

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 50-289/94-01  
50-320/94-01

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50-320

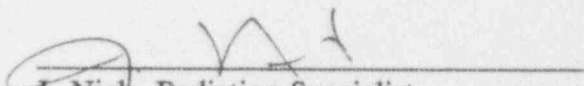
License Nos. DPR-50


Licensee: GPU Nuclear Corporation  
Middletown, Pennsylvania 17057-0191

Facility Name: Three Mile Island Nuclear Station

Inspection At: Middletown, Pennsylvania

Inspection Period: January 10 - 14, 1994

Inspector:   
J. Nick, Radiation Specialist  
Facilities Radiation Protection Section, DRSS 2/7/94  
Date

Approved by:   
R. Bores, Chief  
Facilities Radiation Protection Section, DRSS 2/7/94  
Date

Areas Inspected: Implementation of the radiological controls program. Program elements reviewed included organization and staffing levels, staff qualifications and training, corrective action and self-assessment programs, external exposure control, internal exposure control, and the program to maintain radiation exposure as low as reasonably achievable (ALARA).

Results: The radiological controls program was generally very effective in protecting the safety of workers in radiological areas. Areas toured in the facility were well maintained and exhibited good housekeeping. The radiation protection group was staffed by qualified individuals with documented training and qualifications. The licensee provided good program assessment with continuing improvements to the radiological controls program. Improvement was noted in the program upgrade to comply with the requirements of the revision to 10 CFR 20. Minor weakness was noted in issuance of respiratory protection and documentation of technicians' qualifications and training. No violations of NRC regulations were identified.

## DETAILS

### 1.0 Individuals Contacted

#### 1.1 Licensee Personnel

- \*R. De Santis, Public Affairs Manager
- \*D. Etheridge, Manager, Radiological Engineering
- \*C. Faust, Nuclear Safety
- J. Harworth, Group Supervisor - Dosimetry
- \*E. Houser, Lead Instructor
- G. Kuehn, Director, Radiological Controls/Occupational Safety
- D. Merchant, Radiological Engineer
- \*B. Mehler, PDMS Manager
- \*S. Mervine, Support Training Manager
- A. Miller, Acting Manager, TMI Licensing
- A. Paynter, Radiological Engineer
- \*C. Pollard, Quality Assurance Monitor
- L. Poppenwimer, Engineering Associate
- W. Potts, Radiological Controls/ Occupational Safety Director
- \*M. Ross, Director, Operations and Maintenance
- \*E. Scheyder, Site Services Director
- \*J. Schmidt, Engineer
- \*J. Schork, TMI Licensing Engineer
- D. Shriner, Radiological Engineer
- \*P. Velez, Manager, Radiological Controls Field Operations
- D. Viola, Group Radiological Controls Supervisor
- J. Wetmore, Manager, TMI Licensing
- \*S. Williams, NSCC Staff
- D. Zeiter, Training Instructor

#### 1.2 NRC Personnel

- D. Beaulieu, Resident Inspector
- \*M. Evans, Senior Resident Inspector
- \*L. Thonus, Project Manager, NRR

#### 1.3 Other

- \*D. Davenport, EFMR Network

\* Denotes those present during the exit meeting

## 2.0 Facility Tours

### 2.1 Unit 1

The inspector toured many of the radiologically controlled areas (RCAs) of the facility including the reactor building, the spent fuel pool area, the control building, the intermediate building, and the auxiliary building. All areas were well posted and exhibited good housekeeping. No discrepancies in postings were identified.

High Radiation Area (HRA) and Very High Radiation Area (VHRA) postings and barriers were checked throughout the facility. All accessible areas were appropriately posted, barricaded, and locked as required by NRC regulations. The licensee had identified two potential areas in Unit 1 as VHRAs. During power operation or when incore detectors are removed from the core, inside the primary shield under the reactor vessel may have dose rates exceeding 500 rads per hour. The licensee had no surveys of dose rates in this area because personnel were not allowed in this area during these conditions. The sole entrance to the area was closed with a large concrete plug and a locked metal grate with hinges. Although this entrance was not yet posted as a VHRA, the licensee planned to put up postings when the reactor power level was significantly reduced. Since this area is within the D-ring area and the licensee has controls to restrict entry into the D-ring area during power operations, the inspector did not identify this as a concern. Additionally, any personnel entering the reactor building before the area was posted were briefed about the conditions and warned of the high dose rates in this area.

The second area identified by the licensee as a potential VHRA was the fuel transfer tube room during the transfer of irradiated fuel or components. The licensee had submitted a procedure change to require the area to be posted as a VHRA prior to moving irradiated fuel or components through the transfer tubes.

### 2.2 Unit 2

The inspector toured many of the radiologically controlled areas (RCAs) of the facility including the control building, the intermediate building, and the auxiliary building. All areas were well posted and most areas exhibited good housekeeping. A minor discrepancy in contaminated area postings was identified to the licensee's radiological controls staff. This discrepancy was resolved and was later verified by the inspector during subsequent tours.

High Radiation Area (HRA) and Very High Radiation Area (VHRA) postings and barriers were checked throughout the facility. All areas were appropriately posted, barricaded, and locked as required by NRC regulations. The licensee had identified three potential areas in Unit 2 as VHRAs. The three areas identified were the reactor building, and the "A" and "B" Make-up Demineralizer Cubicles. Access to these areas was controlled by appropriate administrative controls. The inspector reviewed an internal memorandum (6610-93-0428) that outlined the controls for entrance into a VHRA. However, the inspector expressed

concern that the guidance to workers entering these VHRAs was not documented in the licensee's procedures. The licensee agreed to review the minimum required controls for entry into these areas. The licensee's performance in this area will be reviewed in future inspections.

### 3.0 Organization and Staffing

The licensee's organization had changed since the last inspection. Due to the decreased activities at Unit 2 during the Post Defueling Monitored Storage (PDMS), the radiological controls groups for Unit 1 and Unit 2 were combined under one manager of radiological controls for field operations. With the exception of some contractor technicians, the staffing levels did not change. The inspector did not find any negative consequence to this change and no other changes were noted.

### 4.0 Training and Qualifications

As per the licensee's procedures, all technicians were required to attend continuing cyclic training and pass a cyclic examination. The cyclic training included procedure changes, recent industry problems and lessons learned, changes to the 10 CFR 20 regulations, and areas in the facility that could have rapidly changing dose rates. Health physics technicians were required to obtain a 70% grade to pass the cyclic examination. Specific on the job training (OJT) requalification was required for areas the technicians were assigned and a qualification record was signed by an supervisor or a designated individual.

The inspector reviewed a random selection of the training and qualification records for contractor health physics technicians. Seven technicians' training and qualifications records were reviewed. Training attendance, test results, and evaluator's signatures for task qualifications were reviewed. Most records were complete and documented as required by the licensee's procedures. The inspector found that two different technicians failed to achieve the 70% minimum grade on one cyclic examination in 1993. The licensee's procedure requires notification to the technician's management. In the two instances, the notification was verbal and there was no record of the notification. Although the incidents appeared isolated, there was no documentation on the actions taken by management due to the low grades on the exams. There was no record that the technicians were retested or disciplined. This was identified as a minor weakness in the training and qualification process.

The inspector reviewed the requalification requirements with the licensee's training staff. The Radiological Controls Technicians (RCTs) had a periodic evaluation of their OJT qualifications for their assigned duties. Similarly, the Radiological Support Technicians (RSTs) that were assigned to dosimetry and other support functions maintained a periodic evaluation of their OJT qualifications for their assigned duties. Radiological Instrument

Technicians (RITs) did not have a documented record that their OJT qualifications were reviewed on a periodic basis. The licensee had performed a QA surveillance in this area during 1993. The monitoring report from the QA surveillance stated that the OJT practical factors for some tasks were not completed for all RITs. The corrective action as a result of the QA surveillance did not address the difference in OJT requalification between the RCTs, RSTs, and the RITs. The inspector expressed concern that there was no documentation that the RITs were evaluated and requalified for the tasks they performed. This was identified as a minor weakness in the training and qualification process. The licensee's staff agreed to review this area of training and qualification. The licensee's actions will be reviewed in future inspections.

#### 5.0 External Exposure Control

The inspector observed workers in the RCA wearing their assigned self-reading dosimeter (SRD) and the whole body thermoluminescent dosimeter (TLD) with the correct body placement. The licensee had an on-site laboratory to process whole body TLDs that was currently accredited through the National Voluntary Laboratory Accreditation Program (NVLAP). The inspector reviewed the last on-site audit report written by the NVLAP assessor. Areas for improvement that were noted in the report were already implemented or were being pursued by the licensee's staff. Most of the findings were of minor importance, but one finding was somewhat significant. The licensee had no requirement to perform certain quality assurance tests on Panasonic TLD reader after maintenance or replacement of key parts. Although the licensee had performed these tests in the past, there was no procedural requirement at the time of this inspection. The licensee's staff had identified the finding as an action item that was scheduled to be closed in 1994. The inspector will review the licensee's progress with this action item in future inspections.

The licensee's procedures required the issuance of at least one alarming SRD to a work party when individuals entered an HRA. The inspector observed all individuals in the HRAs with an alarming SRD assigned to their work party.

#### 6.0 Internal Exposure Control

The control of internal exposure was inspected through a review of the licensee's procedures for the issuance of respiratory protection equipment and a review of the internal exposure tracking system. The licensee's internal dose tracking system was maintained on a mainframe computer. The system allowed the assignment of internal dose from air sample results, bioassay results, or calculations. Although not required, the licensee was summing the total external dose and the effective internal dose in the tracking system. The inspector found that the licensee had an effective tracking system to control internal exposure.

During tours of the radiological controlled areas, the inspector observed air sampling equipment in the work place with current calibration dates and daily operational checks documented.

The licensee had procedural guidance for the issuance of respiratory protection when a job required an ALARA review. The procedure outlined the various items that should be considered including the use of respirators to maintain total personnel dose ALARA. This guidance was sufficient for the professional staff when they performed the ALARA reviews of major jobs. However, the inspector could not find any procedural guidance concerning maintaining total personnel exposure ALARA for the technicians or supervisors when issuing respirators on a day-to-day basis. This is a detail of the radiological controls program that could be improved.

The inspector also reviewed the results from the random bioassay program. The licensee had committed to a random audit of 15 personnel per quarter. This was intended to check the effectiveness of the licensee's respiratory protection and internal dose tracking system. The licensee had selected 15 people for each of the first three calendar quarters of 1993. No intake of radioactive materials was detected from the random selections. The random check had not yet been performed for the fourth quarter of 1993. The inspector found the random audit was a very good program element, but questioned the timeliness of the audits.

#### 7.0 Corrective Action and Self-Assessment Programs

The inspector reviewed the licensee's corrective action and self-assessment programs through a review of documents and interviewing personnel. The program was of very good quality and included annual audits performed by the quality assurance group, biannual self-reviews performed by members of the radiological controls staff, a recent readiness review for the implementation of the program revisions for 10 CFR 20, and a Radiological Incident Report (RIR) system. The inspector reviewed the audits and reports and noted some areas for improvement in the radiological controls program. The licensee had taken timely and effective corrective actions for most findings and recommendations. There were five RIRs written in 1993. Three RIRs documented unplanned personnel exposures from discreet radioactive particles and the remaining two reports documented minor radiological occurrences.

The licensee's staff generated approximately 50 Radiological Awareness reports during 1993. These reports documented a review of some portion of the program by staff members. The inspector reviewed the Awareness reports and found some minor areas for improvement that were corrected in a timely manner.

The licensee's staff also performed an annual review of the respiratory protection program. The review had not been completed for the year of 1993 at the time of this inspection; however, the inspector reviewed the report for 1992. The report summarized the number of respirators issued to personnel and other aspects of the program. According to the report,

no positive intakes were reported for personnel who were randomly chosen for a whole body count. A total of approximately 65 personnel were selected for these random checks.

## 8.0 ALARA Program

The licensee's Radiological Controls program contained several components to maintain personnel radiation exposure As Low As Reasonably Achievable (ALARA). The licensee held monthly Radiation Awareness Meetings where Radiological Controls staff members presented ALARA and other radiological information to department representatives. The department representatives took this information back to their respective departments for distribution.

The GRCS staff and the Radiological Engineering staff prepared ALARA reviews of jobs and tasks performed in the RCA. ALARA reviews for major tasks and jobs were assigned to one of the Radiological Engineering staff members. Job supervisors and job planners were also included in ALARA reviews. The Radiological Engineering staff had prepared a report of activities for the Unit 1 tenth refueling outage.

The licensee distributed periodic exposure tracking reports to keep the licensee's staff aware of personnel exposure to workers on each job and overall personnel exposure totals. The reports also included performance summaries, highest individual radiation doses, numbers of Awareness Reports and Radiological Investigative Reports, numbers of positive whole body counts, numbers of skin and clothing contaminations, total square feet of contaminated and airborne radioactivity areas, and a summary of audit/action items. ALARA goals were compared to actual personnel exposures and displayed in graphs and charts.

The ALARA reports stated the total personnel exposure for tenth refueling outage, conducted in late 1993, was approximately 180 person-Rem. The total personnel exposure goal for this outage was 175 person-Rem. Although the exposure was above the licensee's goal, this was the lowest exposure for a refueling outage since the plant was restarted in 1985. The inspector found the reports to be good quality with valuable information to the staff and radiological area workers.

The licensee had developed a procedure for the potential of a planned special exposure (PSE). The PSE is an allowable exposure above the annual regulatory limit, that is to be used when there is no other method available to avoid the planned exposure. Although the licensee did not have any immediate plans to use this procedure, the licensee's staff wanted to have the procedure prepared for an unplanned situation. The inspector reviewed the procedure and found that the licensee had incorporated guidance from 10 CFR 20.1206. The procedure was comprehensive and very good quality.

The licensee had also developed a procedure to limit the radiation exposure to a declared pregnant woman (DPW). The procedure and policy provided very good guidance to the

radiological controls personnel to maintain dose to a DPW, and her embryo/fetus, to below the limits specified in 10 CFR 20.1208.

#### 9.0 Exit Meeting

A meeting was held with licensee representatives at the end of the inspection period on January 14, 1994. The purpose and scope of the inspection were reviewed and the findings of the inspection were discussed. The licensee acknowledged the inspectors findings.