



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

THREE MILE ISLAND, UNIT NO. 1

INSERVICE INSPECTION PROGRAM

SAFETY EVALUATION REPORT

As required by 10 CFR 50.55a(g), Metropolitan Edison Company has updated the Inservice Inspection Program for the Three Mile Island Unit 1 facility to the requirements of the 1974 Edition through Summer 1975 Addenda of Section XI ASME Boiler and Pressure Vessel Code. Based on information submitted by letters dated July 1, 1977, August 17, 1977, September 30, 1977, December 13, 1978, October 26, 1979, and meetings held with the licensee in Bethesda, Maryland on October 18 and 19, 1978, it has been determined that certain requirements of the Code cannot be implemented at the facility because of component or system design, geometry, or materials of construction. Requested relief from those requirements has been evaluated and our determinations to grant or deny the requests are documented below.

I. INSERVICE INSPECTION

A. CLASS 1 COMPONENTS

1. Relief is requested from the frequency requirement for examination of the primary nozzle-to-vessel welds and nozzle inside radiused section. (Item B1.4, Examination Category B-D)

CODE REQUIREMENT

At least 25% of the required examination shall have been completed by the expiration of one-third of the inspection interval (with credit for no more than 33 1/3% if additional examinations are completed) and at least 50% shall have been completed by the expiration of two-thirds of the inspection interval (with credit for no more than 66 2/3%). The remaining required examinations shall be completed by the end of the inspection interval.

LICENSEE BASIS FOR REQUESTING RELIEF

There are 8 nozzles (2 outlet, 4 inlet, and 2 core flood) in this category. The 2 outlet nozzles will be inspected in the second 3-1/3 year's period, except that the inspections from the vessel inside diameter will be deferred to the end of the 10-year interval per Code Case N-73. The inlet and core flood nozzle inspection must be deferred until access is provided by removal of the core barrel at the end of the 1-year inspection interval.

EVALUATION

The licensee proposes to examine all nozzle-to-vessel welds during the inspection interval as required by the Code but not at the required frequency. To meet the frequency requirement, the core barrel and fuel would have to be removed each 3 1/3-year period. This is an impractical requirement to place on the licensee and the additional safety gained by imposing the requirement is not commensurate with the burden. The outlet nozzles are being examined to the requirements of the Code and will serve as a repre-

sentative sample of the general condition of the remaining nozzles. All nozzles will be examined during or by the end of the inspection interval, consistent with Section XI requirements.

CONCLUSION

The staff concludes that the deviation in examination frequency will not significantly diminish the plant's safety and relief from the frequency of examination may be granted.

2. Relief is requested from surface examination of the core flood nozzles (Item B4.1 Examination Category B-F).

CODE REQUIREMENT

Volumetric and surface examination shall be performed and include the base material for at least one wall thickness beyond the edge of the weld. The examinations performed during each inspection interval shall cover the circumference of 100% of the welds.

LICENSEE BASIS FOR REQUESTING RELIEF

High radiation levels make surface examination of the core flood nozzles impractical.

EVALUATION

The licensee has not demonstrated the impracticality of performing the surface examination required by the Code. High radiation level is not a sufficient justification to support relief from the requirement based on the history of the susceptibility of dissimilar metal welds to inservice flaws.

CONCLUSION

The staff concludes that relief from the requirement should not be granted.

3. Request relief from volumetric examination of lug welds on pump casings. (Item B5.4, Examination Category B-K-1)

CODE REQUIREMENT

Volumetric examination performed during each inspection interval shall cover 25% of the integrally-welded supports.

LICENSEE BASIS FOR REQUESTING RELIEF

Lug welds on the pump casings cannot be meaningfully R.T. or U.T. examined because of their geometry and since the casings are cast austenitic stainless steel. Liquid penetrant examination will be used.

EVALUATION

Because of the geometry and materials of construction of the welds and pump casings, it is impractical to perform the Code required volumetric examination and obtain interpretable results. These welds are integral parts of the pumps' supports and are subject, most likely, to surface flaws. Liquid penetrant examination of these welds and heat affected zones, as proposed by the licensee, is an acceptable examination technique for detection of flaws in these types of attachment welds.

CONCLUSION

The staff concludes that the alternative examination proposed by the licensee will provide adequate assurance of the structural integrity of the lug attachment welds and therefore relief from volumetric examination of these welds may be granted.

B. CLASS 2 COMPONENTS

1. Relief is requested from hydrostatic test of the Penetration Pressurization System.

CODE REQUIREMENT

Components shall be examined visually while the system is under the hydrostatic test pressure and temperature.

LICENSEE BASIS FOR REQUESTING RELIEF

This system is an air system for containment integrity. The introduction of water into it for pressure testing will be harmful to it and associated components and will impair and degrade its subsequent operation. This system is leak tested quarterly during normal operation utilizing permanently installed flow instrumentation.

EVALUATION

The intent of the Code in requiring a hydrostatic test is to subject the components to a pressure or strain in order to determine the components' ability to maintain its pressure boundary integrity. The medium used to pressurize the components is of no significance as far as subjecting the components to the desired pressure or producing the desired strain. However, the pressurizing medium becomes a consideration when it could cause degradation of the system or impair its operation. It is impractical to introduce water into the Penetration Pressurization System because of harmful effects that water could cause. The system is subjected to a pneumatic test quarterly, a frequency which exceeds Code requirements.

CONCLUSION

The Penetration Pressurization System is subjected to a pneumatic test, one that is equivalent to a hydrostatic test. The staff finds the alternative test acceptable and concludes that relief from the hydrostatic test requirement may be granted.

2. Request relief from the hydrostatic test requirement for the following systems:
 - a) Waste Gas Disposal System from WDG-14 to Penet. #330
 - b) Nitrogen Supply System from NI-V26 to Penet. #307
 - c) Hydrogen Purge System from HP-V1 to Penet. #240
 - d) Service Air System from SA-V2 to Penet. #109
 - e) Containment Monitoring System from CM-V1 to Penet. #108 and CM-V4 to Penet. #108

CODE REQUIREMENT

Components shall be examined visually while the system is under the hydrostatic test pressure and temperature.

LICENSEE BASIS FOR REQUESTING RELIEF

These are systems which contain gas. The introduction of water into them for pressure testing will be harmful to them and associated components and will impair and degrade their subsequent operation. These systems will be pneumatically pressure tested to Reactor Containment Calculated accident pressure during Local Leak Rate Testing and leak checked (i.e., soap bubble method).

EVALUATION

The introduction of water into the Systems listed in order to meet the hydrostatic test requirement could produce an unsafe condition rather than providing assurance of safety of the plant. Pneumatic tests will be performed on the systems which will provide the same assurance of the systems structural integrity as that provided by a hydrostatic test.

CONCLUSION

The pneumatic tests which will be performed are equivalent to hydrostatic tests required and are therefore acceptable alternatives. The staff concludes that relief from the hydrostatic test requirement may be granted.

3. Request relief from examination of the 14-inch Decay Heat piping from DH-V6 A and B to Reactor Building Sump. (Item C2.1, Examination Category C-F)

CODE REQUIREMENT

Volumetric examination shall cover 100% of the weld and shall include the weld metal and base metal for one-wall thickness beyond the edge of the weld.

LICENSEE BASIS FOR REQUESTING RELIEF

This piping is encased in concrete under the Reactor Building floor and therefore cannot be inspected volumetrically. The butt welds on DH-V6A and B cannot be inspected since these valves are located in a welded valve container and are not accessible.

EVALUATION

It is impractical to perform the required volumetric examination on the welds and heat affected zones in that portion of the Decay Heat System piping between the Reactor Building Sump and valves DH-V6A and DH-V6B. This portion of the piping is encased in concrete beneath the Reactor Building floor. Butt welds on DH-V6A and DH-V6B are also inaccessible because they are enclosed in a welded valve container. This portion of the Decay Heat System piping is low pressure as well as being encased in concrete. Inservice flaw development or failure of this portion of the piping would have little or no effect on the system function or significantly reduce the plant's safety margin.

CONCLUSION:

The staff concludes that the safety of the facility will not be affected significantly by not performing the Code required examination and therefore relief from the requirement may be granted.

4. Request relief from examination of the butt weld and two longitudinal welds on the 10-inch Decay Heat piping elbows immediately upstream of DH-V4A and DH-V4B. (Item 2.1, Examination Category C-F)

CODE REQUIREMENT

Volumetric examination shall cover 100% of the weld and shall include the weld metal and base metal for one-wall thickness beyond the edge of the weld.

LICENSEE BASIS FOR REQUESTING RELIEF

This section of decay heat pipe is contained within a 14-inch guard pipe and is not accessible for inspection.

EVALUATION

Because of system design requirements, these welds are inaccessible for examination in accordance with Section XI requirements. Other welds in the Decay Heat piping will be examined to Code requirements and will provide information representative of the Condition of these inaccessible welds.

CONCLUSION

The staff finds that the examination performed on other welds in close proximity of the inaccessible welds will provide assurance of the structural integrity of these welds. The staff therefore concludes that relief from the examination requirement may be granted.

5. Relief is requested from the pressure test requirements for the Makeup System piping from the pump to the first downstream stop valve.

CODE REQUIREMENT

Components shall be examined visually while the system is under the hydrostatic test pressure and temperature.

LICENSEE BASIS FOR REQUESTING RELIEF

In order to hydro the piping between the makeup (MU) pumps and the first downstream valves, it would be necessary to install a blank in the pump discharge flanges and remove the discharge check valve internals. To install a blank would require springing back relatively short lengths of thick wall pipe, and/or disturbing valves will be examined for leakage with the suction side piping and pump hydros. In addition, the subject piping will be examined for leakage during the first ISI pump test subsequent to the hydro.

EVALUATION

To hydrostatically test the piping between the makeup pumps and the discharge stop valves is impractical because of the system design and because the gain in assurance of the structural integrity of the relatively small section of piping is not commensurate with the preparations required. The sections of piping will be pressure tested to a value sufficiently high enough to determine their structural adequacy.

CONCLUSION

The staff finds the alternate pressure tests acceptable in providing assurance of the structural integrity of the sections of discharge piping and concludes that relief from the Code required pressure test may be granted.

II. INSERVICE TESTING OF PUMPS AND VALVES

A program for Inservice Testing of ASME Code Class 1, Class 2, and Class 3 pumps and valves has been submitted by the licensee by letters dated July 1, 1977 (GQL 0907), October 26, 1979 (GQL 1357), and January 31, 1980 (TLL 032). We are currently reviewing the licensee's submittal for the inservice testing of pumps and valves and a supplement to this safety evaluation covering this matter will be issued in the future.

SUMMARY - INSERVICE INSPECTION

The licensee has submitted information to support his determinations that certain ASME Section XI Code (1974 Edition through Summer 1975) requirements are impractical to implement at the Three Mile Island Unit 1 facility. We have evaluated the licensee's bases for his determinations and find that relief from the specific Code requirements requested may be granted except for the volumetric and surface examination for the core flood nozzles (Item B4.1). Based on our review, the proposed inspection program meets the required version of Section XI of the ASME Boiler and Pressure Vessel Code and addenda as required by 10 CFR 50.55a(g). The proposed program replaces the existing program in Appendix A of the Technical Specifications which is based on an obsolete version of Section XI of the ASME boiler and pressure vessel code and does not contain an augmented inspection program. The proposed program, however, does not include an augmented inspection for pipe cracks caused by intergranular stress corrosion. We are evaluating such an augmented inspection as a generic issue that could impact the Class 2 and Class 3 components of this program in the future. Based on the foregoing, we find that the relief requested is authorized by law, will not endanger life or property or the common defense and security and is in the public interest considering the burden on the licensee that could result if the relief were not granted. We conclude that the revised Inservice Inspection and Testing Program meets the requirements of 10 CFR 50.55a(g).

Environmental Consideration

We have determined that this amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR § 51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: May 7, 1980