# ATTACHMENT 71124.06

INSPECTION AREA: Radioactive Gaseous and Liquid Effluent Treatment

CORNERSTONE: Public Radiation Safety

EFFECTIVE DATE: January 1, 2010

INSPECTION BASES: Licensees provide adequate protection of the public from effluent releases resulting from normal operations of the plant by maintaining the dose to the maximally exposed member of the public as far below the dose limits in 10 CFR Part 20 and 40 CFR Part 190 as is reasonably achievable (ALARA). Criterion 60 in 10 CFR Part 50 Appendix A, requires the control and appropriate mitigation of radioactive materials released as plant effluents. In addition, Paragraph 50.34a (and the associated Appendix I) to 10 CFR Part 50 provide dose based design criteria to ensure the effectiveness of plant effluent processing systems in maintaining effluent releases to the plant environs ALARA. This inspection area verifies aspects of the Public Radiation Safety cornerstone not fully measured by performance indicators. In Public Radiation Safety, the effluent release occurrence performance indicator measures radioactive gaseous and liquid releases that were above a fraction of the Technical Specification and/or Offsite Dose Calculation Manual (ODCM) limits. Unidentified changes to the parameters assumed in the effluent dose calculations (e.g., process system efficiency, release points, exposure pathways, etc.) may not be reflected in the PI reporting.

Radioactive effluent treatment systems and monitors are required by Criteria 60 and 64 of Appendix A to 10 CFR Part 50. Proper operation of the system and monitors, as described in the licensee's Radioactive Effluent Controls Program, will ensure an adequate "defense-in-depth" against an unmonitored, unanticipated, and unplanned discharge of radioactive material to the environment in quantities sufficient to challenge public dose limits.

LEVEL OF EFFORT: Inspect biennially

71124.06-01 INSPECTION OBJECTIVES

01.01 To ensure that the gaseous and liquid effluent processing systems are maintained so that radiological discharges are properly mitigated, monitored, and evaluated with regard to public exposure. Performance requirements are found in General Design Criteria 60 and 64 of Appendix A to 10 CFR Part 50, Radiological Effluent Technical Specifications (RETS), and the Offsite Dose Calculation Manual (ODCM).

01.02 To ensure that abnormal radioactive gaseous or liquid discharges and conditions, when effluent radiation monitors are out-of-service, are controlled in accordance with applicable regulatory requirements and licensee procedures.

01.03 To verify that the licensees' quality control program ensures that the radioactive effluent sampling and analysis requirements are satisfied so that discharges of radioactive materials are adequately quantified and evaluated.

01.04 To verify the adequacy of public dose calculations and projections resulting from radioactive effluent discharges.

71124.06-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning and Program Reviews. To the extent that can be reasonably accomplished, perform in-office preparation before the inspection, and complete the remaining inspection planning and follow-up actions during the onsite aspects of the inspection.

a. Event Report and Effluent Report Reviews.

1. Review the Radiological Effluent Release Report(s) issued since the last inspection. Determine if the reports were submitted as required by the ODCM/Technical Specifications. Note any anomalous results, unexpected trends or abnormal releases identified by the licensee for further inspection to determine if they were evaluated, were entered in the corrective action program and were adequately resolved.

2. Identify radioactive effluent monitor operability issues reported by the licensee as provided in effluent release reports. Review these issues during the onsite inspection, as warranted, given their relative significance. Determine if the issues were entered into the corrective action program and adequately resolved.

b. ODCM and FSAR Reviews.

1. Be familiar with FSAR descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths so they can be verified during inspection walkdowns.

2. Review changes to the ODCM made by the licensee since the last inspection. Review changes against the guidance in NUREG-1301, 1302 and 0133, and Regulatory Guides 1.109, 1.21 and 4.1. If differences are identified, review the technical basis or evaluations of the change during the onsite inspection, to determine whether they were technically justified and maintain effluent releases ALARA.

3. Determine if the licensee has identified any non-radioactive systems that have become contaminated as disclosed either through an event report or are documented in the ODCM since the last inspection. Review during the onsite inspection any 10 CFR 50.59 evaluations that have been performed for systems that have been identified as contaminated since the last inspection. Determine if any of the newly contaminated systems have an unmonitored effluent discharge path to the environment, whether any required ODCM revisions were made to incorporate these new pathways and whether the associated effluents were reported in accordance with Regulatory Guide 1.21.

c. Groundwater Protection Initiative (GPI) Program.

Review reported groundwater monitoring results, and changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater.

d. Procedures, Special Reports & Other Documents.

1. Review LERs, event reports and/or special reports related to the effluent program issued since the previous inspection. Identify any additional focus areas for the inspection based on the scope/breadth of problems described in these reports.

2. Review effluent program implementing procedures, particularly those associated with effluent sampling, effluent monitor setpoint determinations and dose calculations.

3. Obtain copies of licensee and third party (independent) evaluation reports of the effluent monitoring program since the last inspection. Review the reports for insights into the licensee's program and to aid the inspector in selecting areas for review (smart sampling).

02.02 Walkdowns and Observations.

a. Walkdown selected components of the gaseous and liquid discharge systems to verify that equipment configuration and flow paths align with the documents reviewed in 02.01 above and to assess equipment material condition. Be alert for potential unmonitored release points (such as open roof vents in BWR turbine decks, temporary structures butted against turbine, auxiliary or containment buildings), building alterations which could impact airborne, or liquid, effluent

controls, and ventilation system leakage that communicates directly with the environment.

b. For equipment or areas associated with the systems selected above, that are not readily accessible due to radiological conditions, review the licensee's material condition surveillance records, if applicable.

c. Walkdown those filtered ventilation systems whose test results will be reviewed later during the inspection. Verify that there are no conditions, such as degraded HEPA/charcoal banks, improper alignment, or system installation issues that would impact the performance, or the effluent monitoring capability, of the effluent system.

d. When possible for gaseous waste processing, observe selected portions of the routine processing and discharge of radioactive gaseous effluent (including sample collection and analysis). Verify that appropriate treatment equipment is used and the processing activities align with discharge permits.

e. Determine if the licensee has made significant changes to their effluent release points, e.g., changes subject to a 10 CFR 50.59 review or require NRC approval of alternate discharge points (i.e., burning contaminated oil in an auxiliary boiler).

f. When possible for liquid waste processing, observe the routine processing and discharge of effluents (including sample collection and analysis). 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.

Note: For items 02.02 a. and 02.02 b. above, do not duplicate inspection effort of IP 71124.08, Section 02.03.

02.03 Sampling and Analyses.

a. As available, select three to five effluent sampling activities, consistent with smart sampling, and verify that adequate controls have been implemented to ensure representative samples are obtained (e.g. provisions for sample line flushing, vessel recirculation, composite samplers, etc.).

b. As available, select one to three effluent discharges made with inoperable (declared out-of-service) effluent radiation monitors. Verify that controls are in-place to ensure compensatory sampling is performed consistent with the RETS/ODCM and that those controls are adequate to prevent the release of unmonitored liquid and gaseous effluents.

c. Determine whether the facility is routinely relying on the use of compensatory sampling in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection.

d. Review the results of the inter-laboratory comparison program to verify the quality

of the radioactive effluent sample analyses. Verify that the inter-laboratory comparison program include had-to-detect isotopes as appropriate.

02.04 Instrumentation and Equipment. Process monitors, effluent monitors, and count lab instrumentation are reviewed as part of the evaluation of the licensee's Radiation Monitoring Instrumentation program, as provided in IP 71124.05.

a. Effluent Flow Measuring Instruments.

Review the methodology the licensee uses to determine the effluent stack and vent flow rates. Verify that the flow rates are consistent with RETS/ODCM or FSAR values, and that differences between assumed and actual stack and vent flow rates do not affect the results of the projected public doses.

b. Air Cleaning Systems.

Verify that surveillance test results since the previous inspection for Technical Specification required ventilation effluent discharge systems (HEPA and charcoal filtration), such as the Standby Gas Treatment System (BWRs) and the Containment/Auxiliary Building Ventilation System (PWRs), meet Tech. Spec. acceptance criteria.

02.05 Dose Calculations.

a. For significant changes in reported dose values compared to the previous Radiological Effluent Release Report (e.g., a factor of 5, or increases that approach Appendix I criteria), evaluate the factors which may have resulted in the change. If the change was not explained as being influenced by operational issues (e.g., fuel integrity, extended outage, or major decontamination efforts), independently assess the licensee's offsite dose calculations

b. Review one to three radioactive liquid and one to three gaseous waste discharge permits. Verify that the projected doses to members of the public are accurate and based on representative samples of the discharge path.

c. Evaluate the methods used to determine the isotopes that are included in the source term to ensure all applicable radionuclides are included, within detectability standards. Review the current Part 61 analyses to ensure hard-to-detect radionuclides are included in the source term.

d. Review changes in the licensee's offsite dose calculations since the last inspection. Verify the changes are consistent with the ODCM and Regulatory Guide 1.109. Review meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate factors are being used for public dose calculations.

e. Review the latest Land Use Census and verify that changes (e.g., significant increases or decreases to population in the plant environs, changes in critical

exposure pathways, the location of nearest member of the public, or critical receptor, etc.) have been factored into the dose calculations.

f. For the releases reviewed in (b) above, verify that the calculated doses (monthly, quarterly, and annual dose) are within the 10 CFR Part 50, Appendix I and Technical Specification dose criteria.

g. Select, as available, one to three records of any abnormal gaseous or liquid tank discharges (e.g., discharges resulting from misaligned valves, valve leak-by, etc). Ensure the abnormal discharge was monitored by the discharge point effluent monitor. If discharges were made with inoperable effluent radiation monitors, or if unmonitored leakage occurred, ensure that an evaluation was made of the discharge to satisfy 10 CFR 20.1501 so as to account for the source term and projected doses to the public.

02.06 GPI Implementation. 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. 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 (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)

c. 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.

d. 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 licensees are properly accounting for discharges from these surface water bodies as part of their effluent release reports.

e. 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) for the RETS.

f. 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.

02.07 Problem Identification and Resolution. Verify that problems associated with the effluent monitoring and control program are being identified by the licensee at an appropriate threshold and are properly addressed for resolution in the licensee corrective action program. See Inspection Procedure 71152, "Identification and Resolution of Problems," for additional guidance. (Optional) In addition to the above, verify appropriateness of the corrective actions for selected sample of problems documented by the licensee involving radiation monitoring and exposure controls.

71124.06-03 INSPECTION GUIDANCE

03.01 Inspection Planning.

a. Ensure that docketed reports since the previous inspection are included in the current inspection (e.g., annual radioactive effluent release reports, special 30 day reports, supplemental monitoring reports, offsite dose calculation manual revisions). Consider scheduling this inspection soon after the annual radiological environmental report has been submitted such that recent data can be compared between the effluent report and the environmental reports.

b. Guidance on new release points is in 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.

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 guidance provided.

03.02 Walkdowns and Observations.

a. During facility tours, be sensitive to potential unmonitored radioactive gaseous and liquid effluent points. Evaluate how the licensee is quantifying gaseous and liquid discharges and is calculating the associated doses. Review the licensee's assessment of the source term used, including all radionuclides discharged, within detectability standards. Be aware of system contamination that may have impacted otherwise non-contaminated systems (e.g., PWR turbine sumps, plant boilers, RHR heat exchangers, etc)

b. IE Bulletin 80-10 provides guidance on contaminated systems not originally designed to be contaminated.

c. Guidance on the performance of ventilation charcoal and filter banks is provided in ASME N510-1989.

d. 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) do not need further evaluation (see RIS 2008-03). 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).

03.03 Sampling and Analyses.

a. Evaluate potential sampling system configurations or situations that may impact representative sampling (e.g., media by-pass, humidity, line loss, heat trace, etc.).

b. No guidance.

c. No guidance.

d. Regulatory Guides 1.33, 1.21 and/or R.G 4.15, provides the regulatory basis for the licensee participating in an inter-laboratory comparison program to verify the quality of radioactive effluent sample analyses.

03.04 Instrumentation and Equipment.

a. Guidance on the maintenance of flow measurement devices (e.g., pitot tubes) and filter testing is contained in ANSI N42.18-2004, "Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents."

If available, review historical trends in vent/stack flow rates to determine if substantial variability exists, potentially indicating flow restrictions in the measuring device or fan motor problems.

b. Guidance on performance testing of Technical Specification required ventilation systems is provided ASME N510-1989, "Testing of Nuclear Air treatment Systems."

Coordinate with the resident inspectors before inspecting safety-related (accident scenario) ventilation systems to avoid duplication of effort.

03. 05 Dose Calculations.

Use either the NRC PC-DOSE computer code (agreement should be within a factor of 2), perform manual calculation, or review the licensee's dose calculation methods.

03.06 GPI Implementation.

a. through d. No guidance provided.

03.07 Problem Identification and Resolution.

No guidance provided.

71124.06-04 RESOURCE ESTIMATE

For planning purposes it is estimated to take 30 hours, on average (with a range of 26 to 34 hours) to perform the requirements of this attachment.

71124.06-5 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 one (1), defined as the sum of all the inspection requirements. Therefore, all the inspection requirements of the procedure should be completed. If some of the requirements can not be performed due to lack of samples, the procedure should be closed with comment.

END

Revision History for
IP 71124.06

| Commitment Tracking Number | Issue Date | Description of Change | Training Needed | Training Completion Date | Comment Resolution Accession Number |
|---|---|---|---|---|---|
| N/A | 12/02/09<br>CN 09-030 | Conducted four year search for commitments and found none.<br><br>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 | ML092810414 |
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