Section 24

FINAL SUPPORTING STATEMENT FOR REQUIREMENTS FOR THERMAL ANNEALING OF THE REACTOR PRESSURE VESSEL

10 CFR 50.66, 10 CFR 50.66(b)(1), 10 CFR 50.66(b)(2), 10 CFR 50.66(b)(3), 10 CFR 50.66(b)(4), 10 CFR 50.66(c)(1),10 CFR 50.66(c)(2), 10 CFR 50.66(c)(3), 10 CFR 50.66(c)(3)(ii), 10 CFR 50.66(c)(3)(iii) and 10 CFR 50.66(d)

DESCRIPTION OF THE INFORMATION COLLECTION

On January 18, 1996, the NRC amended its regulations for light-water-cooled power plants to provide requirements for thermal annealing of a reactor pressure vessel. This new regulation, 10 CFR 50.66 (known as the thermal annealing rule), provides a set of requirements for the use of thermal annealing by licensees who elect to use this approach to mitigate the detrimental effects of neutron irradiation. This rule requires submittal of a Thermal Annealing Report at least three years prior to the date at which the limiting fracture toughness criteria in 10 CFR 50.61 or 10 CFR 50 Appendix G would be exceeded. This report must include: a Thermal Annealing Operating Plan; a Requalification Inspection and Test Program; a Fracture Toughness Recovery and Reembrittlement Trend Assurance Program; and Identification of Unreviewed Safety Questions and Technical Specification Changes. Under 10 CFR 50.66, the NRC will, within three years of submission of a licensee's Thermal Annealing Report and at least thirty days prior to the start of the annealing, document its views on the report. After completion or termination of thermal annealing, the licensee is required to notify the NRC of the results, and, as required, provide a justification for subsequent operation.

Specifically, 10 CFR 50.66 requires the following information collections:

10 CFR 50.66(b)(1) requires the Thermal Annealing Operating Plan to include (1) a detailed description of the pressure vessel and all structures and components that are expected to experience thermal or stress effects during the annealing operation; (2) an evaluation of the effects of mechanical and thermal stresses and temperatures on the vessel, containment, biological shield, attached piping and appurtenances, and adjacent equipment and components to demonstrate that operability of the reactor will not be detrimentally affected; (3) the methods, including heat source, instrumentation and procedures proposed for performing the thermal annealing; and, (4) the proposed thermal annealing operating parameters, including bounding conditions for temperatures and times, and heatup and cooldown schedules.

10 CFR 50.66(b)(2) requires the Requalification Inspection and Test Program to requalify the annealed reactor vessel to include enough detail to demonstrate that the limitations of the thermal annealing plan are not exceeded and have not degraded the reactor vessel.

10 CFR 50.66(b)(3) details the parameters and conditions that must be evaluated in the Fracture Toughness Recovery and Reembrittlement Trend Assurance Program to document fracture toughness recovery and reembrittlement rate.

10 CFR 50.66(b)(4) requires the report to identify any changes to the facility as described in the updated final safety analysis report (UFSAR) constituting unreviewed safety questions, and any changes to the technical specifications (TS), which are necessary to either conduct the thermal annealing or operate the nuclear power reactor following the annealing.

10 CFR 50.66(c)(1) requires that if the thermal annealing was completed in accordance with the Thermal Annealing Operating Plan (the Plan) and the Requalification Inspection and Test Program (the Program), the licensee shall so confirm in writing to the NRC.

10 CFR 50.66(c)(2) requires that if the thermal annealing was completed but the annealing was not performed in accordance with the Plan and the Program, the licensee shall submit, to the NRC, a summary of lack of compliance and a justification for subsequent operation. This summary and justification must identify any changes to the facility as described in the UFSAR which are attributable to the non-compliance and constitute unreviewed safety questions, and any changes to the TS which are required as a result of the non-compliance.

10 CFR 50.66(c)(3) requires that if the thermal annealing was terminated prior to completion, the licensee shall immediately notify the NRC of the premature termination. 10 CFR 50.66(c)(3)(i) states that if the partial annealing was otherwise performed in accordance with the Plan and relevant portions of the Program, and the licensee does not elect to take credit for any recovery, the licensee need not submit the Thermal Annealing Results Report (Results Report) required by 10 CFR 50.66(d), but instead shall confirm in writing to the NRC that the partial annealing was otherwise performed in accordance with the Plan and relevant portions of the Program. 10 CFR 50.66(c)(3)(ii) states that if the partial annealing was otherwise performed in accordance with the Plan and relevant portions of the Program, and the licensee elects to take full or partial credit for the partial annealing, the licensee shall so confirm in writing to the NRC. 10 CFR 50.66(c)(3)(iii) states that if the partial annealing was not performed in accordance with the Plan and relevant portions of the Program, the licensee shall submit, to the NRC, a summary of lack of compliance and a justification for subsequent operation. The summary and justification shall also identify any changes to the facility as described in the UFSAR which are attributable to the noncompliances and constitute unreviewed safety questions, and any changes to the TS which are required as a result of the noncompliances.

10 CFR 50.66(d) requires, within three months of completing the thermal annealing, unless an extension is authorized by the NRC, a Thermal Annealing Results Report from every licensee that either completes a thermal annealing, or that terminates an annealing but elects to take full or partial credit for the annealing. The Results Report shall provide time and temperature profiles of the actual annealing, the post-anneal RT_{NDT} (reference temperature for nil ductility transition) and Charpy upper-shelf energy values for use in subsequent reactor operation and projected values at the end of the proposed period of operation addressed in the Thermal Annealing Report, and projected post-annealing reembrittlement trends for both RT_{NDT} and Charpy upper-shelf energy.

Regulatory Guide-1.162 was developed to describe a format and content acceptable to the NRC staff for the report to be submitted for approval to perform a thermal annealing of a reactor vessel. Use of this format by the applicant would help ensure the completeness of the information provided, would assist the NRC staff in location of specific information, and would

aid in shortening the time needed for the review process. Also, this guide describes acceptance criteria that the NRC staff would use in evaluating these reports to ensure that the annealing conditions imposed on the reactor and other equipment, components, and structures do not degrade the original design of the system. Section 2.1 of RG-1.162 directs the licensee to retain reactor annealing measurement records until the facility license is terminated.

A. JUSTIFICATION

1. Need for and Practical Utility of the Collection of Information

The information required by 10 CFR 50.66 is needed by the NRC to assess the adequacy of the proposed thermal annealing program and to assure that the plant will continue to be fit for safe operation after the thermal annealing operation. In addition, this information will supply data needed to assess the degree of recovery of fracture toughness properties and the projected reembrittlement rate of the reactor vessel material. This information should be collected and reported, and records should be kept, for the duration of the plants' operating license.

2. Agency Use of Information

NRC uses the information required by Section 10 CFR 50.66 to thoroughly review the thermal annealing program, document its views on the plan, including whether thermal annealing constitutes an unreviewed safety question, and place the results of its evaluation in its Pubic Document Room. The NRC also uses the information to determine whether the annealing conditions will detrimentally affect the safe operation of the plant, and whether the fracture toughness recovery and reembrittlement rates meet the requirements of 10 CFR 50.60 and 50.61.

Upon receipt of licensee's Thermal Annealing Results Report after completion or termination of thermal annealing, the NRC will review the report, document whether the thermal annealing was performed in compliance with the Plan and the Program, place the documentation in the NRC Public Document Room, and hold a public meeting to: (a) permit the licensee to explain the results of the reactor vessel annealing to the NRC and the public, (b) allow the NRC to discuss its inspection of the reactor vessel annealing, and (c) provide an opportunity for the public to comment to the NRC on the thermal annealing.

3. Reduction of Burden Through Information Technology

There are no legal obstacles to reducing the burden associated with this information collection. The NRC encourages respondents to use information technology when it would be beneficial to them. NRC issued a regulation on October 10, 2003 (68 FR 58791), consistent with the Government Paperwork Elimination Act, which allows its licensees, vendors, applicants, and members of the public the option to make submissions electronically via CD-ROM, e-mail, special Web-based interface, or other means. It is estimated that approximately 50% of the potential responses are filed electronically.

4. Effort to Identify Duplication and Use Similar Information

No sources of similar information are available. There is no duplication of requirements. NRC has in place an ongoing program to examine all information collections with the goal of eliminating all duplication and/or unnecessary information collections.

5. Effort to Reduce Small Business Burden

This information does not affect small business.

6. Consequences to Federal Program or Policy Activities if the Collection is not Conducted or is Conducted Less Frequently

These collections are one-time only collections. If the information were not collected, the NRC would be unable to ensure that appropriate limits have been established and that the thermal annealing process would not degrade the integrity of reactor pressure vessel.

7. Circumstances Which Justify Variations from OMB Guidelines

The information records should be retained for the duration of the plants' operating license (over 3 years) to permit assessment of the adequacy of vessel fluence determinations during the period the plant is operating. This information is required to establish that the reactor vessel has adequate toughness as prescribed in 10 CFR 50 Appendix G and 10 CFR 50.61.

8. Consultations Outside the NRC

Opportunity for public comment on the information collection requirements for this clearance package was published in the Federal Register on May 14, 2013 (78 FR 28244). No comments were received.

9. Payment or Gift to Respondents

Not applicable.

10. Confidentiality of Information

Confidential and proprietary information is protected in accordance with NRC regulations at 10 CFR 9.17(a) and 10 CFR 2.390(b). However, no information normally considered confidential or proprietary is requested.

11. Justification for Sensitive Questions

This regulation does not require sensitive information.

12. Estimated Industry Burden and Burden Hour Cost

At the present time, no licensee has proposed to anneal a reactor vessel. However, the reporting burden that could result from compliance with this regulation is estimated to be 6,400 hours per thermal annealing operation at a cost of $1,753,600 (6,400 hours x $274). The recordkeeping burden that could result from compliance with this regulation is estimated to be 200 hours per thermal annealing operation at a cost of $54,800 (200 hours x $274).

13. Estimate of Other Additional Costs

The NRC has determined that the quantity of records to be maintained is roughly proportional to the recordkeeping burden and, therefore, can be used to calculate approximate records storage costs. Based on the number of pages maintained for a typical clearance, the records storage cost has been determined to be equal to 0.0004 times the recordkeeping burden cost. Because the recordkeeping burden is estimated to be 200 hours, the storage cost for this clearance is $21.92 (200 hours x 0.0004 x $274/hour).

14. Estimated Annualized Cost to the Federal Government

As stated above, no licensee has proposed to anneal a reactor vessel. If an application is submitted, the time for the NRC to perform the necessary reviews, prepare the evaluation reports, complete the licensing process and issue approvals is estimated to be an average of 2,000 hours per annealing operation. This one-time cost to the Federal government of activities related to the proposed regulation is estimated to be $548,000 (2,000 hours x $274). This cost is fully recovered by fee assessments to NRC licensees pursuant to 10 CFR Parts 170 and/or 10 CFR 171.

15. Reasons for Changes in Burden or Cost

There is no change in the overall burden; however; there has been an increase in the fee rate from $257 to $274 per hour.

16. Publication for Statistical Use

The collected information is not published for statistical purposes.

17. Reason for Not Displaying the Expiration Date

The requirement is contained in a regulation. Amending the Code of Federal Regulations to display information that, in an annual publication, could become obsolete would be unduly burdensome and too difficult to keep current.

18. Exceptions to the Certification Statement

None.

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

Not applicable.