

ATTACHMENT 71122.01

INSPECTION AREA: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

CORNERSTONE: Public Radiation Safety

INSPECTION BASES: This inspection area verifies aspects of the Public Radiation Safety cornerstone not measured by performance indicators. In Public Radiation Safety, the effluent release occurrence performance indicator measures radioactive gaseous and liquid releases that were above Technical Specification and/or Offsite Dose Calculation Manual limits.

Radiation exposure to the public must be within the 10 CFR Part 20 and 40 CFR Part 190 limits. Doses below the design objectives of Appendix I to 10 CFR Part 50 and 40 CFR Part 190 dose values are considered ALARA.

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

71122.01-01 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 respect 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 the applicable regulatory requirements and licensee procedures.

01.03 To verify that the licensee's 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 projections resulting from radioactive effluent discharges.

71122.01-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning and In-Office Inspection

(Note: to the extent that can be reasonably accomplished, perform in-office preparation before the inspection, and complete the remaining inspection planning or follow-up actions during the inspection).

- a. Request and review appropriate program documents, procedures, and evaluations from the licensee related to the radiological effluent controls program. For example:
 1. ODCM revisions and associated technical justifications for ODCM changes,
 2. new or applicable procedures for effluent programs (e.g., including ground water monitoring programs),
 3. source terms and Part 61 analyses,
 4. evaluations of abnormal effluent discharges (leaks and spills),
 5. 10 CFR 50.59 reviews (e.g., system changes, advanced water chemistry methods),
 6. new entries into 10 CFR 50.75(g) files,
 7. corrective action program condition reports,
 8. licensee event reports, or special reports, and
 9. self assessments and QA audits.
- b. Verify that each of the Radiological Effluent Controls Program requirements are being implemented as described in Radiological Effluent Technical Specifications (RETS).
- c. For each system modification, review changes to the liquid or gaseous radioactive waste system design, procedures, or operation as described in the Updated Final Safety Analysis Report (UFSAR) and plant procedures. Verify that any changes made to the liquid or gaseous waste systems are effective and maintain effluent releases to ALARA.
- d. Review changes to the ODCM made by the licensee since the last inspection. Review changes to ensure consistency is maintained with respect to 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 to ensure changes were technically justified and documented.

- e. For effluent monitoring instrumentation, review documentation to ensure adequate methods and monitoring of effluents. For changes to effluent radiation monitor set-point calculation methodology, evaluate the basis for the changes to ensure an adequate justification.
- f. Review the licensee's program for identifying, assessing and controlling contaminated spills and leaks. For significant, new effluent discharge pathways (such as significant continuing leakage to ground water that continues to impact the environment if not remediated), ensure the ODCM was updated to include the new pathway (see 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 pathways considered in the Regulatory Guide 1.109.

- g. Review the Radiological Effluent Release Report(s) since the last inspection.
 - 1. Determine if anomalous or unexpected results were identified by the licensee and entered in the corrective action program and adequately resolved.
 - 2. For significant changes in reported dose values (compared to the previous Radiological Effluent Release Report) (e.g., a factor of 5, or increases approaching Appendix I criteria), evaluate the factors which may have resulted in the change. If the change was not explained as being influenced by an operational issue (e.g., fuel integrity, extended outage, or major decontamination efforts), independently assess the licensee's offsite dose calculations. Use either the NRC PC-DOSE computer code (agreement should be within a factor of 2), or review the licensee's dose calculation methods, or perform manual calculations.
- h. Review the plant's correlation between the effluent release reports and the environmental monitoring results (see Section IV.B.2 of Appendix I to 10 CFR Part 50).
- i. Review the results from QA audits to determine whether the licensee met the requirements of the RETS/ODCM.

02.02 Onsite Inspection

- a. Walk-down selected components of the gaseous and liquid discharge systems (e.g., gas compressors, demineralizers and filters in use or standby, tanks, and vessels).

Review current system configuration with respect to the description in the FSAR, temporary waste processing activities, system modifications and the equipment material condition. For equipment or areas that are not readily accessible, review the licensee's material condition surveillance records, if applicable.

- b. Walk-down and review selected point of discharge effluent radiation monitoring systems and flow measurement devices. Review effluent radiation monitor alarm set point values for agreement with RETS/ODCM requirements.
- c. 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 that the radioactive gaseous effluent is processed and discharged in accordance with RETS/ODCM requirements. Review several (e.g. 2-5) radioactive gaseous effluent discharge permits, including the projected doses to members of the public.
- d. 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. If possible, observe the sampling and compositing of liquid effluent samples. Review several (e.g., 2-5) radioactive liquid waste discharge permits, including a review of the projected doses to members of the public.

- e. Review a sample of effluent discharges made with inoperable (declared out-of-service) effluent radiation monitors.

Determine if appropriate compensatory sampling and radiological analyses are being conducted at the required frequency specified in the RETS/ODCM.

For compensatory sampling methods, verify that representative samples are being obtained. Also evaluate whether the facility is routinely relying on the use of compensatory sampling in lieu of adequate system maintenance or calibration.

- f. Review surveillance test results on non-safety related ventilation and gaseous discharge systems (HEPA and charcoal filtration). If licensee-specific methodology is used, ensure that the system is operating within acceptance criteria.

Review the methodology the licensee uses to determine the stack and vent flow

rates. Verify that the flow rates are consistent with RETS/ODCM or FSAR values. Note: Differences between assumed and actual stack and vent flow rates may affect the results of the projected public doses.

- g. Determine if the licensee has identified any non-radioactive systems that have become contaminated. Ensure that 10 CFR 50.59 evaluations have been performed per IE Bulletin 80-10. Determine if any of the newly contaminated systems have an unmonitored effluent discharge path to the environment. Determine whether any required ODCM revisions were made to incorporate these new pathways and whether the effluents were reported in accordance with the Regulatory Guide 1.21.
- h. Review instrument maintenance and calibration records (i.e. both installed and counting room equipment) associated with effluent monitoring equipment. Review quality control records for the radiation measurement instruments. Identify indications of degraded instrument performance and review corrective actions taken.
- i. 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 Part 61 analyses to ensure hard-to-detect radionuclides are included in the source term.
- j. Review the meteorological dispersion and deposition factors and hydrogeologic characteristics used in the ODCM and effluent dose calculations to ensure appropriate factors are being used for public dose calculations.
- k. Review the land-use census and verify that any new public dose receptors or pathways have been considered when performing member of the public dose assessments.
- l. Review a selection of monthly, quarterly, and annual dose calculations to ensure that the licensee has properly demonstrated compliance with 10 CFR 50, Appendix I and Technical Specifications dose criteria.
- m. Verify that the licensee is continuing to implement the voluntary NEI/Industry Ground Water Protection Initiative (GPI). Generally, the industry actions are voluntary, and beyond NRC requirements.

Since the last inspection:

- 1. review changes made to the GPI,
- 2. review monitoring results of the GPI,
- 3. review identified leakage or spill events and entries made into 10 CFR 50.75(g) records,

4. Review evaluations of leaks or spills, and review any remediation actions taken for effectiveness, and
 5. Verify voluntary reporting of leaks and spills to local and State authorities.
- n. Abnormal Effluent Discharges (see also R.G. 1.21)

1. Review the 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 abnormal discharges were made with inoperable effluent radiation monitors, ensure that an evaluation was made of the discharge to account for the source term and projected doses to the public (if needed).
2. 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).

3. 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.
 - (a) 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.
 - (b) Evaluate analyses of any new or additional effluent discharge pathways as a result of a spill, leak, abnormal, or unexpected liquid discharge or gaseous discharges. Verify that the ODCM has been revised for any significant, long term ground water discharges (i.e., significant in that the discharge constitutes a significant exposure pathway if not remediated) (LLTF recommendation #18).
 - (c) Verify that significant leaks and spills have been properly documented in the site's corrective action program and/or in the decommissioning file, per 10 CFR 50.75 (g).
 - (d) Verify that the dose assessments have been performed for off-site members of the public that may have been exposed to the abnormal effluent discharges (e.g., may have consumed contaminated ground water).

- (e) Determine whether the licensee completed any required (or voluntary) offsite notifications (State, local, and if appropriate, the NRC).
4. Verify that abnormal discharges are assessed and reported as part of the Annual Radiological Effluent Release Report per Reg. Guide 1.21.
- o. Assess evaluations 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.
 - p. Review routine groundwater monitoring results to assess whether the licensee is monitoring for unknown leakage. Evaluate if the licensee sufficiently evaluates the monitoring results, properly documents and reports the results, enters abnormal results into its corrective action program, and implements adequate corrective actions.
 - q. Review self assessments, audits, and licensee event reports that involved unanticipated offsite discharges of radioactive material.
 - r. If the licensee is committed to follow the guidance in Regulatory Guides 1.33 and/or R.G. 1.21, and/or R.G 4.15, review the results of the inter-laboratory comparison program to verify the quality of radioactive effluent sample analyses.

If applicable, review assessments of any identified bias in the sample analysis results and the overall effect on calculated projected doses to members of the public.

- s. Verify that the licensee is maintaining adequate effluent sampling records (sampling locations, sample analyses results, flow rates, and source term for radioactive liquid and gaseous effluent (i.e., information needed to satisfy the requirements of 10 CFR 20.1501)).
- t. Optional inspection item: Post TMI, post-accident effluent monitoring evaluations were performed (see NUMARC/NESP-007). Perform follow-up reviews of post-accident effluent monitoring instrumentation, and verify that the monitors have calibration and conversion factors for different emergency classifications that reflect expected accident source terms (see RIS 2003-18 and RG 1.101). For example, accident effluent monitor conversion factors should be available for normal RCS, fuel damage, and fuel melt source terms.

02.03 Problem Identification and Resolution (Corrective Action Program)

- a. Determine if problems identified by the licensee through audits, self assessments, and monitoring results are entered into the corrective action program. Determine if

the licensee implements immediate and long term corrective actions that appear to sufficiently address the cause(s) for each identified issue.

- b. Interview staff and review documents to determine if the follow-up activities are being conducted in an effective and timely manner commensurate with their importance to safety and risk:
 - 1. Initial problem identification, characterization, and tracking.
 - 2. Disposition of operability/reportability issues.
 - 3. Evaluation of safety significance/risk and priority for resolution.
 - 4. Identification of repetitive problems.
 - 5. Identification of contributing causes.
 - 6. Identification and implementation of effective corrective actions.
 - 7. Resolution of non-cited violations (NCVs) tracked in the corrective action system.
 - 8. Implementation/consideration of risk significant operational experience feedback.
 - 9. Emphasis should be placed on ensuring problems are identified, characterized, prioritized, entered into a corrective action, and resolved.
- c. For repetitive deficiencies or significant individual deficiencies in problem identification and resolution identified above, determine if the licensee's self-assessment activities are also identifying and addressing these deficiencies.

71122.01-03 INSPECTION GUIDANCE

03.01 Inspection Planning and In-Office Inspection

- a. 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.

Ensure that all docketed reports since the previous inspection are included in the current inspection (e.g., annual radioactive effluent release reports, annual radioactive environmental monitoring reports, special 30 day reports, supplemental monitoring reports, offsite dose calculation manual revisions).

For plants using advanced water chemistry methods, consider performing a review

of evaluations of source term changes that may occur under either routine or accident conditions.

- b. No guidance provided.
- c. No guidance provided.
- d. No guidance provided.
- e. No guidance provided.
- f. No guidance provided.
- g. No guidance provided.
- h. No guidance provided.
- i. No guidance provided.

03.02 Onsite Inspection

- a. During facility tours, be sensitive to potential unmonitored radioactive gaseous and liquid effluent pathways. Evaluate how the licensee is quantifying gaseous and liquid discharges and associated doses. Review the licensee's assessment of the source term used, including all radionuclides discharged, within detectability standards.
- b. Evaluate potential sampling system configurations or situations that may impact representative sampling (e.g., media by-pass, humidity, line loss, heat trace, etc.).
- c. No guidance provided.
- d. Evaluate sampling methods (including tank recirculation times/volumes) used to ensure representative sampling.
- e. No guidance provided.
- f. No guidance provided.
- g. No guidance provided.
- h. Review maintenance of flow measurement devices (e.g., pitot tubes) and filter testing in accordance with ANSI N42.18-2004, "Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents."
- i. Consider the licensee's evaluation of hard-to-detect radionuclide analyses.

- j. As appropriate, review the dispersion and bioaccumulation modeling of the radiological effluent controls program.
- k. No guidance provided.
- l. No guidance provided.
- m. No guidance provided.
- n. In general, discharge pathways that are secondary dispersion/dilution pathways (i.e., those originating from authorized effluent discharges such as rain-out through storm drains or drainage from equipment condensation, including freezers) do not need further evaluation. However, the discharge of radioactive material from unusual discharge pathways (e.g., pumping of water from cable trays) needs an evaluation prior to discharge. This evaluation can be a bounding evaluation that has been performed that determines that the pathway is not likely to make a significant contribution to the total dose; i.e. equal to or more than 10 percent of the total dose from all pathways considered in Regulatory Guide 1.109.
10 CFR 50.75g files (or corrective action program files referencing 50.75g files) should contain a description of the leak or spill, location and size of the impacted area, cross reference to survey results, and results of any remediation performed.
- o. No guidance provided.
- p. If undetected leakage has occurred or is suspected and insufficient monitoring/remediation actions have been taken by the licensee, discuss this concern 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.
- q. No guidance provided.
- r. No guidance provided.
- s. No guidance provided.
- t. No guidance provided.
- u. No guidance provided.
- v. No guidance provided.

71122.01-04 RESOURCE ESTIMATE

The estimated hours needed to complete this procedure ranges from a minimum of 40 hours to a maximum of 48 hours, with a base of 44 hours.

71122.01-05 COMPLETION STATUS

Inspection of the minimum sample size will constitute completion of this procedure in the Reactor Programs System (RPS). That minimum sample size consists of 2 samples determined as follows:

Section 02.01	1 sample
Section 02.02	1 sample
Section 02.03	1 sample

END

ATTACHMENT 1

Revision History For 71122.01

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	05/25/06	Previous History Review	N/A	N/A	N/A
N/A	03/06/02	Revised to allow the inspector the option to review the "... system surveillance test results or licensee specific methodology to ensure that the system is operating within the licensee's acceptance criteria." This revision adds inspection flexibility for licensees that do not have surveillance requirements for ventilation equipment. Additionally a range of inspection hours was established based on the actual inspection data.	N/A	N/A	N/A
N/A	01/24/03	Revised to add a section "Completion Status," that defines the minimum sample size that constitutes completion of the procedure.	N/A	N/A	N/A
N/A	05/25/06	Revised to increase inspection activities as a result of recent groundwater contamination events. Resource estimates have also been increased by four hours to reflect increased inspection activities.	N/A	N/A	ML061350427

N/A	N/A	01/10/08 CN 08-001	<p>Revision history was reviewed for the last four years – no generic requirements were incorporated during this period.</p> <p>This IP is revised to incorporate updates based on the Liquid Radioactive Release Lessons Learned Task Force report, and to provide additional clarifications and inspection items. The primary changes were to:</p> <ul style="list-style-type: none"> • incorporate <i>Liquid Radioactive Release Lessons Learned Task Force</i> Action recommendations # 17, 18, 19. • increase opportunity for document review in-office inspection planning and inspection. • increase inspection of ground water contamination monitoring, surveys, and evaluation of results • include a review of Part 61 analyses • include review of land use census and consideration of new or additional public dose receptors • expand the evaluation of abnormal discharges • include assessment of onsite surface water bodies that may contain radioactivity • verify ongoing implementation of the NEI Ground Water Protection Initiative • provide an optional item to evaluate post-accident effluent monitoring evaluations. 	N/A	ML073550743
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