U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-289/86-13

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: GPU Nuclear Corporation
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Middletown, Pennsylvania 17057

Facility At: Three Mile Island Nuclear Station, Unit 1

Inspection At: Middletown, Pennsylvania

Inspection Conducted: August 1, 1986, to September 8, 1986

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Inspection Summary:

Resident and region-based NRC staff conducted safety inspections (318 hours) of power operations, focusing on plant and personnel performance. Specifically, items reviewed in detail in the operation, maintenance, and surveillance areas were: reactor coolant pump seal problem; maintenance and surveillance associated with emergency feedwater pump bearings; inadvertent dropping of make-up purification filter; and, noble gas buildup in the auxiliary building. Other items included: review of the licensee's eddy current report; review of the licensee's health physics and maintenance programs; and, licensee action on previous findings.

Inspection Results:

For the activities sampled, the inspector noted that, in general, the licensee properly completed evolutions, maintenance, and surveillance activities consistent with regulatory requirements. Review of submitted reports indicated accurate and timely reporting with appropriate corrective action planned or taken. The licensee was very supportive of the on-site review by the NRC Performance Appraisal Team (PAT). The licensee action on previous inspection findings was acceptable.

Overall, implementation of maintenance and health physics programs remains good. On several noted operational events, the licensee is taking adequate corrective actions. In general, licensee personnel exhibited good control of plant operations. No violations were identified.

DETAILS

1. Introduction and Overview

1.1 NRC Staff Activities

The overall purpose of this inspection was to assess licensee activities for the power operation mode as they related to reactor safety and radiation protection. Within each area, the inspectors documented the specific purpose of the area under review, scope of inspections, along with appropriate conclusions. The inspector made this assessment by reviewing information on a sampling basis through actual observation of licensee activities, interviews with licensee personnel, measurement of radiation levels, or independent calculation and selective review of listed applicable documents.

During this period, the Performance Appraisal Team (PAT) performed an inspection. During portions of this time, the on-site NRC staff supported the PAT inspection. The results of that review will be documented in NRC Inspection Report No. 50-289/86-14.

1.2 Licensee Activities

During this period, the licensee operated the plant at full power. Routine operations, maintenance, and surveillance were conducted along with the installation of modifications needed for the startup following the next refueling outage (cycle 6).

During this period, a higher than normal leakage from "C" reactor coolant pump No. 1 seal was noted and is being closely monitored by the licensee.

2. Plant Operations

2.1 Scope of Review

The NRC resident inspectors periodically inspected the facility to determine the licensee's compliance with the general operating requirements of Section 6 of the Technical Specifications (TS) in the following areas:

-- review of selected plant parameters for abnormal trends;

-- plant status from a maintenance/modification viewpoint;

-- control of ongoing and special evolutions, including control room personnel awareness of these evolutions;

-- control of documents, including logkeeping practices;

-- implementation of radiological controls;

-- implementation of the security plan, including access control, boundary integrity, and badging practices; and,

-- implementation of the fire protection plan, including fire barrier integrity, extinguisher checks, and housekeeping.

Because of additional resident office coverage at this facility, more detailed and frequent reviews of operating personnel performance were conducted to determine that:

-- operators are attentive and responsive to plant parameters and conditions;

-- plant evolutions and testing are planned and properly authorized;

-- procedures are used and followed as required by plant policy;

-- equipment status changes are appropriately documented and communicated to appropriate shift personnel;

-- the operating conditions of the plant equipment are effectively monitored and appropriate corrective action is initiated when required;

-- backup instrumentation, measurement, and readings are used as appropriate when normal instrumentation is found to be defective or out of tolerance;

-- logkeeping is timely, accurate, and adequately reflects plant activities and status;

-- operators follow good operating practices in conducting plant operations; and,

-- operator actions are consistent with performance-oriented training.

Specifically, the inspectors focused attention on the areas listed below.

General/Operations

-- Control room operations during regular and backshift hours, including frequent observation of activities in progress, and periodic review of selected sections of the shift foreman's log and control room operator's log and other control room daily logs

-- Areas outside the control room, including important-to safety buildings detached from main plant buildings

-- Selected licensee planning meetings

Maintenance

-- RCS letdown filter change out

-- Reactor coolant leakage on "C" RCP seal

Surveillance

-- Reactor protection channel checks

-- Emergency diesel loading test

-- Thermal power heat balance calculations

-- Monthly battery checks

As a result of this review, the inspectors reviewed specific areas in more detail as described in the sections that follow.

2.2 Findings

2.2.1 Reactor Coolant Pump Seal

During the month of June 1986, the licensee observed that the "C" reactor coolant pump (RCP) No. 1 seal leakoff flow began a slow intermittent increase from a nominal 2 gallons per minute (gpm). During the week of August 15, 1986, the "C" RCP No. 1 seal leakoff increased to approximately 5.5 gpm.

The No. 1 seal is the main seal of the RCP and is a controlled leakage, film-riding face seal. The No. 1 seal seals the upper pump shaft against high pressure injection water from the make-up and purification system, which is used as a buffer to prevent reactor coolant leakage past the pump labyrinth seal. In addition to the No. 1 seal, each pump is equipped with a rubbing face No. 2 seal, which is also capable of operating at full system pressure should

the No. 1 seal fail. A third rubbing face seal is provided for low pressure sealing to prevent discharge into the reactor containment.

Because increased seal leakoff could indicate seal degradation, the licensee contacted the vendor for aid in evaluating seal performance during pump operation. From make-up tank temperature, pH, and No. 1 seal leakoff data, the vendor suggested that the cause of the increased leakoff could be due to electrophoresis. This phenomenon, as purported by the vendor, consists of the plating out of iron oxide particulates (Fe_2O_3) on the seal ring face bevel, allowing for a greater upward force overcoming the seal injection pressure on the seal ring surfaces.

The imbalances of forces on the seal surfaces allow a greater seal leakoff flow. For the effect of electrophoresis to be possible, an electrical potential must exist across the "C" RCP No. 1 seal. The cause for the potential is under investigation. It remains unclear why this potential would develop on one of four RCP's.

The vendor's letter to the licensee, dated July 17, 1986, recommended that the "C" RCP could remain in operation if the following guidelines are used:

-- the site's leakoff flow recorder is not off scale; and,

-- the No. 1 seal leakoff does not exceed the limits specified by the vendor for No. 1 leakoff flow versus make-up tank temperature (approximately 7.0 - 7.5 gpm for the range of TMI-1 make-up tank temperatures).

On or about September 3, 1986, the No. 1 seal leakoff flow increased above 6 gpm, greater than the site's leakoff flow recorder scale (0-6 gpm). The licensee wrote a special temporary procedure (STP No. 1-86-0025) to allow a "bucket check" of the No. 1 seal leakoff flow rate since the control room recorder was off scale. From the bucket checks, leakoff flow was determined to be approximately 5.4 gpm. On September 4, 1986, the licensee commenced a 50,000 gallon flush of the RCS, using the reactor coolant bleed tanks to help remove Fe O particulates from the seal area and RCS. On September 5, 1986, another 30,000-gallon flush was performed and "C" RCP No. 1 seal leakoff decreased to 5.2 gpm. At the end of the

inspection period, the licensee was in the process of replacing the narrow range transmitter (0-3 gpm) with a 3-10 gpm Foxboro flow transmitter to supplement the 0-6 gpm transmitter.

The following documents were reviewed to ensure that an adequate technical review had been performed and the licensee was implementing changes to existing procedures in accordance with applicable station procedures. The documents were also reviewed to ensure that the licensee completed the procedures as required.

-- Abnormal Procedure (AP) 1203-6, Revision 18, "Reactor Coolant Pump and Motor Malfunction;"

-- Temporary Change Notice (TCN) No. 1-86-0125 - changes AP 1203-16 to caution the operator to close No. 1 seal outlet isolation valve on loss of seal injection flow combined with a No. 1 seal leakoff greater than 5 gpm in order to reduce heating effects on the thermal barrier;

-- TCN No. 1-86-0124 - requires seal leakoff flow, labyrinth seal differential pressure, radial bearing temperature, and No. 1 seal outlet temperature data be taken every two hours when a RCP No. 1 seal leakoff is greater than 5 gpm;

-- Special Temporary Procedure (STP) No. 1-86-0025, dated September 3, 1986, "RC-P-1C Bucket Check;"

-- Letter, dated July 17, 1986, from the Westinghouse Electric Corporation to Mr. P. G. Stoehr, Mechanical Engineer, GPU Nuclear; and,

-- various data graphs maintained by the licensee.

The inspector verified that operations personnel were knowledgeable of the alarm indications for a No. 1 seal failure and of the actions required in case of a failure in accordance with applicable procedures. Technical review by the inspector of the licensee's evaluation found it to be adequate. The inspector concluded that even though the licensee was unable to confirm that the seal degradation was due to electrophorsis, their technical approach to resolving the issue was not dependent on this conclusion. The amount and cause of actual seal degradation will not be fully determined until the seal is removed during the next outage. The installation of the larger

scale transmitter, along with "C" RCP No. 1 seal replacement during the 6R outage and further actions concerning the cause of the high seal leakoff, will be an inspector followup item (289/86-13-01).

2.2.2 Emergency Feedwater Pump Bearing Temperature

On October 27, 1986, the inspector noticed that the turbine inboard journal bearing on the turbine-driven emergency feedwater pump (EF-P-1) was hot to the touch along with the exhaust piping. With a licensee-supplied pyrometer, the inspector confirmed that the outboard journal bearing temperature was approximately 142 F with the exhaust piping temperature at 170 F. The turbine had not been recently tested. An idle hot bearing suggests steam valve leakage into the turbine casing.

In discussions with operations personnel, the inspector was told that the bearing had been hot since plant restart. Site mechanical engineers were unaware of the problem when the inspector informed them of the above information. A mechanical engineer confirmed the high temperatures and commenced an engineering evaluation to determine the cause and if possible degradation of the pump had occurred. The inspector will review the engineering evaluation when it is completed.

To independently assess the actual reliability or degradation, if any, to the emergency feed pump (EFP), the inspector reviewed Surveillance Procedure (SP) 1300-3G A/B, "Turbine-Driven Emergency Feedwater Pump Functional Test," completed August 27, 1986, along with the April, May, June, and July 1986 monthly tests. The inspector also reviewed SP 1303-11.39, "Emergency Feedwater Pump Automatic Start," completed August 27, 1986, May 28, 1986, and February 27, 1986. No discrepancies were discovered. SP 1300-3G A/B data sheet states that the reference value for the inboard bearing temperature is 112 F. From the results of the last five months tests, the inspector concluded that the pump would start when called upon to fulfill its safety function.

The inspector does have a concern regarding long-term bearing and turbine degradation due to the internal steam environment and possible inlet valve seat steam cutting on M5-V-10 A/B and M5-V-13 A/B. During the upcoming 6R outage, the licensee plans to inspect the steam inlet valves and repair the leaking valve(s).

The review of the engineering evaluation and licensee actions concerning this matter will be followed up in a subsequent inspection (289/86-13-02).

2.2.3 MU-F-2A Filter Drop

On July 28, 1986, during the changeout of the letdown system pre-filter, MU-F-2A, maintenance personnel dropped the filter cartridge from the handling tool being used while attempting to remove the filter from its housing. Additional information was needed on this event at the end of the reporting period for Inspection Report No. 289/86-10 and, hence, the event was evaluated during this inspection period.

The licensee evaluated the circumstances surrounding this event and documented their findings in Plant Incident Report (PIR) 1-86-08.

The licensee determined that the cause was the use of the wrong long-handled hook being used to remove the filter cartridge from the filter housing. When the opposite end of the handling tool came in contact with the ceiling above the work area, the filter cartridge was dislodged from the hook and fell to the floor of the cubicle. Licensee corrective action consisted of the following actions:

-- all handling tools, except the proper tool, have been removed from the vicinity of the work area; and,

-- secondly, all applicable maintenance personnel have been briefed on the correct procedures and tools to be used for this maintenance evolution.

During the above review, the inspector noted that a small release of noble gas (to the auxiliary building) occurred during this evolution. A small increase on station vent radiation monitor (RM-A-8) was observed. The inspector questioned operations personnel on the procedures and system lineups used to conduct this particular filter changeout. The inspector determined that no specific written procedural steps existed to conduct this evolution. The isolation of the filters is accomplished by operations personnel via the job ticket. Operations personnel interviewed by the inspector appeared to be aware of the hazards present when conducting this evolution and the proper lineup that should be used. The vent line from the filter housing is connected to

the gaseous waste system low pressure vent header. This header is maintained at a positive pressure (1-2 psig) during normal operations. If the vent is opened when the filter housing is open to the atmosphere, then noble gas from the vent header can be released to the auxiliary building environment. Also, residual pressure in the filter housing could have been vented when the filter housing cover was removed. Operations personnel were aware of this situation. System diagrams were adequately marked to indicate this configuration. Although no formal step-by-step operating procedure exists to control this evolution, the formal Maintenance Procedure 1410-F-3 does contain cautions against operating the vent valve with the system open to atmosphere.

The inspector concluded that this evolution can be conducted safely in the future with present controls in place, but it is dependent on the attention to detail on the part of individuals doing the job. Based on interviews, personnel were aware of these potential problems and licensee corrective actions should prevent further problems. This evolution is conducted on a frequent basis and this has been the only example where problems have occurred. The inspector had no other concerns in this area.

2.2.4 Auxiliary Building Noble Gas Buildup

2.2.4.1 Background

During the inspection period, several events occurred during the normal plant operations that resulted in releases of measurable noble gas concentrations to the auxiliary building environment. These events were evidenced by increases on local radiation monitors in the auxiliary building ventilation flow path; RM-A6 and 8. The first event on August 8, 1986, involved decanting the spent resin tank to the miscellaneous waste storage tank (MWST). More recent events causing releases were pumping the auxiliary building sump to the MWST and a sampling evolution for the deborating demineralizers. The deborating demineralizers have recently been placed in service to remove boron when the RCS boron concentration is relatively low.

2.2.4.2 License Investigation

The licensee has been conducting an evaluation to determine the cause of the releases. Several evolutions have been conducted under controlled circumstances to determine if they are the cause of the leak. The problem with this leak is the low pressures (0.8 - 1.8 psig) maintained in the low pressure portions of the gaseous waste system (low pressure vent header) do not allow gas leaks to be determined easily without a helium leak test. One suspected path was a newly installed sample line from the gas space of the make-up tank (MUT). The piping contained numerous mechanical connections and was in an area where recent work had been accomplished. This path proved not to be the leaking system. As of the end of the inspection period, potential leak locations are the low pressure vent header and the sampling lines from the deborating demineralizers. The licensee has not positively identified the leak path to date.

2.2.4.3 NRC Findings

The inspectors have reviewed the data accumulated by the licensee concerning this problem. The licensee is aggressively pursuing the cause of the leak. The affected areas are conservatively posted as "airborne radioactivity" areas for potential noble gas concentrations. No particulate or iodine problems have been identified. The licensee has adjusted ventilation flows and is actively sampling applicable areas whenever the potential exists to have a gas release. The inspector concluded that the problem presents no significant concern for any off-site exposure. All ventilation paths from the auxiliary building pass through filter media for particulate material and iodine and, to date, only minor off-site releases of noble gas have occurred. These releases are a small percentage of the total normal monthly releases from in-plant process systems. The licensee is considering a helium injection test to locate the leak, but the gaseous waste system must be disabled to accomplish this test.

The inspectors will continue to follow licensee action on this problem. Final resolution will be documented in future inspection reports (289/86-13-03).

2.2.5 Post-Eddy Current Inspection Report

On June 17, 1986, the licensee submitted their post-eddy current inspection report, as required by Technical Specification 4.19.5a, in the form of a Technical Data Report (TDR). The licensee's TDR 781, Revision 1, reports the results of steam generator tube eddy current examinations for the examinations starting with the March 21, 1986, outage 5M. This TDR also compares the 1986 eddy current tube examination results with data from previous examinations to establish if changes have occurred in the steam generator tubes during operation since previous examinations. TDR 781, Revision 1, documents results of three categories of examinations; those required by Technical Specification (TS) 4.19, those required by the Topical Report (TR)-008, and GPUN elective examinations. The conclusions reached by GPUN during the eddy current examination and analysis are restated from TDR 781 as follows.

-- Based on the evaluation of the previously degraded tubes, there is no evidence of ongoing corrosion.

-- The examination of the 3 percent random sample showed no evidence of new degradation.

-- The examinations performed as a follow-up to the 1982 repairs showed no evidence of wear-type degradation and no adverse affects from the localized high plug density areas.

-- The results of the 8 x 1 examination of the upper tube sheet and kinetic expansion region were consistent with the 1983 post-expansion baseline results.

-- The lane/wedge area has a higher than average occurrence of defects and GPUN will continue to monitor this area during the next examination.

-- The characterization of the indications and the reviews of the previous data show the 1986 examination results are consistent with the 1984 examination results.

Technical Specifications (TS) 4.19.5a requires a report be submitted documenting the completed results of the steam generator tube inservice inspection. The required report will include the number and extent of tubes inspected,

characterization of each imperfection found, and identification of tubes repaired or removed from service. The inspector verified that the licensee's report was complete and contained required information.

The inspector also reviewed TDR 781, Revision 1, to establish the scope and examination types conducted by GPUN to monitor steam generator tube integrity and status of tube corrosion and wear. The inspector determined the report, as submitted, accurately characterized the licensee's findings and actions associated with eddy current inspection performed in March 1986.

As described in NRC Inspection Report 50-289/86-06, a preliminary review of the data was conducted to verify the requirements of NUREG 1094. Discussions with the licensee and final review of the data revealed that NRC Inspection Report 50-289/86-06, Section 9.3, was not precise in characterizing the licensee's findings as described in their report. In the required 3 percent random samples inspected, the licensee did find one tube with greater than 50 percent throughwall vice none as previously stated. This tube had an indication of 74 percent throughwall; however, the indication was located in the upper tube sheet at approximately 1.7 inches from the top of the tube sheet. Therefore, the defect was not in the free span governed by Technical Specification requirements, nor did it present a concern for potential primary-to-secondary system leakage. This tube was removed from service.

In addition, in the population of tubes classified as degraded, only two tubes required removal from service; however, GPUN elected to remove an additional four tubes that were in the degraded population; thus, six tubes from the degraded population were removed from service vice twenty-five as noted in the NRC inspection report. The number twenty-five should have been characterized as the total number of tubes that were removed from service.

2.2.6 Reactor Coolant System (RCS) Leak Rate

The inspector selectively reviewed RCS leak rate data for the month of August. The inspector independently calculated certain RCS leak rate data reviewed using licensee input data and a generic NRC "basic" computer program "RCSLK9" as specified in NUREG 1107. Licensee and NRC data are tabulated below. Although plant specific parameters are used, the program is somewhat generic so RCSLK9 does not consider the reactor coolant pump's No. 3 seal combined leakoff (0.1044 gpm). The correlation of licensee and NRC data is as follows.

$N_{UNIDENT} = N_{GLR} - N_{IDENT}$

CORRECTED $N_{UNIDENT} = N_{GLR} + 0.1044 - N_{IDENT}$

$= (N_{UNIDENT} + 0.1044)$ which should equal L_{UNIDLK}

L_{UNIDLK} = Licensee Unidentified Leakrate

$N_{UNIDENT}$ = NRC Calculated Unidentified Leakrate

N_{GLR} = NRC Calculated Gross Leak Rate based on RCS mass balance (which should correlate with L_{RCSLPL} - Licensee Calculated Leakage Plus Losses Term)

N_{IDENT} = NRC Calculated Identified Leak Rate (essentially reactor coolant drain tank mass change)

0.1044 = Total leakage due to No.3 RCP seal leakoff

TABLE 1

RCS LEAK RATE DATA
(All Values GPM)

DATE/TIME DURATION	L RCSLPL	N GLR	N UNIDENT (NUREG 1107)	CORRECTED N UNIDENT	L UNIDLK
8/18/86 1:41:37 2 Hours	0.2751	0.28	0.08	0.18	0.1826
9/2/86 9:40:56 2 Hours	0.1657	0.16	-0.02	0.08	0.0855

Columns 2 and 3; 5 and 6 correlate ± 0.2 gpm in accordance with NUREG 1107

The inspector concluded that the licensee leak rate determinations were in good agreement with those calculated by the NRC staff program.

2.3 Conclusion

In general, licensee management and the quality assurance department continued their involvement in site activities. The material condition of the plant remained quite good. Licensee personnel continued to demonstrate overall control during steady-state operations which included periodic maintenance and surveillance testing.

The licensee continues to have a minor problem associated with noble gas leak buildup in the auxiliary building. This appears to be coupled with the licensee's ventilation balancing problem. Resolution should occur after the utility has properly balanced the auxiliary building ventilation system during the next outage.

With respect to the "C" RCP leakage, the licensee continues to closely monitor the status of the seal. The present condition of the seal does not have an adverse effect on plant safety.

3. Radiation Protection

The licensee's radiation protection program was reviewed against applicable 10 CFR 20 and license criteria relating to personnel exposure control, radiological surveillance, and procedure establishment. Specifically, program elements reviewed included:

-- program management and organizational controls;

-- external exposure control;

-- internal exposure control;

-- radioactive material control; and,

-- ALARA.

3.1 Organization and Management Control

The licensee's Radiological Controls Department organization was reviewed against descriptions included in the Technical Specifications and the Department Organization Plan. The current organization appears effective in implementing the radiation protection plan; clear policies and job descriptions have been developed which detail responsibilities and functions. The inspector noted that the current organization includes a position, Radiological Field Operations Deputy Manager, which is not included in the Department Organization Plan. The licensee also indicated that the responsibility for implementing several radiological support functions, including dosimetry, respiratory protection, and in-plant radiological training, will soon be transferring from the Unit 2 to the Unit 1 Radiological Controls Department. This area will receive additional review subsequent to this transfer to ensure all positions are formalized and all responsibilities have been transferred (289/86-13-04).

The inspector reviewed personal resumes for selected individuals in the Radiological Controls Department and compared them to applicable license requirements relating to personal qualifications. No discrepancies in qualifications or experience were noted.

The licensee has an extensive audit program, which provides multiple levels of external and internal review of the Radiological Controls Department activities. External audits and reviews are performed by the Quality Assurance (QA) group, the Operational QA group, and the radiological assessor. The Radiological Engineering staff performs internal audits of the department. Audits and assessments produced by each group were reviewed during this inspection.

The QA group performs two audits of the Unit 1 and Unit 2 radiological protection program per year. The licensee indicated that, for audit purposes, the program had been divided into three sections each of which is reviewed every six months. A scope tracking document is used to ensure the entire program receives review. The inspector reviewed Audit No. S-TMI-85-18 (completed April 4, 1986) and noted that it appears both well organized and complete and provided a comprehensive review of program activities. This audit included an extensive review of the licensee's implementation of their ALARA review procedure.

The Operational QA department performs periodic surveillances of the operation of the Radiological Controls and Chemistry departments. A lead monitor is assigned specifically for the health physics (HP) and chemistry areas. The inspector reviewed the current lead monitor's qualifications and noted the individual possessed a strong background in the above areas. Review of selected completed surveillances indicated the surveillances were properly completed and oriented, and the monitors were very familiar with radiological controls implementing procedures.

The site radiological assessor reviews HP and industrial safety activities for both units and reports directly to the Vice President, Radiological and Environmental Controls, Health and Safety. The current assessor has been at TMI since June 1986. The inspector reviewed selected monthly reports or "assessments" extending back to July 1985 and noted these reviews generally appeared to focus on radiological housekeeping and poor work practice concerns. Specific problems apparently recurred and were mentioned repeatedly in the assessments. For example, a concern with the improper completion of radioactive material tags was noted in the October 1985, the April and July 1986 assessments. The assessor indicated although no

formal system was in place to track items, these minor deficiencies are communicated to management by the monthly report for evaluation. The inspector determined that these minor concerns were resolved by the licensee's present programs.

The radiological engineering section performs internal audits of the implementation of the radiation protection program. The inspector reviewed several of these audits and noted they provided effective technical reviews of department activities. The current controlling procedure for these audits (RCP 1652, "Internal Audits") will soon be replaced by a new procedure which is currently in draft form (9100-ADM-1201.09, "Radiological Controls Internal Assessments"). Once approved and implemented, this procedure should clearly identify specific program elements and assure that all program elements will receive review. The radiological engineering section also tracks Unit 1 radiological investigation reports (RIR's) and radiological awareness reports (RAR's). These reports provide a mechanism for identifying and developing corrective actions for radiological deficiencies and for the communication of suggestions from the radiation workers. Review of selected RIR's indicated this mechanism was generally effective in identifying causes of problems and appropriate corrective actions.

3.2 External Exposure Control

The licensee's procedure for and implementation of the radiation work permit (RWP) system appears to be effective in controlling radiological work activities and personnel exposure. Inspection effort in this area included review of current and historical RWP's, observation of radiological work activities, including preparations for a reactor building entry, and review of selected Dosimetry Investigation Reports.

Effective procedures are in place to control the use of RWP's and provide administrative control over access to high radiation areas. All RWP's reviewed appeared to have appropriate radiological controls for the work being performed. The inspector verified that all requirements of procedure 9100-ADM-4110.09, "Reactor Building Entry," had been completed prior to the reactor building entry on August 7, 1986. The HP technician providing coverage for this entry appeared knowledgeable in procedural requirements and specific radiological conditions inside the reactor building.

The inspector observed routine worker RWP sign-in's at the control point and noted workers appeared knowledgeable of their current exposure and were regularly briefed by the control point technician as to the remaining allowable exposure, the status of their radiation worker or respirator training, etc. No discrepancies involving the use of personnel dosimetry were

noted. The inspector reviewed selected 1986 dosimetry investigation reports, which are generated by the licensee for instances of lost dosimetry, misuse of dosimetry, or anomalous dosimetry results. The corrective actions and dose assignments taken by the licensee and detailed in these reports appeared to be appropriate.

The licensee's high radiation area (HRA) key control program was reviewed against 10 CFR 20 criteria and controlling procedure 9100-ADM-4110.06, "Control of Locked High Radiation Areas." The HRA key locker is located at the HP control point and is audited for accountability on a shift basis. Each lock for individual HRA's requires a unique key. Duplicate HRA keys are maintained in the control room locker. The inspector reviewed key sign-out sheets at the HP control point and verified keys were accounted for as required by the procedure. Technicians and supervisors responsible for key control were questioned and found knowledgeable concerning procedural requirements.

3.3 ALARA

The inspector evaluated the organization and implementation of the licensee's ALARA (As Low As Reasonably Achievable) program by review of selected documents and procedures, discussion with the Radiological Controls Department staff, and review of selected RWP's and associated ALARA reviews. The ALARA program appears to be adequately established. The corporate radiation protection plan includes a strong commitment to ALARA and highlights the basic elements of the program. The Department Organization Plan designates the responsibility for coordinating and implementing the ALARA program to the Radiological Engineering Section.

The inspector noted that the majority of personnel in the Radiological Field Operations and Radiological Engineering sections have not worked through a refueling outage. The licensee indicated that certain steps were being taken to provide refueling training prior to the outage. These include sending members of the Field Operations and Engineering staff to a B&W plant currently in a refueling outage and showing video tapes of a B&W refueling to all technicians in the Field Operations section. The licensee is also planning to provide an "ALARA awareness" training session to plant supervisory and management personnel prior to the outage.

The inspector verified that annual exposure goals are developed and promulgated as part of the TMI annual goals. These goals, however, are actually estimates of anticipated exposures based on previous performance and anticipated activity. Once this estimate is developed no fractional percentage is taken off to

provide a target "goal" for which to strive. The licensee indicated this was an unnecessary exercise since, due to invariable changes in work scheduling, etc., the estimate would generally vary by a percentage much greater than that percentage deducted from the estimate to provide the "goal."

The licensee's exposure goal for 1986 was 390 man-rems. As of July, approximately 96 man-rems had been expended. The licensee expected that dose expenditures would greatly increase towards the end of the year based on outage activities starting in November 1986.

Implementation of the ALARA program was evaluated by review of selected, high-exposure potential jobs and the associated ALARA review package. In July 1986, the licensee made several entries inside the cranewall in the reactor building while at 100 percent power in support of an evolution to add oil to the "D" reactor coolant pump (RCP). Performance of loop entries during power operations poses a radiological and industrial safety concern due to high radiation dose rates and ambient temperatures inside the cranewall. The inspector reviewed surveys, RWP's, and pre- and post-job briefings associated with the three entries made to support the RCP lubrication and determined the work itself was performed in compliance with station procedures and in accordance with good health physics practices. This evolution appeared to have been well planned and controlled and resultant exposures were lower than originally anticipated. Licensee effort should be directed, however, in maintaining an effective preventive maintenance program to ensure similar entries are not required. Several licensee individuals indicated additional lubrication of the "D" RCP was necessary during operation because this pump's oil reservoir was not "topped-off" at the end of the recent steam generator outage prior to resuming power operations.

3.4 Control of Radioactive Material and Contamination; Surveys and Monitoring

The licensee's program was reviewed against: (1) 10 CFR 20, "Standards for Protection Against Radiation;" (2) Technical Specifications; and, (3) station procedures relative to radiation and contamination measurement and evaluation and instrumentation.

During a facility tour, the plant was found to be well organized and maintained. Housekeeping in the licensee's radiological areas was examined and found to be adequate. Radiation areas, high radiation areas, and contaminated areas were examined. The posting and barricading of these areas was found to be consistent and in accordance with station procedures and 10 CFR 20.

Radiological surveys are performed per procedure with sufficient detail to support radiological work. Current radiation, contamination, and airborne surveys are posted at the control point to support worker briefings.

The inspector noted a pilot project consisted of posting and controlling areas containing radioactive noble gases (except radon) based on external exposure in lieu of MPC. It was further noted that surveys posted at the control point do not differentiate between areas containing airborne radioactive noble gases and areas containing other airborne radioactivity. The inspector recommended that the surveys be altered to make this distinction to preclude personnel from entering airborne radioactivity areas under the assumption that the radioactivity was due to radioactive noble gases.

A randomly chosen selection of routine and job-related radiation, contamination, and airborne surveys were removed from file and reviewed for usefulness and compared with station procedures. The survey data was found to be complete, informative, and readily available. When questioned as to what trending of routine survey data is being performed, the licensee indicated trending of routine survey data (except iodine) is not being performed at this time. Trending of routine survey data for the purpose of identifying subtle changes in radiological conditions was discussed with the licensee radiological controls staff.

Examination of the area radiation monitors (ARM) in plant was performed. ARM's were found to be well placed and in sufficient quantity to protect the workers from unexpected changes in radiation levels. The ARMS's appeared to have been source checked and calibrated in accordance with station procedures.

Within the scope of this review, no violation were observed. The licensee's program appears to be adequate. The licensee acknowledged the inspector's comments noted above.

3.5 Internal Exposure

The licensee's program was reviewed against criteria contained in 10 CFR 20.103, "Exposure of Individuals to Concentrations of Radioactive Materials in Air in Restricted Areas," Technical Specifications, and station procedures for respiratory protection.

The licensee performs respirator cleaning, maintenance, and testing in a building shared between respirator maintenance and laundry. The building and respirator maintenance inspection equipment were found to be of high quality and well organized.

Four persons were observed performing maintenance on respirators. Their qualification documentation for performing maintenance was found to be adequate. The licensee requires that personnel performing maintenance must be trained by the manufacturer.

Respirator medical examinations are under the responsibility of the corporate physician. The actual physical examination of respirator users is performed by medical doctors under contract from local communities. All persons who must be respirator qualified must undergo a physical examination prior to the required fit test or practical factors training.

Procedures for bioassay issue and control of respiratory protection equipment and respirator fit testing were also reviewed and found to be adequate.

3.6 Conclusion

Within the scope of this review, no violations were observed. The licensee's program appears to be adequate.

4. Maintenance Program Review

An inspection was performed to verify the licensee has established a program which ensures proper corrective and preventive maintenance is being conducted on plant equipment, which is required to be operational by technical specifications.

The inspector reviewed these activities to verify compliance with regulatory requirements, including those stated in the Technical Specifications; compliance with the administrative and maintenance procedures; compliance with applicable codes and standards; required QA/QC involvement; proper use of safety tags; proper equipment alignment and use of jumpers; personnel qualifications; fire protection; and retest requirements.

4.1 Maintenance Organization

The site manager of maintenance, who reports to the Operations and Maintenance Director, is responsible for the overall maintenance activities at this site. Maintenance activities consist of corrective and preventive maintenance as well as technical specification surveillances. Responsibilities and requirements for ensuring equipment reliability are specified in Administrative Procedure (AP) 1054, "Control of Environmentally Qualified Safety-Related Electrical Equipment," and Maintenance Procedure (MP) 11407-2, "Maintenance of Environmentally Qualified Safety-Related Electrical Equipment." Procedure AP 1054 contains general responsibilities and requirements

for the maintenance, plant engineering, and training departments, while MP 1407-2 is the procedure which provides instructions and guidance to the maintenance foreman and technicians. MP 1407-2 consists of direction which discusses substituting parts, item configuration, and specific test parameters that must be followed and documented.

The effectiveness of the maintenance program was evaluated by randomly reviewing completed corrective maintenance and surveillance packages to ensure that the criterion of procedure 1407-2 were documented in the work packages.

The inspector also verified that the electrical/mechanical maintenance personnel have received training on the referenced AP's.

The inspector had no further questions in this area.

4.2 Maintenance Activities

4.2.1 Program Implementation

The inspector held discussions with the electrical and mechanical maintenance supervisors to evaluate those controls in place to identify, schedule, track, complete, and document both preventive and corrective maintenance activities. The work order form is used for scheduling, dispatching, and recording the results of task assignment. Replacing of safety-related items is defined in procedure 1000-ADM-7317.01.

The inspector reviewed the records of selected maintenance activities performed on safety-related equipment to verify that:

-- required administrative approvals were obtained prior to initiation of work activities;

-- appropriately approved procedures, instructions, and drawings were used;

-- post-maintenance testing was completed prior to returning equipment to operation or storage;

-- hold points were identified and completed or in the process of being completed;

-- qualified test equipment and tools used were recorded and identified in the data records;

-- data sheets were properly completed;

-- acceptance criteria was defined and verified if met; and,

-- records were assembled, stored, and retrievable as part of the maintenance history.

During the course of the inspection, observations were made of the following in-progress maintenance activities on safety-related equipment.

-- General Electric AK-25 breaker preventive maintenance

-- Westinghouse DB-25 and 50 breaker retrofit program

-- Weekly test of the safety-related batteries.

In each of the maintenance activities above, the inspector's observations verified that the following maintenance tasks were accomplished.

-- Work orders were issued to perform the tasks and all required portions were completed;

-- Approved, up-to-date procedures were used and followed by the maintenance personnel performing the task. In the DB-25 breaker retrofit task the maintenance personnel also used the vendor manual written for this effort.

-- Operational personnel in the above examples were notified prior to and upon completion of each maintenance task prior to test completion.

-- Properly specified parts and materials were identified for each activity listed above.

-- Calibrated test equipment was used during the maintenance work. The maintenance personnel also recorded the serial numbers of the various test equipment used on the task data sheets.

The inspector reviewed the qualification summary records for the electrical/mechanical maintenance personnel performing the above maintenance tasks. In addition to their normal training program, these specific maintenance personnel completed the Westinghouse training program on the retrofitting of

the DB-25 and DB-50 breakers. The inspector determined through discussions with the maintenance personnel and witnessing their work on the above equipment that they were in compliance with the maintenance training program developed by Westinghouse.

4.2.2 Maintenance Inspections

The inspector witnessed the maintenance work that was performed on the following safety-related equipment.

-- General Electric AK-25 Breaker No. CB-2 was removed from service and bench tested per Preventive Maintenance Procedure E-36, Revision 13, dated August 8, 1985. The maintenance personnel recorded the as-found condition and compared the readings with the test results that were recorded at the last scheduled test that occurred during February 1986. The inspector verified that the readings were within the acceptance criteria referenced in the procedure.

The inspector also verified that the maintenance personnel performed the following procedural step during the breaker service checks:

-- test equipment encompassed the range of the specified requirements;

-- breaker was protected prior to and during the maintenance work; and,

-- the work area was clean, dry, and protected.

4.2.3 Westinghouse DB-25 and 50 Breaker Retrofit Program

The licensee is converting their DB breaker from a device using an electro-mechanical tripping system to one which uses solid-state tripping.

The inspector witnessed the retrofitting of DB-25 Breaker Load No. NR-P-1A. The modification was performed in accordance with Westinghouse Vendor Manual VM-TM-0102, Procedure E-5, "PM Electrical Preventive Maintenance, 480-Volt Circuit Breaker," and time/current curves per Drawing IB-733-15-1025. Prior to performing the retrofit modification, the breaker received a complete preventive maintenance

inspection. After completing the retrofit modification program, the breaker was tested per Section 7.0 of Procedure E-5.

In reviewing the retrofit program, the inspector identified one concern. Specifically, the licensee was not able to provide records of the seismic analysis for this modification (including mounting bracket design). This item is considered unresolved pending review of this information (86-13-06).

4.2.4 Maintenance Staffing

The number of maintenance personnel appears to be adequate to perform the current maintenance work levels. The personnel training records were up to date with both maintenance craft and supervisor personnel attending classes during this inspection period.

No unacceptable conditions or violations were observed.

4.3 Quality Assurance/Quality Control Interfaces

The inspector ascertained that the licensee has developed and implemented program control and evaluation techniques that comply with the surveillance testing, calibration, and inspection criteria required by Section 4 of their Technical Specifications.

4.3.1 Audits

The inspector reviewed the licensee's audit program to verify implementation of the program elements required by 10 CFR 50, Appendix B, Criteria XVIII and Section 17.2 of the FSAR. In addition, several audit reports containing deficiencies and/or comments were reviewed for content, timeliness of answers, the qualifications of the individuals performing audits, and the audit schedules.

4.3.2 Audit Report

The following audit report was reviewed by the inspector to verify that the licensee was in compliance with the TMI-1 Technical Specifications and procedure 1000 ADM-1291.01, "GPU Nuclear Safety Review and Approval Procedure." Audit S-TMI-85-05,

which was performed during the period of April 15 - May 10, 1985, reviewed seven disciplines. "Maintenance Activities" was one of the seven disciplines audited.

The audit findings were identified to the licensee's management for corrective action. Corrective action for the portion of the audit dealing with the "Maintenance Activities" was technically adequate and performed within a reasonable length of time.

Conditions identified in this audit and the corrective action implemented by the maintenance organization was reflected in the maintenance task witnessed by the inspector during this inspection period.

4.3.3 Quality Control

During the retrofit of Westinghouse DB-25 Breaker No. NR-P1A, the quality control inspector witnessed the final acceptance test of the modified breaker per the requirements of procedure E-5. "PM Electrical Preventive Maintenance Procedure, 480-Volt Circuit Breaker." The quality control inspector was knowledgeable of the work being performed and of the acceptance testing required on this breaker.

4.4 Conclusion

The inspector noted that the licensee's administrative control program controlling safety-related maintenance and I&C activities was consistent with the plant Technical Specifications (TS), Regulatory Guide 1.33, ANSI N-18.7 and Appendix B, Part 10, CFR 50. The maintenance program, which includes both preventive and corrective maintenance activities, was in compliance with the above requirements.

No violations were identified.

5. Followup of Previous Inspection Findings

5.1 The inspector reviewed licensee's followup on previous inspection findings. For each finding, a review was done to ensure the licensee's actions were timely and complete. In addition, a technical review of the applicable subject material was independently reviewed by the inspector to ensure that the licensee's corrective actions or modifications were performed in accordance with applicable standards for procedures and was adequate.

5.1.1 (Closed) Followup Item (289/82-19-03): Licensee to reinforce duct segments subject to collapse. Remaining action on this item consisted of a licensee-initiated repair/modification to some sections of the control building emergency recirculation fan duct work to prevent damage when the duct work was subjected to negative pressures from improper damper positions or clogged filters.

During the outage conducted in March and April of 1986, the licensee completed a modification to the subject duct work. The duct work was replaced and both internal tie rods and external bracing were added to the duct work to alleviate the potential for failure. This modification was completed under B/A No. 412404. The inspector reviewed the installation and the documentation associated with this modification. The modification appears to have alleviated the initial concern about the strength of the subject duct work, but another concern was identified.

The safety evaluation for seismic considerations did not consider whether a significant change was made to affect seismic concerns. The inspector did not find enough analysis or calculations available in the modification package to properly address the seismic evaluation of this modification. For administrative purposes, 82-19-03 is closed, but additional evaluation of the seismic design of this modification is required. This item will remain unresolved pending additional NRC review of licensee completed action in this area (289/86-13-05).

5.1.2 (Closed) Followup Item (85-LO-03): LER on December 31, 1985, reactor trip on high pressure due to main generator lockout relay trip. The inspector reviewed the LER submitted by the licensee to verify completeness, assessment of safety consequences, and corrective action. The licensee could not positively determine the cause of the relay malfunction. Both improper setting and setpoint drift were examined, but neither could be established as the exact cause of failure. All plant responses were normal for this event as discussed in detail in Inspection Report No. 289/85-28.

5.1.3 (Closed) Unresolved Item 289/85-15-02: Cleanliness requirements of internals of electrical panels. During the inspection in April 1985 of the Transzorb Diode modification (Job Tickets associated with MV-V-3 and IC-V-3 and work package A17B-54B16), the

inspector had determined that the work areas and the equipment were not being maintained as specified in the Unit 1 Administrative Procedure 1020, "Cleanliness Requirements."

The licensee had personnel retrained in this area and a QA/QC Audit No. S-TMI-85-05 was conducted. The audit findings identified areas in the quality control program that required changes. Training clarifications were also identified. The inspector verified that the audit findings have been closed with referenced changes completed. During the DB-25 breaker retrofit program (which is discussed in this report), the inspector noted that cleanliness requirements were detailed in the procedure and that the craft personnel had received their training on the site program for maintaining equipment cleanliness.

5.1.4 (Closed) Violation (289/85-22-01): Improper installation of scaffolding in the vicinity of nuclear safety-related equipment. During this inspection, the inspector verified that Maintenance Procedure (MP) 1440-Y-3, "Scaffolding Inspection," has been revised to require compliance with MP 1401-18, "Equipment Storage Inside Class 1 Building." This change is to remind personnel that both procedures are to be complied with. Also, documentation was reviewed which showed maintenance supervision has been briefed on the necessity to follow both MP 1401-18 and 1440-Y-3 and that the Director of Unit 1 has briefed operations and maintenance personnel on the requirements for procedural compliance, the need to improve work habits, and other matters.

Additionally, a memorandum from the manager of TMI QA Modifications/Operations was reviewed, which described the increased QA monitoring which was performed in response to this violation. The memorandum identified QA monitoring findings, management actions resulting from an evaluation of the findings, and the plan to continue the increased monitoring. Routine NRC inspection findings have not identified a repetition of this violation.

5.1.5 (Closed) Violation (289/85-25-03): Posting of uncontrolled and unapproved drawings and procedures on instrument cabinet doors. The licensee's corrective action to avoid further violations included changes to a procedure which required the removal of unauthorized paper posted inside cabinets as part of

cabinet cleaning and the inclusion in the procedure of a list of cabinets which are a part of the cabinet cleaning and inspection program. This list was to include the cabinets identified in the violation.

During this inspection, the inspector verified Preventive Maintenance Procedure E-10, Revision 8, dated March 3, 1986, "Relay Cabinet/Control Cabinet Inspection," had been changed to include the corrective action. Also, a spot check of control room radiation monitoring and instrument cabinets indicated that no unauthorized drawings or instructions were posted inside cabinets. In addition, routine inspections have not identified a repetition of this specific violation but drawing control continues to be a problem as noted in recent PAT inspections.

5.1.6 (Open) Unresolved Item (289/85-25-05): Main Steam Safety Valve Abnormal Performance. The NRC Inspection No. 50-289/85-30 updated this item with a licensee commitment to provide a schedule and course of corrective action for the technical problem by April 1986. Original NRC review identified that, on a high power reactor trip, the main steam safety valves (MSSV's) apparently took pressure control away from the turbine bypass valves (TBV's) and atmospheric dump valves (ADV's) in that full open demand signals are not sent to TBV's and ADV's with MSSV's periodically lifting and seating. The safety concern is that the periodic challenging of an MSSV could cause one or more valves to fail open, resulting in a significant and uncontrolled cooldown on the reactor coolant system. In a letter, dated April 18, 1986, the licensee concluded that their evaluation showed the MSSV system was fully capable of performing its design function and that it does not constitute a safety concern. They did acknowledge that the technical problem was to be addressed by the B&W Owners' Group Trip Reduction and Transient Response Improvement Program.

The licensee's letter briefly described the results of their testing of MSSV performance during the January 2, 1986, full power (88 percent) trip. The licensee extensively monitored MSSV performance using limit switches for valve position, thermographic and conventional video tape recorders were used for recording valve lift sequences, and normally installed (local) acoustic monitors for the detection of at least one valve opening.

A summary of the problems found is as follows.

-- TBV and ADV full open demand signal did not occur with main steam header pressure at MSSV setpoint actuation (1040 - 1092.5 psig).

-- Two MSSV's performance could not be fully explained. MS-V17B lifted three times. MS-17C did not open until 1055 psig with a setting of 1046 psig. The licensee committed to replace these valves during the Cycle 6 refueling outage.

-- Acoustic monitor data was inaccurate when compared to video tape data and visual observation in terms of identifying which MS header had a lifting MSSV.

With respect to the above information, the inspector concluded that the technical problems noted above persisted and could cause a safety concern if improper operator action occurs. In the interim, operators are instructed to reduce MS header pressure using manual control of the TBV to assure seating of the MSSV's. This mitigates the potential safety concern.

Region I will continue to follow licensee corrective actions as noted above and will continue to follow up on the efforts of the B&W Owners' Group, which has formally adopted this technical issue into their reassessment program. Accordingly, this item remains unresolved.

5.1.7 (Closed) Violation Item (289/85-27-01): Failure to establish and properly change procedures for safety-related activities as required by Regulatory Guide 1.33 and Technical Specifications 6.8.1. The licensee has revised administrative instructions for conduct of operations (AP 1029) and procedure utilization (AP 1001G) to require a review of situations where no procedures exist and to evaluate the circumstances and determine if procedures or other administrative controls are required. This guidance is similar to the requirements for control of station activities in the Operations Quality Control Manual, Section 6.11.1.3.

The licensee has also issued a memorandum from the TMI-1 Director's office to all personnel emphasizing the importance of having adequate procedures and using proper procedure compliance. The bi-annual procedure review was emphasized as a vehicle to review, revise, and strengthen procedures to prevent challenges to plant safety systems. As noted by the licensee, this new procedure guidance and emphasis by management on proper use of station operating and maintenance procedures has reduced the number of problems created by inadequate procedures and procedure noncompliance.

Since the inception of these new requirements, the inspectors, during routine inspections, have not noted any significant instances of where inadequate procedures have caused safety issues.

In one instance, the reactor trip of June 2, 1986, (see Inspection Report 50-289/86-09), a procedure for secondary plant electrical work was inadequate. This, combined with a faulty breaker, caused the trip. The inspector reviewed the referenced procedure change and related guidance promulgated by the Director, TMI-1. The inspector concluded that although the guidance is not totally specific enough to address individual situations, it has proven adequate to raise the level of concern among station personnel regarding procedure compliance and use of correct procedures.

The inspectors will continue to review licensee actions regarding proper procedure establishment and changing procedures.

5.1.8 (Closed) Violation (289/85-27-07): Failure to properly review for adequacy administrative control procedures on the independent verification of equipment control measures. As noted in the licensee's response, it will take a complete cycle of the required periodic procedure review process to ensure that any other possible inconsistencies related to independent verification not already identified are noted. During this inspection, additional corrective actions committed to by the licensee were verified as follows.

-- Documentation was reviewed which verified information on the independent verification program was provided to shift supervisors and their crews, electrical maintenance personnel, maintenance personnel, and utility personnel.

-- AP 1001K, "Periodic Procedural Review," was changed to include a step to ensure that if the placement/removal of electrical jumpers, temporary mechanical modifications, and/or lifted leads that the change complied with AP 1013, "Bypass of Safety Functions and Jumper Control."

- By memorandum dated March 10, 1986, the PRG chairman cautioned all PRG members to fully consider the potential impact of one procedure change on other procedures and that PRG members assure that procedures they own or review reflect appropriately expanded requirements of AP 1030.

5.1.9 (Closed) Inspector Follow Item (289/85-27-10): The licensee is to correct procedural deficiencies identified in Independent On-Site Safety Review Group (IOSRG) Procedure 6310-ADM-1010.01. During this inspection, the inspector verified the procedural deficiencies, which had been identified, relating to records retention, preparation of reports, and documentation of safety evaluations had been corrected.

IOSRG Procedure 6310-ADM-1010.01, Revision 4, dated March 25, 1986, was verified to have been changed to (1) correctly specify records retention in the computerized data base in accordance with Administrative Procedure (AP) 1064, (2) specify the IOSRG reporting requirements to agree with the actual way in which the IOSRG issues reports, and (3) specify IOSRG's responsibilities relating to review of safety evaluations.

5.1.10 (Open) Followup Item (289/85-30-03): Audit tracking system of radiation protection program; individual elements not in place to assure all program elements receive review. The licensee has developed procedure 9100-ADM-1201.09, "Radiological Controls Internal Assessments," which is currently in the review cycle. This procedure divides the radiological controls program into specific sections and designates the radiological engineering manager as responsible for

ensuring that major sections all receive review. This item can be closed once the procedure has been approved (see also paragraph 3.1).

5.1.11 (Closed) Followup Item (289/85-30-04): High radiation posting area. The item concerned the briefing of licensee technicians regarding a high radiation area posting problem caused by changing radiological conditions. The licensee issued a memo which was included in the HP technician reading book and which described the high radiation area posting problem and emphasized the need to post based on whole body dose rates. The inspector determined licensee HP technicians had read and signed off on the memo.

5.1.12 (Open) Information Notice 289/86-IN-53: NRC Information Notice 86-53. This describes a potential generic safety problem involving improper installation of heat shrinkable tubing over electrical splices and terminations. The inspector verified that the licensee has issued procedure 1420-Y-24, "Installation of Ray-Chem Splices," which is used at this site in the support of procedures 1420-Y-23, "Installing Wire and Cable," and 1420-Y-15, "Cable Splices and Connector Insulation." Ray-Chem Manual VM-TM-0144 (which describes the approved methods of using the Ray-Chem splice material) is used in training at this site and is referenced in Maintenance Procedures 1407-1, 1407-2, and 1420-Y-24. A revision to procedure 1420-Y-24, which is in progress during this inspection period, is addressing the problems associated with shrinkable tubing and the effect on bending radius that can occur.

This item is still considered open pending NRC review of revised procedure 1420-Y-24 addressing the allowable bending radius subject (86-IN-53).

5.1.13 (Closed) Followup Item (289/86-01-02): Special report on RPS breakers as a result of the failure of a shunt trip device. The licensee submitted a report on this event in the form of LER No. 86-003, dated February 14, 1986. This LER was reviewed in NRC Inspection Report No. 289/86-05 and the event itself was reviewed in detail in NRC Inspection Report 289/86-01.

5.1.14 (Closed) Inspection Follow Item (289/86-01-03): Special Report on ICS Event. The licensee agreed to provide a special report on the partial loss of ICS on January 24, 1986. On May 28, 1986, the licensee submitted this report to NRC Region I. The inspector reviewed the special report and verified the licensee's corrective actions were complete and that the lessons learned had been or will be incorporated into applicable procedures. Modifications to change several ICS modules were reviewed and found acceptable. The inspector considers this item closed.

5.1.15 (Closed) Unresolved Item (289/86-01-05): Corporate safety review and approval procedure to address both the frequency and the content of technical specification-required report of safety reviews. During this inspection, the inspector verified that the corporate GPU Nuclear Safety Review and Approval Procedure 1000-ADM-1291.01, Revision 1, effective September 1, 1986, had been revised to specify the preparation of the technical specification-required report of independent safety reviews be prepared and transmitted at least annually to the responsible division director. It was decided by the licensee that the corporate procedure would only specify the frequency of the required report. The reports are intended to assist the individual division directors in carrying out their responsibilities. Consequently, the content will be determined by their individual needs. The inspectors had no further questions relative to this matter.

5.1.16 (Closed) Violation Item (289/86-05-02): Failure to survey for airborne radioactivity. The inspector reviewed the licensee's corrective actions as described in their response to the Notice of Violation. The licensee's actions included: (1) modification of counting equipment software to allow rapid sample analysis; (2) counselling of involved personnel regarding communication problems at shift turnover; and (3) procurement of charcoal absorbers to provide iodine cleanup capability.

The inspector reviewed the licensee's corrective action in this area. The counting system software has been modified to allow the selection of 100, 500, or 1000-second counting times. This will allow the technicians to process a large amount of samples more rapidly, although the methodology will have to be more closely examined to ensure that the proper sample count time is used to ensure accurate results.

A new procedure, No. 9100-OPS-4224.34, "Operations an Filter Replacement of Portable Ventilation," was written and issued to describe the installation and use of the new charcoal filter units. This procedure was reviewed by the inspector and appears to be adequate.

5.1.17 (Closed) Violation Item (289/86-05-06): Failure to post a radiation area. The licensee's corrective actions were completed as described in their response to the Notice of Violation and included counseling of the involved individual, notification of all HP technicians on the incident, and completion of an internal investigation.

5.1.18 (Closed) Unresolved Item (289/86-05-07): Licensee to review events causing worker contamination during steam generator maintenance. The licensee performed an effective internal investigation of the contamination event and has developed recommendations which should preclude a similar contamination in the future.

5.2 Conclusion

The review of licensee's followup on outstanding items indicated the licensee was taking timely and proper corrective actions associated with each item. For the items that remain open, the licensee is actively pursuing resolutions of the issues. The inspector concluded that the licensee's technical approach to the different issues addressed above were adequate. In general, the licensee's system for resolving and completing outstanding items was found to be acceptable.

6. Exit Interview

The inspectors discussed the inspection scope and findings with the licensee management at a final exit interview conducted September 8, 1986. Licensee personnel attending the final exit meeting included the following:

G. Kuehn, Manager, Radiological Controls, TMI-1
C. Incorvati, Audit Supervisor, TMI-1
S. Otto, TMI-1 Licensing Engineer

The inspection results, as discussed at the meeting, are summarized in the cover page of the inspection report. Licensee representatives indicated that none of the subjects discussed contained proprietary or safeguard information.

Unresolved Items are matters about which information is required in order to ascertain whether they are acceptable items, violations, or deviations. Unresolved item(s) discussed during the exit meeting are documented in paragraphs 4.2 and 5.1.