

FINAL SUPPORTING STATEMENT FOR  
10 CFR PART 50  
ISSUANCE, LIMITATIONS, AND CONDITIONS OF LICENSES AND CONSTRUCTION PERMITS  
SECTION 5

(50.54(hh)(1) Procedures for aircraft threat; 50.54(cc), Bankruptcy Notifications;  
50.55(e), Design and Construction Deficiencies; 50.55(f), Appendices A & B, Quality Assurance;  
50.55a, ASME Codes; 50.59(c) and (d), Reports; Appendices G & H, 50.60, Fracture Toughness  
50.61, Pressurized Thermal Shock; 50.62, ATWS; 50.63, Station Blackout;  
50.64, Highly Enriched Uranium; 50.65, Maintenance; and 50.66, Thermal Annealing)

3150-0011

ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) is authorized by Congress to have responsibility and authority for the licensing and regulation of nuclear power plants, research/test facilities, fuel reprocessing plants and other utilization and production facilities licensed pursuant to the Act. To meet its responsibilities, the NRC conducts a detailed review of all applications for licenses to construct and operate such facilities. The purpose of the detailed review is to ensure that the proposed facilities can be built and operated safely at the proposed locations, and that all structures, systems and components important to safety will be designed to withstand the effects of postulated accident conditions, without undue risk to the health and safety of the public.

Under 10 CFR Part 50, before a company can build a nuclear power plant at a particular site, it must obtain a construction permit from the NRC. Subsequently, the company must obtain an operating license from the NRC before it can operate the plant. The decision by the NRC as to whether to approve a company's application for a construction permit or an operating license is based largely on the NRC staff's detailed review of the information provided by the company as part of its application. Information provided by the applicant as part of the application is crucial to the licensing process as it provides the NRC with the information it needs to make a decision with regard to the proposed plant's impact on the public's health and safety and the environment.

The Commission issues a license or construction permit, with appropriate conditions and limitations (including technical specifications), after determining that an application for a license meets certain standards and requirements. Licensees must maintain records and prepare reports to demonstrate their fulfillment of regulatory requirements. The information collection requirements in this section include:

- procedures to address preparatory actions in the event of potential aircraft threat or a beyond-design basis threat;
- notification in cases of bankruptcy;
- reports of deficiencies occurring during the design and construction of nuclear power plants;
- maintenance of records of the design, fabrication, erection and testing of structures, systems and components important to safety throughout the life of the unit;
- maintenance of records of changes in the facility of changes in procedures and of tests and experiments and to submit a report containing a brief description of any changes, tests and experiments, including a summary of the evaluation of each;

- test methods for supplemental fracture toughness; proposed schedules for meeting the requirements on the Use of Highly Enriched Uranium, and
- Thermal Annealing Reports.

These regulations affect 94 licensees for operating nuclear power plants and 31 licensees for operating research & test reactors. They also affect licensees for 24 power plants and 3 research & test reactors that are currently being decommissioned and 1 research & test reactors that currently have possession-only licenses. It is expected that four nuclear plants will be under active construction under 10 CFR Part 52 and one plant under active construction under 10 CFR Part 50.

## A. JUSTIFICATION

### 1. Need for the Collection of Information

The information is needed in order to determine licensee compliance with the regulations set forth in 50.54(hh)(1); 50.55(e); 50.55(f); Appendices A & B; 50.55a; 50.59(c) and (d); Appendices G & H; 50.60; 50.61; 50.62; 50.63; 50.64; 50.65; and 50.66. Details of these regulations can be found at the end of this supporting statement in "Description of Requirements."

### 2. Agency Use of Information

Applicants or licensees requesting approval to construct or operate utilization or production facilities are required by the Atomic Energy Act of 1954, as amended (the Act), to provide information and data that the NRC may determine necessary to ensure the health and safety of the public.

The NRC uses the records and reports required in this part to ascertain that licensees' licensing the design, construction, operation, and decommissioning of commercial nuclear power plants and other nuclear facilities programs are adequate to protect public health and minimize danger to life and property and that licensees' personnel are aware of and follow up on the information and steps needed to perform licensed activities in a safe manner. The reports and recordkeeping requirements allow NRC to determine whether to take actions, such as to conduct inspections or to alert other licensees to prevent similar events that may have generic implications.

### 3. Reduction of Burden Through Information Technology

The NRC has issued [\*Guidance for Electronic Submissions to the NRC\*](#) which provides direction for the electronic transmission and submittal of documents to the NRC. Electronic transmission and submittal of documents can be accomplished via the following avenues: the Electronic Information Exchange (EIE) process, which is available from the NRC's "Electronic Submittals" Web page, by Optical Storage Media (OSM) (e.g. CD-ROM, DVD), by facsimile or by e-mail. It is estimated that approximately 60% of the 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.

5. Effort to Reduce Small Business Burden

Not Applicable.

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

If the information is not collected, NRC will not be in a position to assess whether licensees are operating within the specific safety requirements applicable to the licensing and operating activities for existing nuclear power reactors and research and test reactors.

The information and required frequency from licensees that seek to license and operator nuclear power reactors and research and test reactors is essential to NRC's determination of whether the applicant has adequate equipment, training, funds and experience throughout the life of the licensee to protect the public health and safety.

7. Circumstances which Justify Variation From OMB Guidelines

50.54(cc) varies from the Office of Management and Budget guidelines by requiring that licensees submit the notification in less than 30 days from the date of filing of the petition in bankruptcy. The requirement to provide notification promptly following the filing of the petition is a reasonable measure to ensure that NRC is made aware of the bankruptcy so as to take effective action to protect public health and safety. Allowing a period of 30 or more days to elapse might preclude NRC from becoming aware of the licensee's distressed financial circumstances in time to prevent the development or aggravation of a potential hazard to the public. Moreover, the United States Code contains requirements regarding notification of creditors of bankruptcy. This regulation requires one additional notification. Notifying NRC promptly after the filing of the petition would in fact be less of a burden on the bankrupt licensee than a separate notification later in the proceedings since these notifications are accomplished by forwarding to NRC a copy of the petition.

Records in 50.55(e) are required to be retained longer than the OMB established 3-year retention period because operating experience has demonstrated that a minimum of a 10-year retention period is necessary in order to evaluate the adequacy of the evaluation and correction of recurring defects. Procurement documents are retained for the lifetime of the components, a standard industry practice. Review of documented component characteristics and performance history must be available for review as needed.

The two-day initial notification required by 10 CFR 50.55(e)(6)(i) provides the NRC with advance notice of potentially generic defects, substantial safety hazards, or significant breakdowns in QA programs, which could affect operating facilities.

Pursuant to NRC Regulatory Guides 1.28 (Rev.4) and 1.33 (Rev.2), design, fabrication, erection and testing of structures, systems and components important to safety must be retained for the life of the plant in order to support the review and confirmation of safety-related activities.

ASME B&PV Code, Section XI, and ASME OM Code requirements for ISI and IST programs, and 10 CFR 50.55a specify that records and reports must be maintained for the service lifetime of the component or system. Such lifetime retention of the records is necessary to ensure adequate historical information of the design, examination, and testing of components and systems to provide a basis for evaluating degradation of these components and systems at any time during their service lifetime.

The information reported pursuant to 10 CFR 50.59 is required to be submitted every two years, but may be submitted annually or along with the FSAR updates, and, therefore, does not vary from OMB guidelines. The record retention periods specified in 10 CFR 50.59 (5 years, and until termination of the license) are required because these records provide the NRC with vital information about reactor facility changes, tests, and experiments made without prior Commission approval. Without these records, NRC's ability to protect the health and safety of the public would be reduced.

The provisions of 10 CFR 50.60, 10 CFR 50 Appendix G, and 10 CFR 50 Appendix H require that this information be maintained for the life of the plant in order to detect material deteriorations or flaws which might affect the health and safety of the public.

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 October 18, 2017 (82 FR 48539). Additionally, we contacted via email nine potential respondents in the areas of reactor owner/operator licensees, state government, research facilities and nuclear industry stakeholder representatives from Northern States Power Company, Florida Power and Light, Southern Nuclear Operating Co., Tennessee Valley Authority, Illinois Emergency Management Agency – State of Illinois, Union of Concerned Scientists, SHINE Medical Technologies, Inc., MIT – Nuclear Reactor Laboratory and the University of Missouri – Columbia. Of the nine potential respondents contacted, no respondent replied. Further, no comments were received from the published Federal Register Notice.

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 request sensitive information.

12. Estimated Industry Burden and Burden Hour Cost

The total estimated cost for information collection requirements in this section is estimated to be 2,219,795 hours at a cost of \$583,806,067 (2,219,795 hours x \$263/hr).

	Hours	Responses
Reporting	335,417	1,168
Recordkeeping	1,884,278	153
Third Party Disclosure	100	1
<b>TOTAL</b>	<b>2,219,795</b>	<b>1,322</b>

Detailed burden estimates are included in the supplemental burden spreadsheet titled, "Table 1 - Summary of Supporting Statements." The \$263 hourly rate used in the burden estimates is based on the Nuclear Regulatory Commission's fee for hourly rates as noted in 10 CFR 170.20 "Average cost per professional staff-hour." For more information on the basis of this rate, see the Revision Of Fee Schedules; Fee Recovery For Fiscal Year 2017 (82 FR 30682; June 30, 2017).

13. Estimate of Other Additional Costs

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 .0004 times the recordkeeping burden cost. Therefore, the storage cost for this clearance is estimated to be \$198,226 (1,884,278 recordkeeping hours x \$263 x .0004).

14. Estimated Annualized Cost to the Federal Government

The staff has developed estimates of annualized costs to the Federal Government related to the conduct of this collection of information. These estimates are based on staff experience and subject matter expertise and include the burden needed to review, analyze, and process the collected information and any relevant operational expenses.

The annualized cost to the government is estimated to be \$21,633,065 (82,255 staff hours x \$263/hr) as shown on the attached Summary Table.

15. Reasons for Changes in Burden or Cost

The burden and number of responses have changed as described in the tables below:

**Burden change**

	2015 estimates	Current submission	Change
Reporting	147,910.0	335,417	187,507

Recordkeeping	1,833,589.0	1,884,278	50,689
Third Party Disclosure	104.0	100	-4
Total	1,981,603.0	2,219,795	238,192

#### **Change in Responses**

	2015 estimates	Current submission	Change
Reporting	1,197.7	1,168	-29.7
Recordkeeping	159.0	153	-6
Third Party Disclosure	1.3	1	-0.3
Total	1,358.0	1,322	-36

The primary reason for the increase in reporting burden is a change in the burden estimate to prepare requests for alternatives and relief requests under 10 CFR 50.55(a). The estimated time to prepare a relief request was adjusted from 80 hours per request to 380 hours per request. This adjustment is based on staff experience and interactions with industry / respondents. This change resulted in an increase from an estimated 59,940 hours of burden associated with alternatives and relief requests to an estimated 253,460 hours, an increase of 193,520 hours.

In addition, this submission corrects the recordkeeping totals for Final Safety Analysis Reports (FSAR) updates. In the previous renewal, the supporting statement accounted for 198,000 hours of burden for this section, but these hours were inadvertently left out when totals for Part 50 were calculated. The current submission correctly includes recordkeeping for FSAR updates totaling 196,160 hours of recordkeeping burden.

Recordkeeping burden decreased for most requirements due to a change in the number of recordkeepers. Two notable decreases were:

- The total recordkeeping burden associated with codes and standards (10 CFR 50.55a) has decreased by 28,128 hours due to a decrease in the number of recordkeepers from 109 (104 operating reactors and 5 plants under construction) to 98 (94 operating reactors and 4 plants under construction).
- The total recordkeeping burden for maintenance program records decreased by 40,221 hours due to plants completing decommissioning, their license has been terminated and the facility no longer falls under NRC regulatory purview. Burden for maintenance records is significantly lower for operating reactors because the number of respondents has been reduced to 94 from 104 due to licensees not being renewed.

Although there are fewer recordkeepers in the current submission, the reduction in recordkeeping burden is offset by the correction and addition of hours for recordkeeping burden associated with FSAR updates.

#### **16. Publication for Statistical Use**

The information being collected is not expected to be published for statistical use.

17. Reason for Not Displaying the Expiration Date

The recordkeeping and reporting requirements for this information collection are associated with regulations and are not submitted on instruments such as forms or surveys. For this reason, there are no data instruments on which to display an OMB expiration date. Further, amending the regulatory text of the CFR 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.

## **Appendix A – Description Requirements**

### **Issuance, Limitations, and Conditions of Licenses and Construction Permits**

Section 50.54(cc) requires licensees to notify the appropriate NRC regional office immediately in writing in the event of the commencement of a bankruptcy proceeding involving the licensee, indicating the bankruptcy court in which the petition was filed and the date of the filing. There is no action required of a licensee unless and until a bankruptcy petition is filed.

Section 50.54(hh)(1) requires licensees to develop, implement, and maintain procedures to address preparatory actions to be taken in the event of a potential aircraft threat to a nuclear power reactor facility.

Section 50.54(hh)(2) requires licensees to develop and implement guidance and strategies to address the loss of large areas of the plant due to explosions or fires from a beyond-design basis threat. These one-time requirements have been completed.

10 CFR 50.55(e) establishes requirements for reporting deficiencies occurring during the design and construction of nuclear power plants. The regulation is designed to enable the NRC to receive prompt notification of deficiencies and to have timely information on which to base an evaluation of the potential safety consequences of the deficiency and determine whether regulatory action is required. Therefore, the holder of a permit for the construction of a nuclear power plant is required to notify the Commission of each significant deficiency found in design and construction, which if it were to remain uncorrected, could adversely affect the safety of operations of the nuclear power plant at any time throughout the expected lifetime of the plant.

10 CFR 50.55(e)(1)(i) requires each CP holder to adopt appropriate procedures to evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable, and, except as provided in 10 CFR 50.55(e)(1)(ii), in all cases within 60 days of discovery, in order to identify a reportable defect or failure to comply that could create a substantial safety hazard.

10 CFR 50.55(e)(1)(ii) requires that if the evaluation required by 50.55(e)(1)(i) cannot be completed within 60 days of discovery, an interim report is prepared and submitted to the Commission. The interim report should describe the deviation or failure to comply that is being evaluated and should also state when the evaluation will be completed. The interim report must be submitted in writing within 60 days of discovery of the deviation or failure to comply.

10 CFR 50.55(e)(1)(iii) requires that a director or responsible officer of a CP holder is informed within 5 working days after completion of the evaluation described above, if the construction of a facility or activity, or a basic component supplied for such facility or activity fails to comply with the Atomic Energy Act of 1954, as amended (the Act), or any applicable rule, regulation, order, or license of the Commission relating to a substantial safety hazard; contains a defect; or undergoes any significant breakdown in any portion of the quality assurance program required by 10 CFR 50 Appendix B that could have produced a defect in a basic component. Such breakdowns in the QA program are reportable whether or not the breakdown actually resulted in a defect in a design approved and released for construction or installation.

10 CFR 50.55(e)(2) requires a CP holder to notify the Commission, through a director or responsible officer or designated person, of information reasonably indicating that the facility fails



to comply with the Act or any applicable rule, regulation, order, or license of the Commission relating to a substantial safety hazard.

10 CFR 50.55(e)(3) requires a CP holder to notify the Commission, through a director or responsible officer or designated person, of information reasonably indicating the existence of any construction defect or any defect found in the final design of a facility as approved and released for construction.

10 CFR 50.55(e)(4) requires a CP holder to notify the Commission, through a director or responsible officer or designated person, of information reasonably indicating any significant breakdown in the QA program.

10 CFR 50.55(e)(6)(i) requires notifications, as required by paragraphs (e)(2), (3) and (4) above, to be made initially by facsimile or by telephone within 2 days following receipt of information by the director or responsible corporate officer. This does not apply to interim reports described in 10 CFR 50.55(e)(1)(ii). Verification that the facsimile has been received should be made by telephone.

10 CFR 50.55(e)(6)(ii) requires notifications, as specified above, to also be made in writing, with copies to the appropriate Regional Administrator and to the appropriate NRC resident inspector, within 30 days following receipt of information by the director or responsible corporate officer.

10 CFR 50.55(e)(8) requires that the notification, required by 10 CFR 50.55(e)(6)(ii), clearly indicate that it is being submitted under 10 CFR 50.55(e) and includes, to the extent known, the name and address of the individual(s) informing the Commission; identification of the facility, the activity or the basic component supplied for the facility or the activity within the U.S. which contains a defect or fails to comply; identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect; nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply; the date on which the information of such defect or failure to comply was obtained; in the case of a basic component which contains a defect or fails to comply, the number and location of all the components in use at the facility; the corrective action which has been, is being, or will be taken, the name of the individual or organization responsible for the action, and the length of time that has been or will be taken to complete the action; and any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to other entities.

10 CFR 50.55(e)(9)(i) requires a CP holder to retain procurement documents (records) defining the requirements that facilities or basic components must meet for the lifetime of the basic component.

10 CFR 50.55(e)(9)(ii) requires a CP holder to retain records of evaluations of deviations and failures to comply for 5 years from the date of the evaluation.

10 CFR 50.55(e)(10) specifies that the reporting requirements of 10 CFR 50.55(e) are satisfied when the defect or failure to comply associated with a substantial safety hazard has been previously reported under 10 CFR 21, 10 CFR 50.55(e), 10 CFR 50.71 or 10 CFR 73.73. For holders of construction permits issued prior to October 29, 1991, evaluation, reporting, and recordkeeping requirements of 10 CFR 50.55(e) may be met by complying with the comparable requirements of 10 CFR 21. The burden is included in 10 CFR 21 (3150-0035) or NRC Form 366 (3150-0104).

10 CFR 50.55a incorporates by reference Division 1 rules of Section III, "Rules for Construction of Nuclear Power Plant Components," and Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code); and the rules of the ASME "Code for Operation and Maintenance of Nuclear Power Plants" (OM Code). These rules of the ASME B&PV and OM Codes set forth the requirements to which nuclear power plant components are designed, constructed, tested, repaired, and inspected. The ASME Codes contain information collection requirements that impose a recordkeeping and reporting burden for the plant owners. In general, the records prepared are not collected by the NRC, but are retained by the licensee to be made available to the NRC, if requested, at the time of an NRC audit.

### ***Section III Recordkeeping Requirements***

Section III, Subsection NCA specifies recordkeeping requirements for Class 1 (Subsection NB), Class 2 (Subsection NC), and Class 3 (Subsection ND) components. These provisions require the Owner to:

- NCA-3230: Owner's Certificate; AIA Agreement. Prepare and submit to the ASME necessary forms to obtain an Owner's Certificate of Authorization, and to obtain a written agreement with an Authorized Inspection Agency (AIA), prior to application, to provide inspection and auditing services (NCA-3230). This activity by the Owner occurs after receipt of notification from the NRC that an application for a Construction Permit or Combined Operating License has been docketed. The information to be supplied by the Owner when making an application is identified in the forms issued by the ASME. It is estimated that completion of these information forms takes 80 person-hours per plant (p-hours/plant). Four plants have been considered to be responsible for this recordkeeping process during this clearance period or 1.3 plants per year. (Because this is submitted to the ASME, it is considered a 3<sup>rd</sup> Party Disclosure requirement and appears on the 3<sup>rd</sup> Party Table.)
- NCA-3280: Owner's Data Report. Prepare and file ASME Form N-3, "Owner's Data Report for Nuclear Power Plant Components" (NCA-3280). Information to be included on this form identifies the Owner and location of the plant, and the nuclear vessels, piping, and pumps and valves installed within the plant. Information required to identify each component includes certificate holder and serial number, system identification, state number, national board number, and year built (NCA-3280). Form N-3, which is provided by the ASME, expedites the documentation of this information. It is estimated that the time to obtain the necessary information and to document that information on Form N-3 is 400 p-hours/plant. The preparation of four Form N-3s is anticipated during this clearance period or 1.3 Form N-3s per year. (one-time recordkeeping)
- NCA-3260: Design Report. Document that a review of the Design Report has been performed to verify that all Design and Service Loadings have been evaluated and meet the acceptance criteria (NCA-3260). It is estimated that review of the Design Report, with documentation of any areas that need to be revised, takes 2,000 p-hours/plant. Four reviews are expected during this clearance period or 1.3 design reports per year. (one-time recordkeeping)

- NB/NC/ND-3220: Overpressure Protection Report. Provide and file the Overpressure Protection Report required for the nuclear protection system (NCA-3220 (m) and (n)). This report includes the overpressure protection requirements for each component or system, including location of the overpressure protection devices, identification of the edition and addenda, system drawings, range of operating conditions, and an analysis of the conditions that give rise to the maximum pressure relieving requirements (NB/NC/ND-7200). It is estimated that the time associated with preparing the Overpressure Protection Report is 2,000 p-hrs, which is comprised of 1,600 p-hours associated with obtaining and developing the necessary information and 400 p-hrs for collating the information into the necessary report. Four such reports will be prepared in this clearance period or 1.3 such reports per year during this clearance period. (one-time recordkeeping)
- Quality Assurance Program. Document a Quality Assurance Program, and file copies of the Quality Assurance Manual with the Authorized Inspection Agency (NCA-8140). This documentation includes programs for surveying, qualifying, and auditing suppliers of subcontracted services (e.g., nondestructive examination contractors, material suppliers, and material manufacturers). Although Section III identifies the need for a documented Quality Assurance (QA) program, the primary NRC requirement for an overall QA program is contained in 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." Therefore, no additional information collection burden is imposed on Owners by the quality assurance provisions of Section III which are incorporated by reference into Section 50.55a.
- Design Specifications. Provide, correlate, and certify Design Specifications (NCA-3250). This requires that the component Design Specification be provided in sufficient detail to form the basis for fabrication in accordance with the rules of Section III. The Design Specifications shall be certified to be correct and complete and to be in compliance with the requirements of NCA-3250 by one or more competent Registered Professional Engineers (NCA-3255). Although this is a requirement of Section III, its incorporation by reference in Section 50.55a does not impose an additional information collection burden on the Owner. Preparation and certification of design specifications for construction of engineered structures is a routine and necessary engineering practice, which occurs with or without the incorporation of this Section III provision into Section 50.55a.
- Record retention periods (no burden). Designate records to be maintained and provide for their maintenance (NCA-3290). Although Section III identifies the need for specific record retention, the primary NRC requirement for record retention is specified in 10 CFR 50, Appendix B, Criterion XVI (Quality Assurance Records). Therefore, no additional information collection burden is imposed on Owners by the record retention provisions of Section III which are incorporated by reference into Section 50.55a.

## ***Section XI***

Section XI, Subsection IWA specifies recordkeeping requirements for ISI of Class 1 (Subsection IWB), Class 2 (Subsection IWC), Class 3 (Subsection IWD), Class MC (Subsection IWE), and Class CC (Subsection IWL) components. These recordkeeping requirements require the Owner to:

- Records of Exams: NIS-1 Forms. Prepare records of the preservice and inservice

examinations of Class 1 and Class 2 pressure retaining components and their supports on ASME Form NIS-1, "Owner's Report for Inservice Inspections." Information to be included on Form NIS-1, which expedites documentation of the required information, includes identification of the component (i.e., name of component, name of manufacturer, manufacturer serial number, state number, national board number), examination dates, the applicable Section XI edition and addenda, and abstracts of the examination and tests, including results, and any corrective measures (IWA-6230).

Section XI examinations are performed on the basis of a 10-year interval (i.e., all components to be examined, are examined within 10 years), with examinations distributed over three 40-month periods. For the purpose of this burden calculation, it has been estimated that it takes 160 p-hours to obtain and document the information required on Form NIS-1 for the examinations during one 40-month examination period at one plant. This averages to approximately 50 p-hrs/year/plant, or a total industry recordkeeping burden of 4,900 p-hrs/year (98 plants X 50 p-hrs/year/plant). Four plants currently under construction were included here because they will be responsible for completing the Form NIS-1 for preservice exams during this clearance period. Voluntary implementation of ASME Code Case N-532, Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as required by IWA-4000 and IWA-6000, provides a less burdensome recordkeeping alternative. These records must be prepared following activities conducted during a refueling outage (approximately once every 18 months). It is estimated that the alternative recordkeeping associated with Code Case N-532 reduces burden by 10 p-hours per licensee annually. Thus, the annual reduction in industry recordkeeping burden associated with the Code Case N-532 is 940 p-hours/yr (94 plants X 10 p-hours). This results in a total recordkeeping burden of 3,960 p-hours/yr (4,900 p-hours/yr - 940 p-hours/yr).

- Records of Repairs: NIS-2 Forms. Document the repairs and replacements in the inservice inspection summary reports on existing Form NIS-2, "Owner's Report for Repair or Replacements." Information to be included on ASME Form NIS-2 includes identification of the component (i.e., name of component, name of manufacturer, manufacturer serial number, national board number, year built) and system, the applicable construction code and Section XI edition and addenda, repair organization, and a description of the work performed (IWA-6350).

Form NIS-2 expedites documentation of the required information. For the purpose of this burden calculation, it has been estimated that, on the average, 50 components are repaired each year by each plant in accordance with Section XI rules. It is estimated that it takes 2 hours to document the repair of an individual component on Form NIS-2. This results in a recordkeeping burden associated with this documentation of 100 p-hours/year/plant, or a total industry recordkeeping burden of 9,400 p-hrs/year (94 plants X 100 p-hrs/year/plant).

- ISI and IST Plans and Schedules. Prepare plans and schedules for preservice and inservice examination and tests (IWA-6210). It is estimated that the preparation of the plans and schedules for preservice and inservice examination requires 1,600 p-hours, and the plans and schedules for preservice and inservice testing requires 400 p-hours. Assuming that, on average, 10% of the plants prepared plans and schedules for examination and testing (plans and schedules are established for 10 year intervals), this would result in an industry recordkeeping burden of 19,600 p-hrs/year [(1,600 + 400)

p-hrs/plant x (0.10) (98) plants/year]. The plants currently under construction were included here because they will be responsible for completing plans and schedules for preservice exams during this clearance period.

- Records of Component Examination/Tests. Record the results of preservice and inservice examinations of components performed in accordance with Section XI, IWB/IWC/IWD/IWF-2000. Specific requirements for examinations are tabulated in IWB/IWC/IWD/IWF-2500-1 for components such as vessels, piping and their supports. A record of each examination includes the component identification, date of examination, specific Section XI requirement, type of examination (e.g., volumetric, surface, visual), equipment settings, and record of any indications. The examinations are distributed over a 10-year examination interval (three 40-month periods) with examinations being performed at, on average, 18-month refueling outages (i.e., two per clearance period). Therefore, on average, approximately 1/10 of the components are examined/year. The recordkeeping burden associated with these examinations is estimated at 1 hour/component. Based on an estimate of 4,000 components/plant, it takes 400 p-hrs/year/plant (4000 components/10 x 1 p-hour/component) to document the testing of these components for each plant, which results in a total industry recordkeeping burden of 39,200 p-hours/year (400 p-hrs/year/plant x 98 plants). The plants currently under construction were included here because they will be responsible for completing preservice exams and tests during this clearance period. Subsequent to the initial time estimate for this requirement, a number of rulemakings have incorporated by reference changes that have increased by burden by 3 hours per plant per year for PWRs and 4 hours per plant for BWRs. Therefore the additional record keeping burden associated with the records associated with the examinations results in a total industry recordkeeping burden of 312 p-hours/year (3 p-hrs/year/plant x 60 PWR plants + 4 p-hrs/year/plant x 30 BWR plants).
- Develop Containment ISI plan. The 1996 incorporation by reference of Subsections IWE and IWL into 10 CFR 50.55a requires licensees to develop an inservice inspection (ISI) plan for these subsections, implement that ISI plan, and then develop and implement 10-year updates to that ISI plan. The development of the initial ISI plan is estimated to average 4000 p-hrs for a new licensee. All 94 operating plant licensees have completed the development of the ISI plan. The four plants currently under construction will need to develop this plan during this clearance period for an industry burden of 16,000 p-hrs (4000 p-hrs x 4). This results in an annualized burden of 1,333 p-hrs/yr (4000 p-hrs x 4 / 3years). (one-time recordkeeping)
- Implement Containment ISI Plan. It is estimated that recordkeeping for implementing the Containment ISI plan requires 600 p-hrs/yr for each plant performing ISI of the containment. Assuming that on the average 10 plants per year perform ISI of the containment, this results in an industry burden of 6,000 p-hrs/yr. This burden estimate was amended through a series of rulemakings to 598 hours per p-hrs/yr. Every 10 years each licensee must update the ISI plan. Update of the plan is estimated to average 180 p-hrs per plant. Assuming that 10 plants per year update their containment ISI plans, this results in an industry burden of 1,800 p-hrs/yr. The total recordkeeping burden is estimated to be 7,780 p-hrs/yr ((598 p-hrs/yr + 180 p-hrs/yr) x 10 plants).

The following additional significant recordkeeping requirements result from implementation of specific Section XI technical requirements:

- Reactor Vessel Exam. The 1995 Edition up to and including the 2007 Edition through the 2008 Addenda of Section XI requires examination of essentially 100% of the length of all reactor vessel shell welds during the 2nd, 3rd, and 4th inspection intervals. (Section XI has required examination of essentially 100% of the length of reactor vessel shell welds during the 1st interval since the 1974 Edition as modified by addenda through the 1975 Addenda.) Although the data from these examinations is generally automatically recorded and processed, it is estimated that about 200 p-hrs is required to assemble, review, and summarize the additional data that is collected once during each 10-year inspection interval. On average, about 10 percent of all operating plants perform the reactor vessel shell weld examinations each year. Therefore, the additional recordkeeping burden per year resulting from the specified reactor vessel examination is estimated to be 1,880 p-hrs/year (200 p-hrs/plant x [10 x 94] plants/year).
- Qualification of NDE personnel. Section XI, Mandatory Appendix VII, "Qualification of Nondestructive Examination Personnel for Ultrasonic Examination," specifies requirements for the training and qualification of ultrasonic nondestructive examination (NDE) personnel in preparation for employer certification to perform NDE. Appendix VII specifies requirements for qualification records. These records include those for recertification (e.g., name of individual, qualification level, educational background and experience, statement indicating satisfactory completion of prior training, record of annual supplemental training, results of vision examinations, and current qualification examination results). It is estimated that it takes 65 p-hrs/plant/year to prepare and maintain the specified training records. This results in a yearly recordkeeping industry burden of 6,370 p-hrs/year (98 plants x 65 p-hr/plant/year).
- ASME QAI-1 Specification. Table IWA-1600-1 references a revised ASME QAI-1 specification which requires that Authorized Inspection Agencies be accredited by ASME. It is estimated that the records associated with this requirement results in an average of 10 p-hrs per plant per year. The total industry recordkeeping burden is estimated to be 980 p-hrs/yr (10 p-hrs/plant-yr x 98 plants). This estimate is based on discussion with an authorized nuclear inspection (ANI) organization, but the impact has been assigned to the owners who ultimately pay for ANI services.
- Visual examinations. IWA-2210 describes visual examination requirements and requires calibration records for light meters and test charts. It is estimated that the records associated with these requirements result in an average of 1 p-hr per plant per year. The industry recordkeeping burden is estimated to be 98 p-hrs/yr (i.e., 1 p-hr/plant-yr x 98 plants).
- Near-distance test chart. IWA-2322 requires that, before the near-distance test chart is used for the first time, an optical comparator or other suitable instrument be used to verify the height of a representative lower case character. It is estimated that the records associated with this requirement result in an average of 2 p-hrs at each plant once a licensee updates its ISI program to the 1991 Addenda or later edition and addenda. It is estimated that 20 plants will implement this new requirement during the 3-year clearance period. The industry recordkeeping burden is estimated to be

13.4 p-hrs/year (i.e., 2 p-hrs/plant x 20 plants/3 years).

- Repair plans. IWA-4150 requires repair/replacement activity details to be documented in repair/replacement plans. It is estimated that the records associated with this requirement results in an average of 1 p-hr for each repair operation, and an average of 100 repair plans per plant per year is assumed. Therefore, the industry recordkeeping burden is estimated to be 9,400 p-hrs/yr (100 p-hrs/plant/yr x 94 plants).
- PWR Steam Generator Slewing. IWB-4720 requires an estimated 4 p-hrs for records for each pressurized water reactor (PWR) plant in conjunction with each series of steam generator slewing operations during any refueling outage. The records include the Slewing Procedure Specification, procedure qualification, performance qualification for personnel, location records, and examination records. If slewing operations are performed an average of three times each ten-year interval for each PWR plant, the industry recordkeeping burden is estimated to be 77 p-hrs/yr (64 PWR plants x 3 times/10 years x 4 hrs each).
- Qualification records. Appendix VIII, Article VIII-5000 requires that qualification records be kept. The records are generated when the qualification activities are performed. A conservative estimate is that ten percent of the total initial Appendix VIII qualification costs per plant applies to records. The costs are equivalent to an average per plant total of 260 p-hrs for Appendix VIII records. The recordkeeping burden, estimated to be a one-time total of 24,440 p-hrs or an annualized 8,147 hours (260 p-hrs/plant x 94 plants/3), has been completed for the 94 operating plants. No new procedure qualifications for the plants under construction are expected during the clearance period. (one-time recordkeeping).
- Code Case N-513-2, Evaluation Criteria for Temporary Acceptance of Flaws in Class 3 Piping, permits licensees to voluntarily adopt provisions for temporary acceptance of a flaw in certain piping. This requirement was incorporated into a NonMandatory Appendix. Use of this Appendix is voluntary and only used by licensees if it benefits them, no burden will be considered.
- Code Case N-523-2, Mechanical Clamping Devices for Class 2 and 3 Piping, allows the use of mechanical clamping devices for Class 2 and Class 3 piping. This requirement was incorporated into a NonMandatory Appendix. Use of this Appendix is voluntary and only used by licensees if it benefits them, no burden will be considered.
- Welding/Brazing Qualification Records. It is assumed that the recordkeeping associated with the current ASME Code requirement is that each licensee performs procedure qualifications 6 times in each 3-year clearance period, and that the recordkeeping associated with each procedure qualification is 8 p-hours. Therefore, there are 98 reactors X 6 procedure qualifications ) 3 years = 196 procedure qualifications performed each year. The industry recordkeeping burden for the current ASME Code requirement is 196 procedure qualifications/year X 8 p-hours per procedure qualification = 1,568 p-hours/year. Voluntary implementation of ASME Code Case N-573, Transfer of Procedure Qualification Records Between Owners, provides a less burdensome recordkeeping alternative for qualification records of welding and brazing procedures related to repair and replacement activities. It is estimated that the

alternative recordkeeping associated with Code Case N-573 reduces the number of procedure qualifications performed each year by half. Thus, the industry decrease in recordkeeping burden is 784 p-hrs/yr (1,568 p-hours/2). The resulting total burden associated with the welding/brazing qualifications is 784 p-hrs/yr (1,568 p-hours/year - 784 p-hrs/yr). The plants currently under construction were included here because they will be responsible for completing welding/brazing procedure qualifications during this clearance period.

### **OM Code**

- Records of Pump Tests. Record the results of the preservice and inservice pump tests in accordance with OM Code Subsection ISTB, which provides rules for the preservice and inservice testing of pumps to assess the operational readiness of certain centrifugal and positive displacement pumps. The inservice tests, like the inservice examinations, are established for a 10-year interval, but the testing is performed on a quarterly basis. A record of each test includes the pump identification, date of test or examination, reason for test or examination, test or examination procedure used, values of measured parameters, identification of test equipment used, calibration records, comparisons with allowable ranges of test and examination values and analysis of deviations, and requirements for corrective action. It is estimated that it takes 80 p-hrs to document the testing of the quarterly pump tests for each plant, which results in a yearly burden for each plant of 320 p-hrs. This results in a total industry recordkeeping burden of 30,080 p-hrs/yr (320 p-hrs/yr x 94 plants). The 2012 Edition of the ASME OM Code specifies the use of Mandatory Appendix V, "Pump Periodic Verification Test Program." Mandatory Appendix V establishes the requirements for implementing a pump periodic verification test. The test verifies that pumps that are in a licensee's inservice testing program can meet the required (differential or discharge) pressure as applicable, at its highest design basis accident flow rate. The test, if required, must be performed once every two years. If a pump does not have a specific design basis accident flow rate in the licensee's credited safety analysis, or if a pump's comprehensive test flow rate and (differential or discharge) pressure bound the pump's design basis accident flow rate and (differential or discharge) pressure, a pump periodic verification test is not required. Approximately 17 operating plants and one of the new plants will perform these tests every refueling outage (approximately every 2 years) starting in 2019 for operating plants and in 2020 for new plants.
- Records of Valve Tests. Record the results of the preservice and inservice valve tests in accordance with OM Code Subsection ISTC, which provides rules for the preservice and inservice testing of valves to assess the operational readiness of certain valves and pressure relief devices. The inservice tests, like the inservice examinations, are established for a ten-year interval, but the testing is performed on a frequency, depending on the valve, from quarterly to every ten years. The types of records to be retained for valve testing are similar to those identified above for pump testing. Because of the greater number of valves tested, it is estimated that it takes 200 p-hrs to document the periodic valve tests for each plant, which results in a yearly burden for each plant of 800 p-hrs. This results in a total industry recordkeeping burden of 75,200 p-hrs/yr (800 p-hrs/yr x 94 plants). The changes in the rule to adopt the 2009 and 2012 Editions of the OM Code will allow plants to avert quarterly testing but will require adding biannual testing. Seventy-three operating sites and two new sites will avert the



quarterly tests but add biannual tests and 10-year diagnostic tests for the remaining life of the reactor starting in 2019.

- Mandatory Appendix III Inservice Testing of Motor-Operated Valves. The proposed condition in 10 CFR 50.55a(b)(3)(ii) imposes three supplemental requirements on the use of Mandatory Appendix III, "Preservice and Inservice Testing of Active Electric Motor Operated Valve Assemblies in Light-Water Reactor Power Plants," in the 2009 Edition of the ASME OM Code. Mandatory Appendix III represents the incorporation of ASME OM Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor Operated Valve Assemblies in Light-Water Reactor Power Plants," and Code Case OMN 11, "Risk-Informed Testing for Motor-Operated Valves," into the OM Code. The three supplemental requirements proposed in 10 CFR 50.55a(b)(3)(ii) are (A) MOV diagnostic test interval, (B) MOV testing impact on risk, and (C) MOV risk categorization. Sixty-seven operating plants will make these procedural revisions by 2019. Seventy-three operating sites and two new sites will avert the quarterly tests but add biannual tests and 10-year diagnostic tests for the remaining life of the reactor starting in 2019.
- Pump Pressure Instruments. Table ISTB 4.7.1-1 (1994 Addenda) requires more accurate pressure instruments for the comprehensive and preservice pump tests. Records are required for the procurement and periodic calibration of these instruments. The burden is estimated at one p-hr per plant per instrument per year. Assuming three instruments per plant, it is estimated that the industry recordkeeping burden is 282 p-hrs/yr (3 instruments x 1 p-hr/yr x 94 plants).
- Alternative Rules for Testing Valves. Code Case OMN-1, Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light Water Reactor Power Plants, requires that the adequacy of the initial test interval for certain electric operated valve assemblies be evaluated between 5 and 6 years after implementation of Code Case OMN-1. The Code Case is a voluntary alternative, and this is a one-time burden. Assuming that half of the plants choose to implement the Code Case, the estimated industry recordkeeping burden is 4,700 p-hrs/yr (1 p-hr/evaluation x 100 motor-operated valves x 47 plants) (one-time recordkeeping starting approximately November 22, 2004).

#### **10 CFR 50.55a**

- Requests for alternatives. 10 CFR 50.55a(z) allows applicants to use alternatives to the requirements of 10 CFR 50.55a paragraphs (c), (d), (e), (f), (g), and (h) when authorized by the NRC. It is estimated that all (94) of the plants will choose to use alternatives to the requirements of the 1998 Edition through 2013 Edition of the ASME Boiler and Pressure Vessel Code or the 1995 Edition through the 2012 Edition of the *ASME Code for the Operation and Maintenance of Nuclear Power Plants*. The estimated burden to prepare and submit an alternative to the NRC for authorization is 380 p-hours per alternative. The NRC staff assumes that each plant will submit an average of 3 alternatives per year (2 for ASME Section XI and 1 for the OM Code), for an annual burden of 107160 hours (3 requests for alternatives x 380p-hours/request x 94 plants = 107,160 hours).

In addition, NRC staff estimates that one plant per year will submit a request for alternatives associated with digital upgrades of their safety instrumentation and control (I&C), for an annual burden of 380 hours (1 request x 380 hours = 380 hours).

It is estimated that all four of the plants for which a combined license (COL) was issued under Part 52 will choose to use alternatives to the requirements of the 1998 Edition through 2013 Edition of the ASME Boiler and Pressure Vessel Code or the 1995 Edition through the 2012 Edition of the ASME *Code for the Operation and Maintenance of Nuclear Power Plants*. The estimated burden to prepare and submit an alternative to the NRC for authorization is 380 plant-hours per alternative. NRC staff assumes that each COL plant will submit an average of 6 alternatives during this clearance period (3 for ASME Section III, 1 for Section XI, 1 for OM Code, and 1 for IEEE-603), the estimated industry reporting burden for new reactors is 3040 plant-hrs/year (2 alternatives/year/plant x 380 plant-hrs/alternative x 4 COL plants).

The total burden for requests for alternatives is estimated for be 110,580 hours (107,160 for operating reactors + 3040 for COLs + 380 hours for I&C).

- 50.55a(b)(3)(v): Snubbers. 10 CFR 50.55a(b)(3)(v) requires that a licensee voluntarily choosing to use Subsection ISTD for the examination of snubbers may do so after processing a one-time plant technical specification or licensee-controlled documents change. All of the plants will have to implement Subsection ISTD for the examination of snubbers once they implement the 2005 Addenda (or later Editions/Addenda) of the ASME OM Code. It is estimated that 20 plants will implement ISTD during the next three years. The estimated one-time reporting burden to prepare a technical specification change during the next three years is 2,000 p-hrs (100 p-hrs/plant x 20 plants). This results in an annual burden of 667 p-hrs/yr (100 p-hrs/plant x 20 plants / 3 years).
- Relief requests. 10 CFR 50.55a(f)(5) and 10 CFR 50.55a(g)(5) allow applicants to request relief from Code requirements determined to be impractical. It is estimated that all (104) of the plants will need to request relief from some of the requirements of the ASME B&PV Code or the ASME OM Code. The estimated burden to prepare and submit a request for relief from Code requirements is 380 p-hours per relief request. Assuming each plant submits an average of 4 relief requests per year (3 for ASME Section XI and 1 for the OM Code), the estimated industry reporting burden is 142,880 p-hrs/year (4 relief requests/year/plant x 380 p-hrs/relief request x 94 plants).

A number of changes to the ASME Code, incorporated by reference through the rulemaking process, have resulted in a reduction or an increase in the number of relief requests submitted over time. The current estimate is based on the actual number of relief requests received by the NRC over the past three years, and therefore incorporates the reductions and increases that resulted from these rulemakings:

10 CFR 50.55(f) addresses quality assurance program requirements for holders of construction permits. The NRC does not anticipate any applications for new reactors within the reporting period (2018-2021). (10 CFR 52.83, applicable to new reactor applications, invokes the provisions of 10 CFR 50, including 10 CFR 50.55(f).)

10 CFR 50 Appendix A, General Design Criteria for Nuclear Plants, Criteria 1, requires maintenance of records of the design, fabrication, erection, and testing of structures, systems, and components important to safety throughout the life of the unit.

10 CFR 50 Appendix B. Each nuclear power plant subject to the criteria in 10 CFR 50 Appendix B shall implement the quality assurance program described or referenced in the Safety Analysis Report for the facility. 10 CFR 50 Appendix B requires that sufficient records be maintained to furnish evidence of activities affecting quality. Appropriate records of the design, fabrication, erection and testing of structures, systems and components important to safety shall be maintained by the licensee throughout the life of the plant, including:

1. Management: QA plan, procedures, and instructions
2. Qualification and training of personnel
3. Design
4. Procurement, items identification/control, acceptance status
5. Special processes
6. Manufacture, installation/testing
7. Calibration
8. Handling, storage and shipping
9. Inspection, test, and operating status
10. Non-conformance, corrective action
11. Audits
12. Modification, maintenance, and repair
13. Operation
14. QA plans in support of Part 52 applications

10 CFR 50.59(c) allows a holder of a license authorizing operation of a production or utilization facility or for a facility that has ceased operation to (i) make changes in the facility as described in the Final Safety Analysis Report (FSAR), (ii) make changes in procedures as described in the Final Safety Analysis Report, and (iii) conduct tests or experiments not described in the Final Safety Analysis Report, without prior Commission approval, unless the proposed change, test or experiment involves a change to the technical specifications incorporated in the license or meets one or more specified criteria, which would more than minimally decrease safety, in which case prior Commission approval is required prior to making the change.

10 CFR 50.59(d) requires the facility licensee (for 94 operating power reactors, 31 operating non-power (research/test) reactors, 24 permanently shutdown power reactors being decommissioned, and 4 permanently shutdown non-power reactors) to maintain records of changes in the facility, of changes in procedures, and of tests and experiments and to submit a report containing a brief description of any changes, tests, and experiments, including a summary of the evaluation of each. The report must be submitted at intervals not to exceed 24 months. This report generally consists of a few pages. The records of changes in the facility must be maintained until the termination of the license is issued. Records of changes in procedures and records of tests and experiments must be maintained for a period of 5 years.

10 CFR 50.60, "Acceptance criteria for fracture prevention measures for light water nuclear power reactors for normal operation" provisions are as follows: (a) except as provided in 10 CFR 50.60(b), all light water nuclear power reactors, other than reactor facilities for which 10 CFR 50.82(a)(1) certifications have been submitted, must meet the fracture toughness and material

surveillance program requirements for the reactor coolant pressure boundary set forth in 10 CFR 50 Appendix G and 10 CFR 50 Appendix H; and (b) proposed alternatives to the described requirements in 10 CFR 50 Appendix G and 10 CFR 50 Appendix H may be used when an exemption is granted by the Commission under 10 CFR 50.12.

10 CFR 50 Appendix G specifies minimum fracture toughness requirements for ferritic materials of pressure-retaining components of the reactor coolant pressure boundary of light water nuclear power reactors. The Section I Note requires the adequacy of the fracture toughness of other ferritic materials not covered in Section I to be demonstrated on an individual basis. Section III.A requires supplemental information for a reactor vessel constructed to an American Society of Mechanical Engineers (ASME) Code earlier than the Summer 1972 Addenda of the 1971 Edition to demonstrate equivalence with the fracture toughness requirements of 10 CFR 50 Appendix G. Section III.B requires the submission and approval prior to testing of test methods for supplemental fracture toughness described in Section IV.A.1.b. Section III.C requires that records of the fracture toughness test program be retained until termination of the license to comply with ASME Code requirements. Section IV.A.1 requires licensees to maintain upper-shelf energy throughout the life of the reactor vessel of no less than 50 ft-lbs unless it is demonstrated that lower values of upper-shelf energy will provide margins of safety against fracture equivalent to those required by Appendix G of the ASME Code, "Fracture Toughness Criteria for Protection Against Failure." The analysis for satisfying this section must be submitted for review and approval on an individual-case basis at least 3 years prior to the date when the predicted Charpy upper-shelf energy will no longer satisfy the requirements of Section IV.A.1, or on a schedule approved by the NRC. Section IV.A.2 requires licensees to provide pressure-temperature limits for the reactor vessel. Both upper-shelf energy and pressure-temperature limits are dependent upon the predicted radiation damage to the reactor vessel.

10 CFR 50 Appendix H requires a material surveillance program for each reactor vessel to monitor changes in the fracture toughness of the reactor vessel beltline materials resulting from their exposure to neutron irradiation and the thermal environment. Under the program, fracture toughness test data are obtained from material specimens exposed in surveillance capsules, which are withdrawn periodically from the reactor vessel. Section III.B.1 requires test procedures and reporting requirements that meet the requirements of American Society for Testing and Materials (ASTM) E 185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," to the extent practical for the configuration of the specimens in the capsule. Section III.B.3 requires a proposed withdrawal schedule and technical justification to be submitted to and approved by the NRC. Section III.C.1 requires integrated surveillance programs for reactors with similar design and operating features to be submitted to NRC for approval. Criteria for approval include, among other items, an adequate dosimetry program, a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected. Section III.C.3 requires that any reduction in the amount of testing must be authorized by NRC. Section IV requires: A.) a summary technical report, submitted to NRC, of test results obtained from each capsule withdrawal, within one year of the date of capsule withdrawal, unless an extension is granted by NRC; B.) that the report include the data specified in Section III.B.1 of 10 CFR 50 Appendix H and the results of all fracture toughness tests conducted on the beltline materials in the irradiated and unirradiated conditions; and C.) if a change in the Technical Specifications (TS) is required, either in the pressure-temperature limits or in the operating procedures required to meet the limits, the expected date for submittal of the revised TS must be provided with the report.

10 CFR 50.61(b)(1) requires each PWR licensee, other than a licensee for a PWR for which 10 CFR 50.82(a)(1) certifications have been submitted, to have projected values of  $RT_{PTS}$ , accepted by the NRC, for each reactor vessel beltline material for the expiration date of the operating license (EOL) fluence of the material. The assessment must use the calculation procedures given in 10 CFR 50.61 and must specify the bases for the projected value, including the assumptions regarding core loading patterns, and must specify the copper and nickel contents and the fluence value used in the calculation for each beltline material. This assessment must be updated whenever there is a significant change in projected values of  $RT_{PTS}$ , or upon a request for a change in the expiration date for operation of the facility. For PWRs with a construction permit issued before February 3, 2010, projected values of  $RT_{MAX-X}$  per 10 CFR 50.61a, "Alternative Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," could be used as an alternative.

10 CFR 50.61(b)(3) provides for submittal and anticipated approval by the NRC of detailed plant-specific analyses, submitted to demonstrate acceptable risk with  $RT_{PTS}$  above the screening limit due to plant modifications, new information, or new analysis techniques.

10 CFR 50.61(b)(4) requires licensees for PWRs for which the analysis required by 10 CFR 50.61(b)(3) indicates that no reasonably practical flux reduction program will prevent  $RT_{PTS}$  from exceeding the PTS screening criterion to submit a safety analysis to determine what, if any, modifications to equipment, systems, and operation are necessary to prevent potential failure of the reactor vessel as a result of postulated PTS events if continued operation beyond the screening criterion is allowed. This analysis must be submitted at least three years before  $RT_{PTS}$  is projected to exceed the PTS screening criterion.

10 CFR 50.61(b)(6) states that if NRC concludes that operation of the facility with  $PT_{PTS}$  in excess of the PTS screening criterion cannot be approved on the basis of the licensee's analyses submitted in accordance with 10 CFR 50.61(b)(3) and (4), the licensee shall request and receive approval by NRC prior to any operation beyond the criterion.

10 CFR 50.61(c)(3) requires licensees to report to NRC any information believed to significantly improve the accuracy of the  $RT_{PTS}$  values.

10 CFR 50.62 requires the installation of certain equipment in nuclear power plants to prevent and mitigate anticipated transient without scram (ATWS) events. The licensee for a nuclear power plant is required, by 10 CFR 50.62(c)(6), to submit a copy of equipment design and installation plans to the NRC to ensure that the equipment will perform its intended safety function. The burden to provide this information is included in the OMB clearance for 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants" (3150-0151). The information is included in an applicant's Final Safety Analysis Report (FSAR). 10 CFR 52.47, 52.79, 52.137, and 52.157 require that applicants for standard design certifications, combined licenses, standard design approvals, and manufacturing licenses include the information required by this section in their FSAR.

10 CFR 50.62(d) requires the licensee to submit a schedule to the NRC for implementing the requirements of 10 CFR 50.62. This provision allows the establishment of implementation schedules that are tailored to the safety priority needs and resources of the individual licensee. This requirement is complete.

The provisions of 10 CFR 50.63 require each licensed light-water-cooled nuclear power plant to be able to withstand for a specified duration and recover from a site blackout. This information collection has been completed for all current licensees. No new reactor licenses will be issued during this clearance period.

10 CFR 50.63(a)(2) states that the capability for coping with a site blackout of specified duration shall be determined by an appropriate coping analysis. Utilities are expected to have the baseline assumptions, analyses, and related information used in their coping evaluations available for NRC review. Information for plants licensed to operate prior to September 27, 2007 is complete. The burden to provide this information is included in the OMB clearance for 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants" (3150-0151). The information is included in an applicant's Final Safety Analysis Report (FSAR).

10 CFR 50.63(c)(1) requires light-water-cooled nuclear power plant licensed to operate after July 21, 1988, but before September 27, 2007 to submit the following information 270 days after the date of license issuance:

- (i) A proposed station blackout duration for use in determining compliance with 10 CFR 50.63, including a justification for the selection based on the following factors: (i) the redundancy of the onsite emergency AC power sources; (ii) the reliability of the onsite emergency AC power sources; (iii) the expected frequency of loss of offsite power; and (iv) the probable time needed to restore offsite power.
- (ii) A description of the procedures that will be implemented for site blackout events for the duration determined in (i), above, and for recovery therefrom.
- (iii) A list of modifications to equipment and associated procedures, if any, necessary to meet the requirements of 10 CFR 50.63 for the specified site blackout duration determined in (i), above, and a proposed schedule for implementing the stated modifications.

10 CFR 50.63(c)(4) requires licensees for plants licensed to operate on or before June 21, 1988, to submit a schedule commitment for implementing any equipment and associated procedure modifications. This submittal was required within 30 days after receipt of NRC's regulatory assessment and was required to include an explanation of the schedule and a justification if the schedule did not provide for completion of the modifications within two years of the notification. Thus, all information collection is now complete.

Section 50.64(b)(1) limits the use of highly enriched uranium (HEU) fuel in non-power reactors. This regulation requires that new non-power reactors use low enriched uranium (LEU) fuel unless the applicant demonstrates a "unique purpose" as defined in 50.2. Moreover, section 50.64(b)(2) requires that existing non-power reactors replace HEU fuel with acceptable LEU fuel when available.

Section 50.64(c)(1) states any request by a licensee for a determination that a non-power reactor has a unique purpose as defined in 50.2 should be submitted with supporting documentation to the Director of the Office of Nuclear Reactor Regulation.

Section 50.64(c)(2)(i) requires that licensees authorized to possess and use HEU fuel submit to

the NRC written documentation containing a schedule of when a Safety Analysis Report will be submitted and when other events will take place in the conversion from HEU to LEU fuel. This documentation should be updated annually until the Safety Analysis Report is submitted. This documentation containing the schedule will be based upon the availability of replacement fuel acceptable to the NRC and consideration of other factors such as the availability of shipping casks, financial support, and reactor usage.

Section 50.64(c)(2)(ii) requires the licensee authorized to possess and use HEU fuel to submit a statement to the NRC that Federal Government funding for conversion to LEU is not available (with supporting documentation) in lieu of the requirement of section 50.64(c)(2)(i) above. If this statement of non-availability of Federal Government funding is submitted, the licensee will be required to resubmit a proposal for meeting the requirements of 50.64(b)(2) or (3) at 12-month intervals.

Section 50.64(c)(2)(iii) requires that the proposal include, to the extent required to effect the conversion, all necessary changes in the license, facility, or procedures. Supporting safety analyses should also be provided so as to meet the schedule established for conversion.

Section 50.65 contains requirements pertaining to the monitoring of the effectiveness of maintenance at nuclear power plants. This performance-based rule requires monitoring of the overall continuing effectiveness of licensee maintenance programs by means of licensee tracking of the performance (in terms of availability and/or reliability) or condition of structures, systems or components (SSCs) within the scope of the rule as defined in 10 CFR 50.65(b), with the objective that: (1) safety-related and certain non-safety related SSCs remain capable of performing their intended functions; and (2) the non-safety related SSCs will not fail in a manner that could prevent the fulfillment of safety-related functions, or result in reactor scrams or trips and unnecessary actuations of safety-related systems. For a nuclear power plant for which the licensee has submitted the certifications specified in 10 CFR 50.82(a)(1) (i.e., a decommissioned plant), 10 CFR 50.65 applies to the extent that the licensee shall monitor the performance or condition of all SSCs associated with the storage, control, and maintenance of spent fuel in a safe condition, in a manner sufficient to provide reasonable assurance that such structures, systems, and components remain capable of fulfilling their intended functions. 10 CFR 50.65(a)(4), added in 2000, requires assessing and managing risk associated with maintenance activities.

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 which requires a license amendment, 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 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, the projected post-annealing reembrittlement trends for both  $RT_{NDT}$  and Charpy upper-shelf energy, and their projected values at the end of the proposed period of operation addressed in the Thermal Annealing Report.

Regulatory Guide (RG) 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 C2.1 of RG 1.162 directs the licensee to retain reactor annealing measurement records until the facility license is terminated.

GUIDANCE DOCUMENTS FOR INFORMATION COLLECTION REQUIREMENTS  
CONTAINED IN  
10 CFR PART 50  
ISSUANCE, LIMITATIONS, AND CONDITIONS OF LICENSES AND CONSTRUCTION PERMITS  
SECTION 5  
(10 CFR 50.30 – 50.39)

3150-0011

Title	Accession number
Regulatory Guide 1.160, Rev. 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (endorses industry guidance document, Nuclear Utility Management and Resources Committee (NUMARC) 93-01, Rev. 2, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.")	ML113610098
Regulatory Guide 1.162, "Format and Content of Report for Thermal Annealing of Reactor Pressure Vessels"	ML003740052
Regulatory Guide 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping"	ML032510128
Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants" (endorses a February 2000 revision to Section 11 of NUMARC 93-01 which provided the industry guidance on implementation of 10 CFR 50.65(a)(4))	ML003740117
Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"	ML100910006
Regulatory Guide 1.175, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Inservice Testing"	ML003740149
Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities"	ML090410014