



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

# NRC INSPECTION MANUAL

PRPB

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## INSPECTION PROCEDURE 83729

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### OCCUPATIONAL EXPOSURE DURING EXTENDED OUTAGES

PROGRAM APPLICABILITY: 2515

SALP: Radiological Controls

#### 83729-01 INSPECTION OBJECTIVE

To determine the adequacy of the licensee's occupational radiation protection program during extended outages (major maintenance and refueling).

#### 83729-02 INSPECTION REQUIREMENTS

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

02.02 Changes. Review changes since the last inspection in organization, personnel, facilities, equipment, programs, and procedures that may affect occupational radiation protection.

02.03 Planning and Preparation. Determine whether planning and preparation for the outage are adequate.

#### 02.04 Training and Qualifications of New Personnel

- a. Review the applicable education, experience, qualifications and training of selected members of the licensee's (and its contractor's) radiation protection and plant chemistry organization(s).
- b. Review applicable radiation protection worker education, qualification, and training of selected members of other organizations (including contractor employees).

#### 02.05 External Exposure Control

- a. Determine whether personal dosimetry for external exposure meets requirements.
- b. Determine whether administrative controls of external radiation exposure meet requirements and are designed to maintain exposures ALARA.

- c. Determine whether records, reports, and notifications of external exposures meet regulatory requirements.

#### 02.06 Internal Exposure Control

- a. Determine whether assessment of individual intakes of radioactive materials meets requirements.
- b. Determine whether process or other engineering controls are used to the extent practicable to limit concentrations of airborne radioactive materials.
- c. Determine whether administrative controls of internal radiation exposure meet requirements and maintain exposures ALARA.
- d. Determine whether use of respiratory protection equipment meets requirements.
- e. Determine whether records, reports, and notifications of internal exposures meet requirements.

#### 02.07 Control of Radioactive Materials and Contamination, Surveys, and Monitoring

- a. Determine whether survey and monitoring activities are performed as required.
- b. Determine whether control of radioactive materials and contamination meets requirements.

#### 02.08 Maintaining Occupational Exposure ALARA

- a. Workers Awareness and Involvement. Determine whether workers are aware of, and involved in, the ALARA program.
- b. ALARA Goals and Objectives. Determine whether the licensee is establishing and tracking ALARA goals and objectives.
- c. ALARA Results. Review measures of the effectiveness of the ALARA program and determine whether the program is effective.

### 83729-03 INSPECTION GUIDANCE

#### 03.01 Audits and Appraisals

- a. Review reports of required audits since the last inspection. Look particularly for those audits that probe for programmatic weaknesses and assess the quality of the program. Focus upon licensee followup actions for identified deficiencies. Are corrective actions timely and technically acceptable?

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 supervisory and management personnel, determine whether changes have adversely affected the licensee's program for control of radiation exposures. Determine whether changes are in accordance with 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. Review representative records and discuss outage planning with licensee representatives, and observe activities to verify necessary planning and preparations. Examples of areas that may be examined include:

- a. Increased health physics staff, including plant's method of ensuring supervisory control over contract technicians.
- b. Special training, including use of mockup training.
- c. Increased supplies, including clothing, temporary shielding materials, etc.
- d. ALARA considerations, including work package review by health physics personnel, dose reduction methods, and radwaste reduction.
- e. Adequacy of licensee controls and monitoring of contractor work standards, equipment, and practices.
- f. Early involvement of health physics group and knowledge of work to be performed.
- g. Provisions for engineering controls, such as auxiliary ventilation systems to minimize the need to use respiratory protection equipment (Regulatory Guide 8.8, Section C.2.d).

#### 03.04 Training and Qualifications of New Personnel

- a. Review representative training records and briefly discuss with workers and supervisors.
- b. Emphasis should be on training provided to the increased work force required for the outage. Discuss with plant management and the RPM.

#### 03.05 External Exposure Control

- 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. Improper wearing or use of dosimeters.

2. Exposure records and reports.
  3. Use of pocket dosimeters and comparison of their measurements with TLD or film badge results; procedures for investigating overexposures and lost/off-scale dosimeters.
  4. Special processing of dosimetry devices.
  5. Quality assurance of personal dosimetry measurements.
  6. Photon, beta, and neutron exposures.
  7. Extremity exposures.
  8. Timely dissemination of current dose status.
  9. Review of workers' dose status by managers.
- b. By direct observation, discussion, and review of records and procedures, determine whether administrative controls are adequate.

1. Practices and Procedures

Aspects of administrative controls that may be considered include:

- (a) Planning work to maintain exposures ALARA and within limits.
- (b) Use of current survey and personal dosimeter data for dose control.
- (c) Use of control/action levels.
- (d) Radiation work permit (RWP) program.
- (e) Controlling access to high exposure areas.
- (f) Radiation work practices.
- (g) Management reviews of exposure data trends and discrepancies.

2. Posting and Labeling

While touring the plant, determine by direct observation and radiation measurements of representative areas, whether posting and labeling requirements are met. If convenient, this may be done by accompanying a health physics technician on a routine daily survey.

- c.
1. Review exposure summary reports to determine compliance with the regulation.
  2. Review exposure summary records to verify compliance with 10 CFR 20.101(b) limits. Select a sampling of individuals who have current exposures in excess of 10 CFR 20.101(a) limits and verify that Forms NRC-4 were completed prior to exceeding the 10 CFR

20.101(a) limits. Review exposure records to verify that the licensee is complying with provisions of 10 CFR 20.102 (transient worker rule).

3. Determine if minors have been permitted to work in restricted areas, and if so, review records to determine compliance with 10 CFR 20.104(a).
4. Review selected Forms NRC-5 to determine compliance with the regulations.
5. Determine if overexposures of individuals to external radiation have been appropriately reported to NRC (10 CFR 20.403 and 20.405) and to the exposed individual [10 CFR 19.13(d)].

#### 03.06 Internal Exposure Control

- a.
  1. Review calculations for intakes greater than 40 MPC-hr. Consider the licensee's comparisons of whole-body or organ-burden data obtained from bioassays with estimates based on air-sampling data.
  2. Determine whether air sampling is representative of air in zones occupied by workers. (See ANSI N13.1 Section 4.2.1.1 and Section 6.)
  3. Review equipment, procedures, and locations of equipment to determine the adequacy of provisions for bioassays of workers.
- b. See 10 CFR 20.103(b)(1) and Regulatory Guide 8.8, Section C.2.d.
- c. Review and discuss the licensee's evaluations of suspected exposures or exposures exceeding the 40 MPC-hour control values. Consider the use of proper equipment, use of proper protection factors, appropriateness of preventive measures following exposure greater than 40 MPC-hours, and proper use of 2 and 10 MPC-hour exclusions.
- d. Guidance on use of respiratory protection equipment is given in Regulatory Guide 8.15 and NUREG-0041.
- e.
  1. Review records of the results of evaluations and actions taken when an individual has been exposed to concentrations of radioactive material greater than 40 MPC-hours.
  2. Review records of the results of bioassays, including whole-body counting.
  3. Determine if minors have been permitted to work in restricted areas, and if so, review records to determine compliance with the regulations.

#### 03.07 Control of Radioactive Materials and Contamination, Surveys, and Monitoring

- a. Aspects of surveys and monitoring that may be examined include:
  1. Adequacy of supply, maintenance, and calibration and performance

checks of survey and monitoring instruments.

2. Proper use of portal monitors and friskers.
3. Adequacy of surveys necessary to assess personnel exposure due to skin contamination.
4. Adequacy of survey practices, including technician awareness of limitations of the survey instruments.
5. Timely dissemination of survey data and information on plant conditions for use in work planning and dose control.
6. Records of surveys and review of survey results by health physics supervision/management.

Note: Process and effluent monitors are covered in other inspection procedures.

- b. Aspects of radioactive materials and contamination controls that may be examined include:
  1. Evaluation of personal contamination.
  2. Proper contamination control work techniques and prompt correction and cleanup of contamination.
  3. Efforts to reduce the volume of contaminated trash including steps to minimize introduction of uncontaminated material into contaminated areas.
  4. Surveys, monitoring, and releases of potentially contaminated material to unrestricted areas. (See IE Bulletin 80-10, IE Circular 81-07, and IE Information Notice 80-22.)

### 03.08 Maintaining Occupational Exposures ALARA

- a. Worker Awareness and Involvement. Discuss the ALARA program with several workers to determine whether they understand the program, understand their role in the program, and are actively involved in the program.
- b. ALARA Goals and Objectives. Goals and objectives may be qualitative and quantitative. Means should be provided to track progress toward the goals and to take action on the findings. Goals may be set for the facility as a whole and for different divisions or groups within the facility. Facility goals might include a total annual collective dose (person-rem) value, and a percentage reduction in preventive maintenance time in high radiation areas.
- c. ALARA Results. As a minimum, consider the total annual collective dose (person-rem) for the facility. Determine whether that collective dose is increasing or decreasing, and whether it is higher or lower than the collective dose for other facilities of the same type and generating capacity. Consider reasons for increases or higher-than-average doses and discuss licensee's plans in relation to relatively high doses or upward dose trends.

Successes in meeting ALARA goals and objectives provide measures of ALARA program effectiveness.

03.09 Corresponding Inspection Requirements in Other Inspection Procedures. Completion of the inspection requirements of this outage procedure satisfies the corresponding requirements in other operational ("minimum/basic") procedures as follows:

<u>83729 Inspection Requirement</u>	<u>Corresponding Inspection Requirements</u>	
	<u>Procedure</u>	<u>Requirement</u>
02.01 Audits and Appraisals	83722	02.05
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02.07 Control of Radioactive Materials and Contamination, Surveys, and Monitoring	83726	02.03
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02.08 Maintaining Occupational Exposures ALARA	83728	02.03
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		02.05

83729-04 BIBLIOGRAPHY

See bibliographies in corresponding inspection procedures listed in 03.09.

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