

SAFETY REVIEWS, DESIGN CHANGES, AND MODIFICATIONS AT PERMANENTLY SHUTDOWN REACTORS

Effective Date: 01/01/2021

PROGRAM APPLICABILITY: IMC 2561, Appendix A

37801-01 INSPECTION OBJECTIVES

01.01 To verify the licensee's safety review process is in accordance with the requirements of 10 *Code of Federal Regulations* (CFR) 50.59, "Changes, tests, and experiments." The inspection provides assurance that required license amendments have been obtained.

37801-02 INSPECTION REQUIREMENTS

02.01 Decommissioning Safety Review Program

- a. Review the licensee's safety review process and procedures to ensure they are adequate identifying changes to technical specifications (TS) resulting from proposed changes, tests, experiments, and modifications.
- b. Determine whether the licensee's safety review process committee is appropriately staffed and trained in accordance with its charter, as defined in the licensee's TSs, quality assurance plan, or other licensing documentation, as applicable.
- c. Ascertain whether the licensee's training program provides effective periodic training for personnel preparing, reviewing, and approving safety evaluations. Verify that the training and qualification of the personnel conducting the 10 CFR 50.59 training is consistent with license requirements. Determine whether the licensee has established a process to assess training effectiveness.
- d. Verify supporting design basis documentation, such as calculations, design specifications, vendor manuals, Post-Shutdown Decommissioning Activities Report (PSDAR), and TSs are updated consistent with design changes.

02.02 Design Changes, Tests, Experiments, and Modifications

- a. Select (3-5) design changes and/or modifications to review, including a sampling of 10 CFR 50.59 screenings and (1-3) 10 CFR 50.59 evaluations (if such evaluations are available) performed since the last inspection. Assess the details of the evaluations, evaluate whether the licensee's judgments were appropriate, and determine whether key considerations were effectively evaluated to maintain plant safety.

- b. Select a sample of maintenance and/or work activities (1-3, as available) to ascertain whether the licensee appropriately utilized the 10 CFR 50.59 process.
- c. If possible, attend a licensee's safety review committee meeting.

02.03 Problem Identification and Resolution

Verify that the licensee is identifying problems related to safety reviews, design changes and modifications at an appropriate threshold and entering them into its corrective action program. If applicable, for a sample of problems documented in the corrective action program, verify that the licensee has identified and implemented appropriate corrective actions.

37801-03 INSPECTION GUIDANCE

General Guidance

As a plant enters decommissioning, inspectors can expect an increased amount of plant modifications. Plant modifications can include temporary or permanent plant changes, such as system abandonments, design changes, procedure changes, equivalency evaluations, calculations and commercial grade dedications.

Plants holding a 10 CFR Part 50 license can use 10 CFR 50.59 to conduct changes, tests, experiments, or modifications. The intent of the 10 CFR 50.59 process is to permit licensees to make changes to the facility without NRC approval through a license amendment, provided the changes maintain acceptable levels of safety as documented in the FSAR (or equivalent). 10 CFR 50.59(c)(2) identifies eight evaluation criteria that shall be used by the licensee to determine if a license amendment is required prior to implementation of the change, test, experiment or modification. A licensee's 10 CFR 50.59 process typically involves an initial 10 CFR 50.59 screening to determine if a 10 CFR 50.59 evaluation is required. If the screening determines that a 10 CFR 50.59 evaluation is required, the licensee will apply the eight evaluation criteria of 10 CFR 50.59(c)(2) to determine if the change, test, experiment or modification requires a license amendment to complete. Evaluations that concluded a change did not require prior NRC approval are required to be reported to the NRC consistent with 10 CFR 50.71, "Maintenance of records, making of reports."

A licensee's 10 CFR 50.59 process is not the only avenue a licensee can make a change; the 10 CFR 50.59 process shall only be used for changes to SSCs described in the FSAR. Changes to SSCs described in the Offsite Dose Calculation Manual (ODCM), Quality Assurance Program Description (QAPD), TSs, emergency preparedness, and security shall be pursued through portions of 10 CFR 50.54 "Conditions of licenses." Specifically, changes to SSCs described in the ODCM, QAPD, and TSs are controlled by 10 CFR 50.54(a)(4), changes associated with security are controlled by 10 CFR 50.54(p), and changes associated with emergency preparedness are controlled by 10 CFR 50.54(q). For changes associated with fire protection, the licensee shall use 10 CFR 50.48 "Fire Protection." A licensee will often review safety evaluations and proposed changes in their decommissioning safety review program.

For plants undergoing decommissioning, additional requirements are set forth to provide assurance that decommissioning changes, tests, experiments, and modifications are properly

evaluated by licensees. In addition to the requirements in 10 CFR 50.59, decommissioning changes can be made without NRC staff review, if they do not: (1) foreclose the unrestricted release of the site; (2) significantly increase decommissioning costs; (3) cause any significant environmental impact not previously reviewed; or (4) violate the terms of the existing license. Changes that are inconsistent with or result in a significant schedule change from what is described in the PSDAR are required to be reported to the NRC in accordance with 10 CFR 50.82, "Termination of license."

Regulatory Guide 1.187 "Guidance for Implementation of 10 CFR 50.59, Changes, Test, and Experiments," states that Revision 1 of Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Evaluations" provides methods that are acceptable to the NRC staff for complying with the provisions of 10 CFR 50.59. NEI has also published a NEI 96-07, Revision 1, Appendix E, "User's Guide for NEI 96-7, Revision 1, Guidelines for 10 CFR 50.59 Implementation." However, NEI 96-07, Revision 1, Appendix E has not been reviewed or endorsed by the NRC and should not be used by NRC staff in evaluating compliance with the provisions of 10 CFR 50.59. If needed, questions regarding potential 10 CFR 50.59 issues as a result of a licensee's use of Appendix E can be discussed with the Division of Operating Reactor Licensing project manager (PM).

The inspector is not required to complete all the inspection requirements listed in this IP, nor is the inspector limited to those inspection requirements listed if additional concerns are identified. However, the objectives of this IP should be met. Due to the variance in decommissioning strategies and timelines, subsequent inspections may be less comprehensive, based on the site activities and adequacy of the plant modification program. Inspectors should select inspection items using a performance based, risk-informed approach, while also considering variety. Inspectors should review a sampling of past inspection reports to inform their selection.

The inspector can coordinate with the PM to identify the safety or regulatory significant changes, tests, experiments, or modifications identified for review. Depending on the vintage of the plant and the decommissioning schedule, significant modifications may include large-scale structures, systems, and components (SSCs), changes to the soil form, or structure removal activities. If possible, prior to permanent shutdown, the PM and regional inspectors should coordinate and meet with licensee representatives to determine which licensee activities and potential modifications should be reviewed to provide assurance that decommissioning activities can proceed safely. For significant activities, such as reactor vessel and steam generator removal or segmentation of large radioactive components, a small multi-disciplined inspection effort may be considered to assess the licensee's safety evaluations.

Specific Guidance

Inspectors should remain cognizant of the need for technical or interpretive assistance to effectively review a safety evaluation or identify a safety concern. This assistance may be obtained through the NMSS PM, regional subject matter experts or the regional inspector responsible for site inspection. Regional subject matter experts should be consulted as warranted during review of any 10 CFR 50.59 violations. Note that the programmatic portion of this procedure (Section 03.01) need not be completed annually. Consider reviewing this portion of the procedure every 3 years or when the site transitions to a new decommissioning strategy as defined in Inspection Manual Chapter (IMC) 2561, "Decommissioning Power Reactor Inspector Program" (i.e., transitioning from SAFSTOR to DECON).

03.01 Decommissioning Safety Review Program

- a. The safety review process used by a licensee during decommissioning should be comparable to the program utilized by the licensee during power reactor operation. Assess whether the program: (1) reflects the licensee's current decommissioned organization and staffing configuration; (2) incorporates the most recent regulatory requirements and guidance; (3) applies appropriate management and technical reviews; and (4) includes appropriate quality considerations to assure that safety questions, evaluations, and justifications are performed and documented. Verify the licensee's 10 CFR 50.59 program is robust, especially if the plant has been in long-term storage (i.e., SAFSTOR) or has not recently utilized the 10 CFR 50.59 program.
- b. The inspector should ensure that the safety committees are properly staffed and members appropriately trained. A performance-based assessment should be performed to ensure that significant decommissioning activities are independently and effectively reviewed, as required by the TSs and docketed commitments. The inspector and/or PM should observe the conduct of a safety review committee and assess the effectiveness of this review body as it relates to: (1) questioning risks, benefits and the technical adequacy of the particular activity; (2) providing an independent safety perspective; and (3) contributing to plant safety through, in part, the incorporation of lessons learned and experience. Any independent safety review committees should also be assessed.
- c. The inspector should review the licensee's training and qualification program for the individuals performing safety evaluations and reviews to ensure that the training is consistent with licensee commitments as described in licensing basis documentation. The training program should be updated in a timely fashion to ensure that an accurate facility configuration is presented to personnel who prepare and review packages that result in changes, tests, or experiments. Information provided to the staff in the form of plant procedures and drawings should also correctly represent the facility configuration and operation of modified systems and components.
- d. It is the NRC's expectation that the procedures that govern the control and implementation of decommissioning design changes and modifications will be comparable in quality to the procedures that were in use when the plant was in operation. However, based on the safety significance of SSCs, the level of quality assurance applied by the licensee may be different between systems that assure safe storage of spent fuel or monitor for radioactive effluents and those SSCs that do not provide this function. The inspector should review the licensing basis documentation and 10 CFR 50.65 maintenance rule implementation program to determine how the licensee has classified the importance of SSCs and if these classifications are appropriate. Review drawings and modification documents to verify the changes are appropriately made and have not affected other interfacing systems.

The inspector should focus on the procedures that control design changes, modifications, system operation, spent fuel management, and other activities of regulatory concern such as radiation sampling and survey, transportation, fire protection, and emergency preparedness. The inspector should assess whether reductions in procedural reviews, details, or requirements adversely impact quality of activities governed by those procedures or the level of safety assurance specified in the requirements.

Throughout decommissioning, the risks associated with long-term storage or dismantlement and decontamination will generally decrease due to reductions in the radiological source term, general area radiation dose, and external threat to safe fuel storage. Therefore, the NRC staff expects that licensees will review and implement, as required, changes to their programs, plans, and procedures to reflect the current decommissioning safety risk.

03.02 Design Changes, Tests, Experiments, and Modifications

- a. It is the NRC's expectation that procedures governing the control and implementation of decommissioning design changes and modifications will be comparable in quality to the procedures that were in use when the plant was in operation. However, based on the safety significance of the SSCs, the level of quality assurance applied by the licensee may be different between systems that assure safe storage of spent fuel or monitor for radioactive effluents and systems not associated with these functions.

Review a sampling of 10 CFR 50.59 screenings and (1-3 samples) 10 CFR 50.59 evaluations performed since the last inspection to determine whether the licensee performed the evaluations in accordance with 10 CFR 50.59. Ensure the licensee accurately evaluates the current plant configuration, potential design basis accidents, normal and abnormal events, and site characteristics. Safety evaluations written for specific work activities (such as large component removal) should also be evaluated to ensure the activity does not result in a change to the TS. Assess the rigor of engineering and management reviews to determine whether the proposed activities are bounded by the general decommissioning safety evaluation.

Confirm that the licensee adequately evaluated any inter-relationships between the modification and other systems affected by the activity. Such situations could involve SSCs shared between units, structural modifications, and heavy lifts. Review affected procedures, drawings, maintenance records, and calculations to verify the changes do not negatively impact other systems.

- b. The inspector should select (3-5) maintenance activities to assess whether these activities resulted in changes or modifications without a proper 10 CFR 50.59 screening. The inspector should focus on the SSCs necessary to safely store and transport spent fuel and/or highly irradiated materials. SSCs used to monitor for radioactive effluents should also be a focus during the inspection; however, these SSCs may not be described in the FSAR. If so, the appropriate regulatory change process, such as those described in the technical specifications, should be followed. The inspector should verify that safety evaluations are performed as required, that drawings and procedures are updated in a timely fashion, and that appropriate training is performed to ensure that personnel properly operate and maintain the affected SSC.

Examples of such changes could include TS systems and emergency action level instrumentation such as: spent fuel pool cooling pump rebuilds, radiological effluent or criticality monitoring instrumentation replacement, spent fuel rack repairs, spent fuel pool level indication or spent fuel pool heat exchanger tube plugging. Other examples to review include the removal or modification of a building, contouring or excavation of soil and foundations, diversion of rain water and sewage system effluent, deactivation of systems and components, replacing cooling systems with lower capacity systems or modifications to containment to facilitate decommissioning. Inspectors should perform

walkdowns of these modifications to verify the changes are consistent with the modification documents.

Other items to review include: spent fuel pool heat-up or evaporation tests, spent fuel pool inventory loss mitigation strategy to prevent the potential for a zirconium fire (if applicable), load testing of cranes, and special dismantlement activities involving highly irradiated or contaminated materials and components. The inspector should be aware of licensee plans or actions that modify, remove or redistribute soils and potentially affect ground water transport. Changes in radiological effluent pathways could jeopardize licensee radiological assessments, environmental impact evaluations, and NRC safety judgments used to assess decommissioning.

Inspectors should not duplicate the inspection efforts completed during implementation of IMC 2690, "Inspection Program for Dry Storage of Spent Reactor Fuel at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings" when reviewing evaluations associated with the spent fuel pool. If not covered during implementation of IMC 2690, inspectors should review items such as evaluations for safe load pathways and heavy load drop scenarios, and the review of the engineered features designed to mitigate impact failure of SSCs should a transfer cask fall free or impact an SSC. Similarly, review of 10 CFR 50.59 screenings and evaluations written for the transfer of irradiated fuel should include an assessment of performance for certified fuel handlers. This may include operator command and control, supervisory oversight, man-machine interface changes, and training.

- c. The inspector should observe the conduct of a safety review committee and assess the effectiveness of this review body associated with: (1) questioning risks, benefits, and the technical adequacy of the activities; (2) providing an independent safety perspective; and (3) contributing to plant safety through, in part, the incorporation of lessons learned and experience. Any independent safety review committee should be assessed if possible.

Assess whether the licensee is timely in updating and maintaining accurate design and configuration information in the control room or other decommissioning control location. Interfaces between SSCs could be subtle and difficult to identify. Such situations could involve SSCs shared between units, structural modifications, and heavy lifts. The inspector should focus on the procedures that control design changes, modifications, system operation, spent fuel management, radiation sampling and survey, transportation, fire protection (changes controlled in accordance with 10 CFR 50.48), emergency preparedness (changes controlled in accordance with 10 CFR 50.54(q)), and other activities of regulatory concern. The inspector should assess whether reductions in procedural reviews, details, or requirements adversely impacted quality of activities governed by those procedures or the level of safety assurance required by regulatory requirements.

03.03 Problem Identification and Resolution.

Additional guidance can be found in IP 71152, "Problem Identification and Resolution" and IP 40801, "Problem Identification and Resolution at Permanently Shutdown Reactors."

37801-04 RESOURCE ESTIMATE

Note that for all decommissioning inspection activities, the frequency of performance, level of effort needed, and specific inspection requirements to be evaluated and verified vary based on the particular stage of decommissioning at the facility, the scope of licensee activities, and the overall decommissioning strategy chosen for the plant (i.e., SAFSTOR or DECON). IMC 2561 contains a discussion of the expected inspection frequency and resource estimates during each phase of decommissioning and should be used when planning resources to conduct this inspection.

37801-05 COMPLETION STATUS

Inspection findings, open items, follow-up items, and conclusions shall be documented in accordance with IMC 0610 and other relevant regional or NMSS instructions. Inspections resulting from allegations will be documented and dispositioned in accordance with Management Directive 8.8, "Management of Allegations."

37801-06 REFERENCES

10 CFR 50.48, "Fire protection"

10 CFR 50.54, "Conditions of licenses"

10 CFR 50.59, "Changes, tests, and experiments"

10 CFR 50.71, "Maintenance of records, making of reports"

10 CFR 50.82, "Termination of license"

IP 71111.17T, "Evaluations of Changes, Tests, and Experiments"

IP 71111.18, "Plant Modifications"

IP 71152, "Problem Identification and Resolution"

NEI 96-07, "Guidelines for 10 CFR 50.59 Evaluations"

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants"

Regulatory Guide 1.187 "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments"

RIS 2016-03, "10 CFR 50.59 Issues Identified in NRC's San Onofre Steam Generator Tube Degradation Lessons Learned Report," April 2016. (ML15196A575)

END

ATTACHMENT 1
Revision History for IP 37801

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	08/11/1997	Initial issuance.	N/A	N/A
N/A	ML20205L624 09/09/20 CN 20-041	Revised to include feedback from inspectors and also for format and editorial changes. The content of this procedure was updated to focus on the inspector's efforts on risk informing the inspection.	N/A	ML20205L622