INSPECTION PROCEDURE 83724

# EXTERNAL OCCUPATIONAL EXPOSURE CONTROL AND PERSONAL DOSIMETRY

PROGRAM APPLICABILITY: 2515

## 83724-01 INSPECTION OBJECTIVES

01.01 To determine the adequacy of the licensee's personal dosimetry for external exposure and capability to control external occupational exposure during normal operations.

01.02 To determine the adequacy of the licensee's personal dosimetry for external radiation and capability to control the external exposure of onsite emergency workers during accident conditions.

## 83724-02 INSPECTION REQUIREMENTS

This procedure is implemented to independently assess licensee conclusions regarding extent of condition of issues, when selected as a part of supplemental inspections using IP 95002, “Supplemental Inspection For One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area.”

02.01 Audits and Appraisals. Review the results of audits and appraisals performed by or for the licensee since the last inspection and the adequacy of the licensee's commitments and corrective action.

02.02 Changes. Review changes in facilities, equipment, personnel, and procedures that may affect external exposure control and personal dosimetry.

02.03 Planning and Preparation for Outages. Determine whether necessary radiation protection planning and preparation for maintenance and refueling outages are adequate.

02.04 Personal Dosimetry

a. Determine whether personal dosimetry for external exposure meets requirements.

b. Determine whether personal dosimeters dedicated for emergency use meet regulatory requirements, are operable, maintained, and readily available for all emergency workers.

02.05 Administrative Controls. Determine whether administrative controls of external radiation exposure meet requirements and are designed to maintain exposures ALARA.

02.06 Records, Reports, and Notifications. Determine whether records, reports, and notifications of external exposures meet regulatory requirements.

83724-03 INSPECTION GUIDANCE

03.01 Audits and Appraisals

a. Review reports of required audits. Verify the timeliness and effectiveness of licensee corrective actions.

Requirements for reviews and audits normally are contained in the Technical Specifications. Audit teams should include someone with experience or training commensurate with the scope, complexity, or special nature of the activities audited (Regulatory Guide 1.146 and ANSI/ASME N45.2.23-1978, Section 2.2).

b. Review reports of other audits, appraisals, assessments, evaluations etc., that may provide information on program quality.

03.02 Changes

a. By observation and discussion with cognizant management personnel, determine whether changes have adversely affected the licensee's program for control of external exposures. Determine whether changes are in accordance with the requirements of 10 CFR 50.59.

b. By direct observation and discussion, determine whether workers are aware of, and understand, the changes.

03.03 Planning and Preparation for Outages

a. Review representative records and discuss outage planning with licensee representatives, and observe activities to verify necessary planning and preparations to include the use of appropriate dosimetry. Focus on planned work in high radiation areas, with special emphasis on any diving activities with potential exposure concerns (e.g., in fuel pool with spent bundles present).

03.04 Personal Dosimetry

a. By direct observation, discussion, and review of records, determine whether personal dosimetry is used effectively and

in accordance with requirements for monitoring external exposure.

Aspects of personal dosimetry that may be examined include:

1. Compliance with 10 CFR 20.1501(c) requiring that personnel dosimeters that are used in accordance with 10 CFR 20.1502(a) be processed by a processor accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the appropriate types of radiation. Voluntary and redundant dosimeters, as well as direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to extremities, are excepted from this requirement.

   No NVLAP tests are included for the dose at the nominal depth of the lenses of the eye, i.e., 300 mg/cm2. The eye has a separate dose limit (15 rem per year) and individual monitoring for eye dose is required only if the eye dose equivalent is likely to exceed, in a year, 10% of that limit (1.5 rem).

   It is expected that power reactor licensees holding an operating licensee will be accredited in test categories I through VII, inclusive, and in category VIII if personnel dosimeters are used to measure neutron dose equivalent. (See ANSI N13.11 for a description of these categories.) If a licensee is not accredited in all of these categories, the categories omitted and the reasons for omitting them, are to be noted in the inspection report.

2. Dosimeter selection and placement criteria: adequacy of criteria for utilization and placement of whole body and extremity dosimeters including use in non-uniform radiation fields. See IE Information Notice Numbers 83-59, 81-26, Part 3, and 83-59, Supplement No. 1. Part 20.1201(c) requires the assigned deep-dose and shallow-dose equivalent be measured for the area of the body receiving the highest dose rates. The inspector should review the licensee's procedure to ensure that the licensee has reasonable criteria for complying with 20.1201(c) for workers in radiation areas, where dose rates are greater than 10 mrem/h. Additionally, in a dose gradient of 1.5 or greater it is reasonable to require a worker to move the dosimeter (or have additional dosimetry) if the dose missed by the individual by not moving the dosimeter was significant (e.g, 30 mrem to the individual for the work shift). From a collective dose perspective, using the same dose gradient threshold, a "missed" collective dose of 250 mrem or more for a job, is a reasonable threshold action criterion for demonstrating compliance with 20.1201(c).

3. Improper wearing or use of dosimeters by individuals.

4. Exposure records and reports.

5. Use of pocket dosimeters and comparison of their measurement with TLD or film badge results; procedures for investigating overexposures and lost/offscale dosimeters.

6. Use of digital alarming dosimeters. 10 CFR 20.1501(b) requires that licensees periodically calibrate these instruments. Improper uses of digital alarming dosimeters have resulted from (1) lack of training in their proper use, (use in high noise areas or under protective clothing, which made the alarm inaudible, and (3) poor (or no) procedures for their use.

7. Special processing of dosimeters.

8. Quality assurance (which includes quality control) of the personal dosimetry program.

9. Photon, beta, and neutron exposures.

10. Exposures to extremities.

11. Skin doses from uniform sources and discrete hot particles.

12. Timely dissemination of current dose status.

13. Review of workers' dose status by managers.

b. By direct observation, discussion, and record review, determine that personal dosimeters to be used for emergency operations are adequate, properly stored, and maintained. Observe representative samples of equipment; for example, equipment in emergency kits, in the Operational Support Center, or in the Technical Support Center.

03.05 Administrative Controls. By direct observation, discussion, and review of records and procedures, determine whether administrative controls are adequate.

a. Practices and Procedures. Aspects of administrative controls that may be considered include:

1. Planning work to maintain exposures ALARA and within limits.

2. Use of current survey and personal dosimeter data for dose control.

3. Use of control/action levels.

4. Radiation work permit (RWP) program.

5. Controlling access to high exposure areas and very high radiation areas. Focus on the adequacy of survey evaluations necessary to post and control these areas.

6. Radiation work practices.

7. Management reviews of exposure data trends and discrepancies.

b. Posting and Labeling. While touring the plant, determine by direct observation and radiation measurements of representative areas, whether posting and labeling requirements are met and that dosimetry for these areas is appropriately required. If convenient, this may be done by accompanying a health physics technician on a routine daily survey.

03.06 Records, Reports, and Notifications

a. Review exposure summary reports to determine compliance with the regulations.

b. Based on a review of records, how has the licensee complied with 10 CFR 20.1502(a) in determining which workers are required to have individual monitoring devices?

c. Records of exposures of workers for whom individual monitoring of external exposure was required, and who started work after the beginning of the year, may indicate whether the licensee's determination of the workers' prior dose (from both external and internal sources) for the current year is in compliance with 10 CFR 20.2104.

d. Determine if minors have been permitted to work in restricted areas, and if so, determine compliance with 20.1207 by review of exposure records.

e. Review each planned special exposure to determine whether it meets the requirements of 10 CFR 20.1206. See Regulatory Guide 8.35, "Planned Special Exposures"

f. Review a selected sample of records of exposures of declared pregnant women to determine whether, in each case, the dose to the embryo/fetus meets the requirements of 10 CFR 20.1208. See Regulatory Guide 8.36, "Radiation Dose to the Embryo Fetus"

g. Review selected Forms NRC-5 to determine compliance with the regulations.

h. Determine if overexposures of individuals to external radiation have been appropriately reported to the NRC (10 CFR 20.2202 and 20.2203) and to the exposed individual [10 CFR 19.13(d)].

83724-04 RESOURCE ESTIMATE

It is estimated that 25-35 inspector-hours onsite will be needed to complete the requirements of this procedure, for single or multiple sites.

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