INSPECTION MANUAL CHAPTER 2694 APPENDIX C

PRINCIPAL INSPECTION PLAN (PIP) CREATION

Effective Date: 06/24/2025

2694C-01 GUIDANCE

The safe construction and pre-operation of the facility is the ultimate responsibility of the licensee. The U.S. Nuclear Regulatory Commission (NRC) staff verifies, through inspecting a sample of activities, that the licensee carries out these responsibilities in compliance with their licensing basis. The construction inspection program described in Inspection Manual Chapter (IMC) 2694 and this appendix, establishes a process to develop a principal inspection plan (PIP) with minimum core inspections recommended to contribute to a determination of reasonable assurance that the facility is constructed (and will be operated) in a safe manner.

This appendix will (1) recommend steps to develop a PIP; (2) provide guiding principles, assumptions and limitations to consider when developing the PIP; and (3) clarify the development process of the PIP and the final product of the PIP. The goal of this appendix is to provide consistent guidance for developing a PIP and provides additional transparency to internal and external stakeholders.

Additional inspections, audits, or other activities due to NRC- or licensee-identified deficiencies or self-revealing deficiencies may be necessary. The resolution of allegations or enforcement actions taken against licensees may also require additional inspections or impose new requirements.

a. PIP Development: The PIP should be initially developed (to the greatest extent possible) prior to the commencement of construction. The PIP should be risk-informed, with a focus on safety-significant items and services (SSIS), including items relied on for safety (IROFS), IROFS boundary packages, management measures, or programs, that are required, as applicable, by regulations and license application (LA), licensee, and/or license amendment, including the integrated safety analysis (ISA). The PIP may also leverage insights and tools developed by the staff or licensee to risk-inform sample selection, as applicable.

   Licensees who decide to construct “at-risk” have not completed the licensing process with the NRC and may have designs, IROFS, management measures, or programs that have not been reviewed or approved by the NRC by the time construction has commenced. In these circumstances, the PIP should attempt to leverage the LA, integrated safety analysis summary (ISAS), and any other applicable, docketed resource to determine the scope, frequency, and schedule of the PIP.

   The PIP should identify aspects of construction and pre-operations that are described in the LA or amendments that occur during construction. The identification of these aspects may involve subject matter experts in various disciplines, offices, and divisions within the NRC. The identification and tying of these aspects to inspection activities should also

consider the aspects' designation as an IROFS and the qualitative risk associated with the aspect.

Inspection experience at operating fuel facilities has demonstrated variability in how licensees establish safe operations at their facilities. While IROFS and their associated management measures provide available and reliable means to limit consequences of accidents to unlikely or highly unlikely events, licensees have leveraged a variety of non-IROFS to support safe operations or meet other regulatory requirements, such as fire protection. For non-IROFS, consider the qualitative risk of the SSIS. See Section 06.02 of IMC 2694for additional details.

Once risk-informed inspection activities/samples have been identified, the inspection activities should be arranged chronologically, when possible, to match expected construction and pre-operational activities at the facility. A review of the inspection procedures (IPs) should be used to ensure that inspection activities are scheduled in the PIP at the appropriate time (e.g., before or after certain construction milestones have been met, or with a specified frequency).

The PIP should be discussed with the licensee, or applicant for at-risk construction activities, after creation to ensure that the PIP adequately maps to the construction timeline envisioned by the licensee/applicant and their contractor. Construction schedules can be dynamic with changing construction milestones, and as a result, the PIP will be a living document. Initial communications will be key in establishing a PIP with estimated dates for construction milestones and key activities for inspection and resource planning.

The PIP may be created, stored, and adjusted in any format deemed appropriate by the Region, including in the Reactor Program System (RPS).

b. PIP Adjustments. After initial creation, the PIP may require adjustment to account for changes in the construction schedule; or in the case of construction "at-risk," (as examples) because of licensing activities, modifications to designs, or via commitments made by the licensee. Additionally, activities resulting from NRC- or licensee-identified deficiencies, or other deficiencies may necessitate changes to the PIP. Ongoing communications with the licensee/applicant are encouraged to offer best-estimate dates, including schedule changes, that are assigned to inspection activities.

   Adjustments to the PIP should be made as soon as practicable and should be communicated to the licensee as soon as possible. NRC and licensee resources needed to perform and support inspection activities should be informed of potential and real changes to the PIP as early as possible to promote efficiency and to ensure that potential new inspection dates are supportable.

c. PIP Implementation. Based on the PIP schedule, the inspection staff will plan and conduct inspections in accordance with applicable IPs. Inspection activities will generally be planned, with announced, onsite activities documented in RRPS (or equivalent system). The inspection activities may consist of the following:

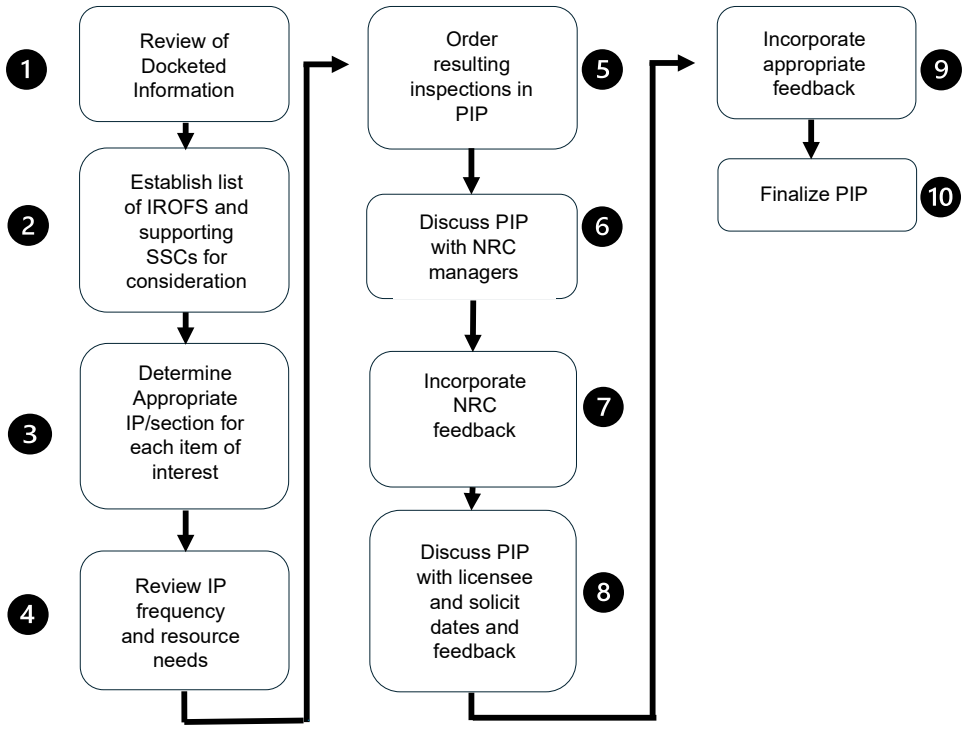
   - developing and documenting detailed inspection plans
   - completing the inspection requirements as defined in the applicable IPs

- communicating inspection results to appropriate NRC and licensee management
- processing inspection findings in accordance with appropriate guidance
- documenting completed inspections

2694C-02 PIP CREATION FLOWCHART

a. Provided below is a flowchart outlining 10 steps recommended for developing the PIP. Perform a review of docketed information submitted by the licensee/applicant. This may include program documents, quality assurance plans, ISA, ISAS, LA, licensee, and/or license amendment, or any docketed license commitments.

b. From the documents reviewed in Step 1, establish a list of risk-informed SSISs, including IROFS and non-IROFS, if applicable, and applicable management measures, that support the safe construction and operation of the facility. The PIP may also leverage insights and tools developed by the staff or licensee/applicant to risk-inform sample selection, as applicable. For non-IROFS, consider the qualitative risk of the SSIS.



c. From the list created in Step 2, consider the aspects of these items and determine how they may be inspected. If available, utilize IROFS boundary packages to assist in selecting key attributes of the IROFS. Assign an IP or IP section to each of these aspects.

d. Based upon the list from Step 3, consider the frequency and resource needs to verify that the selected SSIS are being designed, procured, installed, constructed, and/or implemented, as applicable, in accordance with the licensee's/applicant's construction and pre-operations requirements.

e. Based on Step 4, logically organize the IPs based upon reasonable phases of construction or provided construction milestones from the licensee/applicant. For example, geotechnical and foundation work is typically early in construction, followed by mechanical and electrical construction activities.

f. Once the inspection resources are organized and ordered to mimic a construction schedule, the PIP should be discussed with NRC managers to solicit any feedback or changes.

g. Incorporate any NRC feedback or changes, as directed.

h. Socialize the PIP with the licensee/applicant and collaborate on establishing target dates for inspection activities. Consider licensee/applicant feedback or comments. Note: this step is to help inform the PIP and not intended to seek approval from the licensee/applicant.

i. Work with NRC management to address and resolve any comments or feedback from the licensee/applicant. If recommended changes were not incorporated from the licensee/applicant, provide reasoning for why the changes were not made.

j. Finalize the PIP. This may include the incorporation of the PIP into RRPS (or equivalent system). Communicate with the licensee/applicant the final PIP.

2694C-03 ILLUSTRATIVE EXAMPLE

In reviewing the LA, ISAS, and plant design drawings, (Step 1) several IROFS related to uranyl nitrate storage tanks were noted. These IROFSs establish: (1) safe geometry limits by defining the dimensions of the tanks; and (2) they specify that the tanks have overfill protection provided via active engineering controls (i.e., a level transmitter manipulates inlet valve position). Additionally, the documents show that the tanks are seismically qualified if properly secured to the floor (non-IROFS seismic source characterization).

These three items may be captured (Step 2) in a list and consideration was given to the risk of the uranyl nitrate storage tanks not being properly secured to the floor. Based on the qualitative risk, the non-IROFS should be considered to be included as part of the inspection sample.

From the list, the inspection of the tank dimensions (IROFS 1) could be accomplished using the Appendix F, "Mechanical Components," of IP 88200, "Inspections of Safety Significant Items and Services During Construction of Fuel Cycle Facilities." Using the same IP 88200, the active engineering control (level switch) could be accomplished using Appendix J: "Instrumentation and Control (I&C) Systems," (see next paragraph for additional considerations); and the mounting of the tank may be inspected using Appendix K: "Welding," Appendix C: "Structural Steel and Supports," or Appendix F: "Mechanical Components," (depending on when and how they are mounted to the floor). A review of the IPs and discussions with subject matter experts may help resolve which IPs and appendices would be appropriate (Step 3).

For inspection of the level switch, it may not be a critical attribute to directly observe the installation of the switch, and as a result, this inspection may wait until the licensee performs verification testing. The inspection of the tank and its structural supports may be accomplished using the same Appendix F and could be inspected at the same time (post-installation). If these activities were to occur at different stages of construction and/or the inspection attributes are made inaccessible as a result of construction activities, (e.g., concrete poured over rebar would prevent later inspection of rebar), then the inspection procedure may need to be performed more than once (Step 4). If the summation of activities to be accomplished is greater than the PIP resource estimate would reasonably provide, consideration should be given to multiple inspections and prioritizing the inspection samples based on risk.

Once all inspections are considered and some broad logic applied (e.g., structural concrete occurs before instrumentation and controls), the general order of inspections should be assembled into a timeline, with milestone dates, if available (Step 5). Since frequency and resources have been determined at this step, an overall budget for the project may be established.

The results of this PIP should be presented to NRC managers for awareness and comment (Step 6). This should include applicable managers in Region II, Division of Fuels, Radiological Safety, and Security and the Office of Nuclear Material Safety and Safeguards. These managers (and their staff) should provide feedback on the timeline and resources for the PIP. The feedback should be considered and incorporated (Step 7), as directed.

The licensee/applicant should then be provided with the PIP (Step 8) so that they can provide feedback (Step 9) that may help inform when IROFS and certain non-IROFS should be available for review and inspection. The licensee/applicant may also provide better inspection start date estimates to improve the accuracy of the PIP. The PIP should incorporate those changes deemed an improvement and then finalized. The NRC staff should communicate with the licensee/applicant on the final PIP and provide reasoning, if applicable, why any licensee/applicant proposed changes were not included (Step 10).

END

List of Attachments:

Attachment 1: Revision History for IMC 2694 Appendix C

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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)
	ML25030A117 06/24/25 CN 25-020	Major revision. Clearly defined applicability of IMC 2694 and only applicable to new licensees/applicants for new construction. Created new and consistent terms to be used across fuels IMC/IPs.	N/A	N/A