



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 105 TO FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI-2

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated October 2, 1995, the Detroit Edison Company (DECo or the licensee) requested an amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-43 for Fermi-2. The proposed amendment would defer completion of certain aspects of TS 4.3.3.2, 4.8.1.1.2.e.4.b, and 4.8.1.1.2.e.6.b surveillances until the next plant outage after September 29, 1995. Specifically, the completion of emergency diesel generator output breaker logic system functional testing for the loss of power function, to positively verify that the breaker reclosure permissive relay (52XX) is re-energized by the associated bus load shedding logic contact closing, rather than the 52XX relay being re-energized by a parallel path, would be deferred until the next plant outage after September 29, 1995. Additionally, completion of testing to verify that the 480-volt emergency loads are energized through the load sequencer and not a parallel path would be deferred until the next plant outage after September 29, 1995.

2.0 BACKGROUND

TS surveillance 4.3.3.2 requires verifying that logic system functional tests and simulated automatic operation of all channels shall be performed at least once per 18 months. Loss of power (4160-volt bus loss or degraded voltage) is one of the functions that is tested as part of this surveillance requirement. The associated surveillance test procedure involves tripping the output breaker and verifying that the associated output breakers trip, initiating a load shed followed by the reclosure of the associated output breaker. The associated bus load shedding logic contacts close to re-energize the output breaker closing coil permissive relay (52XX). Closure of the 52XX relay contacts, coincident with other breaker closure signals, results in closure of the breaker. However, the testing does not verify that the parallel control room breaker closure switch (CMC) contacts, or the 52XX relay seal-in contacts, are not responsible for the re-energizing of the 52XX relay. The surveillance procedure has the CMC switch in the required position which should result in the CMC switch contact being open and the 52XX relay dropping out; however, there is no positive verification that these contacts are not in fact closed (i.e., stuck closed).

TS surveillances 4.8.1.1.2.e.4.b and 6.b require verifying that the diesel generator starts on the auto-start signal and energizes the emergency busses with automatically connected loads through the load sequencer. The associated surveillance test procedure involves verification that the auto-connected loads are running on the 480-volt emergency busses after the diesels automatically start. However, the testing does not verify that the automatic digital load sequencer system relays are responsible for actually connecting the associated loads. There are parallel control switch contacts and/or control relay contacts that could provide for immediate connection of the loads to the 480-volt emergency bus after diesel generator starting without a closure signal from the load sequencer system. The sequence of surveillance testing procedure steps establishes conditions to open these parallel contacts, but does not verify that the contacts are actually open.

### 3.0 EVALUATION

The 4160-volt ESF (engineered safety features) busses are equipped with undervoltage relaying. This relaying will initiate a load shed sequence to remove predetermined loads from the associated busses and initiate an emergency diesel generator auto-start. Once started, the diesel generator output breaker will close. Loading of the diesels is accomplished through the load sequencer to ensure that the required loads are re-energized and the diesels are not overloaded which could otherwise occur due to the combined starting currents of the loads. The logic associated with the undervoltage relaying, the loads and logic associated with the loss-of-offsite power, and the diesel generator starting logic were all last tested during the last refueling outage that ended in December 1994.

For the testing deficiencies associated with the diesel generator output breaker logic, the licensee stated that the function of the inadequately tested contacts is not needed (function bypassed) when the CMC switch in the control room is in its normally OPEN position. Any hypothetical failure of the subject contacts could have gone undetected during the last surveillance testing only if a parallel contact in the output breaker CMC switch or the 52XX relay would energize via the failed closed parallel contact(s) and provide the required breaker closing coil permissive logic.

The 52XX relay provides anti-pumping protection for the diesel generator output breaker. Anti-pumping is a feature of an electrically operated circuit breaker to prevent repeated closing and tripping (pumping) of the breaker after a breaker closure signal is initiated and the circuit breaker closes onto a fault. The licensee stated that for Fermi 2 circuit breakers, a shunt contact is connected across the 52XX relay coil such that the shunt contact closes whenever the circuit breaker closes, thereby shorting out the relay coil causing the relay to drop out. This resets the circuit breaker circuitry in preparation for a circuit breaker reclosure attempt in the event of a loss-of-offsite power. In the event that either the 52XX seal-in contact or the CMC switch "open" contact are welded in the closed position (the situation necessary to mask the undervoltage load shed contact surveillance test

function), there is no adverse impact on the diesel output breaker since the 52XX relay coil shunt contact configuration is unaffected. Therefore, there is no safety concern associated with the failure to have properly tested the subject contacts or with approval of the proposed action.

For the inadequately tested load sequencer contacts, the licensee stated that any hypothetical failure of the subject contacts could have gone undetected during the previous surveillance testing only if a parallel contact in the associated CMC control switch or a control relay contact had failed closed and had not been detected. If this had occurred, the licensee stated that the associated load would still function as needed because the logic pathway would be completed via the failed closed parallel contact(s) and the 480-volt emergency bus loads would load onto the bus when the diesel generator output breaker closes. In addition, the previous surveillance testing verified that the diesels were able to respond adequately to the connection of all loads, so that if there were any failed closed parallel contacts that were undetected, they did not have an adverse impact on the diesel function. For any individual 480-volt emergency load, if its associated parallel contact were welded closed, that load would immediately be loaded onto the diesel when the output breaker were closed, instead of being delayed in groups by the load sequencer for periods of 5 to 10 seconds.

The licensee confirmed that in the worst case, represented by the concurrent failure of all of the incompletely tested contacts (up to 15 individual contacts on 15 separate loads per diesel generator), approximately 185 hp (horsepower) of additional load could be loaded onto the most highly loaded diesel when the output breaker closes. The licensee's engineering evaluations have confirmed that the diesels are capable of accepting this additional load coincident with other loads being sequenced onto the diesels when the output breakers close.

The licensee also confirmed that the individual loads would not be adversely affected by the associated voltage drop and recovery time associated with a worst-case simultaneous loading of the emergency 480-volt loads. The voltage dip for a short period of time will not damage the individual components, motor-operated valves, and continuous duty motors that start when the diesel output breaker closes. The resulting individual component terminal voltage and overall recovery time are acceptable. The results of the licensee's evaluations indicate that all individual loads connected to the diesels would perform their required safety functions in the required time without adverse consequences. Therefore, there is no safety concern associated with the failure to have properly tested the subject contacts or with approval of the proposed action.

Additionally, the licensee performed a site-specific and industry failure history data search for similar relays and control switches. The results indicated that the overall failure rates were very low. The licensee has additionally committed to complete the surveillances at the next plant outage, regardless of duration. The licensee has also taken compensatory measures to alert operators of the significance of the missed surveillances and the proper control switch positions.

Based on the successful operation of the diesel generators during the previous surveillance and during monthly surveillance testing, the demonstrated low safety significance with the missed surveillances, and the low failure rates associated with similar relays and control switches, the staff finds the licensee's proposed request for deferral of certain aspects of the surveillance testing for the diesel output breaker reclosure circuitry and 480-volt load sequencer until the next plant outage to be acceptable.

#### 4.0 EMERGENCY CIRCUMSTANCES

In its October 2, 1995, application the licensee requested that the amendment be treated as an emergency amendment because the Commission is currently exercising enforcement discretion with respect to the missed surveillances and failure to act would require an unnecessary plant shutdown. In accordance with 10 CFR 50.91(a)(5), the licensee provided the following information regarding why this emergency situation occurred and it could not avoid the situation.

At 5:00 p.m. EDT on September 28, 1995, all four emergency diesel generators were declared inoperable due to missed TS surveillance requirements due to incomplete control switch and relay contact position verification during surveillance testing.

DECo evaluated the situation and concluded that the potentially untested portions of the logic circuitry did not, and would not, prevent the surveillance testing from demonstrating that the emergency diesel generators are functional and would perform the safety functions if needed, and that there was no potential adverse impact on public health and safety. DECo requested and the Commission exercised enforcement discretion with respect to the missed surveillances to begin at 5:00 p.m. EDT on September 29, 1995, until an emergency TS change could be approved or as committed to by DECo, until the next plant outage during which time the surveillances would be completed. Had the Commission not exercised enforcement discretion, a reactor shutdown would have been required. To conduct the required surveillance testing, all four diesel generators would have to be removed from service sequentially to manipulate the associated output breaker closure switch. Additionally, various safety-related system components would have to be taken out of service to verify that the load sequencing control relay contacts are operating properly.

Electrical surveillance overlap drawings were created as a result of LER 94-003, "Inadequate Logic Functional Test." An independent review was performed in conjunction with the development of these overlap drawings. This review identified concerns of contact ambiguity regarding certain portions of the diesel generator output breaker and 480-volt load sequencer surveillance tests. These concerns were reviewed and found to be valid by Fermi 2 engineering personnel on September 28, 1995. The review determined that contacts in parallel with contacts to be functionally tested are not verified to be open. This could hypothetically result in a false satisfactory test of the contact function. The situation was a direct result of the review to improve surveillance testing documentation and because of the independent review requirements could not have been avoided. It is also a conservative



assumption that the hypothetical contact failures would mask otherwise apparently successful surveillance testing.

The licensee validated the contact ambiguity concerns, but because the affected surveillances were required to be completed during the previous refueling outage, the licensee declared all four diesel generators inoperable due to the missed portions of the surveillances. The licensee could not complete the surveillances in the additional 24 hours allowed by TS 4.0.3 for completion of missed surveillances. The Commission is currently exercising enforcement discretion with respect to the proposed surveillances. Lacking approval of the licensee's proposed amendment, the licensee would be required to shut down to complete the surveillances. Accordingly, the Commission has determined that there are emergency circumstances warranting prompt approval by the Commission pursuant to 10 CFR 50.91(a)(5).

#### 5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92(c) state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

- (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or
- (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) involve a significant reduction in a margin of safety.

The proposed changes do not involve a significant hazards consideration because operation of the Fermi 2 facility in accordance with the proposed changes would not:

- (1) Involve an increase in the probability or consequences of an accident previously evaluated.

There is no change in the underlying Fermi 2 accident or transient analysis. The components for which testing is being deferred are not associated with any accident initiation mechanism. Further, testing that has been completed in conjunction with engineering analysis has shown that the diesel generators will still perform their safety function. Therefore, based on the above considerations, the staff concludes that the proposed testing deferral will not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated.

The affected components are associated with components in the A.C. emergency power system. The system is normally not operating (i.e., in standby mode). Previous system testing has shown that the testing deferral of the affected components will not affect the initiation of this standby system. Further, as explained previously, if an affected component had failed during the previous surveillance in such a way that the failure would have been masked, the system would still function as needed because the function would be powered through the failed closed parallel contacts. The licensee's engineering analysis has also shown that subsequent worst-case concurrent failure of untested load sequencer contacts would not adversely affect operation of the diesel. The proposed changes also do not affect normal plant operation. Therefore, based on the above considerations, the staff concludes that the proposed testing deferral does not create the possibility of a new or different kind of accident from any accident previously evaluated.

- (3) Involve a significant reduction in a margin of safety.

The proposed changes have no impact on safety analyses assumptions. The proposed changes do not alter the ability of the emergency A.C. power system to respond and perform its function nor do the proposed changes affect any instrument setpoints or design margins. The previous surveillance testing in conjunction with engineering analysis and the low failure rate of the untested components demonstrate that the diesel generators can perform their safety function. Therefore, based on the above considerations, the staff concludes that the proposed testing deferral does not involve a significant reduction in a margin of safety.

## 6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State official was notified of the proposed issuance of the amendment. The State official had no comments.

## 7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration determination with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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