Nuclear Regulatory Commission
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NRC INSPECTION MANUAL

NMSS/FCSS

INSPECTION PROCEDURE 88045

EFFLUENT CONTROL AND ENVIRONMENTAL PROTECTION

PROGRAM APPLICABILITY: 2600

88045-01 INSPECTION OBJECTIVES

The objectives of this procedure are to determine whether the licensee or certificate holder:

01.01 Is complying with regulations and license/certificate requirements related to the processing, control, release, and reporting of information to the NRC of radioactive liquid and airborne effluents;

01.02 Is implementing a program to ensure that releases of radioactivity to the environment provide minimal impact on the environment and the public; and

01.03 Maintains adequate management controls for the radiological effluent control and environmental program.

88045-02 INSPECTION REQUIREMENTS

02.01 Management Controls.

a. Responsibilities. Determine whether, since the last inspection, there have been any changes in the program and procedures or in the assignments of responsibilities to organizational units and individuals to implement the program. Based on a review of a sample of these changes, determine whether they are consistent with the requirements of the license or certificate.

b. Internal Audits and Inspections. Determine whether there are provisions for an ongoing review of effluent control and environmental monitoring results. Review a sample of records of audits and inspections done by the licensee or certificate holder, including sampling results, and determine whether corrective actions have been undertaken and recorded for deficiencies recognized and identified during the audit process. Determine whether systems are being implemented to inform management of audit and inspection results for review and action.

02.02 Quality Control of Analytical Measurements. Review a sample of changes in sample analytical methods since the last inspection and determine whether the accuracy resulting from those changes is at least as good as, or better than, the accuracy level before any changes were made. From review of operations, discussions, and review of records, determine whether the types and numbers of quality control measurements are made at the required frequencies as specified in the licensee or certificate holder's procedures or as required by the license/certificate. Determine whether the licensee or certificate holder's criteria for accepting or rejecting the measurement results is available and being implemented, and whether procedures for following up and correcting

deficiencies that might be found in sampling results are being implemented.

02.03 Program Implementation.

a. Monitoring Stations and Sampling Locations. Determine, by review of records and discussions with licensee or certificate holder personnel, whether sampling points and monitoring stations are adequate and are in compliance with the license/certificate requirements. Inspect a selection of sampling stations and locations during sample collection times, if practicable; otherwise, examine operations such as air/liquid effluent monitoring, air sampling, and radiation dose measurement stations as required by license/certificate. Determine whether the equipment is operating as intended.

b. Liquid and Airborne Effluent Monitoring Instruments. Through observation of operations, discussions, and record reviews, determine whether the licensee or certificate holder is following procedures and is in compliance with license/certificate requirements for:

1. Calibrations and functional tests,

2. Correlations of monitor readings and laboratory measurements of radioactivity in the release path, and

3. Setpoints for equipment alarms and trips.

c. Records and Reports of Environmental and Radioactive Effluent Monitoring. By record review and discussions, determine whether the licensee or certificate holder is following procedures and is in compliance with the following listed regulations and/or license/certificate requirements applicable to the facility:

1. 10 CFR 20, Subpart L, “Records”

2. 10 CFR 20, Subpart M, “Reports”

3. 10 CFR 40.65, “Effluent monitoring reporting requirements”

4. 10 CFR 70.59, “Effluent monitoring reporting requirements”

5. License/certificate requirements for:

(a) Environmental and radiological effluent monitoring reports, in terms of frequency and content, and

(b) Maintenance of records.

02.04 Radioactive Liquid Effluents. Through observation of operations, discussions, and record reviews, determine whether the licensee or certificate holder is following procedures and is in compliance with license/certificate requirements for:

a. 10 CFR 20, Subpart D, “Radiation Dose Limits for Individual Members of the Public”

b. 10 CFR 20.2003, “Disposal by release into sanitary sewerage”

c. License/certificate requirements for:

1. Limits on release rates, concentrations, total quantities, and dose to a member of the public;

2. Analysis for specific radionuclides;

3. Monitoring of specified release points; and

4. Any limits on activity contained in holding or storage tanks.

02.05 Radioactive Airborne Effluents. Through observation of operations, discussions, and record reviews, determine whether the licensee or certificate holder is following procedures and is in compliance with license/certificate requirements for:

a. 10 CFR 20.1101(d), "Radiation Protection Programs" (Note: Constraint on air emissions of radioactive material to the environment)

b. 10 CFR 20, Subpart D, "Radiation Dose Limits for Individual Members of the Public"

c. License/certificate requirements for:

1. Limits on release rates, concentrations, total quantities, and dose to a member of the public;

2. Analysis for specific radionuclides;

3. Monitoring of specified release points; and

4. Any limits on activity contained in holding or monitoring tanks.

02.06 Procedures for Controlling the Release of Radioactive Liquid and Gaseous Effluents.

a. Review a sample of radiological effluent processing and control procedures which have been modified since the last Inspection Procedure (IP) 88045 inspection and determine whether these procedures:

1. Were changed, reviewed, and approved in accordance with the licensee or certificate holder's procedural control system, and

2. Continue to effectively implement regulatory requirements for control of effluents.

b. Determine whether the licensee or certificate holder is adequately following the effluent control procedures.

02.07 Identification and Resolution of Problems. Determine whether the licensee or certificate holder is identifying effluent control and treatment or environmental monitoring problems at an appropriate threshold and entering them into the corrective action program. Determine, for selected licensee or certificate holder identified items, whether effective corrective actions have been taken.

88045-03 INSPECTION GUIDANCE

03.01 If there have been no changes in the effluent control or environmental monitoring program procedures, or changes in personnel or personnel responsibilities, there is no need to pursue this part of the inspection in depth. If changes have occurred in the procedures, those should be examined (together with discussions with licensee or certificate holder personnel) to determine that the changes have maintained or enhanced the program and conform to license/certificate requirements. Personnel qualifications and responsibilities normally are specified in the license/certificate application and require a

license/certificate amendment prior to changes. Determine whether personnel are qualified to perform the assigned functions (to a reasonable degree).

03.02 The environmental monitoring program should be documented in policy directives designating a person or organizational unit responsible for reviewing the program on an ongoing basis.

Procedures should establish criteria for: sampling; sample preparation for analyses; data recording and storage; reporting sample results; instrument calibration; and actions to be taken for results which are anomalous or exceed established limits. Management controls should include provisions for review and evaluation of program results to determine whether deficiencies and trends are recognized and evaluated, and that timely corrective actions and followup actions are taken.

Examine a sample set of raw data records for reasonable assurance that the environmental monitoring program conforms to license/certificate requirements.

Split samples with the licensee and compare analysis results as necessary to determine whether the licensee's sample preparation and counting programs are adequate. Large discrepancies in sample results may indicate a need to re-examine sample preparation and/or counter calibration by the licensee. Sample splitting in many cases is difficult, especially soil samples and air samples. Sample splitting may be done with liquid effluents, vegetation, stream bottom, etc. Independent sampling is discouraged if the purpose is to make a comparison of NRC results with the licensee results. For example, an independent air sample, because of the time factor and other reasons, such as location, may be an order of magnitude different from a licensee sample, yet both could be correct.

03.03 a. Monitoring Stations and Sampling Locations.

If it is known in advance when the licensee or certificate holder will be taking environmental samples, attempt to schedule the inspection in order to directly observe the sampling activities to determine if they are done per the applicable procedures. Observe equipment functional tests if any are being performed when onsite. Such observations should be done only to the extent that the inspector is satisfied that sampling is being done in accordance with procedures. Such sampling may include effluent air and liquid, soil, vegetation, stream bottom silt or vegetation, small animals, fish, and radiation dosimeters, among others. If there have been procedural changes, the inspector should observe laboratory sample preparations such as ashing, chemical treatment, etc., and counting and evaluation of results. Discuss processes with the field and laboratory technicians to determine they are being done according to procedures. Also, the inspector should examine records of the calibration of analytical and counting equipment to determine if they are being done at the required frequencies.

b. Liquid and Airborne Effluent Monitoring Instruments.

The objective of a calibration is to assure the continued adequacy and operability of the instrument system. The adequacy of the system is judged on the basis of its stability with time and its ability to reproduce measurements within acceptable limits, which should be specified by the licensee or certificate holder in instrument calibration procedures, over the useful range of the instrument. The useful range must encompass the normal and reasonably expected values of the monitored variable, including values expected from anticipated operational occurrences.

The term "calibration" may be defined in license/certificate requirements, but if it is

not, use the following:

"A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the CHANNEL FUNCTIONAL TEST. THE CALIBRATION may be performed by any series of sequential, overlapping, or total channel steps such that entire channel is calibrated."

The calibration procedure and method used should:

1. Check the response over the range of the readout device; for example, 1/4, 1/2, 3/4;

2. Determine the actuation at prescribed set points of alarms or other automatic functions of the system;

3. Require periodic (i.e., at least quarterly) comparison of monitor readings against the concentrations (or release rates) of radioactive material in the monitored release path;

4. Determine whether the sensitivity of the monitor is within an acceptable range--the background radiation, internal to the monitor from crud buildup or from external sources, remains at an acceptable level;

5. Be performed using a written procedure approved by appropriate plant supervision; and

6. Require documentation of the results and review and approval of results by appropriate plant supervision.

The set points of effluent and process monitors should be set forth in written procedures along with instructions which describe the rules and authority required to change specified set points. The bases for each set point should be known by the responsible operator/technician and should be explained in plant documents.

The comparison of monitor readings with laboratory measurements of radioactive material in the release path is made primarily to assure the response of the monitor is within an acceptable range for values which form the bases for the alarm and trip set points.

c. Records and Reports of Environmental and Radioactive Effluent Monitoring. Examine the environmental and radiological effluent monitoring records generated since the last inspection--all annual or semiannual reports, all pertinent non-routine event reports, and a random selection of monitoring records equivalent to about two months of operation. Review reports to licensee or certificate holder management of environmental monitoring and effluent controls and releases since the last inspection.

Review the reports and records for obvious mistakes, anomalous measurements results, trends, missing data (compare the recorded date with the requirements), and determine the accuracy of the data in the report or record with the licensee or certificate holder if any of these aspects are identified or suspected.

The term “not detected” or similar terms should not be used. Each reported result should be: (1) a value and its associated standard deviation; or (2) an indication that the result was below the stated value of the lower limit of detection.

(Regulatory Guide (RG) 4-16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants")

03.04/03.05 Radioactive Liquid/Airborne Effluents. Review the licensee or certificate holder's reports for compliance with the regulations for annual and other dose limits and constraints to individual members of the public from radioactive liquid and gaseous effluents. Review a sample of records of releases of liquids to the sanitary sewerage to determine compliance with concentration and/or quantity limits in the license or regulations. Pay special care to the licensee or certificate holder's specific license/certificate requirements concerning radiological effluent releases, analysis, monitoring and limits on activity or dose.

03.06 Procedures for Controlling the Release of Radioactive Liquid/Gaseous Effluents. Select a sample set of procedures that have been changed since the last IP 88045 inspection for both liquid and gaseous measurement systems and determine whether the procedures are adequately written to facilitate their use. Determine whether the procedures contain clearly written steps for tasks such as sampling, sample preparation for analyses, data recording and storage, reporting sample results, instrument calibration, and actions to be taken for results which are anomalous or exceed established limits.

Determine if procedural steps are being adequately followed by direct observation of the licensee or certificate holder employees performing the associated tasks and through discussions with employees. If it is possible to directly observe the changed procedures being used, then discuss by walk-throughs with technicians.

88045-04 RESOURCE ESTIMATE

An inspection performed using this inspection procedure is estimated to require 34 hours of inspector resources. This estimate is only for the direct inspection effort and does not include preparation for and documentation of the inspection. The estimate may vary depending on the degree of complexity of the site's effluents and thus its environmental protection program.

88045-05 REFERENCES

10 CFR 20, "Standards for Protection Against Radiation"

10 CFR 40, "Domestic Licensing of Source Material"

10 CFR 70, "Domestic Licensing of Special Nuclear Material"

10 CFR 76, "Certification of Gaseous Diffusion Plants"

40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations"

U.S. Nuclear Regulatory Commission, Regulatory Guide 4.5, "Measurements of Radionuclides in the Environment - Sampling and Analysis of Plutonium in Soil," dated May 1974

U.S. Nuclear Regulatory Commission, Regulatory Guide 4.13, "Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications," Revision 1, dated August 1977

U.S. Nuclear Regulatory Commission, Regulatory Guide 4.14, "Radiological Effluent and

Environmental Monitoring at Uranium Mills," Revision 1, dated April 1980

U.S. Nuclear Regulatory Commission, Regulatory Guide 4.15, "Quality Assurances for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment," Revision 1, dated February 1979

U.S. Nuclear Regulatory Commission, Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants," Revision 1, dated December 1985

END

ATTACHMENT 1
Revision History for IP 88045

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	09/05/06 CN 06-020	This document has been revised to: (1) emphasize the risk-informed, performance-based approach to inspection, (2) impose changes to the core inspection program based on operating experience, and (3) remove completed or obsolete MCs and incorporate other fuel cycle MCs into a central location.	None	N/A	ML061940435