seismicity and the focal mechanism also agrees with the orientation of a projection of the Wateree Creek fault (section 2.5.3.2.3).

4. The applicant's suggested stress barrier might be better considered a boundary between two stress regimes rather than an impenetrable barrier. The applicant's arguments support the concept that a rupture initiated on one side of the boundary will not propagate through the boundary and continue the rupture on the opposite side of the boundary. Thus, if an event occurs above the boundary, its size is restricted by the boundary. Dr. Murphy's comment is that events can and have occurred below the boundary and, therefore, the boundary does not intrinsically limit the size of the event. The following observations support the occurrence of seismic activity below the boundary: (1) the applicant reports seismicity above and below 1 km; (2) the USGS stress measurements indicate that above the stress boundary there is a stress regime that tends to favor thrust-type faulting and that below the boundary there is a regime that tends to favor strike-slip type faulting. The applicant's data indicate that the shallow events (<1 km) have thrust-type focal mechanisms and that for the deeper events (<2 km) there is a strike-slip component in the focal mechanisms.

5. The applicant's arguments for the limited areal extent of the geological structures in the vicinity of the Monticello Reservoir include observations: (a) The focal mechanisms of earthquake have nodal plane orientations generally corresponding to the orientation of fractures observed in the two USGS wells, suggesting that seismicity may be occurring along a network of preexisting fractures which surface geology indicates are not continuous over long distances. (b) The permeability data from the USGS wells and exploratory borings indicate significant variations laterally and with depth. These observations are not strong indicators of the three-dimensional extent of the geological features available for possible rupture. The observations are based only on shallow data (wells and surface geology; depth less than 1 km) and may not apply to the deeper earthquakes (depth greater than 1 km).

6. The level of seismic activity at Monticello Reservoir may be characterized as a low background level that has been punctuated by four swarms (temporal/spotted clusters of seismicity), including activity at initiation of filling. It was during the swarms that the largest events to date (M_L = 2.8) occurred. At this time, there is no way of knowing how the level of seismicity is going to vary over the expected life of the V. C. Summer facility.

7. The applicant's calculations show that if 3.2 km (length of the clusters of seismic activity) is taken as the source dimension and 100 bars (Fletcher measured 90 bars at Monticello) as the stress drop, by Brune's model (1970), a magnitude (M_L) 5.3 event is possible in the immediate vicinity of the reservoir.

Dr. Murphy supports his second argument with the following points:

1. The applicant has not adequately supported his assumption of maximum MM intensity VI shaking for earthquakes associated with Monticello Reservoir.

2. The applicant's method of relating MM intensity VI shaking to local magnitude involved:

   a. the use of a relationship between seismic moment and local magnitude whose validity has only been documented to date for southern California earthquakes;

   b. an extrapolation of seismic moments from widely scattered data points on a log-log graph.

In summary, Dr. Murphy recommends that an event of magnitude 5 to 5-1/4 occurring in the near-field is sufficiently conservative and should be used for the SSE. This recommendation is based more on observed flaws in the applicant's arguments and disagreements with his conclusions drawn from available data than on fully independent analyses.

Statement of Professional Qualifications

of Andrew J. Murphy

My name is Andrew J. Murphy. I am a Research Seismologist in the Earth Sciences Branch (formerly the Site Safety Research Branch) of the Office of Nuclear Regulatory Research of the U.S. Nuclear Regulatory Commission.

My education and experience have been in geophysics and seismology. I attended St. Louis University from 1964-1968, receiving a B.S. degree in geophysical engineering. I attended Columbia University from 1969-1975 receiving the Ph.D. degree in May of 1975. My Ph.D. thesis work concerned the characterization of long-period earth noise and earthquake detection problems.

During the period 1975-1979, I worked at the Lamont-Doherty Geological Observatory of Columbia University as a Research Scientist and Research Associate. My attention was principally to the collection and analysis of seismological data on the seismicity and the tectonics of the northeastern Caribbean Sea area.

I joined the NRC Office of Nuclear Regulatory Research in October 1979 as a Research Seismologist. In that position my duties included the formulation, development, and implementation of research projects in seismology and geophysics. Currently I am responsible for regional projects in New England, the southeastern U.S., the Pacific Northwest, and the New Madrid Seismic Zone and for topical projects concerning earthquake recurrence intervals and the attenuation of Lg-waves.

In March 1980, I was detailed to assist the Geosciences Branch of the Office of Nuclear Reactor Regulation in preparing the SER for the U.C. Summer Facility. I examined the problem of reservoir-induced seismicity at the Monticello Reservoir, a part of the Summer Facility.