INSPECTION PROCEDURE 71124 ATTACHMENT 07

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

INSPECTABLE AREA: Radiological Environmental Monitoring Program

CORNERSTONE: Public Radiation Safety

EFFECTIVE DATE: April 1, 2016

INSPECTION BASES: Licensees rely on the radiological environmental monitoring program (REMP) to satisfy the requirements of Criterion 64, "Monitoring Radioactivity Releases," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The REMP supplements the effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environment are in agreement with the values predicted by the radioactive effluent monitoring program.

The licensee is required to implement the REMP in accordance with its technical specifications (TS) and/or offsite dose calculation manual (ODCM). The REMP is based on the design objectives contained in 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," to 10 CFR Part 50.

10 CFR 50.34a, "Design Objectives for Equipment To Control Releases of Radioactive Material in Effluents—Nuclear Power Reactors" states that Appendix I provides the numerical guidance on meeting this design objective. The scope of the REMP is specified in 10 CFR Part 50, Appendix I, Section IV, paragraph B. This inspection area verifies aspects of the Public Radiation Safety Cornerstone for which there are no performance indicators to measure performance.

LEVEL OF EFFORT: Inspect Biennially

71124.07-01 INSPECTION OBJECTIVES

01.01 To verify that the REMP quantifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid effluent release program.

01.02 To verify that the REMP is implemented consistently with the licensee's TS and/or ODCM and to validate that the radioactive effluent release program meets the design objectives in Appendix I to 10 CFR Part 50.

01.03 To ensure that the REMP (1) monitors noneffluent exposure pathways (e.g., onsite spills or leaks, exposures from direct and scattered (skyshine) radiation from plant facilities and components), (2) is based on sound principles and assumptions, and (3) validates that doses to members of the public are within the dose limits of 10 CFR Part 20, "Standards for Protection against Radiation," and 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," as applicable.

01.04 To verify that the licensee is continuing to implement the voluntary NEI/Industry Ground Water Protection Initiative (GPI).

71124.07-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning.

a. Review the annual radiological environmental operating reports, and the results of any licensee assessments since the last inspection, to verify that the REMP was implemented in accordance with the TS and ODCM. Review the 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.

b. Review the ODCM to identify locations of environmental monitoring stations.

c. Review the final safety analysis report (FSAR) for information regarding the environmental monitoring program and meteorological monitoring instrumentation.

d. Review quality assurance audit results of the program to assist in choosing inspection "smart samples." If the licensee uses a vendor laboratory to analyze the REMP samples, review any audits and technical evaluations performed on the vendor's program.

e. Review the annual effluent release report and the 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," report, to determine if the

licensee is sampling, as appropriate, for the predominant and dose-causing radionuclides likely to be released in effluents.

f. Review reported groundwater monitoring results, and changes to the licensee's written program for identifying and controlling contaminated spills/leaks to ground water. Review changes to the plan and program since last inspection to identify changes that have decreased effectiveness and scope.

02.02 Site Inspection. (1 sample)

a. Walk down three to five of the air sampling stations and three to five of the thermoluminescent dosimeter (TLD) monitoring stations to determine whether they are located as described in the ODCM and to determine the equipment material condition. Consistent with smart sampling, the air sampling stations should be selected based on the locations in the downwind sectors with the highest concentration per unit release rate (X/Q), and highest deposition per unit release rate (D/Q), and thermoluminescence dosimeters (TLDs) should be selected based on the most risk-significant locations (e.g., those that have the highest potential for public dose impact).

b. For the air samplers and TLDs selected above, review the calibration and maintenance records to verify that they demonstrate adequate operability of these components. Additionally, review the calibration and maintenance records of up to five composite water samplers as available.

c. Verify that the licensee has initiated sampling of other appropriate media upon loss of a required sampling station.

d. Observe the collection and preparation of two to four environmental samples from different environmental media (e.g., ground and surface water, milk, vegetation, sediment, and soil) as feasible. Verify that environmental sampling is representative of the release pathways as specified in the ODCM and that sampling techniques are in accordance with procedures.

e. Based on direct observation and review of records, verify that the meteorological instruments are operable, calibrated, and maintained in accordance with guidance contained in the FSAR, NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and licensee procedures. Verify that the meteorological data readout and recording instruments in the control room and, if applicable, at the tower are operable.

f. Verify that missed and or anomalous environmental samples are identified and reported in the annual environmental monitoring report. As available, select three to five events that involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement, and verify that the licensee has identified the cause and has implemented corrective actions. Review the licensee's assessment of any positive sample results (i.e., licensed radioactive material detected above the lower limits of detection (LLDs). Review the associated radioactive effluent release data that was the source of the released material.

g. Select three to five structures, systems, or components (SSCs) that involve or could reasonably involve licensed material for which there is a credible mechanism for licensed material to reach ground water, and verify that the licensee has implemented a sampling and monitoring program sufficient to detect leakage of these SSCs to ground water.

h. Verify that records of information important to decommissioning (e.g., significant contamination resulting from leaks and spills), as required by 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning," paragraph (g), and remediation since the previous inspection are retained in a retrievable manner.

i. Review any significant changes made by the licensee to the ODCM as the result of changes to the land census, long-term meteorological conditions (3-year average), or modifications to the sampler stations since the last inspection. Review technical justifications for any changed sampling locations. Verify that 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.

j. Verify that the appropriate detection sensitivities with respect to TS/ODCM are used for counting samples (i.e., the samples meet the TS/ODCM required LLDs). Review quality control charts for maintaining radiation measurement instrument status and actions taken for degrading detector performance. If the licensee uses a vendor laboratory to analyze the REMP samples, review the results of the vendor's quality control program, including the inter-laboratory comparison program, to verify the adequacy of the vendor's program.

k. Review the results of the licensees' inter-laboratory comparison program to verify the adequacy of environmental sample analyses performed by the licensee. Verify that the inter-laboratory comparison test included the media/nuclide mix appropriate for the facility. If applicable, review the licensee's determination of any bias to the data and the overall effect on the REMP.

02.03 GPI Implementation. (1 sample)

Verify that the licensee is continuing to implement the voluntary NEI/Industry Ground Water Protection Initiative (GPI). Since the last inspection:

a. Review monitoring results of the 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.

b. If applicable, document observations of incomplete or discontinued elements of the licensee's implementation of the GPI in the inspection report in Section 4OA5. *[C1]* If the licensee is not implementing the minimization of contamination and survey aspects of the GPI, review licensee methods of meeting the Decommissioning Planning Rule requirements in 10 CFR 20.1406 (minimization of contamination) (see Regulatory

Guide 4.22, “Decommissioning Planning During Operations”) and 10 CFR 20.1501, “General” for requirements on subsurface surveys.

c. Review identified leakage or spill events and entries made into 10 CFR 50.75 (g) records. Review evaluations of leaks or spills, and review any remediation actions taken for effectiveness. Review onsite contamination events involving contamination of ground water (Lessons Learned Task Force (LLTF recommendation #17). Assess whether the source of the leak or spill was identified and mitigated.

Note: Limited, defined documentation of the review of abnormal or unplanned radioactive discharges (e.g., leaks and spills) should be provided in the inspection reports (see also IMC 0612). (LLTF recommendation #19)

d. For unmonitored spills, leaks, or unexpected liquid or gaseous discharges, ensure that an evaluation was performed to determine the type and amount of radioactive material that was discharged.

1. Assess 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.

2. Determine whether the licensee completed offsite notifications (State, local, and if appropriate, the NRC), as provided in its GPI implementing procedures.

e. Review the evaluation of discharges from onsite surface water bodies (ponds, retention basins, lakes) that contain or potentially contain radioactivity, and the potential for ground water leakage from these onsite surface water bodies. Determine if the licensee is properly accounting for discharges from these surface water bodies as part of its effluent release reports.

f. Verify that on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year are documented in the Annual Radiological Environmental Operating Report (AREOR) for REMP or the Annual Radiological Effluent Release Report (ARERR).

g. For significant, new effluent discharge points (such as significant or continuing leakage to ground water 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.

02.04 Problem Identification and Resolution. (1 sample)

Verify that problems associated with the REMP are being identified by the licensee at an appropriate threshold and are properly addressed for resolution in the licensee’s corrective action program. See Inspection Procedure 71152, “Problem Identification

and Resolution," for additional guidance (optional). In addition to the above, verify the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve the REMP.

71124.07-03 INSPECTION GUIDANCE

03.01 Inspection Planning.

a. Guidance on the proper location of environmental monitoring stations is in NUREG-1301, "Offsite Dose Calculation Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," issued April 1991. Also, refer to the NRC Branch Technical Position, Revision 1, "An Acceptable Radiological Environmental Monitoring Program," for additional information.

b. No inspection guidance.

c. No inspection guidance.

d. No inspection guidance.

e. No inspection guidance.

f. No inspection guidance.

03.02 Site Inspection.

a. Shifts in wind sectors with the highest X/Q and D/Q may be detected by comparing several years of the licensee's meteorological data.

b. No inspection guidance.

c. Guidance on sample collection and preservation is provided in NUREG-1576, "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (MARLAP), issued July 2004. Also, refer to the NRC Branch Technical Position, Revision 1, "An Acceptable Radiological Environmental Monitoring Program," for guidance on sampling other appropriate media upon loss of a required sample location.

d. 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.

Note that most 10 CFR Part 50 licensees will not be committed to Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," but may be committed to Safety Guide 23, "Onsite Meteorological Programs," (1972).

e. Ensure that the licensee has addressed any positive indications in the environmental monitoring samples and has adjusted the effluent monitoring program and dose modeling, as appropriate to ensure the accuracy of the models. (See Section 6.8 in NUREG-1301, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," and in NUREG-1302, "Offsite Dose Calculation Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors," issued April 1991.)

f. Some examples of SSCs are outdoor refueling water storage tanks, spent fuel pools, spent fuel pool leak detection systems, outdoor tanks, outdoor storage of contaminated equipment, buried piping, retention ponds, basins, or reservoirs, and steam lines. Some examples of leak detection methods for the SSCs are ground water monitoring, operator rounds, engineering walkdowns or inspections, leak detection systems, or periodic integrity testing.

g. No inspection guidance.

h. No inspection guidance.

i. No inspection guidance.

j. No inspection guidance.

k. No inspection guidance.

03.03 GPI Implementation.

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.

a. Monitoring results are provided in the licensee's Annual Radiological Effluent Release Report or the Annual Radiological Environmental Operating Report.

b. No inspection guidance.

c. 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, discuss this issue with your supervisor. If assistance in assessing the adequacy of the licensee's onsite/offsite monitoring activities is needed and/or site hydrologic characteristics are not clearly defined, the program office should be consulted..

d. No inspection guidance.

e. No inspection guidance.

f. No inspection guidance.

g. Guidance on new release points is provided in Regulatory Guide 1.21 and Lessons Learned Task Force (LLTF) recommendation #17.

Note: In accordance with Regulatory Guide 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 Regulatory Guide 1.109.

03.04 Problem Identification and Resolution.

No inspection guidance.

71124.07-04 RESOURCE ESTIMATE

For planning purposes, it is estimated to take 29 hours, on average (with a range of 25 to 33 hours) to perform the requirements of this attachment.

71124.07-05 COMPLETION STATUS

Inspection of the minimum sample size will constitute completion of this procedure in the RPS. The minimum sample size for this attachment is three, defined as the sum of all the inspection requirements.

If any of the sample inspection requirements cannot be completed, the procedure should be closed in accordance with IMC 0306, "Planning, Tracking and Reporting of the Reactor Oversight Process (ROP)." For example, if certain steps could not be completed due to sample unavailability, the procedure attachment should be declared "Complete – full sample not available" with a comment addressing the specific steps or activities that could not be completed.

71124.07-06 REFERENCES

10 CFR Part 50, Appendix A, “General Design Criteria for Nuclear Power Plants,” Criterion 64, “Monitoring radioactivity releases,”

10 CFR 50.34a, “Design Objectives for Equipment to Control Releases of Radioactive Material in Effluents—Nuclear Power Reactors,”

10 CFR 50.75, “Reporting and recordkeeping for decommissioning planning,”

IMC 0612, “Power Reactor Inspection Reports,”

Inspection Procedure 71152, “Problem Identification and Resolution,”

NEI 07-07, “Industry Ground Water Protection Initiative (GPI),”

NEI 08-08A, “Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination,”

NRC, “Lessons Learned Task Force (LLTF) Report,”

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

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

NUREG-1576, “Multi-Agency Radiological Laboratory Analytical Protocols Manual,”

Regulatory Guide (RG) 4.22, “Decommissioning Planning During Operations,”

RG 1.23, “Meteorological Monitoring Programs for Nuclear Power Plants,”

RG 4.22, “Decommissioning Planning During Operations,” and

Safety Guide 23, “Onsite Meteorological Programs.”

END

Attachment 1: Revision History for IP 71124, Attachment 07

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public Information)
N/A	12/02/09 CN 09-030	Conducted four year search for commitments and found none. This new procedure is being issued as a result of the 2009 ROP IP Realignment. It supersedes inspection requirements in IP 71121 and 71122.	Yes 09/09/2009	ML092810423
C1 Reference: SRM-SECY-11-019 (August 15, 2011) Senior Management Review of Overall Regulatory Approach to Groundwater Protection	ML12321A387 06/06/13 CN 13-013	This revision directs the inspection staff to document observations of incomplete or discontinued implementation of the NEI/industry ground water protection Initiative (GPI). The revision also instructs inspection staff that if the licensee is not implementing the GPI, to review the adequacy of the licensee's implementation of the Decommissioning Planning Rule under 10 CFR 20.1406(c) and 10 CFR 20.1501, including Part 52 licensee requirements to implement the GPI and NEI-08-08A.	N/A	ML13085A201 ML13129A076

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML15345A067 04/01/16 CN 16-010	Revisions to the IP 71124.07 procedure attachment were made in response to the 2013 ROP Enhancement Project. This revised procedure includes groundwater monitoring inspection requirements transferred in from IP 71124.06. The revision changed the way samples are counted.	N/A	IP revised only to include new sample sizes. There is no valid comment resolution at this time.