MAY 20 1977

Docket Nos. 50-269
50-270
and 50-287

Duke Power Company
ATTN: Mr. William O. Parker, Jr.
Vice President - Steam Production
Post Office Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Gentlemen:

In our meeting on March 23, 1977, at the Jocassee Dam site near the Oconee Nuclear Station, we stated what we consider to be appropriate actions for Duke Power Company to take to allow us to evaluate the potential seismic hazard at the Jocassee Dam.

We outlined a threefold program: (1) a short term report, (2) a monitoring program, and (3) a longer-term report that will describe the findings of the monitoring program.

It is requested that the short term report be submitted within 60 days of the date of this letter. The contents of this report were discussed with you at the meeting cited above. The enclosure to this letter provides further details of what the short term report should include.

The enclosure also addresses what we consider to be an adequate monitoring and reporting program. This program includes (1) the installation of three permanent seismic monitoring stations and two to four microearthquake recorders to augment the permanent stations, all which we request that you install by August 1, 1977, (2) reports of the results of the monitoring program submitted to the NRC quarterly, and (3) informing NRC by telephone of any unusual seismic activity as soon as possible. The enclosure provides the details of this program.

The longer-term report should be submitted by January 1, 1979, and summarize and discuss the results of the monitoring program through November 1978.

OFFICE ➔						
SURNAME ➔						
DATE ➔						

It is requested that you submit a request for a license amendment to your facility which would incorporate the requirements discussed herein for the monitoring program and the longer-term report. Please respond within 45 days after receipt of this letter.

Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosure:

cc w/encl:
See next page

DISTRIBUTION
Dockets
NRC(3)
LOCAL PDR
ORB#1 Reading
KRGoller
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[redacted]
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OFFICE	DOR:ORB#1	DOR:ORB#1				
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 20, 1977

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Vice President - Steam Production
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Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosure:
Monitoring & Reporting Information

cc w/encl:
See next page

cc: Mr. William L. Porter
Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, North Carolina 28242

J. Michael McGarry, III, Esquire
DeBevoise & Liberman
700 Shoreham Building
806-15th Street, NW.,
Washington, D.C. 20005

Oconee Public Library
201 South Spring Street
Walhalla, South Carolina 29691

SHORT TERM REPORT

This report should address formally the questions raised during the recent meeting at Jocassee Dam.

(a) Seismicity: All seismic observations gathered to date should be provided in an organized manner, including numbers of events recorded, hypocentral data, focal mechanisms where determined, epicenter maps and depth cross-sections, locations and changes in operating stations and descriptions of network capacity. Also included should be a log of water-level fluctuation.

The report on seismic studies prepared by Law Engineering provides adequate seismic information for the time interval mid-October 1975 until late-June 1976. This report should be resubmitted as part of the total report. For the interval from late June 1976 until the present, no seismic data have been presented to us other than informal oral descriptions.

Consequently, the seismic information for this latter interval should be presented in a formal written report treated in all the detail described in the first paragraph of this section.

(b) Geologic Reconnaissance of the Site Area

The reports submitted to date do not appear to be current and should be modified to depict clearly the current understanding of the location of faulting in the vicinity of Lake Jocassee and the Lake Jocassee Dam. The report of Dr. Conn (Engineering Geology of the Keowee-Toxaway Project, of December 1966, and June 1974) discusses faulting in the vicinity of the dam; a clarification of his findings should be provided. The relevant geologic maps of the site and region and an assessment of the age of last movement of faults in the vicinity of the Lake Jocassee Dam should be provided. Typical construction photographs of the dam rock foundation and abutments should also be provided.

(c) In order to evaluate the seismic adequacy of the dam the following information should be provided:

1. The embankment design and specification should be described along with the foundation treatments used;

2. Seepage rates and changes in seepage rates should be described and plotted;

3. Groundwater profiles (phreatic surface) through the abutments and foundation of the dam should be plotted;

4. The ability of the foundation of the dam to resist the effects of potential fault movements should be assessed and reported. Past measurements of the settling, displacement and cracking of the dam should be interpreted to estimate the existing state of strain, particularly in the core of the dam. The additional strain which can safely be tolerated should be estimated and related to the magnitude of potential fault movement;

5. The tolerance of the abutment material to strain and cracking resulting from fault movement should be estimated based on the properties of the saprolites and the magnitude of potential fault movement. If abutment cracking cannot be ruled out then the piping and erosional resistance of the weathered rock should be assessed.

6. A detailed description of the Federal Power Commission monitoring program for seismic safety should be provided. The dam operating plans in the event of significant seismic excitation should be provided together with plans for immediate inspections and readings of critical instruments. In addition, a plan for the prompt and formal involvement of Duke Power Company geotechnical consultants should be developed to assure that evidence detrimental to the safety of Jocassee dam is not overlooked.

MONITORING PROGRAM

At present it cannot be stated that the levels of activity of late 1975-1976 will not resume. Consequently, it is essential to maintain a monitoring network which will provide accurate and timely information concerning size, frequency and hypocentral data for possible seismic activity.

(a) Seismic Stations: Until November 1978, three permanent stations should be operated by Duke Power and recorded at the damsite at that time a decision will be made, based on the level of activity up to November 1978, as to whether to continue the monitoring program. Two to four microearthquake recorders should be used to augment these stations until December 1977. At that time a decision will be made, based on the level of activity during 1977, as to whether to continue operation of the microearthquake recorders. The two

stations in addition to SMT should be installed as soon as possible. Suggested locations for these stations are shown in the attached figure. If possible, arrangements should be made with the USGS and USC to incorporate one or all of the Jocassee stations in the South Carolina network. This would allow recording of these stations on the develocorder at USC. If arrangements are made to include the stations in the network, it may be possible to use USGS radio frequencies for radio telemetry.

To improve the timing resolution for the permanent stations recording speeds of 120 mm/min should be used on the helicorders.

(b) Reporting Procedures: Quarterly reports should be provided to the NRC within one month of the end of each reporting period. These reports should include the following:

1. Text: Short report of the general level of seismicity and and any changes in seismicity.

2. Tables:

   a. Catalog of all earthquakes recorded;

   b. List of all hypocenters located (HYPO71 Format);

   c. Operational report:

      i) Location of stations;

      ii) Times of operation of each station, number of days recording for each station, total number of station-days reporting;

      iii) Report of reasons for any station failures;

3. Figures:

   a. Station locations;

   b. Epicenter locations (with magnitude shown by symbol size);

      i) For reporting period;

      ii) Cumulative, from October 1975;

   c. Graphs of daily water level (and daily range), change in water level/day, number of earthquakes/day, energy release/day, all plotted on the same time scale, for the reporting period;

d. Graphs of the parameters in item 3, above, for ten day intervals from October 1975;

e. Cross-sections of earthquake depths (with error bars) along profiles oriented N-S, E-W, NE-SW, NW-SE and any other profiles suggested by the data.

4. Other Information: If sufficient data are available, "b-values" and focal mechanisms should also be determined. Direction of motion at each station should be included in the report for all earthquakes used in focal mechanism determinations. Interpretation of the significance of these parameters is not required from Duke Power Company station data (HYP071 format).

   A copy of at least one "typical" seismogram should be included with each report to show data quality and type of activity.

   If felt earthquakes occur, intensity surveys should be carried out and summaries of intensity reports and contoured intensity maps should be included in the report.

5. Abnormal Activity: The NRC should be informed by telephone of any unusual activity as soon as possible. Any of the following should be considered unusual activity:

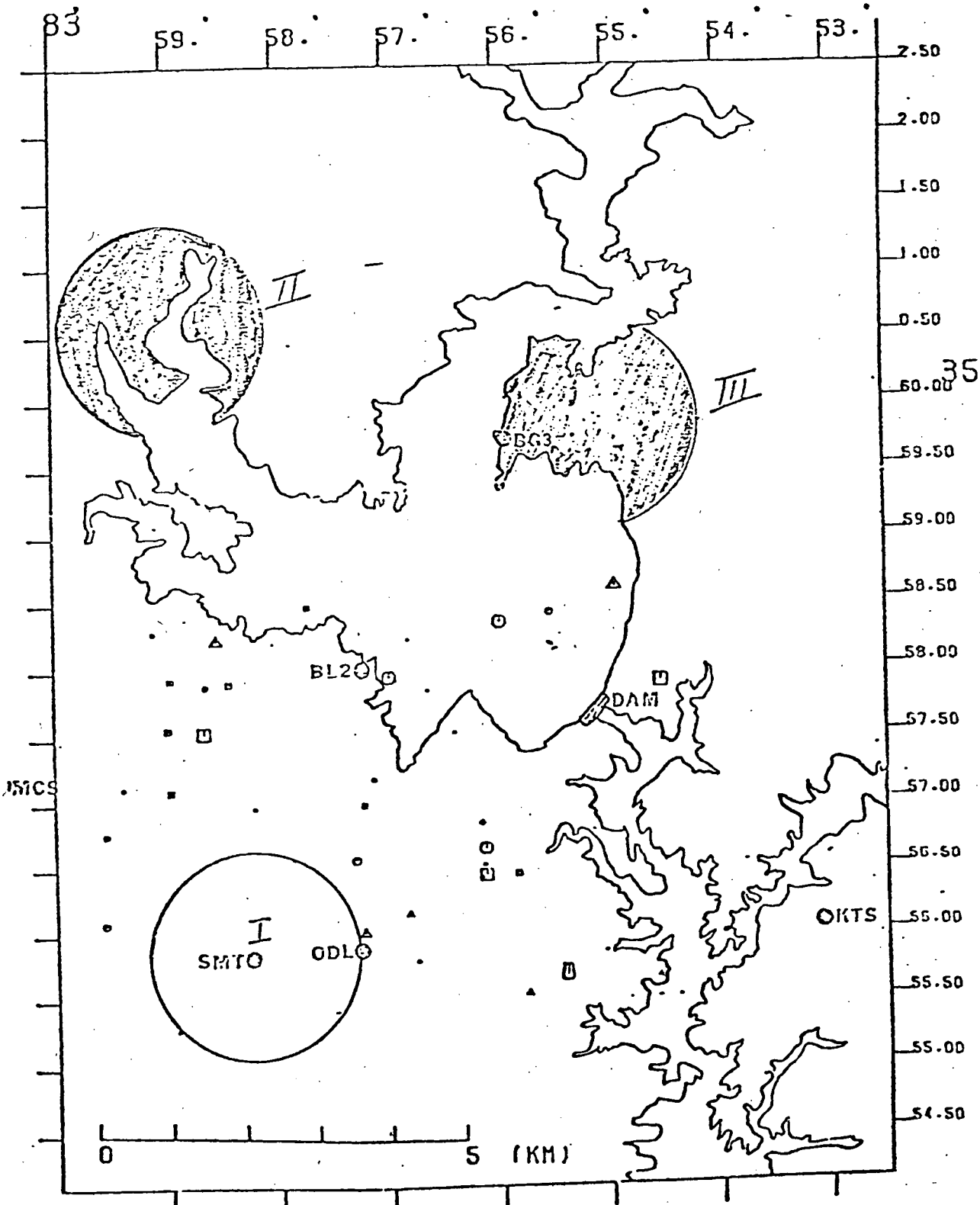
   a. Any earthquake larger than magnitude 2;

   b. More than 100 events per week;

   c. Any plans to make ususual changes in water level in the reservoir.

JOCASSEE EARTHQUAKES

FROM OCT. 28,76 TO FEB. 2,77



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RECOMMENDED STATION LOCATIONS AT LAKE JOCASSEE