



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

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Report Nos.: 50-280/91-09 and 50-281/91-09

Licensee: Virginia Electric and Power Company
Glen Allen, Va. 23060

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32, DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: March 26 - 29, 1991

Inspectors:

P. L. Loudon

4/17/91
Date Signed

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4/17/91
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Accompanying personnel: J. D. Potter

Approved by:

J. D. Potter, Chief
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Division of Radiation Safety and Safeguards

4/17/91
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the area of occupational radiation exposure, and preoperational evaluation of external exposure control and facilities and equipment for the new radwaste facility. Specific areas examined included: audits and appraisals, training and qualifications, external exposure control, control of radioactive materials and contamination, surveys and monitoring, maintaining occupational exposures ALARA, and NRC Information Notices.

Results:

In the areas inspected no violations or deviations were identified. Based on interviews with licensee management, supervision, personnel from station departments, records review, and continued aggressive support of upper level and corporate management, the inspectors found the radiation protection program at Surry to be improving, and a station strength. Surry's problem self-identification and ALARA programs were continuing to perform as licensee strengths.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Benthall, Supervisor, Licensing
- *W. Campbell, Supervisor, IRSP Planner
- *W. Cook, Supervisor, Health Physics Operations
- *D. Erickson, Superintendent, Radiation Protection
- *B. Garber, Supervisor, Radiation Protection
- *D. Hart, Supervisor, Quality Assurance
- *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
- *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.

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- *J. York, Resident Inspector

*Attended exit interview

2. Occupational Exposure

a. Organization and Management Controls

The inspectors 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 inspectors reviewed the licensee's program for self-identification of weaknesses related to the radiation protection program and the appropriateness of corrective actions taken. Radiological Problem Reports (RPRs), Personnel Contamination Events (PCEs), and Station Deviation Reports were reviewed by the inspectors. It was noted that thorough investigations to identify root causes, and data trending of the more significant events were being performed.

The inspectors reviewed the findings of a newly developed evaluation program of the Radiation Protection Department conducted by Quality

Assurance. The assessment consists of eight modules which are grouped to address various program areas. The eight areas include, contamination controls, radiation protection organization and administration, external exposure control, internal radiation exposure, control of solid radioactive waste, work control, and instrumentation and equipment. Within each module are sub-modules which address specific areas within the aforementioned general areas. An average rating is determined for each general area based on the results of each specific area finding. The numbers are then pooled to produce an overall rating for the program. The findings for each specific area are then passed to the appropriate supervisor for corrective actions. Within the report, no area received a rating below the acceptable level (rating 2.0). There were a number of specific area ratings that bordered the acceptable/unsatisfactory level (rating 2.5). Inspectors discussed with the RP Superintendent the results of this evaluation and inquired about corrective actions for those areas rated as borderline or unsatisfactory. Based on these discussions, inspectors determined that timely and appropriate corrective actions were being taken for the items of concern.

b. Training and Qualifications

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 responsibilities and the availability of radiation exposure data.

The inspectors reviewed changes in the licensee's training program, policies, and goals relating to the radiation protection program and discussed the changes with licensee representatives. The inspectors verified that the changes should not adversely affect the licensee's program.

The inspectors discussed the Health Physics Technician Development Program (HPTDP) with the program's lead instructor. The program currently has an enrollment of 14 individuals. The curriculum consists of seven steps, each step contains four to six modules which address the subject matter for the step. While performing self-study and tasks required for each module, the student is under the supervision of an experienced HP technician, who reports his progress to a representative from the training program. Completion of module in-plant tasks are performance tested under the supervision of a HPTDP instructor. For steps which focus on a specific RP program area (e.g. count room, dosimetry, ALARA, etc.), the student is assigned to that particular laboratory or office. A strong effort is made not to

interrupt the students progression through the program. Normally, the student is not assigned extraneous tasks or pulled off the program to provide support during outages. Four Systems Training modules are included in the seven step program. Each module addresses specific in-plant areas and potential radiological hazards for each of the systems. Once the program is completed, the student is placed in the HP technician continuing training program. Positive comments received from experienced technicians indicate that the program sufficiently provides the students with all pertinent training to perform HP technician duties.

The inspectors reviewed the Group Training Mock-up which was completed in August of 1990. The system is comprised of various valves, demineralizers, and pumps which are identical to those encountered in the plant. A heat exchanger is also included in the system which can provide for desired flow rates and temperatures. The licensee has purchased radio-controlled radiation monitoring equipment to use with the mock-up to simulate radiological conditions in the plant remotely. Cognizant personnel stated that when the mock-up is used to simulate radiation work, the area is roped off, a step-off pad is placed in the area, and workers perform their tasks outfitted as per the RWP requirements associated with the job. HP coverage is also provided in the simulations to point out potential areas of radiological concern. The primary purpose of the group training mock-up was to move advanced radiation worker training from in plant to the mock-up to reduce personnel exposure. Personnel stated that initial dose were not estimates fully quantified, but it was apparent that the mock-up resulted in dose reduction to many jobs performed during the November 1990 outage.

c. Planning and Preparation

The inspectors reviewed the licensee's planning for the Unit 2 outage scheduled to begin March 30, 1991. The current planning system involves engineering, maintenance, site services, operations, outage planning, and ALARA. A work request must go through several reviews before it is placed on the outage planning schedule. Requests must undergo ALARA review for jobs in which the estimated collective dose exceeded 1 person-rem. The request must contain specific information detailing location of the job and anticipated repair times, to assist ALARA in determining what dose reduction efforts (shielding, dressout requirements) are necessary.

d. External Exposure Control and Personnel Dosimetry

Technical Specification 6.4.B requires the licensee to have written procedures 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 inspectors reviewed selected RWPs for appropriateness of the radiation protection requirements based on work scope, location, and conditions and found the RWPs to be thorough and complete.

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 Auxiliary Building (AB), inspectors observed the use of digital alarming dosimeters (DADs). The licensee has instituted a self issuing system for DADs which has assisted in expediting dosimetry issuance and provides for computer tracking of each dosimeter. The licensee continues to set DAD alarm points for specific radiation areas creating worker dose awareness and reducing dose.

e. Internal Exposure Control (Whole Body Counting System)

The licensee has recently amended its procedure for calibration of their two whole body counters (ND standup counter and a chair counter.) As detailed in a prior inspection (IR 90-25), the licensee did not perform annual calibrations of the whole body counting systems. Full calibrations were performed only in the event that the counters failed a QC test. Cognizant personnel stated that Procedure HP-5.28.62 "Whole Body Counter Calibration Standup & Chair/ND9900," dated August 10, 1990, would be amended to include a statement concerning the annual calibration of the whole body counting systems. The requirements and stipulations will remain the same for QC test failures, however the whole body counters will now be regularly calibrated on an annual basis.

As the inspectors were preparing to exit the site, it was observed that the whole body counters could not be calibrated to meet procedural quality control limits. Further investigation by the licensee into the problem revealed the background count rates were significantly elevated throughout the entire gamma ray energy spectrum. The licensee indicated that the problem appeared to be due to meteorological inversion layers in the area. These layers tend to "trap" terrestrial radiation for a short time period, therefore, increasing the observed background counting rates. The dosimetry technician requested the inspectors to provide samples for urinalysis. The collection of urinalysis samples is currently a non-proceduralized contingency in the event the whole body counting systems are inoperable. Discussions with licensee management indicated that this backup plan would be formally added to the whole body counting procedures. There were no positive results indicated by the urinalysis.

f. Surveys, Monitoring, and Control of Radioactive Material and Contamination

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.

The inspectors reviewed the plant procedures which established the licensee's radiological survey and monitoring program and verified that the procedures were consistent with regulations, Technical Specifications, and good health physics practices.

Inspectors reviewed the licensee's shift log of regular surveys performed on a daily, weekly, monthly, and quarterly basis. All surveys were documented as being performed in the required time frame. A selected group of surveys were reviewed for proper documentation and supervisory review as required by procedures. All surveys reviewed were in order and had been reviewed by appropriate supervisors in a timely manner.

Inspectors discussed the contamination control program with licensee representatives. Decontamination of the RCA continues with 11,495 of the 89,500 square feet contaminated at the end of 1990. Licensee representatives stated that plans are in place to continue reclaiming areas of the auxiliary building. Inspectors reviewed the Leak and Contaminated Area Tracking Update Report (LACAT) for 1991. This report lists the areas in need of deconning, collective dose estimates to decon, and the daily maintenance dose expenditure for the areas while contaminated. It also outlines priority areas for reclamation. The licensee plans to reclaim approximately 3,000 square feet of contaminated area in 1991.

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

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 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 licensee's ALARA program continues to be an aggressive element within the radiation protection program. The inspectors noted the continued involvement of corporate management with ALARA through the implementation of the station's Five Year Dose Reduction Plan and funding support described in the 1991 Business Plan.

The licensee's ALARA program has continued to implement new dose reduction techniques which include; telemetry for dose meters, staggering of dose allotments for workers on a particular job depending on the radiation field in the exact area the worker will be performing the task, ALARA responsibility being passed to other departments (Operations and Maintenance and others) via the respective departmental ALARA coordinators, and ALARA training incorporated in routine quarterly training of maintenance and site services personnel. Continued usage of the Videodisc Information Management System (VIMS) has also contributed to further operational dose reduction. The ALARA Coordinator has recently enhanced the VIMS to include component mark numbers and indicate low dose waiting areas. The use of the system is expanding and maintenance has identified the need for two VIMS within their department.

Inspectors attended the monthly ALARA Committee meeting on March 28, 1991, which reviewed recent ALARA suggestions and RWPs for higher dose jobs during the upcoming Unit 2 outage. The committee is comprised of the respective departmental ALARA coordinators, an assistant plant manager, supervisors from various HP sections, and the HP Superintendent. The ALARA suggestions were determined to be substantive and addressed specific dose problems which provided for changes that would reduce dose through physical changes or procedural techniques. Items approved while the inspectors were in attendance included:

- ° Color coding of resin discharge piping to avoid confusion during pre and post surveys to reduce time in the area.
- ° Provision for a low dose work area in the radiologically controlled areas (RCAs) to allow workers to bring valves and other components out of a high dose area while performing repairs and calibrations before installation.
- ° Install remote radiation monitors on skimmer filter housings with readout in a low dose area to inform HP technicians of increase in filter dose rates.
- ° Purchase of peristaltic pumps that use tygon tubing to replace steel pumps for draining liquid waste. The tubing pump would not become contaminated as would the steel pump thus minimizing radwaste and spreadable contamination.

During the RWP portion of the meeting, inspectors noted that the committee thoroughly briefed the foreman for each particular job and emphasized the radiological hazards and pointed out any relevant dose reduction techniques. The committee responded to concerns about the jobs expressed by the foremen. Of particular note was a suggestion made by an ironwork foreman who stated that he felt doses for his portion of a job could be reduced if filters were changed prior to his entry into the area. Although the dose reduction for this effort was

not quantified, it illustrated the effectiveness of the ALARA program developing individual worker awareness of dose reduction.

No violations or deviations were identified.

3. Facilities and Equipment, Preoperational (83527) and External Occupational Exposure Control and Personal Dosimetry, Preoperational (83524)

The inspectors toured and reviewed the licensee's new on-site radwaste facility. The facility has just entered component level and pre-op testing mode with hot testing to begin in June 1991. Several design features were reviewed in the facility for exposure reduction controls. Among those items noted were:

- ° Repair and maintenance areas for components. The facility is designed with areas to remove pumps and other components from a high dose/contaminated areas to allow for maintenance in lower dose or clean areas.
- ° The overall piping design has eliminated sharp angles, low spots, and backflow areas, thus reducing crud traps and potential hot spot areas.
- ° Personnel exposure control is supported by new protective clothing change rooms and showers. Personnel contamination and tool monitors were purchased to be used at RCA access points. Emergency showers are also located in the decon room and the new chemistry laboratory.
- ° A shielded room is located off the loading area to accommodate surveys before shipment and upon receipt of material.
- ° The licensee purchased specialized pumps for many of the systems which would become highly contaminated. These pumps assist dose reduction by the use of inherent ALARA design features. Breakdown and refitting can be accomplished in about one-third the time required for standard pumps as the pumps are mounted on a bed that can be rotated to facilitate maintenance. Usually only four wrenches are required for total disassembly. Over time for dose intense maintenance, this advantage could lead to significant dose savings at the facility.

The inspectors determined all systems reviewed met requirements of modules 83527 and 83524.

No violations or deviations were identified.

4. Information Notices (92701)

The inspector determined that the following Information Notices (INs) had been received by the licensee, reviewed for applicability, distributed to appropriate personnel, and that action, as appropriate was taken or scheduled:

IN 88-63 Supplement 1	High Radiation Hazards from Irradiated Incore Detectors and Cables
IN 90-08	Kr-85 Hazards From Decayed Fuel
IN 90-09	Extended Interim Storage of Low-Level Radioactive Waste By Fuel Cycle and Materials Licensees
IN 90-44	Dose Rate Instruments Underresponding to True Radiation Fields
IN 90-47	Unplanned Radiation Exposures to Personnel Extremities Due to Improper Handling of Potentially Highly Radioactive Sources
IN 90-48	Enforcement Policy for Hot Particle Exposures
IN 90-49	Stress Corrosion Cracking in PWR Steam Generator Tubes
IN 90-50	Minimization of Methane Gas in Plant Systems and Radwaste Shipping Containers
IN 90-56	Inadvertent Shipment of a Radioactive Source in a Container Thought to be Empty
IN 90-66	Incomplete Draining and Drying of Shipping Casks
IN 90-82	Requirements for Use of NRC Approved Transport Packages for Shipment of Type A Quantities of Radioactive Material
IN 91-10	Summary of Semiannual Program Performance Reports on Fitness-for-Duty (FFD) in the Nuclear Industry

5. Exit Meeting

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on March 28, 1991. The inspectors summarized the scope of their findings, and stated that the licensee's self-identification and ALARA program continued to perform as program strengths. The licensee did not identify any documents or processes as proprietary. Dissenting comments were not received from the licensee.