

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-289/78-03
30-12457/78-01
50-289
Docket No. 30-12457
DPR-50
License No. 37-17257-01 Priority -- Category C
Licensee: Metropolitan Edison Company
P. O. Box 542
Reading, Pennsylvania 19603

Facility Name: Three Mile Island Nuclear Generating Station, Unit 1

Inspection at: Middletown, Pennsylvania

Inspection conducted: February 26 - March 1, and (offsite) March 9, 1978

Inspectors: Karl E. Plumlee 3/27/78
Karl E. Plumlee, Radiation Specialist date signed
Percy E. Clemens 3/27/78
Percy E. Clemens, Radiation Specialist date signed

Peter J. Knapp _____
Approved by: _____ date signed
Peter J. Knapp, Chief, Radiation Support
Section, Fuel Facilities and Materials
Safety Branch 3/27/78
date signed

Inspection Summary:

Inspection on February 26 - March 1, 1978 (Report No. 50-289/78-03)
Areas Inspected: Radiation protection program, including: qualifications of radiation protection personnel; audits of radiation protection activities; training; procedures; instruments and equipment; exposure control; posting, labeling, and control of radioactive materials and radiation areas; surveys; notifications and reports; review of corrective actions on previous items of noncompliance; and independent measurements by the inspectors. The initial inspection and area examination was conducted during non-regular hours (February 26, 1978, 8:30 p.m. - 11:15 p.m.). This inspection involved 53 inspector-hours on site by two NRC inspectors.
Results: Of the nine areas inspected, no items of noncompliance were identified in seven areas. Two items of noncompliance were identified in two areas: Infraction - failure to post radiation areas, paragraph 3; Infraction - failure to fully adhere to procedures, paragraph 4).

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DETAILS

1. Persons Contacted

- M. Beers, Station Shift Supervisor
- *R. Dubiel, Supervisor of Radiation Protection and Chemistry
- E. Fuhrer, Engineer II - Nuclear
- *E. Gee, Safety Supervisor
- L. Hydrick, Foreman, Radwaste Operation
- F. Huwe, Radiation Protection Foreman
- *G. Kunder, Unit 1 Superintendent, Technical Support
- L. Landry, Engineer II - Nuclear
- R. McCann, Radiation Protection Foreman
- *T. Mulleavy, Radiation Protection Supervisor
- *J. O'Hanlon, Unit 1 Superintendent
- G. Reid, Unit 1 Chemistry Foreman
- J. Smith, Foreman, Radwaste Operation
- P. Velez, Radiation Protection Foreman
- R. Zeckman, Group Supervisor, Nuclear and Technical Training

*denotes those present at the exit interview, 3:45 p.m., March 1, 1978.

2. Licensee Action on Previous Inspection Findings

(Closed) Deviation (289/77-18): Smoking practices, and Noncompliance (289/77-29): Smoking in a posted no smoking area. Review of the licensee's corrective actions and observations during tours of the facility indicated that corrective actions on this item are acceptable. (Paragraph 6)

(Closed) Noncompliance (289/77-34): Failure to fully complete gaseous radioactive release records. Review of the licensee's corrective actions indicated that the current records are complete and a review will be made of the semiannual effluent release report for the period January 1 - June 30, 1977. (Paragraph 7)

(Open) Inspector Follow Item (289/76-26): Replacement of temporary wooden doors and padlocks at High Radiation Area entrances. The licensee representative stated that one metal door is now available and others are on order to complete this job.

3. Posting and Control of Access to Radiation Areas, High Radiation Areas, and Contaminated Areas

Part of the inspection effort was to tour the facility and observe the licensee's compliance with regulatory requirements for the control of access to and the posting of hazardous areas.

10 CFR 20.202(b)(2) (in part) defines a Radiation Area as any area accessible to personnel in which there exists radiation, originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, and 10 CFR 20.203(b), "Radiation Areas," requires that each Radiation Area shall be conspicuously posted with a sign or signs bearing the radiation symbol and the words, "Caution, Radiation Area."

During tours, escorted by licensee representatives, the inspectors noticed there were no Radiation Area or High Radiation Area signs at the Nuclear Sample Room and at the Reactor Building personnel entrance on the morning of February 27, 1978.

During subsequent reviews of records of Radiation Work Permits (RWPs) and radiation surveys it appeared that personnel had access to the Nuclear Sample Room and to the Reactor Building, and the radiation levels were up to 10 mrem and up to 50 mrem, respectively in these areas, thus posting was required.

The inspector made confirmatory measurements in the Nuclear Sample Room. The inspector briefly interviewed personnel emerging from the Reactor Building. Based on this information, the inspector identified the above as examples of noncompliance with requirements of 10 CFR 20.202(b)(2). (78-03-01)

The licensee posted these areas before the completion of the inspection. The licensee representatives stated that the Radiation Protection Supervisor and the Foremen would give increased attention to posting during their routine checks of conditions in the facility. (Paragraph 13)

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4. Radiation Protection Procedures

Part of the inspection effort was to observe the workers' adherence to procedures and to review procedures and practices for the control of personnel exposures and contamination.

Technical Specification Section 5.11 requires adherence to procedures for all operations involving personnel radiation exposure.

a. Self-Monitoring at a Steppoff Pad

Health Physics Procedure HP 1612 requires individuals to monitor themselves for contamination on leaving contaminated areas, going to a controlled area. The procedure states that monitoring devices have been provided in the restricted area for this purpose.

The inspector observed at about 10:45 a.m., on February 27, 1978, that an individual who was removing a 50 cubic foot radwaste container from the Radwaste Process Area, elevation 305 feet, failed to monitor himself for contamination when he left this contaminated area at a steppoff pad, going to a controlled area. The individual was working under RWP 16384 which showed a maximum contamination level of $74,800 \text{ dpm}/100\text{cm}^2$ in this contaminated area. The solidified radwaste containers being transferred were Nos. 78-C-25, -26, -27, and -28.

The inspector observed that the procedure placed the primary responsibility on the individual, and there was no instruction and no monitoring equipment at the steppoff pad and no reminder in the RWP that the individual shall monitor on leaving the contaminated area.

The inspector stated that this failure to self-monitor was an example of noncompliance with the above requirements.
(78-03-02)

b. Determination of Container Contamination

Health Physics Procedure HP 1620 requires a determination that solidified radwaste containers are free of contamination before they are moved from the Radwaste Process Area to a temporary storage area, and that Form 1620-1 be used for the survey.

The inspector observed that the transfer of a solidified radwaste container (described above) apparently was made without any determination that this container was free of surface contamination. The technician who had surveyed the container stated in the inspector's presence that the determination that the container was free of contamination had been inadvertently omitted.

The inspector noted that the solidified radwaste containers were being transferred from one level to another in the facility (305 ft to 281 ft elevation) and the transfer path included controlled area corridors and an elevator. The applicable RWP's for this transfer were Nos. 16383 and 16384.

The inspector stated that the failure to determine that the container (No. 73-C-25) was free of contamination before it was moved from the Radwaste Process Area to a temporary storage area constituted noncompliance with the above requirements. (78-03-02)

c. Wearing of Personnel Dosimeters

A requirement of Procedure AP 1003 Section 2.2 is that a dosimeter will be worn by each person when entering a controlled area of the plant.

Part of the inspection effort was to determine compliance with the above requirement.

The inspector toured the facility and checked the wearing of personal dosimetry equipment daily on February 26, 27, 28, and March 1, 1978. No problems were identified on those dates.

An individual had informed an NRC:I representative by telephone that on two occasions an individual had been sent into a controlled area without a dosimeter even though the immediate superior (a contractor employee) had been reminded of the requirement on the second occasion; and that two additional individuals were present without dosimeters on that occasion. The inspector did not identify the above individual to the licensee although the individual freely consented to be identified. The individual requested an evaluation of the radiation exposure received.

The licensee representative stated that a watchman, employed by a security contractor, had been found in a controlled area on February 22 and again on February 24, 1978, without the required personnel dosimetry equipment, and on the 24th the watchman announced that NRC would be informed of these circumstances.

The licensee representative stated that this watchman had been assigned a position outside an open door during a waste shipping operation and had not entered the building. The licensee had evaluated the watchmen exposures to be less than 10 mrem (total) based on a survey of each loaded vehicle before its departure, and on the truck drivers' dosimeters.

The inspector observed radioactive waste transfers and shipping during the inspection. The inspector also contacted an individual by telephone on March 9, 1978, who stated that this information appeared to be correct, based on direct observation of these events on February 22 and 24, 1978.

The inspector reviewed the records of the loaded-vehicle surveys and, based on the above information, found that the licensee's evaluation of the watchmen's exposures appeared to be acceptable.

The inspector informed the individual who had called NRC:I on this matter that the exposure received appeared to be less than one percent of the allowable exposure during a calendar month. The individual stated that the information was welcome and nothing more was needed.

The inspector noted that the licensee had identified the above occurrences and appeared to have corrected the cause. The inspector had no further questions on this item.

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d. Review of Procedures

The inspector noted, during a review of selected procedures, that the frequency of neutron surveys was not specified, although a survey had been performed under Health Physics Procedure HP 1603 "Neutron Survey" following the most recent refueling outage.

The licensee representative stated the intent to perform a neutron survey after each refueling outage to determine the fast-to-thermal neutron ratio and also any changes in levels that followed refueling and any change to the facility during the outage.

Before the completion of the inspection, the licensee initiated a temporary change notice (TCN 78-55) requiring this determination to be performed following each refueling outage.

The review of procedures did not identify any further problems. The inspector had no further questions on this area of the inspection.

5. Control of Internal and External Exposures

Part of the inspection effort was to review the dosimetry program and the bioassay and in-vivo assay results for compliance with regulatory limits and requirements.

a. Exposure Levels

The licensee dosimetry records indicated that only one Metropolitan Edison Company employee received in excess of 1 1/4 Rems whole body exposure during any calendar quarter of 1977, and none exceeded 5 Rems during the calendar year 1977. One employee exceeded 4 Rems, three additional employees exceeded 2 Rems, and 73 additional employees exceeded 1 Rem exposure to the whole body during the year 1977.

The licensee bioassay and in-vivo counting records indicated that no significant uptakes of radioactive materials occurred during 1977.

The licensee's control of exposures to personnel appeared to be acceptable.

b. Dosimetry Records

The inspector reviewed the personnel dosimetry records to determine the licensee's compliance with recordkeeping requirements. 10 CFR 20.102, "Determination of accumulated dose," and 10 CFR 20.401, "Records of surveys, radiation monitoring, and disposals," require records to be clear and legible, and in any case where the licensee is unable to obtain reports of an individual's previously accumulated occupational dose information, require the assumption that the dose received is as shown in 10 CFR 20.102(c)(1). This assumed dose is 1 1/4 or 3 3/4 Rems dose to the whole body for each calendar quarter after the individual's 18th birthday.

The inspector noted that the personnel dosimetry records were recently printed out by a computer. It appeared that the licensee maintained the correct information required by Forms NRC-4 and NRC-5 for each individual for whom the licensee was required to maintain the (lifetime) total accumulated dose and the unused part of the permissible accumulated dose.

The licensee had not supplied the previously accumulated dose information for several other individuals to the computer. The computer took these doses to be zero rather than the values given by 10 CFR 20.102(c)(1). The total accumulated doses and unused parts of the permissible accumulated doses printed out for these individuals were incorrect. In one example, the correction would change these values by greater than 150 Rems.

The inspector found that the computer printout contained intermixed correct and incorrect information with no identification which was correct. The inspector stated that the record could be cleared up (as an example) by striking out the incorrect information. (78-03-03) A licensee records audit is described in Paragraph 9.a.

6. Housekeeping Practices

Part of the inspection effort was to observe the control of smoking and eating in prohibited areas, area decontamination and cleanliness, ventilation balance, and the status of radiochemistry hoods and sample sinks.

a. Smoking and Eating Practices

- (289/77-18): Smoking while transferring a contaminated container; and,
- (289/77-29): Smoking in a posted no smoking (fire protection) area.

Observation during tours of the facility showed that receptacles were provided at the entrances to no smoking areas and appropriate signs were posted for the control of smoking in prohibited areas. No indication was found, on this inspection, of any unacceptable smoking or eating practices.

b. Ventilation Control

A standard design objective is that, where such areas are not isolated, the air flow is from areas of low radioactivity potential to areas of high radioactivity potential. This objective is indicated in the TMI-1 FSAR, Section 9.8.3 and Figure 9-21, and in the TMI-2 FSAR, Section 12.2.1, "Ventilation Design Objectives."

The inspector observed on February 27, 1978, that the ventilation flow was from the Nuclear Sample Room (a posted contaminated area) into the Radiochemistry Laboratory and through an open door into a busy corridor. The door was blocked open although a sign indicated it is to be kept closed.

The licensee representative promptly closed the door. Subsequent measurements showed that the ventilation flow was reduced but the direction of flow was not changed.

The licensee subsequently corrected the direction of flow by shutting off a blower. The inspector verified that the direction of flow was corrected (i.e., into the contaminated area) at 11:00 a.m., on March 1, 1978. The licensee found that the blower was inadvertently started later in the day. The blower has now been tagged off.

The licensee subsequently initiated a service request for assistance by the ventilation designer in order to improve the ventilation balance.

The completion of the ventilation balance will be reviewed on a subsequent inspection. (78-03-04)

The inspector also checked the face flow velocities at the radiochemistry hoods and the nuclear sample sink, using an NRC instrument.

No problems were identified. The inspector had no further questions on the control of face flow velocities.

c. Area Decontamination Practices and Cleanliness

The inspector observed that the licensee's decontamination practices and the cleanliness of and maintenance of floors and radiation protection supplies and equipment appeared to be acceptable within the guidance provided by Regulatory Guide 1.39, "Housekeeping Requirements of Watercooled Nuclear Power Plants," and ANSI Standard N 45.2.3-1973.

The inspector had no further questions on area decontamination practices and cleanliness.

7. Radioactive Release Records and Reports

(289/77-34): Failure to fully complete gaseous radioactive release records. The inspector reviewed the licensee's corrective actions and observed that the current records are being fully completed. The licensee representative stated that any significant corrections will be provided on any previous information reported to the NRC; however, the licensee review of a previous report had not been finished.

The licensee release records and reports will be reviewed on a routine inspection of radioactive waste systems. The inspector had no further questions on this item at this time.

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8. Organization and Qualifications of Personnel Performing Radiation Protection Duties

Part of the inspection effort was to review the staffing and organization for radiation protection activities and the qualifications and training of these personnel.

a. Organization

Technical Specification Section 6.2.1, by reference to Figure 6-1, indicates that the Supervisor, Radiation Protection and Chemistry, is assisted by a Radiation Protection Supervisor and a Chemical Supervisor, with Radiation Chemistry Technicians reporting to these two supervisors.

Review during this inspection showed that no Chemical Supervisor was designated; however, a Chemistry Foreman was assigned to each reactor (Unit -1 and -2).

Personnel reporting to the Supervisor, Radiation Protection and Chemistry, include:

- (1) Radiation Protection Supervisor
- (2) Two Chemistry Foremen
- (3) Two Engineers - II Nuclear
- (4) Staff Chemist
- (5) Technical Analyst

In addition to these personnel, three Radiation Protection Foremen and two Radwaste Foremen report to the Radiation Protection Supervisor.

The organization appeared to be acceptable. The inspector had no further questions on this item.

b. Qualifications of Technicians

Technical Specification 6.3.1 states "Comprising the station staff shall be supervisory and professional personnel encompassing the qualifications described in Section 4 of ANSI N 18.1-1971, "Selection and Training of Nuclear Power Plant Personnel." Section 4.5.2 of ANSI N 18.1-1971 states "Technicians in responsible positions shall have a minimum of two years of

working experience in their specialty. These personnel should have a minimum of one year of related technical training in addition to their experience."

The inspector reviewed the records of the 12 Radiation Chemistry Technicians and noted that each one had at least four years work experience in this specialty.

The licensee has 12 Junior Radiation Chemistry Technicians that do not meet the above requirement, but these individuals work under the direct supervision of the Radiation Chemistry Technicians and the Radiation Protection Foreman.

The Junior Radiation Chemistry Technicians initially received formal instruction conducted onsite by a contract employee, and also on-the-job training conducted by the Radiation Chemistry Technicians and the Foremen. Except for three who are scheduled to attend during June 1978, they have completed a chemistry laboratory training course conducted offsite by Babcock and Wilcox Corporation.

The inspector noted that training records are being maintained that show each task for which the technicians have been qualified.

No items of noncompliance were identified in the technician qualifications and training.

c. Qualifications of Radiation Protection Foremen

ANSI N 18.1-1971 does not indicate any minimum qualification requirements for Foremen.

The licensee representative stated that the designation of each Foreman was based on his experience and his evaluated ability to carry out the assigned responsibilities of the position including, among others, the performance and evaluation of each task routinely performed by personnel under the Foreman's direction.

The inspector observed that the Radiation Protection Foremen each had five or more years work experience in radiation protection.

The Foremen's qualifications appear to be acceptable. The inspector had no further questions on this item.

d. Qualifications of the Radiation Protection Supervisor, and the Supervisor of Radiation Protection and Chemistry

The Technical Specifications, by reference to ANSI N 18.1-1971, require the responsible person for radiation protection to have a minimum of five years experience in radiation protection at a nuclear reactor facility and two years of related technical training. Regulatory Guide 1.8, "Personnel Selection and Training," indicates that the Radiation Protection Manager should have at least five years of professional experience in applied radiation protection and a bachelor's degree or the equivalent in a science or engineering subject (or additional years of experience).

Additional documentation of this information was supplied in a licensee letter dated October 6, 1977 (Technical Specification Change Request No. 58), and in the FSARs for Units 1 and 2.

The inspector reviewed the resumes of these individuals, and supporting documents.

The Radiation Protection Supervisor has in excess of 16 years of experience in radiation protection. This included four years as the Plant Health Physicist at a nuclear power plant prior to his accepting employment at Three Mile Island Unit 1 in 1974.

The licensee representative stated that the incumbent has held the position of Radiation Protection Supervisor since July 1977.

The Supervisor of Radiation Protection and Chemistry has in excess of five years of experience in radiation protection and he has a bachelor's degree in physics and a master's degree in health physics.

These qualifications appear to be acceptable within the above commitments, requirements, and guidance.

The inspector had no further questions on this item.

e. Staffing and Qualifications of Temporary Personnel

The licensee representative stated that in preparation for a refueling outage scheduled to commence March 18, 1978, twenty contract radiation protection technicians and three contract supervisors have been selected to assist during the outage. These individuals will train onsite prior to the outage.

Selection was based on resumes and recommendations. The licensee representative requires experience on jobs similar to those scheduled during the outage. In addition to routine refueling these jobs include the replacement of a letdown system heat exchanger, incore flux detector replacement, reactor coolant pump seal replacement, and setpoint checks of the pressurizer safety valve.

The inspector had no further questions on this item.

f. Training for Specific Jobs

In addition to obtaining contract personnel who have worked on these jobs at other sites, the licensee has planned each major job scheduled during the outage.

A training rig was assembled and the crew was trained on the equipment to be used in removing the in-core detectors. Personnel who changed out the first letdown system heat exchanger last year planned the changeout of the second unit this year. Pump seal replacement has been rehearsed.

The inspector had no further questions on preparations for the outage.

g. Respiratory Protection

The inspector reviewed the respiratory protection program to determine compliance with the requirements of 10 CFR 20.103 and Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection."

The inspector reviewed Health Physics Procedure 1616, "Use of Respiratory Protection Devices." This procedure contained the written procedures required by the regulations.

The inspector also reviewed data which indicated that the licensee has instituted a medical program to assure that personnel are physically able to wear respiratory protective equipment. At the time of the inspection approximately 400 employees had been examined.

A licensee representative informed the inspector that a written policy statement on respirator usage had been developed, and was being presented to the Union for information, and was expected to be issued to the employees in the immediate future. According to the licensee representative, the policy will probably be signed by the Site Superintendent.

The inspectors observed that the licensee has recently installed a DOP aerosol test system, including a test chamber, and they witnessed approximately 5 employees being tested for respirator fit. All of the employees passed the test.

No items of noncompliance were identified.

9. Licensee Audits of Radiation Protection Activities

a. Offsite Organization's Audits of Radiation Protection

Technical Specification Section 6.5.2.A.2.k requires the Met Ed Corporate Technical Support Staff to audit the radiological controls and the training and qualifications of the station staff at least once every two years.

The most recent audit was of dosimetry records. The licensee representative stated that the audit report was due March 15, 1978.

The inspector reviewed reports of audit Nos. 77-10, "Radiation Control," and 77-29, "Control of Measuring and Test Equipment."

The inspector noted that the auditing appeared to be acceptable and that the problems identified therein were followed up.

The audit of dosimetry records will be followed up with respect to item 78-01 03, described in Paragraph 5.b.

b. Other Auditing

The Radiation Protection Supervisor audits the monthly and weekly schedules for completion. The Foremen check on the completion of dosimetry determinations, laboratory sample analyses, and contracted services such as contaminated laundry. The Foremen review the completed RWP's.

The licensee's auditing appeared to be acceptable. The inspector had no further questions on this item.

10. Instruments and Equipment

Part of the inspection effort was to review the availability and the upkeep of instruments and equipment used for radiation protection. The inspector reviewed the availability of friskers at contaminated area stepoff pads (Paragraph 4.a) and discussed the licensee's policy (Paragraph 13).

The inspector noted that the instruments that were in use appeared to be in the current calibration status required by the licensee's procedures.

The inspector had no further questions on this item.

11. Radioactive Sources (License No. 37-17257-01)

The licensee is authorized by the above license and also by condition 2.b(2) of License DPR-50 to possess several radioactive sources.

The Technical Specifications, in Section 4.13, require specified categories of sealed radioactive sources to be tested for leakage at intervals not to exceed six months, and the licensee maintains Surveillance Procedure No. 1301-72 to accomplish these tests.

The inspector reviewed the leak test and inventory records for 15 sources that were tested on March 31, 1977, and September 12, 1977.

No omissions and no items of noncompliance were identified. The inspector had no further questions on this item.

12. Notifications and Reports to NRC and to Individuals

Part of the inspection effort was to review the licensee's compliance with the requirements of 10 CFR 19 and 10 CFR 20.408 to report personnel radiation exposure summaries and any overexposures to the NRC, and to inform individuals of their occupational exposure at this facility on request and on termination.

The records did not indicate any overexposures during 1977 or 1978 to the date of the inspection.

The licensee reports appeared to be acceptable. The inspector had no further questions on this item.

13. Exit Interview

The inspectors met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the onsite inspection on March 1, 1978.

The inspector reviewed the findings of the inspection and stated that on completion of a review of the findings in the regional office the licensee would be contacted by telephone. (The telephone contact was completed on March 21, 1978.)

The inspector reviewed the licensee's adherence to procedures.

The inspector stated that the dosimetry records could be improved if the licensee chose to do so, by striking out the incorrect information printed by the computer. The inspector stated that the required information appeared to be correct.

The inspector stated that he had checked the radiation hoods and the sample sink area, and on a recheck made earlier in the day the air flow appeared to be acceptable. The inspector stated that ventilation balance would be reviewed again on a subsequent inspection.