



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 21, 1985

050 - 219

Docket No. 50-219
LS05-85-11-029

Amndt. 93 to DPR-16

Mr. P. B. Fiedler
Vice President and Director
Oyster Creek Nuclear Generating Station
Post Office Box 388
Forked River, New Jersey 08731

Dear Mr. Fiedler:

SUBJECT: WATER PURITY OF REACTOR COOLANT

Re: Oyster Creek Nuclear Generating Station

The Commission has issued the enclosed Amendment No.93 to Provisional Operating License No. DPR-16 for the Oyster Creek Nuclear Generating Station. This amendment is in response to your application dated September 18, 1984.

This amendment authorizes changes to the Oyster Creek Appendix A Technical Specifications (TS) to incorporate additional restrictions on conductivity and chloride limits in Section 3.3.E, Reactor Coolant Quality and revise its Bases.

The application dated September 18, 1984, was in response to Section 4.20 of the Integrated Plant Safety Assessment Report (IPSAR), Systematic Evaluation Program, NUREG-0822, dated January 1983, for Oyster Creek, that states you have agreed to amend the TS to incorporate the conductivity and chloride limits in Regulatory Guide (RG) 1.56. In our review of your September 18, 1984 application to amend the TS, you did not address the guideline in footnote "a" of Table 1 of RG 1.56 that states the total time for all incidents exceeding the acceptable reactor water chemistry limits in Table 1 should not exceed 2 weeks per year. The staff considers this restriction on plant operation to be a necessary part of a method, described in RG 1.56 and acceptable to the staff, for implementing the criteria in General Design Criterion 14 with regard to minimizing the probability of corrosion-induced failure of the reactor coolant pressure boundary in boiling water reactors (BWRs). This restriction is in the Standard Technical Specifications for BWRs (NUREG-0123). The staff requests that you propose appropriate TS to incorporate such a restriction in the TS, or provide a justification that such a TS is not needed, on a schedule to be negotiated with the NRC Project Manager.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on February 27, 1985 (50 FR 7988). No public comments or requests for hearing were received.

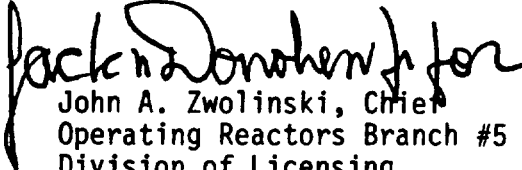
Mr. P. B. Fiedler

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November 21, 1985

A copy of our related Safety Evaluation is also enclosed. A notice of issuance pertaining to this action will appear in the Commission's biweekly notice publication in the Federal Register.

Sincerely,


John A. Zwolinski, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:

1. Amendment No. 93 to
License No. DPR-16
2. Safety Evaluation

cc w/enclosures:
See next page

A copy of our related Safety Evaluation is also enclosed. A notice of issuance pertaining to this action will appear in the Commission's biweekly notice publication in the Federal Register.

Sincerely,

Original signed by
John A. Donohew For
John A. Zwolinski, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:

- 1. Amendment No. 93 to License No. DPR-16
- 2. Safety Evaluation

cc w/enclosures:
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Mr. P. B. Fiedler
Oyster Creek Nuclear Generating Station

Oyster Creek Nuclear
Generating Station

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

GPU NUCLEAR CORPORATION
AND
JERSEY CENTRAL POWER & LIGHT COMPANY
OYSTER CREEK NUCLEAR GENERATING STATION
AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 93
License No. DPR-16

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by GPU Nuclear Corporation and Jersey Central Power and Light Company (the licensees) dated September 18, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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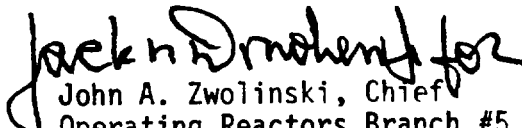
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Provisional Operating License No. DPR-16 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 93, are hereby incorporated in the license. GPU Nuclear Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


John A. Zwolinski, Chief
Operating Reactors Branch #5
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 21, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 93

PROVISIONAL OPERATING LICENSE NO. DPR-16

DOCKET NO. 50-219

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain vertical lines indicating the area of change.

REMOVE

3.3-2
3.3-6

INSERT

3.3-2
3.3-6

D. Reactor Coolant System Leakage

Reactor coolant leakage into the primary containment from unidentified sources shall not exceed 5 gpm. In addition, the total leakage in the containment, identified and unidentified, shall not exceed 25 gpm. If these conditions cannot be met, the reactor will be placed in the cold shutdown condition.

E. Reactor Coolant Quality

1. The reactor coolant quality during power operation with steaming rates to the turbine-condenser of less than 100,000 pounds per hour shall be limited to:

conductivity	2 uS/cm	(S = mhos at 25°C(77°F))
chloride ion	0.1 ppm	

2. When the conductivity and chloride concentration limits given in 3.3.E.1 are exceeded, an orderly shutdown shall be initiated immediately, and the reactor coolant temperature shall be reduced to less than 212°F within 24 hours.
3. The reactor coolant quality during power operation with steaming rates to the turbine-condenser of greater than or equal to 100,000 pounds per hour shall be limited to:

conductivity	10 uS/cm	(S = mhos at 25°C(77°F))
chloride ion	0.5 ppm	

4. When the maximum conductivity or chloride concentration limits given in 3.3.E.3 are exceeded, an orderly shutdown shall be initiated immediately, and the reactor coolant temperature shall be reduced to less than 212°F within 24 hours.
5. During power operation with steaming rates to the turbine-condenser of greater than or equal to 100,000 pounds per hour, the time limit above 1.0 uS/cm at 25°C (77°F) and 0.2 ppm chloride shall not exceed 72 hours for any single incident.
6. When the time limits for 3.3.E.5 are exceeded, an orderly shutdown shall be initiated within 4 hours.

F. Recirculation Loop Operability

1. The reactor shall not be operated with one or more recirculation loops out of service except as specified in Specification 3.3.F.2.
2. Reactor Operation with one idle recirculation loop is permitted provided that the idle loop is not isolated from the reactor vessel.
3. If Specifications 3.3.F.1 and 3.3.F.2 are not met, the reactor shall be placed in the cold shutdown condition within 24 hours.

Chlorides are known to (1) promote intergranular stress corrosion cracking of sensitized stainless steels, (2) induce transgranular cracking of non-sensitized stainless steels, (3) promote pitting and (4) promote crevice attack in most RCS materials (BWR Water Chemistry Guidelines, EPRI, April 1, 1984). The higher the concentration, the faster the attack. Therefore, the level of chloride in the reactor water should be kept as low as is practically achievable. The limits are therefore set to be consistent with Regulatory Guide 1.56 (Rev. 1.)

In the case of BWR's where no additives are used in the primary coolant, and where neutral pH is maintained, conductivity provides a very good measure of the quality of the reactor water. When the conductivity is within its proper normal range, pH, chloride, and other impurities affecting conductivity and water quality must also be within their normal ranges. Significant changes in conductivity provide the operator with a warning mechanism so that he can investigate and remedy the conditions causing the change. Measurements of pH, chloride, and other chemical parameters are made to determine the cause of the unusual conductivity and instigate proper corrective action. These can be done before limiting conditions, with respect to variables affecting the boundaries of the reactor coolant, are exceeded. Several techniques are available to correct off-standard reactor water quality conditions including removal of impurities from reactor water by the cleanup system, reducing input of impurities causing off-standard conditions by reducing power and reducing the reactor coolant temperature to less than 212°F. The major benefit of reducing the reactor coolant temperature to less than 212°F is to reduce the temperature dependent corrosion rates and thereby provide time for the cleanup system to re-establish proper water quality.

References

- (1) FDSAR, Volume I, Section IV-2
- (2) (Deleted)
- (3) (Deleted)
- (4) Licensing Application Amendment 16, Design Requirements Section
- (5) (Deleted)
- (6) FDSAR, Volume I, Section IV-2.3.3 and Volume II, Appendix H
- (7) FDSAR, Volume I, Table IV-2-1
- (8) Licensing Application Amendment 34, Question 14
- (9) Licensing Application Amendment 28, Item III-B-2
- (10) Licensing Application Amendment 32, Question 15
- (11) (Deleted)
- (12) Licensing Application Amendment 68, Supplement No. 6 Addendum 3
- (13) Licensing Application Amendment 16, Page 1



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 93 TO PROVISIONAL OPERATING LICENSE NO. DPR-16

GPU NUCLEAR CORPORATION AND
JERSEY CENTRAL POWER & LIGHT COMPANY
OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated September 18, 1984, (ref. 2) GPU Nuclear (the licensee) requested an amendment to the Appendix A Technical Specifications (TS) to Oyster Creek Nuclear Generating Station (OCNGS). This amendment would incorporate additional requirements on conductivity and chloride limits in Section 3.3.E, Reactor Coolant Quality, and revise its Bases.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on February 27, 1985 (50 FR 7988). No public comments or requests for hearing were received.

2.0 DISCUSSION AND EVALUATION

As part of the staff's Systematic Evaluation Program (SEP), the staff issued the Integrated Plant Safety Assessment Report (IPSAR), NUREG-0822, dated January 1983, for OCNGS. In Section 4.20, Topic V-12.A, Water Purity of BWR Primary Coolant, the staff stated that the safety objective of this section was to ensure that the plant reactor coolant chemistry is adequately controlled to minimize the possibility for corrosion-induced failures of the reactor coolant pressure boundary (RCPB). The staff required in the conclusion of this section that the licensee modify the existing limiting conditions for operation for primary coolant chemistry in the TSs to be consistent with the BWR Water Quality Specification (ref. 6) or the current licensing criteria. The current licensing criteria for conductivity and chloride limits is the guideline limits established in Regulatory Guide (RG) 1.56 (ref. 5). The licensee agreed to amend the TS to incorporate these conductivity and chloride limits and the staff found this action acceptable in the IPSAR.

As a result, the licensee, in a letter dated September 18, 1984, proposed to revise the TS for chlorides and conductivity to be consistent with RG 1.56.

2.1 Review Criterion

10 CFR Part 50 (Appendix A, General Design Criterion 14), requires that the RCPB have minimal probability of rapidly propagating failure. RG 1.56 provides an acceptable method for implementing the criteria with regard to minimizing the probability of corrosion-induced failure of the RCPB in BWRs. This includes corrosion-induced failures of the RCPB from impurities in the reactor coolant system. The RG identified acceptable reactor water chemistry limits and stated that appropriate corrective actions to be defined in the plant TS should be taken.

2.2 Review Guidelines

The proposed TS were compared to RG 1.56 guidelines on acceptable reactor water chemistry limits and on appropriate corrective actions to be defined in the TS.

2.3 Evaluation

The licensee's submittal of revised TS on September 18, 1984, proposed limiting conditions for operation regarding chloride and conductivity limits in the reactor coolant system and appropriate corrective actions to be defined in the TS suggested in RG 1.56 and the staff, therefore, concludes the proposed TS are acceptable.

There are two exceptions between the guidelines in RG 1.56 and what the licensee proposed. These exceptions are the following:

1. The temperature at which conductance analysis was to be made was not specified to be 25°C (77°F) in two proposed TS.
2. A time limit of 2 weeks per year for operation above 1 micro mho/cm and 0.2 ppm chloride was not addressed by the licensee.

For item 1 above, the licensee did not state in its proposed TS that the unit "S" for conductivity stood for the standard definition of "mhos." Also, although the licensee did state in proposed TS 3.3.E.5 that the conductivity was to be measured at the standard temperature of 25°C (77°F), this was not included in proposed TS 3.3.E.1 and 3.3.E.3. The licensee has agreed to have the phrase "S=mhos at 25°C (77°F)" added to its proposed TS 3.3.E.1 and 3.3.E.3 for clarification in the August Progress Review Meeting on Licensing Actions of September 18, 1985 (ref. 1). Incorporating the standard definition for conductivity in the licensee's application of September 18, 1984, is a minor clarification of the proposed TS and, thus, did not require a renote in the Federal Register of the licensee's application with the addition of this change. This clarification did not change either the substance of the licensee's application or the basis of the staff's proposed determination that this application did not involve a significant hazards consideration.

Item 2 above refers to footnote "a" to Table 1, Acceptable Reactor Water Chemistry Limits, of RG 1.56. The licensee failed to address the guideline in footnote "a" that states the total time for all incidents exceeding the acceptable reactor water chemistry limits in Table 1 should not exceed

2 weeks per year. The staff considers such a restriction on plant operation a necessary part of a method described in RG 1.56 and acceptable to the staff for implementing the criteria in General Design Criterion 14 with regard to minimizing the probability of corrosion-induced failure of the RCPB in boiling water reactors (BWRs) such as OCNCS. This restriction is in the Standard Technical Specifications (STS) for BWRs (NUREG-0123) (ref 4).

An acceptable TS to meet item 2 above is a statement in TS 3.3.E.5 that the total time for such incidents--as described in TS 3.3.E.5--should not exceed 2 weeks per year and that restart, after the required shutdown (TS 3.3.E.6) because this limit was exceeded, is permitted after the cause for the out-of-limit condition is determined and corrected and the chemistry limits of TS 3.3.E.5 are reestablished. The staff considers that the above action by the licensee, if the reactor water chemistry limits in proposed TS 3.3.E.5 are exceeded for a period of 2 weeks per year, is necessary, and should be required by the TS to ensure that the reactor coolant chemistry is adequately controlled to minimize the possibility for corrosion-induced failures in the RCPB. The licensee has not provided a justification for not incorporating this requirement into the TS.

The licensee has also proposed a change to the basis for Section 3.3, Reactor Coolant, of the TS. The changes to the Bases are the following: (1) revise the paragraph on chlorides in the reactor coolant to state the effect of chlorides on the reactor coolant system and that the chloride limits in the TS are consistent with RG 1.56, (2) delete the paragraph on dissolved oxygen in the reactor coolant and (3) replace the phrase "placing the reactor in the cold shutdown condition" by "reducing the reactor coolant temperature to less than 212°F." There are no TS on dissolved oxygen in the reactor; therefore, the Bases does not need the paragraph on dissolved oxygen in the coolant. The staff has reviewed these changes and finds them correct, and, therefore, acceptable.

RG 1.56 also contains recommended condensate chemistry limits for the feedwater system; however, the limits are not normally included in plant TS and are not contained in the STS for BWRs (NUREG-0123). The licensee did not propose such a TS and the staff does not require one.

As noted in the staff's Safety Evaluation Report (SER) on March 16, 1981, (ref. 3) for SEP Topic V-12.A, Oyster Creek has sufficient instrumentation to monitor feedwater conductivity over the range recommended in RG 1.56. In that SER the staff concluded that the alarms of the conductivity meters at the influent and effluent of the demineralizers will fulfill the specific conductivity limits in RG 1.56, especially because the influent alarm is set conservatively (ref. 3, page 5).

2.4 Summary

The proposed OCNCS TS changes regarding reactor water conductivity and chloride concentration limits meet the limits and appropriate corrective actions in RG 1.56 and are therefore acceptable. The staff, however, believes that the licensee should address the guideline in RG 1.56 that

the total time for all incidents exceeding the acceptable reactor water chemistry limits should not exceed 2 weeks per year. The licensee should propose appropriate corrective actions for the OCNGS TS or justify why they are not needed. With this, the staff can completely resolve the issue raised in Section 4.20 of the IPSAR.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ACKNOWLEDGEMENT

This evaluation was prepared by T. Michaels and J. Donohew.

6.0 REFERENCES

1. August Progress Review (Licensing Actions) Meeting of September 18, 1985. Meeting Minutes dated October 29, 1985.
2. Letter from P. B. Fiedler (GPU) to Director, NRR (NRC), September 18, 1984, Subject: Oyster Creek Nuclear Generating Station Technical Specification Change Request No. 124.
3. Letter from D. M. Crutchfield (NRC) to I. R. Finfrock (JCP&L), March 16, 1981, Subject: SEP Topics V-5, Reactor Coolant Pressure Boundary Leakage Detection and V-12.A, Water Purity of Boiling Water Reactor Primary Coolant - Oyster Creek Nuclear Power Plant.

4. NUREG-0123, Standard Technical Specifications (STS) for GE BWRs, Revision 2.
5. Regulatory Guide 1.56, Maintenance of Water Purity in Boiling Water Reactors.
6. BWR Water Quality Specification (Specification No. SP-1302-28-001) submitted by the licensee by letter dated August 24, 1982.

Dated: November 21, 1985