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March 27, 1984
EF2 - 67,742

Director of Nuclear Reactor Regulation
Attention: Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Youngblood:

Reference: Fermi-2
NRC Docket No. 50-341

Subject: Leakage Reduction Program

A revised Leakage Reduction Program is attached for your review. It has been formatted for incorporation into Section H.III.D.1.1 of the Fermi-2 FSAR in a forthcoming amendment. The program description has been revised to more clearly define the program and its implementation. It should be noted that Fermi will be submitting leakage reduction test results after fuel load. This is due to the fact that some systems cannot be tested until the reactor is operating. Consultation with other utilities indicates that this approach has been previously accepted by the NRC.

Should you have any questions concerning the above, please contact Mr. O. Keener Earle, (313) 586-4211.

Sincerely,

Wayne H. Jens

cc: Mr. P. M. Byron
Mr. M. D. Lynch

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H.III.D.1.1 Primary Coolant Outside Containment

H.III.D.1.1.1 Statement of Concern

Parts 20 and 100 of Title 10 of the Code of Federal Regulations specify radiation limits and guidelines for licensed facilities to ensure the protection of public health and safety. In a power reactor, many systems that may or will contain significant radioactive liquid and/or gas inventories after a serious transient or accident have components located outside containment. At TMI-2, the major radioactive releases appear to have come from leaks in such systems. Leakage from the systems must be maintained as low as practical to prevent releases of significant quantities of radioactive material when the systems are operated. The plant operating staff should know the leakage rate of each system and have positive control over them to ensure the maximum availability of the equipment.

H.III.D.1.1.2 NRC Position

H.III.D.1.1.2.1 Full Power License Requirement

Applicants shall implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids during or after a serious transient or accident to as-low-as-practical levels. This program shall include the following:

(1) Immediate leak reduction

   (a) Implement all practical leak reduction measures for all systems that could carry radioactive fluid outside of containment.

   (b) Measure actual leakage rates with system in operation and report them to the NRC.

(2) Continuing Leak Reduction - Establish and implement a program of preventive maintenance to reduce leakage to as-low-as-practical levels. This program shall include periodic integrated leak tests at intervals not to exceed each refueling cycle.

H.III.D.1.1.2.2 Dated Requirement

Applicants shall submit the information requested in the "Clarification" section of this position at least 4 months prior to issuance of a fuel-loading license.

This requirement shall be implemented by applicants for operating license prior to issuance of a full-power license. (See Section III.D.1.1 of Ref. 4).

H.III.D.1.1.2.3 Clarification

Applicants shall provide a summary description, together with initial leak-test results, of their program to reduce leakage from systems outside containment that would or could contain primary coolant or other highly radioactive fluids or gases during or following a serious transient or accident.

(1) Systems that should be leak tested are as follows (any other plant system which has similar functions or post-accident characteristics even though not specified herein, should be included):

a. Residual heat removal (RHR)

b. Containment spray recirculation

c. High-pressure injection recirculation

d. Containment and primary coolant sampling

e. Reactor core isolation cooling

f. Waste gas (including headers and cover gas system outside of containment in addition to decay or storage system).

(2) Testing of gaseous systems should include helium leak detection or equivalent testing methods.

(3) Should consider program to reduce potential release paths due to design and operator deficiencies as discussed in NRC letter to all operating nuclear power plants regarding North Anna and related incidents, dated October 17, 1979.

H.III.D.1.1.2.4 Applicability

This requirement applies to all operating license applicants.

H.III.D.1.1.3 Detroit Edison Position

Detroit Edison has developed a Leakage Reduction Program to reduce and maintain leakage to as-low-as-practical from systems outside primary containment that could or would contain highly radioactive fluids during and/or after a serious transient or accident. This program is based on Requirement 2.1.6a of NUREG-0578 (Reference 1) and the requirements of item III.D.1.1 of NUREGs 0660, 0694 and 0737 (References 2, 3 and 4 respectively).

H.III.D.1.1.3.1 Program Scope

Table H.III.D.1.1-1 identifies systems included in the Leakage Reduction Program. Table H.III.D.1.1-2 lists systems to which the Leakage Reduction Program is not applicable and futher provides the justification for their exclusion. Only the systems listed in Table H.III.D.1.1-1 are included in the program.

H.III.D.1.1.3.2 Program Description

The Detroit Edison Leakage Reduction Program includes the following features:

a. A combination of periodic visual inspections on accessible portions of the systems and detailed system walkdowns to identify leakage into secondary containment out of components such as valve stems, pump seals, fittings, relief valve discharge lines, drains, vents and instrument loops. When possible, these inspections are performed with the systems at approximately operating pressure in a normal or test condition.

b. An aggressive maintenance program is utilized to correct identified leakage problems and assign a high priority to leakage related work requests for systems in this program. Essentially all leakage on concerned (i.e., those identified in Table H.III.D.1.1-1) systems will be addressed. These preventive and corrective maintenance measures ensure minimum leakage on a continuing basis.

c. Periodic leak rate testing of systems (those listed in Table H.III.D.1.1-1) and system components such as valves at intervals not to exceed each refueling outage. The general test methods used to determine leakage from systems within the scope of this Leakage Reduction Program are provided in paragraph H.III.D.1.1.3.3.

d. Records are maintained on inspections and tests performed and are used to identify chronic or generic leakage problems in order to implement modifications and/or corrective maintenance measures. These records are also made available to the plant operators.

Approximately about the time full power is achieved, Detroit Edison will have collected the necessary data and will submit to the NRC staff a report of the recorded leakage and preventive/corrective maintenance performed as the direct result of the evaluation of this leakage. The report will also identify general leakage criteria to be applied during the first fuel cycle as the basis for instituting corrective action in the form of preventive maintenance. Prior to the start of the second fuel cycle, Detroit Edison will revise the general criteria to the extent necessary based on the

experience gained during the first operating cycle of Fermi 2. These revised criteria will be used as the basis for the long term leakage reduction/monitoring program for EF-2.

NOTE: In addition to this testing program, system leakage tests will be performed on many of these systems as part of the 10CFR50, Appendix J leakage testing program. The systems and components that are subject to this testing and which comprise the containment boundary are identified in Table 6.2-2 of this FSAR.

H.III.D.1.1.3.3 Test Methods

a) Liquid Systems - Systems or portions of systems that could contain radioactive liquids during and/or after an accident are periodically placed into normal operation or a testing mode. During these test conditions the systems are visually inspected for leakage with all results being recorded. Leakage detected during the periodic visual inspections or the less frequent integrated leakrate test, will be measured where possible, and recorded. Techniques used for leakage measurement include collection into a graduated container and estimation by equating drops per unit of time to a standard volume.

b) Gaseous Systems - For systems or portions of systems that may contain radioactive gases during and/or after an accident, a pressure drop or make-up gas rate test is used. Clean air or nitrogen is used for these tests. When leakage is indicated by a pressure drop or excessive make-up, visual inspection techniques are applied to components during pressurization. The most common method of visual inspection will be the application of leak-detection fluid to suspected points of leakage (i.e., valve stem packings & air pump seals). The application of the helium leak detection method of inspection may be considered for some gaseous systems.

H.III.D.1.1.3.4 Test Procedures

Each system identified in Table H.III.D.1.1-1 will have a surveillance testing procedure(s). These test procedure will contain the following elements as applicable:

a) A description of system and plant operating conditions necessary to conduct each leak test. Test boundaries are identified and include only those portions of the system that could contain radioactive fluids during and/or after an accident. For example, the Core Spray suction piping from the condensate storage tank would not be inspected as this suction line is used for test purposes only and would not contain radioactive fluid during or after an accident.

b) Elaboration of special test methods necessary to supplement general test methods.

c) Data sheets listing the specific areas to be inspected. These data sheets will identify isometric drawing numbers and provide spaces to record inspection results.

H.III.D.1.1.3.5 References

1. U.S. Nuclear Regulatory Comission, TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations, NUREG-0578, July 1979.

2. U.S. Nuclear Regulatory Commission, NRC Action Plan Developed as a Result of the TMI-2 Accident, NUREG-0660, Vols. 1 and 2, May 1980.

3. U.S. Nuclear Regulatory Commission, TMI-Related Requirements for New Operating Licenses, NUREG-0694, June 1980.

4. U.S. Nuclear Regulatory Commission, Clarification of TMI Action Plan Requirements, NUREG-0737, October 1980.

5. ASME Boiler and Pressure Vessel Code, Section XI.

TABLE H.III.D.1.1-1 SYSTEMS OUTSIDE PRIMARY CONTAINMENT THAT COULD CONTAIN HIGHLY RADIOACTIVE FLUIDS

Reactor core isolation cooling
Residual heat removal
  Containment Spray
  Suppression pool cooling
  Low-pressure coolant injection
  Shutdown cooling
Core spray
Reactor water sample
Reactor water cleanup
Combustible gas control
High-pressure coolant injection
Standby gas treatment
Control rod drive discharge headers
Containment sampling system

TABLE H.III.D.1.1-2 SYSTEMS OUTSIDE PRIMARY CONTAINMENT THAT WOULD NOT CONTAIN HIGHLY RADIOACTIVE FLUIDS

System	Comment
RHR fuel pool cooling	Not directly affected by accident.
Standby liquid control	Injects fluid and does not circulate reactor coolant.
General service water/emergency equipment service water	Does not circulate reactor coolant and could become contaminated only due to system leaks.
Reactor building closed cooling water/emergency equipment cooling water	Does not circulate reactor coolant and could become contaminated only due to system leaks.
Condensate storage	Could become contaminated only due to isolation valve leakage.
Demineralized water makeup	Could become contaminated only due to isolation valve leakage.
Torus water management	Isolated during LOCA and not required for accident mitigation.
Control air/station air	Would require system failure.
Fuel-pool cooling and cleanup	Not directly affected by accident.
Main steam lines	Would require failure of MSIVs and failure of MSIV leakage control system.
Feedwater lines	Would require failure of isolation valves.
Drywell cooling system	Uses RBCCW or EECW and is not needed for safe shutdown of plant.
RHR steam condensing	Not required for accident Mitigation
Reactor building floor/equipment	Not required for accident mitigation. Minimizing leakage from systems in Table H.III.D.1.1-1 minimizes input to this system.
Radwaste	Not required for accident mitigation.