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March 19, 1985
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Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Chief
Operating Reactor Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Stolz:

Three Mile Island Nuclear Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Pump and Valve Inservice Testing (IST)

Your letter of October 23, 1984 provides a supplemental evaluation (SSE) on Pump and Valve Inservice Testing (IST) and your letter of December 11, 1984 concludes that the updated IST Program which GPUN submitted on July 10, 1984 was acceptable with the exception of the relief requests which were denied. It is the intent of this letter to initiate appeal for further review of certain requests for exemption from ASME Code Section XI test requirements due to impracticality in accordance with 10CFR50.55a(g). GPUN has estimated a cost of $1,500,000 for plant modifications that would be needed in order to perform these additional tests. We request that further review take into consideration these costs and other cost aspects, in addition to the safety benefit to be derived from testing, as can be applied in a "cost/benefit" analysis.

Also, additional relief is requested as described in Attachment 1 (item A.2.b) regarding the pump differential pressure calculation for the Boric Acid Mix Pumps (CA-P1A/B). A revision to the applicable portion of our IST program submittal (Reference 4) is included in Attachment 2.

Most of the IST open items have been resolved. Attachment 1 addresses each of the items included in your SSE and provides additional GPUN commitments for testing which will resolve some of these items. Under each item in Attachment 1 for which "cost/benefit" analysis is needed, we present the technical justification for exemption due to the impracticality of testing along with the estimated cost for plant modifications that would be required to perform the tests which are in question.

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The largest area of concern deals with additional requirements for isolation valve testing which would require $1,000,000 in plant modifications. In regard to the inclusion of additional valves in T.S. Table 3.1.6.1, GPUN does not feel that it is the intent of the regulation that individual elements of the IST Program be included in Technical Specifications. T.S. Section 4.2.2 currently specifies that Inservice Testing of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with applicable code and addenda as required by 10CFR50.55a(g), except where relief has been granted.

TMI-1 Technical Specification Section 4.2.2 provides standard language referencing 50.55a(g) and was included in TMI-1 Technical Specifications as requested by NRC in a letter dated November 17, 1976. GPUN asserts that duplication within the Technical Specifications serves no useful purpose and detracts from the safety impact as described in NUREG-1024, Section 2.2 (Reference 4).

Modification costs are just one aspect of the costs involved. Other aspects should also be considered (i.e., ALARA, lost operating time due to testing, exposure to errors due to additional testing and replacement power costs) although it would be difficult to estimate these costs with any degree of accuracy.

Replacement power costs are usually estimated at approximately $500,000 per day. Testing, where it is necessary during the transition to cold shutdown, would result in $50,000 per day in the cost of fuel oil. Although ASME Code Section XI (IWV-3426) allows leakage limits to be established by the plant owner, unnecessary valve maintenance would result in driving the personnel exposures and the costs much higher if the acceptance criteria were established arbitrarily below that allowable by plant design in order to be conservative.

Additionally, the performance of the tests which are in question places the plant in a non-routine condition. This results in a certain amount of added risk, and introduces some possibility of maintenance or operator error, i.e. through valve misalignments, etc. The cost impact as a result of additional risk in performing these tests would be small and difficult to estimate. However, the benefit gained from testing will probably also be small insofar as the public health and safety is concerned.

In summary, we believe that a "systematic and documented" (cost/benefit) analysis of the relevant and material factors would show that the subject isolation valve testing would not provide a substantial increase in the overall protection of the public health and safety, and any requirement to add additional valves to T.S. Table 3.1.6.1 is not needed since inservice testing of ASME code valves is already required by T.S. Section 4.2.2. The Proposed Rule, "Revision of Backfitting Process for Power Reactors" states that all of

those factors for such a systematic and documented analysis described therein are currently in use by the Commission and are addressed in the Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission (NUREG-BR-0058), SECY-83-321 (NRC Manual), and in the CRGR Charter. Therefore, in the absence of a final rule on "Backfitting," we request in this appeal that those factors of such an analysis be applied.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH/MRK/spb

Attachment

cc: Joel Page
J. Thoma
R. Conte

References: (1) Letter from J. Stolz to H. Hukill dated October 23, 1984.
(2) Letter from J. Stolz to H. Hukill dated April 20, 1981.
(3) Letter from J. Stolz to H. Hukill dated December 11, 1984.
(4) Letter from H. Hukill to J. Stolz dated July 10, 1984.
(5) NUREG-1024 Technical Specifications - Enhancing the Safety Impact, November, 1983.

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PUMP AND VALVE INSERVICE TESTING (IST) - OPEN ITEMS

Item designations correspond to those of the Supplement Safety Evaluation Report (Reference 1).

Item A.1

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

Flow measuring instrumentation for SW-P2A/B and AH-P3A/B will be added prior to Cycle 7 startup. GPUN will continue to record and evaluate inlet pressure, differential pressure, and bearing vibration (pump in-board vibration for AH-P3A/B and motor bearing vibration for SW-P2A/B since the SW-P2A/B impellers are submerged below river level). This item is resolved.

Item A.2

a) 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)

These pumps will be tested quarterly. This item is resolved.

b) CA-P1A/B (Boric Acid Mix Pumps)

The supplemental evaluation (SSE) (Reference 1) denies GPUN's previous request to delete these pumps and associated flowpath valves CA-V177 and WDL-V361) from the IST Program. The SSE does not, however, reflect the relief which is now being requested subsequent to further discussion with NRC staff on this item.

In a conference call with the NRC on May 21, 1984, GPUN understood that a revised test program would be acceptable to resolve this item by addition of WDL-P13A/B (and the associated flowpath valves) to the IST Program. The Reclaimed Boric Acid Recycle Pumps (WDL-P13A/B) are similar in function to CA-P1A/B in that they can supply concentrated boric acid to the RCS. Although ASME Section XI, IWP-1100 states that emergency powered pumps should be included in the IST Program, and WDL-P13A/B are not emergency powered, they are included in the IST Program at NRC request. The addition of WDL-P13A/B into the program provides further assurance of the capability to supply concentrated boric acid to the Reactor Coolant System in order to meet the intent of the ASME Code Section XI.

Additionally, since CA-P1A/B are positive displacement pumps, we feel that it would not be meaningful to calculate ΔP for CA-P1A/B. Therefore, we wish to amend our IST program submittal (Reference 4) to request further relief in accordance with 10 CFR 50.55a(g)(5) as shown in Attachment 2 which provides a revision to pages 1, 7 and 8 of Table A-2 of that program submittal. This change including the justification for relief is indicated by change bars.

Without recirculation capability, the only method of testing these pumps would be to inject into the Reactor Coolant System (RCS). The resulting reactivity changes would affect plant operations adversely and would result in significant volumes of additional radioactive waste. The cost of plant modifications for CA-P1A/B to install the additional recirculation line (including the associated heat trace, flow meter, pressure gauges, etc.) is estimated at $500,000.

It is impractical to test the subject pumps during plant operation. The revised test program, which includes WDL-P13A/B meets the intent of the code. Therefore, the requested relief is justified.

Item B.1

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

The SSE (Reference 1) states that TMI-1 procedure SP 1300-3T should be revised to specify a 150 psid minimum test pressure for CF-V4A/B. The test method employed by SP 1300-3T, however, pressurizes the upstream side of CF-V4A/B to 460-599 psig while the downstream side of CF-V4A/B is open to atmosphere. This ensures a test pressure greater than 150 psid. Therefore, there is no need to change the procedure.

The SSE (Reference 1) states that SP 1300-3T should be revised to indicate that testing must be accomplished during heatup from cold shutdown as required by the Event V Order dated April 20, 1981. The Order for Modification of License concerning Primary Coolant System Pressure Isolation Valves does not specify that periodic leakage testing necessarily be accomplished during heatup. In accordance with the Order and T.S. 4.2.7, tests conducted during cooldown when valve dissassembly is not involved are considered as valid a test as a test performed during heatup. Therefore, there is no significant safety benefit to require changing the procedure or further restricting the test conditions.

A failure of CF-V4A/B, which isolate the Core Flood Tanks from the RCS, does not lead to a LOCA outside containment. Therefore, CF-V4A/B are not of the WASH 1400 Event V configuration and are not included in the Event V Order dated April 20, 1981. Attached to and referenced in the Event V Order is the Technical Evaluation Report (TER) Primary Coolant System Isolation Valves dated October 24, 1980, by the NRC's contractor, Franklin Research Center. Page 4 of the TER states that CF-V4A/B is not a valve configuration of concern and that they need not be included in the testing. Therefore, addition of these valves to Technical Specification (T.S.) Table 3.1.6.1. is not justified.

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

These valves are only used to spray the pressurizer when RCS pressure is less than 400 psig. During normal plant operation these valves are shut and do not automatically open; therefore, they are entirely passive (RC-V4 is procedurally required to be shut when the RCS is greater than 400 psig). Their leak tightness will be verified by current RCS leakage calculations. The cost for plant modifications to allow individual pressure isolation valve testing of RC-V4 and RC-V23 is estimated to be $100,000. GPUN concludes that these costs are not warranted based on the increment of safety to be gained by individual valve testing, and the relief which is being requested is therefore justified.

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

These valves are in the HPI line from the MU Pumps to the RCS. Please note that there are many (at least four) high pressure valves in series in these lines. The MOVs (MU-V16A-D) open when RCS pressure drops below 1600 psig. Failure to perform a pressure isolation function seems unlikely with the number of redundant valves involved. Figure 1 and the sixth paragraph in Section 3.2 of the Franklin Research Center TER (Reference 2, Attachment 2) do not support an Event V configuration for these valves.

The HPI check valves were disassembled in 1980 to correct manufacturing quality assurance problems. TMI-1 has not operated since that time. Therefore, there is reasonable assurance that these valves can perform a pressure isolation function.

The cost for modification to allow pressure isolation testing is estimated to cost $250,000 for MU-V107A/B/C/D and $350,000 for MU-V86A/B, MU-V94. GPUN concludes that $600,000 modification costs are not warranted based on the increment of safety to be gained by individual valve testing, and the relief which is being requested is therefore justified.

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

These valves are two motor operated valves in series; and therefore, do not exhibit Event V valve configuration per Figure 1 of the Franklin Research Center TER. Therefore, there is no demonstrated need to add these valves to T.S. Table 3.1.6.1. In addition, when the RCS is greater than or equal to 400 psig, these valves are closed by procedure and are individually interlocked closed. Therefore, these valves are passive. The cost of modification to allow individual valve pressure isolation testing is estimated to cost $75,000.

DH-V1 and DH-V2 were disassembled during 1976 and 1983 (see GPUN letter dated June 13, 1984 for the details on maintenance performed). Disc and seating surfaces were found satisfactory in both instances. GPUN concludes that there is reasonable assurance that DH-V1 and DH-V2 can

perform a pressure barrier function and that modification costs are not warranted based on the increment of safety to be gained by individual leak testing of DH-V1 and DH-V2 and the relief which is being requested is therefore justified.

Item B.2 - Full Stroke Testing of Check Valves

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

CF-V4A/B and CF-V5A/B are the same size, model number, and manufacturer. If disassembly of CF-V4(A or B), or CF-V5(A or B) shows a degraded condition which would make its full stroke capability questionable, the remaining three valves will be disassembled at the same outage. This is in compliance with the SSE (Reference 1). Therefore, this item is resolved.

b) CO-V16A/B, EF-V11A/B, EF-V13, EF-V12A/B (Emergency Feed Pump Suction and Discharge Check Valves)

Relief was granted. Therefore, this item is resolved.

c) DH-V14A/B, DH-V16A/B (Decay Heat Removal Pumps Suction and Discharge Check Valves)

The SSE (Reference 1) states that licensee proposes to part stroke these valves quarterly and perform a full stroke test each refueling utilizing flowrate equal to or greater than the maximum assumed in the Safety Analysis Report. The staff concurs with the testing proposed and grants relief from full stroke testing at quarterly or cold shutdown intervals. GPUN wishes to point out that the TMI-1 IST Program (Reference 3) includes tests for full flow through DH-V16A/B and 73% opening of DH-V14A/B. Our request for relief therein states that a full stroke test of DH-V14A/B is not practical, since it would necessitate the spray down of the entire Reactor Building to achieve full flow and further states that 73% opening of DH-V14A/B provides reasonable assurance that the valve will open fully. GPUN interprets the SSE to indicate that 73% opening of DH-V14A/B is accepted as being equivalent to a full stroke test. Therefore, this item is resolved.

d) MS-V9A/B (Main Steam Supply Check Valves to Steam Driven Emergency Feedwater Pump)

These valves supply steam from the OTSGs to the steam driven Emergency Feedwater Pump (EF-P1). During a cold shutdown, it is impractical to stroke test these valves (full stroke or partial stroke) since the steam which would be needed to operate these valves is not available during cold shutdown conditions.

Full stroke testing of MS-V9A/B is also impractical due to other limitations during plant conditions when steam is available. EF-P1 must be tested using the recirculation line to the Condensate Storage Tank bypassing the OTSG. This is to prevent degradation of the OTSGs by excessive thermal stress cycling of the emergency feedwater nozzles. The number of thermal cycles on the emergency feedwater nozzles is limited to (40) cycles over the life of the plant. Due to the small size of the recirculation line, EF-P1 cannot be tested at full capacity; and MS-V9A/B will not open fully. Under these restrictions it is only possible to obtain approximately 48% flow which corresponds to about 80% opening of MS-V9A/B.

Plant modifications which would be required to perform full stroke tests of MS-V9A/B either by piping in auxiliary steam or by replacing the recirculation piping with larger piping capable of recirculating the full EFW pump capacity would introduce exorbitant cost. GPUN has not fully examined the cost and safety impact of modifications which would be required to test MS-V9A/B, however, we do not feel that such modifications would be beneficial.

MS-V9B was disassembled for IST examination purposes in late 1984 and found to be in excellent condition. Since no indication of potential degradation was found, this provides additional assurance of the continued capability of MS-V9A/B to open fully when needed.

It is impractical to test MS-V9A/B when steam is not available and it is also impractical to perform a full stroke test on MS-V9A/B. GPUN concludes that quarterly testing of MS-V9 at 48% flow (80% open) when steam is available meets the intent of the ASME Code Section XI and the relief which is being requested is therefore justified.

e) BS-V21A/B (Reactor Building Spray Pump Suction Check Valves from Sodium Thiosulfate Tanks)

The line from the Sodium Thiosulfate Tank has been cut and blind-flanged. BS-V21A/B are no longer included in the IST Program. Therefore, this item is resolved.

f) BS-V52A/B (Sodium Hydroxide Tank to Decay Heat Pumps Suction Header Check Valves)

Relief was granted. Therefore, this item is resolved.

g) Fluid Block System Check Valves (Liquid Supply Check Valves to Selected Gate Containment Isolation Valves)

Until the fluid block system is physically removed, GPUN will either maintain the manual valve in each relevant line administratively closed or cut and cap the lines. In either case, the option to use this system will not be maintained until the system is removed. Therefore, this item is resolved.

h) MU-V73A/B/C, MU-V107A/B/C/D (Makeup Pumps Discharge Check Valves to the Cold Legs)

Relief was granted. Therefore, this item is resolved.

i) MU-V14A/B (Makeup Pumps Suction Stop Check Valves)

Relief was granted. Therefore, this item is resolved.

j) MU-V94, MU-V95, MU-V86A/B (HPI Cross Connect Piping and HPI Discharge Check Valves)

Relief was granted. Therefore, this item is resolved.

Item B.3

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

Full stroke testing of EF-V3 each refueling is not practical for the reason that such a test would introduce contaminants into the OTSGs. GPUN is pursuing the feasibility of removing the valve internals for EF-V3 per 10CFR50.59 evaluation. Part stroke testing of EF-V3 will be performed in accordance with the IST Program until the valve internals are removed.

This valve was disassembled on 12/5/84 (for IST purposes) and found to be in excellent condition. Therefore, there is reasonable assurance that EF-V3 would open if required.

Item B.4

a) FW-V12A/B (Main Feedwater Check Valves)

GPUN will develop a method to verify the full closure capability of FW-V12A/B before startup from the cycle six refueling outage. Until that time, NRC has agreed that testing of FW-V12A/B will not be required based on disassembly and repair of the valves in 1980. Therefore, this item is resolved for Cycle 5 operation.

Item B.5

a) BS-V30A/B (Reactor Building Spray Discharge Check Valves)

If a disassembly/inspection reveals that the full stroke capability of the disassembled valve may be in question, GPUN will disassemble and inspect the other valve at the same outage. This commitment is in compliance with the SSE. Therefore, this item is resolved.

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TABLE A-2
THREE MILE ISLAND - UNIT NO. 1
PERIODIC INSERVICE INSPECTION PROGRAM - (PUMPS)
EXCEPTIONS TO ASME XI REQUIREMENTS

PUMP NAME	PUMP NO.	ASME XI CODE CLASS	ASME III CODE CLASS EQUIVALENT	ASME XI EXCEPTION REQUESTED*	JUSTIFICATION	TESTING PERFORMED IN LIEU OF CODE REQUIREMENT
CONTROL BUILDING CHILLED WATER	AH-P3A AH-P3B	3	Non-Nuclear	Q	See Note 3	Flow metering will be installed prior to startup for Cycle 7.
				T_b	See Note 13	None
				Lubr. Level	See Note 13	None
BUILDING SPRAY	BS-P1A BS-P1B	2	N-2	None	N/A	N/A
BORIC ACID	CA-P1A CA-P1B	3	Non-Nuclear	Quarterly Testing	See Note 12	Refueling interval testing
				Q	See Note 12	Q will be caluclated
				P_i	See Note 12	None
				ΔP	See Note 12	None
				T_b	See Note 5	None
				Five Minute runtime	See Note 12	Run until system is stable
DECAY HEAT CLOSED COOLING WATER	DC-P1A DC-P1B	3	Non-Nuclear	None	N/A	N/A
DECAY HEAT REMOVAL	DH-P1A DH-P1B	2	N-2	None	N/A	N/A
DECAY HEAT RIVER WATER	DR-P1A DR-P1B	3	Non-Nuclear	V	See Note 1	Motor vibration will be measured.
				T_b	See Note 2	None
				Lubr. Level	See Note 2	None

* SEE ASME SECTION XI FOR DEFINITION OF TEST QUANTITIES

JUSTIFICATION NOTES (Cont.)

be drained and then flushed with Nuclear Service Closed Cooling Water. The drain and flush water is drained to the Reactor Building Sump and this produces large quantities of water that must be processed through the Liquid Waste Disposal System. However, flow rate will be measured during refueling outages, when river water is pumped through the cooling coils in accordance with Technical Specification requirements.

Note 12

For CA-P1A/B and WDL-P13A/B, GPUN requests relief from the measurement of Q, ΔP, P_i, and the 5 minute run time. In addition, relief is requested to perform testing only during refueling outages.

Without recirculation capability, the only method of testing these pumps is to inject into the Reactor Coolant Makeup System. The resulting reactivity changes would affect plant operations adversely and would result in significant volumes of radioactive waste. For these reasons it is impractical to test the subject pumps during operation. The appropriate test interval is each refueling.

In a conference call with NRC on May 21, 1984, the following test program was agreed upon in order to meet the intent of the ASME Code Section XI test requirements:

1. Tests of the subject pumps will be conducted each refueling interval.

2. Pump differential pressure (ΔP) will be calculated, not measured, since pump inlet pressure (P_i) is not available (there are no existing pressure gauge taps).

3. Flow rate (Q) will be calculated using tank level change over time, since installed flow measuring instuments do not exist.

GPUN proposes to calculate pump differential pressure (ΔP) for WDL-P13A/B only. Since CA-P1A/B are positive displacement pumps, relief is requested from the ASME Section XI, IWP-3110 requirement to calculate ΔP for CA-P1A/B. The calculation of ΔP for CA-P1A/B would not be meaningful since the flow rate is fixed solely by the displacement of the cylinder and the speed of the pump both of which are held constant, while ΔP is only a function of system resistance (backpressure). Therefore, such a calculation would be an unnecessary exercise for the operator.

JUSTIFICATION NOTES (Cont.)

Tests each refueling to verify the required flowrate for CA-P1A/B while pumping to the Makeup Tank will demonstrate positively that CA-P1A/B can perform its safety function by providing the required boric acid capacity at normal Makeup Tank backpressures. For this test, the Makeup Tank will be pressurized to its normal operating range. Pump vibration will be measured while pumping to the Makeup Tank and Makeup Tank level change over time will be used to determine the flow rate.

ASME Section XI IWP-3500 states that pumps under test should be run for at least 5 minutes under conditions as stable as the system permits prior to taking data. To minimize radioactive waste, the subject pumps will be run until the system is stablized and then data will be recorded. GPUN believes this meets the intent of IWP-3500.

ASME Section XI, IWP-1100 states that emergency powered pumps should be included in the IST Program. WDL-P13A/B are not emergency powered, but are included in the IST Program as requested by NRC. The addition of WDL-P13A/B in the program provides further assurance of the capability to supply concentrated boric acid to the Reactor Coolant Makeup System.

Note 13

The pump and motor form an integral unit. The pump bearings are located in the motor. There is no lubrication level on the pump that can be checked. Also yearly bearing temperatures will not be measured since the bearings are deep inside the motor end caps.