ATTACHMENT 71121.01

INSPECTABLE AREA: Access Control To Radiologically Significant Areas

CORNERSTONE: Occupational Radiation Safety

INSPECTION BASIS: This inspectable area focuses primarily on verification of aspects of the Occupational Radiation Safety cornerstone not measured by performance indicators. However, NRC oversight is maintained for risk significant high and very high radiation areas. The Occupational Radiation Safety performance indicator (PI) measures non-conformances involving high radiation areas (HRAs) greater than 1 R/hr and very high radiation areas (VHRAs), and unintended personnel exposures (resulting from one or more radiation barrier failures) greater than 100 mrem TEDE, 10% of the non-stochastic limits in 10 CFR 20.1201, 50 rem SDE from a discrete hot particle or 100 mrem to the embryo/fetus of a declared pregnant woman. The PI for minors is 20% of the dose limits in 10 CFR 20.1207. Controls for high radiation areas below 1 R/hr and airborne radioactivity areas are not covered by the PI and are a major focus of the baseline inspection program.

LEVEL OF EFFORT: Inspect Annually

71121.01-01 INSPECTION OBJECTIVES

01.01 To review and assess licensee's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas (HRAs), and worker adherence to these controls.

01.02 To observe access controls to radiation and high radiation areas <1000 mrem/hr and areas that are subject to significant transient dose rates. Review the controls that have been established and confirm that workers follow established rules. Review the high radiation area incidents found in the performance indicators (PIs) and in the licensee's corrective action program during the current assessment period.

01.03 To verify that the licensee is maintaining adequate controls over HRAs (with dose rates greater than 25 rem/h) and all VHRAs.

71121.01-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning. Review all licensee PIs for the Occupational Exposure Cornerstone for followup.

02.02 Plant Walk Downs and RWP Reviews

a. Identify exposure significant work areas (about 2-3) within radiation areas, high radiation areas (<1 R/hr), or airborne radioactivity areas in the plant and review associated licensee controls and surveys of these areas to determine if controls (e.g., surveys, postings, barricades) are acceptable.

b. With a survey instrument, walk down these areas or their perimeters to determine: whether prescribed RWP, procedure, and engineering controls are in place, whether licensee surveys and postings are complete and accurate, and whether air samplers are properly located.

c. Review radiation work permits (RWPs) used to access these and other high radiation areas and identify what work control instructions or control barriers have been specified. Use plant-specific Technical Specification HRA requirements as the standard for the necessary barriers. Review electronic personal dosimeter (EPD) alarm set points (both integrated dose and dose rate) for conformity with survey indications and plant policy. Verify that workers know what actions are required when their EPD noticeably malfunctions or alarms.

d. Review RWPs for airborne radioactivity areas with the potential for individual worker internal exposures of >50 mrem CEDE (20 DAC-hrs). For these selected airborne radioactive material areas, verify barrier integrity and engineering controls performance (e.g., HEPA ventilation system operation). Focus on any work areas with a history of, or the potential for, airborne transuranics. The inspector should review up to three RWPs, as available.

e. Review and assess the adequacy of the licensee's internal dose assessment for any actual internal exposure greater than 50 mrem CEDE (limit these assessments to no more than two intake events with similar radionuclide mixes). Note that Attachment 03, Section 02.04(a) has a similar inspection requirement; if NRC assessments were done under that Attachment, do not duplicate that effort for this section during the same inspection cycle.

f. Examine the licensee's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools.

02.03 Problem Identification and Resolution

a. Review the licensee's self assessments, audits, Licensee Event Reports, and Special Reports related to the access control program since the last inspection. Determine if identified problems are entered into the corrective action program for resolution.

b. Review corrective action reports (up to 15) related to access controls. Include in this review 2-3 high radiation area radiological incidents (non-PIs, identified by the licensee) in high radiation areas <1R/hr that have occurred since the last inspection in this area. Interview staff and review documents to determine if the follow-up activities are being conducted in an effective and timely manner commensurate with their importance to safety and risk:

1. Initial problem identification, characterization, and tracking.
2. Disposition of operability/reportability issues.
3. Evaluation of safety significance/risk and priority for resolution.
4. Identification of repetitive problems.
5. Identification of contributing causes.
6. Identification and implementation of effective corrective actions.
7. Resolution of non-cited violations (NCVs) tracked in the corrective action system.
8. Implementation/consideration of risk significant operational experience feedback.

Emphasis should be placed on ensuring problems are identified, characterized, prioritized, entered into a corrective action, and resolved.

c. For repetitive deficiencies or significant individual deficiencies in problem identification and resolution identified above, determine if the licensee's self-assessment activities are also identifying and addressing these deficiencies.

d. Review licensee documentation packages for all PI events occurring since the last inspection. Determine if any of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at 1 meter. If so, determine what barriers had failed and if there were any barriers left to prevent personnel access. For unintended exposures >100 mrem TEDE (or >5 rem SDE or >1.5 rem LDE), determine if there were any overexposures or substantial potential for overexposure? If any of the above conditions were met, then document the PI as a significant inspection finding, in accordance with IMC 0612 (formerly IMC 0610*) guidance.

02.04 Job-In-Progress Reviews

NOTE: This section should be combined with Section 02.02 of this procedure.

a. 1. Based on the licensee's schedule of work activities, select two to three jobs being performed in radiation areas, airborne radioactivity areas, or high radiation areas (<1 R/hr) for observation. Concentrate on work activities that present the greatest radiological risk to workers. For example, observe work that is estimated to result in the highest collective doses, involves diving activities in or around spent fuel or highly activated material, or that involves potentially changing (deteriorating) radiological conditions. During the time of inspection, if there are no radiologically significant work activities being performed in the areas described above (areas of < 1 R/hr, diving activities, or work involving potentially changing (deteriorating) radiological conditions), then the inspector should observe work being performed in high radiation areas having dose rates > 1 R/hr for purposes of PI supplementation and verification.

2. Review all radiological job requirements (RWP requirements and work procedure requirements). When practical, attend RWP job briefings.

3. Observe job performance with respect to these requirements. Determine if radiological conditions in the work area were adequately communicated to workers through briefings and postings.

b. During job performance observations, verify the adequacy of radiological controls, such as: required surveys (including system breach radiation, contamination, and airborne surveys), radiation protection job coverage(including audio and visual surveillance for remote job coverage), and contamination controls.

c. For high radiation work areas with significant dose rate gradients (factor of 5 or more), review the application of dosimetry to effectively monitor exposure to personnel. Focus on any underwater diving activities, where the dose rate gradients are severe, thereby increasing the necessity of providing multiple dosimeters and/or enhanced job controls. Verify licensee controls are adequate.

02.05 High Risk Significant, High Dose Rate HRA and VHRA Controls. Focus on verifying aspects of the licensee PI activities for high risk, high dose rate (HDR) HRAs (>25 rem in one hour @30 cm) and for all VHRAs. These areas provide the potential for significant worker overexposures, and in some cases, potentially lethal acute exposures.

a. Discuss with the Radiation Protection Manager (RPM) HDR-HRA, and VHRA controls and procedures. Focus on any procedural changes since the last inspection. Verify that any changes to licensee procedures do not substantially reduce the effectiveness and level of worker protection.

b. Discuss with no more than two first-line HP supervisors (or equivalent positions having backshift HP oversight authority) the controls in place for special areas that have the potential to become VHRA during certain plant operations. Determine if these plant operations (e.g., PWR thimble withdrawal into the reactor cavity sump) require communication beforehand with the HP group, so as to allow corresponding timely actions to properly post and control the radiation hazards.

c. Verify adequate posting and locking of all entrances to all HDR-HRA, and VHRA (if reasonably accessible).

02.06 Radiation Worker Performance

a. During job performance observations, observe radiation worker performance with respect to stated radiation protection work requirements. Determine if they are aware of the significant radiological conditions in their workplace, and the RWP controls/limits in place, and that their performance takes into consideration the level of radiological hazards present.

b. Review up to ten radiological problem reports since the last inspection which find that the cause of the event was due to radiation worker errors. Determine if there is an observable pattern traceable to a similar cause. Determine if this perspective matches the corrective action approach taken by the licensee to resolve the reported problems. Discuss with the RPM any problems with the correction actions planned or taken.

02.07 Radiation Protection Technician Proficiency

a. During job performance observations, observe radiation protection technician performance with respect to all radiation protection work requirements. Determine if they aware of the radiological conditions in their workplace and the RWP controls/limits, and if their performance is consistent with their training and qualifications with respect to the radiological hazards and work activities.

b. Review a maximum of ten radiological problem reports since the last inspection that finds that the cause of the event was radiation protection technician error. Determine if there is an observable pattern traceable to a similar cause. Determine if this perspective matches the corrective action approach taken by the licensee to resolve the reported problems.

71121.01-03 INSPECTION GUIDANCE

03.01 No inspection guidance provided.

03.02 Plant Walkdowns and RWP Reviews

a.,b., c and e. No guidance provided.

d. Continuous air monitors positioned throughout the power plant are often used as initial trending indicators of increasing airborne radioactive material levels . While identified increases in airborne levels may not be dose significant (as indicated by the directly measurable beta-gamma emitting radionuclides), power plants with known transuranic contamination problems should consider and assess this transuranic component when appropriate. This focus is especially vital during certain maintenance activities in known transuranic contaminated areas. See Information Notice 97-36, “Unplanned Intakes by Worker of Transuranic Airborne Radioactive Materials and External Exposure Due to Inadequate Control of Work” for discussion of previous problems and guidance in this area.

f. Licensees may store highly activated materials (e.g.,fuel channels, and LPRM sources,) underwater on short-hangers, which could be inadvertently raised to the pool surface. If unshielded, these materials could create a HRA or VHRA. For applicable guidance and a history of previous events, see Regulatory Guide 8.38, “Control of Access to High and Very High Radiation Areas In Nuclear Plants”, Section C. 4. 2; Information Notice 90-33, “Sources of Unexpected Occupational Radiation Exposure at Spent Fuel Storage Pools”; and Health Physics Positions (HPPOS)016 and 245 (NUREG/CR-5569, Rev.1)and HPPOS 333 (Miller-Joyner memorandum, et al, January 30, 1995), and Questions and Answers 447 and 448 (NUREG/CR-6204).

03.03 No inspection guidance provided.

03.04 Job-In-Progress Review

a. - b. No guidance provided;

c. 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. Part 20.1201(c) does not exempt any work areas from the requirement to measure dose (DDE) at the part of the body receiving the highest exposure. However (while not a focus of this inspection), the licensee's procedure should have reasonable criteria for complying with 20.1201(c) for workers where dose rates are greater than 10 mrem/h. Additionally, assuming a dose gradient of 1.5 or more, it would not be reasonable to move the personal dosimeter (or provide for additional dosimeters), unless an individual's dose missed by not moving the dosimeter was "significant" (e.g, 30 mrem for an individual for the work shift). From a collective dose perspective (assuming a dose gradient of 1.5 or more), a "missed" collective dose of 250 mrem or more for a job is a reasonable threshold action criterion for the licensee to provide additional personal monitoring (or move the dosimeter) to measure the highest DDE, consistent with 20.1201(c).

03.05 High Risk Significant, High Dose Rate HRA and VHRA Controls. Because of the potential high risk radiation environment these areas can present, an annual baseline, independent NRC verification of the performance indicators is needed. The intent of this limited inspection oversight/requirement is to maintain a continued NRC vigilance of the licensee's program and procedural controls, and plant staff awareness of these special, accessible areas where the potential for lethal overexposure exist.

This HP inspection requirement should not be repeated during the site-wide, annual PI verification team inspection.

a. Determine if entries are made into areas controlled as VHRAs. For example, PWRs can control primary containments as VHRAs during power operations. Discuss with licensee management the required procedural controls and HP technician coverage during such entries.

b. See Regulatory Guide 8.38, Section C. 4., Appendix A & B for guidance for specific work areas and activities that have documented histories of worker overexposures.

c. See applicable Questions and Answers (NUREG/CR-6204) and HPPOS (NUREG/CR-5569).

71121.01-04 RESOURCE ESTIMATE

For planning purposes, it is estimated to take, on average, between 24 hours and 40 hours annually to perform the requirements of this attachment.

71121.01-05 COMPLETION STATUS

Inspection of the minimum sample size (MSS) will constitute completion of this procedure in the RPS. MSS for this attachment is defined as the sum of all the inspection requirements. Therefore, all the inspection requirements of the procedure should be

completed. The number of inspection requirements in Section 02.01 is one; Section 02.02 is six (a-f); Section 02.03 is 4 (a-d); 02.04 is 3 (a-c); Section 02.05 is 3 (a-c); Section 02.06 is 2 (a-b); and Section 02.07 is 2 (a-b).

The total inspection requirements and MSS is twenty-one. During the inspection if no opportunity is available (e.g., no intakes >50 mrem, 02.(e)), count that inspection requirement completed for purposes of the MSS reporting.

END