

YANKEE ATOMIC ELECTRIC COMPANY



1671 Worcester Road, Framingham, Massachusetts 01701

September 1, 1982

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FYR 82-90

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

References: (a) License No. DPR-3 (Docket No. 50-29)
(b) USNRC Letter to YAEC, dated July 29, 1982

Subject: Environmental Qualification of Safety-Related Electrical
Equipment

Dear Sir:

Your letter, Reference (b), expresses your concern relative to the qualification of our steam generator level transmitters for their short-term protective function. Your concern is based primarily on inadequacies in our documentation of qualification and on the fact that similar transmitters have failed in the short term in a separate test. We have reviewed the FRC evaluation of our documentation, the applicable test reports, and the functional requirements of our transmitters; and we have concluded that the test in which the transmitters failed does not apply to the transmitters installed at Yankee, that the Yankee transmitters are adequate to perform their short-term protective function, and that our qualification test documents are inadequate in that they do not provide a comprehensive record of the test results. Since we cannot improve the quality of the test documentation, we plan to replace the transmitters. The bases for these conclusions are summarized in the following paragraphs.

It is our opinion that the test in which three transmitters failed at six to eight minutes into the test cannot be used for comparison to the transmitters installed at Yankee. It is stated in the functional requirements and test criteria for this test that the transmitters did not have any special modifications for environmental conditions because the time required to function was very short. In the test results and conclusions, it reiterates the fact that the model tested was not designed for the environment in which it was tested and concludes that the short-term function was demonstrated. The FRC has concluded that the test failures render the test inconclusive with respect to short-term functionality, and we agree with this conclusion with respect to those transmitters because they were not designed to cope with the test environment. However, the transmitters at Yankee were designed for nuclear service; and therefore, we do not agree that this test is applicable to our transmitters.

The transmitters which are installed at Yankee are of post-accident environmental design. The transmitters were quoted and ordered as post-accident operative models, which includes high temperature specs, epoxy paint, special seals, and high radioactive capacity. In addition, we have a

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Letter of Certification from the vendor that the material supplied is in accordance with the specification on the order. This letter was recently uncovered in our files and has not been submitted to the FRC, but it provides additional assurance that the transmitters at Yankee were designed for post-accident environment and are not of the unmodified type which failed in the above test.

The above-mentioned certification letter satisfies one of the inadequacies in our documentation package. The remaining concern is that the test report on which we base our qualification is unclear and contains numerous discrepancies. The test was performed over ten years ago, and we agree that the test report does not conform to current practices. However, the report indicates that the transmitters were tested to temperature and pressure conditions which exceeded the Yankee LOCA accident profile for 2.75 hours. These environmental conditions and the test time greatly exceed the short-term requirements of our transmitters.

The transmitters installed at Yankee provide a trip signal on low steam generator level in the event of loss of feedwater. Events which occur outside containment to cause loss of feedwater do not cause a harsh environment at the transmitter location. The protection for a feedwater line break between the feedwater line check valve and the steam generator is provided by low steam pressure sensors which are located outside containment. Therefore, the only event which could cause a harsh environment at the transmitter location and require operation of the low steam generator level trip is a break in the feedwater line between the containment penetration and the check valve. Because of the relatively short pipe length and configuration, the probability of a break at this location is low. In addition, due to the lower energy content of the fluid, a break at this location will cause a less severe environment than a MSLB. For the worst case break, the trip will operate in less than one minute, and for smaller breaks the trip will operate in less than five minutes with a corresponding less severe environment. In accordance with current guidelines, this demonstrates a more than adequate margin of test profile and time over break environmental and the short operating time requirements.

Based on our review of the bases for your concern, we conclude that the transmitters are adequate for their short-term protective function; but, due to our inability to improve the quality of the test documentation, we have initiated the replacement of the four transmitters. Fully qualified transmitters have been ordered; and, if present delivery schedules are met, we plan to install the replacement transmitters during the forthcoming refueling outage.

We trust this information is satisfactory; however, if you have any questions, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. A. Kay

J. A. Kay
Senior Engineer - Licensing

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