

DRAFT SUPPORTING STATEMENT FOR  
10 CFR PART 50  
STANDARDS FOR LICENSES, CERTIFICATIONS AND REGULATORY APPROVALS  
SECTION 7

(50.44(c), Hydrogen Control Requirements;  
Appendix K, 50.46, Acceptance Criteria for Emergency Core Cooling Systems (ECCS);  
50.47, 50.54(q & t), Appendix E, Emergency Planning;  
50.48, Appendix R, Fire Protection;  
50.49, Environmental Qualification;  
50.120, Training & Qualification of Nuclear Power Plant Personnel;  
Appendix J, Primary Reactor Containment Leakage Testing For  
Water-Cooled Power Reactors;  
Appendix S, 50.54(ff), Earthquake Engineering Criteria for Nuclear Power Plants)

3150-0011

ABSTRACT

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50 contains the Nuclear Regulatory Commission's (NRC) requirements and provisions for "Standards for Licenses, Certifications and Regulatory Approvals.

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.

These regulations affect 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities" licensees for operating nuclear power plants, licensed non-power production and utilization facilities (NPUF), other new technologies (ONTs), such as light (LWRs) and non-light-water reactors (non-LWRs), and power plants that are currently being decommissioned. Also, license and permit holders, and applicants under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." These entities total 195 respondents for the current clearance cycle. Licensees may

voluntarily submit a request for an exemption to the Commission and maintain a record of that request.

Licenseses must perform certain tasks, maintain records and prepare reports to demonstrate their fulfillment of regulatory requirements. The reporting and recordkeeping requirements pertain to hydrogen control analyses; licensee emergency preparedness plans; fire protection plans; records documenting drills and training records for each fire brigade member; list of electric equipment important to safety; documents related to the establishment, implementation and maintenance of the training and qualification of nuclear power plant personnel; pre-operational and periodic tests must be documented in a readily available summary report and made available for inspection upon request at the nuclear power plant.

This renewal incorporates information collection changes made as part of the Emergency Preparedness (EP) for Small Modular Reactors (SMR) and Other New Technologies (ONT) Final Rule, approved by OMB on October 13, 2023. To allow maximum flexibility while continuing to provide adequate protection of public health and safety and the common defense and security, the NRC made the new EP requirements an alternative to the current requirements. Thus, existing SMR or ONT facilities or future facilities licensed after the effective date of the final rule will use either the new performance-based EP program or the existing deterministic EP requirements in 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 CFR 50.44c; 50.46; 50.47; 50.54(q & t). 50.48; 50.49; 50.120 and Appendix S, 50.54(ff). Details of these regulations can be found at the end of this supporting statement in Appendix A, "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. The emergency plans provide reasonable assurance that adequate protective measures can and will be taken

in the event of a radiological emergency. The emergency preparedness information submitted by licensees enables the NRC to determine the adequacy of the emergency plan, in regard to compliance with the emergency preparedness regulations. This includes whether additional regulatory oversight is needed. The information is also used to update information in the NRC Emergency Operations Center used in support of an NRC's response to an actual emergency, drill, or exercise.

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 90% 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

The regulations cited previously affect both commercial power reactor licensees and non-power reactor licensees (e.g., research and test reactors operated by colleges and universities). Appendix E to 10 CFR Part 50 states that Regulatory Guide 2.6<sup>1</sup> will be used as guidance for the acceptability of research and test reactor emergency response plans. Regulatory Guide 2.6 endorses ANSI/ANS-15.16-1982.<sup>2</sup> The American Nuclear Society revised ANSI/ANS-15.16-1982 on September 13, 2008, and the NRC is pursuing endorsement of ANSI/ANS-15.16-2008 with a revision to Regulatory Guide 2.6. In addition, NUREG-0849<sup>3</sup> addresses emergency plans for research and test reactors. Together, these documents present the non-power reactor emergency planning and preparedness requirements.

The emergency preparedness recordkeeping and reporting burden for non-power reactors is less than for power reactors, because the requirements are based on the potential risks associated with the specific reactor, and the corresponding need to protect the health and safety of the public and the environment. Non-power reactors are much smaller than power reactors, and as such, create a lesser risk from credible accidents.

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<sup>1</sup> Regulatory Guide 2.6, Emergency Planning for Research and Test Reactors, Rev. 2, September 2017.

<sup>2</sup> ANSI/ANS-15.16-1982, American National Standard for Emergency Planning for Research Reactors, October 11, 1982.

<sup>3</sup> NUREG-0849, Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors, October 1983.

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 able 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.

If the information were not collected, or collected less frequently, the NRC could be unaware for an extended period of time that an existing or revised emergency plan is no longer adequate to protect the health and safety of the public and the environment. Without a timely review of information, changes to personnel, procedures, equipment, or facilities, or failure to maintain an effective emergency plan, could adversely affect emergency preparedness and response without the NRC imposing required corrective measures.

7. Circumstances which Justify Variation From OMB Guidelines

A licensee must submit a report under 10 CFR 50.46(a)(3)(ii) within 30 days of discovering any significant change or error so that NRC is apprised of significant safety issues requiring immediate resolution.

Section 50.4(b)(5) requires that written communications for emergency plans and related submissions, the signed original must be sent to the NRC Document Control Desk, with one copy to the appropriate Regional Office, and one copy to the appropriate NRC Resident Inspector (if one has been assigned to the site of the facility). This is required because the NRC has both a headquarters and regional offices, and an NRC Resident Inspector located at the site.

Section 50.54(q)(6) requires that licensees retain their emergency plan and each change that reduces the effectiveness of the plan as a record until the Commission terminates the reactor license, which is initially issued for 40 years. Section 50.54(t) requires that the results and recommendations from emergency plan and emergency preparedness program reviews be retained for five years. This ensures that the plans will be maintained and will provide appropriate documentation that will support NRC review.

Licensees must retain the fire protection plan until the NRC terminates the license in order to ensure the health and safety of the public.

The records required by 10 CFR 50.49(d) and 10 CFR 50.49(j) are required to be maintained for the life of the component so that the NRC and the licensees can periodically assess and determine if equipment important to safety at nuclear power plants

meets specified performance requirements.

Rather than requiring records to be routinely submitted to the NRC, 10 CFR 50.120 requires sufficient records to be maintained on-site to permit NRC verification of the adequacy of the programs. Pursuant to 10 CFR 50.71, program records are to be retained until termination of the license. Job performance qualifications are to be retained and maintained for each employee for the duration of employment. These record retention requirements result in an auditable trail for ensuring that training is developed, evaluated, and revised based on job performance requirements, and that power reactor personnel are qualified to perform their jobs.

Leakage test results, implementation plans, and records of the performance-based testing program must be kept for the operating lifetime of each nuclear plant for reference purposes.

8. Consultations Outside the NRC

Opportunity for public comment on the information collection requirements for this clearance package has been published in the Federal Register.

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).

11. Justification for Sensitive Questions

This regulation does not request sensitive information.

12. Estimated Industry Burden and Burden Hour Cost

Detailed burden estimates are included in the supplemental burden spreadsheet titled, "Burden worksheet for Section 7, Standards for Licenses, Certifications and Regulatory Approvals."

	Hours	Responses
Reporting	716,106	4224
Recordkeeping	381,622	158
<b>TOTAL</b>	<b>1,097,727</b>	<b>4,382</b>

The total estimated cost for information collection requirements in this section is estimated to be 1.097M hours at a cost of \$329.2M.

Detailed burden estimates are included in the supplemental burden spreadsheet titled, "Table 1 - Summary of Supporting Statements."

The \$300 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 2023 (88 FR 39120, June 15, 2023).

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 \$45,795 (381,622 recordkeeping hours x \$300 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 estimated cost to the government is shown on the attached Summary Table. The annualized cost to the government is estimated to be \$6.082M (20,275 staff hours x \$300/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**

	2021 estimates	Current submission	Change
Reporting	423,951	716,106	+292,155
Recordkeeping	412,819	381,622	-31,197
Total	836,770	1,097,727	+260,958

### Change in Responses

	2021 estimates	Current submission	Change
Reporting	4,484	4,224	-260
Recordkeeping	164	158	-6
Total	4,648	4,382	-266

The overall burden for this section increased from 836,770 to 1.097M hours an increase of 260,958 hours. Burden for reporting increased from 423,951 hours to 716,106 hours, an increase of 292,155 hours.

External programs are contributing to the progression of advanced reactor designs, causing an influx of applications during this clearance cycle. Due to these programs, ongoing robust pre-application engagements (i.e., topical report reviews), and meetings, discussions and continuous contact with prospective stakeholders, the agency is expected to receive applications for, construction permits (CP), early site permits (ESP), standard design approvals (SDAs) and certifications, manufacturing license (MLs), combined licensees (COLs), for commercial nuclear power reactors, as well as operating licenses (OLs) related to the licensing processes that apply to light-water reactors (LWR) and non-light water reactors (NLWR). The effects if any of these projected applications on the requirements in this section are captured below.

Additionally, digitized electronic recordkeeping and advancement in technology has impacted the burden to maintain records. Staff has recognized these advancements and applied burden accordingly. The effects if any are captured below.

#### Reporting Increases:

- Section 50.46(a)(3)(ii & iii), projected SDA & DC applicants or holders have increased the responses by 1 and 20 hours for this section.
- Section Appendix S and 50.54(ff), increases in construction permits and operating licenses have increased the respondents by 2 and 310,000 hours.

#### Reporting Decreases:

- Section 50.47, 50.54(q & t), Appendix E, (Operating Power Reactors), decreased by 3 responses due to a reduction in sites and 6,075 hours.
- Section App. E.IV.F.2.a,b, decreased by 1.5 respondents and 60 hours due to a reduction in sites participating in exercises.
- Section 50.47, 50.54(q & t), Appendix E, (non-power reactors being decommissioned and possession only), decreased by 5 respondents and 2,550 hours.
- Section 50.47, 50.54(q & t), Appendix E (Emergency Planning), decreased by 6 respondents and 6480 hours.
- Section Appendix S and 50.54(ff), NRC staff has determined through historical review, driving events are uncommon, and has decreased the respondents by 3 and 2,700 hours.

Recordkeeping overall has been reduced from 412,819 to 381,622 a reduction of 31,197 hours.

Additionally, digitized electronic recordkeeping and advancement in technology has impacted the burden to maintain records. Staff has recognized these advancements and applied burden accordingly. The effects if any are captured below:

Recordkeeping Increases:

- Section 50.44(c), increased by 5 recordkeepers and 5 hours.
- Section 50.49(a),(d),(f), (One-time environmental qualification) increased 1 recordkeeper and 793.3 hours.
- Section 50.49(d),(f),(j), (Environmental Qualification) increased 12 recordkeepers and 24,960 hours.
- Section 50.120(b), (Training & Qualification Records for Operating Reactors) increased 8 recordkeepers and 6,240 hours.
- Section 50.120(b), (Training & Qualification Records for Applicants) increased 5 recordkeepers and 7,200 hours.
- Section Appendix S and 50.54(ff), (Earthquake Engineering Criteria, CPA/OL, DC/COL applicants) increased 2 recordkeepers and 200 hours.

Recordkeeping Decreases:

- Section, 50.47, 50.54(q & t), Appendix E (Operating Power Reactors), decreased by 4 recordkeepers, 501 hours per recordkeeper due to advancement in technology as stated above, and 59,470 hours.
- Section, 50.47, 50.54(q & t), Appendix E (Operating Power Reactors Sites Being Decommissioned), decreased by 5 recordkeepers and 1,280 hours.
- Section, 50.48, Appendix R, decreased by 2 recordkeepers and 168 hours.
- Section, 50.155(a)(1), One-time Licensees review, decreased by 15 recordkeepers, and 4,725 hours; only 2 licensees are expected to comply during this clearance cycle.
- Section, 50.155(f)(1), removed all recordkeepers, these requirements are being maintained under Section 50.71(e); the hours per recordkeeper has been reduced from 100 per to 50 per due to advancement in technology as stated above and applied to Section 50.71(e) accordingly.
- Section, Appendix J, decreased by 6 recordkeepers and 360 hours.
- Section, Appendix S and 50.54(ff), decreased by 3 recordkeepers and 300 hours.
- Section, Appendix S IV(a)(3), decreased by 3 recordkeepers and 960 hours.

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 of Requirements**

### **50.155 Mitigation of beyond design-basis-events**

Section 50.34(i) requires applicants for power reactor operating licenses to include plans for implementing the requirements in 10 CFR 50.155, “Mitigation of Beyond-Design-Basis Events,” including a schedule for achieving full compliance, a description of the integrated response capability, and the equipment and location of the equipment upon which the strategies rely.

Section 50.155(a)(1) Each holder of an operating license for a nuclear power reactor under this part and each holder of a combined license under part 52 of this chapter for which the Commission has made the finding under § 52.103(g) of this chapter shall comply with the requirements of this section until submittal of the license holder's certifications described in § 50.82(a)(1) or § 52.110(a) of this chapter.

Section 50.155(f)(1) requires licensees to maintain documentation of changes in the implementation of the requirements of section 50.155. These documents are being maintained under the requirements in Section 50.71(e).

### **Standards for Licenses. Certifications and Regulatory Approvals**

#### **SECTION VI- (50.44(c), Hydrogen Control Requirements:**

10 CFR 50.44(b)(1), (2), (3), and (4)- contain requirements for a mixed atmosphere, combustible gas control, equipment survivability, and monitoring of hydrogen and oxygen concentrations during an accident, for currently-licensed reactors. Further, 10 CFR 50.44(b)(5) requires each current holder of an operating license for a boiling water reactor (BWR) with a Mark III-type of containment or for a pressurized water reactor (PWR) with an ice condenser-type of containment to perform certain detailed analyses regarding hydrogen control, structural capability, and equipment survivability. However, as noted above, all of the requirements have already been met for currently-licensed reactors.

10 CFR 50.44(c)- requires future water-cooled reactor applicants and licensees to:

(1) *Mixed Atmosphere*: Have a mixed atmosphere during accidents;

(2) *Combustible Gas Control*: Either have an inerted atmosphere or limit hydrogen concentrations in containment during and following an accident that releases an equivalent amount of hydrogen as would be generated from a 100 percent fuel clad-coolant reaction, uniformly distributed, to less than 10 percent (by volume) and maintain containment structural integrity and appropriate accident mitigating features.

(3) *Equipment Survivability*: Containments that do not rely upon an inerted atmosphere to control combustible gases must be able to establish and maintain safe shutdown and containment structural integrity with systems and components capable of performing their functions during and after exposure to the environmental conditions created by the burning of hydrogen. Environmental conditions caused by local detonations of hydrogen must also be included, unless such detonations can be shown unlikely to occur. The amount of hydrogen to be considered must be equivalent to that generated from a fuel clad-coolant reaction involving 100 percent of the fuel cladding surrounding the active fuel region.

(4) *Monitoring*: Equipment must be provided for monitoring oxygen in containments that use an inerted atmosphere for combustible gas control, and for monitoring hydrogen in all containments. Equipment for monitoring oxygen and hydrogen must be functional, reliable, and capable of continuously measuring the concentration of the monitored gas in the containment atmosphere following a significant beyond-design-basis accident for combustible gas control and accident management, including emergency planning.

(5) *Structural Analysis*: An applicant must perform an analysis that demonstrates containment structural integrity. This demonstration must use an analytical technique that is accepted by the NRC and include sufficient supporting justification to show that the technique describes the containment response to the structural loads involved. The analysis must address an accident that releases hydrogen generated from 100 percent fuel clad-coolant reaction accompanied by hydrogen burning. Systems necessary to ensure containment integrity must also be demonstrated to perform their function under these conditions.

10 CFR 50.44(d)- requires future non-water-cooled reactor applicants and licensees and certain future water-cooled reactor applicants and licensees to provide:

(1) Information addressing whether accidents involving combustible gases are technically relevant for their design; and,

(2) If accidents involving combustible gases are found to be technically relevant, information (including a design-specific probabilistic risk assessment) demonstrating that the safety impacts of combustible gases during design-basis and significant beyond-design-basis accidents have been addressed to ensure adequate protection of public health and safety and common defense and security.

## **SECTION VII- Appendix K. 50.46. ECCS**

10 CFR 50.46- provides an alternate method of meeting the 10 CFR 50 Appendix K requirements for Emergency Core Cooling Systems (ECCS). It permits licensees or applicants to analyze ECCS performance using realistic calculations. This method of calculation may remove some operating restrictions and, thus, motivate licensees to submit realistic analyses for review. This aspect of the rule represents a voluntary information collection burden to the industry. Realistic analyses are not required of licensees not electing this option.

10 CFR 50.46(a)(3)(i)- requires that each applicant for, or holder of, an operating license or construction permit, other than a holder of a license for a reactor facility for which the certifications required under 10 CFR 50.82(a)(1) have been submitted, shall estimate the effect of any change to, or error in, an acceptable evaluation model, or in the application of such a model, to determine if the change or error is significant. For this purpose, a significant change or error is one which results in a calculated peak fuel cladding temperature differing by more than 50°F from the temperature calculated for the limiting transient using the last acceptable model, or is a cumulation of changes and errors, such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50°F.

10 CFR 50.46(a)(3)(ii)- requires that, for each change to, or error discovered in, an acceptable evaluation model or in the application of such a model that affects the temperature calculation, the applicant or holder of a construction permit, operating license, combined license, or manufacturing license shall report the nature of the change or error, and its estimated effect on the limiting ECCS analysis, to the Commission at least annually. If the change or error is significant, the applicant or licensee shall provide this report within 30 days and include with the report a proposed schedule for providing a re- analysis or taking other action as may be needed to show compliance with 10 CFR 50.46 requirements. This schedule may be developed using an integrated scheduling system previously approved for the facility by the NRC. For those facilities not using an NRC- approved integrated scheduling system, a schedule will be established by the NRC staff within 60 days of receipt of the proposed schedule. Any change or error correction that results in a calculated ECCS performance that does not conform to the criteria set forth in 10 CFR 50.46(b) is a reportable event as described in 10 CFR 50.55(e), 10 CFR 50.72 and 10 CFR 50.73. The affected applicant or licensee shall propose immediate steps to demonstrate compliance or bring plant design or operation into compliance with 10 CFR 50.46 requirements.

10 CFR 50.46(a)(3)(iii) - requires that, for each change to or error discovered in an acceptable evaluation model or in the application of such a model that affects the temperature calculation, the applicant or holder of a standard design approval or the applicant for a standard design certification (including an applicant after the Commission has adopted a final design certification rule) shall report the nature of the change or error and its estimated effect on the limiting ECCS analysis to the Commission and to any applicant or licensee referencing the design approval or design certification at least annually. If the change or error is significant, the applicant or holder of the design approval or the applicant for the design certification shall provide this report within 30 days and include with the report a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with 10 CFR 50.46 requirements. The

affected applicant or holder shall propose immediate steps to demonstrate compliance or bring plant design into compliance with 10 CFR 50.46 requirements.

The effort associated with the reports required by 10 CFR 50.46 will vary, depending upon the nature of the ECCS model change or error being addressed. Most of the annual reports disclose that no changes were made to the ECCS evaluation or convey information about minor changes. These reports will require little effort to prepare. Other annual reports may be based on extensive re-analysis of ECCS performance, resulting in a greater expenditure of effort. To arrive at its estimate of the burden associated with the annual reports, the staff used its understanding of the types of reports typically submitted and its experience in the level of effort required to conduct ECCS evaluations.

10 CFR 50, Appendix K.I.A.- offers licensees the option to use a reduced power level margin for ECCS evaluation or maintain the current margin of 2% power. To use this option and apply a lower assumed power level, licensees would be required to demonstrate the uncertainties associated with measuring reactor thermal power. The resulting change to ECCS evaluation results must be reported per 10 CFR 50.46(a)(3) and filed as a license amendment.

10 CFR 50, Appendix K.II.1.a.- requires that a description of each evaluation model be furnished. The description shall be sufficiently complete to permit technical review of the analytical approach including the equations used, their approximations in difference form, the assumptions made, and the values of all parameters or the procedure for their selection, as for example, in accordance with a specified physical law or empirical correlation.

10 CFR 50, Appendix K.II.1.- requires that a complete listing of each computer program be furnished to the NRC upon request in the same form as used in the evaluation model (EM). NRC does not anticipate the need to request such information during this clearance period.

### **SECTION VIII- 50.47, 50.54(q & t), Appendix E, Emergency Planning**

Section 50.47 contains emergency planning standards that must be met in onsite and offsite emergency plans for a nuclear power reactor. Appendix E to 10 CFR Part 50 specifies the content of emergency plans for production and utilization facilities and establishes the minimum requirements for emergency plans to provide reasonable assurance that public health and safety is not endangered by operation of the facility concerned.

Section 50.54 establishes license conditions for licenses issued by the NRC.

Section 50.54(q) requires nuclear power, research reactor and/or fuel facility licensees to follow and maintain in effect emergency plans which meet the applicable standards in 10 CFR 50.47 and requirements in Appendix E to 10 CFR Part 50. Section 50.54(q) authorizes licensees to make changes to their emergency plans without NRC approval provided the licensee performs and retains an analysis demonstrating that the change(s) does/do not reduce the effectiveness of the plan and establishes the record keeping and reporting requirements for changes made to an emergency plan. Changes made to emergency plans must be submitted to the NRC within 30 days after the change is put into effect to allow the NRC to review the changes in a timely manner. Without a timely review, changes to personnel, procedures, equipment, or facilities that could adversely affect emergency preparedness, including failure to maintain an effective emergency plan, could

exist without being examined by the NRC. The NRC could be unaware of potential reductions in the adequacy of emergency preparedness for an extended period of time, such that the revised plans may no longer provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

Section 50.54(t) requires licensees to provide for the development, revision, implementation, and maintenance of its emergency preparedness program, and specifies that all program elements must be periodically reviewed by persons who have no direct responsibility for the implementation of the emergency preparedness program.

#### Inspection Reporting Requirements for Emergency Preparedness

Inspections are an important element of NRC's reactor oversight process (ROP), in that they ensure that licensees continue to meet applicable regulatory requirements. The NRC evaluates plant performance by analyzing two distinct inputs: (1) inspection findings resulting from NRC's inspection program, and (2) performance indicators (PIs) reported by the licensee. There are three emergency preparedness PIs: (1) drill and exercise performance, (2) emergency response organization drill and exercise participation, and (3) alert and notification system reliability. The data which make up the PIs are generated by the licensees and reported to the NRC on a quarterly basis.

#### 10 CFR 50.4(b)(5)- (Emergency plan and related submittals)

10 CFR 50.4(b)(5) provides the specific regulatory requirements for the submittal of written communications associated with emergency plans submitted under 10 CFR 50.34, changes to an emergency plan maintained under 10 CFR 50.54(q), and emergency implementing procedures as described in Section V, "Implementing Procedures," of Appendix E to 10 CFR Part 50.

#### **SECTION IX- 50.48. Appendix R. Fire Protection**

10 CFR 50.48(a)- requires that each operating nuclear power plant have a fire protection plan that satisfies Criterion 3 of 10 CFR 50 Appendix A. This fire protection plan must describe the overall fire protection program for the facility, identify the various positions within the licensee's organization that are responsible for the program, state the authorities that are delegated to each of these positions to implement those responsibilities, and outline the plans for fire protection, fire detection and suppression capability, and limitation of fire damage. The plan must also describe specific features necessary to implement the program described above, such as administrative controls and personnel requirements for fire prevention and manual fire suppression activities, automatic and manually operated fire detection and suppression systems, and the means to limit damage to structures, systems, and components important to safety so that the capability to safely shut down the plant is ensured. Licensees shall retain the fire protection plan and each change to the plan as a record until the Commission terminates the reactor license and shall retain each superseded revision of the procedures for three years from the date it was superseded.

10 CFR 50.48(b)- requires that plants licensed to operate before January 1, 1979, meet sections III.G, III.J, and III.O of 10 CFR Part 50, Appendix R; and fire protection features accepted by the staff in fire protection safety evaluation reports.

10 CFR 50.48(c)- was implemented in 2004 to provide licensees with the option to transition their fire protection programs to ones based on National Fire Protection Association Standard



NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Electric Generating Plants, 2001 Edition" [69 FRN 33536, June 16, 2004]. Forty-six units have completed the transition. The remaining units will not be transitioning.

10 CFR 50.48(f)- requires licensees that have submitted 10 CFR 50.82(a)(1) certifications to maintain a fire protection program to address the potential for fires which could cause the release or spread of radioactive materials. Several units have recently shutdown or announced their intention to shutdown in the near future and then move to the decommissioning process.

10 CFR 50.48(f)(2)- requires that the fire protection program be assessed by the licensee on a regular basis and revised, as appropriate, during decommissioning.

10 CFR 50.48(f)(3)- permits the licensee to make changes to the fire protection program without prior NRC approval if the changes do not reduce the effectiveness of fire protection for facilities, systems, and equipment which could result in a radiological hazard.

10 CFR 50 Appendix R- "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," includes sections III.G, III.J, and III.O that are required to be met by plants licensed to operate before January 1, 1979. Section III.G requires the capability to safely shut down. III.J requires emergency lighting. III.O requires the reactor coolant pump oil collection systems.

10 CFR 50 Appendix R- "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," also require each nuclear power plant to have a fire brigade (III.H), documented drills (Section III.I.3.d) and documented training records for each fire brigade member (Section III.I.4). Portions of 10 CFR 50 Appendix R were backfit to nuclear power plant licensees, however Sections III.H and III.I were not. All nuclear power plants have fire brigades, drills and training, but those features are not based on the rule requirements captioned above. Therefore, there is no burden associated with this section of 10 CFR 50, Appendix R.

Forty-six nuclear units have transitioned to performance-based fire protection programs under 10 CFR 50.48(c). These comply with requirements analogous to those under 10 CFR 50 Appendix R, Section III.G, as part of their new fire protection programs or provide justification using performance-based methods for other means of complying with GDC 3 of Appendix A to 10 CFR 50 (Responses on the part of the NFPA 805 licensees can be assumed to be incorporated into their reporting requirements under Section 50.48(c).)

## **SECTION X- 50.49. Environmental Qualification:**

### Recordkeeping Requirements

10 CFR 50.49(a)- requires applicants and licensees of nuclear power plants, other than a nuclear power plant for which 10 CFR 50.82(a)(1) certifications have been submitted, to establish a program for qualifying the electric equipment important to safety as defined in 10 CFR 50.49. The current licensees have completed this requirement. Additional information is expected to be collected from new combined operating license (COL), standard design

certification, and standard design approval applicants.

10 CFR 50.49(d)- requires applicants and licensees to prepare a list of electric equipment important to safety and include the performance specifications under conditions existing during and following design basis accidents, the electric characteristics for which performance under specified conditions can be ensured, and the environmental conditions in which it must operate. Applicants and licensees must keep the list and information in the file current. All current licensees have prepared lists of equipment and performance specifications, and future information collection under this section of the regulation is required to the degree it is necessary for keeping the information current. New COL applicants would need to prepare and maintain this list of electrical equipment important to safety that is covered under this section.

10 CFR 50.49(f)- requires each item of electric equipment important to safety to be qualified by one of four specified methods, all with a supporting analysis to show that the equipment to be qualified is acceptable. Licensees have completed this requirement for existing plant equipment. However, this requirement remains active for qualification of new equipment installations and for replacement equipment that falls under the scope of this regulation. The COL applicants would need to qualify each item of electric equipment important to safety under one of four specified methods and perform a supporting analysis to show that the equipment to be qualified is acceptable. All COL applicants are expected to qualify electrical equipment during the clearance period.

10 CFR 50.49(j)- requires that a record of the qualification, including documentation required by 10 CFR 50.49(d), be maintained in an auditable form for the entire period during which the covered item is installed or stored for future use in the nuclear power plant. This is required to permit verification that each item of electric equipment important to safety is qualified for its application and meets its specified performance requirements when it is subjected to the conditions predicted to be present when it must perform its safety function, up to the end of its qualified life. This requirement would not apply to COL's because the plants would be in the initial design phase.

10 CFR 50.49(l)- requires replacement equipment to be qualified in accordance with the provisions of 10 CFR 50.49 unless there are sound reasons to the contrary. Therefore, unless there is suitable justification for some alternate course of action, new equipment installations and replacement equipment that fall under the scope of 10 CFR 50.49 must be qualified in accordance with 10 CFR 50.49 requirements, including the documentation requirements of 10 CFR 50.49(d), CFR 50.49(f) and CFR 50.49(j). The licensee must maintain any justification for an alternative course of action on site, and the justification must be available for inspection as part of the inspection procedure. This requirement would not apply to COL's because the plants would be in the initial design phase.

#### Reporting Requirements

10 CFR 50.49(h)- requires each licensee to notify the NRC of any significant equipment qualification problem that may require extension of the completion date, provided pursuant to 10 CFR 50.49(g), within 60 days of its discovery. Since this requirement has been completed by all licensees, no further collection of information is required under this section of the regulation. This requirement would not apply to COL's because the activity would be completed as part of the initial design.

10 CFR 50.49(i)- requires applicants for operating licenses granted after February 22, 1983, but prior to November 30, 1985, to perform an analysis to ensure that the plant can be safely operated pending completion of equipment qualification required by this section. This requirement is complete and is not applicable to new COLs.

#### **SECTION XXX- 50.120. Training & Qualification of Nuclear Power Point Personnel**

Section 306 of the Nuclear Waste Policy Act of 1982, Public Law 97-425, directed the NRC to "promulgate regulations or other appropriate Commission regulatory guidance for the training and qualifications of civilian nuclear power plant operators, supervisors, technicians and other appropriate operating personnel." In April 1993, the NRC published 10 CFR 50.120.

10 CFR 50.120- requires that each applicant for, and holder of, an operating license for a commercial nuclear power plant establish, implement, and maintain training programs for 9 categories of power plant personnel that provide qualified personnel to operate and maintain the facility in a safe manner in all modes of operation.

10 CFR 50.120(b)(1)- requires that applicants and licensees develop and maintain these training programs with a “systems approach to training (SAT)” based on job performance requirements. Section 10 CFR 50.120 builds on existing industry practice related to training. Training for the personnel covered by 10 CFR 50.120 has already been developed and implemented by the industry.

10 CFR 50.120(b)(2)- requires power plant applicants and licensees to periodically evaluate and revise the training programs to reflect industry experience, changes to the site, procedures, regulations, and quality assurance requirements.

10 CFR 50.120(b)(2)- also requires periodic review of the training programs by licensee management and requires licensees and applicants to maintain and keep available for NRC inspection, materials sufficient to verify the adequacy of the training programs. Documents related to the establishment, implementation, and maintenance of the training programs must be kept. Documentation demonstrating the job performance qualifications of personnel performing in positions covered by 10 CFR 50.120, including contractor personnel, must be maintained for each employee for the duration of employment.

### **SECTION XXXI - Appendix J. Containment Leakage**

The 10 CFR 50 Appendix J is divided into two options: Option A, Prescriptive Requirements, and Option B, Performance-Based Requirements. Option B is a performance-based rule in which the intervals between tests are established, in part, based on the previous leakage rate performance of the component or system. A licensee may adopt, on a voluntary basis, either or both of the overall leakage testing requirements (Type A tests) and the local leakage rate testing requirements (Type B and C tests) of Option B. In either case, the recordkeeping requirements of Option B must be implemented. The pre-operational and periodic Type A, B, and C tests must be documented to show that the performance criteria for leakage have been met. The comparison to previous results of the performance of the overall containment system, and of individual components within it, must be documented to show that the test intervals established for the containment system and components within it are adequate. These records must be available for inspection at plant sites, but licensees are not required to submit these results to the Nuclear Regulatory Commission (NRC).

Neither option of 10 CFR 50 Appendix J contains specific reporting requirements. All requirements to make reports to the NRC were eliminated from 10 CFR 50 Appendix J (in what is now known as Option A) in 1995, and Option B, promulgated in 1995, also contains no reporting requirements, other than referring to the requirements contained in 10 CFR 50.72 and 10 CFR 50.73. For either option, licensees, under 10 CFR 50.72 and 10 CFR 50.73, currently report any instances of leakage exceeding authorized limits in the Technical Specifications (TS) of the license.

Although there are no specific reporting requirements, each option has recordkeeping requirements.

## OPTION A

10 CFR 50, Appendix J, Section III requires licensees to develop a program consisting of a schedule for conducting Type A, B and C tests for leak testing the primary reactor containment and related systems and components penetrating the primary containment pressure boundary. Since this information is presented in the Final Safety Analysis Report (FSAR), any burden involved in its preparation is considered under preparation of the FSAR.

10 CFR 50, Appendix J, Section III.A.6 states that if a licensee's containment does not pass the Type A test, the test schedule applicable to subsequent Type A tests will be reviewed and approved by the Commission. No Commission notifications are expected during this clearance period.

10 CFR 50, Appendix J, Section V.B requires recordkeeping of test results. The pre-operational and periodic tests must be documented in a readily available summary report that will be made available for inspection, upon request, at the nuclear power plant. The summary report shall include a schematic arrangement of the leakage rate measurement system, the instrumentation used, the supplemental test method, and the test program selected as applicable to the pre-operational test, and all the subsequent periodic tests. The report shall contain an analysis and interpretation of the leakage rate test data for the Type A test results to the extent necessary to demonstrate the acceptability of the containment's leakage rate in meeting acceptance criteria.

### 10 CFR 50, Appendix J, Section V.B. 2

For each periodic test, leakage test results from Type A, B, and C tests shall be included in the summary report. The summary report shall contain an analysis and interpretation of the Type A test results and a summary analysis of periodic Type B and Type C tests that were performed since the last Type A test. Leakage test results from Type A, B, and C tests that failed to meet the acceptance criteria of Appendix J, Sections III.A.5(b), III.B.3, and III.C.3 shall be included in a separate accompanying summary report that includes an analysis and interpretation of the test data, the least squares fit analysis of the test data, the instrumentation error analysis, and the structural conditions of the containment or components, if any, which contributed to the failure in meeting the acceptance criteria. Results and analyses of the supplemental verification test employed to demonstrate the validity of the leakage rate test measurements shall also be included.

## OPTION B

10 CFR 50, Appendix J, Section III.A requires that a Type A test be conducted 1) after the containment system has been completed and is ready for operation and 2) at a periodic interval based on the historical performance of the overall containment system as a barrier to fission product releases to reduce the risk from reactor accidents. The test results must be compared with previous results to examine the performance history of the overall containment system to limit leakage.

10 CFR 50, Appendix J, Section III.B requires Type B and Type C pneumatic tests to be conducted (1) prior to initial criticality, and (2) periodically thereafter at intervals based on the safety significance and historical performance of each boundary and isolation valve to

ensure the integrity of the overall containment system as a barrier to fission product release to reduce the risk from reactor accidents.

The performance-based testing program must be established which contains a performance criterion for Type B and C tests, consideration of leakage-rate limits and factors that affect performance, evaluations of performance, and comparison to previous test results.

10 CFR 50, Appendix J, Section IV requires that the results of pre-operational and periodic Type A, B, and C tests must be documented to show that performance criteria for leakage have been met. The comparison to previous results of the performance of the overall containment system and of individual components within it must be documented to show that the test intervals established for the containment system and components within it are adequate. These records must be available for inspection at plant sites.

10 CFR 50, Appendix J, Section V.A requires that if the requirements for tests in Option B, Section III.A, or Option B, Section III.B, are implemented, the recordkeeping requirements in Option B, IV, for these tests must be substituted for the reporting requirements of the tests contained in Option A.

10 CFR 50, Appendix J, Section V. B. 2 requires that a licensee or applicant for an operating license may adopt Option B, or parts thereof, by submitting its implementation plan and request for revision to technical specifications. (Burden for changes to TS is covered by the Section 2 Supporting Statement.)

10 CFR 50, Appendix J, Section V. B. 3

The regulatory guide or other implementation document used to develop a performance-based leakage program must be included, by general reference, in the plant's TS. The submittal for TS revisions must contain justification, including supporting analyses, if the licensee chooses to deviate from methods approved by the Commission and endorsed in a regulatory guide.

10 CFR 50, Appendix J, Section V. B. 4

The detailed licensee programs for conducting testing under Option B must be available at the plant site for inspection.

### **SECTION XXXIII- Appendix S. Earthquake Engineering Criteria**

10 CFR 50 Appendix S, Section I(a) states that each applicant for a construction permit, operating license, design certification, combined license, design approval, or manufacturing license is required to design nuclear power plant structures, systems, and components (SSCs) important to safety to withstand the effects of natural phenomena, such as earthquakes, without loss of capability to perform their safety functions. Also, as specified in 10 CFR 50.54(ff), nuclear plants that have implemented the earthquake engineering criteria described herein must shut down if the criteria in paragraph IV(a)(3) of this appendix are exceeded. 10 CFR 50 Appendix S, Section I(b) states that the criteria in Appendix S implement General Design Criterion 2 in so far as it requires SSCs important to safety to withstand the effects of earthquakes (i.e., the effects of Vibratory Ground Motions due to Safe Shutdown Earthquake and Operating Basis Earthquake).

10 CFR 50 Appendix S IV(a)(3) states that if vibratory ground motion exceeds that of the

Operating Basis Earthquake Ground Motion, or if significant plant damage occurs, the licensee must shut down the nuclear power plant. If systems, structures, or components necessary for the safe shutdown of the nuclear power plant are not available after the occurrence of the Operating Basis Earthquake Ground Motion, the licensee must consult with the Commission and must propose a plan for the timely, safe shutdown of the nuclear power plant. Both 10 CFR 50 Appendix S IV(a)(3) and 10 CFR 50.54(ff) require that prior to resuming operations, the licensee must demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public and that the licensing basis is maintained.

10 CFR 50, Appendix S, Paragraph IV(a)(4) states that suitable instrumentation must be provided to that the seismic response of nuclear power plant features important to safety can be evaluated promptly after an earthquake.

GUIDANCE DOCUMENTS FOR INFORMATION COLLECTION REQUIREMENTS  
CONTAINED IN  
10 CFR PART 50  
STANDARDS FOR LICENSES, CERTIFICATIONS AND REGULATORY APPROVALS  
SECTION 7

(50.44(c), Hydrogen Control;  
Appendix K, 50.46, ECCS;  
50.47, 50.54(q & t), Appendix E, Emergency Planning;  
50.48, Appendix R, Fire Protection;  
50.49, Environmental Qualification;  
50.120, Training & Qualification;  
Appendix J, Containment Leakage;  
Appendix S, Earthquake Engineering Criteria)

3150-0011

Title	Accession number
Regulatory Guide 2.6, Emergency Planning for Research and Test Reactors, Rev. 2, September 2017.	ML17263A472
NUREG-0849, Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors, October 1983.	ML062190191
NUREG 0654/FEMA Rep-1, Rev.1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980.	ML040420012
NUREG 0654/FEMA-REP-1, Rev. 2 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," December 2019.	ML19347D139
Regulatory Guide, 1.189, Fire Protection for Nuclear Power Plants, Revision 5, October 2023.	ML2314A287
Regulatory Guide 1.12, Revision 3, Nuclear Power Plant Instrumentation for Earthquakes	ML17094A831
Regulatory Guide 1.29, Revision 6, Seismic Design Classification for Nuclear Power Plants	ML21155A003
Regulatory Guide 1.60, Revision 2, Design Response Spectra For Seismic Design of Nuclear Power Plants	ML13210A432



Title	Accession number
Regulatory Guide 1.61, Revision 2, Damping Values For Seismic Design of Nuclear Power Plants	ML23284A272
Regulatory Guide 1.92, Revision 3, Combining Modal Responses and Spatial Components in Seismic Response Analysis	ML12220A043
Regulatory Guide 1.100, Revision 4, Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants	ML19312C677
Regulatory Guide 1.122, Revision 1, Development of Floor Response Spectra For Seismic Design of Floor Supported Equipment or Components	ML003739367
Regulatory Guide 1.166, Revision 1, Pre-Earthquake Planning, Shutdown, and Restart of a Nuclear Power Plant Following an Earthquake	ML19266A616
Regulatory Guide 1.208, March 2007, A Performance-Based Approach to Define Site-Specific Earthquake Ground Motion	ML070310619