INSPECTION PROCEDURE 83750

OCCUPATIONAL RADIATION EXPOSURE

PROGRAM APPLICABILITY: 2561

SALP FUNCTIONAL AREA: PLANT SUPPORT (SOPLTSUP)

83750-01 INSPECTION OBJECTIVES

01.01 To provide a balanced, minimum examination and evaluation of the area of occupational radiation safety, particularly during extended outages when the occupational radiation protection program undergoes maximum stress.

01.02 To provide for early identification of potential problems in the area of occupational radiation safety.

83750-02 INSPECTION REQUIREMENTS

02.01 Audits and Appraisals

a. Review a selected sample of the results of audits performed by or for the licensee since the last inspection and the adequacy of the licensee's corrective actions.

b. Review the experience of the licensee in identifying and correcting deficiencies or weaknesses related to the control of radiation or radioactive material. (Radiological Incident Reporting System).

02.02 Changes. Review major 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 radiation work are adequate. Determine whether management support for, and cooperation with, radiation protection planning for radiation work are adequate. Emphasize work with the potential for high individual and/or collective exposures such as work typically performed during plant outages.

02.04 Training and Qualifications of Personnel

a. Review the applicable education, experience, qualifications and training of selected members of the licensee's (and its contractor's) radiation protection organization(s).

b. Review applicable radiation protection worker education, qualification, and training of selected members of other organizations (including contractor employees).

c. Review training of health physics technicians (HPTs) on implementation of the "new Part 20" (10 CFR 20.1001-20.2401).

d. Determine whether workers have been instructed in the relevant provisions of new Part 20 (10 CFR 20.1001-20.2402) consistent with the requirements of 10 CFR 19.12.

02.05 External Exposure Control

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

b. Determine whether management and 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 the total effective dose equivalent (TEDE) ALARA.

d. Determine whether the respiratory protection program meets requirements.

e. Determine whether records, reports, and notifications of internal exposures meet requirements.

02.07 Planned Special Exposures. Review each planned special exposure to determine whether it meets the regulatory requirements.

02.08 Dose to the Embryo/Fetus and Exposures of Declared Pregnant Women. Review a selected sample of the records of exposures of declared pregnant women to determine whether, in each case, the dose to the embryo/fetus meets regulatory requirements.

02.09
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.

02.10 Maintaining Occupational Exposure ALARA

a. Program/Organization. Determine whether the licensee's organizational structure can effectively implement the ALARA program.

b. ALARA Related Training. Determine whether ALARA related training is adequate in scope and depth, and is provided to appropriate personnel.

c. ALARA Goals and Objectives. Determine whether the licensee has an adequate program for establishing and tracking performance related to ALARA goals and objectives.

d. Radiation Source and Field Control. Review the licensee's initiatives to implement operational methods and practices in the pursuit of maintaining doses ALARA.

e. Workers Awareness and Involvement. Determine whether workers are aware of, and involved in, the ALARA program.

f. ALARA Reviews. Determine whether the licensee's program for conducting ALARA reviews is sufficient to perform (1) effective pre-job ALARA reviews of planned work, (2) active review of on-going work to identify anomalies, and (3) effective post-job ALARA review.

g. ALARA Results. Review whether the licensee's ALARA program is effective in maintaining doses ALARA.

02.11 Plant Areas Unusable as a Result of Operational Occurrences. Identify plant areas that have become unusable as a result of operational occurrences and licensee actions that have been taken to control and recover such areas.

02.12 Effectiveness of Licensee Controls

a. Based on issues, events, or problems identified or addressed during the inspection, especially those reviewed pursuant to 02.01, 02.03, and 02.10, evaluate the effectiveness of licensee controls in identifying, resolving, and preventing problems in the area of radiological controls.

b. Determine whether there are strengths or weaknesses in the licensee's controls for the identification and resolution of the reviewed issues that could enhance or degrade plant operations or safety.

83750-03 INSPECTION GUIDANCE

NOTE: The following guidance includes references to publicly available documents in the NRC Document Control System.

Microfiche addresses given for these documents refer to the microfiche stored in microfiche cabinets at every NRC NUDOCS/AD Work Station. These microfiche addresses are not provided for different documents containing questions and answers on the "new" 10 CFR Part 20 because these questions and answers are being compiled in a more convenient form as a single document that contains all of the questions and answers that have been issued in final form to date.

03.01 Audits and Appraisals

a. Limit the review to a selected sample of 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. Look for trends indicative of programmatic weaknesses.

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. Reports of other audits, appraisals, assessments, evaluations, etc. may provide information on program quality.

Institute of Nuclear Power Operations (INPO) reports are routinely reviewed by the resident inspector as required by inspection procedure 71707. Results of INPO report findings can be obtained from the resident inspector. All INPO report information shall be treated in accordance to the guidance stated in inspection procedure 71707.

c. Do incident reports (radiological occurrence reports) indicate whether programmatic problems exist and if licensee-identified deficiencies are properly addressed, including, as appropriate, a root cause analysis and corrective actions?

d. 10 CFR 20.1101(c) requires that "the licensee shall periodically (at least annually) review the radiation protection program content and implementation." It is acceptable for a licensee implementing the new Part 20 to use a combination of reviews and audits each year that covers all aspects of its radiation protection program during a 2-3 year cycle (rather than a one-year cycle) provided that the combination of these reviews and audits covers program content and implementation. [For additional guidance see Question 118 under the heading for section 10 CFR 20.1101.]

03.02 Changes

a. By observation and discussion with cognizant supervisory and management personnel, determine whether the changes have affected (positively or negatively) the licensee's program for control of radiation exposures. Are changes in accordance

with 10 CFR 50.59? Be sensitive to changes that result in a lessening of the ability of the radiation protection manager (RPM) to have direct recourse to the onsite plant/station manager in order to resolve questions related to the conduct of the radiation protection program. Additionally, be sensitive to any organizational change in the RPM position relative to its reporting chain and level in the organization. Document any such changes in the inspection report.

b. Are workers aware of and do they understand the changes, as evidenced by observation and discussion?

03.03 Planning and Preparation. Review a selected sample of records, discuss outage planning with licensee representatives, and observe activities to verify necessary planning and preparations and management support for radiation protection planning. Examples of areas that may be examined include:

a. Increased health physics staff, including the 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. This involvement should include an examination of the adequacy of plant review of special (non-routine, seldom used) procedures and infrequent evolutions that have the potential for creating radiological hazards.

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).

h. Examination of indicators of management support, or lack of support, for radiation protection planning such as:

1. Approvals of budgeted items needed for radiation protection during the outage.

2. Inclusion of radiation protection staff in outage planning meetings.
3. Approval of needed visits by radiation protection personnel to other sites to observe outage activities.

i. For plants planning their first outage, or for experienced plants performing significant tasks (e.g., 10-year in-service

inspection) for the first time, determination of the extent to which the outage experience of other similar plants is being used in the planning process.

j. For plants that have experienced outages, determination of the extent to which experience from, and lessons learned during, previous outages are being incorporated to improve performance.

03.04 Training and Qualifications of Personnel

a. Select individuals who have joined the radiation protection staff since the last inspection and contractor personnel hired for the outage. By direct observation and discussion with workers, do they have the minimum knowledge (10 CFR 19.12) required to work with radioactive material? For a selected sample of contractor health physics technicians (HPTs), review the actions taken by the licensee, in accordance with the new training rule (10 CFR 50.120), to ensure that these individuals are task qualified to perform their assigned outage activities. Based on direct observation and discussion with HPTs providing job coverage, do they have knowledge of the job activities and radiological conditions to provide adequate coverage? In discussions with HPTs, focus on ensuring adequate knowledge of radiological hazards associated with plant systems [especially neutron-activated components such as traversing incore probes (TIPs), incore neutron detectors, and cabling, as discussed in Information Notice No. 88-63 and its Supplements 1 and 2, "High Radiation Hazards from Irradiated Incore Detectors and Cables"].

   Review the licensee's method to provide training of permanent and contractor personnel on safety significant changes in procedures and recent events.

b. Place emphasis on training provided to the increased work force required for the outage. Discuss with plant management and the Radiation Protection Manager (RPM).

c. Implementation of the new Part 20 and related regulatory guidance necessitates procedural changes and training for health physics technicians (HPTs). Focus, in particular, on the new requirements for control of very high radiation areas and for maintaining the total effective dose equivalent (TEDE) ALARA when using individual respiratory protective equipment.

d. 10 CFR 19.12 includes the requirement that "All individuals working in or frequenting any portion of a restricted area... shall be instructed to observe, to the extent within the worker's control, the applicable provisions of Commission regulations and licenses for the protection of personnel from exposures to radiation or radioactive materials occurring in such areas..." Thus 10 CFR 19.12 provides a regulatory basis for requiring training on the provisions of the new Part 20

for occupationally exposed workers who enter restricted areas.

e. The following general guidance concerns the impact of the new training rule, 10 CFR 50.120, on inspections of training and is consistent with Health Physics Position Record #325, "New Training Rule for Nuclear Power Plant Personnel," (located at microfiche address 76266-310).

1. The only radiation protection personnel covered by the new rule are "radiological protection technicians" (HPTs) who are employees of the power plant. No supervisory, managerial or technical staff are covered. Contractor HPTs are not covered unless they occupy regular positions performing independently within the licensee's organization. If short-term contractor HPTs (e.g., outage workers) are assigned to work independently, they must be qualified to perform their assigned tasks.

2. The training rule covers qualification only in the sense of job task qualification, not qualification based on pre-selection criteria. Furthermore, successful completion of a training program required by the rule does not obviate the need to comply with other training or qualification requirements imposed by other regulations and/or license conditions.

3. Inspect the training area for cause. When a performance deficiency could be related to a training program problem, examine the training area in sufficient depth to determine if and why inadequate training contributed to the performance problem.

03.05 External Exposure Control

a. Based on direct observation, discussion, and review of records, are personal dosimeters used effectively and in accordance with requirements for monitoring external exposure?

Limit the examination of records to the last NRC inspection of this area and focus on the results of whole body and skin dose measurements (and eye dose measurements when required by Part 20). Also include a review of selected investigations by the licensee of instances where an individual exceeded an administrative dose limit. Evaluate the other aspects of the program (dosimeter placement, RWPs, planning, etc.) by observation of actual work in progress and discussion with workers, with special attention placed on high dose rate jobs or jobs in radiation fields with high dose rate gradients.

Aspects of the personal dosimetry program 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/cm^2. Under the new Part 20, 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 license 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 test 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 Nos. 83-59, 81-26, Part 3, and Supplement No. 1, 83-59. Reasonable "multibadging" criteria are provided in a paper by C. G. Hudson [Radiation Protection Management 1 (#2), 43-49, (1984)], a paper by W. E. Ferrell et al. [Radiation Protection Management 4 (#5), 31-36 (1987)].

3. Improper wearing or use of dosimeters by individuals.

4. Exposure records and reports.

5. Use of pocket dosimeters and comparison of their measurements 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, (2) 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 the extremities.

11. Timely dissemination of current dose status.

12. Review of workers' dose status by managers.

b. Based on direct observation, discussion, and review of records and procedures, are management and administrative controls adequate?

1. Practices and Procedures

Aspects of management and administrative controls that may be considered include:

(a) Planning work to maintain exposures ALARA and within limits, including coordination of work during outages to prevent work parties from interfering with one another and to make best use of available resources (e.g., scaffolding, shielding, ventilation equipment).

(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) Control of exposures of declared pregnant women to limit doses to the embryo/fetus.

(f) Controlling access to high exposure areas.

(g) Control of access to very high radiation areas.

(h) Radiation work practices including considerations of high and very high radiation areas and awareness of potential hazards (e.g., in diving operations, removing neutron-activated items from the reactor, and other non-routine and infrequent operations).

(i) Management involvement with and oversight of ongoing radiation protection activities including first-line supervisory oversight and control of contractor activities.

(j) Management reviews of exposure data trends and discrepancies.

2. Direct Observation of Measures to Reduce Exposure

Based on direct observation during tours of the radiologically controlled area, does the licensee demonstrate a commitment toward external exposure reduction? Licensee efforts might include hotspot

reduction efforts such as pipe flushing and removal of crud traps or installation of temporary and permanent shielding. Consider occupancy factor when evaluating the efficacy of licensee's efforts to reduce area dose rates.

3. Posting and Labeling

Based on direct observation and radiation measurements of representative areas, are posting and labeling requirements met? If convenient, this may be done by accompanying a health physics technician on a routine daily survey.

c. 1. Do exposure summary reports show compliance with regulations?

2. (a) 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?

(b) 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 these workers' prior dose (from both external and internal sources) for the current year is in compliance with 10 CFR 20.2104.

3. Have minors been permitted to work in restricted areas and, if so, do records show compliance with 10 CFR 20.1207?

4. Do selected NRC Forms 5 indicate compliance with the regulations?

5. Have any overexposures of individuals to external radiation been appropriately reported to NRC (10 CFR 20.2202 and 20.2203) and to the exposed individual [10 CFR 19.13(d)]?

03.06 Internal Exposure Control

a. 1. Consider the licensee's comparisons of whole-body or organ-burden data obtained from bioassays with estimates based on air-sampling data.

2. During tours of the facility, observe work in progress to 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.) Observe techniques used to evaluate air samples for radiological hazard. As applicable, this may include observation of count room practices, DAC-hour correlations and assignment of DAC-hours, correlation to internal dose, or a determination that internal dose assignment is not necessary.

3. During tours of the facility, observe work to determine if the licensee has implemented proper equipment, use of procedures, and appropriate locations of equipment to determine the adequacy of provisions for bioassays of workers.

4. During whole body counting as part of site access processing, review whole body counting equipment operation and discuss counting and calibration methods with equipment operators.

5. For selected individuals whose whole body counts exceed the licensee's action level for investigation, review the results and corrective actions from such investigations.

6. Review records to determine how the licensee complied with 10 CFR 20.1502(b) in determining which individuals are required to be monitored for occupational intake of radioactive material.

7. NOTE:

   Intakes of radioactive material may result in alarming of high-sensitivity automated personal contamination monitors (used to detect external contamination). Licensees who expect to have intakes that may be detected by these monitors should be prepared for these alarms. See question #145 and answer (under the heading for 10 CFR 20.1702) in the questions and answers on the new Part 20 for additional guidance concerning situations of this type.

b. See 10 CFR 20.1701 and Regulatory Guide 8.8, Section C.2.d.

c. Guidance on use of respiratory protection equipment is given in Regulatory Guide 8.15 and NUREG-0041.

   10 CFR 20.1702 requires that the use of respiratory protection equipment (and other controls) to limit intakes of radioactive material be consistent with maintaining the total effective dose equivalent ALARA. Evaluations (and records of these evaluations) for the use of respiratory protection equipment made in accordance with this requirement are acceptable if they are consistent with the guidance provided in the answer to Question 60 (under the heading for 10 CFR 20.1703) in the questions and answers on the new Part 20; however, other means of meeting this ALARA requirement may also be acceptable.

d. 1. Records of the results of bioassays, including whole-body counting, are the principal source of information for intakes of radioactive material.

   2. Have minors been permitted to work in restricted areas, and if so, do records show compliance with the regulations?

3. Based on a selected sample of records of individuals for whom individual monitoring of intakes of radioactive material was required, have the committed effective dose equivalent and total effective dose equivalent been properly assessed and recorded? See Regulatory Guide 8.7 (Instructions for Recording and Reporting Occupational Radiation Exposure Data) and 8.34 (Monitoring Criteria and Methods to Calculate Occupational Radiation Doses) for additional guidance.

03.07 Planned Special Exposures (PSEs)

The relevant requirements of 10 CFR Part 20 are in sections 20.1201(b), 20.1206, 20.2104(b), 20.2104(e)(2), 20.2105, 20.2106, 20.2202(e), and 20.2204.

See the discussion of PSEs in the statement of considerations for the new Part 20 (56 FR 23371-23372.

See the definition of a PSE in 10 CFR 20.1003.

See Regulatory Guide 8.35, "Planned Special Exposures."

See the following questions and answers in the first seven sets of questions and answers on the "new" Part 20. Under the heading "10 CFR 20.1206 Planned Special Exposures," see Questions 8, 24, 63, 135, 136, 137. Also see Question 112 under the heading "10 CFR 20.2105 Records of Planned Special Exposure."

03.08 Dose to the Embryo/Fetus and Exposures of Declared Pregnant Women

Relevant regulatory requirements are in 10 CFR 20.1208, 20.1502(a)(2) and (b)(2), and in 20.2106(e) and (f).

See the definitions of "declared pregnant woman" (DPW) and "embryo/fetus" in 10 CFR 20.1003.

See the discussion of "Dose to an Embryo/Fetus" in the statement of considerations for the new Part 20 (56 FR 23372-23374).

Assessment of the dose to the embryo/fetus should be in accordance with the guidance provided in Regulatory Guide 8.36, "Radiation Dose to the Embryo/Fetus". Dose assessment methods that do not appear to be consistent with the regulatory positions in Regulatory Guide 8.36 are to be described briefly in the inspection report even if these methods appear to be acceptable.

Records and reports of embryo/fetus dose should be consistent with the guidance in Regulatory Position 2.3 of Regulatory Guide 8.7, "Instructions for Recording and Reporting Occupational Radiation Exposure Data."

See Regulatory Position 4, Exposures of Minors and Declared Pregnant Women," in Regulatory Guide 8.35, "Planned Special Exposures."

See the following questions and answers in the first seven sets of questions and answers on the "new " Part 20 under the heading "10 CFR 20.1208 Dose to the Embryo/Fetus": Questions 59, 84, 120, 138, 382, 416, 439, 440, 441, 442, and 443.

A declaration of pregnancy must be voluntary and must be in writing; the declaration by the woman is revocable by the woman. The woman does not need to provide any "medical proof" of pregnancy; she is a declared pregnant woman if she provides a written declaration that she is pregnant.

03.09
Control of Radioactive Materials and Contamination, Surveys and Monitoring

a. During tours of the facility and during discussion with workers, evaluate aspects of surveys and monitoring. These may include:

   1. Adequacy of surveys necessary to post and control high radiation and radiation areas. Verify that area radiation monitors required by Technical Specifications have been maintained operable. Confirm that access to high radiation areas that have radiation levels greater than 1000 mR/hr has been controlled and that the requirements of 10 CFR 20.1602 have been met for control of access to very high radiation areas.

   2. Adequacy of supply, maintenance, and calibration and performance checks of survey and monitoring instruments.

   3. Proper use of personal contamination monitors and friskers, including consideration of hot particle contamination.

   4. Adequacy of surveys necessary to assess personnel exposure due to skin contamination, particularly for hot particle contamination.

   5. Adequacy of survey practices, including technician awareness of limitations of the survey instruments.

   6. Adequacy of surveys necessary to control occupational dose received during work that involves changing exposure conditions. Examples of such work are special plant operations, resin transfers, and other movements of solid radioactive material.

   7. Timely dissemination of survey data and information on plant conditions for use in work planning and dose control.

   8. Records of surveys and review of survey results by health physics supervision/management.

b. Aspects of radioactive materials and contamination controls that may be examined include:

1. Licensee evaluations (when required by licensee procedures) of personal contamination events. Determine whether the evaluations properly identify cause and whether corrective actions are adequate to prevent recurrence.

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, IE Information Notices 80-22, 83-05, 85-92, and 86-90. See also Health Physics Position Record #250, "Monitoring at Nuclear Power Plants for Contamination by Radionuclides that Decay by Electron Capture" located at microfiche address 62160-116.)

5. Identification of plant areas that have become unusable as a result of an operational occurrence and licensee actions to control and recover such areas. (See SECY-89-326 dated 10/20/89 located at microfiche address 70038-056.)

   NOTE: Such situations must be discussed with both licensee and regional office management.

6. Surveys conducted in association with receipt of packages containing radioactive material.

03.10 Maintaining Occupational Exposure ALARA

NOTE: In new Part 20, 10 CFR 20.1101(b) requires that the licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses that are ALARA. However, because recent performance of the nuclear power reactor industry generally has been good with respect to achieving occupational doses that are ALARA, no change in the depth or scope of inspection with respect to ALARA is needed, as a result of the ALARA requirement of 10 CFR 20.1101(b), for licensees implementing new Part 20. Poor ALARA performers will continue to be allocated increased inspection resources (e.g., ALARA team inspections).

a. The licensee's organizational structure for ALARA responsibilities should have a clear delineation of authority and responsibility, including dedicated ALARA staff adequate to implement the program on a daily basis as well as during outages.

b. ALARA training that extends beyond the scope of General Employee Training for personnel such as radiation workers, is

desirable for radiation protection technicians, and special maintenance teams. Professional development training should be available for the ALARA coordinator and related staff. To be most effective, mockup training should be reasonably realistic (e.g., including realistic temperature, humidity, and lighting) and address ALARA considerations.

c. The licensee should have an appropriate basis for establishing goals and objectives. Goals should be continuously monitored and actions taken as necessary when goals are exceeded. Goals may be set for the facility as a whole, for different divisions or groups within the facility, and for specific work activities.

d. Review the extent to which the licensee has implemented or assessed methods offering significant potential for reducing occupational radiation exposure by reducing out-of-core radiation sources/fields. The following techniques are reported to be available for reducing exposure [See the Electric Power Research Institute (EPRI) report TR-100265, "Radiation-Field Control Manual - 1991 Edition," March 1992.]

1. PWRs: Methods available now that can provide an immediate impact are (a) chemical decontamination together with elevated pH primary chemistry (2.2 ppm Li, pH 7.4) and use of Zircalloy fuel grids, and (b) valve maintenance procedures to remove Co debris. Methods available now that will have a slower impact are (a) elevated pH and Zircalloy fuel grids without decontamination, (b) electropolishing of replacement steam generators, and (c) cobalt replacement guidelines and NOREM valves. Methods expected to be available in 1992/1993 that may have an immediate impact are (a) full system decontamination and (b) enriched boric acid for the primary system.
2. BWRs: Methods available now that can provide an immediate impact are (a) chemical decontamination together with (1) replacement of control blade pins and rollers and (2) zinc injection, (b) installation of cobalt-free feedwater control valves, and (c) valve maintenance procedures to remove Co debris. [Note: The use of zinc injection has resulted in problems at some BWRs. The zinc-65 produced by neutron activation of zinc has caused higher radiation fields, higher volumes of radioactive waste, and in at least one case, surface contamination problems. As of July 1992, these problems are being addressed by industry groups.] Methods available now that will have a slower impact are (a) pins and rollers replacements and zinc injection without decontamination, (b) electropolishing/pre-conditioning replacement components, and (c) cobalt replacement guidelines. Methods expected to be available in 1992/1993 that may have a rapid impact are (a) replacement of in situ pins and rollers, (b) use of depleted zinc-64, avoiding excess zinc-65, (c) full system decontamination including vessel, and (d) NOREM cobalt-free hardfacings for valves.

The techniques above involve cobalt source reduction, preconditioning of out-of-core surfaces, control of crud transport (water chemistry control), and chemical decontamination. (See EPRI NP-6708, "Progress in Radiation Control Technology.")

Licensees should not be expected to implement a method for reducing out-of-core radiation sources/fields until the method has been fully tested and proven by a full-scale field demonstration in one or more nuclear power plants. The term "fully tested and proven" means that the technique has been fully scoped and reliable generic technical basis documentation is available for the licensees to evaluate the potential for their particular plant application.

e. Based on discussions of the ALARA program with several workers, do they understand the program, understand their role in the program, and are they actively involved in the program?

f. Based on a review of work tasks, were pre- and post-job ALARA reviews conducted? Did the pre-job reviews adequately address the work to be performed, and were lessons learned from post-job reviews factored into future work/training? The radiological significance of work performed under the direction of licensee vendors/contractors should be reviewed before the work is started. Does the licensee perform ALARA reviews of on-going work activities? Identify any anomalies in the expected rate at which personnel exposure is being accumulated.

g. Compare, as a minimum, the licensee's total annual collective dose (person-rem) against their goals. Are the licensee's collective doses increasing or decreasing? Discuss with the licensee reasons for any trends and actions they are taking or have taken that impacted the trend. Is the licensee effective in identifying causes of higher than necessary doses and in effecting corrective actions? Does the licensee review dose experience for specific jobs against available industry norms for similar jobs?

03.11 Plant Areas Unusable as a Result of Operational Occurrences

Flooding and long-term contamination of part of the radwaste building at one facility highlighted the possibility that similar conditions may arise at other reactor facilities. Licensee actions to control and recover areas that become unusable as a result of an operational occurrence are to be followed by the inspector. If such an event occurs, the inspector must review and discuss the situation, and the licensee's proposed corrective actions, with both licensee management and regional office management. Licensee actions must be in accordance with the requirement of 10 CFR 20.1101(b) that the "licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to

members of the public that are...ALARA." (See SECY-89-326, dated October 20, 1989, located at Microfiche Address 70058-056.)

03.12 Effectiveness of Licensee Controls

a. When safety issues, events, or problems are reviewed, the adequacy of the results of licensee controls may be assessed by determining how effective the licensee was in performing the following:

1. Initial identification of the problem.

2. Elevation of problems to the proper level of management for resolution (internal communications and procedures).

3. Root cause analysis.

4. Implementation of corrective actions.

5. Expansion of the scope of corrective actions to include applicable related systems, equipment, procedures, and personnel actions.

b. The determination of whether there are strengths or weaknesses in the licensee's controls will be limited to those issues, events, or problems reviewed in detail. The evaluation will not draw sweeping conclusions about the licensee's overall control programs but will be very specific in identifying any licensee strengths or weaknesses encountered with the individual items reviewed.

NOTE: For additional inspection guidance on licensee controls, refer to IP 40500, "Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems."

83750-04 INSPECTION RESOURCES

Completion of this inspection procedure is expected to take, on average, approximately 75 hours of direct inspection on site for a single unit site. Multi-unit sites are expected to require an additional 30 hours of direct inspection for each additional unit.

END