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 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

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Report No.: 50-250/93-12 and 50-251/93-12

Licensee: Florida Power and Light Company
 9250 West Flagler Street
 Miami, FL 33102

Docket Nos.: 50-250 and 50-251 License Nos.: DPR-31 and DPR -41

Facility Name: Turkey Point Units 3 and 4

Inspection Conducted: May 3-7, 1993

Inspectors: *A. T. Boland* 6/3/93
 A. T. Boland Date Signed

Donald B. Forbes 6/3/93
 D. B. Forbes Date Signed

Approved by: *W. H. Rankin* 6/3/93
 W. H. Rankin, Chief Date Signed
 Facilities Radiation Protection Section
 Radiological Protection and Emergency Preparedness Branch
 Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection of the licensee's radiation protection (RP) program involved review of health physics (HP) activities primarily related to the current Unit 4 outage. The specific areas evaluated included organization and staffing; training and qualifications; self-assessment programs; external and internal exposure monitoring and assessment programs; control of radioactive material and contamination, surveys and monitoring; and As Low As Reasonably Achievable (ALARA) program implementation.

Results:

Based on interviews with licensee personnel, records review, and observation of work activities in progress, the inspector found the RP program to be functioning adequately to protect the health and safety of plant workers. RP staffing levels appeared adequate to support on-going outage activities; however, several vacancies were noted in the routine organization. The licensee's self-assessment and RP training programs were conducted in accordance with requirements. The licensee continued to implement effective internal and external exposure control programs with all exposures less than



10 CFR Part 20 limits. The licensee's efforts in reducing contaminated area as well as pursuing resolution to increased personnel contamination events were appropriate; however, overall housekeeping and material control was below the standards observed during previous outages, particularly in containment. The ALARA program continued to be effective in controlling overall collective dose. One Inspector Follow-up Item (IFI) was identified regarding the survey program for plant areas with a high potential for changing radiological conditions (Paragraph 7.b).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

T. Abbatiello, Quality Assurance Manager
J. Bates, Support Supervisor - Health Physics
B. Boger, Training Supervisor
R. Brown, Operations Supervisor - Health Physics
J. Danek, Manager, Corporate Health Physics
M. Eades, Quality Assurance Specialist
M. Givens, Technical Support Supervisor
A. Horvath, Procedures/Training Coordinator
*M. Jimenez, Health Physicist, Corporate
*H. Johnson, Supervisor, Operations
*V. Kaminskas, Manager, Operations
*J. Knorr, Licensing Engineer
*J. Lindsey, Supervisor, Health Physics
*C. Mowrey, Licensing Engineer
*L. Pearce, Plant Manager
*T. Plunkett, Vice President
*J. Porter, Engineering Supervisor
*E. Weinkam, Manager, Licensing
J. Williams, Dosimetry and Records Supervisor

Other licensee employees contacted included engineers, technicians, operators, and office personnel.

Nuclear Regulatory Commission

*K. Landis, Section Chief, DRP, Region II
*W. Rankin, Section Chief, FRP, Region II
*L. Trocine, Resident Inspector

*Attended May 7, 1993 Exit Meeting

2. Organization and Management Controls (83729)

The inspector reviewed and discussed with licensee representatives changes made to the RP organization since the last NRC inspection of this area conducted November 2-6, 1992, and documented in Inspection Report (IR) No. 50-250, 251/92-25. The inspector was informed that the primary lines of authority and organizational structure for the RP function had remained unchanged; however, several vacancies were noted as well as personnel reassignments.

No changes were observed in the supervisory staff reporting directly to the HP Supervisor which included the positions of Operations Supervisor, Support Supervisor, Dosimetry/Records Supervisor, and ALARA Supervisor. However, at the time of the onsite inspection, the following positions were vacant: two Health Physics Shift Supervisors (HPSSs), a HP Engineer, and an ALARA Specialist as well as several administrative



technician and radiation protection man (RPM) positions. In addition, the position of Technical Support Supervisor had recently been filled from within the HP group due to the transfer of the individual to another function within the company. Regarding this position, the individual appeared to be transitioning well into his new responsibilities and program continuity appeared to be maintained.

Licensee management personnel stated that actions were currently underway to fill the vacated positions as well as to assess the overall organizational structure of the HP function to determine where changes might be feasible to improve efficiency. In addition, the inspector was informed that in 1993, approximately 20 utility men were permanently assigned to the HP group to support general activities including decontamination work. This was considered an enhancement to the licensee's overall program.

At the time of the inspection approximately 44 permanent RPM positions were filled. For the Unit 4 outage, approximately 150 technicians were utilized to supplement the routine staff. This number included approximately 69 senior technicians, 37 junior technicians, 9 HP administrative technicians, and 43 decontamination personnel. The inspector noted that in-house senior technicians were used to backfill the vacant HPSS positions during the outage, and that many of the utility men were placed in temporary junior technician positions for the outage following satisfactory completion of training and/or the job performance measures (JPMs) for the specific tasks they were expected to perform. The qualifications of the outage HP staff are discussed in detail in Paragraph 3.a.

Based on discussions with licensee representatives and observation of activities in progress, the RP staffing levels appeared adequate to support on-going and planned outage activities. Although no concerns were noted, the inspector encouraged the licensee's continued efforts to fill HP staff vacancies in the routine organization.

No violations or deviations were identified.

3. Health Physics Technician Training and Qualifications (83729)

10 CFR 19.12 requires, in part, that the licensee instruct all individuals working in or frequenting any portion of a restricted area in the health protection aspects associated with exposure to radioactive material or radiation; in precautions or procedures to minimize exposure; in the applicable provisions of the Commission regulations; in the individual's responsibilities; and in the availability of radiation exposure data.

a. Contractor Technician Training

The inspector reviewed the process for qualifying and training contractor HP personnel. Licensee procedure O-ADM-360, Health Physics Department Personnel Training and Qualifications, dated

March 1, 1993, outlines the training qualifications for contractor, HP personnel. The procedure requires temporary contractor HP personnel to meet the qualifications of ANSI/ANS-3.1-1981 which stipulates a minimum of three years of related working experience. Contract personnel must also satisfactorily complete Radiation Controlled Area (RCA) Training and/or the RCA Training Examination in addition to Temporary Employee Training to include site specifics.

Refresher training is required for contractor HP technicians who have not performed HP duties at the site within the past 12 months. The refresher training is to include plant policies, procedures, and practices relating to their specific duties.

The inspector reviewed selected resumes for the contractor technicians employed onsite for the current Unit 4 outage and verified compliance with ANSI 3.1-1981 requirements. Review of training documentation and interviews with several contractor HP technicians and licensee training staff members determined successful completion of procedural reviews and qualification tasks. The inspector noted that non-ANSI qualified Florida Power and Light employees used to provide outage HP support were qualified to perform specific duties without supervision based on the successful completion of an applicable JPM.

The inspector determined the licensee's program for contractor HP technician training was adequate and conducted in accordance with approved procedures.

No violations or deviations were identified.

b. General Employee Training (GET)

GET Level I training was provided to employees needing unescorted access to only the protected area. For workers needing unescorted access to the RCA, Level II training was required, in addition to Level I. Both levels of training required personnel to pass an examination with a minimum passing score of 80 percent. The specific lesson plans and procedures related to the GET program reviewed by the inspector and discussed with licensee representatives included the following:

- O-ADM-306, Plant Access Training, dated July 23, 1992
- Site Specific Information Review Handout 3410007, dated April 23, 1991
- GET Level 1 Lesson Plan 3300005, General Employee Training, dated January 1, 1993
- GET Level 2 Lesson Plan 3300001, Radiation Controlled Area Training, dated November 20, 1990



In addition, a selected number of individual training qualification records were reviewed by the inspector and compared to the access training records shown on the computers at the entrance to the RCA, the latter of which allowed HP personnel to determine if an individual was qualified to enter the RCA. For the records reviewed, no discrepancies in personnel qualifications were noted.

Based on the evaluation of selected training procedures, examinations, student handouts, and course outlines, the inspector determined that the licensee's GET program met the provisions of 10 CFR 19.12.

No violations or deviations were identified

4. Self Assessment Programs (83729)

a. Quality Assurance Audits

Technical Specification (TS) 6.5.2.8 requires audits of facility activities to be performed under the cognizance of the Company Nuclear Review Board (CNRB) encompassing conformance of facility operation to all provisions contained in the TSs and applicable License Conditions at least once per 12 months, and the Process Control Program (PCP) and implementing procedures at least once per 24 months.

Since the last NRC inspection of this area in November 1992, two quality assurance audits related to the RP function had been performed: QAO-PTN-92-036, Radiation Protection and Industrial Radiation Safety Program, conducted August 12 through December 2, 1992, and QAO-PTN-92-042, Sealed Source Contamination, conducted October 14 through December 2, 1992. The inspector reviewed the audit reports and associated audit checklists as well as discussed the conduct of the audits with the principal auditor. The audits appeared adequate in scope to address the major program areas and included procedure and documentation review and field evaluations. Review of the results of the two audits determined that no findings were identified which required a formal response; however, several issues were identified during the Radiation Protection Program Audit. The items were primarily related to field observations conducted immediately following the passage of Hurricane Andrew and addressed areas such as radiological postings and compliance with radiation-work permits. Based on the audit report and discussions with the auditor, the inspector noted that the occurrences were minor in nature and immediate corrective actions were implemented. No contamination events or unplanned exposures resulted from the events identified.

Based on the review of this program area, the inspector concluded that the audit program related to the RP function was adequate to identify program deficiencies and was conducted in accordance with TS requirements.

No violations or deviations were identified.

b. Supervisory Surveillance Program

Health Physics Administrative Procedure O-HPA-009, Health Physics Supervisory Surveillance, dated October 10, 1991, establishes the program for HP Supervisor tours of the RCA to identify deficiencies and initiate corrective actions, as appropriate. Each supervisor is to tour their assigned area of the RCA on a daily basis and provide any deficiencies observed to the Health Physics Supervisor. On a weekly basis each supervisor is required to submit a written report addressing at a minimum, observations related to survey maps, area posting, control of radioactive material, contamination control, instrumentation, and housekeeping.

The inspector reviewed and discussed with licensee personnel the surveillances conducted thus far in 1993. Review of selected surveillance reports and the findings data base noted that, in general, the program was conducted in accordance with procedural guidance and was fostering improvements in the RP program. In reviewing the matrix of surveillances conducted, the inspector noted that some daily inspections had not been performed by certain supervisors; however, the overall effectiveness of the surveillance program had not been diminished by this because the assigned areas to be inspected were routinely rotated among supervision. Licensee management agreed to focus greater attention on ensuring that surveillances were consistently performed by all assigned supervision. Further, although corrective actions appeared to be taken on identified findings, the inspector noted that the tracking system did not always accurately reflect the completion of corrective actions.

In addition, the inspector noted that the program included evaluations for all areas of the RCA, except containment. Based on the general housekeeping observations discussed in Paragraph 7.b, the inspector discussed with the licensee the potential benefits of adding the Unit 3 and Unit 4 containments to their routine tours during outage periods.

No violations or deviations were identified.

5. External Exposure Controls (83729)

10 CFR 20.101 requires that no licensee shall possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter, a

total occupational dose in excess of 1.25 rems to the whole body, head and trunk, active blood forming organs, lens of the eyes, or gonads; 18.75 rems to the hands and forearms, feet and ankles; and 7.5 rems to the skin of the whole body.

10 CFR 20.202 requires each licensee to supply appropriate monitoring equipment to specific individuals and requires the use of such equipment.

a. External Exposure and Dosimetry Program

The inspector reviewed and discussed with licensee representatives external exposures for plant and contractor employees for the period October 1, 1992 through May 5, 1993. The inspector verified that assigned quarterly doses were within 10 CFR Part 20 limits. For the fourth quarter 1992 and first quarter 1993 the maximum doses for individuals employed at the site were as follows:

	<u>4th Quarter 1992</u>	<u>1st Quarter 1993</u>
Whole Body (WB) Dose (TPN Only)	1691 mrem	738 mrem
WB Skin Dose	1691 mrem	1602 mrem
Extremity	3159 mrem	2381 mrem

For the second quarter 1993, the inspector determined that through May 5, 1993, the maximum whole body, skin and extremity exposures were 1804 mrem, 2302, mrem, and 4636 mrem, respectively. In addition, for those individuals who had exceeded 1.25 rem to the whole body in the second quarter 1993, the inspector determined for selected personnel that exposure extensions had been authorized. Review of the associated documentation verified that exposure history files were completed (NRC Form-4) and extensions granted based on annual and lifetime cumulative exposures, as required. Licensee representatives stated that, in general, no exposure extensions would be granted above 2 rem per quarter, and for 1993 only two extensions to this threshold had been granted. No concerns were identified by the inspector.

During tours of the Unit 4 Containment, the Auxiliary Building, and the RadWaste Building, the inspector observed personnel wearing dosimetry devices appropriately. The licensee continued to implement both digital alarming dosimeters (DADs) and self-reading pocket dosimeters (SRPDs); however, the former were being used as the primary devices for RCA entries. Licensee



representatives stated that the DADs system had not yet been integrated into the computerized dose tracking system; however, efforts in this area were continuing.

No violations or deviations were identified.

b. Radiation Work Permit System

Licensee Administrative Procedure O-HPA-001, Radiation Work Permit Initiation and Termination, dated December 17, 1992, provides instructions for preparing, processing, and terminating Radiation Work Permits (RWPs) used for access control to the RCA. The inspector noted that the licensee had implemented procedural changes to clarify the requirements for pre-job briefings related to a previously identified NRC concern. Specifically, for RWPs requiring a briefing, support personnel may receive a partial briefing based on the limited nature of the particular task to be performed. Conduct of partial briefings as well as the specific task associated with the briefing must now be documented on the pre-job briefing form. The inspector reviewed RWP-4061, Regenerative Heat Exchanger Inspection; RWP-4062, Valve LCV-460 Repair; RWP-4075, Eddy Current Testing; and RWP-4148, Conoseal Work, which required workers to attend a pre-job briefing. Evaluation of documentation for selected workers who had signed in and worked on the RWP verified that all individuals had received a pre-job briefing as required. No concerns were noted with the procedural changes nor program implementation related to this area.

In addition, the inspector observed selected briefings conducted for workers prior to entering the RCA. The briefings addressed radiological concerns and RWP requirements appropriately and no concerns were noted. During tours of the Unit 4 containment, the inspector evaluated personnel performing work on RWPs relative to meeting the dress and other special requirements with no discrepancies noted.

No violations or deviations were identified.

c. Exposure to Skin

Licensee Procedure O-HPS-026.1, Decontamination of Personnel, dated July 23, 1991, requires skin dose calculations be performed when the exposure exceeds 25,000 disintegrations per minute-hours (dpm-hrs) for a hot particle and 300,000 dpm-hrs for distributed contamination. Procedure O-HPA-034.2, Determination of Dose to the Skin from Skin Contamination, dated January 28, 1992, details guidance for determining skin dose due to surface contamination.



The inspector reviewed skin contamination cases associated with the Unit 4 outage. Although the licensee had realized an increased number of contamination events during the outage, the associated exposures were relatively minor. For the skin dose assessments reviewed by the inspector, the maximum exposure assigned was approximately 380 mrem for a worker providing support to eddy current testing activities. The inspector did not note any concerns regarding the licensee's technical methods for performing the dose assessments. However, during the review of contamination event No. 93-077, the inspector noted that the incident package, which had received review, did not contain a dose assessment even though the hot particle criteria of 25,000 dpm-hours using a frisker was met. Prior to the end of the inspection, the licensee determined that isotopic analysis of the particle yielded an exposure of approximately 15,000 dpm-hrs, below the threshold requiring a dose assessment. Although no regulatory requirements were violated, licensee management indicated they would evaluate improvements in the contamination assessment process to ensure that the need for dose assessments are clearly highlighted.

No violations or deviations were identified.

6. Internal Exposure (83729)

10 CFR 20.103(a)(1) states that no licensee shall possess, use, or transfer licensed material in such a manner as to permit any individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in Appendix B, Table 1, Column 1.

a. Respiratory Protection and Breathing Air Quality

10 CFR 20.103(c)(2) permits the licensee to maintain and to implement a respiratory protection program that includes, at a minimum: air sampling to identify the hazard; surveys and bioassay to evaluate the actual exposures; written procedures to select, fit, and maintain respirators; written procedures regarding supervision and training of personnel and issuance of records; and determination by a physician prior to the use of respirators, that the individual user is physically able to use respiratory protective equipment.

Health Physics Administrative Procedure 0-ADM-041, TPN Respiratory Protection Plan, dated October 15, 1991, provides guidelines and general information for maintaining, issuing, and using respiratory protective equipment to limit inhalation of airborne radioactive material. Lesson Plan 3300006, Respiratory Protection Training, dated September 26, 1991, provides the training requirements for personnel using respirators, self-contained breathing apparatus (SCBA), and bubble hoods. The inspector also



reviewed the respiratory training film which demonstrated the correct use and handling of respiratory equipment. Review of the respiratory procedures and training material was determined by the inspector to be appropriate in scope.

The inspector reviewed records for selected employees who had been issued and had used respiratory protection equipment during the current Unit 4 outage. The inspector verified that for the records reviewed, each worker had successfully completed respiratory protection training, was medically qualified, and was fit-tested for the specific respirator type used in accordance with licensee procedural requirements.

The inspector reviewed the respirator log sheets indicating the number and types of respirators issued during the current outage. The licensee recently began tracking actual numbers of respirators issued versus respirators worn during a specific time period to improve their overall process for respirator reduction. The inspector discussed with the licensee methods to be used for future respirator reductions to enhance ALARA concepts. Discussions with the licensee indicated plans to further reduce the use of respirators by worker training, successful decontamination efforts, and various engineering controls such as the use of worksite ventilation and face shields.

30 CFR 11.121 requires that compressed, gaseous breathing air meet the applicable minimum grade requirements for Type 1 gaseous air set forth in the Compressed Gas Association (CGA) Commodity Specification for Air, G-7.1 (Grade D or higher quality).

The inspector reviewed and discussed with the licensee's Respiratory Protection Supervisor the program for testing and qualifying breathing air as Grade D, particularly as it related to preparation for Unit 4 outage activities. The inspector, accompanied by licensee personnel, inspected the in-use breathing air system which included a plant in-line system using two permanently installed compressors labeled as A and B compressors. The in-line system was backed up by a series of in-line compressed air bottles. The compressed air bottles were designed to allow the licensee time to activate a backup portable air compressor in the event the permanently installed system failed. The inspector examined breathing air manifolds for physical integrity, current calibration of gauges, and the presence of carbon monoxide monitoring equipment. In addition, the inspector further noted that the supplied air hoods and hoses available for use were compatible per manufacturer's instructions as were air supplied respirators and hoses.

Review of breathing air testing records verified that the licensee was calibrating in-line carbon monoxide monitors and sampling in-use breathing air systems for certification in accordance with procedural requirements. For the tests reviewed, breathing air met Grade D requirements.

No violations or deviations were identified.

b. Whole Body Counting and Exposure Tracking

10 CFR 20.103 (a)(3) requires, in part, that the licensee, as appropriate, use measurements of radioactivity in the body, measurements of radioactivity excreted from the body, or any combination of such measurements as may be necessary for timely detection and assessment of individual intakes of radioactivity by exposed individuals.

The inspector was informed by licensee representatives that no positive internal contaminations had been identified to date in 1993 with the exception of one contractor who showed a positive whole body count while processing into Turkey Point Plant. The inspector reviewed the licensee's assessment of a potential internal exposure event involving a worker who was contaminated during conoseal activities. For this event, initial whole body counting information identified the presence of Cobalt-58 and Cobalt-60. The measured activity decreased upon showering and the individual was released. Upon return, approximately 24 hours later, no detectable activity was identified after two successive counts. The licensee's assessment determined the contamination to be external. The inspector had no concerns regarding the licensee's methodology or conclusion for this event.

Licensee Procedure O-HPS-038.1, Personnel Maximum Permissible Concentration-hour (MPC-hr) Tracking, dated July 5, 1990, provides guidelines to assess and track individual airborne exposures. Airborne exposures for selected workers were reviewed by the inspector and all MPC-hrs were correctly calculated, documented and entered into the HP computer. Approximately three MPC-hrs was the maximum cumulative exposure assigned to a worker in 1993 at the Turkey Point site. During the review, the inspector observed that MPC-hrs were not available at the computer terminal used at the respiratory equipment issue station, although personnel cannot be issued a respirator if their airborne exposure assignment exceeds 20 MPC-hrs in a week. This computer shows a worker's qualifications to wear particular respiratory equipment such as medical qualifications, fitness qualifications, and training qualifications. However, based on discussions with the licensee on HP process controls, this information is available to the issuer in hard copy form, and the risk of a worker being issued a respirator due to delays in information transmittal and exceeding any limits for MPC-hrs was minimal. The inspector had no further concerns with this process.

Based on the above, the inspector concluded that the licensee was effectively controlling internal contaminations with no exposure greater than the 40 MPC-hr control limit identified.

No violations or deviations were identified.

7. Control of Radioactive Materials and Contamination, Surveys, and Monitoring (83279)

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulation and (2) are reasonable under the circumstances to evaluate the extent of radioactive hazards that may be present.

a. Posting and Labeling

10 CFR 20.203 specifies the posting, labeling, and control requirements for radiation areas, high radiation areas, airborne radioactivity areas, and radioactive material areas. Additional requirements for control of high radiation areas are contained in TS 6.12.

During tours of the plant, the inspector reviewed the licensee's program for posting and controlling areas with respect to the aforementioned requirements, and no discrepancies were noted. The inspector further verified that all locked high radiation areas were locked and posted, as required, and for those areas which could not be locked that flashing lights and postings were used to warn workers.

10 CFR 20.203 (f) requires, in part, each container of licensed material containing greater than Appendix C quantities to bear a durable, clearly visible label.

Licensee procedures O-ADM-605, Control of Radioactive Tools Equipment and Components, dated August 28, 1992, and O-HPS-041, Control of Radioactive Material Inside the Radiation Area, dated May 5, 1991, detail the licensee's implementation of the radioactive material labeling requirements. During tours of the Containment, Auxiliary Building, RadWaste Building, and various radioactive material storage locations, the inspector noted that radioactive material areas were appropriately posted and containers were labelled consistent with regulatory requirements and procedural requirements. In addition, the inspector observed the licensee's actions to control an unknown object which was found in the reactor vessel during search and retrieval activities. The item, reading approximately 100 rem/hour, was secured and suspended in the reactor cavity during refueling operations. The inspector noted that the rope was labeled and maintained under constant surveillance by RP to prevent unauthorized removal. At the conclusion of the inspection, the



licensee was making preparations to remove the item from the cavity and transfer it to high level storage. No concerns were noted regarding the licensee's control of the object.

No violations or deviations were identified.

b. Routine Surveys

The inspector reviewed licensee procedure O-HPS-021.3, dated February 5, 1992, which provides guidelines for controlling the release of materials from the RCA and discussed with the licensee the methods used to release material from the restricted area. The inspector observed technicians performing release surveys of materials, and no concerns were noted.

In addition, the inspector reviewed selected records of radiation and contamination surveys performed during the period from January 1 through May 6, 1993, and discussed the survey results with licensee representatives. During tours of the plant the inspector observed HP technicians performing radiation and contamination surveys, and no concerns were noted.

The inspector independently verified radiation and/or contamination levels during tours of the Unit 4 Containment, Dry Storage Warehouse, RadWaste Building, Auxiliary Building, Spent Fuel Building, and outside radioactive material storage areas. The inspector noted that all containers, materials, and areas were properly labeled, posted, and/or safeguarded in accordance with the radiation hazard present. However, during performance of radiation surveys in the Auxiliary Building, the inspector identified radiation levels in the Unit 4 Demineralizer Room of between 80 and 120 mrem per hour on contact and within approximately 6 inches of a locked high radiation gate. The area outside the gate was not posted or controlled as a high radiation area. Additional surveys by the licensee identified similar results as well as approximately 40 mrem per hour dose rates at 18 inches from the gate. The inspector noted that the area was posted and controlled, based on the 18 inch measurement, in accordance with TS requirements; however, for conservatism the licensee typically posts areas in excess of 80 mrem per hour. Upon identification, the licensee posted the entrance to the Demineralizer Room as a high radiation area.

Discussions with licensee representatives noted that the routine survey frequency for this area was monthly. Review of the surveys for the two prior months showed an increasing trend in the area of concern; however, the exact location of the various surveys or whether they included verification of the dose rates at the locked high radiation area boundary door were uncertain. The inspector noted that this area had a high potential for changing conditions, particularly during outages, and that a monthly survey frequency may not be adequate to properly characterize radiological



conditions. Licensee management indicated they would evaluate the need for improvements in the survey program for areas with a high potential for changing radiological conditions. The inspector informed the licensee that this issue would be followed up on during a subsequent inspection and would be tracked by the NRC as an Inspector Followup Item (IFI 50-250, 251/93-12-01).

In addition, overall housekeeping and material control was below the housekeeping standards observed during the previous unit 3 outage. As was discussed with the licensee, miscellaneous trash and loose waste rags, yellow bags, protective clothing (PCs), yellow plastic, and survey materials were left in work spaces prior to disposition in the Unit 4 Containment, RadWaste Building, and the outside storage areas adjacent to the Unit 4 equipment hatch. Additional discussion regarding housekeeping activities is discussed in Paragraph 4.b above.

No violations or deviations were identified.

c. Personnel and Area Contamination

The licensee maintained approximately 117,750 square feet (ft²) of floor space as radiologically controlled. As of May 6, 1993, the licensee was tracking approximately 11,000 ft² of floor space as contaminated which equated to approximately 11 percent of the RCA. The licensee was maintaining contaminated floor space at less than 2 percent prior to the Unit 4 refueling outage. Discussions with licensee personnel indicated plans to recover floor space contaminated during the outage.

As of April 29, 1993, approximately 63 Personnel Contamination Events (PCEs) had occurred of which approximately 45 PCEs had occurred during the outage. Twenty-eight of which occurred during the first 16 days of the Unit 4 outage. At the time of the inspection, the current rate of PCEs for 1993 was 0.83 per 1000 man-hours and 1.66 per 1000 RWP entries. Although the total number of PCEs for the current year was low, the licensee had already exceeded the outage goal of 42. A root cause analysis was performed and determined this number of PCEs represented a factor of 4 increase in the daily rate. The rate of personnel contaminations per man-hour, however, had increased at a rate of 2.5 times higher than the last outage. The licensee has no indication that the average time in containment or in the RCA per entry was greater than that observed during the last outage, but the total man-hours per day in the RCA was about 1.8 times higher. The licensee's analysis has determined that approximately 25 percent of the PCEs may have resulted from wet or sweaty protective clothing or improper undressing. The licensee is currently evaluating several actions to reduce the rate of PCEs which include the use of paper shorts under the PCs, paper suits over the PCs, PC coveralls constructed of a tighter woven material, increased emphasis on worker training when undressing,

and improved laundry technique for PCs to include the use of static removal materials during the drying phase of laundry. The inspector reviewed licensee administrative procedure O-ADM-606, Maintenance and Laundering of Protective Clothing, dated March 9, 1993, and the licensee's on-going efforts in this area were considered appropriate.

No violations or deviations were identified.

d. Radiation Detection and Survey Instrumentation

During facility tours, the inspector noted that survey instrumentation and continuous air monitors in use within the RCA were operable and displayed current calibration stickers. In containment, the inspector did observe an RM-14, located just inside the personnel hatch, which did not display a daily source checksheet. Licensee representatives stated that the instrument was for indication only and was not used for official surveys because the background count rate was not within an acceptable range. Prior to the end of the onsite inspection, the licensee marked the instrument for information only. The inspector further noted an adequate number of survey instruments were available for use.

No violations or deviations were identified.

8. Program for As Low As Reasonably Achievable (ALARA) (83729)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures ALARA.

The inspector reviewed and discussed with cognizant licensee representatives ALARA program implementation and initiatives for the current Unit 4 outage and operations in 1992. The inspector noted that the site collective dose for 1992 was 336 person-rem as compared to a target of 425 person-rem (SRPD), and included approximately 208 person-rem for the Unit 3 refueling outage as well as several forced outages earlier in the year. For 1993, the licensee had established an annual dose goal of 360 person-rem, and as of the May 4, 1993 ALARA Daily Exposure Report, the licensee had accumulated approximately 174 person-rem, by SRPD. For the on-going Unit 4 refueling outage, the licensee had expended approximately 147 person-rem, by SRPD. This dose was slightly above projected for the stage of the outage; however, the licensee stated that much of the dose intensive work was complete, and that approximately 200 person-rem, compared to a goal of 230 person-rem, for the outage appeared achievable.

Review of job-specific exposure data for the Unit 4 outage, revealed that the licensee continued to improve their performance for repetitive defueling tasks. For the sixteen activities tracked by the licensee, nine of them were below the best past performance. For the outage, the



work activities with the greatest dose impact included conoseal modification and steam generator eddy current testing. Discussions with the licensee regarding these evolutions noted that the individual dose performances had exceeded the estimate for both cases. For the conoseal modification, approximately 25 person-rem was expended as of May 4, 1993, compared to an estimate of 12.0 person-rem. The licensee attributed much of the additional dose to the higher than expected dose rates, up to twice that encountered in Unit 3, and some equipment problems were also experienced. For eddy current testing, 7 person-rem was estimated with approximately 11.8 person-rem expended. Licensee representatives stated that the 7 person-rem estimate was based on the best past performance when testing was performed on the generators sequentially. For this outage, the testing was done simultaneously, and the work was completed in eight days. Comparison of the Unit 4 performance to that during the similar Unit 3 evolution, noted an improved time and dose performance. The inspector also noted that the licensee had implemented a unique felt washer system for the eddy current probe cables. The units, attached to each probe, serve to clean the cables and prevent the spread of contamination; thus, reducing time and associated dose for platform decontamination activities.

The inspector toured the licensee's mock-up facility located in the Training Building. The facility included the necessary hardware for conoseal, reactor coolant pump seals, flux mapper drive unit, and steam generator bowl mock-ups as well as mock-ups for various plant pumps and valves. The inspector noted the facility to be of high quality, and to be used effectively as a training tool for various Unit 4 outage activities.

Based on the above, the inspector informed the licensee representatives that the ALARA program continued to be effective in controlling exposures during the Unit 4 outage. Overall, collective dose expended was consistent with the work performed.

No violations or deviations were identified.

9. Action on Previous Inspection Findings (92701)

(Closed) IFI 50-250, 251/92-25-01: Evaluate changes to RWP Procedures regarding the conduct of pre-job briefings. As discussed in detail in Paragraph 5.b above, the licensee had incorporated appropriate procedural changes to address the conduct of partial pre-job briefings for workers conducting support. Review documentation for selected workers signed-in on RWPs requiring pre-job briefings determined that pre-job briefings were conducted and documented in accordance with approved procedures. The licensee was informed that this issue is considered closed.

10. Exit Interview (83729, 92701)

The inspection scope and results were summarized on May 7, 1993, with those persons indicated in Paragraph 1 above. The general program areas

reviewed and the inspection findings listed below were discussed in detail. Licensee representatives acknowledged the inspector's comments and no dissenting comments were received. Although proprietary information was reviewed during this inspection, such material would not be included in the report.

Item Number

Description and Reference

50-250, 251/93-12-01

IFI - Evaluate needed improvements in the survey program for areas with a high potential for changing radiological conditions (Paragraph 7.b).

