Babcock & Wilcox

a McDermott company

Nuclear Power Generation Division

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November 24, 1981

Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: 10 CFR 21 REPORT

Dear Mr. DeYoung:

Pursuant to the requirements of 10 CFR 21, this report in three copies is made concerning a setpoint for initiation of the ESFAS in B&W's 205 FA plants under construction that is considered as being too low. This concern is judged reportable for the Bellefonte Units 1 and 2 of TVA, the WNP 1 and 4 Units of WPPSS and the Pebble Springs Unit of PGE.

Dr. D. H. Roy, Manager of Engineering, who was delegated to act for Mr. D.E. Guilbert, Vice President, in the latter's absence, was informed of this reportable concern at 8:15 AM, November 23, 1981.

A telephonic report of this concern was made to Mr. Nacario of your office at 11:30 AM, November 23, 1981.

The attached presents the necessary information relative to this matter. If you have any questions concerning this matter, you may contact Mr. D. Mars of my staff at 804-385-2852.

Yours very truly,

J.H. Taylor
Manager, Licensing

JHT/fw
cc: Mr. R. B. Borsum, B&W Bethesda Office
Attachment

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Low ESFAS Initiation Setpoint

Introduction

The presently established ESFAS initiation setpoint of 1600 psig for the 205 FA plants has been identified as being too low. If a small break LOCA takes place, core uncovery and possible fuel damage is predicted to occur before HPI is initiated. This concern is judged to be reportable under 10 CFR 21 for the Bellefonte Units 1 and 2 of TVA, the Washington Nuclear Power Units 1 and 4 of WPPSS, and the Pebble Springs Unit of PGE.

Description of Concern

The ESFAS setpoint for the 205 FA plants was established a number of years ago at a value of 1600 psig; that is, upon a loss of cooolant accident, when the RCS pressure is reduced to 1600 psig, ESFAS is actuated and HPI is initiated.

Recent small break analysis has determined that breaks in the range of .075 to .022 ft^2 (the latter is an HPI line size) will result in core uncovery and possibly fuel damage if HPI is initiated at a setpoint of 1600 psig. This analysis assumes that there is a 100 psig instrument string error and that when the setpoint is 1600, the actual RCS pressure would be 1500 psig. After the break takes place, the analysis shows that there is a rapid RCS depressurization but the RCS pressure does not fall to the 1500 psig level. The RCS then repressurizes, followed by another reduction in pressure, this time to the 1500 psig level where ESFAS is actuated. However, in the elapsed time between the break occurrence to the point of ESFAS actuation, the water level has fallen below the top of the core and fuel damage may have occurred.

The recent analysis shows that the minimum RCS pressure at which ESFAS should be initiated is 1600 psig; accounting for an assumed 100 psig error in the instrument string brings the ESFAS setpoint to 1700 psig, or 100 psig higher than the originally established setpoint. The recent analysis used a version of the CRAFT-2 code that has not yet been approved by NRC. The new value of 1600 psig is only an estimate at present since certain input data to the small break LOCA analysis relating to steam generator heat removal rates is preliminary at this time. Verification of the 1600 psig actuation pressure or establishment of a final value is scheduled for late 1982, using a revised code and new small break LOCA analyses for the 205 FA plants that respond to the requirements of NUREG-0565. The setpoint is also subject to later modification when instrument accuracies are established upon completion of the instrumentation qualification program.

Studies were also made to determine if reactor building pressure will increase, after the occurrence of a small break LOCA, to a sufficiently high pressure to actuate ESFAS. Results show that the pressure would not reach the ESFAS actuation setpoint, based on the assumption that containment vent valves are open.

The originally established ESFAS actuation setpoint of 1600 psig is documented in the Bellefonte FSAR; it is also documented in a number of system specifications, such as decay heat, make-up, ESFAS and RCS for the Bellefonte, WNP and Pebble Springs Units, as well as in equipment instruction books for the Bellefonte and WNP Units. This setpoint has been used by the Bellefonte and WNP Units in the design of certain BOP equipment, such as the FOGG system and containment isolation equipment.

Cause of Defect

The original ESFAS initiation pressure was established based on small break analyses that were considered acceptable at the time the work was done. As a consequence of the TMI-2 accident, and in response to the requirements of NUREG-0565, additional small break analyses have been performed which consider break sizes smaller than those previously analyzed. The present concern results from the work on these new small break analyses.

Reportability

The initially established ESFAS actuation setpoint of 1600 psig is judged to be a concern reportable under 10 CFR 21 for the Bellefonte Units 1 and 2 of TVA, the WNP Units 1 and 4 of WPPSS and the Pebble Springs Unit of PGE. This concern is not applicable to the 177 FA plants in operation and under construction, since the ESFAS initiation setpoint is acceptable and effective for mitigating small break LOCAs. This concern is also not applicable to the 145 FA plant since the ESFAS actuation setpoint has not yet been implemented.

Corrective Action

1. The TVA and WPPSS utilities have been notified of the new ESFAS set point of 1700 psig.

2. Action has been initiated to revise all affected B&W and vendor documents to incorporate the new setpoint for the Bellefonte and WNP Units.

3. PGE has been notified of the revised ESFAS setpoint of 1700 psig and the appropriate documentation will be revised on a schedule which will support the Pebble Springs Unit Licensing activities.