A.1 DIVISION 1 APPLICABLE REGULATORY GUIDES

A.1.1 REGULATORY GUIDE 1.1 (November 1970), NET POSITIVE SUCTION HEAD FOR EMERGENCY CORE COOLING AND CONTAINMENT HEAT REMOVAL SYSTEM PUMPS

Fermi 2 conforms to the regulatory position in this guide. The net positive suction head (NPSH) margin has been adequately established as being conservative.

The analysis establishing the adequacy of the NPSH margin is found in response to Question 2.8.3f of Amendment 17 to the Fermi 2 FSAR.

For details refer to Subsection 6.3.2.14.

A.1.2 REGULATORY GUIDE 1.2 (November 1970), THERMAL SHOCK TO REACTOR PRESSURE VESSELS

The reactor pressure vessel (RPV) of the Fermi 2 plant will behave in a nonbrittle manner under loss-of-coolant conditions. This position is based on NEDO-10029, "An Analytical Study on Brittle Fracture of GE-BWR Vessel Subject to the Design Basis Accident."

For details refer to Subsection 5.4.4.

A.1.3 REGULATORY GUIDE 1.3 (June 1974, Revision 2), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A LOSS OF COOLANT ACCIDENT FOR BOILING WATER REACTORS

Regulatory Guide 1.3 is no longer the basis for Fermi 2 Loss of Coolant Accident radiological consequence analysis. Alternative Source Term (AST) analysis per Regulatory Guide 1.183 has replaced the original Regulatory Guide 1.3 based analysis and discussed in Section 15.6.5 and 15.7.4.

A.1.4 REGULATORY GUIDE 1.4 (June 1974, Revision 2), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A LOSS OF COOLANT ACCIDENT FOR PRESSURIZED WATER REACTORS

Regulatory Guide 1.4 does not apply to Fermi 2, which is a BWR.

A.1.5 REGULATORY GUIDE 1.5 (March 1971), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A STEAM LINE BREAK ACCIDENT FOR BOILING WATER REACTORS

The analyses of the effects of a steam line break accident are discussed in Subsection 15.6.4. The analysis is in conformance with the regulatory position of this guide.

A.1.6 REGULATORY GUIDE 1.6 (March 1971), INDEPENDENCE BETWEEN REDUNDANT STANDBY (ONSITE) POWER SOURCES AND BETWEEN THEIR DISTRIBUTION SYSTEMS

To provide the assurance of protection from releases of radioactivity by maintenance of fission product barrier integrity under accident conditions, the electrical power supply system to the emergency core cooling systems and operational reactor coolant pressure boundary (RCPB) protection systems must be sufficient in capacity and redundancy to supply service to vital functions at all times from onsite power. In addition, General Design Criterion (GDC) 17 of Appendix A to 10 CFR 50 requires sufficient independence and testability of the onsite electrical power system to perform under single-failure conditions.

The Fermi 2 plant onsite power system consists of four emergency diesel generator (EDG) units separated into two divisions. Each division containing two EDGs will supply power to its own radial load. The capacity of each division (two EDGs; 2850 kW/unit) and required capacities and preoperational design loads are listed in the tables of Subsection 8.3.1.1.8.1. Either divisional pair of diesel generator units will be capable of supplying loads needed for safe reactor shutdown as Position 1 of the guide requires.

To comply with Position 2, each division is connected to an independent offsite power source; Division I through transformers to the 120-kV electrical system grid and Division II through the 345-kV grid.

Fermi 2 has identified the residual heat removal (RHR) system as vital to the protection of the fission product barrier. This system does not comply with Position 1 of the guide. The RHR electrical system automatically transfers loads between divisions (if necessary) during a LOCA. Due to the special nature of the above automatic transfer, all feeds to and from the motor control center (MCC) are run exclusively in conduit in order to maintain divisional integrity.

Position 3 of the guide specifies that dc load groups have battery and battery chargers to energize them. The Fermi 2 dc systems consist of two loads. Within each division are two 130- V dc control batteries in series, thus producing 260-V dc emergency power feed capacity. To provide independence of battery and charger combinations, the system incorporated into the dc system has a charger for each 130-V dc battery and one standby battery charger per division. In conjunction, the dc instrument system consists of one 48/24-V battery per division with two 24-V dc chargers per division and a standby charger. As a result, the battery and charger system combination relies on no automatic connections to other redundant dc loads.

No automatic load transfers are to be performed with the exception of certain RHR-related loads as noted above. There do exist manually operated electrical and physical interlocked maintenance ties between the two ac power supply divisions. During operating conditions, both breakers at each end of the ties are kept open and racked out of their operating position. In compliance with Position 4, this interlock arrangement prevents operator inadvertent error, which might imperil standby power source availability.

The Fermi 2 design uses two divisions of ac sources each with redundant motor-generator sets, i.e., two EDGs per division. This redundancy ensures reliability and satisfies the need for protection against common-mode failures and single failures required in Position 5.

For additional information, refer to Subsections 8.3.1.1.4 and 8.3.1.1.8.1.

A.1.7 REGULATORY GUIDE 1.7 (March 2004, Revision 3), CONTROL OF COMBUSTIBLE GAS CONCENTRATIONS IN CONTAINMENT

Fermi 2 originally complied with the guidance in Regulatory Guide 1.7, Revision 2. The NRC amended 10 CFR 50.44, "Standards for combustible gas control system in lightwater-cooled power reactors" on October 16, 2003 to eliminate the requirements for hydrogen recombiners. The hydrogen recombiner Technical Specification requirements were subsequently removed by License Amendment 159, dated March 15, 2004. Regulatory Guide 1.7, Revision 3, was issued in March 2007 to reflect the amended 10 CFR 50.44.

Fermi 2 complies with guidance set forth in this regulatory guide.

As it is no longer required for compliance with tis regulatory guide, the Combustible Gas Control System (CGCS) has been retired in place with its electrical circuits de-energized and fluid process piping isolated from primary containment with redundant locked-closed isolation valves as described in Subsection 6.2.5. Combustible gas control of the primary containment is provided by inerting the primary containment with nitrogen, see Section 9.3.6. For descriptions of the hydrogen/oxygen monitoring system, see Subsection 7.6.1.

A.1.8 REGULATORY GUIDE 1.8 (September 1975, Revision 1), PERSONNEL QUALIFICATION AND TRAINING

With regard to Revision 1 to Regulatory Guide 1.8 (September 1975), Fermi 2 is in conformance.

A.1.9 REGULATORY GUIDE 1.9 (December 1979, Revision 2), SELECTION, DESIGN, AND QUALIFICATION OF DIESEL GENERATOR UNITS USED AS STANDBY (ONSITE) ELECTRICAL POWER SYSTEMS AT NUCLEAR POWER PLANTS

The guidelines presented in Regulatory Guide 1.9, Revision 2, apply to nuclear power plants whose construction permit applications were docketed after December 1979. Because the application for Fermi 2 was docketed in 1969, the revised versions of the guidelines do not apply to Fermi 2.

The EDGs for Fermi 2 are acceptable as discussed on page 31 of the AEC Staff Safety Evaluation Report of May 17, 1971. The Fermi 2 design conforms to the regulatory guide positions except those in paragraphs C.4, C.5, C.7, C.9, and C.11 of Regulatory Guide 1.9 (December 1979, Revision 2). Exceptions taken to Positions C.4, C.5, C.7, C.9, and C.11 are described below, along with Edison's compliance with Position C.14.

Exception To Position C.4

Preoperational tests have validated the starting and load- accepting capability of the EDGs. Minor deviations from the Regulatory Guide recommendations are noted below but they do not impair the ability of the EDGs to perform their design functions.

System analyses performed by Colt and Detroit Edison produced results close to the recommended limit of 75% in this position. As a result, pre-operational testing was utilized

to ensure successful operation in lieu of analytical comparison to the 75% limit. The pre-operational test results, shown in Table 8.3-8, identified that the first voltage dip associated with the RHR pump start did decrease below 75%, but subsequent voltage dips, such as for the CS pump start, did not. The original excitation systems (Portec) were replaced with new excitation systems (Basler). System analysis by Coltec with the new excitation systems predicted voltage dips below 75% for the RHR pump start. Testing performed during refueling outages since the replacement has shown that voltage dips associated with the RHR pump start have sometimes been below the 75% value of this position as well as below those from the pre-operational test results. Similarly, testing has shown that the voltage dip associated with the CS pump start has at times decreased below 75%. The continued successful testing during refueling outages with the identified voltage dips ensures the adequacy of the EDG performance during large-motor starting transients even when voltage dips below the 75% value associated with this position. Voltage dips, while not an acceptance criteria of the testing, are monitored to identify potential for EDG or other equipment degradation. Revision 2 to Regulatory Guide 1.9 maintains the same voltage dip limits of 75 percent and a frequency limit of 95 percent as did Revision 1.

The recovery time of the original regulatory guide was relaxed somewhat in Revision 1. The original regulatory guide required voltage recovery to 10 percent of nominal and frequency to 2 percent of nominal within 45 percent of each load sequence. The revised regulatory guide now allows the recovery in 60 percent of each load sequence. Preoperational test results showed that all loading frequencies, with the exception of the RHR pumps (Table 8.3-8), were within the allowed recovery times.

Fermi 2 is also in compliance with the overspeed trip requirements of this position.

Exception To Position C.5

The Fermi 2 EDGs were purchased to meet IEEE 323-1971, which was acceptable when they were purchased in February 1973.

Exception To Position C.7

Fermi 2 meets most of the requirements of this position. The EDG protective trips are automatically bypassed (except for overspeed and generator differential, in accordance with Position C.7). In addition, the crankcase overpressure and low lube-oil pressure trips, although not bypassed, require coincidental signals to trip, again in accordance with Position C.7. Fermi 2 also has a start failure relay trip which, during the startup of the unit, does not require coincidental signals to trip. (Once the unit is up to speed, two speed contacts bypass the relay.) This approach, as presented in Subsection 8.3.1.1.12.2 and Table 8.3-12 is in compliance with EICSB 17 of the Standard Review Plan (SRP) and was found acceptable in the interim safety evaluation report, NUREG-0314.

The bypass circuits are initiated by either relay ESA or ESB, such that a single failure will not prevent a bypass of the trips.

The bypass function is testable and the emergency mode operation of the EDG is annunciated in the main control room. Any trip that is bypassed will still annunciate in the control room. Fermi 2 does not have manual reset of the trip bypass but the trip bypass automatically resets when the emergency start signals are picked up.

Exception To Position C.9

This position suggests the use of the 1975 version of IEEE 344 for the seismic qualification program. The Fermi 2 seismic qualification followed the 1971 version of IEEE 344, which was current when the equipment was purchased in February 1973.

Exception To Position C.11

Position C.11 suggests that the EDG site-acceptance tests and periodic tests conform with Sections 6.5 and 6.6 of IEEE 387-1977 and be supplemented by Regulatory Guide 1.108. The Fermi 2 EDGs were tested to the performance requirements of Regulatory Guide 1.108, but not necessarily all of the requirements of IEEE 387-1977.

Position C.13

Position C.13 is not applicable to Fermi 2.

Compliance With Position C.14

The Fermi 2 preoperational test procedures were developed to meet Regulatory Guide 1.108, Revision 1. Regulatory Guide 1.108, Section C.2.a.(3), requires a demonstration run of 22 hr at the continuous rating (2850 kW) and 2 hr at the 2-hr rating (3135 kW). Position C.14 in Regulatory Guide 1.9 is basically the same requirement as Regulatory Guide 1.108 except that the test sequence is different and must be continuous. Regulatory Guide 1.9 now calls for a warm-up run at the continuous rating until equilibrium temperatures are reached, then a 2-hr run at the 2-hr load and a subsequent 22-hr run at the continuous rating. Since this position reflects the current NRC position, Edison has run the preoperational test in accordance with Position C.14.

A.1.10 REGULATORY GUIDE 1.10 (January 1973, Revision 1), MECHANICAL (CADWELD) SPLICES IN REINFORCING BARS OF SEISMIC CATEGORY I CONCRETE STRUCTURES

The Fermi 2 procedures are in conformance with the overall objectives and intent in Regulatory Guide 1.10. A minor exception to the detailed practices set forth in the guide is that the Fermi 2 procedures require (1) each splice operator to be qualified by at least one test splice at each anticipated splice position and (2) a test program similar in quality to the one which is specified in the guide. However, it relies heavily on the use of companion or "sister" splicing, rather than "production" splice testing, to qualify the production splices. The procedure requires production testing in the event of companion test failures.

For details refer to Subsection 3.8.4.6.6.

This Regulatory Guide has since been withdrawn (as of July 1981).

A.1.11 REGULATORY GUIDE 1.11 (Supplement, February 1972), INSTRUMENT LINES PENETRATING PRIMARY REACTOR CONTAINMENT

The design of Fermi 2 satisfies GDC 55 and 56 of 10 CFR 50, Appendix A, as well as Regulatory Guide 1.11 and the Supplement to this regulatory guide issued in February 1972. By the use of a single automated excess flow check valve and shutoff valve external to the primary containment wall and a flow restriction orifice, internal to the primary containment wall, the isolation of the penetration line ports takes place. Normally open, the excess flow check valves close automatically and indicate the actuation on the control room panel on

occurrence of a line break. These "N" stamp valves are designed to conservative requirements for seismic testing and close with a 2.5-gpm maximum reverse flow rate. Design operating pressure is 1250 psig at 575°F.

For design details refer to Subsection 6.2.4.2.5.

A.1.12 REGULATORY GUIDE 1.12 (April 1974, Revision 1), INSTRUMENTATION FOR EARTHQUAKES

The seismic instrumentation program described in Subsection 3.7.4 meets the intent of Regulatory Guide 1.12, Revision 1. The system conceived and designed for the Fermi facility was documented in January of 1972, prior to the issuance of Regulatory Guide 1.12. In June 1975, the Fermi project reviewed this earthquake recording system for compliance with the requirements of Regulatory Guide 1.12, Revision 1, and concluded that the intent of the requirements was satisfied. In May 1996, the recording system was upgraded with a digital recorder. The upgrade was reviewed for compliance with the requirements of Regulatory Guide 1.12, Revision 1, and concluded that the intent of the requirements was satisfied.

The Fermi 2 earthquake recording system does not contain a triaxial seismic switch, a triaxial response spectrum switch, or any triaxial peak accelerographs. The intent of the Regulatory Guide requirements for this equipment is fulfilled, however, by installed triaxial active time history accelerographs and passive response spectra recorders.

A seismic trigger set at 1/8 of the horizontal operating-basis earthquake (OBE) zero period acceleration level indicates to control room personnel that a seismic event has occurred. Active on-line playback apparatus and extracted triaxial response spectra data provide information allowing a decision to be made expeditiously regarding facility shutdown.

High frequency acceleration data from the 18 response spectrum recorders at the Fermi facility provides significant peak acceleration information for representative reactor equipment, reactor piping, and other Category I equipment and Category I facility structures.

A.1.13 REGULATORY GUIDE 1.13 (December 1975, Revision 1), FUEL STORAGE FACILITY DESIGN BASIS

The design of the Fermi 2 fuel storage facility does not conform fully to certain regulatory positions in this guide. Edison has incorporated alternative solutions to ensure that the design of this facility is adequate. The Fermi 2 reactor building crane meets single-failure criteria and is therefore acceptable by the revised (Revision 1) guide. The design basis of the facility versus the regulatory positions is discussed below.

Edison has done a very careful analysis of the probability of a missile generated by cyclonic winds damaging the pool or the fuel. The results of the study show that in view of the extremely low probability of a tornado-borne missile damaging fuel, neither the added complexity to plant operation nor the cost of a fuel pool cover is warranted. Based on its own independent assessment (AEC letter of June 11, 1974, W. R. Butler (AEC) to H. Tauber (Edison)), the AEC waived the requirement to provide tornado protection of the spent fuel pool on the basis of the low probability of a tornado, the lower likelihood that objects could be lifted to the elevation of the fuel pool and become missiles, and the expectation that where

spent fuel damage were to occur, the associated offsite exposure radiological consequences would be likely within 10CFR100 limits.

The reactor building crane is designed to standards of complete redundancy of fail-safe systems. Hooks, cables, brakes, and motors are redundant; drums are fail-safe. Edison takes the position that this solution is superior to the area-interlock method suggested in the regulatory guide. The reactor building crane is described in Subsection 9.1.4.2.2.

Coolant can be added to the pool from the condensate storage tanks (up to 100 gpm), or from the RHR system. The RHR system, including storage, and the cross-tie piping between the RHR system and the fuel pool diffusers, are designed to Category I requirements.

The justification for the design for fuel pool makeup is as follows: the pool, which is a Category I structure, incorporates a very high integrity stainless steel liner; therefore, a large leak is very unlikely. Consequently, the time from initiation of the low-level alarm until the water reaches the top of the fuel is in units of hours. Should the fill line be unusable at this time, numerous alternatives are available to get water into the pool, such as the use of the fire-fighting system or connection of a fire hose to the RHR system. These alternatives can be employed within the time available.

The fuel storage facility is described in Subsections 3.1.2.6, 9.1.1.1, 9.1.2.1, 9.1.3.1, and 9.1.4.1.

A.1.14 REGULATORY GUIDE 1.14 (August 1975, Revision 1), REACTOR COOLANT PUMP FLYWHEEL INTEGRITY

Regulatory Guide 1.14 does not apply to Fermi 2 since BWRs do not use reactor coolant pumps and BWR reactor recirculation coolant pump motors do not have inertia flywheels.

A.1.15 REGULATORY GUIDE 1.15 (December 1972, Revision 1), TESTING OF REINFORCING BARS FOR SEISMIC CATEGORY I CONCRETE STRUCTURES

Fermi 2 is in conformance with the guide except for a departure relating to the requirement to test one bar for each bar size from every 50 tons or fraction thereof from each heat. Edison Specification No. 3071-16, "Concrete Reinforcement," requires that the reinforcing steel conform to ASTM A 615-72, which requires bar testing on a "per heat" basis without regard to heat tonnage.

This Regulatory Guide has since been withdrawn (as of July 1981).

A.1.17 REGULATORY GUIDE 1.17 (June 1973), PROTECTION OF NUCLEAR POWER PLANTS AGAINST INDUSTRIAL SABOTAGE

The Fermi 2 Physical Security Plan is not designed to conform specifically to Regulatory Guide 1.17.

The Fermi 2 Physical Security Plan conforms to 10 CFR 73, Section 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Industrial Sabotage." The guidelines of NUREG-0908, Acceptance Criteria for the Evaluation of Nuclear Power Reactor Security Plans (August 1982), were used to develop the plan.

A.1.18 REGULATORY GUIDE 1.18 (December 1972, Revision 1), STRUCTURAL ACCEPTANCE TEST FOR CONCRETE PRIMARY REACTOR CONTAINMENTS

Regulatory Guide 1.18 does not apply since Fermi 2 utilizes a steel primary reactor containment.

A.1.19 REGULATORY GUIDE 1.19 (August 1972, Revision 1), NON-DESTRUCTIVE EXAMINATION OF PRIMARY CONTAINMENT LINER WELDS

Regulatory Guide 1.19 does not apply since there is no primary containment liner in the Fermi 2 power plant.

A.1.20 REGULATORY GUIDE 1.20 (May 1976, Revision 2), COMPREHENSIVE VIBRATION ASSESSMENT PROGRAM FOR REACTOR INTERNALS DURING PREOPERATIONAL AND INITIAL STARTUP TESTING

The Fermi 2 vibration program for the reactor internals includes provisions for confirmatory instrumented vibration tests as suggested in this guide. The Tennessee Valley Authority Browns Ferry, Unit 1, reactor was the prototype reactor and was to be tested according to the BWR Prototype Vibrational Testing Program.

Complete details of the program were developed and are available for review by the NRC prior to the performance of scheduled preoperational functional tests.

Refer to Subsection 3.9.1.3 for additional discussion on the testing of reactor internals.

A.1.21 REGULATORY GUIDE 1.21 (June 1974, Revision 1), MEASURING, EVALUATING, AND REPORTING RADIOACTIVITY IN SOLID WASTE AND RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND GASEOUS EFFLUENTS FROM LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

The Fermi 2 design complied with the first issue of Regulatory Guide 1.21. Changes to the guide in Revision 1 have caused some features of the plant design to be in possible noncompliance.

Areas of possible noncompliance do not affect the ability to safely shut down the reactor. Automatic termination of releases from the condenser offgas system on detection of high activity has not been provided. Edison's reason for noncompliance with this aspect of Regulatory Guide 1.21 is based on Edison's compliance with Appendix I to 10 CFR 50 taking priority. A brief summary of the considerations involved follows.

Paragraph 20.1(c) of 10 CFR 20 states

> Persons engaged in activities under licenses issued by the Nuclear Regulatory Commission . . . make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term ‘as low as is reasonably achievable’ means as low as is reasonably achievable taking into account the state of technology, and the

economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of atomic energy in the public interest.

Public use of a dependable energy source, although a seldom- emphasized consideration of the "as low as is reasonably achievable" requirement, is part of the regulation and must receive equal emphasis.

Section IV of Appendix I to 10 CFR 50, which contains numerical guidance for technical specifications and limiting conditions for operation, states that the licensee is permitted the flexibility of operation, compatible with considerations of health and safety, to ensure that "the public is provided a dependable source of power even under unusual operating conditions that may temporarily result in releases higher than such numerical guides for design objectives . . ." (emphasis added). Edison regards this type of operating flexibility to be warranted in light of the restrictive nature of Appendix I. Continued operation of licensed facilities in this manner will not decrease the protection from radiation established by existing regulations. The Commission has clearly emphasized that the Appendix I guides are not radiation protection standards, but are a quantitative expression of meaning of the "as low as is reasonably achievable" requirement. The Commission's standards are in 10 CFR 20 and remain unchanged by Appendix I to 10 CFR 50.

Edison complied with the radiation protection standards for limiting potential doses to the public contained in 10 CFR 20 prior to elaborate additions to the condenser offgas system. It procured the condenser offgas system to satisfy the then proposed Appendix I to 10 CFR 50 to reduce activity releases to the "as low as practicable" level, and not because the health and safety of the public were endangered.

Guidance on technical specifications and limiting condition for operation contained in Appendix I requires (among other things) that the licensee implement a program of corrective action should material actually released during any calendar quarter result in a calculated exposure exceeding twice the annual design objective. This essentially means that a licensee shall take corrective action to limit activity releases well before any individual could receive an exposure above the limiting values of 10 CFR 20. The action taken by a licensee in compliance with Appendix I (and monitored by the Commission) inherently ensures that the limiting doses of 10 CFR 20 will not be exceeded. Automatic isolation of the condenser offgas system would ultimately result in a turbine trip and the potential loss of electrical power to some members of the public. This is not only unnecessary, but should be avoided in order to comply with all aspects of Appendix I.

Clearly, automatic termination of the offgas system operation at the restrictive levels contained in Appendix I is inconsistent with an objective of Appendix I to ensure that the public is provided a dependable source of power even under unusual operating conditions that may temporarily result in releases higher than the design objective.

Automatic termination of offgas system operation required by Regulatory Guide 1.21 is outside the scope of the regulatory guide and inconsistent with the operational flexibility permitted by Appendix I. Compliance with this particular aspect of the regulatory guide should not take priority over the requirements of Appendix I.

In summary, the corrective action the operator would take to comply with the requirements of Appendix I would limit the resultant doses to a value well below the historically accepted safe limits specified in 10 CFR 20. Automatic termination of the condenser offgas system operation would not provide the operator with the option of reducing power nor permit activity releases temporarily higher than those associated with the almost immeasurably small doses of Appendix I, which the Commission expressly expected would be exceeded to permit the necessary flexibility in compliance with Appendix I in its entirety.

The Fermi 2 Technical Specifications and Offsite Dose Calculation Manual implement the intent of this Regulatory Guide.

A.1.22 REGULATORY GUIDE 1.22 (February 1972), PERIODIC TESTING OF PROTECTION SYSTEM ACTUATION FUNCTIONS

The current Fermi 2 provisions for periodic testing of protection system actuation functions conform to the requirements of this guide.

Refer to Subsections 7.2.1.1, 7.2.2.2, 7.3.1.2, 7.6.1.1, 7.6.1.2, 7.6.1.4, 7.6.1.7, 7.6.1.8, 7.6.1.14, 7.6.1.15, 7.6.2.1, 7.6.2.2, 7.6.2.3, 7.6.2.4, 7.6.2.7, 7.6.2.8, 7.6.2.9, 7.6.2.12, 7.6.2.13, and 7.6.2.15.

A.1.23 REGULATORY GUIDE 1.23 (February 1972), ONSITE METEOROLOGICAL PROGRAMS

The Fermi 2 onsite meteorological programs fulfill the requirements of this guide except for the section on instrument accuracy. The Fermi 2 meteorological data acquisition system meets the system accuracy requirements of proposed Revision 1 (September 1980) to Regulatory Guide 1.23.

For details on the Fermi 2 meteorological program, refer to Subsection 2.3.3.6.

A.1.24 REGULATORY GUIDE 1.24 (March 1972), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A PRESSURIZED WATER REACTOR RADIOACTIVE GAS STORAGE TANK FAILURE

Regulatory Guide 1.24 does not apply since Fermi 2 is a BWR.

A.1.25 REGULATORY GUIDE 1.25 (March 1972), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A FUEL HANDLING ACCIDENT IN THE FUEL HANDLING AND STORAGE FACILITY FOR BOILING AND PRESSURIZED WATER REACTORS

The analysis of the fuel-handling accident, as discussed in Subsection 15.7.4, is in conformance with the regulatory position of this guide. Regulatory Guide 1.25 assumptions regarding the pool iodine decontamination factor and gap fractions (except as modified per License Amendment 87 based on NUREG/CR-5009) apply to the analysis of 9x9 fuel that does not meet the Regulatory Guide 1.183 limitations on fuel burnup. Fuel handling accidents involving fuel that meets the Regulatory Guide 1.183 (Table 3, Footnote 11)

burnup specifications are analyzed in accordance with the NRC's Alternate Source Term and; thus, do not conform to this regulatory guide.

A.1.26 REGULATORY GUIDE 1.26 (February 1976, Revision 3), QUALITY GROUP CLASSIFICATIONS AND STANDARDS FOR WATER-, STEAM-, and NUCLEAR POWER PLANTS

The Fermi 2 design is not in full conformance with the requirements of this guide. The design is based on the commitment in the PSAR as accepted by the AEC-DL in the Safety Evaluation Report (SER) Section 3.3.3, page 16. The Fermi 2 project considers the extent to which the design conforms to this guide to be adequate.

For details refer to Subsection 3.2.2.

A.1.27 REGULATORY GUIDE 1.27 (January 1976, Revision 2), ULTIMATE HEAT SINK FOR NUCLEAR POWER PLANTS

The design of the Fermi 2 RHR Complex conforms with the requirements of GDC 44 of 10 CFR 50, Appendix A, by providing assurance of system redundancy for safe removal of reactor decay heat after emergency shutdown and during accident conditions. Fermi 2 meets regulatory guide position 1 by providing 6,598,000 gallons of water at 1 foot below grade level to permit safe cooldown requirements over a 7-day period. This period includes time needed to evaluate the situation and take corrective action to initiate replenishment activities if necessary.

The ultimate heat sink system was originally sized to provide sufficient cooling for 30 days following an accident without make-up water addition to the RHR reservoir. Regulatory Guide 1.27 states that a UHS capacity of less than 30 days may be acceptable if it can be demonstrated that replenishment can be effected to ensure the continuous capability of the sink to perform its safety functions, taking into account the availability of replenishment equipment and the limitations that may be imposed on freedom of movement following an accident.

The Fermi 2 UHS design evolved long before the post-TMI improvements in Emergency Preparedness. These improvements are reflected in the Detroit Edison Radiological Emergency Response Preparedness Plan. One of the objectives of this program is effective and timely implementation of emergency measures. Detroit Edison now has the resources of the Emergency Response Organization to rapidly identify the need for reservoir replenishment and to direct procurement of material and field implementation. This change significantly improves the ability to provide reservoir replenishment within 7 days as it relates to resolving problems associated with freedom of movement following an accident or occurrence of severe natural phenomena.

The 7-day make-up provision for the RHR reservoir is consistent with the 7-day make-up provisions allowed for replenishment of the diesel generator fuel supply. Therefore, this period of time is sufficient to recover from the effects of natural phenomena such as tornado, storm, earthquake or flood and restore site access for replenishment activities.

Make-up will be provided by the normal make-up system or using RHR Complex fire hoses. If these systems are not available, temporary equipment will be used. The necessary pumps

and hoses are commercially available from many sources and that seven days is sufficient time to procure and install the equipment. The water source will be either Lake Erie, the Fermi 1 discharge canal, the circulating water reservoir, the on-site Quarry Lake or Swan Creek. The temperature and quality of make-up water is maintained to ensure that the service water systems and cooling towers perform as required. Siphon of the reservoir is prevented by ensuring that hoses are not placed into the reservoir water.

The 7-day supply calculations utilize the Marley design and test data for cooling tower drift and evaporative water losses. As discussed in Section 9.2.5.3.3, water losses due to leakage and EECW makeup from the reservoir are assumed. In addition, both divisions of EDGs, RHR, EECW/EESW, EDGSW, and RHRSW cooling towers are assumed to be operating maximizing heat load to the reservoir and maximizing evaporative and drift losses. Constant historical worst-case meteorological data is used to compute evaporative water losses. The 7-day supply also assumes initial reservoir level at the technical specification limit of 580' -0" versus the normal operations level of between 582'-0" and 583'-0" which provides additional conservatism.

In regard to Position 2 of the Regulatory Guide, the Fermi 2 RHR heat sink is designed to withstand the most severe natural phenomenon such as the safe-shutdown earthquake (SSE), tornado, hurricane, flood, or drought. In addition, other less severe phenomena and reasonably probable combinations of less severe phenomena have been accounted for in the safety analysis.

The primary components of man-made structures in the RHR heat sink complex are the RHR cooling towers. In the ultimate heat sink design calculations, the 1972 ASHRAE Handbook Fundamentals ambient air wet bulb temperature of 76°F and dry bulb temperature of 92°F are used. These design temperatures represent values that have been equaled or exceeded by only 1% of the total hours of the months of June through September. These conditions are assumed to be continuous over the 7-day period.

The Technical Specification limit for cooling tower reservoir temperature is 80°F. To calculate the peak suppression pool temperature following DBA/LOCA, an energy balance calculation was used to determine the post-LOCA RHRSW temperature increase as a function of time from the initial condition of 80°F to the cooling tower maximum return design temperature of 90°F. The temperature profile, which is nonlinear, was conservatively bounded by a linear profile with the initial temperature of 80°F increasing in a linear way to 90°F over an 8-hour period. Using the conditions outlined in Regulatory Guide 1.1 (November 1970), adequate NPSH margin is provided for pumps taking suction from the suppression pool.

Regulatory Position 3 requires redundant sources of water, both of which must be capable of meeting the requirements of Position 1. In cases where an extremely low probability of failure due to natural phenomena of a single source is demonstrated, this requirement may be waived. In addition, Technical Specifications, including provisions for actions taken in the event of the threat of partial loss of capability of the ultimate heat sink, must be reviewed. The Fermi 2 design of the ultimate heat sink provides a highly reliable single water source of Category I design. This source is located below grade and is composed of two separate reservoirs connected by redundant 10-inch penetrations. The design allows either redundant division of the RHRSW, EESW or EDGSW systems to use the entire volume of water in the

two reservoirs. The 7-day water supply is thus met even after considering any single failure. In the event of a seismic disturbance and failure that causes development of a crack, only water stored above ground-water elevation will be lost. The 7-day water supply includes allowance for a below grade crack in both reservoir basins. The RHR complex of diesel generators, cooling towers, RHRSW, EESW and EDGSW systems, and auxiliaries is redundant.

For details refer to Subsection 9.2.5.2.

A.1.28 REGULATORY GUIDE 1.28 (February 1979, Revision 2), QUALITY ASSURANCE PROGRAM REQUIREMENTS (DESIGN AND CONSTRUCTION)

The Fermi 2 quality assurance (QA) program complies with ANSI N45.2-1977 and the requirements of Revision 2 of this regulatory guide.

For details on the QA program, refer to Chapter 17.

A.1.29 REGULATORY GUIDE 1.29 (September 1978, Revision 3), SEISMIC DESIGN CLASSIFICATION

The Fermi 2 design is in conformance with the requirements of Regulatory Guide 1.29. Refer to Subsection 3.2.1 for a listing of safety-related structures, systems, and components that are designed to withstand the effects of an SSE.

A.1.30 REGULATORY GUIDE 1.30 (August 1972), QUALITY ASSURANCE REQUIREMENTS FOR THE INSTALLATION, INSPECTION, AND TESTING OF INSTRUMENTATION AND ELECTRIC EQUIPMENT

The Fermi 2 QA program is in conformance with this guide.

For details refer to Chapter 17.

A.1.31 REGULATORY GUIDE 1.31 (April 1978, Revision 3), CONTROL OF FERRITE CONTENT IN STAINLESS-STEEL WELD METAL

Stainless steel systems and components for Fermi 2 were fabricated by GE or Dravo and include the following:

a. Reactor recirculation system
b. Control rod drive (CRD) hydraulic return
c. CRD housing to flange
d. Reactor core isolation cooling (RCIC) system (suction from condensate storage).

Since these systems and components were ordered prior to the inception of Regulatory Guide 1.31, welds were not specifically tested for delta ferrite. Welds made by GE were made with long- standing procedures that had been proven adequate for consistently producing satisfactory, fissure-free welds. In addition, welds produced in five BWRs using the same

procedures as used on Fermi 2 equipment were tested and found to contain a minimum of 3 percent delta ferrite. In addition, stainless steel welds made by Dravo were made using weld filler metal containing 5 to 15 percent delta ferrite. Similar welds made by Dravo using the same procedures were inspected and found to consistently contain a minimum of 3 percent delta ferrite.

In view of the above, Edison does not plan a delta ferrite inspection program on previously fabricated stainless steel components and systems. In addition, since Regulatory Guide 1.31 and Branch Technical Position (BTP) MTEB 5.1 were issued, a considerable amount of attention has been given to delta ferrite control. Programs have been undertaken to determine not only the effects of delta ferrite on fissure sensitivity but also the effects of welding parameters on delta ferrite formation. Programs included analysis of laboratory-produced welds as well as statistical analysis of welds in actual components and systems.

These programs indicated that fissuring is minimized when as little as 3 percent delta ferrite is present. Additional amounts of delta ferrite do not further reduce fissure susceptibility.

It has also been shown that the delta ferrite in a resultant weld can be controlled by controlling the chemistry of the weld metal. Weld metals containing approximately 5 percent delta ferrite will produce welds with a minimum of 3 percent delta ferrite. Accordingly, for all future fabrication and installation of austenitic stainless steel components and systems, Edison will control delta ferrite formation as follows:

a. Each heat of austenitic stainless steel (A-No. 8 analysis of ASME Section IX, QW 442) bare wire and each heat or lot of austenitic stainless steel covered electrodes will be purchased in accordance with the applicable requirements of ASME Code Sections II and III as well as DECo Specification 3071-370

b. All austenitic stainless steel weld materials of the A-No. 8 analysis will also be specified to contain a minimum ferrite number of 8FN. The ferrite number will be determined by both chemical analysis and magnetic measurements performed by the filler metal manufacturer on an undiluted weld pad, with the exception that the ferrite number for A-No. 8 filler metals of SFA Specification 5.9 that are used with the gas tungsten arc welding (GTAW) process need only be determined by chemical analysis. Welding of the coupon shall be as specified in the applicable SFA specification.

c. Completed final welds will not be inspected for ferrite content.

The controls used for Fermi 2 are now consistent with industrial practices and Regulatory Guide 1.31.

A.1.32 REGULATORY GUIDE 1.32 (February 1977, Revision 2), CRITERIA FOR SAFETY RELATED ELECTRIC POWER SYSTEMS FOR NUCLEAR POWER PLANTS

The Fermi 2 design conforms to the requirements of Revision 1 to this guide, with the exception of Parts 1d, 1e, and 2b. These sections required compliance with Regulatory Guides 1.75 and 1.93. For discussions of those guides, see the applicable sections of this appendix.

For details refer to Sections 8.2 and 8.3.

A.1.33 REGULATORY GUIDE 1.33 (February 1978, Revision 2), QUALITY ASSURANCE PROGRAM REQUIREMENTS (OPERATION)

Fermi 2 is in conformance with the requirements of Regulatory Guide 1.33, with the following exceptions:

a. The Quality Assurance program as described in Subsection 17.2.7 permits the conditional release of material lacking the specified quality assurance records, provided the item can be readily removed. The program allows for functional testing on conditionally released materials that have been installed; however, they will not be placed in service unless a technical evaluation has been performed and documented, and appropriate 10 CFR 50.59 review in accordance with 10 CFR 50.59 has been performed.

b. Exception is taken from the audit program scope and frequency of audits described in Regulatory Guide 1.33 and ANSI N18.7-1976 as endorsed by Regulatory Guide 1.33. The provisions in the Quality Assurance Program described in Subsection 17.2.18 govern the audit program. When differences exist between Regulatory Guide 1.33 and the UFSAR, the latter shall take precedence.

c. When purchasing commercial grade calibration or testing services from a laboratory holding accreditation by an Accreditation Body (AB) which is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA), procurement documents are not required to impose a quality assurance program consistent with ANSI N45.2-1977. Alternative requirements described in UFSAR Appendix A, A.1.123, for Regulatory Guide 1.123 may be implemented in lieu of imposing a quality assurance program consistent with ANSI N45.2-1977. In addition, the following exception will be taken to ANSI N18.7: When purchasing commercial grade calibration or testing services from a laboratory holding accreditation by an accrediting body recognized by the ILAC MRA, the procurement documents are not requires to impose a quality assurance program consistent with ANSI N45.2-1977. Alternative requirements described in UFSAR, Appendix A, for Regulatory Guide 1.123 may be implemented in lieu of imposing a quality assurance program consistent with ANSI N45.2-1977.

An exception is taken to the review of all plant procedures every two years. Instead, non-routine procedures (procedures such as emergency operating procedures, abnormal operating procedures, procedures which implement the emergency plan, and Security and other procedures that are implemented as a result of an event) shall be reviewed at least every two years and revised as appropriate. On a biennial basis, continue to audit a sample of routine procedures and immediately review procedures following an unusual incident or plant modification. Routine plant procedures that are used at least biennially receive scrutiny by knowledgeable individuals during work activities and are updated, as necessary, to assure adequacy of controlled activities. Plant policy requires that the job be stopped and the procedure revised or the situation resolved prior to work continuing if the procedure cannot

be implemented as written. Routine plant procedures that have not been used for two years will be reviewed before use to determine if changes are necessary or desirable.

Exception is also taken to full compliance with some of the regulatory guides listed in Section C.2 of Regulatory Guide 1.33. The Fermi 2 position on regulatory guides listed in Section C.2 is stated elsewhere in this appendix.

A.1.34 REGULATORY GUIDE 1.34 (December 1972), CONTROL OF ELECTROSLAG WELD PROPERTIES

Electroslag welding has been performed only on the turbine shielding wall in the field for Fermi 2. Although Edison specifications did not specifically prohibit it, no use of electroslag welding on core support structures or ASME Class 1 or 2 vessels or components can be identified. Most of those components that would be expected to have electroslag welding were completed and fabricated before this guide was issued.

A.1.35 REGULATORY GUIDE 1.35 (January 1976, Revision 2), INSERVICE SURVEILLANCE OF UNGROUTED TENDONS IN PRE- STRESSED CONCRETE CONTAINMENT STRUCTURES

This guide does not apply to Fermi 2, which does not use a concrete containment.

A.1.36 REGULATORY GUIDE 1.36 (February 1973), NONMETALLIC THERMAL INSULATION FOR AUSTENITIC STAINLESS STEEL

The Fermi 2 design is in conformance with the requirements of this regulatory guide.

For details refer to Subsection 5.2.3.3.

A.1.37 REGULATORY GUIDE 1.37 (March 1973), QUALITY ASSURANCE REQUIREMENTS FOR CLEANING OF FLUID SYSTEMS AND ASSOCIATED COMPONENTS OF WATER-COOLED NUCLEAR POWER PLANTS

Fermi 2 is in conformance with the requirements of 10 CFR 50, Appendix B. The plant startup task force is responsible for activities to ensure system cleanliness and flushing with the objective of meeting the intent of ANSI N45.2.1.

For details refer to Subsection 17.1.9 and Chapters 13 and 14.

A.1.38 REGULATORY GUIDE 1.38 (May 1977, Revision 2), QUALITY ASSURANCE REQUIREMENTS FOR PACKAGING, SHIPPING, RECEIVING, STORAGE, AND HANDLING OF ITEMS FOR WATER-COOLED NUCLEAR POWER PLANTS

During the initial design and construction phase, the Fermi 2 project conformed to 10 CFR 50, Appendix B, but not with the measures required to comply with this guide.

The Fermi 2 project procedure was to require each manufacturer to work by written packaging and handling procedures that had been reviewed and approved by Edison, and to

supply storage instructions that were followed for onsite storage. These measures are similar to the requirements in ANSI N45.2.2-1972. This standard, however, contained some provisions that were not feasible to implement on Fermi 2 because of the date of issue; specifically,

a. Each specific item covered by the standard (all QA level I items) was required to be classified into one of four levels (A through D). Classification of those items already on order or delivered to the job site prior to issuance of the guide was not feasible for the Fermi 2 project

b. There were numerous minor requirements that would require significant investigation to ensure compliance, both at the job site and at the vendors' facilities. These include, but were not necessarily limited to, the requirement that all tarpaulin be fire retardant, that nonmetallic caps and plugs be brightly colored, and that all hoisting equipment meet the requirements of either ANSI B30.2.0, B30.5, B30.6, or A10.5, as appropriate

c. Inspection, examination, and testing personnel were required to be qualified in accordance with ANSI N45.2.6. The Fermi 2 position on this is stated in the conformance review of Regulatory Guide 1.58.

The operational QA program complies with the requirements of this regulatory guide.

A.1.39 REGULATORY GUIDE 1.39 (September 1977, Revision 2), HOUSEKEEPING REQUIREMENTS FOR WATER-COOLED NUCLEAR POWER PLANTS

The Fermi 2 project was in conformance with the regulatory position of this guide during the construction phase. Procedures were written for the regulation of site area, site preparation, and fire prevention and protection, as required by ANSI N45.2.3-1973. During the operational phase, the Fermi 2 Quality Assurance program is based on ANSI Standard N18.7-1976, “Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants”, as modified by Regulatory Guide 1.33. Housekeeping controls during the operational phase are in conformance with Regulatory Guide 1.33.

A.1.40 REGULATORY GUIDE 1.40 (March 1973), QUALIFICATION TESTS OF CONTINUOUS-DUTY MOTORS INSTALLED INSIDE THE CONTAINMENT OF WATER-COOLED NUCLEAR POWER PLANTS

There are no continuous-duty motors inside the drywell of the Fermi 2 plant to which this guide applies.

A.1.41 REGULATORY GUIDE 1.41 (March 1973), PREOPERATIONAL TESTING OF REDUNDANT ONSITE ELECTRIC POWER SYSTEMS TO VERIFY PROPER LOAD GROUP ASSIGNMENTS

The Fermi 2 testing program, described in Subsection 8.3.1, is in conformance with the requirements of this guide.

A.1.43 REGULATORY GUIDE 1.43 (May 1973), CONTROL OF STAINLESS STEEL WELD CLADDING OF LOW-ALLOY STEEL COMPONENTS

The requirements in this guide primarily concern fabrication of the RPV. Fermi 2 is in conformance with the requirements of this guide.

For details refer to Section 5.4.

A.1.44 REGULATORY GUIDE 1.44 (May 1973), CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL

Fermi 2 is not in complete conformance with the regulatory position as stated in this guide. Intergranular corrosion tests were not performed for each welding procedure to be used for welding material having a carbon content greater than 0.03 percent.

The corrosion tests are not considered necessary because the essential variables used in welding procedures at Fermi 2 were based on recommendations made by GE following extensive research. Furthermore, intergranular stress corrosion cracking (IGSCC) countermeasures have been applied to the extent practical. Steps were taken to minimize sensitization by control of welding procedures and the adverse effects of the limited sensitization offset by IGSCC countermeasures.

For details refer to Subsections 5.2.3 and 5.2.5.

A.1.45 REGULATORY GUIDE 1.45 (May 1973), REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE DETECTION SYSTEMS

To ensure the safety of the public, GDC for Nuclear Power Plants, Criterion 30, Appendix A of 10 CFR 50, requires all plants to provide a means for detecting and identifying the locations of the sources of reactor coolant leakage from the RCPB. The Fermi 2 design, in conformance with Regulatory Position 1 of Guide 1.45, effectively identifies, classifies, and collects sources of leakage to monitor and control individual leakage flow rates, as well as total flow rates.

Sources of leakage can be classified as identified and unidentified. Position 2 of this guide requires that unidentified sources be collected and monitored with a flow rate accuracy of 1 gpm. This sensitivity requirement is attained on the Fermi design by the drywell floor drain sump level rate-of-change monitor.

Regulatory Position 3 requires a minimum of three separate detection systems in the design. These sensing systems must include a sump level and flow monitor and an airborne particulate radioactivity monitor. In addition, either an air cooler condensate flow rate or airborne gaseous radioactivity monitoring system must be included in the design. All global (i.e., general area) systems must use humidity, temperature, or pressure conditions of the containment atmosphere as the alarm setpoint indicator. The Fermi 2 design conforms with these system requirements by providing monitoring of sump level and flow, airborne gaseous radioactivity, and a supplementary drywell floor level monitor. Specific monitored parameters are sump level, sump level flow, airborne particulate matter, airborne gaseous radioactivity, primary containment pressure and temperature, low reactor water level, high steam flow indications, and drywell local temperature.

Regulatory Position 4 requires detection of intersystem leakage utilizing methods of radioactivity monitoring and abnormal water levels or flow in local RCPB regions. Intersystem leakage can be detected in the following systems: RHR service water, general service water, and reactor building closed cooling water systems. With the exception of the general service water, all of these systems use radioactivity level indication as the monitoring parameter. In addition, abnormal water levels or flow are also monitored. Thus Fermi 2 complies with Position 4 of the guide.

The sensitivity and response time for each leakage detection system for unidentified leakage is required by Position 5 to match the 1 gpm-or-less standard of Position 3 in less than 1 hr after the onset of the leak. As stated previously, the Fermi 2 designed detection system guarantees detection of flows with this precise accuracy limit.

Position 6 of the guide specifies that leakage detection systems should be capable of performing their functions during and following seismic events not requiring plant shutdown. The sump level analog monitor will remain functional when exposed to the SSE. In addition, the steam leak detection systems, which utilize temperature detectors and excess steam flow differential pressure measurements, are to withstand SSE conditions. The primary containment pressure and reactor water level systems are also Category I components. Thus, with the exception of the sump level detection (for sump pump control) and the airborne radioactivity monitoring systems, Fermi 2 complies with the intent of Position 6.

Regulatory Position 7 requires that each leakage detection system have a capability for independent activation of response alarms within the control room. In addition, the control room is required to contain indicators from each system. These indicators are required to be calibrated and metered in units that allow operators to convert measurements into common leakage equivalent. Equipment used in the Fermi 2 design provides for control room alarms and indicators. Such design will allow common equivalent leakage procedures to be developed.

Position 8 requires designed equipment to readily permit testing for operability and calibration during plant operation. All leakage detection systems of Fermi 2 except the sump level can be periodically tested and calibrated during plant operation. The reactor level and drywell pressure lines are designed to allow calibration of switch setpoints by application of calibration pressures to switch actuators. The sump level switch operation can be observed during normal operation, and comparison between sets of switches can be used for calibration. The flow within the sumps using differential pressure transmitters can be calibrated. Calibration of the primary containment drain pumps can also be accomplished outside the drywell during operation.

Position 9 states that Technical Specifications with limiting conditions for both identified and unidentified leakage should include the availability of various instrument types during plant operation and the spectrum of coverage each instrument provides. The Fermi 2 Technical Specifications for leakage detection systems include the information necessary to comply with Position 9.

For details on system specifications, refer to Subsection 5.2.7.

A.1.46 REGULATORY GUIDE 1.46 (May 1973), PROTECTION AGAINST PIPE WHIP INSIDE CONTAINMENT

The Fermi 2 design meets the intent of this regulatory guide.

For details, refer to Subsection 3.6.1.

A.1.47 REGULATORY GUIDE 1.47 (May 1973), BYPASSED AND INOPERABLE STATUS INDICATION FOR NUCLEAR POWER PLANT SAFETY SYSTEMS

The Fermi 2 design does not comply with this regulatory guide.

This guide describes an acceptable method of complying with the requirements of Section 4.13 of IEEE 279-1971, and Criterion XIV of Appendix B to 10 CFR Part 50. Fermi 2 implements this requirement of IEEE 279-1971 through the design of subject systems to provide continuous indication in the event that the protective action of some part of the protection system has been bypassed or deliberately rendered inoperative. The conformance of these designs is described in UFSAR Section 1.6, 7.1, 7.2 and 7.3. The requirements of 10 CFR 50, Appendix B, Criterion XIV, are met through proven administrative controls that establish measures for indicating the operating status of structures, systems, and components of the nuclear power plant to prevent inadvertent operation.

A.1.48 REGULATORY GUIDE 1.48 (May 1973), DESIGN LIMITS AND LOADING COMBINATIONS FOR CATEGORY I FLUID SYSTEM COMPONENTS

Fermi 2 does not conform to this regulatory guide.

The Fermi 2 Category I pressure-retaining components are designed pursuant to 10 CFR 50, Paragraph 50.55a, which invokes the compliance with ASME Code Section III.

For details refer to Section 5.5.

A.1.49 REGULATORY GUIDE 1.49 (December 1973, Revision 1), POWER LEVELS OF NUCLEAR POWER PLANTS

Fermi 2 nuclear power plant design is in conformance with Regulatory Guide 1.49. The licensed power level of 3430 MWt for this plant is below the 3800-MWt limit set forth in this guide.

This Regulatory Guide has since been withdrawn (as of June 2007)..

A.1.50 REGULATORY GUIDE 1.50 (May 1973), CONTROL OF PREHEAT TEMPERATURE FOR WELDING OF LOW-ALLOY STEEL

Fermi 2 is in conformance with this guide except for Regulatory Position 2. All low-alloy steel welds, except for ASME Section III, Class 3, 4-in.-and-less diameter piping, are examined by nondestructive testing methods for detection of cracks and other defects prior to or following the application of postweld heat treatment.

A.1.52 REGULATORY GUIDE 1.52 (March 1978, Revision 2), DESIGN, TESTING, AND MAINTENANCE CRITERIA FOR POSTACCIDENT ENGINEERED-SAFETY-FEATURE ATMOSPHERE CLEANUP SYSTEM AIR FILTRATION AND ADSORPTION UNITS OF LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

General Design Criteria 19, 41, 42, 43, and 61 in Appendix A of 10 CFR 50, "General Design Criteria for Nuclear Power Plants," cover the design of atmosphere cleanup systems to safeguard public health and safety. Regulatory Guide 1.52 states acceptable methods for complying with these criteria for the control center and secondary containment filtration systems.

The Fermi 2 control center emergency air filtration system design as described in Section 6.4 conforms to most positions in this guide except for the lack of redundancy of passive components. Other items which do not strictly conform are identified in the following table; overall functional performance is adequate.

The standby gas treatment system (SGTS) design, discussed in Section 6.2 does not strictly conform to all guide positions, but its overall functional performance is adequate. The specific conformances to the positions of Regulatory Guide 1.52 are given in the compliance evaluation for the control center filtration system and SGTS, which follows.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

Regulatory Position	Control Center Filtration System	Standby Gas Treatment System		
1.0 Environmental Design Criteria				
a. Each ESF atmosphere cleanup system is based on maximum conditions resulting from DBA.	Yes	No. Parameters are listed below:		
			Fermi 2	R.G. 1.52
		Maximum influent temperature	153°F	180°F
		Average radiation levels:		
		Airborne	Not specified	10^5 rads/hr
		Iodine buildup	Not specified	10^9 rads
		Average airborne iodine:		
		Elemental	0.35 mg/m^3	10.0 mg/m^3

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

Regulatory Position	Control Center Filtration System	Standby Gas Treatment System	
		Methyl iodine and particulate iodine	0.035 mg/m^3 1.0 mg/m^3
b. System design based on 30-day integrated dose after a DBA in the vicinity of the adsorber section, using Regulatory Guides 1.3, 1.4, and 1.25 radiation source assumptions	Yes	No. A total integrated dose for the charcoal was not used in Fermi 2 SGTS specifications. There are no data for removal efficiency after 10^9 rads exposure. Evans* determined removal efficiency loss is <0.1 percent for KI_3-impregnated carbon. Relative humidity was less than 90 percent for exposure of 10^9 rads from a radiation field of 1.5 x 10^7 rads/hr.	
c. Adsorber design based on concentration and relative abundance of iodine as assumed in Regulatory Guides 1.3, 1.4, and 1.25	Yes	Yes. Average airborne elemental and methyl radioiodine release was 1300 g in secondary containment, after DBA. CVI simulation** of SGTS module shows 99.99 percent removal of airborne methyl iodine concentration of 0.035 mg/m^3	
d. Compatibility of atmosphere cleanup system with other ESF systems	Yes	System designed to withstand post-LOCA environment and function normally in conjunction with other ESF systems	
e. Components of systems designed for both the lowest and highest predicted temperatures	Yes	Yes. All compartments are heated and cooled by Category I equipment during DBA	
2.0 System Design Criteria			

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* A. G. Evans, "Effect of Intense Gamma Radiation on Radioiodine Retention by Activated Carbon," Proceedings of the Twelfth AEC Air Cleaning Conference, pp. 401-414

** D. P. Siegwarth and M. Siegler, Detroit Edison Standby Gas Treatment System Gasketless Filter Test Series, General Electric Company (private), NEDC-12431, Class III, July 1973.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
a.	Required redundancy for atmosphere cleanup systems designed and installed to limit doses after DBA. Includes both active and passive components	No. The recirculation and makeup filter system is provided with redundancy of active components only. The recirculation and makeup filter system is provided with redundancy of fans, dampers, heaters, and controls. The passive components, such as ductwork, filter housings, filter, and moisture separator, are not redundant.	No. Previous requirements for SGTS did not specify this feature. Single stacks and ductwork penetrating the reactor building were not associated with any failure mechanisms at that time. Fermi 2 design has common discharge on RB roof and common inlet in secondary containment.
b.	Physical separation of redundant atmosphere cleanup system with missile protection	Yes, except for nonredundant passive components.	Yes. Active components are protected.
c.	Atmosphere cleanup system designed as Category I	Yes	Yes
d.	ACS pressure surge protection	No. Location of the recirculation and makeup air filter system is external to secondary containment. There are no anticipated pressure surges of significant magnitude that could cause damage to any of the filter system components. Thus no pressure relief valves are included in the overall system design.	No. The maximum system pressure is 20.0 in. H_2O. There are no relief valves in the STGS system except in the charcoal adsorber section, which may be overpressurized by CO_2.
e.	Atmosphere cleanup system construction materials must effectively perform under exposure to high radiation levels.	Yes, even though superfluous.	Yes
f.	Limiting flow rate for a single cleanup train of 30,000cfm.	Yes	Yes. Four parallel filter elements, each rated at 1000 scfm, are used.
g.	Atmosphere cleanup system instrumentation to signal, alarm, and record pressure drops, flow rates in the control room	Recirculation and makeup air filter system will be instrumented to alarm in the main control room for large pressure drop. The system flow rate can only be measured locally.	Design provides local signal and alarms for pressure. Flow is recorded, and low flow is alarmed in the main control room.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
h.	Electrical distribution and power supply conforming to IEEE standards	Yes	Yes
i.	Automatic activation of ESF atmosphere cleanup systems	Yes	Yes
j.	Unit replacement capability of filter to protect workers from exposure to radiation in accordance with Regulatory Guide 8.8	No. However, unit will be disassembled in largest segments compatible with handling equipment and access availability	Removal of SGTS as a unit is required by the guide. This is impossible for the Fermi SGTS for two reasons: (1) the SGTS fans are mounted separately from the main skid, and (2) the main skid was final assembled on the fifth floor of the auxiliary building from components. Removal as a single unit is not physically possible. Replacement of SGTS is not necessary to remove the SGTS, it can be cut into the segments in which it was shop fabricated for removal.
k.	Protection of outdoor air intakes from weather and contamination.	Yes	Not applicable.
l.	Atmosphere cleanup system housing and ductwork limitations on maximum total leakage rate in accordance with ANSI N509-1976, duct and housing leak tests performed in accordance with ANSI N510-1975	No. Maximum total leakage rate determined in accordance with ANSI N509-1980. Duct and housing leak test developed and implemented using ANSI N510-1980 as guidance.	Fermi 2 criterion for measuring housing integrity is the housing differential pressure. It shall not decrease more than 4 in. H_2O in 5 minutes with initial internal pressure of 20 in. H_2O. In addition, SGTS must maintain the secondary containment at a net negative pressure of 0.25 in. H_2O with respect to the atmosphere.
3.0	Component Design Criteria and Qualification Testing		
a.	Demister performance and qualification requirements to 5.4 ANSI N509-1976	No. Demisters designed in accordance with MSAR 71-45	Fermi 2 SGTS demisters are not designed to ANSI N509. However, they are designed to the functionally similar requirements of Savannah River Laboratory Report DP-812.
b.	Air heaters designed to 5.5 ANSI N509-1976	No. The heaters are designed to reduce the relative humidity to 70 percent.	A prototype heating element will not be qualified under DBA conditions. A heater certified for heating capacity only will be used. The heaters, however, are designed to reduce the relative humidity of the incoming air to 70 percent (maximum) under the worst-expected conditions during postulated accident conditions.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
c.	Prefilter material must withstand radiation levels and environmental conditions during a DBA, designed to 5.3 ANSI N509-1976.	No. Materials will withstand the radiation levels and environmental conditions in accordance with ANSI N509-1980.	No. Materials will withstand the radiation levels and environmental conditions in accordance with ANSI N509-1980.
d.	HEPA filter requirements to 5.1 ANSI N509-1976	No. HEPA filter requirements are in accordance with ANSI N509-1980.	No. HEPA filter requirements are in accordance with ANSI N509-1980.
e.	Design and construction requirements and materials for filter and adsorber mounting frames in accordance with 5.6.3 ANSI N509-1976	No. Designed in accordance with 4.3 ORNL-NSIC-65.	Regulatory Guide 1.52 requires HEPA filter separators to be made of corrosion-resistant unpainted steel. Fermi 2 HEPA filters have aluminum separators. HEPA demister, and prefilter frames are made of carbon steel.
f.	Design and construction requirements for filter and adsorber bank arrangements in accordance with 4.4 ERDA 76-21	No. Designed in accordance with 4.4 ORNL-NSIC-65.	No. Designed in accordance with 4.4 ORNL-NSIC-65
g.	Housing steel conformance to 5.6 ANSI N509-1976.	No. Designed in accordance with 4.5 ORNL-NSIC-65	No. Designed in accordance with 4.5 ORNL-NSIC-65
h.	Water drain recommendations in accordance with 4.5.8 ERDA-76-21	No. Designed in accordance with 4.5 ORNL-NSIC-65	No. Designed in accordance with 4.5 ORNL-NSIC-65

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
i.	Removal of gaseous iodine by adsorber material.	No. Demonstration and certification of the radiation stability of the carbon used in the adsorber will not be performed. Outside air intake radiation levels are low. Thus insignificant loss in carbon performance will take place. Each new replacement batch of impregnated activated carbon used in the adsorber section will meet the qualification and batch test results summarized in Table 5.1 of ANSI/ASME N509-1980- except for Methyl Iodine Penetration at 30°C, 95% RH. ANSI/ASME N509-1980 requires 3% penetration, maximum. Fermi 2's replacement carbon will be tested in accordance with ASTM D3803-1989 to a more stringent acceptance value of 1% penetration, maximum.	No. Seismic efficiency and certification of charcoal for design radiation will not be part of Fermi 2 testing procedures. Seismic analysis will be by calculation only, although some interments will be tested on a shaker table. Past testing experience (see footnote b in 1.0(c.)) will be considered valid for charcoal tests. Testing of new activated carbon will be performed in accordance with ASTM D3803-1989 at 30°C, 95% RH showing less than 1.0% penetration for methyl iodine.
j.	Design of adsorber cells in accordance with 5.2 ANSI N509-1976	No. Gasketless charcoal adsorber design is used in accordance with ANSI N509-1976	No. Gasketless charcoal adsorber design is used in accordance with ANSI N509-1976
k.	Fire prevention in adsorber from auto-ignition by water sprays	No. Entering air into the makeup and recirculation filter is outside air mixed with the discharge from the 99 percent efficiency SGTS, and the resulting radioactivity-induced heat in the adsorbent from this air is not expected to be sufficient for adsorbent auto-ignition	A CO_2 fire protection system is provided instead of the water spray system. Fermi 2 SGTS fire protection system functions to detect and limit charcoal temperatures to values well below the ignition limit and precludes the possibility of charcoal ignition. The ignition temperature of charcoal is 625°F. Fermi 2 CO_2 system will automatically activate at 310°F
l.	System fans provided with rated flow capacity to 5.7 and 5.8 ANSI N509-1976	No. Designed in accordance with 2.7 ORNL-NSIC-65	No. Designed in accordance with 2.7 ORNL-NSIC-65

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
m.	Atmosphere cleanup system fans on blower designed to operate under environmental conditions postulated	Yes	Yes
n.	Ductwork conformance with 5.10 of ANSI N509-1976	No. Ductwork conforms to the intent of ANSI N509-1980 for all areas of duct construction and testing. The duct construction characteristics are as follows: (1) Transverse companion angles are stitch welded on exterior of the duct, and the duct is bent or formed over the angle. (2) Longitudinal seams are mechanical-lock type and externally brazed with sealant applied to internal duct surfaces. In addition, sealant has been applied externally to the seam to enhance low leakage characteristics	No. The ductwork conforms to the intent of ANSI N509-1980 for all areas of duct construction and testing.
o.	Design configuration to minimize hazards	Yes	Yes
p.	Dampers designed to 5.9 ANSI N509-1976	No	No
4.0	Maintenance		
a.	Easy access to components in accordance with 4.7 ANSI N509-1976 and 23.8 ERDA 76-21.	No. Designed in accordance with 2.5 ORNL-NSIC-65	Fermi 2 SGTS entrance doors are about 5 ft high and probably will require a man to bend over. This is not considered a hindrance for proper maintenance.
b.	Definite mounting frame separation distance (3ft).	No. Minimum 3 ft spacing has not been provided. Components are accessible for maintenance without entering the unit housing by the use of access doors.	Sufficient spacing for component maintenance is provided even though the recommended 3ft is not always provided.
c.	Permanent test probes with external connections in accordance with 4.11 ANSI N509-1976	No. Permanent test probes provided but not necessarily in accordance with ANSI N509-1976.	No. Fermi 2 has no permanent test probes and/or manifolds, only couplings in the doors for DOP and Freon connections.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

	Regulatory Position	Control Center Filtration System	Standby Gas Treatment System
d.	Periodic operation of standby atmosphere cleanup system	No. Periodic operation is performed in accordance with Regulatory Guide 1.52 Revision 3, Position 6.1, per License Amendment No. 192.	No. Periodic operation is performed in accordance with Regulatory Guide 1.52 Revision 3, Position 6.1, per License Amendment No. 192.
e.	ACS components installed after active construction	Yes	Yes
5.0	In-Place Testing Criteria		
a.	Visual inspection before testing in accordance with 5 ANSI N510-1975	No. Visual inspection in accordance with ANSI N510-1980	No. Visual inspection in accordance with ANSI N510-1980
b.	The airflow distribution should be tested initially and after maintenance that affects distribution	Yes	Yes
c.	The in-place DOP test for HEPA filters should be in accordance with ANSI N510-1975 and occur initially and periodically thereafter	No.* In place DOP test in accordance with ANSI N510-1980 to confirm a penetration of less than 1.0 percent ± 10 percent rated flow. This meets Generic Letter 83-13.	No. In place DOP test in accordance with ANSI N510-1980.
d.	Bypass leakage testing of the activated carbon adsorber section should be in accordance with ANSI N510-1975	No. Bypass leakage testing in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas to confirm a penetration less than 1.0 percent at ± 10 percent rated flow. This meets Generic Letter 83-13.	No. Bypass leakage testing in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas.

* A silicone sealant is used as a permanent seal in HVAC ductwork.

CONFORMANCE OF VENTILATION SYSTEMS WITH RESPECT TO THE POSITIONS OF REGULATORY GUIDE 1.52

Regulatory Position	Regulatory Position	Regulatory Position
6.0 Laboratory Testing Criteria for Activated Carbon	Yes. Both the make-up and recirculation activated carbon adsorbers have been assigned a decontamination efficiency of 95 percent each. This results in a combined efficiency of 99.75 percent for the make-up air supply. Laboratory testing acceptance criteria are based on 95 percent efficient adsorbers. Laboratory testing of used activated carbon will be performed in accordance with ASTM 0383-1989 at 30°C, 70% RH showing a Methyl Iodine penetration of less than 1.0%. This is with a 2-in. bed for the emergency make-up filter train; and a 4-inch bed for the emergency recirculation air filter train. Verification of the above will be done within 31 days after removal.	Yes. (As justified below) A sample of the SGTS charcoal is removed from the adsorber by vertically inserting a "grain thief." Charcoal removed in this manner will provide a sample possessing essentially the same characteristics of the bed and has advantages over the parallel-canister-type sample arrangement required by Regulatory Guide 1.21. The "grain thief" sample device withdraws a sample that has experienced (1) the same volume, (2) same flow rate, and (3) same exposure to contaminants as the charcoal in the bed. The parallel-canister arrangement has several disadvantages that are avoided by the present design. (1) Air will likely flow through the canister at a different rate than it flows through the bed. This will cause inconsistency in the amount of contamination or loss of efficiency between the sample and the charcol bed; (2) The parallel-canister sample arrangement will require a gasketed seal on the canister that may deteriorate and cause charcoal adsorber bypass; and (3) A parallel-canister sample arrangement will provide the potential for charcoal adsorber bypass if a sample canister is removed and not replaced or if the canister holder is not properly sealed with a cover and gasket. Laboratory testing of used activated carbon will be performed in accordance with ASTM 03803-1989 at 30°C, 70% RH showing a methyl iodide penetration of less than 0.100%. This is in accordance with ASTM 03803-1989 with a 6-inch bed. Verification of the above will be done within 31 days after removal.

The areas of noncompliance do not, either singly or in combination, reduce the high level of reliability of these systems for protecting the health, safety, and welfare of the public. The areas of noncompliance are essentially subjective in nature, and noncompliance does not functionally impair the performance of either system.

A.1.53 REGULATORY GUIDE 1.53 (June 1973), APPLICATION OF THE SINGLE-FAILURE CRITERION TO NUCLEAR POWER PLANT PROTECTION SYSTEMS

Under Section 50.55a, "Codes and Standards," of "Licensing of Production and Utilization Facilities" of 10 CFR 50, the regulatory staff requires the use of IEEE-279-1971 section 4.2 (ANSI N42.7-1972) issued in the Institute of Electrical and Electronic Engineers Criteria for

Nuclear Power Plant Protection Systems. This standard requires that any single failure of a protection system component will not alter proper protective actions at the system level.

The Fermi 2 reactor protection system (RPS) complies with Regulatory Guide 1.53 by meeting the single-failure criterion. In compliance with the positions of the guide the RPS uses redundant sensors and system logic to ensure that failure of a sensing element, decision logic, or an actuator unit will not impair other redundant system functions. Thus any single failure will not prevent or initiate protective action. The RPS employs separate channels in which a fault affecting one channel will not prevent other channels from operating. In addition, facilities exist for testing the RPS so that equipment can be operated in various test modes to confirm operability.

For details refer to Subsection 7.2.2.

A.1.54 REGULATORY GUIDE 1.54 (June 1973), QUALITY ASSURANCE REQUIREMENTS FOR PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR POWER PLANTS

The coatings used in the Fermi 2 containment are described in Subsection 6.2.1.6 and are listed in Table 6.2-8. Not all the coatings used on surfaces within the drywell and suppression pool (wetwell) are "qualified" in terms of compliance to the recommendations of Regulatory Guide 1.54. The unqualified coatings, however, have been evaluated and have been determined to have no adverse effect on the reliable performance of the plant under normal or abnormal conditions, and it is considered that the intent of Regulatory Guide 1.54 has been fulfilled.

The Plasite 7155 suppression pool (wetwell) coatings and the coatings applied to the concrete surfaces of the drywell conform to the recommendations of Regulatory Guide 1.54 and are considered fully qualified.

The Carboguard 6250 N suppression pool and torus vent header interior coating conforms to the recommendations of Regulatory Guide 1.54 (1973) with the following exceptions:

- ASTM D5139-10, endorsed by Revision 2 of Regulatory Guide 1.54, was used for surface preparation of test panels instead of ANSI N101.2-1972.
- ASTM D4082-10, endorsed by Revision 2 of Regulatory Guide 1.54, was used for radiation testing instead of ANSI N5.12-1974.
- ASTM D3912-10, endorsed by Revision 2 of Regulatory Guide 1.54, was used for chemical resistance testing instead of ANSI N5.12-1974.
- ASTM D3911-08, endorsed and supplemented by Revision 2 of Regulatory Guide 1.54, was used for evaluation of design basis accident test panels instead of ANSI N101.2-1972.
- ASTM E84, endorsed by Revision 2 of Regulatory Guide 1.54, was used for cure requirements of fire evaluation panels instead of ANSI N101.2-1972.
- There are small areas where Carboguard 6250 N coating was applied to small stainless steel components and welds or where Carboguard 6250 N overlaps Plasite 7155 coating in the suppression pool interior surfaces. These areas are considered

unqualified and tracked as indicated in Table 6.2-8. Additionally, there are small areas in the torus vent header interior vacuum breaker and downcomer penetrations where Carboguard 6250 N coating overlaps Plasite 7155 coating. DBA testing has been performed to simulate this overlap condition in order to provide reasonable assurance that, when properly applied and maintained, the coating will not detach under normal or accident conditions per ASTM D7491-08.

The unqualified Carboguard 6250 N coating areas have been evaluated and have been determined to have no adverse effect on the reliable performance of the plant under normal or abnormal conditions. The alternative standards endorsed by Revision 2 of Regulatory Guide 1.54 have been evaluated relative to the design basis standards. It is concluded that they provide an acceptable qualification basis for the Carboguard 6250 N coating at Fermi 2, and it is considered that the intent of Regulatory Guide 1.54 (1973) has been fulfilled.

Most of the coating on the drywell reactor coolant pressure boundary and the drywell primary structural steel (Carboline Carbozinc 11) was applied prior to the issuance of Regulatory Guide 1.54 and ANSI N101.4, in accordance with the accepted industry standards of that time. This coating system has a long record of reliable service in operating BWRs under a variety of adverse conditions.

The Carbozinc 11 coating has also been subjected to extensive design-basis accident (DBA) testing using a variety of application techniques. The conditions under which failure of the coating could occur and its failure mode have been evaluated (Subsection 6.2.1.6). The coating has been found to present no threat to the reliable performance of the plant under normal or abnormal circumstances.

In 1984, the commercial name of the Carbozinc 11 coating was changed to Carbozinc 11 SG. Consequently, in cases where repairs to the original Carbozinc 11 coating were needed after 1984, Carbozinc 11 SG was used.

A.1.55 REGULATORY GUIDE 1.55 (June 1973), CONCRETE PLACEMENT IN CATEGORY I STRUCTURES

The Fermi 2 procedures conform to the requirements of this guide.

For details refer to Sections 3.8 and 17.1.

A.1.56 REGULATORY GUIDE 1.56 (July 1978, Revision 1 for Comment), MAINTENANCE OF WATER PURITY IN BOILING WATER REACTORS

Fermi 2 chemistry procedures have been developed in conformance with this guide. For details, refer to Subsections 5.5.8, 9.3.2, and 10.4.6.1.2.

A.1.57 REGULATORY GUIDE 1.57 (June 1973), DESIGN LIMITS AND LOADING COMBINATIONS FOR METAL PRIMARY REACTOR CONTAINMENT SYSTEM COMPONENTS

The Fermi 2 containment was purchased, designed, and constructed in accordance with ASME Code Section III, 1968, and is not in conformance with the requirements of this guide,

which are based on ASME Code Section III, 1971. Physical changes could not be made without major construction schedule impact.

For details refer to Section 3.8.

A.1.58 REGULATORY GUIDE 1.58 (September 1980, Revision 1), QUALIFICATION OF NUCLEAR POWER PLANT INSPECTION, EXAMINATION, AND TESTING PERSONNEL

The established design and construction QA program, which predates the development of ANSI N45.2.6-1973, was not committed to be in compliance with Regulatory Guide 1.58. Rather, it met the intent of the endorsed ANSI standard.

Inspection and examination personnel of site contractors have been qualified to the requirements of ANSI N45.2.6-1973. Inspection personnel of Project Quality Assurance who performed first-level inspection were also qualified to the same standard.

Edison test personnel, who are part of the Startup Organization and who perform the Checkout and Initial Operations and Preoperational testing, have been qualified to requirements that exceed the requirements of ANSI N45.2.6-1978.

During operations, the provisions of ANSI N45.2.6-1978 apply only to QA/QC inspectors. With two exceptions, the Edison operational QA program conforms to Regulatory Guide 1.58, Revision 1.

(1) For plant inspection, examination, and testing personnel, a grace period of 90 days beyond the maximum one-year cycle is allowed for the completion of at least one inspection or examination.

(2) Edison's exception to NRC Position C.6, regarding the educational requirements, is based on the concern that these requirements, when applied to contractors and vendors, would disqualify fully qualified inspection personnel who have demonstrated the ability to perform but lack the education. The ability to perform should be the only criterion.

A.1.59 REGULATORY GUIDE 1.59 (August 1977, Revision 2), DESIGN BASIS FLOODS FOR NUCLEAR POWER PLANTS

The analytical methods for assessment of design-basis floods at the Fermi 2 site differ in some areas from those presented in Regulatory Guide 1.59, Revision 2. The methods employed for Fermi 2 were reviewed by the NRC staff and were determined to be acceptable. (Refer to NUREG-0314, Sections 2.4 and 3.4.)

A.1.60 REGULATORY GUIDE 1.60 (December 1973, Revision 1), DESIGN RESPONSE SPECTRA FOR SEISMIC DESIGN OF NUCLEAR POWER PLANTS

The Fermi 2 design is not in conformance with the recommendations of this guide. The DBE (now called the SSE) for this plant was defined in 1971; it was reviewed by the AEC/DRL in May 1971, and judged to be reasonable and conservative by the staff and consultants. The seismic environment required in Revision 1 by the AEC sets criteria which in some cases are

up to 50 percent more conservative than those used in Fermi 2 design. The following table shows the comparison of design response spectra. Although the Fermi 2 design is not in conformance with the specific numerical requirements of this guide, the discrepancy between recommended response spectra of Revision 1 and the design of Fermi 2 does not have any significant impact on reactor safety.

COMPARISON OF DESIGN RESPONSE SPECTRA

I. Horizontal OBE (2 percent damping)

Parameter	Control Point	Fermi 2	Regulatory Guide 1.60
Acceleration (g)	A	0.08	0.08
Acceleration (g)	B	0.14	0.28
Acceleration (g)	C	0.17	0.34
Displacement (in.)	D	5.0	7.2

II. Horizontal SSE (5 percent damping)

Parameter	Control Point	Fermi 2	Regulatory Guide 1.60
Acceleration (g)	A	0.15	0.15
Acceleration (g)	B	0.18	0.39
Acceleration (g)	C	0.22	0.47
Displacement (in.)	D	7.5	11.0

For details on seismic design bases, refer to Subsections 3.7.1.1, 3.7.1.3, 3.7.2.1, 3.7.2.2, 3.7.2.6, 3.7.3.6, 3.7.3.15, 3.7.3.16, 3.7.4.4, and 3.7.5.2.

In response to a request from the NRC Geosciences Branch, a site-specific earthquake ground response spectrum (essentially per Regulatory Guide 1.60 pegged at 0.15g horizontal) was developed, and structures, systems, and components required for cold shutdown were reassessed for the effect of this site-specific earthquake (see Subsections 2.5.2.11 and 3.7.1.2.1).

A.1.61 REGULATORY GUIDE 1.61 (October 1973), DAMPING VALUES FOR SEISMIC DESIGN OF NUCLEAR POWER PLANTS

The Fermi 2 design conforms to the required damping values for Category I structures, components, and systems. Thus, these structures, components, and systems will remain functional in the event of an SSE as required by Appendix A to 10 CFR 100, "Seismic and Geologic Siting Criteria," and 10 CFR 100, "Reactor Site Criteria." A comparison of model damping values as an analysis of viscous damping for elastic spectral or time-history dynamics has shown that Fermi 2 values are lower than Regulatory Guide 1.61 specifications. Therefore, the Fermi 2 design meets the guide requirements. The following

table displays the comparison of guide and Fermi 2 project damping values for each division of structure or component required by the guide except prestressed concrete structures, which Fermi 2 does not have. In addition, specific values of damping are given for the RPV, CRD housing, fuel, and coupling drywell-building values. Fermi 2 damping values are conservatively two to four times lower than the regulatory guide requirements except in the case of bolted steel structures. The comparison shows compliance with Position 1 of the guide.

Therefore due to the lower damping values, Position 2 requiring documented test data of dynamic seismic analysis is not applicable. The use of lower damping values is conservatively incorporated into the Fermi 2 design, thus avoiding an underestimation of vibration amplitudes and dynamic stresses. As a result, Position 3 of the guide has been complied with.

DAMPING VALUES

Item	Percent of Critical: Operating-Basis Earthquake (1/2 SSE)		Percent of Critical: Safe-Shutdown Earthquake	
	Fermi 2	R.G. 1.61	Fermi 2	R.G. 1.61
General				
Equipment and large (12 in.) diameter piping	0.5	2.0	1.0	3.0
Small-diameter piping (12 in.)	0.5	1.0	1.0	2.0
Welded and H.S. bolted steel framed structures	2.0	2.0	5.0	4.0
Bolted and riveted steel framed structures	5.0	4.0	10.0	7.0
Welded structural assemblies (equipment and supports)	2.0		4.0	
Reinforced concrete structures	2.0	4.0	5.0	7.0
Specific				
Reactor pressure vessel	2.0		2.0	
CRD housing	3.5		3.5	
Fuel	7.0		7.0	
Drywell-building (coupled)	2.0		5.0	

For details on the seismic analysis, refer to Subsections 3.7.3.6 through 3.7.3.16, and 3.7.5.1 through 3.7.5.4.

A.1.62 REGULATORY GUIDE 1.62 (October 1973), MANUAL INITIATION OF PROTECTIVE ACTIONS

The Fermi 2 system design is in partial conformance with this guide.

The isolation system does not have a single manual pushbutton that actuates all valves closed. A manual switch is available to close each individual valve.

The automatic depressurization system (ADS) cannot be actuated manually at the system level. Manual actuation is available at the component level.

Manual initiation of the low pressure coolant injection (LPCI) system is not available at the system level. However, since a low reactor pressure interlock prevents the premature opening of the injection valves from either manual or automatic initiation, actuation at the component level is considered adequate.

The core spray system cannot be actuated by a single manual switch. Manual switches are available in the main control room to actuate the individual system components.

The high pressure coolant injection (HPCI) system cannot be actuated by a single manual switch. Manual switches are available in the main control room to actuate the individual components of the system.

A.1.63 REGULATORY GUIDE 1.63 (July 1978, Revision 2), ELECTRIC PENETRATION ASSEMBLIES IN CONTAINMENT STRUCTURES FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

The guidelines presented in Regulatory Guide 1.63, Revision 2, apply to nuclear power plants for which construction permit applications were docketed after December 30, 1977. The application for Fermi 2 was docketed in 1969 and, as such, is exempt from the guidelines of Regulatory Guide 1.63. However, the Fermi 2 design complies with the intent of Regulatory Guide 1.63 (October 1973, Revision 0). For details, refer to Subsections 6.2.1.2.1.5, 6.2.1.4.1.1, and 8.3.1.3.

A.1.64 REGULATORY GUIDE 1.64 (June 1976, Revision 2), QUALITY ASSURANCE REQUIREMENTS OF THE DESIGN OF NUCLEAR POWER PLANTS

The NRC regulatory staff has accepted ANSI Standard N45.2.11-1974, "Quality Assurance Requirements for the Design of Nuclear Power Plants," as an acceptable method of complying with the Commission's regulations in regard to Design Control. The initial issue of Regulatory Guide 1.64, which endorsed a draft version of ANSI N45.2.11, was published in October 1973, approximately a year after the issuance of the QA Manual. Later revisions of Regulatory Guide 1.64 were published in February 1975, and June 1976. Regulatory Guide 1.64, Revision 1, endorsed the approved ANSI Standard N45.2.11-1974, and was applicable to submittals docketed after April 1, 1975. Regulatory Guide 1.64, Revision 2,

clarified the limitations on performance of "independent design verification" by supervisors, and was applicable to submittals docketed after July 15, 1976.

The current Fermi 2 QA Program was planned to meet the requirements of 10 CFR 50, Appendix B. It includes the elements of Design Control necessary for approval at the time it was submitted. To retrofit to the requirements of Regulatory Guide 1.64, Revision 2, was not feasible, and to modify the Design Control program for the remainder of the design and construction phase would have been disruptive.

During the operational phase, design activities will be required to comply with ANSI N45.2.11 as endorsed by Regulatory Guide 1.64, Revision 2.

A.1.65 REGULATORY GUIDE 1.65 (October 1973), MATERIALS AND INSPECTIONS FOR REACTOR VESSEL CLOSURE STUDS

The Fermi 2 design and inspection procedures are in conformance with the requirements of this guide except those in Regulatory Positions 2b, 2e, and 3.

Studs were examined in accordance with the requirements of ASME Boiler and Pressure Vessel Code Section III, N-325 (1968 edition plus 1969 Addendum (Summer) in effect at time of contract). Bored blank nuts were ultrasonically examined by both the longitudinal and shear wave methods. Shear wave examination on the nuts was performed in both the axial and circumferential directions.

Regulatory Position 3 recommends provision for adequate corrosion protection during venting and filling of the vessel, and while the head is removed. General Electric supplies thread protectors that prevent stud damage, but stud holes are not plugged, and neither stud nor flange threads are protected from exposure to water. In practice this has been found to be adequate for studs complying with Regulatory Guide 1.65 Regulatory Position 1 & 2, as exposure to applied loads and operating and servicing environments has not required the replacement of any BWR studs (which were in compliance as stated above) or flange threads. No corrosion protection for studs is proposed.

For details, refer to Section 5.4.

A.1.67 REGULATORY GUIDE 1.67 (October 1973), INSTALLATION OF OVERPRESSURE PROTECTION DEVICES

The guidance provided by this Regulatory Guide has been applied in the installation of the Fermi 2 overpressure protection devices.

A.1.68 REGULATORY GUIDE 1.68 (August 1978, Revision 2), INITIAL TEST PROGRAMS FOR WATER-COOLED REACTOR POWER PLANTS

Compliance with Revision 2 to Regulatory Guide 1.68 is required of applicants for operating licenses docketed after August 15, 1978. Since the docket date for Fermi 2 significantly precedes this effective date, Revision 2 to the Regulatory Guide was not implemented.

The preoperational and initial startup test program were in compliance with those portions of Regulatory Guide 1.68, Revision 0, applicable to BWRs and to Fermi 2 systems, except as noted below:

a. Position D.2.o (Appendix A)

No test of rod pattern exchange was planned. This test has been eliminated from the normal GE prescribed test program and equivalent testing is incorporated in the core performance test

b. Position D.2.r (Appendix A)

No two-pump reactor recirculation pump trip at 100 percent power will be performed. With recent improvement in analytical methods, the two-pump trip at 100 percent power is no longer considered to be a significant fuel thermal transient. The two-pump trip would subject the plant to a large power loss and potential scram. The planned one-pump trip testing will provide adequate plant instability response testing.

Revisions 1 and 2 of Regulatory Guide 1.68 do not affect Edison's position with regard to the Fermi 2 initial test program.

For further details refer to Chapter 14.

A.1.68.1 REGULATORY GUIDE 1.68.1 (January 1977, Revision 1), PREOPERATIONAL AND INITIAL STARTUP TESTING OF FEEDWATER AND CONDENSATE SYSTEMS FOR BOILING WATER REACTOR POWER PLANTS

The Fermi 2 Preoperational and Startup Phase Testing Program for the condensate and feedwater systems meets the intent of Regulatory Guide 1.68.1, Revision 1.

For details refer to Subsections 14.1.3 and 14.1.4.

A.1.68.2 REGULATORY GUIDE 1.68.2 (July 1978, Revision 1), INITIAL STARTUP TEST PROGRAM TO DEMONSTRATE REMOTE SHUTDOWN CAPABILITY FOR WATER-COOLED NUCLEAR POWER PLANTS

Fermi 2 is in compliance with Regulatory Guide 1.68.2. Preoperational testing to demonstrate the remote-shutdown capabiliity of Fermi 2 was conducted in accordance with the requirements of this guide.

For details, refer to Subsection 14.1.4.8.26.

A.1.69 REGULATORY GUIDE 1.69 (December 1973), CONCRETE RADIATION SHIELDS FOR NUCLEAR POWER PLANTS

Regulatory Guide 1.69 cites ANSI N101.6-1972, "Concrete Radiation Shields," as applicable to nuclear power plant shielding. The Fermi 2 plant design meets the intent of this guide.

For details refer to Section 12.1.

A.1.70 REGULATORY GUIDE 1.70 (November 1978, Revision 3), STANDARD FORMAT AND CONTENT OF SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS

The Fermi 2 UFSAR is in the format of Revision 1 to this guide, which was the current revision at the time of submittal of the original FSAR. Chapter 15 is in the format of Revision 2.

A.1.71 REGULATORY GUIDE 1.71 (December 1973), WELDER QUALIFICATION FOR AREAS OF LIMITED ACCESSIBILITY

Edison's welding program at Fermi 2 requires qualification of welders as described in this regulatory guide. This requirement applies to both Edison and contractor welders working at Fermi 2. Welds are evaluated individually to determine if testing for compliance with this guide is required.

A.1.72 REGULATORY GUIDE 1.72 (July 1978, Revision 2), SPRAY POND PIPING MADE FROM FIBERGLASS-REINFORCED THERMOSETTING RESIN

This regulatory guide is not applicable to Fermi 2 design and QA requirements. The Fermi 2 plant does not use fiberglass-reinforced thermosetting plastic materials in the construction of ultimate heat sink piping.

A.1.73 REGULATORY GUIDE 1.73 (January 1974) QUALIFICATION TESTS OF ELECTRIC VALVE OPERATORS INSTALLED INSIDE THE CONTAINMENT OF NUCLEAR POWER PLANTS

Regulatory Guide 1.73 pertains to qualification and testing of Class 1 electric valve operators for service within the containment of light-water-cooled nuclear power plants. Based on Section III, "Design Control," of Appendix B to 10 CFR 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," this guide requires qualification testing of a prototype unit under conservative design conditions. To guide such testing, the commission has adopted IEEE Standard 382-1972, "IEEE Trial-Use Guide for Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations," as acceptable methods for testing. Review of Fermi 2 electric valve operators considering the criteria of IEEE 382-1972 shows that the valve operators are in compliance with the requirements stated in Position 1 of the guide. Valve operators within containment are provided with NEMA Class H insulation. The insulation as well as the operators are seismic, radiation, and temperature qualified to withstand containment normal operating conditions and the DBA conditions. The test sequence given in IEEE 382-1972 is more conservative than actual operating conditions. Therefore, in compliance with Position 2, Section 4.5.2 of the standard was applied in the test-analysis of the operators. These tests included periodic actuating conditions at 340°F steam atmosphere and radiation testing of 2.0×10^8 rads. These conditions simulate the most severe DBA and are thus as conservative as Position 3 of this guide. An exception is valve E11-F608, which has non-Class H insulation. However, this valve is not required to operate during or after an accident to mitigate the consequences of the accident.

A.1.74 REGULATORY GUIDE 1.74 (February 1974), QUALITY ASSURANCE TERMS AND DEFINITIONS

In order to ensure that Fermi 2 has been designed and built in accordance with the commitments made in (1) the Final Safety Analysis Report, (2) a planned and systematic program of Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, and (3) 10 CFR 50, a documented lexicon of terms and definitions, which describes and characterizes the operating functions of plant structures, systems, and components, which is universal and conforming to common industrial usage, must be devised. To comply with the intent of the recommendations of Regulatory Guide 1.74 and 10 CFR 50, ANSI N45.2.10 was adopted by Fermi 2. This standard of word usage was applied to project contracts, letters of intent, work orders, purchase orders or proposals, and legal authorizations. The recently updated document ANSI N45.2.10-1973 recommended by this guide and the Fermi 2 adopted ANSI N45.2.10 differ insignificantly. Fermi 2 word usage thus conforms generally with QA definitions contained in ANSI N45.2.10. Any changes in usage at the late date within the project would have been detrimental to the continuity of project documentation and personnel communications. Therefore, the changes in the updated revision of ANSI N45.2.10 were not incorporated into Fermi 2 project documents.

A.1.75 REGULATORY GUIDE 1.75 (September 1978, Revision 2), PHYSICAL INDEPENDENCE OF ELECTRIC SYSTEMS

The Fermi 2 plant is not in full compliance with Regulatory Guide 1.75. This guide was issued after the design criteria of Fermi 2 were formulated. Revision 1 of this guide requires application of IEEE Standard 384-1974, "IEEE Trial Use Standard Criteria for Separation of Class 1E Equipment and Circuits." This standard classifies associated circuits as non-Class 1E circuits which share power supplies, enclosures, or raceways with Class 1E circuits or are not separated by distance or barriers from Class 1E components. The Fermi 2 plant does not classify by unique identification or color coding associated circuits.

IEEE Standard 384 also requires a use of isolation devices that do not influence Class 1E equipment during a LOCA. Thus these devices cannot interrupt normal device functions solely by fault current.

In general, the associated circuits must be analyzed to demonstrate no degradation of Class 1E circuit functions. Although identification of associated circuits per se has not been performed, a complete study of Class 1E circuits and their interaction with all other circuits has proved that sufficient isolation and physical separation exist in Fermi 2 design to ensure safe operation.

The comparison of the Fermi 2 design and the regulatory position of Regulatory Guide 1.75, Revision 1, is found in Subsection 3.12.4.

A.1.76 REGULATORY GUIDE 1.76 (April 1974), DESIGN BASIS TORNADO FOR NUCLEAR POWER PLANTS

Under GDC 2, "Design Bases for Protection Against Natural Phenomena," of Appendix A to 10 CFR 50, it is required that structures, systems, and components be able to withstand the

effects of natural phenomena. In particular, Regulatory Guide 1.76 cites tornado effects as a concern for design and defines maximum wind conditions. In compliance with Position 1 of this guide, the Fermi 2 plant has been analyzed with conditions defined in a design-basis tornado. The Fermi 2 design-basis tornado is a tornado having a rotational wind velocity of 300 mph, a translational wind velocity of 60 mph and a resultant external pressure drop of 3 psi at the rate of 1 psi/sec.

The Fermi 2 design-basis tornado is virtually identical with the tornado defined in Table 1 of Regulatory Guide 1.76. As described in Subsection 3.3.2.1, the rotational and translational wind velocities given in the guide are slightly different (290 mph/70 mph, respectively); however, the total maximum velocity is the same. Although the rate of pressure drop given in the guide is faster (2 psi/sec) the magnitude of the pressure drop is the same.

Even though the Fermi 2 design-basis tornado was established several years before the issuance of Regulatory Guide 1.76, values were used in the analysis that compare very favorably with the recommendations issued in the guide.

The design of the 4160-V RHR cable vaults and the manholes and ductbanks between these cable vaults and the Reactor/Auxiliary building cable vaults is based on criteria established in Regulatory Guide 1.76, Revision 1 (March 2007) and applicable sections of NUREG-0800, Standard Review Plan 3.5.3 Revision 3 (March 2007).

The Design Basis Tornado wind characteristics are in accordance with Regulatory Guide 1.76 Revision 1 (March 2007) are as follows:

a. A maximum wind velocity of 230 mph

b. A maximum rotational wind velocity of 184 mph

c. A translational wind velocity of 46 mph

d. An external pressure drop of 1.2 psi at the rate of 0.5 psi/sec

For details refer to Subsection 3.3.2.1.

A.1.77 REGULATORY GUIDE 1.77 (May 1974), ASSUMPTIONS USED FOR EVALUATING A CONTROL ROD EJECTION ACCIDENT FOR PRESSURIZED WATER REACTORS

This guide is not applicable to Fermi 2, which is a BWR.

A.1.78 REGULATORY GUIDE 1.78 (Revision 1), ASSUMPTIONS FOR EVALUATING THE HABITABILITY OF A NUCLEAR POWER PLANT CONTROL ROOM DURING A POSTULATED HAZARDOUS CHEMICAL RELEASE

The release of hazardous chemicals presents a potential loss of control room habitability. Criterion 4, "Environmental and Missile Basis," and Criterion 19, "Control Room," of 10 CFR 50 govern the safe operation of a nuclear power plant under normal and abnormal conditions of toxic chemical releases.

Of the toxic chemicals listed in Regulatory Guide 1.78, the following have been identified as present within a 5-mile radius of the plant:

Chemical	Quantity	Location	Distance From Control Center (ft)
Liquid nitrogen	6000 gal	West wall of Reactor building	170

In general, Fermi 2 is in compliance with Regulatory Guide 1.78, Revision 1. However, there are shipments of hazardous chemicals by rail and road routes within a 5-mile radius of the plant. The closest transportation line lies about 3.5 miles from the plant. As discussed in Section 6.4.3.4, at this distance, a release of a hazardous chemical is not considered a threat to Fermi 2 control room habitability.

A.1.79 REGULATORY GUIDE 1.79 (September 1975, Revision 1), PREOPERATIONAL TESTING OF EMERGENCY CORE COOLING SYSTEMS FOR PRESSURIZED WATER REACTORS

This guide is not applicable to Fermi 2, which is a BWR.

A.1.80 REGULATORY GUIDE 1.80 (June 1974), PREOPERATIONAL TESTING OF INSTRUMENT AIR SYSTEMS

Preoperational testing of the control air system was in accordance with this guide.

A.1.81 REGULATORY GUIDE 1.81 (January 1975, Revision 1), SHARED EMERGENCY AND SHUTDOWN ELECTRIC SYSTEMS FOR MULTI-UNIT NUCLEAR POWER PLANTS

This guide is not applicable to Fermi 2 because the current design incorporates only a single nuclear generating unit.

A.1.82 REGULATORY GUIDE 1.82 (May, 1996, Revision 2), WATER SOURCES FOR LONG TERM RECIRCULATION COOLING FOLLOWING A LOSS-OF-COOLANT ACCIDENT

Consistent with Section D, the Detroit Edison response to NRC Bulletin 96-03 committed to replace the original RHR and CS suction strainers with new, larger passive strainers designed to meet the sizing criteria of Revision 2 of this regulatory guide. The new strainers, which were designed and installed in RF06, are of the GE optimized stacked-disk [OSD] design. Whereas the original design sizing was predicated on the deterministic assumption of 50% plugging, the new OSD strainers were designed under the commitment to satisfy the mechanistic design methodology described in Revision 2 of the Regulatory Guide. In their closure of the Fermi response to Bulletin 96-03, the NRC expressed their understanding that the design of the Fermi OSD strainers was performed in accordance with the method provided in NEDO-32686, BWROG Utility Resolution Guidance. The NRC SER that approved the URGs did not accept its proposed analytical methodology for calculating debris head loss and instead stipulated that the calculation of debris head loss were based on vendor supplied analytical correlations developed from tested performance. This requirement is satisfied by utilizing the debris head loss methodology in the NRC-approved GE Licensing

Topical Report NEDO-32721P-A, except as modified to correct elements of the method affected by errors identified in GE Safety Communication 08-02.

A.1.83 REGULATORY GUIDE 1.83 (July 1975, Revision 1), INSERVICE INSPECTION OF PRESSURIZED WATER REACTOR STEAM GENERATOR TUBES

This guide is not applicable to Fermi 2, which is a BWR.

A.1.84 REGULATORY GUIDE 1.84 (September 1983, Revision 21), DESIGN AND FABRICATION CODE CASE ACCEPTABILITY--ASME SECTION III, DIVISION 1

The Fermi 2 plant is in compliance with Regulatory Guide 1.84.

To ensure integrity of the RCPB commensurate with its important safety function, Fermi 2 has applied the code cases of the ASME Boiler and Pressure Vessel Code Section III, to design, fabrication, erection, and testing of Class 1 components within the limitations set forth in 10 CFR 50, Section 50.55(a).

For specific identification of the code cases used, refer to Table 5.2-3.

A.1.85 REGULATORY GUIDE 1.85 (September 1983, Revision 21), MATERIALS CODE CASE ACCEPTABILITY--ASME SECTION III, DIVISION 1

To ensure integrity of the RCPB commensurate with its important safety function, Fermi 2 has applied the code cases of the ASME Boiler and Pressure Vessel Code Section III, to design, fabrication, erection, and testing of Class 1 components within the limitations set forth in 10 CFR 50.55(a) and Regulatory Guide 1.85. Thus the Fermi 2 RCPB is in compliance with the positions of this guide.

For specific identification of the code cases used, refer to Table 5.2-3.

A.1.86 REGULATORY GUIDE 1.86 (June 1974), TERMINATION OF OPERATING LICENSES FOR NUCLEAR REACTORS

This guide is not presently applicable to Fermi 2. At the time of decommissioning and dismantlement of the Fermi 2 plant, Edison intends to follow procedures in compliance with this guide.

A.1.87 REGULATORY GUIDE 1.87 (June 1975, Revision 1), GUIDANCE FOR CONSTRUCTION OF CLASS 1 COMPONENTS IN ELEVATED TEMPERATURE REACTORS (SUPPLEMENT TO ASME SECTION III CODE CASES 1592, 1593, 1594, 1595, and 1596)

This guide is not applicable to the Fermi 2 BWR.

A.1.88 REGULATORY GUIDE 1.88 (October 1976, Revision 2), COLLECTION, STORAGE, AND MAINTENANCE OF NUCLEAR POWER PLANT QUALITY ASSURANCE RECORDS

The guidelines presented in Regulatory Guide 1.88 (Revision 2) apply to nuclear power plants that were issued a construction permit after December 1975. Fermi 2 received its construction permit in September 1972 and is therefore exempt from these guidelines.

The NRC regulatory staff has accepted ANSI Standard N45.2.9-1974, "Requirement for the Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants," as an approved method of complying with the Commission's regulations in regard to QA records.

The QA Record System for the initial design and construction phase was based on the requirements in Criterion XVII of 10 CFR 50, Appendix B. To attempt to retrofit the QA records program to conform to all aspects of the ANSI Standard would not have been feasible, and changing the QA record system as it applied to the remaining design and construction work would have been extremely disruptive.

During the operational phase of Fermi 2, the records management operation will be conducted in two stages. From the time the record is generated until it is transmitted to Information Systems for permanent storage, the record will be maintained in an interim storage cabinet with at least 1-hr fire rating. Subsequent storage by Information Systems will comply with Regulatory Guide 1.88. The interim storage in a 1-hr cabinet will not exceed 1 year.

A.1.89 REGULATORY GUIDE 1.89 (June 1984, Revision 1), ENVIRONMENTAL QUALIFICATION OF CERTAIN ELECTRIC EQUIPMENT IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANTS

The guidelines presented in Regulatory Guide 1.89, Revision 1, apply to nuclear power plants which were not previously required, by the NRC, to qualify equipment in accordance with NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety Related Electrical Equipment."

Fermi 2 was required to provide environmental qualification to NUREG-0588 per NRC memorandum and Order CLI-80-21 (see Subsection 3.11.5 for compliance). Therefore, the requirements of Regulatory Guide 1.89, Revision 1, are not applicable to Fermi 2 except for replacement equipment (Section C.6 of Regulatory Guide 1.89, Revision 1).

With regard to replacement equipment, the requirement is to upgrade all replacement equipment, installed subsequent to February 22, 1983, to the provisions of 10 CFR 50.49 unless there are "sound reasons to the contrary." However, the requirements of 10 CFR 50.49 (see Section 3.11), regarding replacement equipment, are such that holders of operating licenses are not required to requalify electrical equipment important to safety in accordance with 10 CFR 50.49 if the NRC had previously required qualification of that equipment in accordance with NUREG-0588.

Since the Fermi 2 Environmental Qualification Program was established based on the requirements of NUREG-0588, the requirements for replacement equipment specified in

NUREG-0588 and NRC Generic Letter 82-09 provide the guidelines to be used for Fermi 2. Certain information contained in Regulatory Guide 1.89, Revision 1, will be used in addition to the above guidelines when further clarifications are required. An exception to these requirements has been taken in that a specific program for addressing equipment upgrade for components being procured was not implemented until April 1985 and that equipment already procured and/or in stock prior to April 1985 was not reevaluated to these equipment upgrade requirements.

The specific replacement equipment requirements applicable to Fermi 2 are as follows:

a. Equipment qualified to NUREG-0588, Category I, requirements is considered qualified to the highest standards required by 10 CFR 50.49. Replacements for this category of equipment are not required to be upgraded

b. Equipment qualified to NUREG-0588, Category II, requirements shall be upgraded to NUREG-0588, Category I, when replacement equipment is procured unless "sound reasons to the contrary," as specified in Generic Letter 82-09 and/or Regulatory Guide 1.89, Revision 1, are established and documented.

A.1.90 REGULATORY GUIDE 1.90 (August 1977, Revision 1), INSERVICE INSPECTION OF PRESTRESSED CONCRETE CONTAINMENT STRUCTURES WITH GROUTED TENDONS

This regulatory guide is not applicable to Fermi 2, which does not use a concrete containment.

A.1.91 REGULATORY GUIDE 1.91 (February 1978, Revision 1), EVALUATION OF EXPLOSIONS POSTULATED TO OCCUR ON TRANSPORTATION ROUTES NEAR NUCLEAR POWER PLANTS

This guide applies to nuclear power plants for which construction permit applications were docketed on or after March 14, 1975. Fermi 2 was docketed in 1969 and is exempt from the guidelines of Regulatory Guide 1.91. However, Fermi 2 has completed review of this guide.

Fermi 2 is located in design-basis tornado region I. This is based on a calculated maximum wind speed of 360 mph and a dynamic wind pressure of 3 psi (see Subsection 3.3.2.1). A survey of transportation routes within 10 miles of Fermi 2 has been made. The results are documented in Subsections 2.2.1 and 2.2.2. As stated in Subsection 2.2.3.3, no conceivable event--including explosions associated with offsite airways, shipping channels, highways, railroads, and pipelines in the area--is expected to influence normal operation of the plant. All transportation routes, "distances of closest approach," are in excess of 4 miles or 21,000 ft from Fermi 2. Figure 2 of Regulatory Guide 1.91 indicates that an explosion in excess of 5000 tons of equivalent TNT would be necessary to affect plant operations. No further consideration of explosion possibilities on transportation routes is warranted. Fermi 2 is thus in compliance with Regulatory Guide 1.91.

A.1.92 REGULATORY GUIDE 1.92 (February 1976, Revision 1), COMBINING MODAL RESPONSES AND SPATIAL COMPONENTS IN SEISMIC RESPONSE ANALYSIS

The guidelines presented in Regulatory Guide 1.92 apply to nuclear power plants for which construction permit applications were docketed after February 1976. The application for Fermi 2 was docketed in 1969 and because of this, Fermi 2 is exempt from the guidelines of Regulatory Guide 1.92. However, Edison has completed review and analysis of the Fermi 2 design with respect to compliance with Regulatory Guide 1.92, Revision 1. Design calculations incorporated in the Fermi 2 vibration-response analysis use spatial component and vibration mode combination by taking the square root of the sum of the squares (SRSS) with due considerations to closely spaced modes in modal combinations as required by Regulatory Guide 1.92, Revision 1. The details of this method are described in Subsection 3.7.3.4. The mathematical analysis in which the resultant modes were evaluated is described in Subsection 3.7.2.1.2.3. It is concluded, therefore, that the Fermi 2 design conforms to the requirements of Regulatory Guide 1.92, Revision 1.

A.1.93 REGULATORY GUIDE 1.93 (December 1974), AVAILABILITY OF ELECTRIC POWER SOURCES

As required by GDC 17, "Electric Power Systems," of Appendix A to 10 CFR 50, two physically independent offsite power and transmission networks along with redundant onsite ac power sources and redundant onsite dc power supplies must be included in the design of each nuclear unit. Limiting conditions for operation (LCO) during the use of emergency electrical power supplies are given in Regulatory Guide 1.93 in accordance with 10 CFR 50, "Licensing of Production and Utilization Facilities," Section 50.36(c)(2).

Regulatory Guide 1.93 is used by the Regulatory Staff in evaluating all construction permit applications for which the issue date of the SER is July 1, 1974, or after. Hence Fermi 2 is not required to comply with this guide, and such compliance is not envisaged. The Fermi 2 project review reveals that the only possible way to fully comply with this guide and still meet the original design intent would be to add a third onsite source (a fifth EDG) that could be used in either division. The plant design and construction had progressed to the point where this change was no longer feasible.

The results of the review that led to these conclusions are summarized below.

The intent of the regulatory positions as stated in Regulatory Guide 1.93 is to implement the safest operating mode whenever the available electric power sources are less than LCO. In the case of Fermi 2, the LCO consists of two offsite sources and two onsite ac power sources. The offsite sources are (1) a 4.16-kV service line stepped down from a 345-kV transmission source by S.S. transformer 65 and (2) a 4.16-kV service line from S.S. transformer 64 stepped down from a 13.2-kV source from the 120-kV transmission bus via switchyard transformer 1. (Refer to Figure 8.3-1.) The two onsite ac sources consist of the four EDGs, two per division. The onsite dc sources consist of dual 130/260-V battery systems, one per division. In the terms of Regulatory Guide 1.93, there are two offsite and two onsite ac sources and two dc sources for LCO.

The regulatory guide's positions describe five levels of degradation of emergency power sources. These levels, the Regulatory Guide compliance position, and the Fermi 2 project position are described on the following pages.

Level of Degradation	Regulatory Guide 1.93 Position	Fermi 2 Project Position
1. The available ac power sources are one less than LCO	Power operation may continue for 72 hr based on system conditions and reserves. If source is restored during this time, unrestricted operation may continue	a. Loss of one offsite source: Fermi 2 would be shut down b. Loss of one onsite source: Fermi 2 must take exception to the Regulatory position. If EDG damage were severe, it could be months before Fermi 2 could return to power under the limits imposed by this regulatory guide. The Fermi 2 design was based on continuous power generating as long as the remaining standby source is verified regularly.
2. The available offsite ac power sources are two less that the LCO	Power operation may continue for 24 hr, pending possibility of restoring circuits.	With loss of both offsite sources, Fermi 2 must shut down.
3. The available offsite and onsite ac power sources are each one less than the LCO	Power operation may continue for 12 hr with limitation based on one source being restored during that time. If either source is restored, operation may continue for 72 hr in accordance with Position 1.	a. Loss of offsite ac power source: Fermi 2 must be shut down. b. Loss of onsite ac power source: if the offsite source is restored, Fermi 2 should be able to return to power based on verification of the remaining onsite source (see Position 1)

Level of Degradation	Regulatory Guide 1.93 Position	Fermi 2 Project Position
4. The available onsite ac power sources are two less than the LCO	Power operation should not exceed 2 hr. If one source is restored within 2 hr, operation may continue for 72hr.	If both onsite sources are lost, Fermi 2 would be shut down. However, if one source were returned, Fermi 2 would continue to operate, as long as that source was verified regularly.
5. The available onsite dc supplies are one less than LCO	Power operation may continue for a period not to exceed 2 hr. If dc power is restored unrestricted, operation may be resumed.	Fermi 2 would comply with this position. The possibility of this occurring considering the Fermi 2 dc system design is extremely remote.

A.1.94 REGULATORY GUIDE 1.94 (April 1976, Revision 1), QUALITY ASSURANCE REQUIREMENTS FOR INSTALLATION, INSPECTION, AND TESTING OF STRUCTURAL CONCRETE AND STRUCTURAL STEEL DURING THE CONSTRUCTION PHASE OF NUCLEAR POWER PLANTS

The implementation of Regulatory Guide 1.94 applies to nuclear power plants submitting applications for construction permits on or after October 15, 1976. The application for Fermi 2 was docketed in 1969. The necessary tests, inspections, records, and data for compliance were not a strict part of Fermi 2 construction procedures. For this reason, records are not in strict compliance with ANSI N45.2.5-1974. Various methods of construction, testing, recording, and material testing have been used during the fabrication of plant structures. As a result, documentation that ensures high quality in materials and workmanship has been retained by the Project's Quality Assurance Group. An outline of these activities as pursued by Fermi 2 is presented in Section 17.1.

A.1.95 REGULATORY GUIDE 1.95 (January 1977, Revision 1), PROTECTION OF NUCLEAR POWER PLANT CONTROL ROOM OPERATORS AGAINST AN ACCIDENTAL CHLORINE RELEASE

Superseded by License Amendment 147

A.1.96 REGULATORY GUIDE 1.96 (June 1976, Revision 1), DESIGN OF MAIN STEAM ISOLATION VALVE LEAKAGE CONTROL SYSTEMS FOR BOILING WATER REACTOR NUCLEAR POWER PLANTS

Superseded by License Amendment 160.

A.1.97 REGULATORY GUIDE 1.97 (December 1980, Revision 2), INSTRUMENTATION FOR LIGHT-WATER-COOLED NUCLEAR POWER

PLANTS TO ASSESS PLANT AND ENVIRONS CONDITIONS DURING AND FOLLOWING AN ACCIDENT

As a result of the post-TMI concerns delineated in NUREG-0737, the postaccident monitoring instrumentation provided for Fermi 2 has been extensively modified.

New channels of instrumentation have been added as described in NUREG-0737, Items II.B.3, II.D.3, II.F.1.1, II.F.1.2, and II.F.1.3. A number of existing instrument channels have been modified to meet new functional requirements specified in NUREG-0737, Items II.F.1.1, II.F.1.4, II.F.1.5, and II.D.3.3.

The subject of instrumentation for the determination of inadequate core cooling was actively pursued by the BWR Owners Group, which developed an industry position on the application of Regulatory Guide 1.97, Revision 2. Edison actively participated in the BWR Owners Group that developed an industry response to more adequately address the subject of postaccident instrumentation for BWR designs. As a consequence of the fairly comprehensive additions and modifications to the Fermi 2 postaccident monitoring system required by NUREG-0737, the modified system is in conformance with Regulatory Guide 1.97 or Edison has provided adequate justification to support an alternative means of meeting the intent of Regulatory Guide 1.97. Edison has submitted reports of compliance with Regulatory Guide 1.97 in References 1 and 2. (Also see Subsection 7.5.1.4.)

Additional references are also provided, which include SER from the NRC, Inspection Report, additional clarification and commitment letters.

A.1.98 REGULATORY GUIDE 1.98 (March 1976), ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A RADIOACTIVE OFFGAS SYSTEM FAILURE IN A BOILING WATER REACTOR

The analysis of the radiological consequences of a radioactive offgas system failure is presented in Section 15.11.

The analysis of the radiological consequences of the release from continued operation of the steam-jet air ejector after a line break downstream of the steam-jet air ejector is presented in Subsection 15.7.1. The analyses presented in Subsection 15.7.1 follow the Regulatory Guide 1.98 assumptions. (The Regulatory Guide considers only one [lumped] accident, which combines the two events discussed above.)

A few of the assumptions related to the inventories available for release and released from the offgas system differ somewhat from the corresponding assumptions in Regulatory Guide 1.98.

A.1.99 REGULATORY GUIDE 1.99 (May, 1988 Revision 2), RADIATION EMBRITTLEMENT OF REACTOR VESSEL MATERIALS

The Fermi 2 procedures for predicting the effects of neutron radiation on reactor vessel material comply with the requirements of Regulatory Guide 1.99, Revision 2.

For details, refer to Subsection 5.2.4.

A.1.100 REGULATORY GUIDE 1.100 (August 1977, Revision 1), SEISMIC QUALIFICATION OF ELECTRIC EQUIPMENT FOR NUCLEAR POWER PLANTS

The Fermi 2 design is not in conformance with the requirements of Regulatory Guide 1.100, Revision 1. This guide requires the design to conform with the requirements and recommendations specified by IEEE Standard 344-1975 for conducting seismic qualification of Class 1E equipment.

According to the acceptance criteria of SRP 3.10, since the Fermi 2 construction permit application and the preliminary safety analysis report (PSAR) were docketed before October 27, 1972, the seismic qualification of Category I instrumentation, electrical equipment, and supports should meet the requirements of IEEE Standard 344-1971.

As described in Section 3.10 of the UFSAR, the Fermi 2 design complies with the requirements of IEEE Std. 344-1971.

A.1.102 REGULATORY GUIDE 1.102 (September 1976, Revision 1), FLOOD PROTECTION FOR NUCLEAR POWER PLANTS

The Fermi 2 flood protection provisions are in compliance with Regulatory Guide 1.102, Revision 1. (Refer to NUREG-0314, Sections 2.4 and 3.4.)

A.1.103 REGULATORY GUIDE 1.103, (October 1976), POST-TENSIONED PRESTRESSING SYSTEMS FOR CONCRETE REACTOR VESSELS AND CONTAINMENTS

This guide is not applicable to the Fermi 2 plant design.

A.1.105 REGULATORY GUIDE 1.105 (November 1976, Revision 1), INSTRUMENT SETPOINTS

The implementation of Regulatory Guide 1.105, Revision 1, applies to nuclear power plants with construction permit applications docketed after December 15, 1976. The Fermi 2 construction permit application was docketed in April 1969, but Edison has established an acceptable degree of compliance with Regulatory Guide 1.105, Revision 1.

The instrumentation supplied for Fermi 2 complies fully with Regulatory Positions C.1 through C.5 of Regulatory Guide 1.105, Revision 1. The testability option is being implemented on Fermi 2 to ensure this degree of compliance. The documentation required by Regulatory Position C.6 of Regulatory Guide 1.105, Revision 1, has been generated for a specific number of safety system setpoints as part of the BWR generic instrument setpoint methodology response to the NRC staff position on this guide (NRC letter to Edison dated June 14, 1983).

A.1.106 REGULATORY GUIDE 1.106 (March 1977, Revision 1), THERMAL OVERLOAD PROTECTION FOR ELECTRIC MOTORS ON MOTOR-OPERATED VALVES

Two regulatory position options are delineated in Regulatory Guide 1.106, Revision 1. Regulatory Position C.1 is recommended, but Regulatory Position C.2 is allowed as an acceptable degree of compliance.

In complying with Regulatory Position C.2, Fermi 2 established motor-operated valve thermal overload device trip setpoints by considering the following:

a. Variations in ambient temperature at the installed locations of the overloads and the valve motors

b. Variations in motor heating data and the overload's trip characteristics

c. Setpoint drift verification through periodic testing.

A.1.107 REGULATORY GUIDE 1.107 (February 1977, Revision 1), QUALIFICATIONS FOR CEMENT GROUTING FOR PRESTRESSING TENDONS IN CONTAINMENT STRUCTURES

This guide is not applicable to Fermi 2, which is a BWR with a Mark I containment.

A.1.108 REGULATORY GUIDE 1.108 (August 1977, Revision 1), PERIODIC TESTING OF DIESEL GENERATOR UNITS USED AS ONSITE ELECTRIC POWER SYSTEMS AT NUCLEAR POWER PLANTS

The Fermi 2 EDG design and preoperational and periodic testing meet the intent of this Regulatory Guide except where the Technical Specifications surveillance requirements differ. Exceptions are taken to the following regulatory positions:

C.1.b(3) When performing testing of the EDGs in other than the fast (10-sec) start mode, the governor and exciter circuits must be bypassed. Automatic transfer to emergency operation therefore cannot occur without manual action by the testing operator slow starting is allowed in the Technical Specifications to minimize mechanical stress and wear in the diesel engines

C.2.a The testing frequency for diesel generator units is controlled by the Technical Specification Surveillance Frequency Control Program and is not tied to regulatory position C.2.a requirements

C.2.a(3) The 24-hr full-load-carrying test is performed at 2500 to 2600 kW for 22 hr and 2800 to 2900 kW for 2 hr, rather than at the continuous load and 2-hr rating of this regulatory position. The kilowatt load for this test is established in the Technical Specifications

C.2.a(5) The hot-restart test is performed with the loss of offsite power loads only, as established in the Technical Specifications. A demonstration is not performed with design accident loading sequence

C.2.a(8) This test is not performed since position C.1.b(3) is not met

C.2.c(1) The testing frequency for diesel generator units is controlled by the Technical Specification Surveillance Frequency Control Program and is not tied to regulatory position C.2.c requirements

C.2.c(2) The periodic testing load-carrying demonstration is at 2500 to 2600 kW in accordance with the Technical Specifications, rather than at the continuous rating recommended in this position. Also, the Technical Specifications require that the rapid loading (2500 to 2600 kW in less than or equal to 150 sec) only need be demonstrated per the Technical Specification Surveillance Frequency control Program, in conjunction with the 10-sec start test. The testing frequency for diesel generator units is controlled by the Technical Specification Surveillance Frequency Control Program and is not tied to regulatory position C.2.c requirements

C.2.d Test interval of the EDGs is determined in accordance with Technical Specifications and the Corrective Action Program. The testing frequency for diesel generator units is controlled by the Technical Specification Surveillance Frequency Control Program and is not tied to regulatory position C.2.d requirements

C.3.b Reporting requirements were deleted when Technical Specification Amendment 107 was implemented.

A.1.109 REGULATORY GUIDE 1.109 (October 1977, Revision 1), CALCULATION OF ANNUAL DOSES TO MAN FROM ROUTINE RELEASES OF REACTOR EFFLUENTS FOR THE PURPOSE OF EVALUATING COMPLIANCE WITH 10 CFR PART 50 APPENDIX I

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 11.2.9 and Appendix 11A.

A.1.110 REGULATORY GUIDE 1.110 (March 1976), COST-BENEFIT ANALYSIS FOR RADWASTE SYSTEMS FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

Fermi 2 is in conformance with the requirements of Regulatory Guide 1.110 (refer to NUREG-0389, Cost-Benefit Analysis Requirements of Appendix I to 10 CFR Part 50; Their Application to Certain Nuclear Power Plants Docketed Before January 2, 1971; January, 1978).

A.1.111 REGULATORY GUIDE 1.111 (July 1977, Revision 1), METHODS FOR ESTIMATING ATMOSPHERIC TRANSPORT AND DISPERSION OF GASEOUS EFFLUENTS IN ROUTINE RELEASES FROM LIGHT-WATER-COOLED REACTORS

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 2.3.5 and Appendix 11A.

A.1.112 REGULATORY GUIDE 1.112 (April 1976), CALCULATION OF RELEASES OF RADIOACTIVE MATERIALS IN GASEOUS AND LIQUID EFFLUENTS FROM LIGHT-WATER-COOLED POWER REACTORS

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Appendix 11A.

A.1.113 REGULATORY GUIDE 1.113 (April 1977, Revision 1), ESTIMATING AQUATIC DISPERSION OF EFFLUENTS FROM ACCIDENTAL AND ROUTINE REACTOR RELEASES FOR THE PURPOSE OF IMPLEMENTING APPENDIX I

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Appendix 11A.

A.1.114 REGULATORY GUIDE 1.114 (November 1976, Revision 1), GUIDANCE ON BEING OPERATOR AT THE CONTROLS OF A NUCLEAR POWER PLANT

Fermi 2 is in conformance with the requirements of this regulatory guide.

A.1.115 REGULATORY GUIDE 1.115 (July 1977, Revision 1), PROTECTION AGAINST LOW-TRAJECTORY TURBINE MISSILES

Fermi 2 is in conformance with the intent of Regulatory Guide 1.115, Revision 1. The Fermi 2 barrier designs for low-trajectory missile protection were evaluated by use of the Modified Petry Formula. For details on missile protection, refer to Section 3.5.

A.1.116 REGULATORY GUIDE 1.116 (June 1976), QUALITY ASSURANCE REQUIREMENTS FOR INSTALLATION, INSPECTION, AND TESTING OF MECHANICAL EQUIPMENT AND SYSTEMS

The NRC regulatory staff has recognized ANSI Standard N45.2.8-1975, "Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants," as an acceptable method of complying with the Commission's regulations in regard to such equipment and systems. Regulatory Guide 1.116, which endorses ANSI N45.2.8 with certain minor exceptions and clarifications, was issued in June 1976. Since the Fermi 2 QA Program for the design and construction phase was established several years before the issuance of ANSI N45.2.8 or Regulatory Guide 1.116, it was based on the requirements of Appendix B to 10 CFR 50. The QA Program included all the elements necessary for NRC approval at that time, and has been followed for all installation, inspection, and testing of mechanical systems so far accomplished. It was not practical to modify the QA Program to include all aspects of the program set forth in ANSI N45.2.8 for the remaining installation, inspection, and testing of mechanical systems as this would have had a disruptive effect on both cost and schedule.

Regulatory Guide 1.116 also states that the requirements of ANSI N45.2.8 are considered to be applicable during the operations phase. Consequently, the requirements of Regulatory

Guide 1.116 will be followed for those applicable operational phase activities that are comparable to activities occurring during the construction phase.

A.1.117 REGULATORY GUIDE 1.117 (April 1978, Revision 1), TORNADO DESIGN CLASSIFICATION

The Fermi 2 construction permit was issued prior to May 30, 1978. Therefore, Regulatory Guide 1.117 does not apply.

A.1.118 REGULATORY GUIDE 1.118 (June 1978, Revision 2), PERIODIC TESTING OF ELECTRIC POWER AND PROTECTION SYSTEMS

Regulatory Guide 1.118 is required only for construction permit applicants under review. Therefore, Fermi 2 is not required to comply. Fermi 2 complies with the intent of Regulatory Guide 1.118 Rev 2 and IEEE 338-1977 to test power (electrical) system in a formal manner. This test requirement was not contained in IEEE 338-1971; Fermi 2 complies with IEEE 338-1971 for all remaining protection system testing. Power system surveillance test procedures have been developed. Reactor protection system test commitments are found in Subsection 7.2.1.1.3.8.

A.1.120 REGULATORY GUIDE 1.120 (November 1977, Revision 1), FIRE PROTECTION GUIDELINES FOR NUCLEAR POWER PLANTS

Regulatory Guide 1.120, Revision 1, was reissued for an extended comment period of 1 year. During this comment period, the existing BTP APCSB 9.5-1, Appendix A, was still the determining guide for fire protection (in accordance with NRC letter dated November 7, 1977, from the Office of Standards Development).

Fermi 2 fire protection follows the intent of BTP APCSB 9.5-1, Appendix A, Construction Permit Received Prior to July 1, 1976. BTP APCSB 9.5-1, Appendix A, is the controlling document for Fermi 2 fire protection. Appendix 9A describes the positions of compliance to the BTP.

A.1.121 REGULATORY GUIDE 1.121 (August 1976), BASES FOR PLUGGING DEGRADED PWR STEAM GENERATOR TUBES

Regulatory Guide 1.121 is not applicable to Fermi 2.

A.1.122 REGULATORY GUIDE 1.122 (February 1978, Revision 1), DEVELOPMENT OF FLOOR DESIGN RESPONSE SPECTRA FOR SEISMIC DESIGN OF FLOOR-SUPPORTED EQUIPMENT OR COMPONENTS

Regulatory Guide 1.122 is required only for construction permit applicants under review. Thus, the Fermi 2 plant is not required to comply.

A.1.123 REGULATORY GUIDE 1.123 (July 1977, Revision 1), QUALITY ASSURANCE REQUIREMENTS FOR CONTROL OF PROCUREMENT OF ITEMS AND SERVICES FOR NUCLEAR POWER PLANTS

The NRC regulatory staff has accepted ANSI Standard N45.2.131976, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants," as an acceptable method of complying with the Commission's regulations in regard to control of procurement. The initial issue of Regulatory Guide 1.123 applied to construction permit and operating license applications docketed after June 15, 1977, and Revision 1 is applicable to those docketed after August 1, 1977. The Fermi 2 QA Program for the design and construction phase was established several years before the issuance of either ANSI N45.2.13 or Regulatory Guide 1.123, and is based on the requirements of Appendix B to 10 CFR 50. At the stage of the procurement effort when Regulatory Guide 1.123 was issued, it was not feasible to make any retroactive changes in the system of Procurement Control. The Fermi 2 QA Program already included the basic elements set forth in ANSI Standard N45.2.13. Consequently, a change to the system for control of procurement which could affect only the small fraction of the procurement effort still to be done was impractical as any possible benefits would be far outweighed by the cost and schedule impact.

During the operational phase of Fermi 2, the procurement control program will be conducted in compliance with Regulatory Guide 1.123, with the following exception: With respect to ANSI N45.2.13, Section 3.2, "Control of the Procurement Documents," Subsection 3.2.3, "Quality Assurance Program Requirements," DTE takes the following exception:

When purchasing commercial grade calibration or testing services from a laboratory holding accreditation by an Accreditation Body (AB) which is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA), commercial grade surveys need not be performed provided each of the conditions in the following list are met. The ILAC accreditation process cannot be used as part of the commercial grade dedication process of Nondestructive Examination (NDE) or Nondestructive Testing (NDT) services in lieu of performing a commercial grade survey.

1. A documented review of the supplier’s accreditation is performed and includes a verification of the following:
    a) The calibration or test laboratory holds accreditation by an accrediting body recognized by the ILAC MRA. The accreditation encompasses ISO/IEC-17025:2017, “General Requirements for the Competence of Testing and Calibration Laboratories.”
    b) For procurement of calibration services, the published scope of accreditation for the calibration laboratory covers the needed measurement parameters, ranges, and uncertainties.
    c) For procurement of testing services, the published scope of accreditation for the test laboratory covers the needed testing services including test methodology and tolerances/uncertainties.
    d) The laboratory has achieved accreditation based on an on-site accreditation assessment by the selected AB within the past 48

months. The laboratory's accreditation cannot be based on two consecutive remote accreditation assessments.

2. The purchase documents require that:

   a) The service must be provided in accordance with their accredited ISO/IEC-17025:2017 program and scope of accreditation.

   b) As found calibration data must be reported in the certificate of calibration when calibrated items are found to be out of tolerance (for calibration services only).

   c) The equipment/standards used to perform the calibration must be identified in the certificate of calibration (for calibration services only).

   d) Subcontracting of these accredited services is prohibited.

   e) The customer must be notified of any condition that adversely impacts the laboratory's ability to maintain the scope of accreditation.

   f) Performance of the services listed on this order is contingent on the laboratory's accreditation having been achieved through an on-site accreditation assessment by the AB within the past 48 months.

   g) Additional technical and quality requirements, as necessary, based upon a review of the procured scope of services, which may include, but are not necessarily limited to, tolerances, accuracies, ranges, and industry standards.

3. It is validated, at receipt inspection, that the laboratory's documentation certifies that:

   a) The contracted calibration or test service has been performed in accordance with their ISO/IEC-17025:2017 program, and has been performed within their scope of accreditation.

   b) The purchase order's requirements are met.

A.1.124 REGULATORY GUIDE 1.124 (January 1978, Revision 1), SERVICE LIMITS AND LOADING COMBINATIONS FOR CLASS 1 LINEAR-TYPE COMPONENT SUPPORTS

The Fermi 2 construction permit was issued prior to January 10, 1978. Therefore, Regulatory Guide 1.124 does not apply.

A.1.125 REGULATORY GUIDE 1.125 (October 1978, Revision 1), PHYSICAL MODELS FOR DESIGN AND OPERATION OF HYDRAULIC STRUCTURES AND SYSTEMS FOR NUCLEAR POWER PLANTS

Regulatory Guide 1.125 does not apply to Fermi 2 as the construction permit was docketed prior to November 1977.

A.1.126 REGULATORY GUIDE 1.126 (March 1978, Revision 1), AN ACCEPTABLE MODEL AND RELATED STATISTICAL METHODS FOR THE ANALYSIS OF FUEL DENSIFICATION

General Electric Fuel Design Analysis and Manufacturing Procedures as applied to the design and production of the Fermi 2 fuel are in full compliance with Regulatory Guide 1.126.

A.1.127 REGULATORY GUIDE 1.127 (March 1978, Revision 1), INSPECTION OF WATER CONTROL STRUCTURES ASSOCIATED WITH NUCLEAR POWER PLANTS

This guide does not apply to any Fermi 2 structure. As part of the normal maintenance program, the shore barrier will be resurveyed by Edison on an annual basis and after storms in which the crest elevation of incident waves at the shoreline exceeds the top of the shore barrier. (See Subsection 3.4.4.5.) The inspection of the RHR complex reservoir is included in the normal maintenance program.

A.1.128 REGULATORY GUIDE 1.128 (October 1978, Revision 1), INSTALLATION DESIGN AND INSTALLATION OF LARGE LEAD STORAGE BATTERIES FOR NUCLEAR POWER PLANTS

Regulatory Guide 1.128 is required only for construction permit applicants under review. Thus, Fermi 2 is not required to comply.

A.1.129 REGULATORY GUIDE 1.129 (February 1978, Revision 1), MAINTENANCE, TESTING, AND REPLACEMENT OF LARGE LEAD STORAGE BATTERIES FOR NUCLEAR POWER PLANTS

Regulatory Guide 1.129 invokes the use of IEEE Standard 450-1975. Fermi 2 will maintain its present commitment to IEEE 450-1972 and the BWR Standard Technical Specifications with regard to the 130/260-V dc system. See response to Regulatory Guide 1.32 (Subsection A.1.32) for specific compliance.

A.1.130 REGULATORY GUIDE 1.130 (October 1978), SERVICE LIMITS AND LOADING COMBINATIONS FOR CLASS 1 PLATE-AND-SHELL-TYPE COMPONENT SUPPORTS

Regulatory Guide 1.130 applies to construction permit applications docketed after April 1, 1978. It is not applicable to Fermi 2. The Fermi 2 construction permit was docketed April, 1969.

A.1.131 REGULATORY GUIDE 1.131 (August 1977), QUALIFICATION TESTS OF ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

Regulatory Guide 1.131 is applicable only for construction permit applications docketed after May 1, 1978; therefore, application of Regulatory Guide 1.131 is not required for Fermi 2. See Subsection 8.3.1.4.2 for cable qualification.

A.1.132 REGULATORY GUIDE 1.132 (March 1979, Revision 1), SITE INVESTIGATIONS FOR FOUNDATIONS OF NUCLEAR POWER PLANTS

Fermi 2 is in compliance with Regulatory Guide 1.132, Revision 0.

Regulatory Guide 1.132, Revision 1, was issued to evaluate investigations submitted in connection with construction permit applications docketed after March 30, 1979. The guide is also applicable for those facilities where the construction permit was issued prior to March 30, 1979, but major changes in plant layout or design took place after this date.

The Fermi 2 construction permit was issued prior to March 30, 1979, and therefore Regulatory Guide 1.132, Revision 1, is not applicable. However, Fermi 2 generally conforms to the requirements presented in the regulatory guide.

The specific item where the Revision 1 guideline differs from the Fermi 2 compliance is as follows:

"Safety-Related Pipelines"--The regulatory guide requires borings at 100-ft intervals, geological sections along the pipelines, and mapping of the excavation, if founded in bedrock. In addition, if the pipeline is soil supported, sophisticated sampling techniques are required. Although sophisticated sampling techniques were not used, the site investigations were performed in accordance with the state of the art at the time.

In conclusion, Fermi 2 site investigations meet the intent, and in most cases the letter, of Regulatory Guide 1.132, Revision 1.

A.1.133 REGULATORY GUIDE 1.133 (May 1981, Revision 1), LOOSE- PART DETECTION PROGRAM FOR THE PRIMARY SYSTEM OF LIGHT-WATER-COOLED REACTORS

Fermi 2 original design was in compliance with the requirements of Regulatory Guide 1.133, Revision 1.

However, the Regulatory Guide is no longer applicable to Fermi as the compliance to the requirements of RG 1.133 is not required per GE Licensing Topical Report NEDC-32975, which has been reviewed and accepted by the NRC SE dated January 25, 2001.

A.1.134 REGULATORY GUIDE 1.134 (September 2014, Revision 4), MEDICAL EVALUATION OF NUCLEAR POWER PLANT PERSONNEL REQUIRING OPERATOR LICENSES

Fermi 2 is in conformance with the requirements of Regulatory Guide 1.134.

A.1.135 REGULATORY GUIDE 1.135 (September 1977), NORMAL WATER LEVEL AND DISCHARGE AT NUCLEAR POWER PLANTS

Under Section D, Implementation of Regulatory Guide 1.135, the NRC states, ". . . the method described herein will be used in the evaluation of submittals for construction permit applications docketed after May 1, 1978. . .." As the construction permit application for Fermi 2 was docketed in 1969, Regulatory Guide 1.135 is not applicable to Fermi 2.

A.1.136 REGULATORY GUIDE 1.136 (October 1978, Revision 1), MATERIAL FOR CONCRETE CONTAINMENTS

Fermi 2 has a steel primary containment; therefore Regulatory Guide 1.136 does not apply.

A.1.137 REGULATORY GUIDE 1.137 (October 1979, Revision 1) FUEL OIL SYSTEMS FOR STANDBY DIESEL GENERATORS

The fuel oil system was designed and installed prior to the issuance of this regulatory guide. However, the Fermi 2 diesel fuel oil system conforms to the basic arrangement, testing, and other requirements of Regulatory Guide 1.137. There are differences in design detail, but overall the intent of the guide is met.

Specific requirements for fuel-oil testing are contained in the Fermi 2 Technical Specifications, and include provisions for testing of delivered fuel oil prior to storage in the tanks and for periodic sampling thereafter. The Technical Specifications requirements satisfy the intent of Regulatory Guide 1.137, Position C.2.

A.1.138 REGULATORY GUIDE 1.138 (April 1978), LABORATORY INVESTIGATIONS OF SOILS FOR ENGINEERING ANALYSIS AND DESIGN OF NUCLEAR POWER PLANTS

The Fermi 2 construction permit was issued prior to December 1, 1978. Therefore, Regulatory Guide 1.138 does not apply.

A.1.139 REGULATORY GUIDE 1.139 (May 1978), GUIDANCE FOR RESIDUAL HEAT REMOVAL

The Fermi 2 plant is in compliance with Regulatory Guide 1.139.

A.1.140 REGULATORY GUIDE 1.140 (October 1979, Revision 1), DESIGN, TESTING, AND MAINTENANCE CRITERIA FOR NORMAL VENTILATION EXHAUST SYSTEM AIR FILTRATION AND ADSORPTION UNITS OF LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

Various discharge filter systems have been provided for Fermi 2 to control the discharge of radioactive material during normal and operational occurrences. The filter and/or radiation monitors are provided for compliance with GDC 60 and 61 of Appendix A, and Appendix I to 10 CFR 50. The filters were purchased in accordance with standards applicable at the time, such as ORNL-NSIC-65.

Fermi 2 is in compliance with the intent of Revision 1 of this regulatory guide. These filters were designed and constructed prior to the issuance of Regulatory Guide 1.140 and ANSI Standards N510 and N509. However, the design and construction of radwaste building ventilation exhaust hood and building exhaust filters do meet the basic intent and performance criteria in these guidelines.

A.1.141 REGULATORY GUIDE 1.141 (October 1979, Revision 1), CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS

The Fermi 2 isolation system has been reviewed for compliance with NUREG-0737, Item II.E.4.2. The requirements in NUREG-0737 encompass, expand, and supersede Regulatory Guide 1.141, Revision 1, and the present design of the containment isolation system for Fermi 2, in general, conforms to the requirements of NUREG-0737.

A.1.142 REGULATORY GUIDE 1.142 (April 1978), SAFETY-RELATED CONCRETE STRUCTURES FOR NUCLEAR POWER PLANTS (OTHER THAN REACTOR VESSELS AND CONTAINMENTS)

The Fermi 2 construction permit was issued prior to December 15, 1978. Therefore, Regulatory Guide 1.142 does not apply.

In 2009 a second set of Category I 4160-V ductbanks, manholes and above ground cable vaults were designed and constructed. These Category I structures are in compliance with Regulatory Guide 1.142, Revision 2, with the following exception:

Regulatory Guide 1.142, Rev. 2 cites the use of ACI 349-97, “Code Requirements for Nuclear Safety Related Concrete Structures” along with the 15 Regulatory Positions on the use of ACI 349-97. Fermi used a later ACI Code, 349-01, while still complying with all the applicable 15 Positions of the Reg. Guide for the second set of Category I 4160-V ductbanks, manholes and above ground cable vaults. The requirements in the later ACI code is consistent with ACI 349-97.

Position 15 of Regulatory Guide 1.142, Rev. 2 states that Section 11.6 of ACI 318-99 “…” should be used in lieu of 11.6 of ACI 318-97” … “for evaluating members subject to torsion or combination of shear and torsion”. ACI 349-01 incorporated recent revisions of ACI 318; which includes ACI 318-99 Section 11.6 changes and therefore, is consistent and complies with Position 15.

A.1.143 REGULATORY GUIDE 1.143 (October 1979, Revision 1), DESIGN GUIDANCE FOR RADIOACTIVE WASTE MANAGEMENT SYSTEMS, STRUCTURES, AND COMPONENTS INSTALLED IN LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

Fermi 2 is in compliance with Regulatory Guide 1.143, Revision 1, with the following exceptions:

a. Fermi 2 uses nonconsumable inserts (backing rings) in butt-welded pipes of 2.5 in., or larger, diameter. Edison had previously stated its position on the adequacy of this feature in connection with conformance to Regulatory Guide 1.143, Revision 0

b. Regulatory Guide 1.143, Revision 1, requires that concrete be designed in accordance with ACI 318-77, instead of ACI 349-76 as required by Regulatory Guide 1.143, Revision 0. The Fermi 2 turbine house/ radwaste building was designed in accordance with ACI 318-63 and/or ACI 318-71. Since ACI 318-77 is an updated version of ACI 318-71, without any significant changes to the strength requirements of a structural frame, it is Edison's opinion that the turbine house/radwaste building structure does comply with the requirements of Regulatory Guide 1.143, Revision 1, in this regard. Edison had previously stated the adequacy of the concrete standards associated with radwaste structures in connection with conformance to Regulatory Guide 1.143, Revision 0

c. Regulatory Guide 1.143, Revision 1, calls for hydrotesting of the offgas system and holding pressure for 30 minutes, with no leakage indicated. Fermi 2 piping was tested in full compliance with ASME Section III, ND6000, 1971 winter Addendum, which calls for a 10-minute hold. Edison's justification for a 10-minute hydrotest hold pressure is as follows:

1. The Fermi 2 offgas piping is already built to more stringent requirements than called for in this regulatory guide
2. The Fermi 2 offgas system normally operates under a vacuum
3. The ASME 10-minute requirement is sufficient to detect any defects in the piping system.

The adequacy of the offgas system test had been previously stated by Edison in connection with the conformance of Fermi 2 to Regulatory Guide 1.143, Revision 0

A study (Reclassification of the offgas system) was performed, which concluded the Fermi 2 offgas system may be reclassified as non-ASME Code Section III. The code governing the piping and valves is ANSI B31.1.0.

Modifications made to the offgas piping system subsequent to the code reclassification will be in compliance with ANSI B31.1.0, which is consistent with Regulatory Guide 1.143.

d. Regulatory Guide 1.143, Revision 1, calls for certain portions (primarily charcoal adsorber tank supports) of the offgas system to be designed to specified seismic design criteria. The design of the Fermi 2 offgas system does not conform to the specified seismic design criteria

e. Overflow of the condensate storage or condensate return tank is contained within the containment wall around both tanks. Lost condensate is pumped to the valve pit sumps and then pumped to radwaste. Direct access to Lake Erie by water seeping into the ground is prevented by the clay fill seal beneath the shore barrier. Initial movement of any seepage would be downward to mix and dilute with the ground water from the dolomite aquifer

f. Regulatory Guide 1.143, Revision 1, specifies QA practices appropriate for radwaste systems. The QA practices that were applied consist of measures

established to control design activities, the procurement and receiving inspection of pressure boundary items and instrumentation, and the inspection of the installation of pressure boundary items and instrumentation

g. Regulatory Guide 1.143, Revision 1, Section 4.3, states that "process lines should not be less than 3/4-in. (nominal). "The Fermi 2 system contains three process lines (waste slurries and evaporator concentrates) to the extruder which are 1/2-in. Schedule 80 pipe. These pipes have a wall thickness which is actually greater than 3/4-in. Schedule 40 piping. The 1/2-in. piping was needed in these lines to provide and maintain an adequate transport velocity. The lines were specifically designed for slurry service, and feature butt-welded construction, 5-D bends (no elbow fittings), and automatic flushing.

A.1.144 REGULATORY GUIDE 1.144 (September 1980, Revision 1) AUDITING OF QUALITY ASSURANCE PROGRAMS FOR NUCLEAR POWER PLANTS

DTE is in conformance with the requirements and recommendations of this regulatory guide, with the following exceptions:

(1) That a grace period of 25 percent is applied to the completion of annually required documented supplier evaluations and the completion of triennial audits as required by section C.3.b.(2). The total combined time interval for any three consecutive audit intervals should not exceed 3.25 times the specified audit interval.

When procuring commercial grade calibration or testing services from a laboratory holding accreditation by an Accreditation Body (AB) which is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA), the accreditation process and accrediting body may be credited with carrying out a portion of the purchaser's duties of verifying acceptability and effective implementation of the calibration or testing service laboratory's quality assurance program.

In lieu of performing commercial grade survey or accepting a commercial grade survey performed by another licensee, a documented review of the laboratory's accreditation is performed which includes a verification of each of the conditions in the following list. The ILAC accreditation process cannot be used as part of the commercial grade dedication process of Nondestructive Examination (NDE) or Nondestructive Testing (NDT) services in lieu of performing a commercial grade survey.

1. The calibration or test laboratory holds accreditation by an accrediting body recognized by the ILAC MRA. The accreditation encompasses ISO/IEC-17025:2017, "General Requirements for the Competence of Testing and Calibration Laboratories."
2. For procurement of calibration services, the published scope of accreditation for the calibration laboratory covers the needed measurement parameters, ranges, and uncertainties.
3. For procurement of testing services, the published scope of accreditation for the test laboratory covers the needed testing services including test methodology and tolerances/uncertainties.

4. The laboratory has achieved accreditation based on an on-site accreditation assessment by the selected AB within the past 48 months. The laboratory's accreditation cannot be based on two consecutive remote accreditation assessments.

(2) DTE will review the information described in the second paragraph of section C.3.b(2) as it becomes available through its ongoing receipt inspection, operating experience and supplier evaluation programs, in lieu of performing a specific evaluation on an annual basis. The results of the reviews are promptly considered for effect on a supplier's continued qualification and adjustments made as necessary (including corrective actions, adjustments of supplier audit plans, and input to third party auditing entities as warranted). In addition, the results are reviewed periodically to determine if, as a whole, they constitute a significant condition adverse to quality requiring additional action.

QA programs of others, that is suppliers, may be audited and evaluated by another nuclear utility provided an agreement has been established to include DTE's scope of supply and for reviews of programs and their changes, DTE's QA requirements.

A.1.145 REGULATORY GUIDE 1.145 (August 1979), ATMOSPHERIC DISPERSION MODELS FOR POTENTIAL ACCIDENT CONSEQUENCE ASSESSMENTS AT NUCLEAR POWER PLANTS

This analysis uses offsite χ/Q determinations based on this regulatory guide.

A.1.146 REGULATORY GUIDE 1.146 (August 1980), QUALIFICATION OF QUALITY ASSURANCE PROGRAM AUDIT PERSONNEL FOR NUCLEAR POWER PLANTS

The established design and construction QA program, which predates the development of ANSI N45.2.23, was not committed to comply with Regulatory Guide 1.146. However, the adopted practices for the training and qualification of auditor personnel met the requirements of the ANSI standard.

The operations QA program complies with the requirements of Regulatory Guide 1.146, except as follows:

(1) Regardless of the methods used for demonstrating proficiency, the prospective lead auditor shall have participated on at least one Nuclear Quality Assurance Audit within the year preceeding the individual's effective date of qualification. Upon successful demonstration of the ability to effectively implement the audit process and effectively lead audits, and having met the other requirements of section 2.3 of ANSI N.45.2.23-1978, the individual may be certified as being qualified to lead audits.

(2) For sections 3.2 and 5.3 of ANSI N45.2.23-1978, a grace period of 90 days is applied to complete the annual assessment of each lead auditor's qualification.

A.1.147 REGULATORY GUIDE 1.147 (latest edition), INSERVICE INSPECTION CODE CASE ACCEPTABILITY--ASME SECTION XI, DIVISION 1

Fermi 2 is in conformance with the requirements of this regulatory guide. Code cases that apply and have been adopted for use are identified in the inservice inspection program.

A.1.148 REGULATORY GUIDE 1.148 (March 1981), FUNCTIONAL SPECIFICATION FOR ACTIVE VALVE ASSEMBLIES IN SYSTEMS IMPORTANT TO SAFETY IN NUCLEAR POWER PLANTS

The Fermi 2 construction permit and licenses to manufacture were issued prior to July 1, 1981. Therefore, Regulatory Guide 1.148 does not apply. However, the intent of this guide will be met for the new equipment ordered for Fermi 2 after July 1, 1981.

A.1.152 REGULATORY GUIDE 1.152 (NOVEMBER 1985), CRITERIA FOR PROGRAMMABLE DIGITAL COMPUTER SYSTEM SOFTWARE IN SAFETY-RELATED SYSTEMS OF NUCLEAR POWER PLANTS

The Fermi 2 procedures conform to the requirements for designing, verifying, and implementing software and validating computer systems as specified in ANSI/IEEE-ANS-7-4.3.2-1982, "Application Criteria for Programmable Digital Computer Systems in Safety Systems of Nuclear Power Generating Stations." In addition, Fermi 2 conforms with IEEE Standard 7-4.3.2-1993, "IEEE Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations." The 1993 version provides clarifications and detailed descriptive guidelines without changing the basic technical criteria in the 1982 version.

A.1.155 REGULATORY GUIDE 1.55 (AUGUST 1988), STATION BLACKOUT

The Fermi 2 plant is in compliance with Regulatory Guide 1.155. The compliance of the Fermi 2 plant to the regulatory Guide 1.155 was determined using the NUMARC 87-00 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors". The following is a summary of some of the important conclusions from this determination:

a. A minimum emergency diesel generator (EDG) reliability target of .95 per demand for each EDG has been selected and a reliability program is in place to monitor and maintain this reliability level.

b. The Fermi 2 plant minimum acceptable station blackout coping capability was determined to be 4 hours. The Fermi 2 specific plant evaluation determined it is capable of withstanding and recovering from a station blackout event of 4 hour duration.

c. Fermi 2 has an Alternate AC (AAC) power supply available on site that can be started from the Fermi 2 control center and switched to the plant onsite ac power system in less than one (1) hour. The AAC is the 18 MW Combustion Turbine Generator (CTG) 11-1 located near the plant's 120 KV switchyard. The AAC power system is inspected and tested periodically to demonstrate

operability and reliability. An alternate to CTG 11-1 is CTG 11-2, 11-3, or 11-4 which can be started with the standby diesel generator.

d. Procedures and training have been established for operator actions necessary to cope with a station blackout event.

e. Quality assurance activities have been implemented as applicable for the non-safety systems and equipment required to support responses to a station blackout event. Further discussion of Station Blackout is provided in Section 8.4, "Station Blackout (SBO)."

A.1.160 REGULATORY GUIDE 1.160 (JANUARY 1995), MONITORING THE EFFECTIVENESS OF MAINTENANCE AT NUCLEAR POWER PLANTS

The Fermi 2 plant is in compliance with Regulatory Guide 1.160. Regulatory Guide 1.160 endorses the use of NUMARC 93-01 as acceptable guidance for implementing the Maintenance Rule (10 CFR 50.65). Regulatory Guide 1.160 states that methods other than those expressed in NUMARC 93-01 may be used to implement the Maintenance Rule. However, the NRC will determine the acceptability of other methods on a case by case basis.

Fermi 2 has utilized NUMARC 93-01 as the base document for implementing the Maintenance Rule. However, after appropriate justification, exceptions were taken. Most of these exceptions were improvements to NUMARC 93-01 guidance.

A.1.163 REGULATORY GUIDE 1.163 (SEPTEMBER 1995), PERFORMANCE-BASED CONTAINMENT LEAK-TEST PROGRAM

By License Amendment 108, the Fermi 2 Plant has implemented the approach as described in Regulatory Guide 1.163 "Performance Based Containment Leak Test Program." This program allows the testing periodicity to be extended from the present two year limit for Type B and C tests up to 120 months for Type B test and up to 60 months for Type C tests. Also, the periodicity for Type A test has been extended from 3 every 10 years to once per 10 years. Regulatory Guide 1.163 approves Nuclear Energy Institute (NEI) 94-01, Revision 0, which provides methods acceptable to the NRC staff for complying with provisions of Option B in Appendix J to 10 CFR 50, subject to four exceptions listed in Regulatory Guide 1.163. By License Amendment No. 153, a one-time extension of the Type A test interval to 15 years was implemented. By License Amendment 205, the program was revised for the permanent extension of the Type A test interval to once every 15 years and extension of the Type C test interval up to 75 months. The program is in accordance with NEI 94-01 Revision 3-A, dated July 2012, and the limitations and conditions specified in NEI 94-01 Revision 2-A, dated October 2008.

A.1.181 REGULATORY GUIDE 1.181 (SEPTEMBER 1999), CONTENT OF THE UPDATED FINAL SAFETY ANALYSIS REPORT IN ACCORDANCE WITH 10 CFR 50.71 (e)

Fermi 2 complies with the general intent of this regulatory guide. Regulatory Guide 1.181 endorses the use of NEI 98-03, "Guidelines for Updating Final Safety Analysis Reports,"

dated June 1999 as an acceptable method for complying with the provisions of 10 CFR 50.71(e).

A.1.183 REGULATORY GUIDE 1.183 (JULY 2000) ALTERNATIVE RADIOLOGICAL SOURCE TERMS FOR EVALUATING DESIGN BASIS ACCIDENTS AT NUCLEAR POWER REACTORS

The analyses of the control rod drop accident, as discussed in Section 15.4.9, loss of coolant accidents, in general, as discussed in Section 15.6.5, and fuel-handling accidents involving fuel that meets the burnup specification associated with Table 3, Footnote 11 of this regulatory guide, as discussed in Subsection 15.7.4, conform with the regulatory position of this guide.

Analyses of the radiological consequences associated with other Fermi 2 design basis accidents do not conform to the assumptions and methodologies of this regulatory guide.

A.1.196 REGULATORY GUIDE 1.196 (May 2003) CONTROL ROOM HABITABILITY AT LIGHT-WATER NUCLEAR POWER REACTORS

Fermi 2 complies with the guidance set forth in this regulatory guide with the following exceptions:

Positions 2.1 and 2.2: The identification of the licensing bases for CRH and determination of whether CRH is consistent with the licensing bases were completed in the response to Generic Letter 2003-01, “Control Room Habitability.”

The levels of compliance to other Regulatory Guides referenced in Regulatory Guide 1.196 are discussed in applicable sections of UFSAR Appendix A.

A.1.197 REGULATORY GUIDE 1.197 (May 2003) DEMONSTRATING CONTROL ROOM ENVELOPE INTEGRITY AT NUCLEAR POWER REACTORS

Fermi 2 complies with the guidance set forth in this regulatory guide with the following exceptions:

Component Testing described in section C.1.2 and Alternate Test Methods in section C.1.3 are not performed at Fermi 2.

A.4 DIVISION 4 APPLICABLE REGULATORY GUIDES

A.4.1 REGULATORY GUIDE 4.1 (April 1975, Revision 1), PROGRAMS FOR MONITORING RADIOACTIVITY IN THE ENVIRONS OF NUCLEAR POWER PLANTS

Fermi 2's Radiological Environmental Monitoring Program complies with the regulatory guidance of Revision 1 of the NRC Radiological Assessment Branch's Position on the radiological portion of Regulatory Guide 4.8's environmental monitoring program, dated November, 1979.

A.4.2 REGULATORY GUIDE 4.2 (July 1976, Revision 2), PREPARATION OF ENVIRONMENTAL REPORTS FOR NUCLEAR POWER STATIONS

Edison filed an Environmental Report and proposed Technical Specifications - Operating License Stage in April, 1975; Supplement 4 was filed in February 1978. The format of the Environmental Report (OL) does not conform to Revision 2; however, the information contained within the report and its supplements conforms to the requirements of Regulatory Guide 4.2 as it applies to the application for an operating license.

A.4.4 REGULATORY GUIDE 4.4 (May 1974), REPORTING PROCEDURE FOR MATHEMATICAL MODELS SELECTED TO PREDICT HEATED EFFLUENT DISPERSION IN NATURAL WATER BODIES

Fermi 2 conforms to the requirements of this guide. The mathematical models used to analyze the thermal plume from the Fermi 2 discharge into Lake Erie are in accordance with the reporting format as set forth in Regulatory Guide 4.4.

For details refer to Sections 5.1 and 6.1 of the Environmental Report.

A.4.6 REGULATORY GUIDE 4.6 (May 1974), MEASUREMENTS OF RADIONUCLIDES IN THE ENVIRONMENT--STRONTIUM-89 AND STRONTIUM-90 ANALYSIS

Compliance with the intent of Regulatory Guide 4.6 is a component of the Fermi 2 Operational Environmental Radiological Monitoring Program criteria specifications.

A.4.8 REGULATORY GUIDE 4.8 (December 1975), ENVIRONMENTAL TECHNICAL SPECIFICATIONS FOR NUCLEAR POWER PLANTS

Fermi 2's Radiological Environmental Monitoring Program complies with the regulatory guidance of Revision 1 of the NRC Radiological Assessment Branch's Position on the radiological portion of Regulatory Guide 4.8's environmental monitoring program, dated November 1979.

A.4.10 REGULATORY GUIDE 4.10 (June 1976, Revision 1), IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF MATERIAL RESOURCES

The Fermi 2 ER(OL) does not conform to Regulatory Guide 4.10.

A.4.11 REGULATORY GUIDE 4.11 (August 1977, Revision 1), TERRESTRIAL ENVIRONMENTAL STUDIES FOR NUCLEAR POWER STATIONS

The Fermi 2 baseline studies and construction monitoring do not conform to Regulatory Guide 4.11, as they were in effect prior to issuance of the guide. The preoperational and operational programs conform to the intent of Regulatory Guide 4.11 as it applies to the site.

A.4.13 REGULATORY GUIDE 4.13 (July 1977, Revision 1, Issued for Comment), PERFORMANCE, TESTING, AND PROCEDURAL SPECIFICATIONS FOR THERMOLUMINESCENCE DOSIMETRY: ENVIRONMENTAL APPLICATIONS

Compliance with the intent of Regulatory Guide 4.13 is a component of the Fermi 2 Operational Environmental Radiological Monitoring Program criteria specifications.

A.4.15 REGULATORY GUIDE 4.15 (December 1977), QUALITY ASSURANCE FOR RADIOLOGICAL MONITORING PROGRAMS (NORMAL OPERATIONS)--EFFLUENT STREAMS AND THE ENVIRONMENT

Compliance with the intent of Regulatory Guide 4.15 is a component of the Fermi 2 Operational Environmental Radiological Monitoring Program criteria specifications.

A.4.16 REGULATORY GUIDE 4.16 (March 1978), MEASURING, EVALUATING, AND REPORTING RADIOACTIVITY IN RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND AIRBORNE EFFLUENTS FROM NUCLEAR FUEL PROCESSING AND FABRICATION PLANTS

Regulatory Guide 4.16 is not applicable to electric power production facilities.

A.5 DIVISION 5 APPLICABLE REGULATORY GUIDES

A.5.7 REGULATORY GUIDE 5.7 (May 1980, Revision 1), ENTRY/EXIT CONTROL FOR PROTECTED AREAS, VITAL AREAS, AND MATERIAL ACCESS AREAS

Not applicable.

A.5.12 REGULATORY GUIDE 5.12 (November 1973), GENERAL USE OF LOCKS IN THE PROTECTION AND CONTROL OF FACILITIES AND SPECIAL NUCLEAR MATERIALS

The use of locks at Fermi 2 conforms to the general intent of Regulatory Guide 5.12; however, there are some variations from the criteria contained within the guide. The use of locks at Fermi 2 is described in the Fermi 2 Physical Security Plan.

A.5.15 REGULATORY GUIDE 5.15 (January 1974), SECURITY SEALS FOR THE PROTECTION AND CONTROL OF SPECIAL NUCLEAR MATERIAL

Edison will conform to the requirements of this guide when use of locks and seals is necessary in the Fermi 2 plant.

A.5.17 REGULATORY GUIDE 5.17 (January 1974), TRUCK IDENTIFICATION MARKINGS

This guide does not apply to Edison. When special nuclear material is shipped from Fermi 2 it will be shipped in contractor vehicles to which this guide will apply.

This Regulatory Guide has been withdrawn.

A.5.20 REGULATORY GUIDE 5.20 (January 1974), TRAINING, EQUIPPING, AND QUALIFYING OF GUARDS AND WATCHMEN

Appendix B to 10 CFR 73 was promulgated subsequent to the issuance of this regulatory guide and covers the same subject. Edison will comply with 10 CFR 73, Appendix B.

A.5.29 REGULATORY GUIDE 5.29 (June 1975, Revision 1), NUCLEAR MATERIAL CONTROL SYSTEMS FOR NUCLEAR POWER PLANTS

Edison will provide the control necessary to insure that special nuclear material is properly accounted for in accordance with the applicable sections of 10 CFR 74 and not specifically ANSI N15.8.

A.5.32 REGULATORY GUIDE 5.32 (May 1975, Revision 1), COMMUNICATION WITH TRANSPORT VEHICLES

The requirements of Regulatory Guide 5.32 do not apply to Fermi 2. Regulatory Guide 5.32 references certain paragraphs of 10 CFR 73, specifically 73.1(b)(2), which exempt conformance to this guide.

A.5.43 REGULATORY GUIDE 5.43 (January 1975), PLANT SECURITY FORCE DUTIES

The Fermi 2 Physical Security Plan is not designed to conform specifically to Regulatory Guide 5.43.

The Fermi 2 Physical Security Plan, including security force duties, conforms to 10 CFR 73, Section 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Industrial Sabotage. NEI 03-12, Revision 1, was used to develop the plan.

For additional information refer to Section 13.7.

This Regulatory Guide has since been withdrawn (as of April 2020).

A.5.44 REGULATORY GUIDE 5.44 (October 1997, Revision 3), PERIMETER INTRUSION ALARM SYSTEMS

The design of the perimeter intrusion detection system at Fermi 2 conforms to the general intent of the suggestions contained in Regulatory Guide 5.44; however, there are some variations from the suggested criteria contained within the guide.

The perimeter intrusion detection system is described in the Fermi 2 Physical Security Plan and Safeguards Contingency Plan. The Physical Security Plan describes what type of sensors were installed, where they were installed, and how the system effectiveness will be evaluated.

For additional information refer to Section 13.7.

A.5.57 REGULATORY GUIDE 5.57 (June 1980, Revision 1), SHIPPING AND RECEIVING CONTROL OF STRATEGIC SPECIAL NUCLEAR MATERIAL

Edison will conform to the requirements of this guide when shipping spent nuclear fuel as required by 10 CFR 73.1(b)(5).

A.5.71 REGULATORY GUIDE 5.71 (January 2010, Revision 0), CYBER SECURITY PROGRAMS FOR NUCLEAR FACILITIES

The Fermi 2 Cyber Security Program and Cyber Security Plan are not designed to conform specifically to Regulatory Guide 5.71. The Fermi 2 Cyber Security Plan was approved by the NRC License Amendment 185. The Fermi 2 Cyber Security Program, including the Cyber Security Plan, conforms to 10 CFR 73, Section 73.54, "Protection of digital computer and communication systems and networks". NEI 08-09, Revision 6, "Cyber Security Program for Nuclear Power Reactors" was used to develop the Cyber Security Plan.

A.8 DIVISION 8 APPLICABLE REGULATORY GUIDES

A.8.1 REGULATORY GUIDE 8.1 (February 1973), RADIATION SYMBOL

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.1.1.3.

A.8.2 REGULATORY GUIDE 8.2 (February 1973), GUIDE FOR ADMINISTRATIVE PRACTICES IN RADIATION MONITORING

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Chapters 11, 12, and 13.

A.8.3 REGULATORY GUIDE 8.3 (February 1973), FILM BADGE PERFORMANCE CRITERIA

This Regulatory Guide has since been withdrawn (as of January 1998).

A.8.4 REGULATORY GUIDE 8.4 (June 2011, Revision 1), DIRECT READING AND INDIRECT READING POCKET DOSIMETERS

Edison is in conformance with the requirements of this regulatory guide.

A.8.5 REGULATORY GUIDE 8.5 (February 1973), IMMEDIATE EVACUATION SIGNAL

Fermi 2 complies with the intent of this guide. The two systems described below accomplish the objectives of the guide.

Area radiation monitors (ARMs) are provided for the entire plant and include "criticality" monitors for the fuel storage pool and new-fuel vault areas. These two monitors each have a local audible alarm and other features such as control room annunciation and recorder input, fast response time, and seal-in alarm circuitry. Subsection 12.1.4 describes the ARM system in more detail.

Beyond these dedicated ARM channels is the emergency alarm system, which provides a signal to ensure personnel evacuation. The emergency alarm system is described in Subsection 9.5.2 and is discussed in the Radiological Emergency Response Preparedness Plan.

Both the ARM and the emergency alarm systems are subject to initial and periodic tests performed as part of the preoperational test and surveillance programs.

A.8.6 REGULATORY GUIDE 8.6 (May 1973), STANDARD TEST PROCEDURE FOR GEIGER-MUELLER COUNTERS

Fermi 2 is in conformance with the requirements of this regulatory guide.

A.8.7 REGULATORY GUIDE 8.7 (May 1973), OCCUPATIONAL RADIATION EXPOSURE RECORDS SYSTEMS

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.3.4.3.

A.8.8 REGULATORY GUIDE 8.8 (June 1978, Revision 3), INFORMATION RELEVANT TO ENSURING THAT OCCUPATIONAL RADIATION EXPOSURES AT NUCLEAR POWER STATIONS WILL BE AS LOW AS IS REASONABLY ACHIEVABLE

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.3.1.

A.8.9 REGULATORY GUIDE 8.9 (September 1973), ACCEPTABLE CONCEPTS, MODELS, EQUATIONS, AND ASSUMPTIONS FOR A BIOASSAY PROGRAM

Fermi 2 is in compliance with the requirements of this regulatory guide. For details refer to Subsection 12.3.1.

A.8.10 REGULATORY GUIDE 8.10 (September 1975, Revision 1), OPERATING PHILOSOPHY FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES AS LOW AS IS REASONABLY ACHIEVABLE

Fermi 2 is in compliance with the requirements of this regulatory guide. For details refer to Subsection 12.3.1.

A.8.12 REGULATORY GUIDE 8.12 (December 1974), CRITICALITY ALARM SYSTEMS

This regulatory guide is based on a combination of 10 CFR 70, Section 70.24, "Criticality Accident requirements," ANS N16.1-1969, "Criticality Accident Alarm System," with Section 70.24 taking precedence. Fermi 2 complies with the regulatory positions as follows:

a. Criticality Monitoring on the Refuel Floor

The refuel floor is located on the fifth floor of the reactor building. Monitoring for an inadver-tent criticality event on the refuel floor is provided by two redundant detectors (D21-N115 and D21-N117). These detectors are high sensitivity gamma ray detectors (GM tubes) and are located on the east wall approximately 9 ft to 12 ft in the air. The alarm trip setting on these detectors is in the proscribed range of 5-20 mR/hr, which is adequate to detect the minimum accident of concern as described in 10 CFR 70.24 and ANSI/ANS 8.3-1986. The alarm circuitry of these detectors is arranged in a fail safe mode such that any malfunction of the detectors or a loss of power results in an alarm condition. Additionally, the detectors have a meter pegging circuit which precludes a downscale low reading (foldover) during saturation of the GM tube due to high intensity radiation fields. Periodic performance tests are conducted to confirm instrument response to radiation and the operability of the alarm signal generator. The aforementioned design meets the criterion of GDC 63, "Monitoring Fuel and Waste Storage." Moreover, Fermi 2 personnel are instructed to evacuate areas in which radiation or criticality alarms are activated. Evacuation of plant areas is periodically tested by the conduct of emergency response drills.

b. Handling and Transporting New Fuel in the Yard and Reactor Building During Transit to the Refuel Floor

A criticality safe analysis has been performed for safe storage and transport of GE BWR nuclear fuel shipping containers during new fuel receipt for Fermi 2. The analysis provides assurance that an inadvertent criticality is highly improbable during onsite storage, handling and transportation of new fuel within shipping containers. This meets the criterion of GDC 62, "Prevention of Criticality in Fuel Storage and Handling." The safety analysis is the bases for Fermi 2's exemption from the requirements of 10 CFR 70.24, as granted by the Nuclear Regulatory Commission as identified by reference numbers 9 and 10 herein. The exemption requires criticality monitoring in areas where new fuel is handled outside the inner metal shipping containers. In contrast, the exemption allows administrative controls, such as the use of geometrically safe

configurations as bound by the aforesaid safety analysis for areas in which the new fuel remains in the inner metal shipping containers.

c. Criticality Monitoring for the New Fuel Storage Vault

Due to lack of detector redundancy, Fermi 2 does not strictly comply to 10 CFR 70.24 with regard to storage of new fuel in the new fuel storage vault. Accordingly, the fuel pool is used for storage of new fuel rather than the new fuel storage vault. New fuel vault personnel entries require monitoring as governed by plant procedures. The single detector (D21-N116) in the new fuel storage vault is adequate to detect the minimum accident of concern as described in 10 CFR 70.24. This fail safe monitor is located below the 1.5 ft thick concrete floor of the concrete floor of the vault with an alarm trip setting of greater or equal to 5 mR/hr and less than or equal to 20 mR/hr. Calculations indicate this monitor is adequate for the representative critical dose data for a design basis criticality accident. Periodic tests are performed to confirm instrument response to radiation. In addition, a field test of each alarm signal generator is made periodically. During these tests, clarity of the alarm above area background noise will be ascertained.

d. Criticality Monitoring for Calibration Sources and Incore Instrumentation Not in Use

Additionally, the aforementioned NRC exemption states that the quantity of other forms of special nuclear material that is stored onsite in any given location at Fermi 2 (e.g., calibration sources and incore instrumentation that is not in use) is small enough to preclude achieving a critical mass, thus not requiring criticality monitoring.

A.8.13 REGULATORY GUIDE 8.13 (November 1975, Revision 1), INSTRUCTION CONCERNING PRENATAL RADIATION EXPOSURE

Fermi 2 is in conformance with the requirements of this regulatory guide.

A.8.14 REGULATORY GUIDE 8.14 (August 1977, Revision 1), PERSONNEL NEUTRON DOSIMETERS

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.3.4.

A.8.15 REGULATORY GUIDE 8.15 (October 1976), ACCEPTABLE PROGRAMS FOR RESPIRATORY PROTECTION

Fermi 2 is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.3.2.2.2.

A.8.26 REGULATORY GUIDE 8.26 (September 1980), APPLICATIONS OF BIOASSAY FOR FISSION AND ACTIVATION PRODUCTS

The Fermi 2 bioassay program is in conformance with the requirements of this regulatory guide. For details refer to Subsection 12.3.4.2.

REFERENCES

1. Detroit Edison Letter NRC-89-0148, “Additional Clarification to Fermi 2 Compliance to Regulatory Guide 1.97, Revision 2,” dated June 19, 1989.
2. Detroit Edison Letter NRC-89-0201, “Regulatory Guide 1.97 Revision 2 Design Review”, dated September 12, 1989.
3. NRC Letter, “Emergency Response Capability - Conformance to Regulatory Guide 1.97 Revision 2 - (TAC No. 59620),” dated May 2, 1990.
4. Detroit Edison Letter NRC-90-0095, “Compliance with Regulatory Guide 1.97, Revision 2 (TAC No. 59620),” dated June 6, 1990.
5. NRC Letter, “Inspection Report - Report No. 50-341/91014 (DRS)”, dated July 16, 1991.
6. Detroit Edison Letter NRC-91-0098, Regulatory Guide 1.97 Supplemental Information, dated July 31, 1991.
7. Detroit Edison Letter NRC-93-0105, “Fermi 2 Review of Neutron Monitoring System Against Criteria of NEDO-31558A,” dated September 28, 1993.
8. NRC Letter, “Regulatory Guide 1.97 - Boiling Water Reactor Neutron Flux Monitoring-Fermi 2 (TAC No. M59620),” dated February 17, 1994.
9. Detroit Edison Letter NRC-98-0063, "Request for Exemption from 10 CFR 70.24, Criticality Accident Requirements," dated April 27, 1998.
10. NRC Letter, "Fermi 2 - Issuance of Exemption from the Requirements of 10 CFR 70.24 (TAC No. MA1645)," dated June 2, 1998.
11. NRC Letter, “Fermi 2 - Issuance of Amendment RE: Thermal- Hydraulic Stability, Idle Recirculation Loop Startup, and Post-Accident Monitoring (TAC No. MA0721),” dated September 16, 1998.
12. Fermi 2 Technical Specifications Amendment 159, dated March 15, 2004 with NRC Safety Evaluation.