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VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

June 3, 1983

United States Nuclear Regulatory Commission
Attn: Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
Washington, D. C. 20555

Serial No. 299
NO/WDC:acm
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

We have reviewed your letter of May 9, 1983 in reference to the inspection conducted at Surry Power Station between March 21, 1983 and March 25, 1983 and reported in IE Inspection Report No. EA 83-36. Our response to the specific infraction is attached.

We have determined that no proprietary information is contained in the report. Accordingly, the Virginia Electric and Power Company has no objection to this inspection report being made a matter of public disclosure. The information contained in the attached pages is true and accurate to the best of my knowledge and belief.

Very truly yours,

W. L. Stewart
W. L. Stewart

Attachments

1. Response to Notice of Violation
2. Voucher Check in payment of Civil Penalty

cc: Mr. James P. O'Reilly
Regional Administrator
Region II

Mr. D. J. Burke
NRC Resident Inspector
Surry Power Station

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RESPONSE TO NOTICE OF VIOLATION
AND PROPOSED IMPOSITION OF CIVIL PENALTY

NRC COMMENT:

The licensee began a refueling outage on Unit 1 on February 9, 1983. Prior to the outage, failed fuel cladding in the unit had caused a marked increase in the concentration of radioactive material in reactor coolant. When the unit was shut down for refueling, many workers entered the Containment Building and the systems which had contained the highly contaminated reactor coolant were opened for maintenance. As a result of these activities, workers were exposed to airborne radioactive material and radiation from radioactive contamination.

The concentration of radioactive fission and activation product contamination on surfaces inside the Containment Building was unusually high as a result of the fuel cladding failure. The licensee, in an attempt to assess the beta dose rate due to this contamination, made measurements with thermoluminescent dosimeters (TLDs) and interpreted the measurement results to indicate that beta dose rates in the Unit 1 containment were insignificant when compared with gamma dose rates. Subsequent measurements performed at the request of the NRC inspector indicated that the beta contribution to dose rate was quite significant (beta was found to be 5 - 15 times gamma) and that the potential for individuals to exceed prescribed limits did exist. Because of this inadequate evaluation, comprehensive radiation dose monitoring had not been performed. Reconstruction of the circumstances has not indicated that any worker exceeded the limits of 10 CFR 20.

A second consequence of the unusually high contamination levels was an increased potential for elevated concentrations of airborne radioactivity. The NRC inspector observed work being performed on the Residual Heat Removal System in the Unit 1 containment which entailed potentially high levels of airborne contamination. Although the workers were wearing respirators fitted with air purifying canisters, air samples were not taken to determine if the protection factor afforded by the respirators was adequate to limit the workers' uptake of airborne contamination to the prescribed limits in 10 CFR 20. Subsequent questioning of the licensee and examination of available records indicated that the licensee did not always sample the air breathed by workers who were at risk in high airborne radioactivity areas. The licensee did measure internal deposition of radioactivity by whole body counting of selected workers and these measurements showed no excessive internal contamination. The NRC inspector observed situations in which station and contractor personnel disregarded radiological control requirements despite adequate training in the content of those requirements. The enforcement of these requirements by plant management and supervisors was apparently ineffective.

To emphasize the need for internal and external dose monitoring and procedural compliance, particularly in the performance of evaluations to ensure compliance with radiation protection requirements and supervision of personnel to ensure procedural compliance, the Nuclear Regulatory Commission proposes to impose a civil penalty in the amount of Forty Thousand Dollars for this matter. In accordance with the NRC Enforcement Policy 47 FR 9987 (10 CFR Part 2, Appendix C) (March 9, 1982), and pursuant to Section 234 of the Atomic Energy Act of 1954, as amended ("Act"), 42 U.S.C. 2282, PL 96-295, and 10 CFR 2.205, the particular violation and associated civil penalty is set forth

10 CFR 20.103(a)(3) requires that for purposes of determining compliance with the requirements of the section, the licensee use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas.

10 CFR 20.201(a) states that survey means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other source of radiation under a specific set of conditions.

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as may be necessary for the licensee to comply with the regulations in 10 CFR 20, and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

Technical Specification 6.4.B requires that a radiation protection program be organized to meet the requirements of 10 CFR 20.

Technical Specification 6.4.B.1.(e) requires that any individual or group of individuals permitted to enter a high radiation area be provided with a radiation monitoring device which continuously indicates the radiation dose rate in the area.

Technical Specification 6.4.B.1.G requires the entrance to each radiation area, in which the intensity of radiation is equal to or greater than 1000 mrem/hr, be provided with locked barricades to prevent unauthorized entry.

Technical Specification 6.4.D requires that all radiation control procedures be followed.

Contrary to the above and as evidenced by the following examples, the licensee's radiation protection program failed to meet the requirements of 10 CFR 20 and certain specific Technical Specification provisions as follows:

(Note: The Notice of Violation cites five (5) specific examples of failure to meet the requirements of 10 CFR 20 and certain Technical Specifications. For clarity, the remainder of this response will address each example separately. This is a Severity Level III Violation (Supplement IV).)

Example 1. Notwithstanding 10 CFR 20.103 (a)(3), the requirements to use suitable measurements of concentrations of radioactive materials in air were not met in that airborne radioactivity surveys were not performed in the following instances:

- a. On March 24, 1983, during maintenance activities on the residual heat removal (RHR) flat in Unit 1 containment.
- b. On March 21 and 22, 1983, in the breathing zone of personnel working on the RHR flat in Unit 1 containment.
- c. Between March 2 and March 20, 1983, on the platform or in the channel head of Unit 1 "B" and "C" steam generators to

RESPONSE to Example 1:

(1) ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated for Example 1.

(2) REASONS FOR VIOLATION:

The need to obtain adequate air samples in the breathing zone of the workers stated in the example was not recognized due to the lack of appropriate procedural guidance for air sampling criteria. Additionally, respiratory protection policies in effect at the station were deemed conservative for the situations encountered. Thus, health physics personnel failed to obtain more representative air samples to verify that protection factors afforded to the workers were adequate.

(3) CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

Health Physics Procedure HP-3.3.2, Health Physics Survey-Air Sampling, was revised and approved on April 7, 1983 to provide more detailed guidance for the evaluation of airborne radioactivity. Health Physics Technicians were provided specific training on the revised procedure and were tested to ensure adequate understanding. The revised procedure specifically directs technicians to assess airborne radioactivity at the workers breathing zone to ensure these measurements are suitable.

To confirm the adequacy of respiratory protection provided to workers during the Unit No. 1 outage, whole body counts were obtained of all potentially contaminated personnel (770) and an evaluation was performed to determine if significant uptakes had occurred. This evaluation showed no evidence of such uptakes.

(4) CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

Further review and evaluation will be performed to improve the procedural guidance provided to technicians in the assessment of airborne radioactivity. Improvements will be investigated in the development of specific action points, quick assessment techniques and guidance on immediate follow-up actions.

(5) THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

Full compliance will be achieved by June 15, 1983.

Example 2. Notwithstanding 10 CFR 10.201(a) and (b), the requirements to conduct surveys to ensure compliance were not met in the following instances:

- a. Beta radiation surveys performed by the licensee failed to identify the presence of significant beta radiation levels in Unit 1 containment.
- b. The evaluation performed prior to decontamination of six reactor coolant pump bolts on March 24, 1983, did not result in the placement of the whole body TLD on the part of the whole body that would receive the highest dose and did not

RESPONSE to Example 2:

(1) ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated for Example 2.

(2) REASONS FOR VIOLATION:

Approved health physics procedures had established the use of TLDs as an acceptable method for performance of beta survey measurements. The existence of abnormally high contamination levels in Unit No. 1 containment due to failed fuel was not fully recognized to result in the potential for significant beta radiation levels. Although the survey technique used (i.e., TLDs) disclosed no significant beta problem, the possible inadequacy of the surveys (i.e. TLDs) was not thoroughly evaluated when considered in relation to the contamination levels present.

With regard to the inadequate evaluation performed prior to decontamination of reactor coolant pump bolts on March 24, 1983, the apparent cause has been determined to be improper surveys to identify changing radiological conditions at the work site.

(3) CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

Surveys to evaluate beta radiation levels are being performed utilizing portable radiation survey instruments rather than TLDs until such time as the apparent discrepancy between these two methods may be resolved. Additionally, analyses of contamination sources have been performed to provide further data which will be useful in developing improved guidance for assessment of beta radiation hazards.

An evaluation was performed to determine if regulatory limits were exceeded due to improper personnel dosimetry placement during the decontamination of reactor coolant pump bolts on March 24, 1983. Through personnel interviews and by reconstruction of the operation, it was determined that no regulatory limits were exceeded. Reassessment of the individual's whole body and extremity doses, using a conservative occupancy time in the decon enclosure and proximity to the source during work, resulted in adjusted quarterly accumulated dose estimates of 1.717 rem whole body and 2.285 rem to the extremities.

(4) CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

An evaluation is currently being performed to resolve the discrepancy between beta radiation dose rate measurements made with portable survey instruments versus those made with TLDs. This evaluation will also provide improved understanding and guidance with regard to proper use of portable survey instruments for beta radiation assessments.

A review of the RWP program will be performed to provide increased assurance that surveys will properly identify non-uniform radiation fields and ensure appropriate placement of personnel monitoring devices.

(5) THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

Example 3. Notwithstanding Technical Specification 6.4.B.1.(e), the requirement for personnel to have a radiation dose rate instrument, when entering a high radiation area was not met in that on March 24, 1983, three workers entered the "B" cubicle on the 18' elevation of Unit 1 containment, a posted high radiation area, without a radiation survey instrument.

RESPONSE to Example 3:

(1) ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated for Example 3.

(2) REASONS FOR VIOLATION:

The reason for the violation of Technical Specification 6.4.B.1.(e) was determined to be failure of personnel to follow procedures and posted health physics requirements.

(3) CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

The workers involved were instructed on the importance of following all health physics procedures and posted requirements. Written memorandums were issued by the Station Manager to reemphasize to all station personnel the requirement for strict adherence to health physics instructions.

(4) CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

Additional training sessions are being planned for radiation workers at Surry. Consultants will assist the company in this training effort. This effort is scheduled to be complete by August 15, 1983.

(5) THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

Full compliance has been achieved.

Example 4. Notwithstanding Technical Specification 6.4.B.1.G, the requirement to lock high radiation areas with intensities equal to or greater than 1000 mrem/hr was not met in that on March 24, 1983, the regenerative heat exchanger room in Unit 1 containment was not provided with a locked barricade. Radiation levels in the room were as high as 7000 mrem/hr.

RESPONSE to Example 4:

(1) ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated for Example 4.

(2) REASONS FOR VIOLATION:

Previously established controls with regard to high radiation areas (i.e., those greater than 1,000 mrem/hr) inside the containment building had been considered acceptable to satisfy the intent of Technical Specification 6.4.B.1.G. Therefore, no locked barricade was provided for the regenerative heat exchanger room.

(3) CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

A locked barricade (i.e., gate) has been installed at the entrance to the regenerative heat exchanger room in Unit 1 containment. The Unit 1 containment has been reviewed for other high radiation areas (i.e. those greater than 1000 mrem/hr) and appropriate control methods taken.

(4) CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

A review of all high radiation areas within the Unit No. 2 containment building will be performed to identify those areas requiring locked barricades. Barricades to prevent unauthorized access will be provided where feasible. Where lockable enclosures do not exist, alternative methods to ensure positive access control will be established. These measures will be taken before general access is allowed to the containment at the start of the next outage.

(5) THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

Installation of lockable barricades will be accomplished inside each containment building during the next outage of sufficient length.

Example 5. Notwithstanding Technical Specification 6.4.D, the requirement to follow radiation control procedures was not met in that:

- a. On March 22, 1983, a worker did not follow the posted instructions as required by Station Health Physics Manual, paragraph D, page 1.3-4. The worker was observed on the 47' elevation of Unit 1 containment sitting next to a high radiation area sign which included instructions "Do Not Stand in Area".
- b. On March 24, 1983, three workers did not follow posted instructions as required by Health Physics Manual, paragraph D, page 1.3-4. The workers failed to notify Health Physics personnel prior to entering the "B" cubicle on the 18' elevation of Unit 1 containment as instructed on the high radiation area sign at the entrance to the cubicle.
- c. On March 22, 1983, a worker failed to follow the instructions on radiation work permit 698 as required by Station Health Physics Manual, paragraph F.2, page 1.3-a. The individual failed to notify Health Physics personnel as required by the RWP prior to beginning work on the 47' elevation of Unit 1 containment.

- d. On March 24, 1983, a worker in "B" cubicle on the 18' elevation of Unit 1 containment was observed wearing his respirator over his protective cloth hood instead of under it as required by the Station Respiratory Protection Manual, Section 7.

RESPONSE to Example 5:

(1) ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated for Example 5.

(2) REASONS FOR VIOLATION:

The reasons for the violations of Technical Specification 6.4.D were personnel error and failure to follow posted requirements, radiation work permit instructions, and approved procedures.

(3) CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

Meetings with all station supervisory personnel were held by the Station Manager to emphasize and further delineate supervisory responsibilities with regard to worker compliance. Additionally, written memorandums were issued by the Station Manager to ensure full understanding of the requirement for strict adherence to radiation control procedures.

(4) CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

More aggressive surveillance and enforcement of radiological control procedures will be implemented by Health Physics personnel to ensure strict compliance. Additional training sessions as outlined in the response to Example 3 are being planned.

(5) THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

Full compliance has been achieved.