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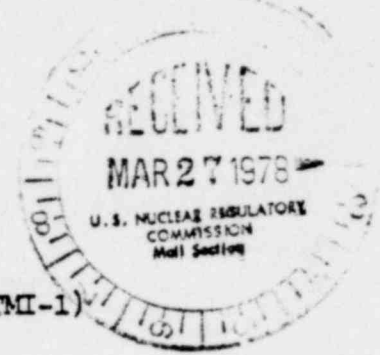
March 16, 1978

GQL 0330

Mr. B. H. Grier, Director
Office of Inspection and Enforcement
Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289



In response to your letter of September 19, 1977, we have attached two copies of 1) Summary of Operating Experience, and 2) Summary of Safety Related Maintenance for Three Mile Island Nuclear Station, Unit 1.

Sincerely,

J. G. Herbein
Vice President-Generation

JGH:DGM:cjg

Attachments

cc: Director (40 copies)
Office of Inspection & Enforcement
c/o Distribution Services Branch, DDC, ADM
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Director (2 copies)
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SUMMARY OF SAFETY RELATED MAINTENANCE

The following is a chronological description of the unit's safety related maintenance for the twelve-month period ending December 31, 1977.

January

There was no safety related maintenance performed during this month.

February

There was no safety related maintenance performed during this month.

March/April

Prior to the refueling outage, Main Steam Safety Valve testing was accomplished on MS-V17B, 18B, 20B, and 21A. Results showed that only one (1) valve failed the initial test. MS-V21A required adjustment to meet the trip testing requirements.

During the Refueling Shutdown various safety related work was performed.

1. Diesel Generator mechanical inspection was conducted at the request of Fairbanks Morse. The Diesel Generator inspection resulted in changing the cam rollers and cam shafts. Also, the diesel BF-D relays were replaced by the Electrical Maintenance Department. Only one diesel was placed out of service at a time while the above work was accomplished. Upon completion of the diesel generator work, each diesel was operated and tested, both unloaded and loaded, before declaring them operable.
2. RC-PlA #1, #2, and #3 Seal inspection, RC-PlA motor inspection, RC-PlD #2, and #3 seal inspection and RC-PlD motor inspection were accomplished during the outage. The seal inspection required prior draining of the RC System, removing seals, and installing blank flanges to allow flooding the fuel transfer canal. The seals were then inspected concurrent with the fuel shuffle. Various parts of the seal assemblies were replaced as a result of the inspection. The motor bearings for these pumps were inspected and resistance measurements were taken. Oil hoses for these pumps were replaced. Also, oil hoses were inspected and replaced on RC-PlB and 1C motors.
3. RC-RV1A/1B set points were increased in accordance with Technical Specification requirements and leak tested. Both valves satisfactorily passed a pop test and leakage test and were replaced on the pressurizer.
4. DH-V5A/B were repaired. DH-V5A/B had been leaking prior to the refueling outage. Due to unavailability of replacement parts, repair of DH-V5B was delayed while DH-V5A was repaired. DH-V5B stem had been bent slightly during operation and was replaced upon completion of DH-V5A repairs.
5. Local Leak Rate Testing resulted in repair of the following valves:

- A. IC-V3
- B. IC-V4

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- C. RB-V7
- D. CA-V4A/B
- E. AH-V1A/B
- F. WDG-V4
- G. CA-V5A/B

There were also some minor packing leaks on other containment isolation valves which required corrective action.

6. MU-C1A developed a leak during Cycle II operation and was replaced during the refueling outage.
7. Eddy current indications in the "B" OTSG led to the stabilization and plugging of six (6) tubes. During the month of April more possible indications were identified by B&W resulting in further Eddy Current testing. Extensive examinations of results showed that additional tube plugging was not warranted in the "B" OTSG.
8. Circ Water Pump and Valve operator repairs were required when the casing cracked on CW-P1D while starting up the Circ Water System. This resulted in all equipment in the Circ Water House being submerged for approximately 6 hours. The motors were sent out for drying, while the CW-Pump bearings were removed, flushed and reinstalled, and the casing for CW-P1D was replaced. CW-V1F body was replaced after discovering a badly worn rubber seat. The CW-Pump motors are being aligned and coupled and will be tested prior to being placed in service.
9. AH-V1A/1B/1C bearing inspection and lubrication were performed as a result of an NRC commitment. All bearings were found to be performing satisfactorily.

May

1. Further eddy current testing resulted in plugging two (2) tubes in the "A" OTSG due to wall thinning. The tubes were plugged as a preventive maintenance measure to prevent a future primary to secondary tube leak. Additional eddy current testing of OTSG "A" and "B" revealed no other tubes required plugging.
2. During the snubber test program repairs were performed on those snubbers which failed to lock up. The repairs included replacement of snubbers, rebuilding snubbers, purging and adjusting snubbers. All snubber work (repairs, retests and installation) was completed prior to heating the RCS above 200°F.
3. OTSG "A" and "B" upper high level sensing connections, lower high level sensing connections, and the drain connections were magnetic particle tested to determine where there were any weld deficiencies. Repairs were performed in accordance with section III ASME Code (1972 edition) on three (3) out of six (6) connections on the "A" OTSG and one (1) out of six (6) connections on the "B" OTSG. The repairs were performed with the secondary side of the OTSG drained below the sense connections.

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4. During the startup phase of the Refueling Outage, a vibration signal was discovered on the OTSG "A" loose parts and vibration system. Further investigation of the vibration revealed a loose washer on the OTSG LOCA restraint bolts. Subsequent inspection of all OTSG LOCA restraint bolts revealed there were several loose bolts on both OTSG's. Repairs to the loose bolts included slugging the bolts tight and welding lock tabs in position to prevent the bolts from vibrating loose. All work was performed with the Reactor at the Hot Shutdown Condition.

June

There was no safety related maintenance performed during this month.

July

Nuclear Services-River Water Pump (NR-P1C) shaft fractured at the coupling while in the process of switching control breakers for NR-P1B. The motor for NR-P1C was uncoupled and removed to repair the damaged shaft. Repairs included replacement of shaft, pump assembly, and alignment of pump to motor. Vibration readings were taken before coupling of pump to motor. After the motor and pump were coupled, vibration readings were taken. Coupling adjustments were made to minimize the motor running current. Both vibration readings and current measurements were satisfactory and the pump was returned to service.

August

There was no safety related maintenance performed during this month.

September

Decay Heat Pumps 1A and 1B

The Decay Heat Pumps 1A & 1B were inspected during this month for possible shaft defects per NRC request. The following work/inspection was performed on each pump:

1. IRD readings were taken.
2. Pump to motor coupling removed.
3. Ultrasonic test of pump shaft.
4. Analysis of UT results.
5. Coupling of pump to motor.
6. Testing of pump and declaring pump operable.
7. Return pump to service.

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Each pump was taken out of service separately to perform the above work. Results of UT and IRD readings were satisfactory for both pumps. All work performed on each pump was completed within the time limits set forth in the technical specifications.

Reactor Coolant Pump 1A

On September 19, 1977, while starting the RC-P's for plant startup, RC-1A tripped due to loss of voltage. Inspection of RC-1A's motor leads revealed

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a phase to ground short had occurred near the local bus and cable connections. Repairs included removal of tape from cable leads and local bus bar, cleaning of cable and bus bar connections, replacement of cable from motor to local bus bar, tightening of all connections, retapping, disconnecting and replacing surge capacitor, meggering of motor, replacing panel covers, testing pump and returning pump to service.

During the repairs of RC-PIA, RC-PIB and 1D motor connections were also inspected. The inspections included removal of tape from motor leads and local bus bar connections, checking connections for signs of deterioration, cleaning and tightening connections, retapping, disconnecting of surge capacitor, meggering of motor, reconnecting surge capacitor, replacement of panel covers, testing of pumps, and returning pump to service. Results of inspections were satisfactory.

October

The DH-P's 1A&1B were inspected during this month for possible shaft defects. The following work/inspection was performed on each pump:

1. IRD readings were taken.
2. Pump to motor coupling removed.
3. Ultrasonic test of pump shaft.
4. Analysis of UT results.
5. Coupling of pump to motor.
6. Testing of pump and declaring pump operable.
7. Return pump to service.

Each pump was taken out of service separately to perform the above work. Results of UT and IRD readings were satisfactory for both pumps. All work performed on each pump was completed within the time limits set forth in the technical specifications.

November

Decay Heat Pumps "A" and "B" were inspected during this month for possible shaft defects. The following work/inspection was performed on each pump:

1. IRD readings were taken
2. Pump to motor coupling removed
3. Ultrasonic test of pump shaft
4. Analysis of UT results
5. Coupling of pump to motor
6. Testing of pump and declaring pump operable
7. Return pump to service

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Each pump was taken out of service separately to perform the above work. Results of UT and IRD readings were satisfactory for both pumps. All work performed on each pump was completed within the time limits set forth in the technical specifications.

DP-PIA end bell was replaced after discovering a slight crack in the end bell. Work included:

1. Testing of redundant component
2. Disassembly of pump to motor coupling

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3. Disassembly motor end bell
4. Replacement of end bell
5. IRD readings
6. Testing of pump and declaring pump operable
7. Returning pump to service

Work was completed within time specifications set forth in technical specifications. Test results were satisfactory.

December

DH-PlA and 1B were inspected on December 5 and 6 respectively for possible shaft defects.

The following work/inspection was performed on each pump:

1. IRD readings were taken
2. Pump to motor coupling removed
3. Ultrasonic test of pump shaft
4. Analysis of UT results
5. Coupling of pump to motor
6. Testing of pump and declaring pump operable
7. Return pump to service

Each pump was taken out of service separately to perform the above work. Results of UT and IRD readings were satisfactory for both pumps. All work performed on each pump was completed within the time limits set forth in the Tech Specs.

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SUMMARY OF OPERATING EXPERIENCE

The following is a chronological description of the unit's operations for the twelve month period ending December 31, 1977.

January

The unit operated at full power for the entire month.

February

Except for the turbine oil trip outage, described below, the unit operated at full power for the entire month.

On February 3, 1977, during the weekly performance of the Turbine Oil Trip Test, the trip device failed to actuate, to verify proper mechanical overspeed protection, and to exercise the mechanical overspeed trip linkage and oil trip valve. In order to accomplish some preliminary trouble shooting, the unit was later reduced to approximately 92% power for two periods of 10 and 15 minutes on February 3, 1977. On February 4, 1977, the generator was taken off line and a tube fitting in the oil supply line to the oil trip solenoid valve was repaired. During the repair work, the Reactor plant remained at approximately 10% power.

March

The unit operated at essentially full power, with the exception of physics testing on March 5, 1977, and main steam safety relief valves testing on March 12, 1977, until March 18, 1977, at 2200 when it was shutdown to commence the refueling outage. The unit remained shutdown for the balance of the month.

April

The unit was down for refueling the entire month.

May

Unit 1 returned to power operation following the 1977 Refueling-Maintenance Outage on 5/16/77 and attained 100% power on 5/20/77. The unit then continued at essentially full power for the remainder of the month.

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June

Except for the 50% power reduction on June 17, 1977 to conduct turbine stop valve testing, Unit 1 continued at essentially 100% full power operation for the entire month. The monthly turbine valve testing is performed at 50% power to eliminate what has been surmised to be one possible mechanism of OTSG tube failures. That is, valve testing at reduced power minimizes the steam flow transient within the steam generator.

July

The Unit operated at essentially full power for the entire month except for the brief power reductions experienced on 7-7 and 7-16. The unit reduced power to approximately 70% on 7-7-77 in order to reduce the load on the main transformer. An inadvertent trip of the main transformer fire service deluge system (due to a faulty detector) caused the transformer cooling fans and oil pumps also to trip. In order to prevent exceeding temperature limitation on the transformer cooling oil, temporary load shedding was initiated. The unit was returned to full power within 22 minutes. On 7-16-77, the unit was reduced to approximately 50% to perform the scheduled turbine stop valve testing. The unit was returned to full power within two hours and fifty minutes.

August

The unit operated at essentially full power for the entire month except for the planned power reduction experienced on 8-20-77.

On August 20, 1977, the unit was reduced to approximately 50% power to perform the scheduled turbine stop valve testing. While at the reduced power, the "A" string of Feedwater Heaters was isolated to repair a leaking Heater Drain Valve (HD-V2A). With the "A" FW Heater String isolated, the unit escalated back to 100% power at a slightly reduced load (approximately 30 MWe) after 2.5 hours. Completion of the valve repair work required an additional 24 hours, at which time the unit returned to full load.

September

TMI-1 operated at essentially full power until September 14, 1977 at 2320, when the unit reduced power to 50% in order to investigate the cause of what appeared to be condenser tube fouling. While operating at 50%, inspection of the condenser revealed some tube blockage and significant screen blockage of the "Amertap" Condenser Cleaning System.

As a result of the contamination of the condensate and feedwater systems on 9-16-77 with I.W.T. Regeneration Acid, OTSG's Chemistry went out of specification in conductivity and pH, and forced the unit to be immediately shutdown.

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On 9/19/77, after commencing plant heat-up, the "A" Reactor Coolant Pump tripped on overload when started. Plant heat-up was delayed to inspect and repair RC-P-1A. Approximately six inches of one phase of the RC-P-1A motor lead had been destroyed due to a loose connector at the motor. Repair of RC-P-1A and subsequent inspection of the connectors in RC-P-1B and RC-P-1D further delayed plant startup.

On 9/24/77 while increasing the generator field voltage in preparation for closing the main generator breakers, the generator and turbine tripped due to a generator ground within the Isolated Phase Bus Duct Cooling System. The Bus Duct had collected moisture while the unit was off the line and once this moisture was removed, the ground was corrected. On 9/27/77 the unit was brought back on line and remained at full power for the remainder of the month.

October

The unit operated at essentially full power for the entire month except for the planned power reduction on 10/22/77 to conduct the turbine stop valve testing.

Monthly inspections of the Decay Heat Removal Pump shafts were initiated in September 1977, per our commitment to the NRC. These inspections which include both vibration and ultrasonic testing are intended to provide additional assurance of the pump shaft reliability.

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November

The unit operated at essentially 100% power for the entire month except for the two brief unplanned forced reductions of November 14, 1977 and November 17, 1977.

Monthly inspections of the Decay Heat Removal Pump shafts continue. In addition, the recirculation orifice on both Decay Heat Removal Pumps was removed in order to increase the minimum recirculation flow.

The unit tripped from 100% power at 0757 on November 14, 1977, due to a module failure within the Integrated Control System (ICS). The actual generated megawatt signal feedback to the ICS failed low causing the ICS to increase reactor power, steam, and feedflow to correct for the seemingly large error between the megawatt demand and actual generated megawatts. The Reactor Protection System tripped the reactor approximately one minute after the ICS module failure. The module was repaired and the unit was brought back on line by 1620 hours, November 14, and the unit attained full power by 2320 hours, November 15, 1977.

While operating at 100% power, the unit experienced an ICS runback to 55% power due to an erroneous Group One "in-limit" indication. The runback occurred at 1413 hours on November 17, 1977. The erroneous Group One in-limit indication cleared by itself and the unit returned to full power by 1448 hours, November 17, 1977. Subsequent trouble shooting revealed excessive moisture on the affected control rod position cable trays due to a leaking roof.

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December

The unit operated at essentially 100% power for the entire month of December with the exception of the following two events.

On 12/3/77, a normal reactor shutdown was started because of a violation of containment integrity at the Personnel Access Door. Because of failure of the door actuating cam roller, the inside door equalizing valve did not fully close, causing the containment integrity violation. The door was repaired, containment integrity re-established, and full power operation restored after reducing to about 86% full power. Total elapsed time at a reduced power level was about one hour.

On 12/11/77, the unit was reduced to about 50% to conduct the monthly turbine stop valve testing. The unit returned to full power within 3.3 hours.

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