



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SUPPLEMENT SAFETY EVALUATION REPORT
THREE MILE ISLAND UNIT 1
PUMP AND VALVE INSERVICE TESTING (IST)

The following safety evaluation refers to items left open in Amendment 71 to the TMI-1 operating license which was issued on August 3, 1981. Item designations correspond to those of Table 2.2 of that SER.

Item A.1

Pumps SW-P2A/B (Screen House Ventilation Equipment Pump) and AH-P3A/B (Control Building Chilled Water Pumps)

The licensee has stated that there is no installed flow measuring instrumentation for these pumps and has agreed to install the needed instruments by the end of the cycle 6 (i.e. prior to cycle 7 startup refueling outage), approximately two and one-half years after the upcoming restart. The licensee also stated that installation of this instrumentation at the end of cycle 5 (i.e. cycle 6 refueling outage) would be very difficult since there are a great number of modifications which he already committed to at that outage. Until these instruments are installed inlet pressure, differential pressure and bearing vibrations will be measured at the motors since the pumps are submerged and their bearings are inaccessible.

Based on the above considerations, relief is granted from the Code requirement to measure flowrate for the referenced pumps until startup from the cycle 7 refueling outage. The granting of this relief will not endanger the health and safety of the public.

Item A.2

Pumps EF-P1, EF-P2A/B (Emergency Feedwater Pumps), BS-P1A/B (Reactor Building Spray Pumps), DH-P1A/B (Decay Heat Removal Pumps), DC-P1A/B (Decay Heat Closed Cooling Water Pumps) and CA-P1A/B (Boric Acid Mix Pumps)

The licensee has requested to test these pumps quarterly instead of monthly as required by editions of the Code previous to the 1980 edition. Since that time the licensee has updated his IST program to the 1980 edition as required by 10 CFR 50.55 a(g), making this relief request obsolete. He, therefore, will test these pumps quarterly as required by that edition. Additionally, the licensee has requested to delete pumps CA-P1A/B and their associated flowpath valves (CA-V177 and WDL-V361) from the IST program, stating that plant redundancy provides several backup supplies of borated water if needed. The staff does not approve the deletion of these components from the IST program since the diverse shutdown capability provided by this system is required by GDC

26 and Technical Specification 3.2.2 requires that either one boric acid mix pump and its associated flowpath or one Reclaimed Boric Acid Mix Pump and its associated flowpath be operable at all times while the reactor is critical. Additionally, one train may only be out of service for maintenance for less than 72 consecutive hours or the reactor must be placed in cold shutdown per Technical Specification 3.3.2. It is the staff's position that operability cannot be demonstrated without inclusion in the IST program. Therefore, they are required to be tested in accordance with the Code.

Item B.1

Leak Testing of Pressure Isolation Valves (PIVs - those that protect lower pressure systems adjacent to the Reactor Coolant System)

CF-V4A/B (Core Flood Discharge Check Valves)

The licensee proposes to test these valves per procedure 1300-3T*. The staff has reviewed the referenced procedure and concludes that it does provide for individual leak testing of the referenced valves but will require slight revision to specify that the minimum test differential pressure shall be greater than 150 psid as currently required by Technical specification 4.2.6 for the other PIVs (Event V) which were incorporated into the plant technical specifications by order dated April 20, 1981. We require that CF-V4A/B be added to Table 3.1.6.1 of the plant technical specifications. Additionally, the test procedure correctly requires a mathematical correction to full functional differential pressure (DP) for this testing which is done at reduced DP, in accordance with the requirements of IWV-3423(e) of the ASME Code, Section XI, 1980 Edition.

RC-V4, RC-V23 (MOV and Check Valve in the Decay Heat Auxiliary Spray Line)

The licensee states that RC-V4 is passive and that his current Reactor Coolant System (RCS) leakage calculations will provide verification of the leaktight integrity of these valves. The staff does not agree that RC-V4 is passive. Additionally, the licensee's RCS leakage calculations will not provide individual verification that each of these two valves are adequately providing pressure isolation. We, therefore, require that the licensee provide individual verification of the leaktight integrity of each of these valves. We require that these valves be added to the list of other PIVs in Technical Specification Table 3.1.6.1.

*Procedure 1300-3T should be clarified to indicate that this testing must be accomplished during heatup from cold shutdown (as required by the Event V Order dated April 20, 1981); testing during cooldown would be additional testing rather than the option specified in paragraph 2.0 of procedure 1300-3T.

MU-V107A/B/C/D, MU-V86A/B, MU-V95 (Makeup System)

The licensee states that these are not PIVs since the discharge piping of the makeup pumps is high pressure piping. Additionally, the licensee states that at least one makeup pump is always running and, therefore, the discharge pressure of the pump provides one of the two needed barriers. The staff disagrees since the suction piping of the makeup pumps is low pressure piping and the inadvertent shutdown of a makeup pump is not uncommon. A failure of the two dedicated pressure boundaries would initiate an intersystem LOCA. The staff requires that the licensee institute a test plan that verifies the individual leaktight integrity of each valve. We require that these valves be added to the list of other PIVs contained in Technical Specification 3.1.6.1.

DH-V1, DH-V2 (Decay Heat Removal System Pump Suction Check Valves from Loop B Hot Leg)

The licensee proposes to verify the leaktight integrity of these valves by their current RCS leakage calculations. Additionally, the licensee proposes to disassemble one valve each 10 years for visual examination. We disagree that either RCS inventory calculations or disassembly of one valve each 10 years will provide the information necessary to verify that two pressure boundaries in series are present. The staff requires individual leak testing of each valve. We require that these valves be added to the list of other PIVs contained in Technical Specification 3.1.6.1.

Item B.2

Full Stroke Testing of Check Valves

CF-V4A/B (Core Flood Tanks Discharge Check Valves)

The licensee proposes to part stroke these valves on a cold shutdown frequency (including refueling) per procedure 1303-11.21 and also proposes to full stroke test valves CF-V5A/B each refueling (similar design and service conditions) to provide additional assurance that these valves have full stroke capability. He additionally proposes to disassemble one of the four referenced valves each 10 years for an inspection of their condition. The licensee provided the results of a disassembly/inspection (Reference 8) which was performed on CF-V4B in November 1983. His information indicated that there were no defects. Based on the considerations discussed above, the staff considers the licensee's proposal adequate except that the staff requires that the remaining three valves in this group be disassembled at the same outage if the valve which has been disassembled shows degradation which would make its full stroke capability questionable. The granting of this relief will not endanger the health and safety of the public.

CO-V16 A/B, EF-V11A/B, EF-V13, EF-V12A/B (Emergency Feed Pumps Discharge Check Valves)

The licensee proposes to full stroke test these valves each refueling per Technical Specification No. 4.9.1.6 but requests relief from full stroking these valves each cold shutdown if less than 3 months has elapsed since the last full stroke (IWV-3522) based on a chemistry concern (oxygenated water to the OTSG). We agree that oxygenated water could be a problem if testing is performed on a cold shutdown frequency. Therefore, this relief request to perform the test requirements of ASME Section XI on the above frequency is granted.

The licensee also requests relief from part stroking EF-V13 and EF-V12 A/B quarterly (IWV-3412(a)), based on excessive thermal cycles on the OTSG nozzles. We concur with this licensee relief request. The granting of these reliefs will not endanger the health and safety of the public.

DH-V14 A/B, DH-V16 A/B (Decay Heat Removal Pumps Suction and Discharge Check Valves)

The licensee proposes (Reference 9) to part stroke these valves quarterly and full stroke each refueling utilizing flowrate equal to or greater than the maximum assumed in the Safety Analysis Report. The licensee also provided information concerning a disassembly/inspection which was performed on DH-V14B in July 1983 (Reference 8), indicating that the valve had full stroke capability.

The staff concurs with the testing proposed and grants relief from full stroke testing at quarterly or cold shutdown intervals. Relief thus granted will not endanger the health and safety of the public.

MS-V9 A/B (Main Steam Supply Check Valves to Steam Driven Auxiliary Feed Pump)

The licensee proposes to part stroke test these valves on a quarterly basis to the 80% open position based on 48% of flowrate but has not provided any proposal for full stroke testing. The staff agrees that a full stroke cannot be performed on a quarterly basis. The licensee is therefore required to full stroke these valves on a cold shutdown frequency.

BS-V21 A/B (Reactor Building Spray Pump Suction Check Valves from Sodium Thiosulfate Tanks)

The licensee proposes to remove these valves from the IST program based on the fact that the NRC has approved (Amendment 80) deleting the sodium thiosulfate tanks. The licensee has stated that the line to the sodium thiosulfate tanks will be cut and blind flanged.

We agree that these components may be removed from the IST program if they no longer have any safety functions. This does not constitute granting relief since these valves no longer have any safety functions.

BS-V52 A/B (Sodium Hydroxide Tank to Decay Heat Pumps Suction Header Check Valves)

The licensee proposes (Reference 8) to full stroke both of these valves each 10 years by a disassembly/inspection. He has also stated that part stroking these valves is not possible without contaminating the reactor coolant system with sodium hydroxide. Both valves were disassembled and inspected in January 1984 and it was determined that they were like new. Additionally, these valves are stainless steel and are in a system which is static (i.e., there is no flow in this system except under accident conditions). The staff agrees with the licensee and grants the relief as requested. The granting of this relief will not endanger the health and safety of the public.

Fluid Block System Check Valves (Liquid Supply Check Valves to Selected Split Wedge Containment Isolation Valves)

The licensee has stated (Reference 9) that the NRC has issued Amendment 93 to the TMI-1 operating license allowing deletion of this system and removing Appendix J testing requirements for these valves. The licensee has committed to positively disable the system, until it is physically removed, by either locking closed a manual valve in each relevant line or cutting and capping those lines. In either case, the option to use this system will not be maintained until the system is removed.

MU-V73 A/B/C, MU-V107 A/B/C/D (Makeup Pumps Discharge Check Valves to the Cold Legs)

The licensee proposes to full stroke test these valves using flow each refueling outage in accordance with surveillance procedure 1303-11.8 and Technical Specification 4.5.2.1. Additionally, he proposes to part stroke MU-V73 A/B/C on a quarterly basis per procedure 1300-3H. The staff agrees with the licensee's proposed alternate testing and grants this relief. The granting of this relief will not endanger the health and safety of the public.

MU-V14 A/E (Makeup Pumps Suction Stop Check Valves)

The licensee proposes to full stroke test and stroke time these valves quarterly (Reference 9) utilizing the motor operator and to full stroke them each refueling using procedure 1303-11.8 and

Technical Specification 4.5.2.1. The staff agrees with the licensee's proposed testing. No relief is required for the quarterly stroking since that meets Code requirements. Additionally, full stroking these valves utilizing flow at other than refueling outages could result in overpressurization of the RCS. The granting of this relief will not endanger the health and safety of the public.

MU-V94, MU-V95, MU-V86 A/B (HPI Cross Connect Piping and HPI Discharge Check Valves)

The licensee proposes to part stroke these valves quarterly and full stroke them at each refueling outage using procedure 1303-11.8 and Technical Specification 4.5.2.1. The staff agrees with the licensee's proposed alternate testing since full stroke testing of these check valves could result in a overpressurization at cold shutdown or during power operation. This relief is therefore granted. The granting of this relief will not endanger the health and safety of the public.

Item B.3

EF-V3 (Emergency River Water Suction Source Check Valve)

The licensee proposes to part stroke this valve quarterly and has made no commitment for verifying the full stroke capability. The staff requires that this valve have its full stroke capability verified on intervals not to exceed refueling outages.

Item B.4

FW-V12 A/B (Main Feedwater Isolation Check Valves)

The licensee states (Reference 9) that he will investigate methods to verify closure of these valves. To support the interim period during which he will make his determination he has provided the results of a disassembly/inspection (Reference 8) which was performed on FW-V12B in November 1980 and on FW-V12A in December 1980. Although the licensee states that the valves were found to be in satisfactory and operable condition after four years of service, the staff's evaluation is that the valves were found to have both missing parts and broken parts that could eventually have resulted in partial or full separation of the disk assembly. Since the valves have not been in active service (i.e., flow through these lines) following their disassembly and repair the staff feels that verification of their leaktight integrity will not be necessary prior to the upcoming restart. However, the staff requires that

the licensee develop a method to verify the leak tight integrity (full closure) before startup from the next refueling outage.

Item B.5

BS-V30 A/B (Reactor Building Spray Discharge Check Valves)

The licensee proposes to part stroke these valves on a quarterly basis and to verify the full stroke capability of one valve (alternating between A and B) each 10 years by disassembly/inspection. The licensee provided results from a disassembly/inspection (Reference 9) which he performed on BS-V30A on June 20, 1984, indicating that the valve was found to have no unusual degradation and was free to open. Additionally, he stated that these valves are stainless steel and not subject to corrosive attack. The staff agrees with the license's proposed alternate testing since, as the licensee has stated, full stroking would require spraying down the reactor building. Therefore, relief is granted to perform the alternate testing with the following exception. If a disassembly/inspection reveals that the full stroke capability of the disassembled valve may be in question, the other valve must also be disassembled and inspected at the same outage. Relief thus granted will not endanger the health and safety of the public.

- References:
- (1) Amendment No. 71 to the TMI-1 Operating License, No. DPR-50 (J. Stolz to H. Hukill) dated August 3, 1981
 - (2) Letter from H. Hukill (TMI-1) to J. Stolz dated September 25, 1981
 - (3) Letter from R. Bosnak to J. Stolz dated April 8, 1982
 - (4) Letter from H. Hukill (TMI-1) to J. Stolz dated December 7, 1982
 - (5) Letter from H. Hukill (TMI-1) to J. Stolz dated March 28, 1983
 - (6) Memorandum from J. Knight (DE) to G. Lainas dated May 2, 1984
 - (7) May 15, 1984 Meeting Summary by O. Thompson dated May 29, 1984
 - (8) Letter from H. Hukill (TMI-1) to J. Stolz dated June 13, 1984
 - (9) Letter from H. Hukill (TMI-1) to J. Stolz dated July 19, 1984

This supplemental safety evaluation was prepared by J. Page, Mechanical Engineering Branch, Division of Engineering

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