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## INSPECTION PROCEDURE 84750

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### DECOMMISSIONING RADIOACTIVE WASTE TREATMENT, AND EFFLUENT AND ENVIRONMENTAL MONITORING

Effective Date: 07/01/2025

PROGRAM APPLICABILITY: IMC 2561 A

#### 84750-01 INSPECTION OBJECTIVES

- 01.01 To verify the gaseous and liquid effluent processing systems are maintained so that radiological discharges are properly mitigated, monitored, and evaluated with regard to public exposure.
- 01.02 To ensure that Radiological Environmental Monitoring Programs (REMP) are effectively implemented consistent with technical specifications (TS) and the offsite dose calculation manual (ODCM); quantifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid release program; and meets the design objectives in Appendix I to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.
- 01.03 To monitor the licensee's continued implementation of the voluntary NEI/Industry Ground Water Protection Initiative (GPI).

#### 84750-02 GENERAL GUIDANCE

Due to variance in decommissioning strategies and timelines, inspection effort is expected to vary based on the phase of decommissioning and changes made to the programs. It is expected that effluents and environmental impacts will change as the site continues through decommissioning.

When a site is actively decommissioning, the inspector should perform all of the inspection requirements, as applicable and available. For co-located sites, the inspection should consist of reviewing the annual reports and corrective action program entries for unit specific items. This gives credit to the applicable reactor oversight process inspections at the operating unit to avoid duplication of inspection efforts. When a site is not co-located with an operating reactor and is in a steady state, i.e., SAFSTOR for a number of years, the inspector should focus on any changes or abnormalities found with a spot check on the program itself.

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.

For additional guidance see IP 71124.06, "Radioactive Gaseous and Liquid Effluent Treatment," and IP 71124.07, "Radiological Environmental Monitoring Program."

03.01 Changes in the Offsite Dose Calculations Manual (ODCM), Process Control Program (PCP), and Radwaste System Design and Operation

**Verify that changes made to the ODCM, PCP, and radwaste system design and operation were identified in the appropriate annual report, evaluate whether they were technically justified, and determine whether the licensee has incorporated these changes into program documents and site procedures.**

Specific Guidance

The inspector should be cognizant of potential changes due to the change of steady state conditions, i.e. new release points created due to dismantlement of systems, structures, and components and other inadvertent impacts. Consider reviewing any significant changes made by the licensee to the ODCM, PCP, as well as to the liquid, gaseous, and solid radwaste system design and operation since the last inspection to ensure adequate technical justification and implementation is within the site's licensing basis and regulations. Consider whether the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment. Review the Annual Radiological Environmental Operating Report for changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data.

The existence of certain plant structures, systems, and components (and the associated radiological source terms) may change as plants transition from an operating power reactor to a decommissioning reactor facility. As such, inspections should focus on areas of this procedure applicable to the current status of the plant to ensure adequate justification and appropriate implementation of changes. Additionally, changes to the ODCM must be evaluated separately in accordance with Technical Specification or Quality Assurance Program requirements.

Evaluate any significant changes to the licensee's effluent release points since the last inspection to verify they were adequately evaluated. For the systems selected above, verify that the systems are operational with their alarm/trip setpoints properly set, properly calibrated, and maintained as specified in the ODCM or in the radiological effluent technical specifications (RETS), as appropriate. Determine if the set points are based on an appropriate effluent radionuclide (noble gas) mix so as not to exceed the effluent dose limits in 10 CFR Part 20 and the design constraints in 10 CFR Part 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents." The radionuclide mix used in the calculation should be the same as or more conservative (lower average energy) than the licensee's actual source term mix.

For significant, new effluent discharge points (such as significant or continuing leakage to groundwater that continues to impact the environment if not remediated), determine if the ODCM was updated to include the new release point and includes the bases for all new assumptions and parameters used in dose calculations. Inspectors should note that in accordance with Regulatory Guide (RG) 1.109, a significant new exposure pathway

exists if a conservative evaluation yields an additional dose increment equal to or more than 10 percent of the total from all exposure pathways considered in RG 1.109.

### 03.02 Annual Effluent and Environmental Reports

**Verify that the licensee's annual Radiological Effluent Release Report and Radiological Environmental Operating Report were submitted as required and that the reported doses are below regulatory requirements.**

#### Specific Guidance

Consider scheduling this inspection soon after the annual reports have been submitted such that recent data can be compared between the effluent report and the environmental report. Note any anomalous results, unexpected trends, positive environmental results, abnormal releases identified by the licensee for further inspection to determine if they were evaluated and were adequately resolved. Gain familiarity with the results, in part, to risk inform the implementation of this procedure.

### 03.03 Implementation of the Radiological, Effluent, and Groundwater Protection Initiative Programs

**Verify that the radiological effluent and environmental programs are being implemented consistent with the regulations and ODCM. Document incomplete or discontinued elements in the licensee's Groundwater Protection Initiative program.**

#### Specific Guidance

The level of effort for this requirement is expected to vary significantly dependent on the number of changes to the effluent and environmental programs, the level and type of site activities, licensee performance, existence of groundwater plumes, considerations on whether the site is co-located, and the use of a risk-informed approach. Inspectors should review past inspection reports to inform their selection. The below guidance is grouped by topical area for convenience. Inspectors should consider varying the activities conducted under this procedure each year using a risk-informed approach.

#### a. Radioactive Gaseous and Liquid Effluent Treatment

When possible, for liquid waste processing, observe the routine processing and discharge of effluents (including sample collection and analysis) to verify that appropriate effluent treatment equipment is being used, and that radioactive liquid waste is being processed and discharged in accordance with procedure requirements and aligns with discharge permits.

As applicable, perform walkdowns of the effluent monitoring ventilation and discharge systems with a focus on any temporary systems or any system with recent changes to verify that the current system configurations, flow paths, and operation are consistent with the description in the Decommissioning Safety Analysis Report (DSAR), ODCM, and site procedures. Look for monitor and tubing degradation and out-of-service tags. For portions of the systems that are inaccessible, review the licensee's material condition and surveillance records. For those systems that provide tank recirculation, consider if the tank recirculation procedure provides sufficient mixing. Generally, a

minimum of three volumes of mixing is provided. See ASTM D3370-10, "Standard Practices for Sampling Water from Closed Conduits" Section 11.4 for tank recirculation information and Section 12.2 for sample line flushing.

Determine whether the licensee performed appropriate calibration of a sample of effluent monitors and for any changes to effluent monitor set points, and evaluated the basis for changes to determine whether an adequate justification exists and does not adversely impact the licensee's ability to monitor releases. Focus on point of discharge effluent monitors and others, if time permits. Guidance on calibration program requirements is in RG 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste"; RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment"; and ANSI Standard N13.1-1969/1999, "Sampling Airborne Radioactive Materials in Nuclear Facilities." If an instrument is not calibrated correctly, determine generic applicability and actual and potential exposure impact, and assess the impact with respect to control or emergency preparedness. Deficiencies should be sufficiently addressed.

Consider sampling radioactive liquid waste discharge permits, as applicable, including a risk-informed sampling of abnormal gaseous and liquid discharges. Determine whether the projected doses to members of the public are accurate, within 10 CFR Part 50, Appendix I, and Technical Specification dose criteria, and based on representative samples taken from the discharge path. If discharges were made with inoperable effluent radiation monitors, or if unmonitored leakage occurred, determine whether an evaluation was made of the discharge to satisfy the survey requirements of 10 CFR 20.1501. Consider discharges resulting from misaligned valves and valve leak-by, etc.

Inspectors should note that, in general, discharge points that are secondary dispersion/dilution points (i.e., those originating from authorized effluent discharges such as rain-out into storm drains or drainage from equipment condensation, including freezers) may not need further evaluation. However, the discharge of radioactive material from unusual discharge points (e.g., pumping of water from cable trays) needs an evaluation prior to discharge. This evaluation can be a bounding evaluation for less significant release points (see RG 1.21, Rev. 2). Some changes may require a 10 CFR 50.59 review, or prior NRC approval (e.g., burning contaminated oil in an auxiliary boiler). Consider if changes are subject to 10 CFR 50.59 reviews or NRC approval (e.g., alternate discharge points).

b. Radiological Environmental Monitoring Program

Determine whether licensee environmental monitoring equipment is properly located, calibrated and maintained, and environmental samples are adequately collected by sampling paperwork review and observation, as appropriate. The inspector should consider walking down a sampling of air sampling stations and thermoluminescent dosimeter (TLD) monitoring stations to determine whether they are located as described in the ODCM and to determine the equipment material condition. For selected air samplers, review the calibration and maintenance records to determine if they demonstrate adequate operability of these components. The inspector could consider observing the collection and preparation of a sampling of environmental samples from different environmental media and determine whether environmental sampling is representative of the release pathways as specified in the ODCM and that sampling

techniques are in accordance with procedures. As available, evaluate the licensee's actions in response to a sampling of events that involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement.

If applicable, determine whether the meteorological instruments are operable, calibrated, and maintained in accordance with guidance contained in the Decommissioning Safety Analysis Report (DSAR), and licensee procedures. The inspector should review whether the meteorological data readout and recording instruments in the control room and at the tower are operable, if applicable. Compare readout data (i.e., wind speed, wind direction, and delta temperature) in the control room and at the meteorological tower to identify any differences that would indicate that inaccurate data are being used for dose determination. Inspectors should note that this program may become defunct after fuel is in an ISFSI and that most 10 CFR Part 50 licensees will not be committed to RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," but may be committed to Safety Guide 23, "Onsite Meteorological Programs," (1972).

Determine whether identified leakage or spill events and entries were appropriately added to the records as required by 10 CFR 50.75(g). Any contamination events involving actual or potential impact to groundwater are generally of higher risk significance. Evaluate whether the source of the leak or spill was identified and whether mitigation or remediation actions were appropriately taken as needed, including any contamination of groundwater. Consider whether sufficient radiological surveys were performed to evaluate the extent of the contamination and the radiological source term. Verify that a survey/evaluation has been performed to include consideration of hard-to-detect radionuclides. Note that the use of scaling factors can be used in bounding calculations. The 10 CFR 50.75(g) files (or corrective action program files referencing 50.75(g) files) should contain a description of the leak or spill (isotopes and quantities), location and size of the impacted area, cross reference to survey results, and results of any remediation performed if undetected leakage has occurred or is suspected, and insufficient monitoring/remediation actions have been taken by the licensee. Inspectors should determine whether on-site groundwater sample results and a description of any significant onsite leaks/spills into groundwater for each calendar year were documented in the Annual Radiological Environmental Operating Report for REMP or the Annual Radiological Effluent Release Report.

If the licensee uses a vendor laboratory to analyze REMP samples, determine whether the vendor's quality control program, including inter-laboratory comparison programs, is adequate. Consider whether the sample analysis method accurately accounts for all material collected on the sampling media (e.g., bleed through on glass fiber filters counted on alpha/beta proportional counters).

c. Groundwater Protection Initiative (GPI)

Review the licensee's implementation of the GPI program described in NEI 07-07 and document incomplete or discontinued elements, as applicable. Review the licensee's monitoring results to implement the voluntary NEI/Industry GPI to determine if the licensee has implemented its program as intended, and to identify any anomalous results. For anomalous results or missed samples, determine if the licensee has identified and addressed deficiencies through its corrective action program. Determine whether the licensee completed offsite notifications as provided in its GPI implementing

procedures. Inspectors should review whether licensees have committed to implementing this initiative and inspect the program and any changes to it accordingly.

Inspectors should note that for Part 50 licensees, adequate implementation of the NEI-GPI provides one acceptable method of implementing the Decommissioning Planning Rule requirements in 10 CFR 20.1406 and 10 CFR 20.1501 in accordance with RG 4.22, "Decommissioning Planning during Operations." If the licensee chooses other methods of implementing these requirements, review those methods of implementation. For 10 CFR Part 52 licensees, in addition to complying with 10 CFR 20.1406, licensees are committed to implementing the GPI as part of their licensing basis, including use of the NEI 08-08A, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination," as implemented in design features and operational programs. If ground disturbing activities are being performed, including demolition of structures that may be releasing previously contained materials to the environment, determine whether the licensee is conducting sufficient sampling to identify new or shifting groundwater plumes or contaminants.

Inspectors should review a sampling of groundwater well results for sites with known leaks such as historical spent fuel pool leaks or other groundwater plumes to determine if monitoring is adequate and whether the overall results are as expected i.e., the overall concentration of groundwater results is decreasing.

#### 03.04 Problem Identification and Resolution

**Verify that the licensee is identifying problems related to radioactive effluent, environmental, and groundwater monitoring programs at an appropriate threshold and entering them into the 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.**

##### Specific Guidance

In determining risk-significance of corrective action program entries for review, consider reviewing radioactive spills and leaks, effluent and environmental anomalous results, positive environmental results, contamination identified outside an RCA, and unusual groundwater readings. Refer to IN 2004-05, "Spent Fuel Leakage to On-site Groundwater," which describes groundwater contamination at a pressurized water reactor caused by blocked leak detection lines, initially indicated by increased foot contamination in certain facility areas.

#### 84750-04 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 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.

## 84750-05 PROCEDURE COMPLETION

Inspection procedure completion is based on completion of the inspection procedure requirements at the frequency specified in IMC 2561, Appendix A. The inspector is not required to complete all of the inspection requirements listed in this Inspection Procedure (IP) nor is the inspector limited to those inspection requirements listed if additional safety concerns are identified. However, the objectives of this IP should be met. Inspection findings, open items, follow-up items, and conclusions shall be documented in accordance with IMC 0610 and other relevant regional or headquarters instructions. Inspections resulting from allegations should be documented and dispositioned in accordance with Management Directive 8.8.

## 84750-06 REFERENCES

ANSI N13.1-1969/1999, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities"

ANSI N13.10-1974/ANSI N42.18-2004, "Specification and Performance of Onsite Instrumentation for Continuously Monitoring Radioactivity in Effluents"

IP 71124.06, "Radioactive Gaseous and Liquid Effluent Treatment"

IP 71124.07, "Radiological Environmental Monitoring Program"

NEI 07-07, "Industry Groundwater Protection Initiative – Final Guidance Document"

NUREG-1301, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors"

NUREG-1302, "Offsite Dose Calculation Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors"

NUREG-1757, "Consolidated Decommissioning Guidance"

RG 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste"

RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants"

RG 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I"

RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment"

Regulatory Issue Summary 08-03, "Return/Re-use of Previously Discharged Radioactive Effluents"

END

Attachment 1: Revision History for IP 84750

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	9/30/1988 CN 88-014	Initial issuance for use in the Systematic Assessment of Licensee Performance (SALP) inspection program.	None Required	None
N/A	12/4/1990 CN 90-014	Revised to remove requirements and guidance relating to solid radioactive waste, which is now contained in the new IP 86750.	None Required	None
N/A	3/15/1994 CN 94-006	Revised to reflect the requirements of the new 10 CFR Part 20 and to add a new section addressing the effectiveness of licensee controls.	None Required	None
N/A	ML19270D639 11/14/19 CN 19-036	The procedure was completely re-written and updated to address recent revisions to IMC 2561, overall content and format changes, and to reflect additional lessons learned from ongoing decommissioning activities.	None Required	ML19270D638
N/A	ML20290A843 11/05/20 CN 20-059	Major revision. This procedure was rewritten to refocus inspection efforts to risk-inform the inspection and streamline the procedure based on inspector input. This revision was informed by the recently issued health physics procedures under IP 71124.	None Required	ML20290A844
N/A	ML25139A097 06/27/25 CN 25-022	Major revision. The procedural guidance was consolidated to implement lessons learned since the last revision from ongoing decommissioning activities. IMC 0040 exception granted to bold inspection requirements.	None Required	None