

FEB 15 1977

MEMORANDUM FOR: Karl R. Goller, Assistant Director for  
Operating Reactors, DOR

FROM: William P. Gammill, Assistant Director for  
Site Technology, LSE

SUBJECT: OCONEE/JOCASSEE DAM SEISMICITY

We have been following the situation at Oconee/Jocassee dam since July 1976, and this memorandum will update what has happened since that time. At the July 27, 1976 site visit the staff requested that Duke Power Company provide a report discussing the earthquake activity at Jocassee Dam. On July 21, 1976, you were informed that another meeting with the utility would probably be needed (July 21, 1976 memo Gammill to Goller, enclosed). This memorandum also itemized a number of concerns relating to the seismicity near Jocassee dam. The staff also recommended that operation of a seismic monitoring network be reinstated. As a result, a meeting with the utility was held on September 21, 1976 to discuss responses to these questions. At that time the applicant supplied several reports relating to the observed seismicity and site geology (see enclosed meeting summary by G. Zech). On October 25, 1976 we were informed that a seismic monitoring program would be reinstalled and operational on November 1, 1976 (letter, Parker to Rusche, October 25, 1976). On January 7, 1977 we met with Drs. Dave Simpson and Klaus Jacob of Lamont-Doherty Geological Observatory to seek advice on methods of resolving this situation.

Our consideration of this issue to date has indicated a need to meet with the applicant as soon as possible to discuss specifics of dam design, the earthquake activity since July, the seismic monitoring program, and local geology. It is my understanding that D. Neighbors of your staff is arranging for such a meeting this month. An agenda for the proposed meeting is enclosed.

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Because of the existence of reservoir-induced seismicity in the vicinity of this large dam upstream from the Oconee nuclear plants we do have a high level of concern. Moderately large damaging earthquakes have occurred in other parts of the world near similar large dams. The presence of this seismicity requires that the seismicity, site geology and their possible impact on the dam be examined vigorously and as soon as possible by both the staff and the utility.

Original Signed by  
W. P. Gammill

William P. Gammill, Assistant Director  
for Site Technology  
Division of Site Safety and  
Environmental Analysis  
Office of Nuclear Reactor Regulation

Enclosures:  
As stated

- cc w/o encls:
- D. Neighbors
- R. Jackson
- J. Kelleher
- J. Stepp
- R. Hofmann
- L. Heller
- W. Bivins

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DATE →	2/4/77	2/10/77	2/11/77	2/11/77	2/14/77

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Our consideration of this issue to date has indicated a need to meet with the applicant as soon as possible to discuss specifics of dam design, the earthquake activity since July, the seismic monitoring program, and local geology. An agenda for the proposed meeting to be held this month is enclosed.

It is anticipated that our continued involvement will be required in order to review data gathered by the utility. In addition, further requests for additional information relating to seismic adequacy of the dam, local geologic conditions, and other seismologic questions will be forthcoming. Dr. Dave Simpson of Lamont-Doherty Geological Observatory, an expert in reservoir-induced seismic activity, has indicated a willingness to act as consultant to us on this review.

TENTATIVE DISCUSSION ITEMS  
FOR  
MEETING WITH DUKE POWER COMPANY  
OCONEE/JOCASSEE DAM

1. Geology and Seismology Staff Objectives
2. Specifics of Seismic Network Operation
  - a. Station locations
  - b. Network capability - magnitude and threshold, distance and depth capability
  - c. Discussion of hypocentral activity since July 1976, including focal plane solutions
  - d. Reporting procedures to NRC staff
3. Specific Information on Geologic Reconnaissance of Site Area
  - a. Location of discovered faulting
  - b. Basis of fault age dating
  - c. Available photos of dam abutments and foundation
  - d. Subsurface geology - models
4. Reservoir-Induced Seismicity
  - a. Similarities - difference Jocassee to known damaging earthquakes
5. Seismic Adequacy of Dam
  - a. Construction process photos/airphotos
  - b. Groundwater elevation before/after dam filling (time-head plots)
  - c. Embankment construction specifications (engineering properties for design and basis, density, gradation for all zones, settlement and alignment of crests and slope as a function of time)

- d. Seepage rates (relief wells, weirs, drains)
- e. Simple strain computations to assess approach to threshold of cracking core
- f. History of inspections and repairs to date
- g. Sensitivity of dam to surface fault movement (thickness and location of filters, strain distribution - rough calculations)
- h. Time - acceleration plot of expected earthquake (reference .12g for 5.6  $M_L$  earthquake - considerations, basis, justification)

We request personnel that can discuss the above items and other related peripheral items be present at the meeting. This should include the seismological consultants and dam engineers.