

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-247/84-17

Docket No. 50-247

License No. DPR-26 Priority \_\_\_\_\_ Category C

Licensee: Consolidated Edison Company of New York, Inc.

4 Irving Place

New York, New York 10003

Facility Name: Indian Point, Unit 2

Inspection At: Buchanan, New York

Inspection Conducted: July 10-13, 17-20, 1984

Inspectors:

J. R. White  
J. R. White, Senior Radiation  
Specialist

8/28/84  
date

Approved by:

M. M. Shanbaky  
M. M. Shanbaky, Chief  
Facilities Radiation Protection  
Section

8/28/84  
date

Inspection Summary:

Inspection on July 10-13 and 17-20, 1984 (Report No. 50-247/84-17)

Areas Inspected: Special, announced safety inspection of the licensee's implementation of corrective measures as specified in Confirmatory Action Letter 84-11, dated June 21, 1984, review and oversight of work activities associated with steam generator eddy current testing and reactor vessel disassembly, and review of radiological events occurring in this period. The inspection consisted of 70 inspector-hours by one regional based inspector.

Results: Of the areas inspected, two violations were identified (i.e., failure to adequately evaluate radiological conditions in accordance with 10 CFR 20.201; and, failure to adequately instruct personnel in accordance with 10 CFR 19.12) detail 6.

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## DETAILS

### 1.0 Persons Contacted

1.1 During the course of this inspection the following licensee personnel were contacted or interviewed:

- Mr. E. McGrath, Senior Vice President, Consolidated Edison (Con Ed)
- \*Mr. C. Jackson, Vice President, Nuclear Power
- \*\*Mr. M. Miele, General Manager, Environmental Health and Safety
- Mr. G. Marguardt, Radiation Protection Manager
- Mr. W. Homyk, Radiological Engineering Manager
- Mr. R. Schmidt, Radiological Engineer, General Dynamics (GD)
- \*\*Mr. W. Graber, Radiological Engineering Manager, GD
- \*Mr. B. Raskovic, Regulatory Affairs
- \*Mr. J. Basile, General Manager, Nuclear Power Generation
- \*Mr. J. Nutant, Vice President, Environmental Affairs

\*Denotes attendance at the Enforcement Conference held on July 18, 1984, which also served as a preliminary Exit Meeting for this inspection effort.

\*\*Denotes attendance at the Exit Meeting held on July 20, 1984.

### 2.0 Purpose

The purpose of this inspection was to verify and validate the licensee's corrective measures relative to the findings of NRC Inspection No. 50-247/84-13 and the associated Confirmatory Action Letter No. 50-247/84-11 pertaining to high radiation area control. The scope of this inspection also included review and oversight of outage activities pertaining to steam generator eddy current testing and reactor vessel disassembly.

During this inspection a worker's allegation pertaining to ALARA implementation and a radiological event involving the potential exposure of personnel to high levels of airborne radioactivity was reviewed.

### 3.0 High Radiation Area Controls in the Vapor Containment (VC)

Upon notification of the findings of NRC Inspection Report No. 50-247/84-13 at the Exit Interview on June 15, 1984, and receipt of Confirmatory Action Letter (CAL) 50-247/84-11, dated June 21, 1984, the licensee initiated action to improve control of high radiation areas in the VC. After establishing certain interim measures, i.e., posting and barricading and assignment of personnel to guard areas greater than 1000 mrem/hr, the following actions were initiated:

- 1) Control point operating procedures were changed to include a formalized checklist of information and instructions to be provided to personnel entering inside the crane wall;
- 2) Control point technicians were instructed in proper briefing techniques;
- 3) Laminated survey maps of the area, maintained with current information, were posted at the control points to graphically delineate the radiological status of the area;
- 4) Procedures for the use of alarming, dose-integrating electronic dosimeters (Digi-dose) were developed sufficient to assure that personnel were familiar with the operation of the device, were provided with it for all entries into high radiation areas, and wore the device in a manner consistent with the regulatory requirements; and,
- 5) All accesses to areas inside the crane wall were (or will be by August 18, 1984) provided with lockable steel gates or barricades sufficient to preclude inadvertent entry into areas greater than 1000 mrem/hr.

Review of the licensee's implementation of high radiation controls for the VC, during this inspection period indicated that adequate controls had been established and that procedures and practices were in accordance with the regulatory requirements and specifications of CAL 50-247/84-11.

#### 4.0 Steam Generator Eddy-Current Testing

Upon notification of the findings of NRC Inspection Report 50-247/84-13 at the Exit Interview on June 15, 1984, and in accordance with the specification of CAL 50-247/84-11, the licensee improved the procedures and practices for monitoring personnel exposure to airborne radioactivity. Increased sampling was performed to measure concentrations of airborne radioactivity during actual work performance, and data was collected and analyzed to verify that adequate respiratory protection was being afforded to workers. Procedure EHS 3.403, "Steam Generator Channel Head Entry", was reviewed. The procedure appears to adequately detail protective measures, precautions and radiological controls necessary for personnel entry into steam generator channel heads, and is consistent with regulatory requirements.

During this inspection effort it was verified that, relative to steam generator repair and testing, the licensee was adequately performing surveys of airborne radioactivity and limiting occupational exposure based on those surveys sufficient to meet the requirements specified in:

- 10 CFR 20.201, "Surveys", and
- 10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas"

## 5.0 Allegation RI-84-A-0097, Violation of ALARA Concepts

During the course of this inspection two workers were dismissed by the licensee for allegedly sleeping in a trailer on the licensee's property. Following, the individuals contacted the NRC Resident Inspector and contended that they were in the trailer because they had no productive work to do in the VC relative to their assignment to repair the No. 5 fan cooler unit. The fan cooler unit is located in a 6 mrem/hr general area. The individuals indicated that by leaving the VC, they prevented unnecessary exposure to this radiation field, and were in compliance with the licensee's policy pertaining to ALARA, and that the licensee, by terminating their employment and maintaining a policy for workers to stay at job sites in radiation areas was in violation of their own procedures. The individuals also claimed other deficiencies in the licensee's ALARA implementation pertaining to a specific reactor coolant pump check valve repair activity performed in a high radiation area.

From interviews with licensee management personnel it was confirmed that the individuals were terminated for sleeping on the job. Since labor-management relations are not within the jurisdiction of the NRC, the NRC Resident Inspector advised the individuals of the claim processes afforded by the Department of Labor.

The claim that the licensee maintains a policy for workers to stay at job sites in radiation areas, regardless of whether they are working or not, could not be substantiated.

With regard to the other claims, the inspector determined that the individuals were referring to Outage Job No. 434 which involves the installation of check valves in the reactor coolant pump seal return line.

The inspector reviewed the licensee's shielding log, area surveys before and after shielding, sections of the modification package, inspected several of the identified work areas, and conducted interviews with responsible managers and supervisors.

The following precautions to minimize individual exposures, were taken by the licensee:

- 1) Lead shielding was placed to protect the work area at each of the reactor coolant pumps. Surveys indicate that general area dose rates were reduced by a factor of 2 as a result of the shielding.
- 2) A cutting and grinding booth was constructed on the 95 foot elevation of the containment building. This allowed segments of the work to be conducted in a low dose rate area.
- 3) Designated staging area for the job was located at the 95 foot elevation of the containment building, again in a low dose rate area.

4) The licensee conducted detailed preplanning and briefing of employees involved with the work.

The inspector reviewed Radiation Work Permit (RWP) 7936, which included outage job 434, "Reactor Coolant Pump Seal Return Check Valve and Reactor Coolant Pump Vent Header for Seal Return". The accumulated dose for the above job was approximately 32 person-rem, with the average accumulated dose per employee on the job at approximately 300 millirem. According to the licensee's records most of the work was accomplished between June 11 and June 23. During this period more than 700 entries into the work area were made by approximately 130 workers and supervisors.

Based on the inspectors review of licensee records, interviews with workers and responsible managers and supervisors, associated with the above jobs the inspectors could not substantiate the allegers claims.

The alieger also furnished a list of persons and phone numbers that he said "would collaborate his allegation". The inspector called a representative sample of the people on the list for specifics. Of those people who would discuss issues with the inspector no one could supply specific jobs, or instances where ALARA practices were being violated.

From the conversations with the personnel on the list the inspector determined that ALARA was not clearly understood by these personnel, i.e., that the licensee implemented ALARA concepts on a task bases as opposed to directing efforts to minimize each individual's exposure. The workers' perception was on an individual exposure basis as opposed to the whole job. For example, one individual said shielding was not adequate on a job he was working on. The individual was not aware that man rem is expended in putting up the shielding, removing it and decontaminating it afterward. Also, personnel were not aware that shielding cannot be hung without engineering evaluations to determine the loading on individual components.

The inspector had discussions with plant management concerning ALARA concepts. The inspector discussed with the licensee management the need to train the job workers in the whole concept of ALARA principles as well as the need to protect the individual from unnecessary exposure to radiation. The licensee management stated that the ALARA policy and workers training in this area would be reevaluated.

No violations were identified in this area.

#### 6.0 Incident Involving Excessive Concentrations of Airborne Radioactive Material

On July 14, 1984, two technicians were assigned to bale and sort dry compactable radwaste in the Unit 1 baling station, in accordance with the requirements of RWP 8217, "Compact Dry Waste...Sort Trash...Trash Segregation..." Radiological Conditions in the area were reported as 5-120 mrem/hr, general area; 20,000 - 200,000 dpm/100 cm<sup>2</sup>, loose surface contamination; and, 8.0E-11  $\mu$ Ci/ml, airborne radioactivity.

The technicians worked in the baling station for about 56 minutes. During this time an air sample was collected in the area. When the technicians left the area, the air sample was evaluated and analyzed.

The results of the air sample analysis indicated  $1.16E-6$   $\mu\text{Ci}/\text{ml}$  B- $\alpha$ , gross activity; and  $3.31E-10$ , gross  $\gamma$  activity. Assuming the activity to be primarily Co-60, which is typical, the 56 minute stay time in the baling station may have resulted in a 120 MPC exposure (i.e., 120 times the concentration specified in 10 CFR 20 Appendix B, Table I, Column 1). Investigation of the event revealed that though an air sample was taken while the workers were in the baling station, the licensee did not exercise any control over what or how work was performed in the area, the radiological status (dose rate) of bags of radwaste that the technicians opened for sorting, and the methods and techniques used by the technicians for compacting radioactive material. Since the licensee had no evaluation of the radiological hazards to which the technicians would be exposed, a single air sample taken over the duration of work in the area was an insufficient means to control personnel occupational exposure in accordance with 10 CFR 20.103. It was fortuitous and not by design that the technicians were not subject to exposure in excess of the regulatory specifications of 10 CFR 20.103.

Though there was a procedure established for the work activity, i.e., RWI 9.11, Rev. 1, "Preparation of Radioactive Waste (LSA) In 17H Drums", the technicians were not trained or instructed on the work practices necessary to accomplish the work in a safe manner. Evidence of this was the fact that the technicians were using bad practices such as throwing the bags to the floor from the top of a 10' pile, cutting open the bags for sorting with no regard for the radiological hazard of the contents, and using the compactor with a defective door that prevented adequate ventilation of the device.

Further the ventilation discharge hose of the compactor was on the floor and could have agitated loose surface contamination sufficient to cause the airborne problem.

Detailed analysis of the air sample on July 14, 1984, indicated the following:

Isotope <sup>#</sup>	Concentration $\mu\text{Ci}/\text{ml}$	Designated MPC $\mu\text{Ci}/\text{ml}$	Effective MPC $\cdot\text{hr}$
Ce-144.	$4.76E-9$	$6E-9$	.79
Co-57	$5.36E-10$	$2E-7$	--
Co-58	$7.33E-8$	$5E-8$	1.47
Co-60	$4.53E-7$	$9E-9$	50.33
Cr-51	$9.9E-9$	$2E-6$	--
Mn-54	$9.97E-9$	$4E-8$	.24
Nb-95	$6.91E-9$	$1E-7$	--
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\*10 CFR 20 Appendix B, Table I, Column 1

Though the licensee had counted the air sample for gross alpha activity, by July 17, 1984 no action had been taken relative to the significance of

the alpha component. On July 17, 1984 the inspector pointed out that the Ce-144 identified may be an indicator of transuranic activity. In response the licensee initiated efforts to qualify and quantify the alpha component; and determined that the sample definitely contained alpha emitting isotopes, and was not merely a radon background. Following, the licensee initiated a plant-wide evaluation and analyses to determine the source, modified sampling and counting procedures to address alpha activity, amended procedures to control personnel exposure to airborne radioactivity based on an effective control value derived from analysis of known alpha activity in waste streams in which the ~90% of the activity is due to Pu-241, i.e.,  $8 \text{ E-11 } \mu\text{Ci/ml}$ .

Further, the licensee initiated alpha monitoring program including procedure development, personnel training and the acquisition of equipment to enhance the identification and quantification of transuranic activity.

Independent laboratory analysis of the alpha activity identified Pu-241 as the principal component which reinforced the general adequacy of the licensee's control value of  $8\text{E-11 } \mu\text{Ci/ml}$ , since the control value for Pu-241 is  $9\text{E-11 } \mu\text{Ci/ml}$ .

The technicians were whole body counted by the licensee and Brookhaven National Laboratory (BNL). Additionally, BNL performed bioanalyses on fecal and urine samples. The preliminary results indicate that the individuals were subjected to minimal intake as a result of the event.

The licensee will provide a written report to NRC Region I upon completion of all evaluations required to ascertain the effect and corrective actions for this event.

From review of this event, the following violations were identified:

- 1) The licensee failed to adequately evaluate the radiological conditions in accordance with 10 CFR 20.201 to which workers were exposed, in that,
  - a) air samples taken to support this activity were not performed sufficient to assure that personnel would not exceed the regulatory limits set forth in 10 CFR 20.103; and
  - b) the licensee failed to recognize and respond to the presence of alpha activity which was evident from analyses of the air sample. (247/84-17-01)
- 2) The licensee failed to adequately instruct the technicians in accordance with the requirements of 10 CFR 19.12 in precautions and procedures to minimize their exposure to radioactive material present in the baling station. (247/84-17-02)

## 7.0 Reactor Vessel Disassembly

During the course of this inspection the work activities pertaining to removal of the Lower Internals (including thermal shield) from the reactor vessel were reviewed. The activities were conducted in accordance with Maintenance Procedure MP-2.4, "Remove Lower Internals from Reactor Vessel" and the associated special radiological requirements specified in S/O-134.

The licensee assigned radiological engineers dedicated to the planning and establishment of radiological controls for this task. Since the potential for extremely high dose rates existed, i.e., 2000 rem/hr in the immediate vicinity of the thermal shield if it broke the water surface of the reactor cavity, extreme precautions, and extensive planning and resources were used.

The following aspects of health physics relative to this operation were reviewed:

- Personnel training and qualification;
- Personnel monitoring provisions;
- Surveillance provisions for air sampling, and radiation measurements;
- Communications;
- Health Physics coverage;
- Protective clothing;
- Respiratory protection;
- ALARA concepts including shielding in the vicinity of the reactor cavity and/or components affecting the general area;
- Procedural requirements pertaining to health physics and maintenance that affected the radiological impact of the activity;
- Planning; and,
- Control of areas adjacent to VC that may be affected by the radiological conditions.

The licensee's performance in each of these areas was well done. Prior to actual performance of the work, the licensee elected to increase the water level in the reactor cavity to the maximum level possible in an effort to assure the thermal shield would remain submerged and shielded during movement. As a result, excessive dose rates were eliminated.

The extraction from the vessel, movement and landing on the storage stand were accomplished as planned with minimum personnel exposure, i.e., between 50 and 200 mrem.

No violations were identified.



8. Exit Interview

The inspector met with the licensee's representative (denoted in Section 1.1) at the conclusion of the inspection on July 20, 1984. The principal findings of the report were discussed previously with licensee management representatives at the Enforcement Conference on July 18, 1984.

At no time during this inspection was written material provided to the licensee by the inspector.