



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

JUN 21 1991

Report Nos.: 50-280/91-13 and 50-281/91-13

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: May 20-24, 1991

Inspector: R. B. Shortridge

6/18/91
Date Signed

Accompanied by: E. B. Pharr

Approved by: J. F. Potter
J. F. Potter, Chief

6/18/91
Date Signed

Facilities Radiation Protection Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the area of occupational radiation safety during an extended outage and included an examination of: audits and appraisals, training and qualification, external exposure control, internal exposure control, control of radioactive materials and contamination, surveys and monitoring, and maintaining occupational exposures ALARA. In addition, licensee responses to previously identified inspection findings were reviewed.

Results:

In the areas inspected, violations or deviations were not identified. Based on interviews with licensee management, supervision, personnel from station departments, and records review, the inspector found the radiation protection program to be managed well. Management and staff were motivated and knowledgeable and were involved in activities to reduce personnel exposure. The licensee's programs for external and internal radiation exposure controls were effective and functioning adequately to protect the health and safety of occupational radiation workers.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Benthall, Supervisor, Licensing
- *W. Cook, Supervisor, Health Physics Operations
- *D. Erickson, Superintendent, Radiation Protection
- *B. Garber, Supervisor, Radiation Protection
- *D. Hart, Supervisor, Radiation Protection
- *M. Kansler, Station Manager
- *J. Keithley, Shift Supervisor, Radiation Protection
- *J. McCarthy, Superintendent, Operations
- *M. Olin, Supervisor, Radiation Protection, Decon Services
- *J. Price, Assistant Station Manager
- *R. Saunders, Assistant Vice President, Nuclear Operations
- *T. Steed, Radiation Protection ALARA Coordinator
- *W. Thornton, Corporate Health Physicist
- *R. Warnick, Health Physics Technician
- *F. Wolking, Nuclear Operation Services
- *K. Wyatt, Maintenance ALARA Coordinator

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, and administrative personnel.

Nuclear Regulatory Commission

- *W. Holland, Senior Resident Inspector
- *S. Tingen, Resident Inspector
- J. York, Resident Inspector

*Attended May 24, 1991 Exit Meeting

2. Audits and Appraisals (83729)

Technical Specification (TS) 6.1.C.3. requires audits of facilities to be performed under the cognizance of the Quality Assurance (QA) Department for conformance of facility operations to TSs and applicable license conditions.

The inspector reviewed a recently developed aspect of the licensee's program of self-appraisal. In addition to audits required by TSs and surveillance performed by QA, assessments have been added to determine the effectiveness of department and program performance. The assessment reviewed was conducted during April 1991 of Surry's Advanced Radiation Worker (ARW) program.

The ARW program is used to improve worker knowledge and skills. Workers are required to perform some similar health physics (HP) technician duties as part of their job function. Frequently air samples, tool surveillance, and radiation and contamination surveys to support their specific job are performed by the ARW, both reducing the demand on HP and improving efficiency of the ARW.

Surry's management initiated the request for assessment after concerns for some ARW program elements were expressed in September 1990 by a Quality Maintenance Team (QMT). The September 1990 assessment identified that management support for the ARW Program could be improved and found that there were basic understanding and identification problems on the part of the ARW.

The QA assessment conducted in April 1991 focused on program concepts, implementation, and training of ARWs. Of primary concern by the ARW was job scope. The ARWs stated that they were unsure as to whether their training was adequate, what level of job performance HP would expect of them, how much of HP duties they were to assume, and where the radiological ownership for ARW job performance was to reside.

The assessment was interview driven and concluded that while the ARW program was performing satisfactorily it could be more efficient and the ARW workers should receive more training to improve their confidence in performing HP related tasks.

Assessment recommendations included upgrading the program to meet worker needs such as hands on training during both initial and recertification ARW training, improve communications between ARWs, HP, and management, and continue to monitor the interface and track and assess ARW effectiveness.

In response, the licensee has completed a group training mockup that incorporates some system capabilities inplant and utilizes similar type components inplant.

The inspector determined that the assessment performed by QA was resulting in improvements to licensee programs and was supplementing the licensee's comprehensive problem self-identification program.

No violations or deviations were identified.

3. Organization and Management Controls (83729)

The inspector reviewed changes made to the licensee's organization, staffing levels and lines of authority as they related to radiation protection, and verified that the changes had not adversely affected the licensee's ability to control radiation exposures or radioactivity.

The inspector reviewed the licensee's program for self-identification of weaknesses related to the radiation protection program and the appropriateness of corrective action taken. By use of Radiological Assessor's Reports (RARs), Radiological Problem Reports (RPRs), and Personnel Contamination Events (PCEs), the licensee was able to identify and document radiological control weaknesses.

The inspector reviewed RARs performed weekly by HP technicians during the period January 1, 1991 to May 15, 1991. Problems identified were mainly associated with housekeeping, downed or not clearly visible postings, posting of expired RWPs, and ALARA issues. The inspector noted that corrective actions were taken immediately and that recurring problems were identified and corrective actions addressing the root cause were proposed. The inspectors also reviewed RPRs, PCEs, and Station Deviation Reports and noted that the licensee was adequately conducting investigations to identify root causes.

No violations or deviations were identified.

4. Training and Qualifications (83729)

10 CFR 19.12 requires the licensee to instruct all individuals working or frequenting any portions of the restricted areas in the health protection aspects associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposure, and in the purpose and function of protection devices employed, applicable provisions of the Commission Regulations, individual's responsibilities and the availability of radiation exposure data.

The inspector discussed with licensee representatives initiatives being taken in ARW training following the April 1991 ARW program assessment. A major problem identified during the audit was that more than 2 to 4 hours of practical training, as currently provided to ARW trainees, was needed to provide for a more thorough training. Training representatives plan to allow for more practical training sessions, both initially and for retraining, and to continue all training under simulated conditions in their group training mock-up facility. The resources available at the training facility allow the training personnel to practically duplicate the environment to which ARWs will be exposed. Their plans are that this practical experience will condition the ARWs to recognize changing radiation conditions and how to respond to them.

The inspector discussed with cognizant licensee representatives the licensee's HP continuing training program. The licensee stated that the facility's HP technicians are organized into six shifts with one shift in training all the time. Training cycles

encompass emergency preparedness, current industry events, new instrumentation, and plant systems. Outside the scope of the set training plans, the HP and training departments have "need to know" meetings in which HP adds to the training plan those things they believe the technicians should know.

Licensee representatives informed the inspector that prior to the outage two HP supervisors and two HP technicians attended a week of training with representatives from Westinghouse. Both lectures and mock-up training sessions were performed to provide valuable insight into the licensee's upcoming steam generator work during the outage. The inspector was informed by the HP Operations Supervisor that this training was beneficial in reducing U2 outage exposure due to S/G work by more than 30 percent as compared to 1990 outage S/G work.

In discussions with the HP Operations Supervisor, the inspector was informed that all six HP shifts have been sent to different utilities to observe their radiation protection programs for a week. The supervisor stated that he had received excellent management support and that he felt the entire HP program had benefitted from the training. The licensee felt that not only had each shift learned from the other utilities but also that they had gained confidence in their own HP program. The inspector determined that the licensee training program continued to improve performance at the facility.

No violations or deviations were identified.

5. External Exposure Control and Personal Dosimetry (83729, 83750)

a. RWP Implementation

TS 6.4.B requires the licensee to have written procedures, including the use of radiation work permits (RWPs), prepared consistent with the requirements of 10 CFR Part 20 and they shall be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

The inspector reviewed selected RWPs related to reactor head work for appropriateness of the radiation protection requirements based on work scope, location, and conditions. The inspector was informed by cognizant licensee representatives that throughout the outage these workers were briefed on certain RWP requirement changes as pertaining to the particular job they would be performing. The inspector also noted that as work conditions changed the RWP was updated as appropriate. During tours of the Containment Building, the inspector observed the adherence of plant workers to the RWP requirements. The inspector found the RWPs to be thorough and complete with worker adherence and knowledge to be adequate.

b. Personal Dosimetry

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

During tours of the Containment Building and Auxiliary Building, the inspector observed the continued use of digital alarming dosimeters (DADs). The inspector noted that an alarm point is set for both dose and integrated dose as prescribed by the individual's RWP. During discussions with licensee representatives, the inspector was informed that in high noise areas workers have on occasion not been able to hear their alarming DADs. The inspector discussed with these representatives the possible use of vibrating DADs that would provide the workers an added sensory indicator of the alarming dosimeter.

c. Licensee Control of Incore Detector Systems

The inspector reviewed Operating Procedure, 1-OP-57 and 2-OP-57, Incore Movable Detector System, which provides requirements for operations personnel for flux mapping and for calibrating the incore movable detector system prior to obtaining the flux map. The procedure pertaining to Unit 1 calibration and flux mapping (1-OP-57, dated August 6, 1986) requires the operator to gain HP's permission to enter the Containment Building during flux mapping and requires the permission of the Operations Shift Supervisor to operate the flux mapping system prior to calibration. The Unit 2 procedure (2-OP-57, dated February 2, 1990) has the same requirements as Unit 1 except that the Shift Supervisor grants the operators permission to enter the containment during flux mapping without notifying HP. The inspector informed licensee management of this oversight of HP notification prior to Unit 2 movement of the incore detectors for calibration and flux mapping. The licensee acknowledged the inspector's comments.

The inspector also reviewed Instrument Maintenance Procedures, IMP-C-IC-81, Incore Movable Detector System Checkout, dated June 26, 1989, and IMP-C-IFM-20, IFM Detector System, dated October 2, 1990. Both procedures were used to determine operability and performance checks of the Incore Detector System. Both procedures require that both the operations and HP shift supervisors have knowledge of the work to be performed and both have granted permission for the work to be done. Both procedures also require adherence to the necessary RWP, and the RWP must be approved by the station's Nuclear Safety Operating Committee, continuous HP coverage, as well as a pre-job briefing between the HP and instrument technicians for work inside

the Containment Building. The inspector noted that the procedures were thorough and required the initials of the responsible party to verify performance of the procedure requirement.

The inspector verified that HP also has a sign off sheet for incore detector operations. The checklist requires the authorization of the HP Supervisor and the Operations Shift Supervisor, as well as adherence to the appropriate RWP, and continuous HP coverage. The inspector found the licensee's control of incore detectors operations to be adequately managed.

No violations or deviations were identified.

6. Internal Exposure Control (83729)

10 CFR 20.103(b)(1) requires that the licensee use process or other engineering controls to the extent practicable to limit concentrations of radioactive materials in the air to levels below those which delimit an airborne radioactivity area as defined in 10 CFR 20.203(d)(1)(ii).

10 CFR 20.103(b) also requires that when it is impracticable to apply process or other engineering controls to limit concentrations of radioactive material, other precautionary procedures shall be used. The precautionary procedures include respiratory protective equipment.

During discussions with licensee representatives, the inspector was informed that in preparation for the revised 10 CFR Part 20 the licensee has been comparing work in respirators as opposed to work without respirators for the purpose of keeping exposures ALARA. The licensee currently uses lapel air samplers to enhance their breathing zone sampling representativeness. Cognizant licensee representatives stated that during the outage, detensioning of the reactor head was done in full-face respirators and lapel air samplers so that thorough sampling data could be collected and reviewed. The inspector noted that all lapel air results were below 25 percent of the Maximum Permissible Concentration (MPC). Decontamination efforts followed and when tensioning of the head took place, workers wore only face shields along with lapel air samplers. Again, lapel results were less than 25 percent MPC.

The inspector was informed that in all previous outages workers had always worn full-face respirators when performing both operations. The licensee noted that the workers were able to perform the retensioning a little faster and expended a little less dose than in previous operations where respirators were worn. Most significantly; though, they noted a more positive worker attitude due to the fact that both physically and mentally

the situation was less stressful and communications were much improved. The inspector recognized the licensee's efforts in preparation for the 10 CFR 20 revisions.

No violations or deviations were identified.

7. Tours of Facilities (83729)

10 CFR 19.11(a) and (b) require, in part, that the licensee post current copies of Part 19, Part 20, the license, license conditions, documents incorporated into the license, license amendments and operation procedures, or that a licensee post a notice describing these documents and where they may be examined.

10 CFR 19.11(d) requires that a licensee post Form NRC-3, "Notice to Employees." Sufficient copies of the required forms are to be posted to permit licensee workers to observe them on the way to or from licensed activity locations.

During the onsite inspection, the inspector verified that Form NRC-3 and notices referencing the appropriate 10 CFR Part 19 and Part 20 and licensee documents were posted in accordance with the applicable regulation. Forms were posted at the entrance of the Turbine Building to the Radiation Control Area (RCA) in view of all employees entering the area.

No violations or deviations were identified.

8. Control of Radioactive Material, Surveys, and Monitoring (83729, 83750)

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 regulations and (2) are reasonable under the circumstances to evaluate the extent of radioactive hazards that may be present.

10 CFR 20.401(b) requires each licensee to maintain records showing the results of surveys required by 10 CFR 20.201(b).

During plant tours, the inspector examined radiation levels and contamination levels posted for various areas in the Auxiliary Building and Unit 2 containment. The inspector performed independent surveys of selected areas and noted that there were not major differences with those posted by the licensee. The inspector also verified that observed radiation detection instrumentation was in current calibration.

The inspector reviewed all Personnel Contamination Events (PCEs) reports. To date, the licensee had experienced only 60 PCEs of the 116 projected. Licensee representatives attributed the good performance in this area to better contamination awareness by

personnel and the early containment decontamination. The licensee was observed to have 266 catch containments for radioactive leaks throughout the plant. Licensee representatives stated that they considered this a large number of leaks and would emphasize the repair rate.

The licensee goal for contaminated square feet (ft²) of RCA was 10,000 for 1991. Currently, there was 19,280 ft² of contaminated area. Licensee representatives stated that prior to the Unit 2 refueling maintenance outage, the contaminated square footage was 14,000 and that the 6,000 ft² area should be easily reclaimed. The licensee has been relatively slow in recovering contaminated area, but area recovered has been coated with epoxy to minimize difficulty in future decontaminations. Meeting the goal of 10,000 ft² in 1991 would show improvement over previous years.

The inspector also reviewed the licensee's policies for installing temporary step off pads for contaminated areas in overhead areas. This item was also discussed with the resident inspectors. No discrepancies were noted with licensee policies on this issue.

No violations or deviations were identified.

9. Program for Maintaining Exposures As Low As Reasonably Achievable (ALARA) (83729)

10 CFR 20.1c states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures as low as reasonably achievable. The recommended elements of an ALARA program are contained in Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be ALARA, and Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures ALARA.

The inspector reviewed licensee documentation for station collective dose and interviewed ALARA personnel to determine current program status. The licensee's collective dose for the outage was 339.168 person-rem on May 21, 1991. This was slightly above the projected dose due to gas stripper repairs in the previous quarter.

The inspector reviewed methods used by the licensee to reduce collective dose in 1991. The installation of fuel with grid spacers made of zircoloy reduced cobalt in the system. In addition, the new fuel installed is designed to have a life of 20 months. Several other dose reducing methods were implemented but had not yet been quantified regarding dose saved. These were:

- ° Hot spot piping flushes on both the pressurizer and cold leg safety injection valves

- Utilization of a valve packing extraction tool
- Utilization of robotics for upper internal inspection
- Increase of temporary shielding by over 300 percent during the outage
- Hydrogen peroxide addition and early boration at shutdown
- Dedication of containment for 6 days of decontamination at the outage start
- Utilization of pop end plugs vice welded plugs on the Non-Regenerative Heat Exchanger

The inspector discussed progress made with the Maintenance Department ALARA Coordinator and reviewed several Maintenance Department Monitoring ALARA reports. The inspector determined that both HP and maintenance were very involved in dose reduction and worked together to minimize collective station dose. Maintenance appears to be assuming a greater share and responsibility for the Station's ALARA program.

No violations or deviations were identified.

10. Licensee Actions on Previously Identified Inspector Findings (92702)

(Closed) VIO 50-280/90-18-01 and 50-281/90-18-01: Between March 23-30, 1990, the licensee failed to utilize process or other engineering controls to the extent practical so that licensee personnel were in an average airborne concentration of 25 Maximum Permissible Concentration hours per week (MPC-hrs/wk) when the radioactivity concentration in the licensee's Auxiliary Building reached 99 times that specified in Appendix B, Table 1, Column 1, of Part 20, on March 26, 1990.

The inspector reviewed and verified implementation of corrective actions stated in the VEPCO response dated July 11, 1990. Corrective actions included installation of a permanent drain line for resin shipping container dewatering activities, a matrix tabulation describing proper ventilation alignment during a given event or situation, updating Surry administrative procedure, SUADM-0-11, to require that a temporary modification be performed and documented for the use of temporary hookups which will be used for handling radioactive process fluids, and balancing of the Auxiliary Building's central and general ventilation exhaust systems.

Based on review of these licensee corrective actions and additional actions which have included walkdowns to identify other contamination control barrier breakdowns due to ventilation

perturbations and purchasing and utilizing continuous air monitoring equipment, the inspector informed licensee representatives that this issue would be considered closed.

11. Exit Meeting

The inspector met with licensee representatives indicated in Paragraph 1 at the conclusion of the inspection on May 24, 1991. The inspector summarized the scope and findings of the inspection with licensee management. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.