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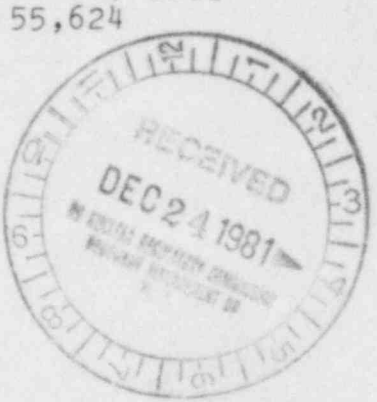
December 16, 1981
EF2 - 55,624



Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Eisenhut:

Reference: Enrico Fermi Atomic Power Plant, Unit 2
NRC Docket No. 50-341

Subject: SER Commitment on Loose Parts Monitoring System

Attached is a description of the Fermi 2 Loose Parts Monitoring System and an evaluation of the degree of conformance with Regulatory Guide 1.133, Revision 1. The content of this response and the required submital date were defined by the Staff in Section 4.4.1 of the Fermi 2 Safety Evaluation Report.

We believe the system meets or exceeds all of the applicable regulatory criteria.

Sincerely,

Harry Tauber

Attachment

cc: L. L. Kintner
B. Little

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Attachment to: EF2-55,624

Edison has purchased and is installing a Babcock & Wilcox Company Loose Parts Monitoring System (LPM) on Fermi 2 per the commitment made in response to NRC Question 230.14, Amendment 24, June 1979.

The LPM System incorporates eight monitor channels which consist of Endevco Model 2273AM20 crystal accelerometers connected via Endevco Type 3075M6 hardline coaxial cable to Unholtz-Dickie Model RCA-2TR charge preamplifiers located within the drywell. Each channel preamplifier is connected through a drywell penetration by coaxial cable to an Unholtz-Dicke Model P22HMA-2 loose parts detector physically located in the plant relay room. Associated with the eight monitor channels is an Unholtz-Dickie Model AM dual audio monitor, a Babcock & Wilcox digital loose parts locator and a Babcock & Wilcox multiplexed analog recording and switching system. A Gulton Model AP-20 alphanumeric thermal printer and a Teac Model A-2340SX four channel tape recorder provides operator interface with the LPM System.

A brief comparison of the system design features with the requirements of R. G. 1.133, Revision 1, are summarized below.

The accelerometers are located on the outside of the pressure coolant boundary as follows:

> Two accelerometers on separate CRD housings on the bottom of the reactor vessel, one accelerometer on each of the two recirculation pump suction lines, one accelerometer on each of the two feedwater lines and finally one accelerometer on each of two selected steam lines. Each pair of accelerometers is located on a natural collection region of the BWR and thereby meet the regulatory position with regard to sensor location.

LPM Systems built by B&W which are virtually identical to the Fermi system have demonstrated adequate sensitivity to meet the regulatory guide cirteria with the exception that the test impacting was actually performed on the outside of the pressure boundary.

Physical channel separation is maintained in the Fermi 2 LPM from the sensor, preamplifier and cabling through the drywell penetrations. This allows on-line maintenance to be performed on equipment common to both sensors in a collection region and thereby meets the criteria established in the regulatory position.

The Fermi 2 LPM has been provided with both automatic and manual startup of the data acquisition equipment. When the alert level established in the system is exceeded, an annunciator window and associated audible alarm in the control room alerts the operating personnel. Four selected channels are automatically and simultaneously recorded on tape in analog form. In addition, the digital loose parts locator prints an alphanumeric message which includes the data, time, channel number, channel label and the delay matrix value for each event. Audio monitoring capability of each channel is provided by the dual audio monitor which is rack mounted in the relay room equipment cabinet. Visual monitoring of the loose part signal can be accomplished using plant test instrumentation (oscilloscope/spectrum analyzer) in conjunction with the system hardware in the relay room. As a result, the Fermi 2 LPM System conforms to the regulatory position on data acquisition.

Alert levels are automatically and continuously provided on each channel of the Fermi 2 LPM System. An automatic gain control (AGC) feature optimizes the system sensitivity by controlling the channel gain to maintain background noise at a constant level relative to the threshold level. An alert is generated only when two or more channels are alarmed and only one or two of the channels are alarmed within the first one-half millisecond of the initial event. This logic discriminates against false alerts resulting from local mechanical or electrical noise. A logic inhibit is provided such that false alerts due to equipment starts or trips can be automatically rejected. This feature will be used only if actual operating experience establishes a need. The Fermi LPM alert level meets all of the appropriate regulatory positions.

The Fermi LPM System has incorporated features which allow periodic checks of the functional operational capability and calibration to be accomplished. Channel checks can be performed by observing the analog readout in the relay room. An audio check can also be made by manual selection in the relay room. Channel functional tests can be performed by using the preamplifier bias check feature to confirm the ability of the channel to function in the required manner. Channel calibration can be accomplished during period of extended shutdown by using a shaker table to generate precise acceleration magnitudes at specific test frequencies. As a result, the system has the ability to meet the regulatory guidance for channel operability tests.

The LPM system components were seismically tested and found to be adequately qualified as reported in B&W test report 13960 and 14689 dated May 4, 1978. The test data was independently reviewed and found to be acceptable when compared to the Fermi 2 spectra. The physical installation of the equipment will be in accordance with seismic I design criteria. All of the equipment located within the drywell has been shown to be environmentally acceptable by actual operating experience within the nuclear industry. Based on the previous discussion the Fermi 2 LPM System meets the seismic and environmental operability requirements delineated in the regulatory position.

System component quality has been determined to be adequate for the satisfactory operation of the system over the required life span. All of the components inside the drywell are sufficiently resistant to radiation to allow a life span of more than forty years. The electronic components used in the system are conservatively rated and should remain operable over the design life of forty years with a minimum level of maintenance. The Fermi 2 LPM System meets or exceeds the regulatory position on system quality.

System repair capability has been optimized to maintain the highest level of availability and maintain a minimum level of exposure to radiation. This is accomplished by the modular design and the interchangeability of the parts and modules. In addition, high quality equipment is used to minimize maintenance and maintain a high level of performance. Channel separation minimizes the effect of any module failure. This includes the use of individual power supplies for each channel. The majority of the system components are located with the relay room which allows access for calibration and maintenance without any radiation exposure penalty. The LPM System exceeds the regulatory guidance for system repair capability.