VERMONT YANKEE
NUCLEAR POWER CORPORATION

Proposed Change No. 119

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REPLY TO:
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March 26, 1984
FVY 84-28

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

Attention: Office of Nuclear Reactor Regulation
Mr. D. G. Eisenhut, Director
Division of Licensing

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) General Electric Company, Safety Evaluation of the Proposed 140% Main Steam Line Flow Trip Setting for the Vermont Yankee Nuclear Power Station, July 1982
(c) Letter, VYNPC to USNRC, FVY 83-80, dated May 15, 1981

Subject: Proposed Technical Specification Change to the Main Steam Line High Flow Setpoint

Dear Sir:

Pursuant to Section 50.59 of the Commission's Rules and Regulations, Vermont Yankee hereby proposes the following changes to Appendix A of the Operating License.

PROPOSED CHANGE

The change involves revision to Pages 41 and 63 to reflect a change in the trip setting for the high main steam line flow instruments from the present 120% to 140% of rated steam flow. In addition, Page 133 is revised to increase the reactor power limit for quarterly MSIV full closure testing from 50% to 75% of rated power.

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REASON FOR CHANGE

Increasing the main steam line high flow isolation setpoint from 120% to 140% of rated steam flow will reduce the probability of inadvertent reactor isolations and possible challenges to safety/relief valves during certain planned operating maneuvers, such as weekly surveillance of Main Steam Isolation Valves (MSIVs) and turbine valves, and during certain operational transients. This is consistent with our proposed resolution of NUREG-0737, Item II.K.3.16, "Reduction in the Challenges and Failures of Relief Valves", as discussed in Reference (c).

As a result of the overly conservative main steam line high flow limit of 120%, MSIV and turbine stop and control valve testing must currently be performed at reduced power levels. This change will permit one of the main steam lines to be isolated during quarterly MSIV surveillance testing with the plant continuing to operate at up to 75% of rated power.

BASIS FOR CHANGE

Reference (b), provided as Enclosure 1, presents the results of a safety analysis performed to justify raising the high flow isolation setpoint from 120% to 140% of rated steam flow.

The purpose of a power limit for quarterly MSIV testing is to limit the reactor steam flow, thereby limiting the severity of the pressurization transient that occurs when a single steam line is isolated. In order to justify raising this limit from 50% to 75% of rated power, a RETRAN analysis was performed to simulate the plant response to a single MSIV closure at 75% power initial conditions. To maximize the severity of the simulation, the MSIV closure time assumed in this analysis was 3.0 seconds, which is the minimum closure time specified in the Vermont Yankee Technical Specifications. The results of this simulation show that flow in each of the three non-isolated steam lines rises, and then steadies out at its peak value of about 100% of rated, which is below the proposed 140% high flow isolation setpoint. In addition, the peak neutron power remains below the APRM flow biased scram setpoint (Technical Specification 2.1.A.1.a), and the peak steam dome pressure remains below the high reactor pressure scram setpoint (Technical Specification 2.2.A). These three setpoints were identified as the most probable to be reached during a single MSIV closure.

The actual plant setpoints for high steam line flow isolation, APRM flow biased scram, and high reactor pressure scram trips will be less than the Technical Specification limits to assure compliance. However, the peak steam line flow, peak neutron power, and peak steam dome pressure predicted for a single MSIV closure were also less than the lowest expected plant trip setpoints.

Sensitivity studies performed showed that the results of this simulation were insensitive to core exposure, control rod pattern, and fuel-clad gap conductance.

SAFETY CONSIDERATIONS

The main steam line high flow setpoint of 120% was originally established for plants with only two steam lines (e.g., Oyster Creek and Nine Mile Point). The basis for the high flow setpoint was not specifically related to a safety limit, but rather, it was set high enough to avoid spurious trips during normal operation and yet low enough to minimize the consequences of main steam line breaks of any size for a plant of that particular steam line configuration. Raising the high flow isolation setpoint from 120% to 140% of rated steam flow provides more margin to the high main steam line flow trip during weekly surveillance testing of MSIV and turbine valves. This increased margin will reduce the probability of inadvertent reactor isolations and subsequent challenges to safety/relief valves during weekly surveillance testing.

Page 63 of the Vermont Yankee Technical Specifications states that the primary function of the high flow instrumentation is to detect a main steam line break. The 120% of rated steam flow trip setting, in conjunction with the flow limiters and main steam line valve closure, limits the mass inventory loss such that the fuel is not uncovered, cladding temperatures remain below 1295°F, and the release of radioactivity to the environs is below the 10CFR100 limits for the worst case main steam line break accident outside the drywell. This worst case main steam line break accident was analyzed in Section 14.6.5 of the Vermont Yankee Final Safety Analysis Report (FSAR), assuming that the MSIVs are closed 10.5 seconds after the break. This assumption is based on a 0.5-second delay time for the development of the automatic isolation signal due to high steam line flow, and a 10.0-second valve closure time.

The high flow isolation signal is generated so quickly that the change in high flow isolation setpoint from 120% to 140% will not significantly affect the assumed 0.5-second delay time. In addition, the assumed 10.0-second MSIV closure time is very conservative, since the closure time specified in Table 4.7.2.a on Pages 135 and 137 of the Vermont Yankee Technical Specifications is between 3.0 and 5.0 seconds. Thus, it is concluded that the 10.5-second assumption used in the FSAR analysis is still conservative with a 140% main steam line high flow setpoint; hence, this proposed change does not impact the FSAR calculated results for the worst case main steam line break outside of the primary containment.

For smaller steam line breaks, a bounding analysis was performed in Reference (b), provided as Enclosure 1, in order to determine the maximum radiological dose from a break in which the proposed 140% high flow isolation setpoint was not tripped. This analysis assumes that the steam line flow increases to a value just under 140% in each steam line, takes no credit for high temperature or high steam line flow trip, and assumes a 10-minute operator action time before isolation. The results of this bounding analysis show that steam is the only effluent released, and the resulting radiological dose is significantly less than that for the design basis accident and below the 10CFR100 limit.

The current 50% of rated reactor power restriction for quarterly MSIV testing was conservatively set to avoid inadvertent trips with a 120% high flow isolation setpoint. Simulation of a single MSIV closure transient at 75% power shows that quarterly MSIV full closure testing can be performed at up to 75% of rated power without reaching the high steam line flow, high neutron flux, or high reactor pressure trip setpoints. With a 50% reactor power limit and a 120% high flow setpoint, the margin to an inadvertent trip on high steam flow during a single MSIV closure would be about 60% of rated steam flow. With a 75% power limit and a 140% high flow setpoint this margin is reduced to about 40% of rated steam flow. However, this 40% steam flow margin is about the same as the margin that would exist during normal operation at 100% steam flow conditions with a 140% high flow setpoint, and is about twice the margin that would exist during normal operation at 100% steam flow with a 120% high flow setpoint. Thus, raising the reactor power limit for quarterly MSIV testing from 50% to 75% of rated power provides adequate protection against an inadvertent reactor isolation on high main steam line flow with a 140% high flow setpoint. In addition to the obvious economic benefits, the change to allow quarterly MSIV testing at 75% power will minimize the potential for fuel failures by reducing the degree of thermal cycling currently required by the reduction to 50% power.

An evaluation of this change has been made, and it has been concluded that the change does not involve an unreviewed safety question, as defined in 10CFR50.59(a)(2).

This proposed change has been reviewed by the Vermont Yankee Nuclear Safety Audit and Review Committee.

SIGNIFICANT HAZARDS CONSIDERATION

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples [48FR14870]. One of these examples (vi) of actions which involve no significant hazards consideration is a change which either may result in some increase to the probability or consequences of a

previously analyzed accident, or may in some way reduce a margin of safety, but where the results of the change are clearly within all acceptable criteria with respect to the system design or component specified in the Standard Review Plan.

As discussed above, changing the main steam line high flow isolation setpoint from 120% to 140% of rated steam flow does not impact the FSAR calculated results for the worst case main steam line break outside of the primary containment. For smaller breaks, a bounding analysis was performed which shows that the resulting radiological dose is significantly less than that for the design basis accident and below the 10CFR100 limit. In addition, the basis for the high flow setpoint was not specifically related to a safety limit, but rather, it was set high enough to avoid spurious trips during normal operation and yet low enough to minimize the consequences of main steam line breaks for a plant with only two steam lines. Raising the high flow isolation setpoint from 120% to 140% of rated steam flow provides more margin to the high main steam line flow trip during weekly surveillance testing of the MSIV and turbine valves. This increased margin will reduce the probability of inadvertent reactor isolations and subsequent challenges to safety/relief valves during weekly surveillance testing, consistent with our proposed resolution of NUREG-0737, Item II.K.3.16, as discussed in Reference (c).

Raising the reactor power limit for quarterly MSIV full closure testing from 50% to 75% of rated power, coincident with changing the main steam line high flow isolation setpoint from 120% to 140% of rated steam flow, actually reduces the present rated steam flow margin for this testing from 60% to 40%. However, as discussed above, the reduced margin is about the same as that which would exist during normal operation at 100% steam flow conditions with a 140% high flow isolation setpoint, and is approximately twice the margin that presently exists during normal operation at 100% steam flow with the existing high flow isolation setpoint of 120% of rated steam flow. Thus, raising the reactor power limit for quarterly MSIV testing from 50% to 75% of rated power provides adequate protection against an inadvertent reactor isolation on high main steam flow with a 140% high flow setpoint.

Based on the above, we have concluded that this change is clearly within all acceptable criteria and does not involve a significant hazards consideration as defined in 10CFR50.92(c).

FEE DETERMINATION

This proposed change requires an approval that involves a single safety issue and is deemed not to involve a significant hazards consideration. For these reasons, Vermont Yankee Nuclear Power Corporation proposes this change as a Class III Amendment. A payment of $4,000.00 is enclosed.

SCHEDULE OF CHANGE

The proposed change described above will be incorporated into the Vermont Yankee Technical Specifications as soon as reasonable upon receipt of your approval.

We trust that this information is sufficient to allow for your review and for the subsequent issuance of a license amendment; however, should you have any questions, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

L. H. Heider
Vice President

KJB/dsm

Enclosure

cc: Vermont Department of Public Services
120 State Street
Montpelier, VY 05602
Attention: Mr. Richard Saudek, Chairman

COMMONWEALTH OF MASSACHUSETTS)
)ss
MIDDLESEX COUNTY)

Then personally appeared before me, L. H. Heider, who, being duly sworn, did state that he is a Vice President of Vermont Yankee Nuclear Power Corporation, that he is duly authorized to execute and file the foregoing request in the name and on the behalf of Vermont Yankee Nuclear Power Corporation and that the statements therein are true to the best of his knowledge and belief.

J B Sinclair
J. B. Sinclair Notary Public
My Commission Expires June 1, 1984