

# NRC INSPECTION MANUAL

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## INSPECTION PROCEDURE 83526

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### CONTROL OF RADIOACTIVE MATERIALS AND CONTAMINATION, SURVEYS, AND MONITORING (PREOPERATIONAL AND SUPPLEMENTAL)

PROGRAM APPLICABILITY: 2513, 2515, and 2525

#### 83526-01 INSPECTION OBJECTIVE

To determine whether the applicant can effectively control radioactive materials and contamination and can perform surveys and monitoring.

#### 83526-02 INSPECTION REQUIREMENTS

02.01 Area Radiation and Airborne Radioactivity Monitors. Determine whether area radiation and airborne radioactivity monitors for normal and emergency operations are installed as described in the FSAR and NUREG-0737, Item II.F.1, Attachment 3, and that adequate procedures have been developed for calibration, performance check, maintenance, and use.

02.02 Portable Survey, Sampling, and Contamination Monitoring Instruments. Determine whether the kinds and quantities of portable survey, sampling, and contamination monitoring instruments, including representative samples of those contained in the emergency kits, the Operations Support Center, and the Technical Support Center meet FSAR commitments, are adequate for use during normal operations, including outages, and for emergency operations, and that adequate procedures have been developed for calibration, performance check, maintenance, and use.

02.03 Protective Clothing and Equipment. Determine whether the kinds and quantities of protective clothing and equipment (other than respiratory protection equipment), including representative samples of that contained in the emergency kits, the Operational Support Center, and the Technical Support Center meet FSAR commitments, are adequate for use during outages and under emergency operations, and that adequate procedures have been developed for their use.

02.04 Radioactive Material and Contamination Control. Determine whether provisions for control of radioactive materials and contamination meet requirements and FSAR commitments.

02.05 In-Plant Surveys and Monitoring. Determine whether provisions for surveys and monitoring of radiation and radioactivity meet requirements and FSAR commitments.

03.01 Area Radiation and Airborne Radioactivity Monitors<sup>1</sup>

- a. For area radiation monitors, factors that may be examined include:
  1. Conformance with the guidance of ANSI/ANS-HPSSC-6.8.1 (for monitoring and normal operations), of Regulatory Guide 1.97 (for accident monitors), and of NUREG-0737, Item II. F.1, Attachment 3 (containment high-range radiation monitor).
  2. Procedures for calibrations and checks of monitors. (See August 16, 1982 memo from Eisenhut for guidance on calibration of accident monitors.)
  3. Alarm setpoints.
  4. Existence of procedures/guidance on actions to be taken when monitors alarm in control room.
- b. For airborne radioactivity monitors, factors that may be examined include:
  1. Locations at normally occupied areas where air-borne radioactivity may exist.
  2. Representative air concentration measured at detectors located as close as possible to sampler intakes.
  3. Provisions for calibrations (routinely and after maintenance) and periodic performance checks.
  4. Alarm setpoints.
- c. For instrumentation to monitor accidental criticality, factors that may be examined include:
  1. Criteria of 10 CFR 70.24(a)(1).
  2. Guidance in Regulatory Guide 8.12 and ANSI/ANS 8.3-1979.

03.02 Portable Survey, Sampling, and Contamination Monitoring Instruments

- a. Portable instruments for measuring radiation or radioactivity normally include:
  1. Low- and high-range exposure rate meters (see Regulatory Guide 1.97 for ranges).
  2. Portable G-M counters.
  3. Alpha scintillation or proportional counter rate meters.
  4. Neutron dose equivalent rate meters.
  5. Air samplers for use with particulate filters and iodine collection devices (such as charcoal cartridge or equivalent filters) and airborne radioactivity monitors, and provisions for collecting noble gas samples. See NUREG-0737, Item III.D.3.3 regarding inplant iodine monitoring instrumentation for accident conditions.

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<sup>1</sup> Process and effluent monitors are covered in other inspection procedures.

See ANSI N323-1978 for guidance on test and calibration of portable survey instruments.

- b. Dedicated instruments for monitoring contamination of individuals include friskers, hand and foot counters, and portal monitors. Factors that may be examined for these include:
  - 1. Capability of the instruments to detect contamination at acceptable levels.
  - 2. Procedures for using the instruments for monitoring and provisions for ensuring compliance with procedures.
- c. For instruments intended for use during emergency operations, additional factors that may be examined include:
  - 1. Special procedures for calibration of high range instruments.
  - 2. Sufficient supplies of appropriate instruments should be readily available and accessible under accident conditions. (See NUREG-0654, Planning Standard H, I, J, K, and L, which is endorsed by Regulatory Guide 1.101.)
  - 3. Instruments in emergency kits should be operable, calibrated, and maintained on a specific schedule (see NUREG-0654, Planning Standard H, which is endorsed by Regulatory Guide 1.101).
  - 4. Personnel should be trained in proper use of instruments and be aware of their locations.

#### 03.03 Protective Clothing and Equipment

- a. Examples of this clothing and equipment (other than respiratory protection equipment) are anti-contamination clothing; plastic suits for liquid contamination control; head covers; shoe covers; and gloves.
- b. Use of this equipment should be specified by procedures, including criteria for use, suitup, suit removal, disposal of contaminated clothing and protective equipment, laundering, and contamination control.
- c. Sufficient supplies should be readily available and accessible for both normal and emergency operations. See NUREG-0654, Planning Standards H and J, for emergency operations.

#### 03.04 Radioactive Material and Contamination Control

- a. Documented plans and procedures should describe the system and responsibilities for identification, accountability, control, movement, storage, and inventory of radioactive materials outside of controlled areas; for identification, control, movement, and storage within controlled areas; for receipt of radioactive material; and criteria for release and unrestricted use in uncontrolled areas of materials from contaminated areas.
- b. Provisions should be made for proper work techniques for contamination control and prompt correction and cleanup of contamination.
- c. Provisions for minimizing the introduction of uncontaminated materials into contaminated areas.

- d. Contamination control has been found to be a good measure of the effectiveness of the health physics program.
- e. Provisions to detect, control, and promptly repair leaks in radioactive systems.

#### 03.05 In-Plant Surveys and Monitoring

- a. This inspection requirement is limited to surveys and monitoring used to evaluate potential occupational exposure. Surveys for radiation exposure rate, air-borne radioactivity, radioactive contamination, and radioactive materials are included. Monitoring of individual radiation exposures (personal dosimetry) is covered in other procedures.
- b. Procedures, or other survey program documents, should describe:
  - 1. Frequency of surveys.
  - 2. Situations requiring surveys.
  - 3. Nature and extent of surveys.
  - 4. Equipment to be used.
  - 5. Reviews of surveys and uses of survey data in work planning and procedures, including radiation work permits.
  - 6. Investigation, evaluation, and correction of abnormal radiological conditions that may be found.
  - 7. Health physics supervision/management review of survey results.
- c. Contamination surveys should include:
  - 1. Checks for contamination of individuals using procedures and equipment that provide acceptable detection levels.
  - 2. Adequate detection of contaminated or activated materials before release for unrestricted use (see IE Circular No. 81-07).
  - 3. Surveys of clean-waste dumps, salvage areas, storage areas, etc.

#### 83526-04 REFERENCES

Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident."

Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors."

Regulatory Guide 8.12, "Criticality Accident Alarm Systems."

Regulatory Guide 8.25, "Calibration and Error Limits of Air Sampling Instruments for Total Volume of Air Sampled."

NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

NUREG-0737, "Clarification of TMI Action Plan Requirements," 1980.

NUREG/CR-2956 (PNL-4471), "Neutron Dosimetry at Commercial Nuclear Plants," March 1983.

ANSI N13.1-1969 (R 1982), "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities."

ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration."

ANSI/ANS-HPSSC 6.8.1-1981, "Location and Design Criteria for Area Radiation Monitoring Systems for Light-Water Nuclear Reactors."

ANSI/ANS 8.3-1979, "Criticality Accident Alarm System."

INPO Report 82-001-EPN-01, "High Sensitivity Portal Monitors - A Review," January 1982.

INPO Good Practice 82-001-FDO-02, "Modular Contamination Enclosures," September 1982.

INPO OEN-01, "Strippable Decontamination Coatings," November 1981.

INPO Good Practice 82-001-OEN-9, "Low Level Radioactive Waste Management," September 1982.

INPO Good Practice 82-001-OEN-10, "Monitoring Personnel for Radioactive Contamination," September 1982.

IE Bulletin No. 80-10, "Contamination of Nonradioactive Systems and Resulting Potential for Unmonitored, Uncontrolled Release to Environment," May 2, 1980.

IE Circular No. 79-21, "Prevention of Unplanned Releases of Radioactivity," October 19, 1979.

IE Circular No. 80-14, "Radioactive Contamination of Plant Demineralized Water System and Resultant Internal Contamination of Personnel," June 24, 1980.

IE Circular No. 81-07, "Control of Radioactively Contaminated Material," May 8, 1981.

IE Information Notice No. 80-22, "Breakdown in Contamination Control Programs," May 22, 1980.

IE Information Notice No. 82-32, "Contamination of Reactor Coolant System by Organic Cleaning Solvents," August 19, 1982.

IE Information Notice No. 82-49, "Correction for Sample Conditions for Air and Gas Monitoring," December 16, 1982.

IE Information Notice No. 83-05, "Obtaining Approval for Disposing of Very-Low-Level Radioactive Waste - 10 CFR 20.302," February 24, 1980.

IE Information Notice No. 83-33, "Nonrepresentative Sampling of Contaminated Oil," May 26, 1983.

NCRP Report No. 57, "Instrumentation and Monitoring Methods for Radiation Protection," May 1, 1978.

NCRP Report No. 65, "Management of Persons Accidentally Contaminated with Radionuclides," April 15, 1980.

HASL-312, "Guidance for Air Sampling at Nuclear Facilities," A. J. Breslin, November 1978.

LA-4558-MS, "Surface Contamination: Decision Levels," J. W. Healy, September 1971.

"Proposed Guidance for Calibration and Surveillance Requirements for Equipment Provided to Meet Item II. F.1, Attachments 1, 2, and 3, NUREG-0737," memorandum from D. G. Eisenhut, NRR, to Regional Administrators, August 16, 1982, with enclosures.

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