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Docket No.: 50-341

APPLICANT: Detroit Edison Company

FACILITY: Fermi 2

SUBJECT: SUMMARY OF JULY 15, 1982 MEETING REGARDING FERMI 2 QUALITY ASSURANCE

The purpose of the meeting was to hear and discuss Detroit Edison Company's means for assurance that Fermi 2 is designed and built in accordance with safety requirements and to determine whether additional assurance is needed in light of recent design and construction deficiencies found at several plants. Enclosure i lists participants in the meeting.

Management

The applicant gave an overview of the Detroit Edison Company (DECo) organization and its management of the design and construction of Fermi 2. DECo has 10 operating fossil-fueled generating plants with 43 units. DECo designed and constructed most of these units. In recent years, however, DECo has been phasing out its engineering and construction division - relying on architect engineering and construction firms to design and build its generating units. DECo was a major contributor of manpower and money in the design, construction, operation and decommissioning of Fermi 1, a 60-MWe demonstration fast breeder nuclear plant.

DECo is the architect-engineer for Fermi 2. Sargent and Lundy was used to design several nuclear related structures and systems (e.g. seismic design of Category I piping.) The nuclear steam supply system was designed by General Electric with construction drawings produced by DECo. Top officers of DECo who authorize resources for Fermi 2 have nuclear and engineering experience from the engineering and management of conventional DECo plants and Fermi 1. In addition, many of the managers of the Fermi 2 nuclear plant construction and operation organizations within DECo have long experience from other plant operations of the company, including Fermi 1. Engineers who have worked in the design of Fermi 2 are being transferred to the Fermi 2 startup and operating organization to effectively use their knowledge of design of Fermi 2 in its operation.

Construction of Fermi 2 was managed at the site by Ralph M. Parsons Company until November 1974, when Daniel Construction Company was retained for site construction management. Construction was stopped between 1974 and 1977 because of decreased demand for power and reduced funds for construction. During this interval, the site construction management transition was made from Parsons to Daniel.

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Detroit Edison manages engineering and construction using established procedures. Interfaces between engineering and construction and between design contractors are audited periodically. In 1979, a management analysis consultant was hired to recommend improvements. The quality assurance program was established in 1969 and has been found to meet the Commission's regulations in Appendix B to 10 CFR 50.

One innovative aspect of the QA program is the provision for construction and operations personnel to express their concerns regarding safety and to hear how their concerns are resolved. Many concerns are resolved by explaining the established quality control procedures but some are resolved by correcting deficient work. In response to a staff question, applicant said that newly-hired craftsmen are instructed about special aspects of nuclear plants by means of orientation films and by personal instruction of foremen.

Senior and middle managers are strongly involved in decisions affecting their responsibilities and in the quality assurance program. The DECo board of directors discusses Fermi 2 quality assurance at its meetings. The vice president in charge of engineering and construction and the vice president in charge of nuclear operations are informed in staff meetings each month about quality assurance matters (e.g. 50.55(e) reports, inspection reports, problems at Fermi 2 and other plants.) The manager of quality assurance reports directly to the president of DECo and is responsible for correspondence with the NRC regarding the identification and correction of deficiencies. DECo management participates in the INPO Oversight Committee and in the Licensing Review Group, established to resolve generic concerns with the NRC.

Quality Assurance

The director of Fermi 2 quality assurance currently has 127 people in his organization, including 54 for finish construction and maintenance, 28 for construction, 26 for operating, 5 for procurement, and 5 for engineering. These people assure quality in design and construction through: requiring quality assurance programs for architect engineers, vendors and contractors; design audits; procedure reviews; inspections, and; concurrence of system completion and testing. As an indication of the effort involved in on-site quality assurance activities, from the start of construction through February 1982 there have been 122 audits and 4,465 inspections. Off-site quality assurance activities include 226 vendor audits, 18 architect-engineer audits, 1,485 source inspections and 22 audits of Detroit Edison project engineering. There have been 39 construction stop-work orders initiated by the DECo quality assurance organization and 45 reports of design or construction deficiencies as defined in 10 CFR 50.55(e).

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The staff questioned applicant about the assurance of quality during the early phases of design and construction. In response to this and other questions, applicant provided the following information:

- The Detroit Edison quality assurance organization was established in 1969 and it has audited contractors quality assurance programs since 1971. The principal contractors in the early phases (prior to 1974) were General Electric and Sargent and Lundy. Each of these contractors had established quality assurance programs at an early phase of design and construction and have quality assurance topical reports approved by the NRC. The contractors who do not have NRC - approved quality assurance topical reports have been audited by DECo. In design auditing teams, engineers having experience applicable to the work being audited were part of the audit team.
- When IE Bulletin 79-14, "Seismic Analyses for As-Built Safety-Related Piping System", July 2, 1979, was issued, the pipe hangars on Fermi 2 had not yet been installed. Therefore, the hangar design was revised to meet the bulletin criteria. The as-built piping hangars are reanalyzed to confirm that the installed piping hangars meet design requirements and, if necessary, modifications are made.

Engineering

The DECo engineering organization for the Fermi 2 project currently includes 225 personnel at Troy Michigan, and 192 personnel at Fermi 2 plant. In addition, the Fermi 2 project currently uses approximately 500 engineers in contractor organizations. Prior to 1974, DECo performed its own engineering. Since that time, DECo has subcontracted most of the engineering work and has established an organization to control the work of many subcontractors. Design control includes: design verification reviews and checking; vendor document and drawing reviews; design change controls, and; testing. A design change package has been established in which changes to all affected components are identified. All as-built drawings are required to be modified within 90 days of a field change.

The Fermi 2 engineering organization has conducted several design reviews and verification programs. One of the principal reviews was made by the DECo Safety Review Task Force which was formed April 10, 1979 to investigate safety, related cooling and auxiliary systems in light of the Three Mile Island 2 accident. It was composed of 21 members, including 10 system engineers, representatives from operations, design, project and licensing, and from consultants (Sol Levy Inc., GE, NUTECH, Stone and Webster, and Sargent and Lundy.) The task force met 48 times in one year to consider the potential for abnormal or accidental radiation releases due to equipment failure and operational errors and to recommend improvements in design or procedures. As a result about 100 recommendations were made to increase safety margins or operations flexibility - 47 of which

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were comparable to NRC TMI Action Plan items for design or procedure changes. Significant recommendations were: redesign the safety relief valve electrical feeds, position indication and pneumatic source; inert the primary containment; upgrade the control air system, and; purchase a simulator for training. In addition, 36 other design reviews and 5 major verification programs were completed. Independent design reviews were made for: radwaste systems; heating, ventilating and air conditioning; fire protection analysis; fuel design; torus hydrodynamic load analysis, and; primary containment analysis.

Conclusion

The staff said it appeared applicant's management had ample nuclear and engineering experience and took a keen interest in the building and operation of Fermi 2. However, there appeared to be a large potential for errors in communicating requirements and specifications because of changes in personnel and contractors since construction began in 1969 and the large number of subcontractors used in the latter stages of design. Staff requested applicant to consider the performance of an independent review or audit for a system that involves a large number of interfaces between design and construction organizations. The audit should concentrate on assurance that performance and safety requirements (e.g. in the Fermi 2 FSAR) were correctly built into the system and operating procedures. The review should cover all disciplines involved in the design and construction (such as electrical, operations, and human factors) and should not concentrate on mechanical design and code aspects (such as pipe and snubber design.) An independent review can be performed by the applicant's organization, provided the reviewing personnel are sufficiently independent of the people who were responsible for the design and construction of the selected system.

The applicant said it will consider the performance of another independent design review. The review of the core spray system which has already been initiated, may fulfill the above-stated requirements. Applicant said it would advise the staff of its plans through the NRC licensing project manager.

Subsequent to the meeting, the applicant provided a summary of its review of the core spray system design (Letter from H. Tauber to L. Kintner, dated July 26, 1982). Staff is currently considering this review and alternative reviews which will fulfill the objective of providing satisfactory assurance that design and construction is in accordance with safety requirements. Applicant will be advised of staff's decision by a separate letter.

Original Signed By:
Lester L. Kintner

L. L. Kintner, Project Manager
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Enclosures:
As stated

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Enclosure 1

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with Detroit Edison Company

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MEETING SUMMARY

Document Control (50-341)

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