Entergy

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June 5, 2002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

License Amendment Request
Relocation of Coolant Chemistry - Conductivity and Chlorides
As Described in Technical Specification 3/4.6.B to Updated
Final Safety Analysis Report

REFERENCE: NUREG 1433, Standard Technical Specifications for General Electric Plants, BWR/4.

LETTER NUMBER: 2.02.032

Dear Sir or Madam:

Pursuant to 10CFR50.90, Entergy Nuclear Operations Inc. (ENO) hereby proposes to amend its Facility Operating License, DPR-35. This proposed license amendment would relocate portions of the "Primary System Boundary – Coolant Chemistry", Technical Specifications (TS) 3/4.6.B, from the TS to the Updated Final Safety Analysis Report. The affected TS contain requirements for reactor coolant conductivity and chloride concentration. This change is consistent with Standard Technical Specifications (NUREG 1433, Revision 2) and changes previously approved by the NRC for other boiling water reactors. Pilgrim has reviewed the proposed amendment in accordance with 10CFR50.92 and concludes it does not involve a significant hazards consideration.

ENO requests approval of the proposed amendment by June 30, 2003 to support Pilgrim's future plans for the application of Noble Metal Chemical Addition (NMCA). Once approved, the amendment shall be implemented within 60 days.

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If you have any questions or require additional information, please contact Bryan Ford at (508) 830-8403.

Sincerely,

Charles M. Dugger

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 5th day of July 2002.

Enclosure: Evaluation of the proposed change – 5 pages

Attachments:
1. Proposed Technical Specification and Bases Changes (mark-up) – 3 pages
2. List of Regulatory Commitments – 1 page

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ENCLOSURE

EVALUATION OF THE PROPOSED CHANGE

ENCLOSURE

Evaluation of the Proposed Change

Subject: Relocation of Coolant Chemistry – Conductivity and Chlorides as Described in Technical Specification 3/4.6.B.

1. Description

This letter is a request to amend Operating License DPR-35 for Pilgrim Nuclear Power Station. The proposed change would revise the Operating License to relocate the Technical Specification (TS) reactor coolant chemistry requirements for conductivity and chloride concentration from the TS to the Updated Final Safety Analysis Report (UFSAR). The proposed change will support Pilgrim's future plans for the application of Noble Metal Chemical Addition (NMCA).

2. Proposed Change

TS Section 3/4.6.B provides chemistry requirements for the reactor coolant system for all operational modes. TS 3.6.B.2, 3.6.B.3 and 3.6.B.4 provide specific limits on coolant conductivity and chloride content. Associated surveillance requirements 4.6.B.2 and 4.6.B.3 control the monitoring, sampling and analysis of reactor coolant. Action requirements are specified in TS 3.6.B.5 for situations where the specified limits cannot be met.

The current requirements of TS 3/4.6.B.2, 3/4.6.B.3 and 3.6.B.4 will be relocated to the UFSAR, and TS 3.6.B.5 will be repeated in the UFSAR as being applicable to these relocated Specifications. TS 3.6.B.5 will be renumbered to 3.6.B.2 because of the relocation of the above TS sections. Conforming changes are also being made to the associated TS Bases by relocating the associated sections to the FSAR.

In summary, the primary system boundary coolant chemistry TS for reactor coolant conductivity and chlorides will be relocated to Pilgrim's UFSAR.

3. Background

TS 3/4.6.B provides chemistry limits for reactor coolant chemistry under all operational modes. Materials in the primary system boundary are primarily stainless steels and Zircaloy cladding. The chemistry limits are established to provide an environment favorable to these materials and help to prevent damage to reactor materials in contact with the coolant. Chloride limits are specified to prevent stress corrosion cracking of stainless steel. Conductivity limits are specified because it gives a good indication of abnormal conditions and the presence of unusual materials in the coolant.

For reactor startups, low steaming rate conditions and the first twenty-four hours after placing the reactor in the power operating condition the dissolved oxygen concentration may be higher than during power operating conditions. During these periods more restrictive limits are placed on chloride ion concentration to assure that permissible oxygen-chloride combinations are not exceeded. Boiling occurs at higher steaming rates causing deaeration of the reactor water, thus maintaining oxygen concentration at low levels. The effect of chloride is not as great when oxygen concentration in the coolant is low, thus a higher limit on chlorides is permitted during power operation. During shutdown and refueling operations, the temperatures necessary for stress corrosion to occur is not present so high concentrations of chlorides are not considered harmful during these periods.

In boiling water reactors where near neutral pH is maintained, conductivity provides a good and prompt measure of the quality of the reactor water. Significant changes in conductivity provide the reactor operator with a warning mechanism to allow the operator to remedy the condition before reactor coolant chemistry limits are reached. Methods available to the operator for correcting the off-standard condition include operation of the reactor water cleanup system, reducing the input of impurities, and placing the reactor in a cold shutdown condition.

Conductivity is monitored on a continuous basis. When the conductivity is in its normal range, pH, chlorides and other impurities affecting conductivity will also be within their acceptable limits. During startups and at low steaming rates reactor coolant samples are analyzed for chloride ion content every four hours because oxygen concentrations could be higher than normal at these conditions. With higher steaming rates a sample is analyzed every ninety-six hours. This frequency is adequate because chloride ion content will not rapidly change over several days. If all conductivity monitors are inoperable, reactor coolant is sampled and analyzed on a daily basis for conductivity and chloride ion content.

Any change of the relocated specifications in the UFSAR will be strictly controlled in accordance with the provisions of 10 CFR 50.59.

4. Technical Analysis

Section 182a of the Atomic Energy Act of 1954, as amended (the Act) requires applicants for nuclear power plant operating licenses to include the TSs as part of the license. The Commission's regulatory requirements related to the content for the TSs are set forth in 10 CFR 50.36. That regulation requires that the TSs include items in eight specific categories. The categories are (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; (5) administrative controls; (6) decommissioning; (7) initial notification; and (8) written reports. However, the regulation does not specify the particular requirements to be included in a plant's TSs.

The Commission amended 10 CFR 50.36 (60 FR 36593, July 19, 1995), and codified four criteria to be used in determining whether a particular matter is required to be included in a limiting condition for operation (LCO), as follows: (1) Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary; (2) a process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes that failure of, or presents a challenge to, the integrity of a fission product barrier; (3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier; or (4) a structure, system, or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety. LCOs and related requirements that fall within or satisfy any of the criteria in the regulation must be retained in the TSs, while those requirements that do not fall within or satisfy these criteria may be relocated to licensee-controlled documents. Pilgrim's UFSAR is one such licensee-controlled document.

Pilgrim proposes to relocate the specification on reactor coolant conductivity and chloride concentration from the TSs to the UFSAR. The four criteria of 10 CFR 50.36 are addressed below:

(1) The reactor coolant conductivity and chloride concentration limits as specified in TS 3.6.B and 4.6.B are not used to detect and indicate in the control room a significant abnormal degradation of the reactor coolant pressure boundary. The TS provides limits on particular chemical properties of the primary coolant, and surveillance requirements to monitor these properties to ensure that degradation of the reactor coolant pressure boundary is not exacerbated by poor chemistry condition. However, degradation of the reactor coolant pressure boundary is a long-term process.

Other regulations and TSs provide direct means to monitor and correct the degradation of the reactor coolant pressure boundary; for example, in-service inspection and primary coolant leakage limits.

(2) Chemistry parameters are not used as an initial condition of a Design Basis Accident or Transient Analysis that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier.

(3) Reactor coolant conductivity and chloride concentration are not used as part of the primary success path which functions or actuates to mitigate a Design Basis Accident or Transient.

(4) Operating experiences or probabilistic safety assessments have not shown chemistry parameters to be significant to public health and safety.

The reactor coolant conductivity and chloride concentration requirements will be relocated to the UFSAR. Therefore, any changes to these requirements will be strictly controlled by the provisions of 10 CFR 50.59.

The relocation of the specifications for reactor coolant conductivity and chloride concentration from the TSs to the UFSAR will continue to provide adequate assurance that concentrations in excess of the limits will be detected and addressed. The proposed TS amendment is consistent with NUREG-1433,"Standard Technical Specifications, General Electric Plants, BWR/4".

In conclusion, the above relocated requirements are not required to be in the TS under 10 CFR 50.36 or 182a of the Atomic Energy Act, and are not required to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety. In addition, sufficient regulatory controls exist under 10 CFR 50.59 to assure continued protection of public health and safety.

5. Regulatory Safety Analysis

5.1 No Significant Hazards Consideration

Pilgrim is proposing to relocate Coolant Chemistry – Conductivity and Chlorides as described in Technical Specification 3/4.6.B to the Updated Final Safety Analysis Report (UFSAR).

Pilgrim has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated.

   Response: No. The proposed change is administrative in nature and does not involve the modification of any plant equipment or affect basic plant operation. Conductivity and chloride limits are not assumed to be an initiator of any analyzed event, nor are these limits assumed in the mitigation of consequences of accidents.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No. The proposed change does not involve any physical alteration of plant equipment and does not change the method by which any safety-related system performs its function. As such, no new or different types of equipment will be installed, and the basic operation of installed equipment is unchanged. The methods governing plant operation and testing remain consistent with current safety analysis assumptions. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No. The proposed change represents the relocation of current Technical Specification requirements to the UFSAR, based on regulatory guidance and previously approved changes for other stations. The proposed change is administrative in nature, does not negate any existing requirement, and does not adversely affect existing plant safety margins or the reliability of the equipment assumed to operate in the safety analysis. As such, there are no changes being made to safety analysis assumptions, safety limits or safety system settings that would adversely affect plant safety as a result of the proposed change. Margins of safety are unaffected by requirements that are retained, but relocated from the Technical Specifications to the UFSAR. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

   Based on the above, Pilgrim concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

6. Environmental Consideration

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need to be prepared in connection with the proposed amendment.

7. References

1. 10 CFR 50.36

2. NUREG-1433, Rev. 2, "Standard Technical Specifications, General Electric Plants, BWR/4"

3. Vermont Yankee, Amendment No. 190, 7/8/00.

This amendment relocated the Technical Specifications for reactor coolant conductivity and chloride concentration to Vermont Yankee's Technical Requirements Manual (TRM) where it will be controlled in accordance with 10 CFR 50.59. Since Pilgrim does not have a TRM, we will incorporate the relocated specifications and bases to the UFSAR. The difference between this identified precedent and the proposed amendment does not affect the proposed amendment's acceptability.

ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATION AND BASES

CHANGES (MARK-UP)

LIMITING CONDITION FOR OPERATION

3.6 PRIMARY SYSTEM BOUNDARY (Cont)

B. Coolant Chemistry

1. The reactor coolant system radioactivity concentration in water shall not exceed 20 microcuries of total iodine per ml of water.

2. The reactor coolant water shall not exceed the following limits with steaming rates less than 100,000 pounds per hour, except as specified in 3.6.B.3:

Conductivity........2 μmho/cm
Chloride ion........0.1 ppm

3. For reactor startups and for the first 24 hours after placing the reactor in the power operating condition, the following limits shall not be exceeded.

Conductivity........10 μmho/cm
Chloride ion........0.1 ppm

4. Except as specified in 3.6.B.3 above, the reactor coolant water shall not exceed the following limits when operating with steaming rates greater than or equal to 100,000 pounds per hour.

Conductivity........10 μmho/cm
Chloride ion........1.0 ppm

2 5. If Specification 3.6.B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in Hot Shutdown within 24 hrs. and Cold Shutdown within the next 8 hours.

SURVEILLANCE REQUIREMENTS

4.6 PRIMARY SYSTEM BOUNDARY (Cont)

B. Coolant Chemistry

1. a. A reactor coolant sample shall be taken at least every 96 hours and analyzed for radioactivity content.

b. Isotopic analysis of a reactor coolant sample shall be made at least once per month.

2. During startups and at steaming rates less than 100,000 pounds per hour, a sample of reactor coolant shall be taken every four hours and analyzed for chloride content.

3. a. With steaming rates of 100,000 pounds per hour or greater, a reactor coolant sample shall be taken at least every 96 hours and analyzed for chloride ion content.

b. When all continuous conductivity monitors are inoperable, a reactor coolant sample shall be taken at least daily and analyzed for conductivity and chloride ion content.

B. Coolant Chemistry (Cont)

Materials in the primary system are primarily stainless steel and the Zircaloy cladding. The reactor water chemistry limits are established to prevent damage to these materials. Limits are placed on conductivity and chloride concentrations. Conductivity is limited because it is continuously measured and given an indication of abnormal conditions and the presence of unusual materials in the coolant. Chloride limits are specified to prevent stress corrosion cracking of stainless steel. According to test data, allowable chloride concentrations could be set several orders of magnitude above the established limit at the oxygen concentration (.2-.3 ppm) experienced during power operation without causing significant failures. Zircaloy does not exhibit similar stress corrosion failures. However, there are some conditions under which the dissolved oxygen content of the reactor coolant water could be higher than .2-.3 ppm, such as refueling, reactor startup and hot standby. During these periods, a more restrictive limit of 0.1 ppm has been established to assure that permissible chloride-oxygen combinations are not exceeded. Boiling occurs at higher steaming rates causing deaeration of the reactor water, thus maintaining oxygen concentration at low levels and assuring that the chloride-oxygen content is not such as would tend to induce stress corrosion cracking.

The water chemistry limits of the reactor coolant system are established to prevent damage to the reactor materials in contact with the coolant. Chloride limits are specified to prevent stress corrosion cracking of the stainless steel. The effect of chloride is not as great when the oxygen concentration in the coolant is low, thus the higher limit on chlorides is permitted during POWER OPERATION. During shutdown and refueling operations, the temperature necessary for stress corrosion to occur is not present so high concentrations of chlorides are not considered harmful during these periods.

In the case of BWR's where no additives are used and where neutral pH is maintained, conductivity provides a very good measure of the quality of the reactor water. Significant changes therein provide the operator with a warning mechanism so he can investigate and remedy the condition causing the change before limiting conditions, with respect to variables affecting the boundaries of the reactor coolant, are exceeded. Methods available to the operator for correcting the off-standard condition include operation of the reactor clean-up system, reducing the input of impurities and placing the reactor in the cold shutdown condition. The major benefit of cold shutdown is to reduce the temperature dependent corrosion rates and provide time for the clean-up system to re-establish the purity of the reactor coolant. During start-up periods, which are in the category of less than 1% reactor power, conductivity may exceed 2 μ mho/cm because of the initial evolution of gases and the initial addition of dissolved metals. During this period of time, when the conductivity exceeds 2 μ mho/cm (other than short term spikes), samples will be taken to assure that the chloride concentration is less than 0.1 ppm.

BASES:

3/4.6 PRIMARY SYSTEM BOUNDARY (Cont)

B. Coolant Chemistry (Cont)

Conductivity measurements are required on a continuous basis since changes in this parameter are an indication of abnormal conditions. When the conductivity is within limits, the pH, chlorides and other impurities affecting conductivity must also be within their acceptable limits. With the conductivity meters inoperable, additional samples must be analyzed to ensure that the chlorides are not exceeding the limits.

The iodine radioactivity will be monitored by reactor water sample analysis. The total iodine activity would not be expected to change over a period of 96 hours. In addition, the trend of the stack off-gas release rate, which is continuously monitored, is an indication of the trend of the iodine activity in the reactor coolant. Since the concentration of radioactivity in the reactor coolant is not continuously measured, coolant sampling would be ineffective as a means to rapidly detect gross fuel element failures. However, some capability to detect gross fuel element failures is inherent in the radiation monitors in the off-gas system and on the main steam lines.

The conductivity of the reactor coolant is continuously monitored. The samples of the coolant which are taken every 96 hours will also be used to determine the chlorides. Therefore, the sampling frequency is considered adequate to detect long-term changes in the chloride ion content. Isotopic analyses to determine major contributors to activity can be performed by a gamma scan.

ATTACHMENT 2

LIST OF REGULATORY COMMITMENTS

List of Regulatory Commitments

The following table identifies those actions committed to by Pilgrim in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
Relocate Coolant Chemistry Technical Specifications and associated Bases to UFSAR.	Within 60 days of license amendment approval.