

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket/Report No. 50-289/90-18
50-320/90-09

License: DPR-50
DPR-73

Licensee: GPU Nuclear Corporation
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Middletown, Pennsylvania 17057

Facility: Three Mile Island Nuclear Station, Units 1 and 2

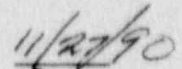
Location: Middletown, Pennsylvania

Dates: September 22, 1990 - October 30, 1990

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Approved by:


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Date

Inspection Summary: Combined Inspection Report Nos. 50-289/90-18 and 50-320/90-09 for September 22, 1990 - October 30, 1990

Areas Inspected: The NRC staff conducted routine and reactive safety inspections of Unit 1 power operations and Unit 2 cleanup activities. The inspectors reviewed plant operations, maintenance and surveillance, radiological practices, security measures and engineering support activities as they related to plant safety. Licensee action on previous inspection findings was also reviewed.

Results: An overview of inspection findings are summarized in the executive summary of this report.

Executive Summary

I. PLANT OPERATIONS

Unit 1 plant operations continue to be conducted in a safe manner. A power reduction to repair condenser tube leaks was observed. The evolution was well controlled and staffing during the evolution was adequate. Tube repairs were accomplished and reactor power was returned to 95 percent. The inspector had no concerns associated with this evolution or other routine plant operations.

II. RADIOLOGICAL CONTROLS

Routine observations of radiological controls were conducted throughout the inspection period. Concerns associated with housekeeping and postings were noted but otherwise radiological controls continue to be satisfactory. The licensee's program for unconditional release of potentially internally contaminated items was found to meet NRC guidelines. The licensee has agreed to enhance the final surveys.

III. MAINTENANCE AND SURVEILLANCE

A technician was observed performing a battery maintenance procedure using step-by-step handwritten instructions to supplement the approved procedure. The handwritten instructions were also used to provide a sequence to reenergize a battery charger to help troubleshoot a problem. This sequence was different than the one specified in the maintenance procedure and, therefore, the formal review and approval process was bypassed. This is another example of a previously identified violation (50-289/90-15-02). The licensee was requested to respond to this latest concern when responding to the previous violation.

IV. ENGINEERING AND TECHNICAL SUPPORT

Engineering support to plant activities was appropriate to resolve specific plant problems. In general, good engineering interface with the plant staff continues to be noted.

V. EMERGENCY PREPAREDNESS (EP)

Routine review of this area identified no noteworthy observations.

VI. SECURITY

Routine review of this area identified no noteworthy observations.

VII. SAFETY ASSESSMENT AND QUALITY VERIFICATION

Review of licensee implementation of technical specification changes determined that the changes were adequately controlled and implemented.

TABLE OF CONTENTS

	<u>Page</u>
1.0 Summary of Facility Activities.	1
1.1 Licensee Activities.	1
1.2 NRC Activities	1
1.3 Persons Contacted.	1
2.0 Plant Operations (71707, 93702)*	2
2.1 Operational Safety Verification.	2
2.2 Followup of Events	3
2.2.1 Fire in TMI-2 Turbine Building.	3
2.2.2 Power Reduction to Repair Condenser Tube Leaks	3
3.0 Radiological Controls (71707)	4
3.1 Routine Radiological Controls.	4
3.2 Release of Material From the RCA	4
4.0 Maintenance and Surveillance (61726, 62703, 71707).	5
4.1 Routine Maintenance Observations	5
4.2 Battery Charger Maintenance.	6
4.3 Routine Surveillance Observations.	7
5.0 Security (71707)	8
5.1 Routine Security Evaluation	8
6.0 Safety Assessment and Quality Verification (40500, 71707, 90712, 92700)	9
6.1 Technical Specification Implementation.	9
7.0 Followup of Previous Inspection Findings (71707, 92702, 92701).	10
7.1 (Closed) Unresolved Item (50-289/87-02-03) Emergency Diesel Generator for Loading Evaluation.	10
7.2 (Closed) Unresolved Item (50-289/89-80-02) Correction of Deviations Between PSG's and the ATP's	11
7.3 (Closed) Unresolved Item (50-289/89-80-05) Establish a Formal Process for Updating the PSG When Safety Significant Changes are made to the ATP's.	11
7.4 (Closed) Unresolved Item (50-289/90-15-01) Performance of Maintenance Procedure with Handwritten Instructions.	11
7.5 (Closed) Unresolved Item (50-289/88-22-03) Test Change Unreviewed by TAG Prior to Testing on TP 349/3	11
8.0 Exit Meeting (30703)	12

*Denotes NRC Inspection Procedure used to inspect the area identified

DETAILS

1.0 Summary of Facility Activities

1.1 Licensee Activities

The licensee operated at 95 percent power during the inspection period except for a five day period. On September 28, 1990, power was reduced to 47 percent to repair main condenser tube leaks and on October 4, 1990, power was returned to 95 percent.

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, through actual observation of licensee activities, interviews with licensee personnel, or independent calculation and selective review of applicable documents. Inspections were accomplished on both normal and back shift hours.

NRC staff inspections were generally conducted in accordance with NRC Inspection Procedures (NIPs). These NIPs are noted under the appropriate section in the Table of Contents to this report.

1.3 Persons Contacted

- D. Atherholt, Operations Engineer
- *G. Broughton, Operations/Maintenance Director
- *J. Byrne, Manager, TMI-2 Licensing
- R. Harper, Manager, Plant Material
- C. Hartman, Manager, Plant Engineering
- D. Hassler, Licensing Engineer
- *H. Hukill, Vice President and Director
- *P. Karish, Plant Engineer, TMI-1
- G. Kuehn, Site Operations Director, TMI-2
- *R. Knight, Licensing Engineer
- *R. Maag, Manager, Plant Material
- *M. Nelson, Manager, Safety Review
- J. Paules, Senior Operations Engineer
- R. Rogan, Director, Licensing
- M. Ross, Plant Operations Director
- H. Shipman, Plant Engineering
- E. Schull, Licensing Engineer
- G. Simonetti, Manager Emergency Preparedness
- R. Skillman, Director, Plant Engineering
- P. Snyder, Manager, Plant Material Assessment
- C. Smyth, Manager, Licensing

J. Stacy, Manager, Security
 *H. Teichmann, QA Auditor
 R. Wells, Licensing Engineer

* Denotes attendance at final exit meeting (see Section 9.0)

2.0 Plant Operations

2.1 Operational Safety Verification

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

--Control Room	--Control Building
--Auxiliary Building	--Diesel Generator Building
--Switchgear Area	--Yard Areas
--Access Control Points	--Containment Penetration Area
--Protected Area Fence Line	--Turbine Building
--Fuel Handling	

During the inspection, operators were interviewed concerning knowledge of recent changes to procedures, facility configuration and plant conditions. The inspector verified adherence to approved procedures for observed activities. Shift turnovers were witnessed and staffing requirements confirmed. The inspectors found that control room access was properly controlled and a professional atmosphere was maintained. Inspector comments or questions resulting from these reviews were resolved by licensee personnel.

Control room instruments and plant computer indications were observed for correlation between channels and for conformance with technical specification (TS) requirements. Operability of engineered safety features, other safety related systems and onsite and offsite power sources were verified. The inspectors observed various alarm conditions and confirmed that operator response was in accordance with plant operating procedures. Compliance with TS and implementation of appropriate action statements for equipment out of service was verified. Logs and records were reviewed to determine if entries were accurate and identified equipment status or deficiencies. These records included operating logs, turnover sheets, system safety tags, and the jumper and lifted leads control log. The inspector also examined the condition of various fire protection, meteorological, and seismic monitoring systems.

Plant housekeeping controls were monitored, including control and storage of flammable material and other potential safety hazards.

2.2 Followup of Events Occurring During the Inspection Period

The inspectors provided onsite coverage and followup of the following events:

2.2.1 Fire in TMI-2 Turbine Building

On September 24, 1990, at 8:20 a.m., an Event of Potential Public Interest was declared due to a fire in the Unit II Turbine Building. A shift foreman was sent to investigate a control room instrument air compressor alarm. The foreman saw smoke coming out of the 2-3 lb motor control center and called the Unit 1 control room. The area monitor fire sensor alarmed soon after the foreman made his report. The fire brigade was dispatched and the switchgear was deenergized from the Unit II control room. By 8:28 a.m., the fire brigade leader determined that no off-site assistance was needed and the Event of Potential Public Interest was terminated. By 9:20 a.m., the fire was verified extinguished. No vital loads were on this switchgear. A preliminary investigation indicated that the fire started in the "C" service air compressor breaker and was caused by a loose wire connection.

The inspector reviewed the event with the licensee to determine if licensee actions were appropriate and what effect the loss of this motor control center had on plant safety. The inspector concluded that the fire brigade had responded in a timely manner with the proper equipment. Review of the electrical loads powered from this motor control center indicated it supplied no safety related equipment. The inspector had no concerns associated with licensee action in this area.

2.2.2 Power Reduction to Repair Condenser Tube Leaks

On September 28, 1990, the inspector observed a reduction in reactor power to 47 percent. The evolution was well controlled and staffing during the evolution was ample and included several senior managers. The licensee alternately secured circulating water flow to the main condenser "A" side and "B" side to repair condenser tube leaks. The leaks had been causing secondary chemistry problems. Upon completion of leak repair, on October 4, 1990, reactor power was returned to 95 percent power. The inspector had no concerns associated with this evolution.

3.0 Radiological Controls

3.1 Routine Radiological Controls

Posting and control of radiation and high radiation areas were inspected. Radiation Work Permit compliance and use of personnel monitoring devices were checked. Conditions of step-off pads, disposal of protective clothing, radiation control job coverage, area monitor operability and calibration (portable and permanent) and personnel frisking were observed on a sampling basis.

On October 5, 1990, the inspector conducted a tour of the spent fuel pool's truck bay. The inspector found that housekeeping in this area was poor. An internal contamination sign was on the floor with nothing connected to it and an area was roped off with a radiological boundary sign attached but it did not specify the type of radiological condition (i.e. radiation area or contamination area). The inspector informed the Radiological Field manager of the problem. The noted radiological posting problems were corrected immediately. Subsequent tours of this area and other spaces indicated this to be an isolated occurrence.

No other deficiencies were noted. Other than described above, radiological controls were satisfactory.

3.2 Release Of Material from the RCA

On October 17, 1990, a specialist inspector performed an on-site review of the licensee's program for release of potentially contaminated material. The purpose of the inspection was to determine the quality of a licensee program for unconditional release of an item from a radiologically controlled area (RCA). In particular, the inspector reviewed the methodology for detecting contamination on the internal surfaces of released components. This inspection consisted of review of records and procedures, discussions with licensee personnel, and direct survey of material designated for uncontrolled release from the site.

The inspector found that a radiological evaluation must be performed by a Radiological Controls Technician prior to unconditional release of an item from the RCA. The evaluation is intended to provide reasonable assurance that levels of contamination are not detectable on the internal and external surfaces of the item. The licensee's current method for determining if contamination exists on interior surfaces of items is to take measurements at available access points on the item assuming that contamination at these locations is representative of contamination on the interiors. This is consistent with NRC guidelines provided in IE Circular No. 81-07, "Control of Radioactively Contaminated Material."

The inspector surveyed many items which were released from the RCA and deposited in a scrap metal dumpster outside the RCA. All items surveyed were found to be free of detectable contamination. The surveys were performed with a sodium iodide (NaI) detector and a pancake GM detector to provide high sensitivity to gamma and beta radiation respectively.

Currently, pancake GM detectors are used by the licensee to assess surface contamination levels. Radiation protection management personnel stated that, in the future, the station will use an instrument with a high gamma sensitivity (such as the NaI detector) to survey components for internal contamination when internal surfaces cannot be directly frisked and when there is a possibility that internal surfaces could be contaminated. They further stated that procedures would be modified to encompass this change.

The inspector concluded that the licensee is currently meeting NRC guidelines for releasing potentially contaminated items. The inspector believes that performing a final survey of items with a sodium iodide detector is an improvement in the licensee's program because this provides one additional check to assure contaminated items, including ones with inaccessible surfaces, are not released.

4.0 Maintenance and Surveillance Observations

4.1 Routine 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;
- activities were accomplished by qualified personnel;
- where necessary, radiological and fire preventive controls were adequate and implemented;
- QC hold points were established where required and observed;

- functional testing was performed prior to declaring the particular component(s) operable; and
- equipment was verified to be properly returned to service.

Maintenance activities reviewed included:

- Job Order 11126, Battery Charger 1D Inspection on September 24, 1990.
- Job Order 26856, Hydrogen Recombiner Repair on September 28, 1990.
- Preventative Maintenance Procedure E-18, Rev 9, "Battery Chargers Annual Inspection." Reviews were conducted throughout the inspection period associated with unresolved item 50-289/90-15-01.
- Maintenance Procedure 1405-3.2, Diesel Engine Maintenance for Diesel "A" and "B," October 15-26, 1990.

Several concerns were identified as described in section 4.2.

4.2 Battery Charger Maintenance

On September 11, 1990, the inspector observed Preventative Maintenance (PM) E-18, Rev 9, "Battery Chargers-Annual Inspection" for the "E" battery charger. The inspector observed that the technician performing the procedure had a page of handwritten step-by-step instructions to supplement the approved procedure. This concern was previously addressed as unresolved item 50-289/90-15-01.

The technician indicated that the handwritten instructions were needed because PM E-18 required certain checks and adjustments be made on the battery charger per the Battery Charger Technical Manual and that these instructions did not provide sufficient detail to perform the checks.

The handwritten instructions were written by the maintenance foreman.

The inspector reviewed PM E-18 and the handwritten instructions. Step 6.7 of PM E-18 requires that checks and adjustments for the battery charger be performed per the "Battery Charger Technical Manual (VM-TM-0160) and Maintenance Foreman's Guidance." The inspector found that the technical manual had no specific instructions to perform High Voltage Alarm and the Low Voltage

Alarm checks. The handwritten instructions gave a step-by-step procedure to perform these two checks. The inspector considers it a weakness that a procedure would reference a Technical Manual to perform a check which did not specifically provide these instructions.

The inspector had one other concern associated with these handwritten instructions. The battery charger is reenergized per PM E-18, step 6.6. Handwritten step-by-step instructions were performed instead of step 6.6. The licensee indicated that this was done because they had been having difficulty in properly reenergizing the charger in the past and this assisted them in troubleshooting the problem. Although the handwritten instructions were technically sound, a formal procedure change and review process should have occurred, especially in light of their recent problems.

The licensee has indicated the PM E-18 will be changed to reflect the battery charger start-up sequence of Operating Procedure 1107-2, "Emergency Electrical System." The startup sequence for the battery chargers in the operating procedure is different than both PM E-18 and the handwritten instructions. It appears that all three sets of instructions are technically sound.

Due to previously identified procedure deficiencies, the licensee has implemented a procedure upgrade program to correct procedure deficiencies during the normal two year review cycle. PM E-18 has not yet received this upgrade.

Bypassing the normal review and approval process had little safety significance in this case but in other procedures this could have significant safety implications. Administrative Procedure 1001G, which is required by Technical Specification 6.8.1, states that "Personnel shall not give directions, guidance, recommendations or clarifications which conflict with approved procedures." Failure to perform Preventative Maintenance Procedure E-18, step 6.6, as written, is a violation of Technical Specification 6.8.1.

The licensee has recently received Notice of Violation 50-289/90-15-02. The violation described in the previous paragraph is considered to be another example of the previous violation and therefore a separate Notice of Violation will not be issued.

4.3 Routine Surveillance Observations

The inspectors witnessed/reviewed selected surveillance tests to determine whether properly approved procedures were in use, details were adequate, test instrumentation was properly

calibrated and used, Technical Specifications were satisfied, testing was performed by qualified personnel and test results satisfied acceptance criteria or were properly dispositioned. The following surveillance testing activities were reviewed:

- Surveillance Procedure 1302-5.30, "Diesel Generator Protective Relaying for Diesel Generator "B"," on October 15, 1990.
- Surveillance Procedure 1301-8.2, "Diesel Generator Annual Inspection (Mechanical) for Diesel Generator "B"," on October 15, 17, and 19, 1990.
- Surveillance Procedure 1301-8.2, "Diesel Generator Annual Inspection (Mechanical) for Diesel Generator A," on October 23, 24, and 25, 1990.
- Surveillance Procedure 1301-8.2A "Diesel Generator Inspection (Electrical) for Diesel Generator A," on October 24, 1990.
- Surveillance Procedure 1302-3.1, RM-A-2P "Quarterly Calibration," on September 25, 1990.

Routine evaluation of this area identified no noteworthy observation.

5.0 Security

5.1 Routine Security Evaluations

Implementation of the Physical Security Plan was observed in the following plant areas:

- 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 that persons in Vital Areas were properly authorized;

- Security posts were adequately staffed and equipped, security personnel were alert and knowledgeable regarding position requirements, and that written procedures were available; and
- Adequate illumination was maintained.

Routine evaluation of this area identified no noteworthy observations.

6.0 Safety Assessment and Quality Verification

6.1 Technical Specification Implementation

The inspector completed a review of licensee implementation of recent technical specification (TS) amendments. This review included verification that various controlled copies of the technical specifications were updated, procedures affected by the TS had appropriate changes completed and licensee personnel were aware of the implication of the changes. Training handouts were reviewed to ensure that operations personnel were aware of the effect of the TS changes on plant operations. The inspector reviewed TS amendments 148, 149, and 150 which were approved January 3, 1989, April 27, 1989, and July 6, 1989, respectively.

TS amendment 148 changed section 4.4.1.2.1 and added an additional Type B local leak rate blind flange and also deleted tests for valves LR-V-1 and LR-V-49 which were removed from the test path. The inspector reviewed the latest revision to surveillance procedure SP-1303-11.18, RB Local Leak Rate Testing, to ensure that appropriate changes were made to implement this new technical specification requirement. No problems were noted.

TS amendment 149 was reviewed to ensure that minor changes made to update and clarify requirements and their bases did not require any procedure changes. One change made to Section 3.1.12 modified the Tave limit for removing the PORV from service to make the limit consistent with already implemented procedural requirements. No problems were noted with this technical specification change.

TS amendment 150 was also reviewed. This amendment removed several fuel cycle dependent specifications, figures and tables from the technical specifications. These requirements are now contained in the Core Operating Limits Report which provided the specific limits for the current operating cycle. This report was developed from previously established NRC approved methodology. This report was provided to the NRC for review prior to each reload cycle. The inspector reviewed various operating procedures which utilized the latest core reload parameter, to verify that the new limits had been appropriately incorporated. No problems were noted.

The inspector concluded that the licensee had adequately incorporated technical specification changes into applicable procedures and that personnel were adequately trained on new requirements. Licensee performance in this area was completed in a timely fashion.

7.0 Followup of Previous Inspection Findings

The NRC Outstanding Items (OI) List was reviewed with cognizant licensee personnel. Items selected by the inspector were subsequently reviewed through discussions with licensee personnel, documentation reviews and field inspections to determine whether licensee actions specified in the OIs had been satisfactorily completed. The overall status of previously identified inspection findings was reviewed and planned/completed licensee actions were discussed for the items reported below.

7.1 (Closed) Unresolved Item (50-289/87-02-03) Emergency Diesel Generator Loading Evaluation

This item concerned the licensee evaluations and calculations for loading of the emergency diesel generators (EDG) under accident conditions. Initially, the inspector questioned the adequacy of the licensee computer program, DAPPER, for tracking EDG loads. Subsequent followup inspection in Inspection Report 88-16 reviewed the licensee load calculations in Technical Document Report (TDR) 836 and contained additional questions on the licensee assumptions about seasonal loads. The inspector requested the licensee evaluate the maximum seasonal load effect on EDG operation for LOCA and LOOP conditions.

The licensee provided an updated revision to TDR-836, approved on June 5, 1989, with supporting calculations, which concluded that the maximum automatic load and subsequent potential manually added loads would not exceed the 3000 kw, 2000 hour rating of the EDG. This evaluation was also provided in an internal licensee memo No. 3330-88-0100 which documented the calculations for EDG maximum loading. The licensee responded to the staff and noted the above information in a letter dated July 31, 1989, No. C311-89-2080.

The inspector reviewed the licensee evaluation and calculations in TDR 836 Revision 3 and licensee memo 3330-88-0100 and concluded that the licensee had properly calculated and documented EDG loads, specifically addressing seasonal variations in EDG loads. The maximum EDG load on the "B" EDG as 2779.3 KW with an additional manually applied load of approximately 211 KW. The manual loads are specified in licensee operating procedures, and adequate instrumentation and guidance exist to prevent inadvertently overloading the EDG.

Licensee action on this item resolved inspector concerns related to EDG loading and this item is closed.

7.2 (Closed) Unresolved Item (50-289/89-80-02) Correction of Deviations Between the PSGs and the ATPs

This item concerned a list of discrepancies between the Abnormal Transient Procedures (ATPs) and the Plant Specific Guideline (PSGs). A list of these discrepancies was noted in Appendix "C" of the Inspection Report. The inspector reviewed Rev 3 to TDR-517 which is the PSG for TMI-1 and the various ATP 1210 series procedures which had discrepancies. The licensee updated TDR-517 or made changes to the ATP 1200 series procedure to correct all identified discrepancies. This action adequately resolved this item and this item is closed.

7.3 (Closed) Unresolved Item (50-289/89-80-05) Establish a Formal Process for Updating the PSG when Safety Significant Changes are made to the ATPs

This item concerned the lack of a formal process to update the PSG (TDR-517) when safety significant changes are made to the ATPs. The licensee formulated a new procedure, Technical Function Division Procedure, AS-002, "Update Process for the B&W Owners Group Technical Basis Document and the Abnormal Transient Procedures." The procedure specifies the process that will be used to ensure that TDR-517 is updated in a timely fashion when changes are made to the ATPs. The inspector reviewed this procedure and determined that the new process appeared adequate to resolve this concern. This item is closed.

7.4 (Closed) Unresolved Item (50-289/90-15-01) Performance of Maintenance Procedure with Handwritten Instructions

Details of this unresolved item are contained in Section 4.2. of this report. This item is closed.

7.5 (Closed) Unresolved Item (50-289/88-22-U3) Test Changes Unreviewed by TAG Prior to Testing on TP 349/3

This item concerned a Quality Deficiency Report (QDR) that was reviewed by the inspector concerning a test procedure, TP 349/3 Functional Testing of the Automatic Bus Transfer (ABT), that had major revisions after the first draft was reviewed by the Test Approval Group (TAG). The final TAG review required by SP-002, Test Procedure Generation/Approval/Change was not accomplished. The licensee reviewed their TAG review process and concluded that this was an isolated incident and was due to time constraints in

the need for the TP in question. No other TPs were approved without full TAG review. The inspector reviewed the corrective action and concluded that licensee action in this area was adequate and this item is closed.

8.0 Exit Meeting

A summary of inspection findings was further discussed with the licensee at the conclusion of the report period on October 30, 1990. Persons designated with an asterisk in Section 1.3 were present at the exit meeting.