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92-16

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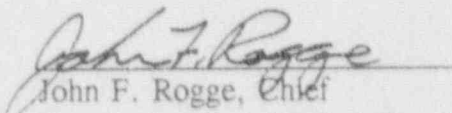
Licensee: GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

Facility: Three Mile Island Station, Units 1 and 2

Location: Middletown, Pennsylvania

Inspection Period: December 8, 1992 - January 18, 1993

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Feb 2, 1993
Date

Inspection Summary

The NRC Staff conducted safety inspections of Unit 1 power operations and Unit 2 cleanup activities. The inspectors reviewed plant operations, maintenance, radiological controls, security, and engineering and technical support activities as they related to plant safety.

Results: An overview of inspection results is in the executive summary.

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EXECUTIVE SUMMARY

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Plant Operations

The inspector found that shift turnovers were comprehensive, accurate, and adequately reflected plant activities and status. Control room operators effectively monitored plant operating conditions and made necessary adjustments. Housekeeping was satisfactory. Overall, the licensee conducted Unit 1 plant operations in a safe manner.

The Unit-2 accident generated water evaporator continues to operate and approximately 1,453,000 gallons of AGW had been vaporized to atmosphere at the close of the inspection period.

Radiological Controls

During each Auxiliary Building tour the inspector paid particular attention to ensure radiological surveys were current and that proper warning signs were posted. The inspector noted no discrepancies and concluded that overall radiological controls were good.

The licensee determined that a 204.7 μ C uranium source had not been leak tested. Technical Specifications require sealed sources to be leak tested. The licensee is evaluating whether or not the source is by definition a sealed source to which the leak test requirement applies. This item is unresolved pending further review.

Maintenance and Surveillance

While returning the flow recorder FR-146 (total station flow to the river) setpoint to normal following the release of the 'A' waste evaporator condensate storage tank to the mechanical draft cooling tower, the licensee found that the setpoint was set low at 9,000 gpm versus the release permit required setpoint of 27,000 gpm. This incident was considered to be an isolated case and the licensee's corrective actions are adequate to prevent recurrence.

The Fuel Handling Building ventilation was operated without placing the effluent radiation monitor in service as required by procedure. This item is unresolved pending completion of the licensee's review.

The inspector closed an item concerning the failure of the licensee to inspect scaffolding to ensure the scaffolding will not endanger safety related equipment. The licensee corrective actions were adequate to prevent recurrence.

Safety Assessment and Quality Verification

The inspector reviewed all TMI LERs that were submitted in 1992, to verify that the details of the events were clearly reported, including the accuracy of the description of cause and the adequacy of the corrective action. The inspector concluded all 1992 LERs were satisfactory.

Security

The inspector concluded that the upgrades to the secondary alarm station that were completed during the inspection period were a good enhancement to plant security.

DETAILS

1.0 SUMMARY OF FACILITY ACTIVITIES

1.1 Licensee Activities

Unit 1 remained at 100% power throughout the inspection period.

The Accident Generated Water (AGW) evaporator continued to vaporize AGW to the atmosphere and at the close of the inspection period approximately 1,453,000 gallons had been vaporized overall to date.

1.2 NRC Staff Activities

This inspection assessed the adequacy of licensee activities for reactor safety, safeguards, and radiation protection. The inspectors made this assessment by reviewing information on a sampling basis. The inspectors obtained information through actual observation of licensee activities, interviews with licensee personnel, and documentation reviews.

The inspectors observed licensee activities during both normal and backshift hours: 13.5 hours of direct inspection were conducted on backshift and 5 hours were conducted on deep backshift. The times of backshift hours were adjusted weekly to assure randomness.

2.0 PLANT OPERATIONS (71707)

2.1 Operational Safety Verification

The inspectors observed overall plant operation and verified that the licensee operated the plant safely and in accordance with procedures and regulatory requirements. The inspectors conducted regular tours of the following plant areas:

- | | |
|-----------------------------|-----------------------------|
| --Control Room | --Auxiliary Building |
| --Switch Gear Areas | --Turbine Building |
| --Access Control Points | --Intake Structure |
| --Protected Area Fence Line | --Intermediate Building |
| --Fuel Handling Building | --Diesel Generator Building |

The inspectors observed plant conditions through control room tours to verify proper alignment of engineered safety features; to verify that operator response to alarm conditions was in accordance with plant operating procedures; to verify compliance with Technical Specifications, including implementation of appropriate action statements for equipment out of service; and to review logs and records to determine if entries were accurate and identified equipment status or deficiencies. The records included operating logs, turnover sheets, and system safety tags.

The inspector conducted detailed walkdowns of accessible areas to inspect major components and systems for leakage, proper alignment, proper lubrication, proper cooling water supply, and any general condition that might prevent fulfillment of their safety function. The

inspector observed plant housekeeping controls including control and storage of flammable material and other potential safety hazards.

The inspector found that shift turnovers were comprehensive, accurate, and adequately reflected plant activities and status. Control room operators effectively monitored plant operating conditions and made necessary adjustments. Housekeeping was satisfactory. The inspector concluded that the licensee conducted overall plant operations in a safe and conservative manner.

3.0 EVAPORATION OF TMI UNIT 2 ACCIDENT GENERATED WATER (71707)

The inspectors observed overall evaporator operation and verified that the evaporator was operated in accordance with licensee procedures and regulatory requirements. At the close of the inspection period, approximately 1,453,000 gallons of the 2.3 million gallons of AGW had been evaporated. The inspectors identified no conditions that were adverse to safety or contrary to regulatory requirements.

4.0 RADIOLOGICAL CONTROLS (71707)

4.1 Routine Radiological Controls

During entry into and exit from radiologically controlled areas, the inspectors verified that proper warning signs were posted, personnel entering were wearing proper dosimetry, personnel and material leaving were properly monitored for radioactive contamination, and monitoring instruments were functional and in calibration. The inspectors also reviewed extended Radiation Work Permits (RWPs) and survey status boards to verify that they were current and accurate. The inspectors observed activities in radiologically controlled areas and verified that personnel were complying with the requirements of applicable RWPs and that workers were aware of the radiological conditions in the area.

During each Auxiliary Building tour the inspector paid particular attention to ensure radiological surveys were current and that proper warning signs were posted. The inspector noted no discrepancies and concluded that overall radiological controls were good.

4.2 Missed Radioactive Source Leak Test (URI, 50-289/92-22-01)

On January 4, 1993, the licensee performed a review of the TMI radioactive source inventory database and determined that source # 200, a depleted uranium slab with an activity of 204.7 μC of U-238, was improperly designated as not requiring a source leak test. The source is a plastic coated alloy metal slab (1/8" x 4" x 4") with uranium as one of the composite materials. Technical Specification 4.13.1, "Radioactive Material Sources Surveillance," requires all sealed sources with an alpha activity greater than 5 μC to be leak tested at intervals not to exceed six months. The leak test of this source was last performed on February 21, 1989. On January 4, 1993, after discovery of the missed surveillance, the licensee performed a leak test on the source with satisfactory results.

The licensee reviewed the entire database and surveillance records and determined that the other 60 sources requiring leak testing had received their surveillance. The licensee determined that the root cause of the event was attributed to personnel error in maintaining the source inventory database correctly. The licensee's initial corrective actions included the initiation of a special audit performed by the Quality Assurance Department. Further corrective actions will be determined based on audit findings.

The inspector reviewed the incident with Radiological Engineering management. The inspector determined that this event had minor safety significance because the source satisfactorily passed the leak test and this metal slab is not likely to leak uranium.

At the end of the inspection period the licensee was reevaluating whether or not source #200 is by definition a sealed source requiring the leak test. The issue will remain unresolved pending further review by the inspector and licensee. The inspector will also evaluate whether there is a programmatic weakness in the overall control of radioactive sources because of recent incidents of misplaced sources as documented in NRC Report No. 50-289/92-16 (50-289/92-22-01).

5.0 MAINTENANCE AND SURVEILLANCE (61726, 62703, 71707, 92702)

5.1 Maintenance Observations

The inspector reviewed selected maintenance activities to assure that: the activity did not violate Technical Specification Limiting Conditions for Operation and that redundant components were operable; required approvals and releases had been obtained prior to commencing work; procedures used for the task were adequate and work was within the skills of the trade; maintenance technicians were properly qualified; radiological and fire preventive controls were adequate; and equipment was properly tested and returned to service.

Maintenance activities reviewed included:

- Job Order No. 056439, "Brass Chip Found on NR-P-1B Packing Leakoff," was inspected on January 12, 1993.
- Preventive Maintenance Procedure (PMP) E-28, "Westinghouse DAP Magnetic Air Circuit Breaker Inspection and Alignment," was inspected on December 16, 1992.
- Corrective Maintenance Procedure 1440-Y-3, "Scaffolding Construction/Inspection," was inspected on January 15, 1993.

Overall, the inspector found that individuals performing the circuit breaker maintenance (PMP E-28) were knowledgeable, maintenance procedure quality was good, and proper QA documentation existed for replacement parts. The inspector concluded that overall

performance of the above maintenance activities was satisfactory.

5.2 Liquid Effluent Release with Total Station Flow Recorder Setpoint Low

On December 5, 1992, while returning the flow recorder FR-146 (total station flow to the river) setpoint to normal following the release of the 'A' waste evaporator condensate storage tank (WECST) to the effluent of the mechanical draft cooling tower, the licensee found that the setpoint was set at 9,000 gpm. The release permit required the setpoint to be 20,700 gpm. An examination of the flow recorder revealed that the indicated flow never dropped below 20,700 gpm during the release. The setpoint on FR-146 provides an alarm and interlock to terminate the release if dilution flow drops below the setpoint during the release. Plant Radiological Engineering calculated that if dilution flow had actually decreased to 9,000 gpm, the release would have been approximately 40% of the maximum permissible concentration for tritium, which was the limiting isotope for the release.

The inspector reviewed the applicable Technical Specifications associated with the release. Technical Specification 3.21.1 requires FR-146 to be operable with its alarm/trip setpoint set to ensure that the limits of Technical Specification 3.22.1.1 are not exceeded. Technical Specification 3.22.1.1 limits the concentration of radioactive material released to unrestricted areas to the limits specified in 10 CFR 20, Appendix B, Table II, Column 2. Technical Specification 3.21.1 further requires that the setpoints be determined in accordance with the Offsite Dose Calculation Manual (ODCM).

Technical Specification 3.21.1(a) states that with a radioactive liquid effluent monitoring instrument channel alarm/trip setpoint less conservative than required, immediately suspend the release of radioactive liquid effluents monitored by the affected channel or declare the channel inoperable. This action statement could not be implemented because the release had been terminated prior to discovery of the error in the setpoint. Technical Specification 3.21.1(b), action statement 21 for inoperability of FR-146 states that radioactive releases via this pathway may continue, provided a flow rate is estimated at least once every 4 hours during actual releases. FR-146 flow is recorded on the release permit at the start of the WECST release, after 1/4 complete, after 1/2 complete, after 3/4 complete, and after the release is complete. Since the release occurred over a 10 hour period, the FR-146 recorder readings were taken approximately every 2.5 hours. Therefore, the licensee unintentionally met the Technical Specification action statement for 4-hour readings. The inspector reviewed the completed release permit and 21,000 gpm was the lowest recorded value for FR-146 flow.

The Plant Review Group determined that this incident was not reportable because the licensee performed the action statement associated with FR-146 inoperability. Therefore, there was no operation or condition prohibited by the plant's Technical Specifications. The inspector agreed that this incident was not reportable.

Licensee corrective actions include revising affected procedures to provide for independent verification of the setpoint by the Operations Department prior to the release. Radiological

Engineering plans to change their release permit to present the FR-146 setpoint in mgpd rather than gpm so that the I&C technicians will not have to perform a conversion from the release permit value to the setpoint thumbwheel scale.

The inspector concluded that although the limiting condition for FR-146 operability was not met, the licensee complied with the associated action statement and, therefore, there was no Technical Specification violation. This incident is considered to be an isolated case and the licensee's corrective actions are adequate to prevent recurrence of a similar incident.

5.3 (Closed) Violation (NC4, 50-289/92-01-01) Scaffolding Deficiencies

This item concerned the failure of the Operations Department to inspect a scaffolding in the Auxiliary Building to ensure that scaffolding would not endanger safety related equipment. This deficiency was one of five deficiencies noted in the inspection report. In the violation response the licensee acknowledged that the repetitive deficiencies did occur. The licensee also determined the deficiencies were the result of a breakdown in the controls and processes established for the proper use of scaffolding at TMI. The licensee reviewed Corrective Maintenance Procedure (CMP) 1440-Y-3, "Scaffolding Construction/Inspection," and determined that the proper procedural controls were in place but adherence to these controls did not occur.

The corrective actions the licensee has implemented include adding daily checks of scaffolding to the Auxiliary Operator (AO) logs so that scaffolding deficiencies can be discovered and corrected. The AOs have been trained to check to ensure that the inspection tag is in place and has the appropriate inspection signatures for each scaffolding erected. The AO also checks to ensure the scaffolding does not hinder operation of or access to components. In addition, the licensee has instructed cognizant personnel on the control and use of scaffolding.

The inspector reviewed CMP 1440-Y-3 and agrees with the licensee that adequate procedural controls are in place to control scaffolding and that the cause of the scaffolding deficiencies was the failure to implement these controls. The inspector verified that cognizant personnel have received additional training on the control of scaffolding. During plant tours, the inspector has noted no additional scaffolding deficiencies since the violation was issued. The inspector concluded that the licensee's corrective actions were adequate to prevent recurrence of similar incidents.

5.4 Operation of Fuel Handling Building Ventilation without the Effluent Radiation Monitor (URI, 50-289/92-22-02)

On December 12, 1992, the licensee performed Surveillance Procedure (SP) 1303-11.56, "Fuel Handling Building Engineered Safety Feature (ESF) Air Treatment System Air Filter Efficiency Test," without the Fuel Handling Building effluent radiation monitor, RM-A-14, in service. This test is performed once per refueling outage. Technical Specification 3.21.2 requires that the RM-A-14 noble gas activity monitor (or suitable equivalent), the iodine

cartridge, the particulate filter, the effluent system flow recorders, and the sampler flow rate monitor be operable during Fuel Handling Building ESF air treatment system operation. Due to the failure to properly follow and sign off the SP 1303-11.56 as written, the 'A' train of the ESF ventilation was operated for 5.5 hours with the RM-A-14 pump turned off.

The day-shift Shift Foreman was notified that the test supervisor needed to place the 'A' train of the ESF ventilation into service to support Surveillance Procedure (SP) 1303-11.56. The Shift Foreman instructed an Auxiliary Operator (AO) to place the 'A' train of the ESF ventilation system into service. The Shift Foreman did not specifically tell the AO to perform the task in accordance with OP 1104-15D, "Fuel Handling Building ESF Air Treatment System Operating Procedure." SP 1303-11.56, prerequisite 4.1, states that all prerequisites of Operating Procedure (OP) 1104-15D are to be observed. Operating Procedure 1104-15D, prerequisite 14, verifies that RM-A-14 or suitable equivalent is in service. The Shift Foreman did not inform the Shift Supervisor that the system was running and did not address the Technical Specification actions associated with RM-A-14. The test supervisor did not sign off any of the 'A' train portion of the surveillance procedure, including these prerequisites, until after the completion of the 'A' train testing and the requirement to place RM-A-14 in service was missed.

The evening-shift Shift Supervisor was informed of the 'A' train ventilation testing during turnover. The evening-shift operating crew attempted to place RM-A-14 in service but did not complete this task because they could not obtain proper indication of which RM-A-14 filter was in service. The licensee later determined that cause of the improper indication was an inadequacy in OP 1105-8, "Radiation Monitoring System," which places RM-A-14 in service. The evening-shift Shift Supervisor consulted Technical Specification 3.15.4 concerning the Fuel Handling Building ESF ventilation and Technical Specification 3.21.2 concerning RM-A-14 and determined that since no fuel handling operations were in progress and the ventilation system was in a testing mode, no real requirement for RM-A-14 existed. However, Technical Specification 3.21.2 states that RM-A-14 must be operable any time the ESF ventilation system is in operation. The licensee completed testing of the 'A' train ventilation on the evening-shift. The next day, the day-shift Shift Supervisor discovered that the ventilation had been operated without RM-A-14 in service.

The inspector evaluated the safety significance of operating the Fuel Handling Building ESF ventilation without RM-A-14 in service. The purpose of RM-A-14 is to monitor the release of radioactive materials in gaseous effluents during actual or potential releases. RM-A-14 has a high and low range gas channel that reads out in the control room and via installed filter cartridges, particulate and iodine sample may be obtained. RM-A-14 has no automatic control or isolation functions. During the time the ventilation system was operated, no handling of irradiated fuel occurred. RM-A-13 was in operation during the period RM-A-14 was out of service. RM-A-13 is a movable atmospheric monitor located in the Fuel Handling Building that has iodine, particulate, and gaseous channels. RM-A-13 meters and recorder have a local indication only. RM-A-13 could have been used to calculate the amount of any release that would have occurred during this period. Therefore, the safety significance of not placing RM-A-14 in service is considered minor.

The inspector reviewed the Technical Specification action statements associated with RM-A-14 inoperability. Technical Specification 3.21.2, Action 27, states that effluent releases may continue provided grab samples are taken at least once per 12 hours and the initial samples are analyzed for gross activity within 24 hours. Since the ventilation was only operated a total of 5.5 hours, the grab sample was not required. Initial samples were not taken and analyzed; however, the Technical Specification is silent on when during the 12 hour period the initial sample must be taken. Technical Specification 3.21.2, Action 31, states that effluent releases may continue via this pathway provided that within 4 hours after the channel has been declared inoperable, samples are continuously taken with auxiliary sampling equipment. RM-A-13 is considered to be acceptable auxiliary sampling equipment. The inspector determined that licensee unknowingly met the requirements of the RM-A-14 action statements and, therefore, no Technical Specifications were violated and this incident was not reportable.

The inspector questioned the licensee if a pre-test briefing was conducted. The inspector found that although there were discussions among individual test participants, there was no comprehensive briefing for all of test personnel.

The licensee is preparing a Plant Experience Report (PER) which will address the root cause of the incident and corrective actions to prevent recurrence. The PER will also provide an assessment of the safety implications of the event.

The lack of preparation for the surveillance tests and the controls used during test performance have been noted weaknesses in the last SALP (50-289/90-99). These weaknesses were more prevalent during infrequently performed procedures. The inspector considered it a weakness that: the day-shift Shift Foreman and/or the test supervisor did not properly communicate to the AO the procedural requirements for placing the ventilation system in service; the evening-shift Shift Supervisor did not recognize Technical Specification 3.21.2 should have been entered for RM-A-14 inoperability; OP 1105-8 did not provide adequate instructions for placing RM-A-14 in service; and no pre-test briefing was conducted for this infrequently performed test. The inspector concluded that the licensee has initiated the proper review for this event. This issue will remain unresolved pending completion of the licensee's evaluation (50-289/92-22-02).

6.0 SECURITY (71707)

The inspectors verified the implementation of the Physical Security Plan by verifying: Protected Area and Vital Area barriers were well maintained and not compromised; isolation zones were clear; personnel and vehicles entering and packages being delivered to the Protected Area were properly searched and access control was in accordance with approved licensee procedures; persons granted access to the site were badged to indicate whether they have unescorted access or escorted authorization; security access controls to Vital Areas were being maintained and persons in Vital Areas were properly authorized; Security posts were adequately staffed and equipped; and adequate illumination was maintained.

The inspectors reviewed the upgrades to the secondary alarm station that were completed during the inspection period. The inspector considered these upgrades were a very good enhancement to plant security. The inspectors concluded that the Security Plan was being properly implemented.

7.0 SAFETY ASSESSMENT/QUALITY VERIFICATION (40500, 92702)

7.1 Licensee Event Report (LER) In-Office Review

The inspector reviewed all TMI LERs that were submitted to the NRC Region I office in 1992, to verify that the details of the events were clearly reported, including the accuracy of the description of cause and the adequacy of the corrective action. The inspector determined whether further information was required from the licensee, whether the event should be classified as an Abnormal Occurrence, whether the information involved with the event should be submitted to Licensing Boards, whether generic implications were indicated, and whether the event warranted on-site followup.

LER 92-001-00 regarded an inadvertent emergency feedwater system actuation that occurred on January 22, 1992. The actuation occurred due to heat sink protection system modification construction error that had gone undetected until the actuation.

LER 92-002-00 regarded a turbine/reactor trip on September 18, 1992, caused by a trip of the 'A' train circulating water pumps. The main cause of the trip was not having a procedure to defeat the circulating water system waterbox pressure switches.

LER 92-003-00 regarded the reactor building atmospheric monitor being rendered inoperable due to the failure to properly return the monitor to service during a surveillance procedure restoration.

The NRC review of the above LERs is considered complete based on satisfactory in-office review. The technical issues related to the LERs are discussed in detail in Inspection Reports 50-289/91-30, 92-18 and, 92-20.

8.0 NRC MANAGEMENT MEETINGS AND OTHER ACTIVITIES (30702)

8.1 Routine Meetings

At periodic intervals during this inspection, meetings were held with senior plant management to discuss licensee activities and areas of concern to the inspectors. At the conclusion of the reporting period, the resident inspector staff conducted an exit meeting with licensee management summarizing inspection activity and findings for this report period. No proprietary information and no information related to Unit-2 Post-Defueling Monitored Storage was identified as being included in the report.