



# THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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MURRAY R. EDELMAN

VICE PRESIDENT  
NUCLEAR

August 28, 1985  
PY-CEI/NRR-0311 L

Mr. B. J. Youngblood, Chief  
Licensing Branch No. 1  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Perry Nuclear Power Plant  
Docket Nos. 50-440; 50-441  
Equipment Qualification  
Outstanding Issue 4

Dear Mr. Youngblood:

The purpose of this letter is to update you concerning Outstanding Issue 4, as defined in SER Supplement No. 5 and in your letter dated July 19, 1985. We have confirmed that, in accordance with the PNPP Equipment Qualification Program:

1. All Safety-Related Electrical Equipment and Active Mechanical Equipment has been seismically qualified.
2. All Safety-Related, Active Pumps and Valves have been qualified for operability. Required preoperational testing will be completed prior to fuel load.
3. All Safety-Related Electrical Equipment and Harsh Environment Mechanical Equipment has been environmentally qualified with the exception of the Flow Element for the Main Steam Leakage Control System (E32-N006A,E,J,N). We believe that qualification of these elements will be completed by fuel load. However, should qualification not be completed by fuel load, the attached proposed Justification for Interim Operation (JIO) will be submitted. We will update you in regard to this matter by September 20, 1985.

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Mr. B. J. Youngblood

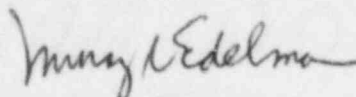
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Field modification work associated with our Equipment Qualification program, has been completed, with the exception of the Intermediate Range Monitor (IRM) connections. The IRM connections will be completed by fuel load. Documentation and close out activities associated with these modifications will also be completed by fuel load.

Please feel free to contact me if you have any questions concerning this matter.

Very truly yours,



Murray R. Edelman  
Vice President  
Nuclear Group

MRE:njc

Attachments

cc: Jay Silberg, Esq.  
John Stefano (2)  
J. Grobe

PNPP - ENVIRONMENTAL QUALIFICATION PROGRAM  
JUSTIFICATION FOR INTERIM OPERATION

Type/Description:

Flow element for Main Steam Leakage Control System. Manufactured by S&K.  
- Model Number 20-9651-8550

Equipment Identification Numbers:

E32N006 A,E,J,N.

Safety Function:

This flow element measures steam leakage flow rate from the Main Steam Isolation Valves (MSIV's) to the Auxiliary Exhaust Gas Treatment System (AEGTS). It is located between the inboard and outboard MSIV's. Failure of this instrument will not result in additional steam leakage. Leakage is controlled by the inboard and outboard main steam isolation valves, which are in turn backed up by the main steam stop valve and the turbine stop valve.

Technical Justification:

The flowmeter is a pipe-mounted element used to measure the rate of flow of fluids. It consists of a tapered tube mounted vertically in the fluid stream, a float within the tube, and a linear variable reactance transformer (LVRT). It will be subjected to the ambient as well as the process fluid environments. The postulated maximum temperature expected during a Design Basis Event (DBE), is 160°F. Abnormal, non-accident conditions are expected to result in temperatures of not more than 147°F. The process conditions are more severe than the accident conditions since the flowmeter is subjected to near operating steam temperatures during normal operation if leakage occurs.

A two-dimensional heat transfer analysis was performed to predict the expected temperature of the flowmeter coil (LVRT) during a DBE. It was determined that for the most extreme environmental and process fluid temperatures (212°F and 500°F, respectively), the coil temperature will reach only about 260°F. Thus, the suggested design limit of 315°F will not be exceeded.

This result is conservative since the analysis accounts for only heat transferred from the solid section and the fin shaft and not from each of the six fins. The insulating effects of the Teflon spacer at the base of the coil are also not considered. Additionally, since heat will be dissipated along the length of the pipe from the heaters to the flowmeter, coil temperature is expected to remain below 260°F.

The anticipated accident radiation level is  $2.0E6$  rads total integrated dose (TID) gamma. The TID for normal operations is  $3.0E5$  rads, for a total combined TID of  $2.3E6$  rads. Component materials of the S&K flowmeter have been identified and evaluated for radiation thresholds and for loss of mechanical and electrical properties at radiation levels exceeding these threshold levels.

Several components contain non-metallic materials with radiation thresholds which are lower than the above specified combined TID. The threshold value is the dose at which a perceptible change occurs in a physical property of the material. Exceeding the threshold of a material does not necessarily preclude serviceability of that component. The non-metallic components of the flowmeter are relied upon for their electrical properties more so than for their mechanical properties. The dielectric strength of the material is, therefore, an important parameter in evaluating radiation exposure effects. Assuming a linear relationship between dielectric strength degradation and radiation dose, the non-metallic components are not expected to experience a significant degradation of dielectric strength at the specified TID.

Neoprene, which has a radiation threshold of  $1.0E6$  rads gamma and is utilized for both its electrical as well as its mechanical properties, experiences only a 25 per cent reduction in tensile strength at a radiation dose of  $3.5E8$  rads gamma; the dielectric strength is affected even less.

Teflon, which is used as a spacer and as electrical wire insulation, has a radiation threshold of  $1.0E4$  rads gamma. It however, has been subjected to testing of up to  $1.2E7$  rads gamma with no loss in dielectric strength.

In summary, the analyses indicate that the S&K flowmeter can be expected to perform its safety function in the anticipated environments discussed above with a high degree of confidence.

#### Qualification Status

Qualification testing (aging, seismic and LOCA) is in progress.