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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 86 TO FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI-2

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated January 29, 1992, the Detroit Edison Company (DECo or the licensee) requested amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-43 for Fermi-2. The proposed amendment would revise TS 4.9.6.a to specify a refueling platform fuel grapple hoist overload set point to allow the use of a General Electric Model NF-500 refueling mast. The changed set point will allow the use of either the Model NF-400 mast currently used or the Model NF-500 mast. The use of the Model NF-400 mast is a potential contingency for any problems which may be encountered with the Model NF-500 mast. Also, the fuel hoist slack cable cutoff surveillance (TS 4.9.6.d) is revised to remove a tolerance band for the slack cable cutoff set point and TS 4.9.6.e is revised to include the Model NF-500 mast.

2.0 EVALUATION

The fuel grapple hoist currently utilizes a four segment, open frame, triangular mast (General Electric Model NF-400). The Model NF-500 is a four segment, solid, cylindrical telescoping mast. The Model NF-500 mast is designed to provide improved contamination control and increased rigidity in order to improve the ability to precisely locate the hoist where desired.

The utilization of this new mast will not affect the function or operation of the fuel grapple hoist mechanism or the refueling platform. The auxiliary hoists of the refueling platform will also remain unaffected. However, the new mast does weigh approximately 400 pounds more than the NF-400 mast; consequently, the hoist overload interlock load limit (contained in TS 4.9.6.a) must be revised, since the weight of the mast was a factor in the establishment of this limit.

Three surveillance requirements are affected by the proposed change. The first, to TS 4.9.6.a, involves the hoist overload cutoff limit and adds a limit of 1395 pounds for the Model NF-500 mast, with the existing limit of 1200 pounds remaining for the Model NF-400 mast.

The hoist overload cutoff is selected to limit the lifting forces of the hoist to ensure that excessive lifting forces are not applied to a fuel bundle should the fuel bundle become stuck during lifting operations. The cutoff also protects other core and reactor vessel components from damage should these components become inadvertently engaged during lifting operations. The hoist overall limit is specified in terms of the external load applied to the hoist, which in turn is equivalent to possible lifting force applied by the hoist. When the hoist is retracted, the weight of each section is transferred from the mast section above to the hoist cable as it is lifted, until full retraction of the three lower sections into the fourth section occurs. The fourth section is always directly supported by the refueling bridge.

As each section is lifted, the new hoist cable tension reduces the capability of the hoist to lift a desired load. This is because the load sensor is set with only the lowest section held by the cable (i.e., the hoist is fully extended). Thus the overload limit must be sufficiently high to allow a desired load (e.g., a fuel bundle) and the two additional mast sections to be lifted with sufficient margin to allow for starting surges and frictional forces. The new limit for the Model NF-500 mast has been determined in this manner in order to prevent actuation of the overload cutoff during normal operation.

Technical Specification 4.9.6.e is being changed to include the Model NF-500 mast due to a similar circumstance occurring with the hoist loaded interlock. The limit is specified in terms of external load and must be low enough that a channeled fuel bundle causes the interlock to occur. However, if set too low the retraction of an empty hoist could cause a "false" loaded signal due solely to the weight of the two additional mast sections which are raised during the retraction process. The current limit of 535 pounds remains sufficiently greater than the weight of the two additional sections of the Model NF-500 mast so that the change to TS 4.9.6.e is only to delineate the load limit with either model mast.

Technical Specification 4.9.6.d requires a demonstration of the slack cable cutoff when the load is less than 50 pounds with a 10 pound tolerance. The purpose of the cutoff is to prevent unwinding of the hoist cable and the associated grapple control air hose without appropriate downward motion of the grapple. To fulfill this purpose, the cutoff must operate before the cable is completely detensioned. A lower limit is thus needed but an upper limit is not. The upper limit setting is practically limited by the need to prevent a "false" operation during normal movement of an unloaded hoist. However, the upper limit has no safety significance and does not need to be specified in TS.

Setting this limit to the currently stated tolerance is a difficult and time consuming task which involves partially unloading the hoist in a controlled manner by slowly lowering a load against a fixed surface. The increased weight of the Model NF-500 mast is expected to exacerbate this process. The proposed TS retains the 40 pound lower limit for this function. The elimination of the unnecessary tolerance band will reduce the time to perform this surveillance and the attendant wear on the hoist equipment.

The limit is given in terms of cable tension. The surveillance terminology is proposed to be modified to eliminate the use of the term "load" to avoid confusion with other surveillances where "load" refers to the external load applied to the hoist. This change is strictly administrative.

The only accident analysis that could potentially be impacted by the use of a heavier refueling mast is the Fuel Handling Accident (FHA). A FHA is postulated to occur as a consequence of a failure of the fuel bundle lifting mechanism. It is postulated that this results in the dropping of a raised fuel bundle with mast onto fuel bundles either loaded in the core or stored in spent fuel storage racks. The most severe fuel handling accident from the radiological viewpoint is the dropping of the fuel assembly onto the top of the core. The original FSAR radiological release calculations are based on the failure of 124 fuel rods. This evaluation is documented in Updated Final Safety Analysis Report (UFSAR) Section 15.7.4 and was reviewed and accepted by the NRC staff in the Fermi-2 Safety Evaluation Report (NUREG-0798), Section 15.2.3.4. The FHA is reviewed on a cycle-to-cycle basis and included in UFSAR Appendix B, Section B.15.7.4 as part of the annual UFSAR update. For the current cycle, the number of fuel rod failures calculated using the NF-400 mast is 104 rods. The calculated number of fuel rod failures for the FHA with the increased weight of the NF-500 mast is 117 rods. Therefore, the radiological release for a FHA with the Model NF-500 mast is within that reviewed and approved by the NRC staff in the original licensing of Fermi-2.

Based on the above, the staff has determined that the licensee's justification for the proposed changes is acceptable. Therefore, the staff finds that the proposed changes are acceptable.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in 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 which may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (57 FR 18173). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 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.

5.0 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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