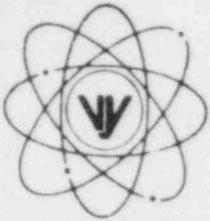


VERMONT YANKEE NUCLEAR POWER CORPORATION

Proposed Change No. 132



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REPLY TO:
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March 12, 1986

FVY 86/22

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Office of Nuclear Reactor Regulation
Mr. H. R. Denton, Director

- References:
- (a) License No. DPR-28 (Docket No. 50-271)
 - (b) Letter, VYNPC to USNRC, WVY 76-139, dated November 10, 1976, Proposed Change No. 51
 - (c) General Electric Company, Vermont Yankee Nuclear Power Station Single Loop Operation, NEDO-30060, February 1983
 - (d) General Electric Service Information Letter, BWR Core Thermal Hydraulic Stability, SIL No. 380, Revision 1, dated February 10, 1984
 - (e) General Electric Company, Loss-of-Coolant Accident Analysis Report for Vermont Yankee Nuclear Power Station, NEDO-21697, August 1977
 - (f) Letter, USNRC to all Licensees of Operating BWR's, NVY 86-16, "Technical Resolution of Generic Issue B-19 Thermal Hydraulic Stability" (Generic Letter 86-02), dated January 23, 1986

Subject: Proposed Technical Specification Change for Single Loop Operation and Thermal Hydraulic Stability

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.

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PROPOSED CHANGE

This proposed change involves deletion and insertion of pages in the Vermont Yankee Technical Specifications as listed on Attachment 1. This submittal supersedes our letter, dated November 10, 1976 [Reference (b)], which transmitted Proposed Change No. 51 concerning continuous single loop operation. We therefore request that Proposed Change No. 51 be withdrawn from further NRC consideration.

This proposed change will revise the Vermont Yankee Technical Specifications to allow single recirculation loop operation for greater than 24 hours. It will also impose new requirements designed to prevent limit cycle oscillations under dual loop operation, single loop operation and natural circulation conditions.

The changes proposed are outlined below.

- o Revised Pages 5, 9, 110, 180-c, 180-h and 180-01 reflect a 0.01 increase in the MCPR fuel cladding integrity safety limit and MCPR operating limits for single loop operation.
- o Revised Pages 5-a, 6, 8, 14-a, 14-b, 19, 21, 47, 48, 64-a, 65 and 110 reflect a reduction in APRM flux scram, and APRM rod block and rod block monitor trip settings, for single loop operation.
- o Revised Pages 110, 180-a, 180-d, 180-n, 180-n1, 180-n2, 180-n3 and 180-n5 reflect a MAPLHGR limit reduction factor of 0.83 for single loop operation.
- o Revised Pages 110, 110-a and 110-b, and new Pages 111-c and 124-a reflect additional requirements for single loop operation. These include limiting core flow to 45% of rated, electrically isolating the idle loop and placing the recirculation flow controls in the manual mode.
- o Revised Pages 110, 110-a, 110-b, 110-c, 110-d and 125, and new Pages 110-j, 111-c, 124-a and 124-b, reflect new core thermal power and core flow limits, and associated APRM/LPRM monitoring requirements, for thermal hydraulic stability under dual loop operation, single loop operation and natural circulation conditions.
- o Revised Pages 5-b, 6-a, 110-e, 110-f and 124, and new Pages 5-c, 14-c, 110-g, 110-h and 110-i reflect purely administrative changes to allow for page continuity in the Technical Specifications. In addition, new Page 124-b corrects an error in the value shown for the largest recirculation break area assumed in the ECCS evaluation. This value is changed from 4.43 square feet to 4.14 square feet.

REASON FOR CHANGE

Vermont Yankee Technical Specification 3.6.G.1 currently limits single loop operation to a maximum 24-hour period. The capability to operate for longer periods with a single recirculation loop is highly desirable, from a plant availability/outage planning standpoint, in the event that loss of a recirculation pump M-G set or other component renders one loop inoperative.

Vermont Yankee Technical Specification 3.6.J.1 addresses thermal hydraulic stability only under natural circulation conditions. There are no stability-related Technical Specifications for dual loop operation or single loop operation. The proposed change establishes core thermal power and core flow limits, and associated monitoring requirements, for thermal hydraulic stability under dual loop operation, single loop operation and natural circulation conditions; in accordance with the recent generic resolution of thermal hydraulic stability for BWRs (Reference (f)).

BASIS FOR CHANGE

The analysis contained in Reference (c) provides the basis for allowing single loop operation for greater than 24 hours. This analysis justifies removal of the current 24-hour time limit, provided that adjustments are made to the APRM flux scram and rod block trip settings, rod block monitor trip setting, MCPR fuel cladding integrity safety limit, MCPR operating limits and MAPLHGR limits.

The new thermal hydraulic stability monitoring requirements, designed to detect and suppress limit cycle oscillations, are based on the guidance provided by General Electric in Reference (d). Incorporating these stability monitoring requirements into the Vermont Yankee Technical Specifications eliminates the need for cycle-specific stability analysis for core reloads.

SAFETY CONSIDERATIONS

The current MCPR fuel cladding integrity safety limit was derived based on operating parameter uncertainties under two loop operation. Sufficient margin was included for the uncertainty of all parameters under single loop operation except for the total core flow measurement and TIP readings. When core flow and TIP reading uncertainties that are bounding for single loop operation are used [Reference (c)], the calculated MCPR fuel cladding integrity safety limit is 0.01 higher. Thus, for single loop operation greater than 24 hours, the MCPR fuel cladding integrity safety limit will be increased by 0.01.

MCPR operating limits are also increased by 0.01 under single loop operation to reflect the 0.01 increase in the fuel cladding integrity safety limit. No further increase in MCPR operating limits is required since the consequences of abnormal operational transients initiated from single loop operation are less severe than those initiated from two loop operation. This follows because the results of pressurization transients, flow decrease transients and cold water increase transients are less severe at lower initial power levels [Reference (c)], and the maximum attainable power for single loop operation is less than for two loop operation.

Because of the potential for backflow through the inactive loop jet pumps, the APRM flux scram, APRM rod block and rod block monitor trip settings are adjusted during single loop operation. The drive flow in the APRM flux scram, APRM rod block and rod block monitor flow biased equations is adjusted to account for the difference between the single loop and two loop drive flow at the same core flow. This ensures that the margin of safety is not reduced during single loop operation.

For the Loss-of-Coolant Accident (LOCA) under single loop operation, the coastdown flow from the unbroken recirculation loop would not be available during a postulated large break in the active recirculation loop. This causes boiling transition to occur earlier and increases the calculated Peak Cladding Temperature (PCT). Thus, revised MAPLHGR limits are calculated for single loop operation assuming a conservative boiling transition time. Reference (c) concludes that a MAPLHGR reduction factor of 0.83 is conservative under single loop operation.

The value for the largest recirculation break area used in the LOCA analysis [Reference (e)] is given on Page 124 of the current Vermont Yankee Technical Specifications as 4.43 square feet. This value is incorrect, since the actual value used in Reference (e) is 4.14 square feet. Page 180-f of the current Technical Specifications, which lists the significant input parameters to the LOCA analysis, uses the correct Reference (e) value of 4.14 square feet. Thus, new Page 124-b revises the Vermont Yankee Technical Specifications to reflect the correct value of 4.14 square feet.

No additional restrictions are required to account for a one-pump seizure accident. As shown in Reference (c), a one-pump seizure event is less severe than a LOCA under single loop operation.

Above 45% of rated core flow under single loop operation, there is the potential for high flow-induced noise in the core due to reverse flow through the inactive jet pumps. Thus, core flow is limited to less than or equal to 45% of rated for single loop operation.

For single loop operation greater than 24 hours, the idle loop is required to be isolated by electrically disarming the recirculation pump, until conditions to allow pump restart have been achieved. This will prevent a cold water injection transient caused by an inadvertent pump startup. In addition, the recirculation controls are required to be placed in the manual flow control mode to prevent oscillations in the recirculation flow control system.

Under single loop operation and natural circulation conditions, continued operation above approximately the 80% rod line, and with core flow less than 34%, is not permitted. For Vermont Yankee, 34% of rated is the core flow obtained with both recirculation pumps operating at minimum speed on the 80% rod line. These restrictions are designed to prevent operation in the extreme high power/low flow corner of the power/flow map where thermal hydraulic instabilities are most likely to occur. This requirement also justifies removal of the statement currently in Technical Specification 3.6.J.1, which prohibits natural circulation operation.

For dual loop and single loop operation, new core thermal power and core flow limits for performing thermal hydraulic stability monitoring are added. While operating in specified regions of the power/flow map above approximately the 80% rod line, APRM/LPRM noise monitoring is required. If APRM and/or LPRM noise levels exceed three times their baseline values, operator action is required to restore the noise to within limits. These specifications are designed to detect and suppress limit cycle oscillations, should they occur.

With the new thermal hydraulic stability requirements discussed above, there is no need for cycle-specific stability analysis. Thus, stability analysis results will not be provided for the current and future core reloads. Adoption of these new Technical Specifications assures that the reactor will be operated such that limit cycle oscillations can be reliably and readily detected and suppressed.

SIGNIFICANT HAZARDS CONSIDERATION

The standards used to arrive at a determination that a request for amendment requires no significant hazards consideration are included in the Commission's regulations, 10CFR50.92, which state that the operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated or (3) involve a significant reduction in a margin of safety.

The discussion below addresses each of these three criteria and demonstrates that the proposed amendment involves no significant hazards consideration.

Single Loop Operation

The number of recirculation loops in operation does not significantly affect the probability of occurrence of any previously analyzed accident. For the Loss-Of-Coolant Accident (LOCA), reduced MAPLHGR limits are required for single loop operation to assure that the peak cladding temperature remains below the 10CFR50.46 limit of 2200°F. Results for the pump seizure accident are bounded by the LOCA results for single loop operation. For the pump seizure accident, natural circulation flow continues, water level is maintained, the core remains submerged, and these combined effects provide a continuous core cooling mechanism. The results of all other accidents for single loop operation are bounded by the two loop analyses. Thus, the proposed Technical Specifications for single loop operation do not involve a significant increase in the probability or consequences of an accident previously evaluated.

Vermont Yankee was designed to operate at reduced power with one recirculation pump, and the current Technical Specifications allow up to 24 hours of single loop operation. Thus, the proposed Technical Specifications for single loop operation do not create the possibility of a new or different kind of accident from an accident previously evaluated.

Differences between two loop operation and single loop operation are accounted for by increased MCPR operating limits, increased MCPR safety limit, revised APRM flow biased scram and rod block setpoints and reduced MAPLHGR limits for single loop operation. These adjustments are designed such that the proposed Technical Specifications for single loop operation involve no significant reduction in a margin of safety.

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. This example is judged to apply to the proposed Technical Specification changes for single loop operation.

Thermal Hydraulic Stability

Monitoring requirements are being added in order to reduce the probability of operating with thermal hydraulic instabilities. Thus, the proposed Technical Specifications for thermal hydraulic stability do not involve a significant increase in the probability or consequences of an event previously evaluated.

Operation is limited to certain regions of the power flow map which are bounded by the assumptions used in the safety analysis. Thus, the proposed Technical Specifications for thermal hydraulic stability do not create the possibility of a new or different kind of accident from an event previously evaluated.

Appropriate surveillance requirements are added for those regions of operation with the potential for thermal hydraulic instabilities. The current Technical Specifications contain no such requirements. Thus, the proposed Technical Specifications for thermal hydraulic stability do not involve a significant reduction in a margin of safety.

Example (ii) of the Commission's guidance (48FR14870) is a change that constitutes an additional limitation, restriction, or control not presently included in the Technical Specifications, such as a more stringent surveillance requirement. The proposed Technical Specifications for thermal hydraulic stability are additional restrictions not presently included in the Technical Specifications; hence, this example is judged to apply.

Administrative Changes

The change to correct the value of the largest recirculation break area corrects a typographical error in the Technical Specifications. Since the proposed value reflects the value actually used in the analysis and referenced elsewhere in the Technical Specifications, this change does not involve a significant increase in the probability or consequences of an event previously evaluated.

The largest recirculation break area used in the LOCA analysis has not changed. Thus, the proposed change does not create the possibility of a new or different kind of accident from an accident previously evaluated.

The largest recirculation break area is being made consistent with the value actually used in the LOCA analysis. Thus, the proposed change involves no significant reduction in a margin of safety.

Example (i) of the Commission's guidance (48FR14870) is a purely administrative change to the Technical Specifications, such as a change to achieve consistency throughout the Technical Specifications, a correction of an error or a change in nomenclature. The proposed change in the value of the largest recirculation break area is an administrative change to correct an error and to achieve consistency throughout the Technical Specifications; hence, this example is judged to apply. This example also applies to the purely administrative changes to allow for page continuity in the Technical Specifications.

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).

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

FEE DETERMINATION

In accordance with the provisions of 10CFR170.12, we are enclosing an application fee of \$150.00.

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.

ATTACHMENT 1

Pages Deleted

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5-a
5-b
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6
6-a
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9
14-a
14-b
-
19
21
47
48
64-a
65
110
110-a
110-b
110-c
110-d
110-e
110-f
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-
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124
-
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125
180-a
180-c
180-d
180-h
180-n
180-n1
180-n2
180-n3
180-n5
180-01

Pages Inserted

5
5-a
5-b
5-c
6
6-a
8
9
14-a
14-b
14-c
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48
64-a
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110-b
110-c
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110-e
110-f
110-g
110-h
110-i
110-j
111-c
124
124-a
124-b
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180-a
180-c
180-d
180-h
180-n
180-n1
180-n2
180-n3
180-n5
180-01