NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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FILE NUMBER:

TO: Mr Rusche

FROM: Duke Power Company
Charlotte, NC
W O Parker Jr

DATE OF DOCUMENT: 11-2-76

DATE RECEIVED: 11-5-76

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DESCRIPTION

Ltr trans the following:

PLANT NAME: Oconee 1-3

ENCLOSURE

Response to our 10-5-76 ltr furnishing info concerning loose parts monitroing system
.....

ACKNOWLEDGED

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FOR ACTION/INFORMATION — ENVIRO 11-8-76 ehf

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NRC FORM 195 (2-76)

DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

November 2, 1976

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch #1

Reference: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

In response to your letter of October 5, 1976 concerning the Oconee Nuclear Station Loose-Parts Monitoring System, please find attached the requested information.

If we may be of further assistance, please advise.

William O. Parker, Jr.

LJB:ge
Attachment

11291

OCONEE NUCLEAR STATION
OPERATING EXPERIENCE WITH LOOSE-PARTS
AND LOOSE-PARTS MONITORING SYSTEMS (LPMS)

1. Please briefly describe any events in which a loose-part was found in your primary loop. Discuss, for each such event, the procedures used to discover the loose-part, its safety consequences and the measures taken to remove it. Assess the usefulness of a LPMS for each of the occurrences described above.

On January 1, 1974, during power escalation testing at 75 percent full power on Oconee Unit 2, a malfunction in the 230 kV switchyard caused a turbine/reactor trip. Following this trip, indication of a loose-part in the Unit 2 reactor vessel was noted on the Loose Parts Monitoring System. A full description of the indication, analysis and safety evaluation is provided in our letter to Mr. Angelo Giambusso dated January 10, 1974. By letter dated January 15, 1974, Atomic Energy Commission's concurrence with Duke's plans for continued operation was given. However, on January 22, 1974 reactor coolant pump 2B2 seal failure noises resulted in a LPMS alarm. The pump was stopped, the unit was manually tripped, and cooldown was begun. During cooldown noises were heard during each pump operating combination. Inspection of the 2B2 RCP revealed a lock bolt and its retaining spiral pin were missing from the bottom of the pump. Analysis of the noise data tapes taken on the LPMS indicated no noise other than that heard during the testing program initiated by the trip on January 1, 1974. The loose objects were recovered using long handled tools fabricated for the purpose and a small pump for flushing and vacuuming. The loose objects consisted of the reactor coolant pump lock bolt, a small bolt, a slotted head set screw, grit and metal shavings. The discovery of these loose objects resulted from operation of the LPMS.

On July 18 and October 10, 1974 instances were identified in which guide pins were determined to be missing from decay heat valves 2LP-12 and 2LP-14. These pins were stainless steel of approximately 3/4"x4" in size. These incidents are described in our Abnormal Occurrence Reports AO-270/74-3 and AO-270/74-15 transmitted by letters dated July 18 and October 29, 1974, respectively.

On April 4, 1976 the LPMS on Oconee Unit 2 detected a noise. A Babcox and Wilcox noise analysis team identified the noise as a large swinging metallic object confined at one end. The unit was shutdown on April 4, 1976 and inspection revealed that a surveillance specimen holder tube had broken loose. The LPMS initially detected the presence of the loose specimen holder tube.

On June 26, 1976, following shutdown of Oconee Unit 3 due to suspected steam generator tube leaks, two pieces of metal were found at the top tube sheet of the 3B steam generator. One piece was approximately 3" long bent in a horseshoe shape and the other piece was 3/4" x 1/2" x 1/16". The origin of these objects is unknown and the LPMS did not detect the objects. There is no safety significance to this event. The LPMS was not involved in the discovery of these objects.

2. Please describe briefly: your LPMS and its operation, the length of time it has been in operation, and the extent of monitoring (e.g., continuously, automatic actuation, etc.).

Each of the three Oconee units has a loose parts monitoring system which consists of eleven channels of noise monitoring. Each channel has a CRYSTAL accelerometer, line driver, amplifier and interconnecting cables. The accelerometers are mounted at different locations on the primary system. Readout meters on each amplifier and an audible alarm indicator with adjustable alarm setpoints are located in the control room. Problems associated with the system included difficulties in installation and vendor explanation, damage to the system when maintenance is performed on other equipment in close proximity and electrical component failures due to ambient conditions and underdesigned components.

The Oconee Unit 1 LPMS has been in operation approximately three and one half years. The Oconee Units 2 and 3 LPMS have been in operation approximately two years. Each LPMS continuously monitors the reactor coolant system. The system alarms automatically on high noise levels. Selected channels are monitored during unit heatup, pump combination changes, etc.

3. Please describe the operating experience to date including any false alarms or spurious signals. If either have occurred, please describe each event. Similarly, has any event occurred that should have, but did not, cause a noise indication? If so, please describe each event.

False alarms and spurious signals have occurred frequently on all units due to electrical interference. Occasionally, equipment failure has caused these false signals. High amplifier sensitivity also has resulted in alarms due to random electrical noise. Only one known event has occurred in which a loose part did not cause a noise indication. This event was described in the answer to the first question.

4. Discuss the cost/benefit considerations of your LPMS, and your degree of confidence in such systems.

Past experience has confirmed the ability of the LPMS to detect both large and small loose objects. It is felt that the benefits of detecting loose objects and evaluating their effects exceed the cost considerations of the LPMS. As problems with the system have been resolved, confidence in the LPMS has increased to a high degree.