

**ATTACHMENT 83502.03**

INSPECTABLE AREA: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM  
(REMP) AND RADIOACTIVE MATERIAL CONTROL PROGRAM

CORNERSTONE: Public Radiation Safety

INSPECTION BASES: This inspection procedure evaluates aspects of the REMP and the radioactive material control program for which there were significant performance findings identified via the NRC baseline inspection program or Licensee Event Reports (LERs). The REMP is required by Criterion 64 of Appendix A to 10 CFR Part 50. 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 and/or Offsite Dose Calculation Manual, which are based on the design objectives contained in Appendix I of 10 CFR Part 50. The radioactive material control program verifies that the licensee maintains a program to ensure that licensed radioactive material is controlled in accordance with the requirements of 10 CFR Part 20.

LEVEL OF EFFORT: Inspection resources will be dependent on the nature of the performance findings, on the number of program areas affected by the findings, and on the level of review necessary to evaluate the findings.

83502.03-01 INSPECTION OBJECTIVES

01.01 To identify the root causes for significant findings identified during the baseline inspection or by LERs of the REMP and the radioactive material control program.

01.02 To evaluate the extent of significant findings in the inspection area and the adequacy of the licensee's actions to correct the identified problems.

01.03 To ensure that significant findings do not preclude the REMP from measuring the effects of radioactive effluent releases to

the environment and from sufficiently validating the integrity of the gaseous and liquid effluent release program.

01.04 To ensure that the licensee's radiation survey program for the release of potentially contaminated material and items is adequate to prevent the inadvertent release of licensed radioactive material which could end up in an unrestricted area.

83502.03-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning and In-Office Inspection

- a. Review the most current Annual Environmental Monitoring Report and licensee assessment results. 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, and analysis of data.
- b. Review the ODCM to identify environmental monitoring stations. Review licensee self assessments, audits, Licensee Event Reports, and interlaboratory comparison program results.
- c. Review FSAR for information concerning the REMP and meteorological monitoring instrumentation.
- d. Review corrective action documents concerning the identification of licensed radioactive material outside of the radiologically controlled area (RCA). Evaluate the licensee's root cause analysis to determine if common causes were identified and if corrective actions appear to address the problem.

02.02 Material Condition of Radiological Environmental and Meteorological Monitoring Equipment. If significant findings are identified concerning the material condition of radiological environmental or meteorological monitoring equipment:

- a. Walk-down all of the licensee's REMP air sampling stations and 30 to 60 percent of the thermoluminescence dosimeter (TLD) locations to evaluate the extent of the problem.
- b. Observe remote and local meteorological monitor indications to assess their operability. Verify that the monitor indications are stable and that the indicated values are within the range of local forecast/observatory measurements.
- c. Review the licensee's maintenance program for REMP and meteorological monitoring equipment. Verify that equipment problems are entered into the licensee's corrective action system. Evaluate the licensee's trending of repetitive

equipment failures and its identification of common cause failures.

- d. Interview the field technicians to evaluate their understanding of equipment and sampling requirements.
- e. For long-term equipment unavailability or repetitive losses of sample media, determine if the licensee has adequately identified the cause of the problems and instituted a corrective action plan.

02.03 Location of REMP Sample Media and Equipment. If significant findings are identified concerning the location of REMP sample media or equipment:

- a. Review the licensee's procedural and administrative controls for the locations of equipment (e.g., air samplers, TLDs, etc.) and sampling points. Verify that these controls ensure that the REMP locations are consistent with the descriptions contained in the ODCM. In the case of sample relocations, ensure that the licensee's controls provide a means of updating the ODCM, which includes a technical evaluation of the change.
- b. Interview supervisory personnel to determine their oversight and verification of ongoing REMP activities and for the relocation of sample points and equipment.

02.04 Collection and Control of REMP Sample Media. If significant findings are identified concerning the collection and control of REMP sample media:

- a. Observe the collection of several of each type of REMP collection media. If the licensee has more than one technician performing the collection, observe a number of these individuals to evaluate the extent of the problem. Discuss the sampling requirements with the individuals to verify their understanding of program requirements.
- b. Review the training and qualifications of the technicians who collect and control REMP samples. Determine if this training provides an adequate level of instruction and if the licensee maintains a refresher or retraining frequency.
- c. Interview supervisory personnel and quality assurance auditors to evaluate their oversight of sampling activities. Determine the role of these individuals in ensuring that each technician is performing the activities in accordance with the licensee's requirements and with appropriate analytical techniques.

02.05 Calibrations of Radiological Environmental and Meteorological Monitoring Equipment. If significant findings are

identified concerning the calibrations of radiological environmental and meteorological monitoring equipment:

- a. Review the licensee's instrument calibration program. Determine if the program is consistent with the regulatory guidance contained in NRC Safety Guide 23 and Regulatory Guides 1.21 and 4.15. Verify that the licensee performs calibrations using sources/instrumentation which are traceable to the National Institute of Standards and Technology (NIST). If periodic re-calibrations indicate instability in the instrument, evaluate the actions taken by the licensee to ensure that the equipment is properly functioning.
- b. Observe the calibrations of several REMP and meteorological instruments. Determine if individuals are knowledgeable of the instrumentation and procedural controls.

02.06 Uncorrelated REMP Sample Results. If significant findings are identified concerning the licensee's evaluation of positive REMP sample results:

- a. Ensure that positive sample results which are above the licensee's reporting level are properly reported to the NRC and evaluated by the licensee, as required.
- b. Determine if the licensee has a duplicate or split sample program to ensure that deficient laboratory practices are not responsible for an abnormal positive result. Although positive REMP results are not uncommon, laboratory errors (e.g., sample control problems, contamination control problems, etc.) can result in false positive sample results.
- c. Review the licensee's procedures for evaluating positive REMP sample results. Verify that the licensee uses the REMP results to verify the effectiveness of its effluent program.
- d. Compare the licensee's effluent release concentrations to the concentration of radionuclides found in the environment. Evaluate if a correlation can be made between the two.

02.07 Radiation Measurement Instrumentation (Counting Room Laboratory). If significant findings are identified concerning the adequacy of radiation measurement instrument calibrations or quality control activities:

- a. Confirmatory Measurements. Using the Verification Test described below, evaluate the licensee's radiochemical measurement capabilities by comparing the licensee's measurements with NRC measurements or the measurements of an equivalent independent laboratory. Ensure that both measurements are made on the same samples or on split samples. If cartridge or filter samples are not available, substitute a simulated cartridge or filter sample prepared

for the NRC. The licensee should analyze NRC or split samples in a routine manner. The methodology, procedures, equipment, personnel, sample size, and counting times should be the same as the licensee normally uses. Analyses should also be performed by the NRC inspection staff in the mobile laboratory or at a Regional Office.

NOTE: Because of the extensive resources required to perform this evaluation, the implementation of this section will require approval from NRC Regional management.

#### Verification Test:

##### 1. Analyses

- (a) Liquids and Gases - Gamma Emitters. Identify all radionuclides detected in the NRC sample. The licensee should identify and quantify all the nuclides that are detectable with the licensee's system using normal counting times. Compare results as described below.
- (b) Liquids and Gases - Other Radionuclides. For radionuclides that cannot be analyzed by gamma-ray spectrometry (e.g., H-3, Sr-89, Sr-90, Fe-55), compare an independent laboratory's results with the licensee's as described below.
- (c) Air Particulate Filters and Charcoal Silver/Zeolite Cartridges
  - (1) Identify all radionuclides detected in the NRC sample.
  - (2) Compare the NRC measurements with the licensee's as described below.

##### 2. Comparison

- (a) Divide each NRC result by its associated uncertainty to obtain the resolution. (Note: For purposes of this procedure, the uncertainty is defined as the relative standard deviation, one sigma, of the NRC result as calculated from counting statistics.)
- (b) Divide each licensee result by the corresponding NRC result to obtain the ratio (licensee result/NRC).
- (c) The licensee's measurement is in agreement if the value of the ratio falls within the limits shown in the following table for the corresponding resolution.

3. Criteria for Accepting the Licensee's Measurements

<u>Resolution</u>	<u>Ratio</u>
<4	0.4 - 2.5
4 - 7	0.5 - 2.0
8 - 15	0.6 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
>200	0.85 - 1.18

4. Action Taken for Measurements Not in Agreement. Perform another Verification Test, if practical, during the inspection. If measurements are still in disagreement, remedial actions should be taken. Remedial action to resolve a disagreement may include the following:

- (a) A review of calibrations and/or recalibration by the licensee.
- (b) Consideration of ways in which the licensee's radioanalytical methods and radioactivity measurement algorithms may contribute to disagreement.
- (c) Licensee analysis of a spiked sample supplied by an independent laboratory for the NRC.
- (d) Reanalysis of the sample by an independent laboratory.

Note: Some discrepancies may result from the use of different equipment and techniques. This should be factored into acceptance criteria.

- b. Verify by calculation: Using the counting efficiencies, counting times, and other parameters, verify that the licensee can meet the lower level of detection (LLD) specified in the ODCM.

02.08 Unrestricted Release of Material from the Radiologically Controlled Area (RCA). If significant inspection findings were identified concerning the unrestricted release of materials from the RCA:

- a. Review the methods used for control, survey, and release from these areas. When possible, observe the performance of personnel surveying and releasing material for unrestricted use.
- b. Verify that the radiation monitoring instrumentation is appropriate for the radiation types present and was calibrated with appropriate radiation sources.
- c. Review the licensee's criteria for the survey and release of potentially contaminated material. Verify that there is guidance on how to respond to an alarm of the survey instrument.

NOTE: 10 CFR Part 20 does not contain release limits for the release of contaminated material to unrestricted areas; thus, the licensee's criteria should be that no detectable licensed radioactive material (radioactive gaseous and liquid effluents excepted) is released for unrestricted use or as waste into an unrestricted area.

- d. Review that the radiation detection sensitivities are consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination and HPPOS-221 for volumetrically contaminated material. If applicable, verify that radiation surveys include radionuclides that decay via electron capture (HPPOS-250).
- e. Review the licensee's procedures and records to verify that the radiation detection instrumentation is used at its typical sensitivity level based on appropriate counting parameters (i.e., counting times and background radiation levels). Verify that the licensee has not established a "release limit" by altering the instrument's typical sensitivity through such methods as raising the discriminator level or locating the instrument in a high radiation background area.
- f. Review incidents identified by the licensee which involve the unconditional release of contaminated materials from the RCA. Determine if the licensee performed a hazards evaluation pursuant to 10 CFR 20.1501 which included an exposure pathway analysis and a dose estimate.
- g. Walk-down the RCA and identify the number and location of RCA entrance/exit points. Based on these observations, review the licensee's administrative controls to ensure that personnel using these exit points properly survey materials

that are removed. Observe personnel using these exit points to ensure that contaminated materials are not released.

- h. Perform on-site, independent analyses/surveys of unconditionally released materials using NRC survey instruments. In the case of soil/granular or liquid samples, package and ship samples to an NRC regional office for analyses or perform analyses using an NRC Mobile Laboratory at the site.
- i. Walk-down areas outside of the RCA, which have the potential to contain inadvertently released licensed materials from the RCA (e.g., storage areas or shop areas). Perform independent surveys of tools or equipment. Evaluate the licensee's survey program to determine if the licensee performs periodic surveys of these areas to verify the effectiveness of its unconditional release program.
- j. Review the licensee's program for control of contaminated tools and equipment. Evaluate how the licensee stores these items to prevent the inadvertent release of these materials from the RCA.

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RESOURCE ESTIMATE

The estimated resources to complete this attachment is 20-60 hours.

END