Douglas R. Gipson
Senior Vice President
Nuclear Generation

Detroit Edison

Fermi 2
6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-5249

February 7, 1997
NRC-97-0006

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: The Detroit Edison Company (Fermi 2) Response to Request for Information Pursuant to 10 CFR § 50.54(f) Regarding Adequacy and Availability of Design Bases Information

This letter and the attached document entitled "Detroit Edison's Response to NRC Request for Information Pursuant to 10 CFR § 50.54(f)" (including Appendix A) (collectively, the "Response") constitute The Detroit Edison Company's reply to the NRC Letter from James M. Taylor to John E. Lobbia, dated October 9, 1996, entitled "Request for Information Pursuant to 10 CFR § 50.54(f) Regarding Adequacy and Availability of Design Bases Information" with respect to the Fermi 2 nuclear plant. The information contained in the Response is submitted to provide the NRC with added confidence and assurance that Fermi 2 is operated and maintained within its design bases as defined by 10 CFR § 50.2, and that discrepancies are identified and reconciled in a timely manner.

In support of this Response, Detroit Edison has used information derived from programs and activities conducted over a period spanning from preoperation to present, which in the aggregate provide what Detroit Edison believes is a valid assessment of the degree of conformance of Fermi 2 with the design bases of 10 CFR § 50.2. This, in turn, provides a foundation for an overall assessment of the effectiveness of processes which are relied upon to maintain design bases conformance. Based on the information derived from these programs and activities, Detroit Edison concludes that there is reasonable assurance that Fermi 2 is configured, operated and maintained within the design bases.

Nevertheless, Detroit Edison has determined to undertake or continue four initiatives to maintain and enhance the foundation for this assurance. Specifically, these initiatives involve:

110029

A074

- completion of an Updated Final Safety Analysis Report review;
- strengthening implementation of the current 10 CFR § 50.59 process;
- strengthening of existing Quality Assurance and Corrective Action programs; and,
- continuing an ongoing series of self-initiated Safety System Functional Inspections

Detroit Edison commits to these initiatives in the manner described more fully in Section 1 of the enclosed Response.

Other than the four commitments noted above, nothing in this response is to be construed as a new regulatory commitment. However, Detroit Edison will take steps necessary to achieve improvement where weaknesses are identified.

If you have questions regarding this Response, please contact Mr. Peter W. Smith, Director of Nuclear Licensing at (313) 586-4097.

Sincerely,

[signature]

Enclosure

cc: A. B. Beach
M. J. Jordan
G. A. Harris
A. J. Kugler
Director, Office of Nuclear Reactor Regulation

AFFIDAVIT OF DOUGLAS R. GIPSON

Douglas R. Gipson, being duly sworn, deposes and says as follows:

I, DOUGLAS R. GIPSON, Senior Vice President, Nuclear for The Detroit Edison Company, hereby affirm under oath that the statements in the attached Response are true and correct to the best of my knowledge and belief.

DOUGLAS R. GIPSON
Senior Vice President

Subscribed and sworn to before me the 7th of February, 1997

Notary Public
My Commission expires: ROSALIE A. ARMETTA NOTARY PUBLIC - MONROE COUNTY, MI MY COMMISSION EXPIRES 10/11/99

DETROIT EDISON RESPONSE TO NRC REQUEST FOR INFORMATION PURSUANT TO 10 CFR § 50.54(f)

TABLE OF CONTENTS

SECTION

1. Executive Summary
2. Background
3. Description of Engineering, Design, & Configuration Processes
4. Translation of Design Bases Requirements into Procedures
5. Conformance of SSC Configuration & Performance with Design Basis
6. Processes for Identification of Problems and Implementation of Corrective Actions
7. Overall Effectiveness of Processes and Programs in Concluding that Configuration of the Plant is Consistent with Design Bases
8. Fermi 2 Design Review and Reconstitution Programs

1.0 EXECUTIVE SUMMARY

This report, entitled "Detroit Edison's Response to NRC Request for Information Pursuant to 10 CFR § 50.54(f)" (including Appendix A) and covering letter dated February 7, 1997, constitute The Detroit Edison Company's Response (collectively, the "Response") to the NRC Letter from James M. Taylor to John E. Lobbia, dated October 9, 1996, "Request for Information Pursuant to 10 CFR § 50.54(f) Regarding Adequacy and Availability of Design Bases Information" with respect to the Fermi 2 nuclear plant. The information contained in these documents is intended to provide the NRC added confidence and assurance that Fermi 2 is operated and maintained within the plant's design bases and that discrepancies are identified and reconciled in a timely manner.

In support of this response, Detroit Edison used information derived from programs and activities conducted over a period spanning from preoperation to present, which in the aggregate provide what Detroit Edison believes is a valid assessment of the degree of conformance of Fermi 2 with the design bases of 10 CFR § 50.2. This, in turn, provides a foundation for an overall assessment of the effectiveness of processes that are relied upon to maintain conformance with the design bases. Reconciliation of identified discrepancies is implicit in the conduct of these programs and activities. Based on the information derived from these programs and activities, Detroit Edison concludes that there is reasonable assurance that Fermi 2 is configured, operated and maintained within the design bases. The October 9, 1996 NRC letter includes, as footnotes, abbreviated definitions of the terms *design bases* and *licensing bases*. In this Response, the term *design bases* means that subset of the licensing bases for the Fermi 2 plant that meets the 10 CFR § 50.2 definition.

The October 9, 1996 NRC letter requested the following specific information:

(a) Description of engineering design and configuration control processes, including those that implement 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR 50;

(b) Rationale for concluding that design bases requirements are translated into operating, maintenance, and testing procedures;

(c) Rationale for concluding that system, structure, and component configuration and performance are consistent with the design bases;

(d) Processes for identification of problems and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC, and;

(e) The overall effectiveness of current processes and programs in concluding that the configuration of the plant is consistent with the design bases.

The letter further requested that the responses to items (a) through (e) indicate whether any design review or reconstitution programs have been undertaken, and provide the rationale for not

implementing such a program, a description of the completed review programs, or a description and status of ongoing programs.

Summary information is provided below for each of the items requested in the NRC October 9, 1996 letter. More detailed discussions are provided in the indicated sections of this report. In addition to the requested information, Detroit Edison has determined to undertake or continue four programs to maintain and enhance future conformance with the design bases.

Description of Engineering Design and Configuration Control Processes (Section 3)

The degree of conformance with the design bases that exists today is the result of the implementation of processes to control changes to the facility and operating, maintenance, and testing procedures. The current degree of conformance with the design bases reflects both the initial degree of conformance when the plant was licensed and the cumulative effectiveness of the processes and their implementation throughout the operating history of the plant. The October 9, 1996 NRC letter requested, as part of this response, a description of the engineering design and configuration control processes.

Detroit Edison was the Architect-Engineer for Fermi 2. As such, Detroit Edison developed design configuration management processes starting from the time the decision was made to construct Fermi 2. The current design configuration management process is controlled by procedures that are based on the requirements of 10 CFR § 50, Appendix B. Since the issuance of the Operating License, the processes to maintain conformance with the design bases have relied on the process to evaluate changes in accordance with 10 CFR § 50.59. There are limited exceptions, in that some changes may be made without direct reliance on the 10 CFR § 50.59 process in specific procedurally controlled circumstances. However, development and changes to the procedures that control these exceptions are themselves subject to 10 CFR § 50.59 review.

The current Fermi 2 10 CFR § 50.59 evaluation process is consistent with NSAC-125, "Guidelines for 10 CFR 50.59 Safety Evaluations," dated June 1989, and is a two step process. The Preliminary Evaluation (PE) first screens proposed changes to determine if they constitute a change subject to 10 CFR § 50.59 requirements for the second step, a formal Safety Evaluation (SE). Personnel are qualified by formal training to perform Preliminary Evaluations and Safety Evaluations. Preliminary Evaluations are approved by a second qualified individual. Safety Evaluations are prepared, reviewed, and approved by separate qualified individuals, reviewed by the Onsite Review Organization (OSRO), and receive an oversight review by the offsite Nuclear Safety Review Group (NSRG). Safety Evaluations may be subject to review by the Independent Safety Engineering Group (ISEG) and the process is subject to audit by the Quality Assurance organization. The Preliminary Evaluation is the primary mechanism to identify changes to the Updated Final Safety Analysis Report (UFSAR) to be included in the UFSAR updates required by 10 CFR § 50.71(e). Changes to the UFSAR are also identified by other mechanisms, but regardless of the mechanism, are subject to the 10 CFR § 50.59 process.

Rationale for Concluding Reasonable Assurance of Conformance with the Design Bases and Assessment of the Effectiveness of Processes that Maintain Conformance with the Design Bases (Sections 4, 5 and 7)

Detroit Edison has concluded that there is reasonable assurance that Fermi 2 is operated and maintained within the design bases. This conclusion is based on information derived from programs and activities conducted over a period spanning from preoperation to present, which in various ways have contributed to an assessment of the degree of conformance with the design bases. The programs and activities include reviews conducted as part of design activities, independent oversight activities conducted by internal organizations or third parties, and audits, reviews, and inspection activities carried out by external organizations, including the NRC. These programs and activities support this response where they reviewed, compared, and reconciled as necessary, details of the as-built plant configuration, plant procedures and processes, design bases, licensing bases, and information in plant documents. In the aggregate, these activities provide an assessment of the degree of conformance with the design bases.

Certain of the programs and activities are of particular relevance to this response because of both timing and scope. Over the last year, Detroit Edison performed an internal Service Water System Operational Performance Inspection (SWSOPI) (covering five service water systems) and a review of the UFSAR text. Additionally, Fermi 2 received NRC Safety System Functional Inspections (SSFIs) of two safety related systems.

The SWSOPI and SSFIs represent vertical slice activities focused on determining whether a system is capable of performing its safety related design bases functions. These types of examinations typically involve review of design documents, operations, maintenance and testing procedures, the safety analysis report, technical specifications, modification packages, licensing correspondence, safety evaluations, maintenance records, related personnel training, and installed equipment configurations. In 1996, seven Fermi 2 systems were subjected to this type of activity, including the non-safety related General Service Water System, which is a significant contributor to overall plant safety. The systems covered by these examinations cumulatively can be associated with approximately 60% of the overall plant risk based on insights gained from the Fermi 2 Probabalistic Safety Assessment model. Although a number of discrepancies were identified during the conduct of these activities, none of these discrepancies were judged as having more than a minor safety significance.

Since the processes used to control conformance with the design bases are applicable independent of the plant system, similar results and conclusions would be expected from performance of these types of vertical slice examinations on any other system. Thus, discrepancies may be identified; however, it is expected that any system subjected to such an inspection would be determined to be capable of performing its design bases function and in conformance with the design bases. Additional confidence in this expectation would be provided by a horizontal slice review that crosses system boundaries; such a review was provided by the UFSAR Overview.

In 1996, Detroit Edison conducted a review of the UFSAR. The UFSAR Overview represents a horizontal slice activity that crossed system boundaries. The UFSAR Overview consisted of a

systematic review of UFSAR text by subject matter experts such as system and design engineers. While the UFSAR Overview was not a complete verification or validation, the subject matter experts were expected to identify any significant discrepancies between the UFSAR and plant configuration and operation. It was recognized that this type of review would not identify all discrepancies. A Quality Assurance surveillance assessed the effectiveness of the UFSAR Overview and provided confidence that significant discrepancies have likely been identified. The UFSAR Overview identified discrepancies, which were documented using the Fermi 2 corrective action process for evaluation and resolution. None of the identified discrepancies were judged as having more than a minor safety significance. It should be noted that the design bases constitute a subset of information contained in the UFSAR and therefore the discrepancies with the UFSAR and other documents identified by these activities do not necessarily represent non-conformance with the design bases.

The results of the horizontal slice across system boundaries provided by the UFSAR Overview supports Detroit Edison's expectation that SSFI style vertical slice examinations of additional systems would yield results similar to the seven vertical slices conducted in the last year. Detroit Edison concludes that there is reasonable assurance that Fermi 2 is configured, operated, and maintained consistent with the design bases.

Description of Corrective Action Process (Section 6)

The Fermi 2 Deviation Event Report (DER) process provides the primary mechanism for problem identification, evaluation and corrective action. Personnel are encouraged to document problems via a DER. DERs are initially screened for potential reportability and operability impacts, and appropriate immediate actions are taken. The process includes provisions for formal operability determinations using guidance provided by NRC Generic Letter 91-18. Reportability determinations for 10 CFR § 50.72 and 50.73 incorporate guidance provided by NUREG -1022. Plant management reviews DERs the next working day and assigns a responsible organization for evaluation, determines the significance level, and assigns the schedule for completion of the initial investigation. The significance levels are used to determine the degree of cause evaluation required and organizational accountability for corrective actions. A more detailed description of the corrective action process is provided in Section 6.

Design Bases Reconstitution (Section 8)

In 1989, Detroit Edison committed to the completion of a self-initiated Design Bases Document (DBD) program. The scope of the program included the Fermi 2 safety related systems, two non-safety related systems subject to enhanced quality requirements (Fire Protection/Detection and Combustion Turbine Generator 11), and three topical DBDs (Motor Operated Valves, Design Basis Event Combination, and Equipment Seismic Qualification). The Design Basis Event Combination and Equipment Seismic Qualification topical DBDs identify plant level design attributes.

The DBD program generally conforms to the NUMARC 90-12, Design Basis Program Guidelines, with only minor exceptions, even though the program was initiated prior to issuance of NUMARC 90-12. All DBDs were prepared under applicable quality assurance programs in accordance with Fermi 2 DBD program procedures or instructions. DBD development included retrieval and review of potential source documents, design calculation assessments, preparation and review, validation, and open item resolution. DBDs are controlled documents readily accessible to site personnel.

The DBD program collated difficult to locate safety related design bases information in a standard format. The DBD validations identified and corrected additional discrepancies between the DBDs, as-built documents, procedures, UFSAR, and Operating License. Over 500 open items were identified and resolved, and the remaining items are being tracked to completion. The DBD program improved the degree of conformance with the design bases and accessibility of design bases information. The DBDs are considered to be living documents, and as such, are reviewed for impact during the design modification process.

Summary and Planned Actions

Detroit Edison concludes that there is reasonable assurance that Fermi 2 is operated and maintained within the design bases. This conclusion is based on information derived from programs and activities conducted over the period spanning from preoperation to present, which have provided an assessment of the degree of conformance with the design bases. The self-initiated SWSOPI, NRC SSFIs, and Detroit Edison UFSAR Overview conducted in 1996 together provide the most relevant information supporting this conclusion. None of the discrepancies identified during the conduct of these reviews were considered to have more than a minor safety significance. Nonetheless, the existence of these discrepancies indicates potential weaknesses in the implementation of processes intended to maintain conformance with the design bases. Additionally, both the NRC and Detroit Edison have identified weaknesses in the implementation of the corrective action process and quality assurance oversight of activities. Detroit Edison acknowledges these observations, but notes that overall, the Quality Assurance and Corrective Action programs have been generally effective in identifying and resolving the majority of problems.

As a result of these observations, Detroit Edison has determined to undertake or continue four initiatives to maintain and enhance conformance with the design bases. Specifically these initiatives involve:

- Completion of an UFSAR validation;
- Strengthening the implementation of the current 10 CFR § 50.59 review process;
- Strengthening the existing Quality Assurance and Corrective Action programs; and,
- Continuing an ongoing series of self-initiated Safety System Functional Inspections.

These four initiatives were selected because together they are expected to enhance and maintain a high degree of conformance with the design bases. The UFSAR validation will rebaseline the UFSAR, establishing a higher degree of conformance with the design bases. Improvements in the implementation of the 10 CFR § 50.59 review process will enhance continuing maintenance of conformance with the design bases. Improvements in Quality Assurance and Corrective Action programs will permit better monitoring and maintenance of the effectiveness of processes that control conformance with the design bases. The performance of self-initiated Safety System Functional Inspections periodically will provide an additional perspective to assess the continuing effectiveness of processes that control conformance with the design bases. Further details of the scope of these activities are provided below.

UFSAR Validation

As a result of the FSAR conformance problems at another utility described by NRC Notice 96-17, Detroit Edison conducted the UFSAR Overview, an assessment of the Fermi 2 UFSAR, to determine whether similar problems existed at Fermi 2. The nature of this review was an overview of UFSAR sections based on the knowledge of the reviewer, as opposed to an in-depth validation of each statement in the UFSAR. Approximately 180 UFSAR problems were documented in DERs from this effort and in other DERs initiated during 1995 and 1996. None of the individual discrepancies were judged as having more than a minor safety significance.

However, because of the overview nature of this effort, and the number of problems identified, it must be assumed that other minor discrepancies remain unidentified. The recent NRC SSFI did identify additional discrepancies. Even though it is also reasonable to conclude that the nature and significance of any undiscovered discrepancies would mirror the characteristics of the identified population, Detroit Edison has determined that additional effort should be applied to improve the accuracy of the UFSAR.

In order to improve UFSAR accuracy, a further review is being planned. This review will involve comparison of the original FSAR and the NRC SER along with its supplements, with the current UFSAR and plant procedures and design documents. This comparison will result in a rebaselining of the UFSAR to provide further assurance that it is reflective of the plant and procedures, and

that changes made since issuance of the Operating License have been appropriately documented. Detroit Edison expects to derive additional benefit beyond the direct improvement in UFSAR accuracy anticipated from this effort. This is expected to include organizational performance enhancements resulting from improved institutional knowledge of the UFSAR and greater site sensitivity in the evaluation of future changes. The validation is expected to be completed by February 7, 1999. Discrepancies identified during the validation will be resolved as provided by the Fermi 2 corrective action process, and necessary updates to the UFSAR will be scheduled in accordance with the requirements of 10 CFR § 50.71(e).

10 CFR § 50.59 Review Process

Since issuance of the Operating License, processes to maintain conformance with the design bases have relied on the process to evaluate changes in accordance with 10 CFR § 50.59. The UFSAR Overview identified UFSAR discrepancies attributed to insufficient review of changes to the facility or procedures at the Preliminary Evaluation stage. While the identified discrepancies were not considered as having more than a minor safety significance, the initial screening is an important stage in the process used to evaluate potential changes under 10 CFR § 50.59. This stage of the 10 CFR § 50.59 review process determines whether a proposed activity constitutes a change to the facility or procedures described in the UFSAR, requiring the more detailed Safety Evaluation and proper updates of the information contained within the UFSAR. Failures at this stage of the 10 CFR § 50.59 process have the potential to allow changes to proceed that may adversely affect conformance with the design bases.

Detroit Edison has improved the accessibility of licensing bases information by creating electronically searchable files containing text and tabular information from a number of relevant documents, such as the UFSAR, plant Technical Specifications, and NRC Safety Evaluation Reports. Access to these files is available site-wide. Controlled hard copies of the UFSAR and plant Technical Specifications are available at many site locations. As familiarity with these files and the search techniques improves, the efffectiveness of the Preliminary Evaluations and the quality of Safety Evaluations are expected to improve. Insights from OSRO and NSRG oversight reviews of Preliminary Evaluations and Safety Evaluations have been fed back to personnel who perform, review, and approve evaluations.

In addition, further improvements regarding the implementation of Detroit Edison's 10 CFR § 50.59 program are under consideration. These improvements will focus on increasing the expertise of personnel who perform Preliminary Evaluations and Safety Evaluations.

Quality Assurance And Corrective Action

Quality Assurance activities and an effective Corrective Action program are considered to play important roles in maintaining ongoing conformance with the design bases. These activities provide opportunities to detect and correct deviations that occur, and are an important source of feedback on the effectiveness of processes relied upon to maintain conformance with the design bases.

The overall effectiveness of Quality Assurance activities and the Corrective Action program at Fermi 2 has not kept pace with comparable activities at top performing plants. Past attempts to address this area have not fully resolved these concerns. This was recently noted during an extensive NRC Operational Safety Inspection (Inspection Report 96-201). This inspection acknowledged that the DER process is comprehensive and gaining acceptance across the organization. However, the inspection concluded that problems exist due to failures of corrective actions to prevent problem recurrence. The report attributed this to a number of factors, including initial problem characterization, probable or root cause determination, and not effectively focusing management attention on long-standing or recurrent problems. Similarly, Quality Assurance activities were faulted for overlooking performance trends and inadequately refocusing Quality Assurance efforts into areas of weakness identified by DER findings and third party evaluations.

Pursuant to Fermi 2 management direction, a team has been established to address the effectiveness of the corrective action program. The team has wide representation from site organizations and includes a wide cross-section of the work force. The team has a mandate to develop a process that will have broad acceptance and address these past concerns.

Another observation from the recent NRC Operational Safety Inspection (Inspection Report 96-201) is an apparent disconnect between DER trend data and QA audit and surveillance results. In addition to the corrective action process improvements discussed above, both the QA and corrective action functions will become part of the same organizational unit, reporting to the QA Director. This organization provides three functional areas within QA: audit and surveillance, quality control, and assessment and support. The assessment and support group will administer the corrective action program, fostering a more focused and intrusive approach to the performance of other QA functions. This is also expected to result in application of QA resources based more consistently on trend data.

Self-Initiated Safety System Functional Inspection

Beginning in 1987, Fermi 2 conducted a program of self-initiated Safety System Functional Inspections (SSFIs) in order to assess the operational readiness of selected plant safety systems. The program was initiated based upon the recognized dependence of safety system readiness on the quality of maintenance, engineering design, equipment testing, and operating experience associated with system components. Industry experience at that time indicated the importance of attention to detail in these areas by licensees.

The self-initiated SSFI program was effective beyond the primary objective of assessing the operational performance capability of selected safety systems. These inspections also identified opportunities for enhancements aimed at improving overall operational readiness in response to the identified weaknesses.

In addition, the recent NRC inspection (Inspection Report 96-201) consisting, in part, of SSFI of the High Pressure Coolant Injection (HPCI) and Non-Interruptible Control Air System (NIAS) systems, concluded that the HPCI and NIAS systems are capable of performing their intended

safety functions. However, NRC review of the UFSAR and DBDs identified discrepancies of the same nature and significance as the Fermi 2 UFSAR Overview and other internal reviews.

Based on the results of these past efforts, Detroit Edison recognizes that SSFIs provide another means of assessing the effectiveness of processes that control conformance with the design bases. In addition, Detroit Edison recognizes that additional benefit would be derived from future evaluations of this type, including organizational performance enhancements expected to result from greater site sensitivity to the importance of integrating design information with operation and maintenance activities to achieve optimal system readiness.

Because safety systems are not normally challenged to the limits of their design bases, SSFIs provide a heightened measure of confidence in system functionality and reliability. Accordingly, Detroit Edison plans on continuing the periodic performance of SSFI type activities consistent with resource allocation, and prioritization, in conjunction with the planning of other Fermi 2 major projects.

2.0 BACKGROUND

This section provides background information that is common to one or more of the subsequent sections. Section 2.1 reiterates the meaning of *design bases and licensing bases* as used in the context of this response. Section 2.2 provides an historical perspective related to Fermi 2 activities and programs that provide the foundation for conclusions presented in this response.

2.1 Design Bases and Licensing Bases

The October 9, 1996 NRC letter requesting this response includes, as footnotes, the following abbreviated definitions of the terms *design bases* based on 10 CFR § 50.2, and *licensing bases*:

> "Design bases mean that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design . . ." The design bases of a facility, as so defined, is a subset of the licensing bases and is contained in the FSAR.
>
> The licensing bases for a plant originally consists of that set of information upon which the Commission, in issuing an initial Operating License, based its comprehensive determination that the design, construction, and proposed operation of the facility satisfied the Commission's requirements and provided reasonable assurance of adequate protection to public health and safety and common defense and security. The licensing bases evolves and is modified throughout a plant's licensing term as a result of the Commission's continuing regulatory activities, as well as the activities of the licensee.

In the context of this response, the term *design bases* is used to describe the subset of the licensing bases for the Fermi 2 plant that meets the above definition, consistent with 10 CFR § 50.2.

2.2 Historical Perspective - Fermi 2

The Fermi 2 plant was initially licensed based on the license application as documented primarily in the Final Safety Analysis Report (FSAR) and its references. The Nuclear Regulatory Commission's basis for granting the Operating License in 1985 is documented principally in the NUREG-0798 Safety Evaluation Report and its six supplements. The information contained in the operating license application is a combination of licensing bases (information needed by the NRC to support the issuance of the license), and descriptive information. The FSAR was converted to the Updated FSAR (UFSAR) using the format and content guidance of Regulatory Guide 1.70, Revision 1, in preparation for periodic updates in accordance with 10 CFR § 50.71(e). Since issuance of the Operating License, changes to the facility have been made as provided by 10 CFR § 50.59.

During the operating history of the Fermi 2 plant, there have been many activities where details of the as-built plant configuration; plant procedures and processes; structure, system, and component

(SSC) design bases; SSC licensing bases; and information in plant documents have been reviewed, compared, verified, reconciled, and where necessary, corrected, in the context of a specific activity. The following types of activities have the greatest potential for providing information that can be used as the basis for an assessment of the degree of conformance with design bases:

- development or review of as-built information
- development or review of design documentation
- development of changes to, or review of the UFSAR
- development or review of plant procedures
- development of changes to, or review of the Operating License or Technical Specifications (TS)
- comparison of design documentation / as-built documentation
- comparison of design documentation / UFSAR
- comparison of design documentation / procedures
- comparison of design documentation / Operating License and TS
- comparison of UFSAR / procedures

Table 2-1 provides a summary of 27 Fermi 2 programs and activities. These 27 programs and activities were selected for inclusion in Table 2-1 because they provided an opportunity to develop or review information related to the above listed attributes. The attributes indicated in Table 2-1 as being associated with a program or activity did not have to be part of its chartered scope to be so indicated in Table 2-1. The program or activity only had to provide an opportunity to develop or review information related to the attribute. Each Table 2-1 entry is cross-referenced to an Appendix A section where additional information regarding the activity can be found. These Table 2-1 programs and activities provide a basis for Fermi 2 to assess the extent to which the design bases have been translated into operating, maintenance, and testing procedures; the extent to which the plant SSCs conform to the design bases; the effectiveness of the corrective action program; and the effectiveness of plant processes that manage changes to the plant and its documentation. Reconciliation of identified discrepancies is implicit in the conduct of these programs and activities.

Table 2-1 includes both "vertical" and "horizontal" slice activities. Safety System Functional Inspections (SSFIs) represent a vertical slice where design, configuration control, and licensing processes are reviewed for a specific system or topic. Accordingly, the table entries for the SSFI reflect both a wide spectrum of opportunities for single-attribute verification (e.g., as-built data) as well as significant structured comparisons of attributes (e.g., design bases vs. as-built, UFSAR vs. Operating License, etc.). The UFSAR Overview in response to Information Notice 96-17 is an example of a horizontal slice activity where many systems, structures, and components are reviewed relative to a single or single group of related processes such as UFSAR preparation and revision.

Due to the scope and emphasis of SSFIs and UFSAR reviews, the combination of these specific activities collectively have a significant potential to provide an assessment of the degree of conformance with the design bases and adequacy and implementation of the existing processes, to

identify discrepancies, and to validate plant information. This potential supports the conclusion that a combination of vertical and horizontal slice activities (SSFIs and UFSAR review), in conjunction with properly defined processes and effective corrective actions, can provide reasonable assurance that the plant and its operation remain consistent with the design bases. The pertinent attributes and findings from these programs and activities are discussed as they apply to the response in Sections 3 through 7.

Activity Types and Oversight Categories

Some of these activities were specifically undertaken to document or validate some aspect of the as-built plant configuration or design bases; for example, the Fermi 2 Design Basis Document (DBD) program and self-initiated Safety System Functional Inspections (SSFIs). Other activities were not undertaken for the specific purpose of independently reviewing design information, but during their implementation, some verification of design and verification of associated documentation was performed. For example, the implementation of the Station Blackout Rule involved the review of much of the onsite ac and dc electrical power distribution systems and their design bases. The activity type codes and associated table entries delineate the type of information development and reviews that were performed.

Certain activities or programs represent oversight activities that were performed for the purpose of independently assessing specific existing information and documentation, differentiating them from in-process activities or programs. Audits and surveillances performed by the Fermi 2 Quality Assurance organization, various studies undertaken by the Fermi 2 Independent Safety Engineering Group (ISEG), Safety System Functional Inspections (SSFIs) performed by Fermi 2 and the NRC, and other NRC inspections are examples of oversight activities that have provided insight on the conformance of design bases documentation, as-built configuration, and plant processes. For oversight activities, Table 2-1 identifies whether the activity was internal, involved a third-party (e.g., contract assistance), or was conducted by an external agency, such as NRC.

Table 2-1
Attributes of Selected Fermi 2 Programs and Activities

Activity Type Codes
AB - As Built
DD - Design Documentation
UF - UFSAR
PR - Plant Procedures
TS - Tech Spec & Op License
x/y - comparison activity

Oversight Codes
IP - In-process activity
I - Internal Fermi 2 oversight (QA, ISEG)
3rd - Third Party Directed by Fermi 2
EX - External

Section	Program	Duration	Activity Type										Oversight			
			Single					Comparisons								
			AB	DD	UF	PR	TS	DD/ AB	DD/ UF	DD/ PR	DD/ TS	UF/ PR	IP	I	3rd	EX
A.1	Self-Initiated SSFI Program	1987-1990	•	•	•	•	•	•	•	•	•	•		•	•	
A.2	Electrical Design Calculation Improvement Program	1990 - 1991	•	•				•					•			
A.3	NRC Electrical Distribution System Functional Inspection (EDSFI)	1991	•	•	•	•	•	•	•	•	•	•				•
A.4	Self Assessment - Service Water System Operational Performance Inspection (SWSOPI)	1996	•	•	•	•	•	•	•	•	•	•		•	•	•
A.5	NRC SSFIs (HPCI & NIAS)	1996	•	•	•	•	•	•	•	•	•	•				•
A.6	UFSAR Overview (IN 96-17)	1996 - present			•				•			•		•		
A.7	Design Basis Document (DBD) Program	1989 - present		•				•	•	•	•		•	•		
A.8	Calculation Assessment Program	1993 - 1995	•	•				•						•		
A.9	ISEG Studies	Ongoing	•	•	•	•	•	•	•	•	•	•		•		
A.10	Biennial Design Control Audit	Ongoing	•	•	•	•	•	•	•	•	•		•	•		
A.11	Backlog Elimination Project	1995-1996	•	•	•			•	•				•	•		
A.12	Fuse Control Program	1984 - present	•	•				•					•	•		
A.13	IPE/IPEEE	1988 - present	•	•		•	•	•		•	•		•	•		

Section	Program	Duration	Activity Type										Oversight			
			Single					Comparisons								
			AB	DD	UF	PR	TS	DD/ AB	DD/ UF	DD/ PR	DD/ TS	UF/ PR	IP	I	3rd	EX
A.14	MOV Program	1988 - present	•	•	•	•	•	•	•	•	•	•	•	•		•
A.15	ISI/IST and ISI/NDE Programs	Ongoing	•	•	•	•	•	•	•		•		•	•	•	
A.16	Maintenance Rule Implementation	1994 - present	•	•	•	•	•						•	•		
A.17	Station Blackout (SBO) Rule Implementation	1989-1996	•	•	•	•	•			•	•		•	•		•
A.18	System Engineering Walkdowns	1995 - present	•	•	•	•	•	•	•				•	•		
A.19	Electrical / I&C As-Built Program	1984 - 1987	•					•					•	•		
A.20	Improved Technical Specification (ITS) Conversion Program	1995 - present		•			•				•		•	•		
A.21	Procedures Generation Package (PGPs)	1986 - 1988	•	•		•	•			•			•	•		•
A.22	Employee Concerns Program	1988 - present	•	•	•	•	•							•		
A.23	Performance/Scheduling Tracking (PST) Program	1987 - present	•	•	•	•							•	•		
A.24	Preventive Maintenance Program	Ongoing	•			•								•		
A.25	Plant Labeling Program	1995 - present	•	•		•		•		•			•			
A.26	Q-List Improvement Program	1986 - present	•	•				•					•	•		
A.27	Surveillance Testing Overlap Review	1994 - 1996		•		•	•			•	•		•	•		

3.0 DESCRIPTION OF ENGINEERING, DESIGN, & CONFIGURATION PROCESSES

The October 9, 1996 NRC letter requested that the response include a description of engineering design and configuration control processes, including those that implement 10 CFR § 50.59, 10 CFR § 50.71(e), and Appendix B to 10 CFR § 50. (Item a)

Response

Subsection 3.1 provides a description of the current engineering design and configuration control processes. The response integrates the various elements and processes used at Fermi 2 related to these topics into a single description. The processes to maintain conformance with the design bases primarily rely on the process for evaluation of changes in accordance with 10 CFR § 50.59. Subsections 3.2, 3.3, and 3.4 describe the current Fermi 2 processes that implement 10 CFR § 50.59, 10 CFR § 50.71(e), and Appendix B to 10 CFR § 50 respectively.

3.1 Fermi 2 Engineering, Design, and Configuration Control Processes

Detroit Edison was the Architect-Engineer for Fermi 2. The design configuration management process was developed by Detroit Edison starting from the time the decision was made to construct Fermi 2. The process continues to be enhanced to reflect its use to support plant operations and the lessons learned from NRC and industry sources.

The current design configuration management process is controlled by procedures contained in the Fermi 2 Conduct Manuals. The Conduct Manuals contain procedures and policies that are applicable across the Nuclear Generation organization. These procedures, described below, require that personnel using or implementing engineering documents be responsible for their integrity.

Fermi 2 Conduct Manuals define the implementation of the requirements of 10 CFR § 50 Appendix B, 10 CFR § 50.59, Regulatory Guide 1.33, Revision 2, ANSI N18.7-1976, and other applicable Regulatory Guides, Standards and Federal Regulations at Fermi 2. Safety related items and activities are designated QA Level 1, the most stringent level of quality assurance. QA Level 1M applies to items that may not have been designed, purchased, fabricated, constructed, or qualified as QA Level 1, but are otherwise important to safety, and are maintained and operated to QA Level 1 requirements, commensurate with their importance to safety. QA Level 1 items and associated activities must satisfy the requirements delineated in the Fermi 2 Conduct Manuals. Design related activities and modifications to Fermi 2 structures, systems, and components designated as QA Level 1 and 1M are conducted to maintain plant design configuration control and to satisfy the applicable Quality Assurance requirements for design activities specified in American National Standard Quality Assurance requirements for the Design of Nuclear Power Plants, N45.2.11-1974, as modified by Regulatory Guide 1.64.

Fermi 2 procedures also impose controls on design related activities and modifications for non-Q (non-10 CFR § 50, Appendix B) structures, systems, and components in order to maintain configuration control.

Processes have been established and actions specified in order that the design configuration and bases of the facility are understood and documented. Specifically, these processes require that:

- Applicable regulatory requirements, codes, standards, and design bases are correctly translated into design documents for plant modifications;
- Design requirements and specifications are correctly incorporated into procurement documents;
- Adequate documentation is provided as objective evidence of the quality of plant structures, systems, and components, and of compliance with regulatory requirements; and,
- Inservice inspection, inservice testing and reactor vessel material surveillance programs are planned, scheduled and implemented in accordance with the applicable requirements.

The design of the plant is described in the UFSAR, the Technical Requirements Manual, and specific Base Configuration Design Documents. Base Configuration Design Documents (BCDDs) are:

- Design Basis Documents (DBDs)
- Design Specifications (including Project Specifications, ASME Design Specifications, and Heavy Load Rigging Specifications)
- Design Calculations (including Stress Reports, Electrical Load Monitoring System [ELMS] and Low Voltage Electrical Load Monitoring System [LVELMS] Databases)
- Base Configuration Drawings (BCDs), such as Civil/Structural Drawings, Mechanical Piping and Instrument Diagrams, Electrical Schematic Diagrams, and Instrumentation and Control Drawings
- Hanger Sketches
- Vendor Design Documents
- Purchase Specifications
- Approved Vendor Manuals

- Computer System Configuration Control Documents (CSCCDs)
- Central Component (CECO) Database (for CECO Lead Fields only)
- Environmental Qualification Central Files
- Environmental Qualification Maintenance and Surveillance Requirements

Design configuration management is primarily implemented by the organization of the Manager - Technical, with limited implementation by other support organizations. Maintaining design configuration control of Fermi 2 systems, structures and components (SSCs) is required in accordance with approved procedures to the extent necessary to implement the following specific requirements:

- Fermi 2 SSCs are maintained in the configuration specified in approved design documents.
- Design documents contain the applicable regulatory requirements, quality standards, and design bases in accordance with NRC licensing requirements.
- Design control activities satisfy the applicable QA requirements for design activities specified in ANSI N45.2.11-1974 as modified by Regulatory Guide 1.64. Any organization performing design work on safety SSCs must perform the design activities under equivalent requirements.
- Changes to BCDDs to reflect the as-built condition of the plant and changes to issued modification packages are accomplished under the same requirements and receive reviews and approvals comparable to the original document.
- Individuals performing independent design activities including those supervising the activities and performing the final technical review are trained and qualified to perform such activities.
- Design inputs are identified, as appropriate.
- Procedures, drawings and other base configuration design documents are checked and verified as required for design adequacy.
- Errors and deficiencies discovered in the design as a result of a review are documented and addressed. Corrective actions are fed back to the responsible organization in order to prevent repetitive errors or deficiencies in the design process.

Permanent Changes to the Design

Five types of permanent physical plant modifications or changes may be prepared:

1. Major design changes by Engineering Design Packages (EDPs)

2. Minor design changes by Technical Service Requests (TSRs)

3. Setpoint/tolerance changes by Technical Service Requests (TSRs)

4. Part replacements by Technical Service Request (TSR) when it is shown through a design characteristic analysis that the new component is equivalent to the old one

5. Computer software modifications by Computer Change Notice (CCN) for process computer changes

Engineering Design Packages (EDPs) are prepared and approved for permanent modifications to plant structures, systems and components. An EDP is required for modifications that are QA level 1 or 1M; Seismic Category I or II/I; modifications for piping classes A, B, C, or D+; modifications for Technical Specification, ISI, or Environmental Qualification (EQ) Components; and for other modifications with significant design impacts. An EDP is not required for some limited exceptions such as modifications affecting the Combustion Turbine Generators, associated Switchyard breakers, and equipment maintained by other Detroit Edison divisions, such as 345kv Switchyard; non-essential plant lighting; Equivalent Parts Identification and Setpoint Changes that can be performed using TSRs; and structural modifications involving only restraint anchors (such as for signs, etc.) that can be performed under a work request containing an engineering evaluation.

The EDPs are comprehensive engineering documents that include, or reference, as appropriate, Design Change Acceptance Tests (DCAT) and special or unique Quality Assurance Inspection Requirements. DCAT tests are those tests required to verify that the objectives of the modification are functionally met, and to confirm that critical design parameters to the modification are satisfied. The procedure requires checking of all EDPs and approval by an engineering supervisor. EDPs are subject to the requirements of the Fermi 2 process that implements 10 CFR § 50.59. During the development and review of the EDP, any necessary Licensing Change Requests (LCRs) are initiated to update the UFSAR in conjunction with implementation of the EDP.

Independent design verification is required for QA Level 1 and 1M design changes and for design changes within the Reactor Building, Auxiliary Building, RHR Complex, and Main Steam Tunnel. Multi-discipline design verification is required in order to confirm or substantiate that a design or a change to a design is technically correct, accurate, and adequate, and that the design is in conformance with all specified design inputs, design bases, design criteria, and design requirements.

Review by the Onsite Review Organization (OSRO) is required for EDPs that require a Safety Evaluation, or are designated to be QA1 or QA1-1M, or affect the fire protection system. Technical Specification 6.5.1 describes the responsibilities of OSRO.

Interfaces between affected organizations are initiated, as necessary, early in the design change process. This is accomplished by the use of the Plant Modification Review Group (PMRG). The PMRG and its participants are responsible for providing the needed interface for conveying installation, operation, testing, maintenance, ALARA, and other design-associated information to the affected Nuclear Generation organizations during the various phases of that design process.

The EDP process becomes integrated with other change processes through the Procedure/Program Revision Notice (PPRN) that is issued concurrently with the issuance of the EDP. This requires each affected organization to review the EDP and to identify and initiate the needed updates to procedures, programs, training and appropriate notifications within the affected organization.

The implementation process for a design change involves preparing modification closure documents and records, reviewing programs, and updating documents. The process requires a Modification Implementation Checklist and a Modification Impact Statement that addresses plant conditions, sequence of operations, prerequisites, precautions, unique situations, operability of Technical Specification Systems and Action Statements, consideration of partial implementation (if applicable) and a review of the Preliminary Evaluation and Safety Evaluation (10 CFR § 50.59) to ensure specific controls supporting the Preliminary Evaluation and Safety Evaluation (10 CFR § 50.59) are met.

Formal turnovers to Operations are a prerequisite for Return to Service. The turnover generally requires a joint walkdown of the modification by the Modification Owner, Modification Field Engineer (or Maintenance Supervisor), or their delegates, and Licensed or Certified Senior Reactor Operator from the Operations Department. Completion of the modification results in the final signoff by the Modification Owner indicating that all field work for the modification is complete, required post modification and DCAT testing have been performed, required procedures are updated, and the "as built" notifications are made. At this point, related LCRs may be implemented and included with the periodic UFSAR update.

Technical Service Requests (TSRs) are used to perform most permanent modifications that do not require an EDP as described above. The significant design and configuration control attributes that apply to EDPs are also applicable to these TSRs. These TSRs require checking, and, as appropriate, Design Change Acceptance Tests and Design Verification. They are subject to the requirements of the Fermi 2 process that implements 10 CFR § 50.59 and, if a Safety Evaluation is required, the TSR and the Safety Evaluation require Onsite Review Organization (OSRO) review.

Design-related activities for programmable digital computer systems are performed in accordance with requirements for design configuration management at Fermi 2. Modifications to hardware, software, firmware, or databases are implemented by an EDP, TSR or Temporary

Modification and are subject to the requirements of the Fermi 2 administrative procedure that implements 10 CFR § 50.59. Design, Documentation, Verification, and Validation criteria for QA Level 1 and applicable QA Level 1M digital equipment are based on Regulatory Guide 1.152, Revision 1, "Criteria for Digital Computers in Safety Systems of Nuclear Power Plants" and Generic Letter 95-02, "Use of NUMARC/EPRI Report TR-102348". Changes to software databases that do not impact design calculations may be performed with only a Work Request and a checked and approved Computer Change Notice (CCN).

Temporary Changes Affecting the Design

Two processes exist to implement temporary changes to plant design. A general temporary modification process is used to make temporary changes to the plant and may be used to provide functions necessary to maintain operability of equipment required by Technical Specifications. A more limited process is available for providing temporary power, which does not provide for operability of equipment required by Technical Specifications.

Temporary Modifications may be made to plant equipment or components identified in Base Configuration Design Documents. These alterations are expected to be installed for a short duration (that is, not longer than one fuel cycle). Temporary Modifications are subject to procedural requirements that implement 10 CFR § 50.59. Materials used in the Temporary Modifications must be compatible for the use intended. The Technical Specification surveillance requirements applicable to the components that the Temporary Modification affects are reviewed and satisfied. Prior to approval, all Temporary Modifications are required to receive a Technical review. Plant Support Engineering review is required for Temporary Modifications that are classified as QA Level 1 or 1M, or involve any systems, structures, or components contained within the Reactor Building, Auxiliary Building, RHR Complex, or Main Steam Tunnel. This review includes such elements as design considerations, safety impacts, and Emergency Operating Procedure design parameters. Additional cross discipline reviews of Temporary Modifications by Radiation Protection and Chemistry are also required when appropriate. The Temporary Modification process includes provisions for post-modification tests (both for installation and removal). The Temporary Modification procedure includes provisions to appropriately post and otherwise update affected Base Configuration Design Documents and other plant programs and documents that require revision, including appropriate procedure revisions to reflect modified plant operation. The Temporary Modification is approved by the Superintendent, System Engineering, and Superintendent, Operations. OSRO review is required if the Temporary Modification requires a 10 CFR § 50.59 Safety Evaluation, or if the Temporary Modification is for QA Level 1 or 1M components. The removal of the Temporary Modifications is described, authorized and documented in accordance with procedures.

Temporary Power modifications may be made to supply temporary power for maintenance equipment, outage related equipment, lighting, or permanent plant equipment. Procedural controls limit the application of this process, and individual changes made using the temporary power process are not subject to additional review within the 10 CFR § 50.59 process. This process may be used to keep permanent plant equipment in service, but may not be used to make permanent plant systems operable or to make connections to Engineered Safety Feature Busses.

Equipment being supplied with temporary power is not considered to be operable in accordance with the Technical Specifications. All electrical service branch feeds for temporary wiring are required to be routed to maintain divisional separation and installed with proper barriers. Temporary power requests are approved by the System Engineer, Electrical Distribution. Plant Support Engineering review of the Electrical Load Management System (ELMS) is required for temporary power requests which are to be powered from plant busses, distribution cabinets, and motor control centers (MCC). The Nuclear Shift Supervisor establishes the necessary plant or system conditions to install the temporary power and authorizes the work to install the temporary power. A separate knowledgeable person from Maintenance or System Engineering is assigned to verify that the correct position is being used for the temporary power feed. Temporary Power Tags are placed at each end of the temporary power feed and include appropriate information. Temporary power is removed when it is determined by the Maintenance Temporary Power Coordinator that it is no longer required. The removal of temporary power is authorized and documented in a manner comparable to that for installation.

Other Configuration Control Topics

An additional link in the configuration control of the plant is the control of materials. The procurement, receipt, inspection, storage, inventory tracking, qualification, dedication, and use of material is controlled by corporate and site procedures.

3.2 Fermi 2 Processes that Implement 10 CFR § 50.59

The requirements of 10 CFR § 50.59 are implemented at Fermi 2 through a two-step process as specified in the "Preliminary Evaluations and 10CFR50.59 Safety Evaluations" procedure. The first step, the Preliminary Evaluation (PE), is performed as part of the interfacing change process, such as an EDP, for the purpose of determining whether a Safety Evaluation (SE) is required. If the Preliminary Evaluation determines that a Safety Evaluation is required, the Safety Evaluation is performed for the purpose of determining whether an Unreviewed Safety Question exists, as defined in 10 CFR § 50.59. A more detailed description of each of these evaluations and their interface with the other processes that identify and effect changes follows. The preliminary and safety evaluation procedure stipulates that Preparer, Reviewer, and Approver of all PEs and SEs be qualified by completing 10 CFR § 50.59 training, including biennial requalification.

As previously stated, the Preliminary Evaluation (PE) is a screen to determine the need for a formal 10 CFR § 50.59 Safety Evaluation. The screening process allows bypassing the remainder of the PE process if the proposed change:

- is an editorial change as defined in the procedure,
- has been fully evaluated in a previous Preliminary Evaluation, or
- has been fully evaluated in a previous Safety Evaluation.

Otherwise, the remaining aspects of the PE are performed. The change is reviewed for impact on a predefined list of License, Plans, and Programs (including effects on the environment). The need to update the UFSAR and other documents is addressed at this stage of the process. If the

Preliminary Evaluation is being done as part of a UFSAR change, additional criteria apply that may exempt the change from requiring a Safety Evaluation. The PE determines if the change constitutes a facility change, procedure change, or test or experiment subject to 10 CFR § 50.59. A separate procedure, "Diagnostic, Special and Infrequently Performed Tests or Evolutions," defines whether a change is a test or experiment in the context of 10 CFR § 50.59. A Safety Evaluation is performed for any proposed change that is not exempted by the PE screening. The basis for the answers to the PE screening questions are documented as part of the PE. The PE is signed by a qualified preparer and approver and is made part of the documentation for the proposed change (e.g., a PE done for a UFSAR change would become a part of the Licensing Change Request (LCR) for the UFSAR change).

If a Safety Evaluation (SE) is required, the following seven questions are used to determine if an Unreviewed Safety Question is involved:

- Will the proposed change increase the probability of an accident previously evaluated in the UFSAR?
- Will the proposed change increase the consequences of an accident previously evaluated in the UFSAR?
- Will the proposed change increase the probability of a malfunction of equipment important to safety previously evaluated in the UFSAR?
- Will the proposed change increase the consequences of a malfunction of equipment important to safety previously evaluated in the UFSAR?
- Will the proposed change create the possibility of an accident of a different type than any previously evaluated in the UFSAR?
- Will the proposed change create the possibility of equipment malfunction of a different type than any previously evaluated in the UFSAR?
- Will the proposed change reduce the margin of safety as defined in the bases for any Technical Specification?

The SE documents the bases for the responses to these questions. If any response is "yes," an Unreviewed Safety Question is involved. If the proposed activity is determined to involve an unreviewed safety question, the procedure directs subsequent actions in accordance with the regulations.

When an approved written SE concludes that a proposed activity does not involve an Unreviewed Safety Question, and no change to the Technical Specifications is required, the proposed design change, procedure change, or special test may be implemented without prior NRC approval. In such cases, the procedures require that:

- Action be initiated to revise the UFSAR, as appropriate, and;

- A record of all such actions be maintained to support the required submittal to the NRC of a report of such changes.

The review, approval, and document retention process for the SE differs from the PE. Each SE is logged and assigned an identification number that uniquely identifies it in the site quality records system. SEs receive an independent technical review, are approved by the author's organizational manager, unit head, or designee, and are presented to the Onsite Review Organization (OSRO) for review.

The Fermi 2 "Preliminary Evaluations and 10 CFR § 50.59 Safety Evaluations" procedure implements the requirements of 10 CFR § 50.59 in a two-step process. This process is further supported by the following interfacing and oversight functions:

- 10 CFR § 50.59 evaluators' initial training and requalification training (every two years)
- ISEG independent oversight of the Safety Evaluation process and its implementation
- Quality Assurance Audit and Surveillance program oversight activities
- OSRO review of Safety Evaluations
- NSRG review of Safety Evaluations
- NRC oversight of the 10 CFR § 50.59 program

3.3 Fermi 2 Processes that Implement 10 CFR § 50.71(e)

The Fermi 2 Final Safety Analysis Report was converted to the Updated Final Safety Analysis Report (UFSAR) following receipt of the Operating License to support periodic updates in accordance with 10 CFR § 50.71(e). The UFSAR was first submitted to the NRC in March 1987. Revisions to the UFSAR were subsequently submitted annually in March through Revision 6 dated March 1993. The December 25, 1993 Fermi 2 turbine accident disrupted the Fermi 2 refueling cycle schedule and the annual UFSAR update cycle. Revision 7 was submitted in May 1995, and Revision 8 is scheduled for May 1997.

UFSAR revisions are effected through the License Change Request (LCR) as controlled by the "Licenses, Plans, and Programs" procedure. (This same procedure also controls amendments and revisions to the Operating License, Technical Specifications, Technical Requirements Manual, Radiological Emergency Response Preparedness (RERP) Plan, Security Plans, selected programs specified by the Technical Specifications, the Core Operating Limits Report, and Technical Specification Clarifications.) LCRs implementing UFSAR changes are assigned a unique number in accordance with the procedure to facilitate tracking and identifying the document after it is entered into ARMS, the Fermi 2 quality records system.

Important attributes of the UFSAR change LCR process include the following:

- Nuclear Licensing maintains a database of LCRs to facilitate tracking
- A Preliminary Evaluation (PE) is required for all UFSAR LCRs
- For changes that do not require a Safety Evaluation (SE), the PE shall clearly state why the SE is not required.
- Procedures identify exceptions where Safety Evaluations are not required for UFSAR changes. These exceptions include editorial changes, changes that have been completely reviewed in an existing Safety Evaluation, and changes that have been reviewed by the NRC and documented in a NRC Safety Evaluation.
- At a minimum, all UFSAR LCRs must be approved by the originator, applicable UFSAR technical expert, and the Director of Nuclear Licensing (or authorized delegate). UFSAR LCRs involving the QA or Fire Protection Programs have additional procedurally specified review and approval requirements.

3.4 Fermi 2 Processes that Implement Appendix B to 10 CFR § 50

The previous subsections of Section 3 have discussed many of the Fermi 2 processes that implement the 10 CFR § 50, Appendix B criteria related to design control; instructions, procedures, and drawings; corrective action; and closely related topics. The remainder of this subsection describes the Fermi 2 quality assurance infrastructure that implements applicable portions of 10 CFR § 50, Appendix B.

The Fermi 2 Quality Assurance Program - General

A quality assurance program to implement the requirements of 10 CFR § 50, Appendix B is contained in UFSAR Section 17.2. Each of the eighteen Appendix B criteria are addressed by the quality assurance program. Changes to the quality assurance program are made to reflect organizational responsibilities and methods of program implementation. Revisions to the quality assurance program are performed in accordance with 10 CFR § 50.54(a)(3)(ii). Any change that constitutes a reduction in commitment is forwarded to the NRC for review and approval prior to implementation.

Conduct Manuals provide a means for communicating quality assurance policy and program requirements to all site organizations. Conduct Manuals contain the necessary program requirements to satisfy applicable portions of 10 CFR § 50, Appendix B, Regulatory Guides, and Industrial Standards related to quality assurance.

Fermi 2 Audit and Surveillance Program

The Fermi 2 audit and surveillance program contributes information toward evaluating the effectiveness of selected plant processes, activities, and programs. This program implements certain requirements of 10 CFR § 50 Appendix B and is an integral part of the Fermi 2 Quality Assurance (QA) Program. The Nuclear Quality Assurance organization is responsible for independent audits of nuclear generation unit activities to verify compliance with the QA program and to assess its effectiveness. The activities audited include those described in the governing procedures that apply to the plant and onsite support organizations. The Fermi 2 audit program has been established in accordance with ANSI 18.7 - 1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants, the ANSI standards referenced therein, and the regulatory guides that endorse them. Audits are performed under the cognizance of the Nuclear Safety Review Group (NSRG) as specified in the Technical Specifications and Quality Assurance Program (UFSAR Chapter 17.2). Additionally, surveillances of specific activities are performed in accordance with the Quality Assurance Conduct Manual. Discrepancies between required program elements and implementation identified by audits and surveillances are addressed through the corrective action process. The corrective action process is described in Section 6.

4.0 TRANSLATION OF DESIGN BASES REQUIREMENTS INTO PROCEDURES

The October 9, 1996 NRC letter requested that the response include the rationale for concluding that design bases requirements are translated into operating, maintenance, and testing procedures (Item b).

Response

Fermi 2 Technical Specifications require the establishment and maintenance of procedures, including procedures covering operation, maintenance, surveillance, and test activities. Procedures governing these activities have been in place since the issuance of the Fermi 2 Operating License. Fermi 2 utilizes a number of programmatic controls (procedures) to translate design bases requirements into these procedures. Ongoing internal, third party, and NRC assessment of these controls and their effectiveness provides opportunities to identify and correct nonconformances and their causes. As concerns have been identified, the program has been strengthened to address them and to reconcile any discrepancies. An example of this is the Surveillance Testing Overlap Review described in Appendix A.

The corrective action process described in Section 6 of this response is the principal means for documenting and resolving discrepancies that may occur. Surveillances, audits, and inspections from within the Fermi 2 organization and from external sources provide additional defense against accumulation of these discrepancies. These activities provide reasonable assurance that the programmatic controls are effective and that procedures covering operation, maintenance, surveillance, and test activities are consistent with the design bases.

Current programs and procedures are discussed in Section 3 of this report. Broadly, the intent of current processes is twofold: first, that changes to the plant design bases as described in the UFSAR are translated into plant procedures; second, that changes to plant procedures conform with the design bases as described in the UFSAR.

Implementation of Changes to the Design Bases

Changes affecting the implementation of the design bases can occur as a result of design change processes. Procedures for operation, maintenance, and testing and surveillance are controlled by plant administrative procedures contained in the Fermi 2 Conduct Manuals. These procedures are required to be reviewed for changes that would result from design changes.

Safety related and non-safety related permanent plant modifications made through Engineering Design Packages (EDPs) and Technical Service Requests (TSRs) (types include TSR-Modification, TSR-Equivalent Part Identification, and TSR-Set Point Change), as well as non-modification design changes such as corrections to drawings, issuing calculations, documenting an equivalent part replacement, etc., are required to be reviewed for necessary procedure changes. Organizations responsible for the applicable procedures are required to identify which procedures will be affected. Responsible organizations must identify and initiate necessary procedure changes and determine whether any procedure changes need to be implemented concurrently to support

testing, returning the equipment to service, or closing out the modification. Administrative controls are in place to implement procedure revisions by the required milestone.

Temporary Modifications and Computer Change Notices that are not covered by TSRs are typically very limited in scope. Procedures that govern these processes require the originator or computer system engineer to identify necessary procedure impacts and advise and coordinate procedure changes with the responsible organizations. Procedure changes, if needed for temporary power installation, are informally coordinated between Nuclear Shift Supervisor, System Engineer-Electrical Distribution, and the Maintenance Temporary Power Coordinator.

Changes to the UFSAR can also be made outside the design change processes. In this case the process for changing the UFSAR also requires identification of any plant documents requiring revision and requires appropriate coordination when implementing the change.

Implementation of Changes to Plant Procedures

Plant procedure revisions, both temporary and permanent, are controlled by plant administrative procedures contained in the Fermi 2 Conduct Manual. Permanent changes are subject to the requirements of the Fermi 2 administrative procedure that implements 10 CFR § 50.59. This includes requirements for identifying whether the proposed activity constitutes a change to the facility or procedures, including assumptions, as described in the UFSAR. Evaluation of such changes is required to determine whether they are allowed under 10 CFR § 50.59 and to synchronize the UFSAR with plant procedures. Additional checks and reviews of permanent procedure changes are procedurally required through the use of checklists, commitment reviews, and second party technical and cross-discipline reviews, as well as final approval by the Plant Manager or delegate, as described in the Technical Specifications. Furthermore, validation, which may include simulator use, is required prior to approval following significant changes to operating procedures. These checks provide additional cues and opportunities to prevent inadvertent deviation from the design bases. Temporary procedure changes are not subject to the same level of review as permanent changes. However, there are strict procedural limitations requiring that temporary changes do not alter the intent or acceptance criteria of procedures and that they do not effect permanent changes without promptly triggering the permanent change process and its associated controls.

Program Effectiveness

The processes described above provide a framework to translate design bases requirements into operating, maintenance, and testing procedures on an ongoing basis. These processes are subject to internal audit, surveillance, and other assessment activities on an ongoing basis (refer to Appendix A for an overview of some of these activities). In addition, oversight review of the results of these processes through assessment of plant procedures has been performed both internally and by NRC.

For example, a self-assessment of service water systems in lieu of NRC SWSOPI was performed in 1996, as further described in Appendix A. This comprehensive review of safety related service water systems (emergency equipment service water, emergency diesel generator service water,

residual heat removal service water, and the emergency equipment cooling water) and the non-safety related General Service Water (GSW) system was performed over several weeks by a multi-discipline team using both Detroit Edison personnel and outside consultants contracted for their relevant expertise and experience in the technical areas. This assessment identified a number of concerns; however, this review did not identify substantial problems with the implementation of plant design bases in plant procedures. The depth of this review and its results provide additional assurance that the design bases requirements are translated into plant procedures.

Similarly, the recently conducted UFSAR Overview provided an opportunity to review conformance of procedures with the UFSAR even though this was not part of the scope of the UFSAR Overview Project. While the Overview scope did not include a detailed comparison of procedures to the design bases, it did identify some differences between plant procedures and the UFSAR and has highlighted areas for improving the processes used to maintain plant procedures. The broad scope of review and low safety significance of findings from this effort also provide reasonable assurance that the design bases are translated into operating, maintenance, and test procedures.

Finally, the NRC performed an Operational Safety Inspection (Inspection Report 96-201) during August and September of 1996 that included an evaluation of the corrective action and quality assurance programs and a Safety System Functional Inspection (SSFI) of Noninterruptible Control Air Supply (NIAS) and High Pressure Coolant Injection (HPCI). While the NRC concluded that the two systems were capable of performing their intended functions, discrepancies were identified between plant procedures and the issued design bases documents and the UFSAR. The inspection report also expressed concerns regarding the effectiveness of the corrective action process and quality assurance activities, although it did verify that the problem identification and corrective action process was comprehensive and gaining site acceptance. However, based on the depth and findings from this assessment, Detroit Edison also believes that the results of this assessment support its confidence in the overall effectiveness of the processes used to translate design bases requirements into plant operating, maintenance, and test procedures.

Both the Service Water Assessment and the NRC SSFI described above represent vertical slice assessments. Since the controls that translate design bases requirements into operating, maintenance, and test procedures are broadly applicable (horizontally) across plant systems and equipment, similar results would be expected for any such vertical slice. This is further supported by the results of the horizontal slice assessment performed by the UFSAR Overview.

Conclusion

Procedures covering operation, maintenance, surveillance, and test activities have been in place since the issuance of the Fermi 2 Operating License. As concerns have been identified, the program has been strengthened to address them and to reconcile discrepancies. Controls are in place to translate the current plant design into plant operating, maintenance, and test procedures. Ongoing internal, third party, and NRC assessment of these controls and their effectiveness provides opportunities to identify and correct nonconformances and their causes. As described

above, Detroit Edison is confident that these controls and assessments provide reasonable assurance that design bases requirements are translated into plant procedures based on the results of a number of vertical assessments in conjunction with the cross-sectional assessment provided by the UFSAR Overview.

5.0 CONFORMANCE OF SSC CONFIGURATION & PERFORMANCE WITH DESIGN BASES

The October 9, 1996 NRC letter requested that the response include the rationale for concluding that system, structure, and component configuration and performance are consistent with the design bases (Item c).

Response

Detroit Edison was the Architect-Engineer for Fermi 2. The design configuration management process was developed by Detroit Edison starting from the time the decision was made to construct Fermi 2. The process continues to be enhanced to reflect its use to support plant operations and the lessons learned from NRC and industry sources. The process is continually strengthened to address concerns as they are identified, and discrepancies are reconciled. The Fuse Control Program, Q-List Improvement Program, Electrical/I&C As-Built Program, and Motor Operated Valve Program are examples of activities where concerns have been identified resulting in the strengthening of the configuration management process.

The current design configuration management process is controlled by procedures that implement the requirements of 10 CFR § 50, Appendix B and 10 CFR § 50.59. The design configuration management process at Fermi 2 requires that personnel using or implementing engineering documents be responsible for their integrity. A more detailed discussion of design configuration management procedures is provided in Section 3 of this response. Integration of design changes into plant operating, maintenance, and testing procedures is accomplished by formally controlled processes described in Sections 3 and 4 of this response.

The corrective action process described in Section 6 of this response is the primary means for documenting and resolving discrepancies. Surveillances, audits, and inspections performed by both internal and external parties provide additional defense against accumulation of discrepancies. These activities provide reasonable assurance that the design configuration management processes are effective and that the plant configuration is consistent with the design bases.

Many ongoing programs and activities are conducted to maintain system, structure, and component configuration and performance consistent with the design bases. In addition to the Inservice Inspection-Inservice Testing (ISI/IST) and Surveillance Programs discussed below, the Performance Evaluation, Preventive Maintenance, and Motor Operated Valve Programs are examples of such activities.

The purpose of the Inservice Inspection-Inservice Testing (ISI/IST) Program is to detect degradation of plant structures and equipment, thus identifying the need for corrective actions to support continued operability. ASME Section III, Class 1, 2, 3 and other essential components required for safe shutdown are included within the ISI/IST Program. The tests monitor selected performance parameters. Typically, acceptance criteria for these parameters are identified in the UFSAR, Technical Specifications, Design Calculations, or applicable ASME Codes or established

based on reference test values. These routine tests and examinations identify adverse trends so that corrective actions can be implemented.

In addition, Surveillance Procedures provide the necessary steps to perform the required periodic testing of safety related structures, systems, and components in accordance with the Technical Specification requirements and/or the ASME Boiler and Pressure Vessel (B&PV) code Section XI. ASME and Technical Specification acceptance criteria are derived in part from design bases requirements contained in the UFSAR. Nuclear Shift Supervisor approval is required before performance of surveillance tests. After completion of surveillance tests, the Nuclear Shift Supervisor reviews tests to verify that they have been successfully performed and meet the acceptance criteria cited in the surveillance procedure.

The processes discussed above provide a framework to maintain SSC configuration and performance consistent with design bases and for detecting and correcting discrepancies. The effectiveness of these processes is assessed by a number of the activities described in Appendix A, supporting Detroit Edison's conclusion that there is reasonable assurance that SSC configuration and performance are consistent with the design bases. Important examples of these activities are the application of the Safety System Functional Inspection process by the NRC and Detroit Edison, Detroit Edison service water self assessment in lieu of an NRC Service Water System Operational Performance Inspection (SWSOPI), and the Detroit Edison initiative for the UFSAR Overview Project. The results of the SSFIs and UFSAR Overview Project support assessment of the effectiveness of the procedures and programs in maintaining the integrity of the configuration and performance of Fermi 2 structures, systems and components consistent with the design bases.

Self-initiated SSFIs patterned after NRC SSFIs were first conducted at Fermi 2 in 1987. The High Pressure Coolant Injection (HPCI) system was selected, along with safety related support systems, for the initial SSFI. Two subsequent inspections covered the Low Pressure Coolant Injection (LPCI) mode of the Residual Heat Removal (RHR) System, including selected supporting systems, and the safety related heating ventilation & air conditioning (HVAC) systems. A fourth self-initiated SSFI of the safety related electrical systems was planned, but was obviated by an Electrical Distribution System Functional Inspection (EDSFI) performed by the NRC. The SSFI process assesses the extent that systems have been designed, modified, operated, maintained and tested in a manner that is consistent with their design bases, in a manner that verifies the design bases, and in a manner that will continue to preserve their design bases. The inspections identified strengths as well as weaknesses within these areas. Weaknesses ranged from isolated documentation discrepancies to more generic programmatic implementation issues. Each of the above SSFIs, and the NRC EDSFI, reached the conclusion that the subject systems were capable of achieving designed safety functions.

Detroit Edison also performed a self-assessment of Service Water systems in lieu of a NRC Service Water Systems Operational Performance Inspection (SWSOPI) in February and March 1996. The Detroit Edison inspection team could not positively conclude that the Fermi 2 Emergency Equipment Cooling Water (EECW) System would perform its safety function under all postulated combinations of events. This was primarily due to the lack of qualified nitrogen and water makeup to the EECW makeup tank. Nitrogen and/or makeup would be required for long

term post accident operability in the event of a concurrent seismic event. This condition was not considered to have more than a minor safety significance. However, Detroit Edison declared both divisions of EECW inoperable and initiated a plant shutdown in accordance with Technical Specifications. The activities undertaken during plant shutdown included installing qualified nitrogen supply and water makeup for the EECW tanks. NRC inspectors performed a follow-up inspection on the self-assessment in order to evaluate (1) whether the inspection requirements of TI 2515/118 were adequately met by the assessment team and (2) the effectiveness of the licensee's responses to the issues raised by the assessment team. Overall, the inspectors concluded that the self-assessment was adequately performed. The inspectors reviewed the responses to the issues raised by the assessment team to ensure that the concerns were being adequately addressed and that no operability concerns existed.

The NRC completed an Operational Safety Inspection on September 13, 1996. The eight member team was led by the Special Inspection Branch of the Office of Nuclear Reactor Regulation. The inspection included an SSFI to assess the functional capability of the High Pressure Coolant Injection (HPCI) System and the Noninterruptible Control Air Supply (NIAS) System, and associated support systems. The team concluded that the inspected systems are capable of performing their intended safety functions. However, a number of UFSAR and Design Basis Document (DBD) discrepancies were identified. The nature and significance of these discrepancies were similar to discrepancies identified by Fermi 2 self-initiated activities.

Because the primary objective of the SSFI is to determine whether the system is capable of performing the safety functions required by the design bases, regulatory requirements, and commitments, and whether the testing is adequate to demonstrate that the system would perform all of the safety functions required, it is very well suited to be used as part of the rationale for concluding that SSC configuration and performance are consistent with the design bases. The SSFI technique emphasizes the functionality of the selected safety system. The focus of these inspections is on the system and hardware operation, maintenance, engineering design, design control, surveillance and testing, and quality assurance and corrective actions. The predominant common feature of the SSFIs is the use of a vertical slice technique to accomplish the inspection objectives. Since the processes used to control conformance with the design bases are applicable independent of system, similar results and conclusions would be expected from performance of these type of vertical slice examinations on any other system. Thus, discrepancies may be identified; however, it is expected that any system subjected to such an inspection would be determined to be capable of performing its design bases function and in conformance with the design bases. Confidence in this expectation is supported by the horizontal slice review that crosses system boundaries provided by the UFSAR Overview.

Detroit Edison initiated a UFSAR Overview Project as part of a response to the issues identified by NRC Information Notice 96-17. The objectives of this project were to increase the level of confidence that: the design and operation are consistent with the UFSAR; programs are maintaining the UFSAR accuracy; and discrepancies are corrected. The overview project could be characterized as a horizontal evaluation, encompassing the entire UFSAR, with the exception of the Technical Specifications and regulatory guide positions. Discrepancies identified were addressed using the Fermi corrective action process. None of the discrepancies were considered

as having more than a minor safety significance. Due to the overview nature of this effort, it was recognized that discrepancies in the UFSAR might remain undiscovered. It did, however, provide an increased level of confidence in the effectiveness of programs and processes that maintain conformance with the UFSAR while providing insight into areas where improvements are needed.

Conclusion

The following factors as described in this section provide the rationale for concluding that adequate assurance exists that system, structure, and component configuration and performance are consistent with the Fermi 2 design bases:

- As the original architect-engineer for Fermi 2, Detroit Edison has had processes and procedures for controlling the design and plant configuration since the construction phase.

- The processes and procedures have evolved over the life of the plant, and have maintained control of the Fermi 2 design and configuration.

- Added confidence in the ability of Fermi 2 processes and procedures to maintain control of the plant design and configuration has been collectively obtained from a number of programs and activities over the history of the plant. In particular, the results from a combination of vertical slice (e.g., SSFIs) and horizontal slice (e.g., UFSAR Overview) activities support this conclusion.

- As concerns are identified, the process is continually strengthened to address them, and discrepancies are reconciled.

6.0 PROCESSES FOR IDENTIFICATION OF PROBLEMS AND IMPLEMENTATION OF CORRECTIVE ACTIONS

The October 9, 1996 NRC letter requested that the response include a description of processes for identification of problems and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC (Item d).

Response

Issues or concerns may be raised by personnel at Fermi 2 through various avenues, some of which include talking to their supervisors, writing a Deviation Event Report (anonymously, if desired), contacting the QA or ISEG organizations, contacting senior management, contacting the Ombudsman, or contacting the NRC directly. Further discussion of the Employee Concerns Program is provided in Appendix A. Detroit Edison continues to encourage its employees to identify problems. The processes described below are associated with one of the previously mentioned mechanisms for problem identification and resolution, the Deviation Event Report (DER) process.

The Fermi 2 DER process provides the primary mechanism for problem identification and resolution. The DER process accommodates problem identification, evaluation and corrective action. Personnel are encouraged to document problems via a DER. DERs are initially screened for potential reportability and operability impacts, and appropriate immediate actions are taken. The process includes provisions for formal operability determinations using guidance provided by NRC Generic Letter 91-18. Reportability determinations for 10 CFR § 50.72 and 50.73 incorporate guidance provided by NUREG -1022. Plant management reviews DERs the next working day and assigns a responsible organization for evaluation, determines the significance level, and assigns the schedule for completion of the initial investigation. The significance levels are used to determine the degree of cause evaluation required and organizational accountability for corrective actions. The process is described in more detail below.

Discrepancy Identification Mechanisms

Discrepancies are identified through multiple mechanisms such as QA audits and surveillances, personnel observations, self and external assessments, third party reviews, operational experience reviews, NRC inspections and resident inspector activities, and execution of programs. The DER is the primary document used to capture identified discrepancies. Once a discrepancy is documented in the DER, the DER process as delineated in the "Deviation And Corrective Action" procedure provides the administrative guidance for investigation, cause identification, corrective action proposal and corrective action implementation.

The use of the DER as the primary document provides consistency in application of corrective actions and a unified database to store all related problem information.

Root Cause Determination Process

DERs are classified based on their significance. The significance level determines the degree of cause evaluation, schedule, and organizational accountability for corrective actions. DERs classified as Level 2 or Level 3 do not require a formal root cause analysis. A most probable cause determination is sufficient for these DERs since the significance of the problem is not of the magnitude to require the expenditure of resources necessary to perform a formal root cause analysis. The Most Probable Cause determination is provided by the DER evaluator and is typically derived through conclusions made as a result of the initial investigation, relying on the evaluator's subject matter expertise.

Level 1 DERs require a formal root cause analysis performed by or reviewed and approved by a designated Core Evaluator. Core Evaluators are selected based on training they have received in root cause analysis and previous experience in performing root cause analysis. Root cause training may be in the form of Human Performance Enhancement System (HPES), Kepner-Tregoe, BPI, Alamo, MORT or the Root Cause Analysis training provided by the Nuclear Training Department at Fermi 2. A root cause methodology is not specified by procedure in order to allow Core Evaluators to select the most appropriate cause evaluation technique for the circumstances.

Corrective Action Determination

After the most probable cause or root cause has been determined, the DER evaluator identifies the proposed corrective actions in the DER. The proposed corrective actions may be determined solely by the evaluator or may be the result of an investigation team effort. In either case, the proposed corrective actions must be reviewed and approved by the Responsible Section Head before implementation. Corrective actions are selected with a view to minimizing the potential for recurrence.

Proposed corrective actions for Level 1 and Level 2 DERs are also reviewed by Safety Engineering in addition to the Responsible Section Head. If Safety Engineering determines that the proposed corrective actions are inappropriate or inadequate, they will so inform the evaluator and work with the evaluator to determine the appropriate corrective actions.

Tracking and Closure of Corrective Actions

Corrective actions delineated in Level 1 and Level 2 DERs are tracked to implementation and closure through the DER. If an effectiveness review of the corrective actions is required at some time after implementation, this review is designated in the DER and scheduled by the DER Tracking Coordinator in Safety Engineering. In addition, Safety Engineering performs effectiveness reviews of randomly selected DERs to verify the overall effectiveness of the program.

Implementation of corrective actions delineated in Level 3 DERs is the responsibility of the Section Head. Corrective actions may be tracked to closure through the DER or the DER may be

"closed to process" and the corrective actions tracked to closure through the process selected. Processes that may be used to implement corrective actions for Level 3 DER include work requests, surveillance documents, training work requests and selected engineering documents.

Organizational Responsibilities and Interfaces for Program Implementation

The Responsible Section Heads are accountable for the implementation of corrective actions. The implementation of corrective actions may require interfacing with other organizational units and utilizing site work processes. The work processes could involve Work Control, Engineering Design, Procedure and Document Control, Training, and Nuclear Licensing. The type and extent of the corrective actions will determine the interface requirements and areas of responsibility.

Interface with 10 CFR § 50, Appendix B

10 CFR § 50 Appendix B and the Fermi 2 Quality Assurance Program require measures be established to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of a significant condition adverse to quality or safety, procedures require that the cause be determined and corrective action be taken to preclude recurrence, and that the significant condition, its cause, and the corrective action be documented. Significant conditions adverse to quality or safety and some corrective action documents for other conditions adverse to quality are reviewed to determine, when appropriate, that the root cause of the problem is identified and corrective action is adequate.

10 CFR § 21 Evaluations

As part of the DER evaluation process, the responsible evaluator must make a determination as to the applicability of 10 CFR § 21. If it is determined that the potential exists for a 10 CFR § 21 report to be made, the licensing department conducts the formal evaluation in accordance with a separate "10 CFR § 21 Evaluations" procedure.

Operability Determinations

Upon discovery of a condition that potentially affects the operability of structures, systems, or components, the Nuclear Shift Supervisor (NSS) is notified, who evaluates the concern to determine if the SSC is operable or inoperable. The NSS has, at his disposal, the support of all organizations onsite to assist in making the decision on operability. If not already initiated, a DER will be written to document the concern. In addition, all DERs processed are evaluated for the need to perform operability determinations on the affected SSCs. The process of performing operability determinations is described in the "Verification of System Operability" procedure, which incorporates the guidance provided by Generic Letter 91-18.

Engineering Functional Analysis (EFA) is the formal process used to evaluate existing or anticipated degraded or nonconforming conditions that may impact the operability of plant systems, structures, and components. These analyses are used to support the Nuclear Shift

Supervisor's operability determination. An EFA is used to analyze or justify continued operation of equipment or system(s) outside current licensing and/or design requirements where reasonable assurance of safety exists. EFAs are not used to implement plant modifications or replace the performance of a Safety Evaluation (10 CFR § 50.59). They do not abridge Technical Specifications, but may be used to support a request for a Notice of Enforcement Discretion, if appropriate. If, at any time, it becomes evident that a Technical Specification component is not capable of performing its safety function(s), the Nuclear Shift Supervisor is contacted to take appropriate action in accordance with the Technical Specifications. EFAs are prepared, checked and then approved by the responsible Plant Support Engineering Supervisor, or delegate. EFAs are documented as part of the DER. Preparers of EFAs contact appropriate personnel to gather additional information, describe the nonconforming condition, identify affected equipment, and justify continued safe operation of the plant. A formal Safety Evaluation (10 CFR § 50.59), if required, is prepared. In summary, an EFA constitutes a reviewed and approved engineering assessment of equipment or system operability and the safety significance and impact of a degraded or nonconforming condition, to justify continued plant operation.

Reportability Requirements

All DERs generated have a section completed that addresses reportability. This section is completed by the NSS or a cognizant member of Safety Engineering. In addition, the need to perform an additional reportability review is determined as part of the investigation phase for each DER. Procedures governing reportability determinations for 10 CFR § 50.72 and 50.73 incorporate guidance provided by NUREG -1022.

DER Trending

Information related to the causes identified during DER investigations is coded and stored in a computer database for periodic analysis.

At present, the coded DER information is reviewed in depth on a semi-annual basis. Adverse trends are typically documented in a "Potential Adverse Trend" DER and assigned to an appropriate organization for evaluation and development of corrective action(s).

On a monthly basis, the DER population is reviewed for recurrences of the adverse trends noted in the semi-annual reports and for other developing trends. DERs noted as pertaining to identified areas of concern are considered for incorporation into the "Potential Adverse Trend" investigation so that appropriate corrective actions can be taken. Other developing trends are monitored until the next semi-annual report or until a "Potential Adverse Trend" DER is warranted.

7.0 OVERALL EFFECTIVENESS OF PROCESSES AND PROGRAMS IN CONCLUDING THAT CONFIGURATION OF THE PLANT IS CONSISTENT WITH DESIGN BASES

The October 9, 1996 NRC letter requested that the response discuss the overall effectiveness of current processes and programs in concluding that the configuration of the plant is consistent with the design bases (Item e).

Response

The Detroit Edison Company concludes that there is reasonable assurance of conformance of Fermi 2 with its design bases. In support of this conclusion, Detroit Edison has used information derived from programs and activities conducted over a period spanning from preoperation to present, which in the aggregate provide what Detroit Edison believes is a valid assessment of the degree of conformance of Fermi 2 with the design bases of 10 CFR § 50.2. This, in turn, provides a foundation for an overall assessment of the effectiveness of processes that are relied upon to maintain design bases conformance. Based on the information derived from these programs and activities, Detroit Edison concludes that processes and programs have been effective in providing reasonable assurance that the configuration of Fermi 2 is consistent with the design bases.

The degree of conformance with the design bases that exists today is the result of the implementation of processes that were in place at any given time throughout the operating history of the plant to control changes to the facility and changes to operating, maintenance, and testing procedures. The current degree of conformance with the design bases reflects both the initial degree of conformance when the plant was licensed and the cumulative effectiveness of the processes and their implementation over time.

Processes and Programs

Section 3 describes Fermi 2 processes used to maintain conformance with the design bases. These processes have been applied to the design, documentation, licensing, and operation over the spectrum of Fermi 2 structures, systems, and components. Since the issuance of the Operating License, the processes to maintain conformance with the design bases have relied on the process to evaluate changes in accordance with 10 CFR § 50.59. As described in Section 3, the processes used to maintain conformance with the design bases have attributes that reinforce their effectiveness. These attributes include comprehensive procedures governing the processes, personnel qualifications, second party review and approval, and provisions for internal and external oversight reviews. In addition, Section 6 describes the attributes of the corrective action process that provides a mechanism for the identification, evaluation , and correction of discrepancies that may occur.

Opportunities to Assess the Integrity of Design Information and Processes

Detroit Edison has used information derived from programs and activities conducted over a period spanning from preoperation to present, which in the aggregate provide what Detroit Edison believes is a valid assessment of the degree of conformance of Fermi 2 with the design bases. This, in turn, provides a foundation for an overall assessment of the effectiveness of processes that are relied upon to maintain design bases conformance.

The programs and activities include reviews conducted as part of design activities, independent oversight activities conducted by internal organizations or third parties, and audits, reviews, and inspection activities carried out by outside parties including the NRC. The programs and activities support this response because they, in various ways, reviewed, compared, and reconciled as necessary, details of the as-built plant configuration, plant procedures and processes, design bases, licensing bases, and information in plant documents. Section 2 of the response identifies and characterizes the scope of these activities, and Appendix A provides additional details regarding these activities and their effectiveness in identifying and correcting plant configuration discrepancies. Attributes and scope of these activities are summarized in Table 2-1. In the aggregate, these activities provide an assessment of the degree of conformance with the design bases and an assessment of the effectiveness of processes used to maintain conformance with the design bases.

Certain of the Table 2-1 programs and activities are of particular relevance to this response because of both timing and scope. Over the last year, Detroit Edison performed an internal Service Water System Operational Performance Inspection (SWSOPI) and a review of the Updated Final Safety Analysis Report (UFSAR) text. Additionally, the NRC performed Safety System Functional Inspections (SSFIs) of two Fermi 2 safety related systems.

The SWSOPI and SSFIs represent vertical slice activities focused on determining whether a system is capable of performing its safety related design bases functions. These types of examinations typically involve review of design documents, operations maintenance and testing procedures, the UFSAR, Technical Specifications, modifications packages, licensing correspondence, safety evaluations, maintenance records, related personnel training, and installed equipment configuration. In 1996, seven Fermi 2 systems were subjected to this type of activity, including the non-safety related General Service Water System, which is a significant contributor to overall plant safety. The systems covered by these examinations cumulatively can be associated with approximately 60% of the overall plant risk based on insights gained from the Fermi 2 Probabalistic Safety Assessment model. Although a number of discrepancies were identified during the conduct of these activities, none of these discrepancies were judged as having more than a minor safety significance.

Since the processes used to control conformance with the design bases are applicable independent of system, similar results and conclusions would be expected from performance of these types of vertical slice examinations on any other system. Thus, discrepancies may be identified, however, it is expected that any system subjected to such an inspection would be determined to be capable

of performing its design bases function. Additional confidence in this expectation would be provided by a horizontal slice review that crosses system boundaries; such a review was provided by the UFSAR Overview.

In 1996, Detroit Edison conducted a review of the UFSAR. The UFSAR Overview represents a horizontal slice activity that crossed system boundaries. The UFSAR Overview consisted of a systematic review of UFSAR text by subject matter experts such as system and design engineers. The review excluded sections related to Technical Specifications and Regulatory Guide positions. While the UFSAR Overview was not a complete verification or validation, the subject matter experts were expected to identify any significant discrepancies between the UFSAR and plant configuration and operation. It was recognized that this type of review would not identify all discrepancies. A quality assurance surveillance of the UFSAR Overview assessed its effectiveness and provided confidence that significant discrepancies would likely have been identified. The UFSAR Overview identified discrepancies, which were documented using the Fermi 2 corrective action process for evaluation and resolution. None of the identified discrepancies were judged as having more than a minor safety significance.

The results of the horizontal slice across system boundaries provided by the UFSAR Overview supports Detroit Edison's expectation that SSFI style vertical slice examinations of additional systems would yield results similar to the seven vertical slices conducted in the last year.

Translation of Design Bases into Operating, Maintenance, and Test Procedures

Procedures covering operation, maintenance, surveillance, and test activities have been in place since the issuance of the Fermi 2 Operating License. Ongoing internal, third party, and NRC assessment of these controls and their effectiveness provides opportunities to identify and correct nonconformances and their causes. Programs are strengthened in response to identified concerns and identified discrepancies are reconciled. Controls are in place to translate the current plant design into plant operating, maintenance, and test procedures.

Section 4 describes a combination of vertical slice and horizontal slice assessment activities related to the processes used to translate design bases requirements into plant procedures. Both the Fermi 2 SWSOPI and the NRC SSFI described in Section 4 represent vertical slice assessments. Since the controls that translate design bases requirements into operating, maintenance, and test procedures are broadly applicable across (horizontally) plant systems and equipment, similar results would be expected for any such vertical slice. This is further supported by the results of the horizontal slice assessment performed by the UFSAR Overview. Detroit Edison is confident the broad scope of review and low safety significance of findings from these efforts provide reasonable assurance that the design bases are translated into operating, maintenance, and test procedures.

Reflection of Design Bases in Structures, Systems, and Components

Section 5 describes vertical and horizontal assessment activities to ensure that system, structure, and component configuration and performance are consistent with the design bases. Each of the Fermi 2 SSFIs described in Section 5 (HPCI, LPCI, safety related HVAC), and the NRC Electrical Distribution System Functional Inspection (EDSFI), reached the conclusion that the subject systems were capable of achieving designed safety functions, notwithstanding identified discrepancies of minor safety significance. Section 5 also describes the results of the recent NRC Operational Safety Inspection involving the HPCI and NIAS systems. It identified UFSAR and Design Bases Document (DBD) inaccuracies and identified a deficiency regarding surveillance acceptance criteria derived from calculations, but also concluded that the inspected systems are capable of performing their intended safety functions.

Since the processes used to control conformance with the design bases are applicable independent of system, similar results and conclusions would be expected from performance of these types of vertical slice examinations on any other system. Thus, discrepancies may be identified, however, it is expected that any system subjected to such an inspection would be determined to be capable of performing its design bases function. Additional confidence in this expectation is provided by a horizontal slice review that crosses system boundaries; such a review was provided by the UFSAR Overview Project. In summary, the scope and results of these previous evaluations contribute to Detroit Edison's confidence that existing processes provide reasonable assurance that SSC configuration and performance are consistent with the design bases.

Effectiveness of Fermi 2 Corrective Action and Quality Assurance Programs

In 1996, the NRC conducted an Operational Safety Inspection (Inspection Report 96-201) to evaluate the effectiveness of the Fermi 2 process for identifying, resolving, and preventing issues that degrade the quality of plant operations or safety. The inspection identified instances where corrective actions were not effective in preventing problem recurrence. The report attributed this to a number of factors relating to initial problem characterization, cause determination, and guidance for escalating management attention to recurrent problems. Detroit Edison acknowledges these observations, but notes that overall, the Quality Assurance and Corrective Action programs have been generally effective in identifying and resolving the majority of problems.

Summary

Detroit Edison concludes that processes and programs have been effective in providing reasonable assurance that the configuration and operation of Fermi 2 is consistent with the design bases. This conclusion is based on the existence and evolution of these processes over the life of the plant. It is further supported by the information derived from programs and activities conducted over a period spanning from preoperation to present, which in the aggregate provide what Detroit Edison believes is a valid assessment of the degree of conformance of Fermi 2 with the design bases of 10 CFR § 50.2. In Section 1, Detroit Edison discussed plans to undertake or continue four initiatives to maintain and enhance future conformance with the design bases.

8.0 FERMI 2 DESIGN REVIEW AND RECONSTITUTION PROGRAMS

The October 9, 1996 NRC letter requested that the response include whether any design review or reconstitution programs have been undertaken, and to provide the rationale for not implementing such a program, description of the completed review programs, or description and status of ongoing programs. The description should include how the program ensures the correctness and accessibility of the design bases information and that the design bases remain current.

Response

The principle "design review and reconstitution" program that has been undertaken at Fermi 2 is the Design Basis Document (DBD) Program, which is described below.

8.1 Design Basis Document (DBD) Program

General

The Fermi 2 DBD program was implemented in two general phases. The first phase involved initial DBD development and began in 1989. This phase was completed in 1995, and the DBDs are controlled documents available at many site locations. This phase involved preparation and issuance of the original revisions of the DBDs. A listing of the Fermi 2 DBDs is provided in Table 8-1. The second phase is presently ongoing phase where the DBDs are maintained and updated as Base Configuration Design Documents in accordance with plant procedures. The majority of the Fermi 2 DBDs are system DBDs. Several topical DBDs supplement the system DBDs to minimize the repetition of design bases common to a number of systems.

The DBD program collated difficult to locate safety related design bases information in a standard format. The DBD validations identified and corrected additional discrepancies between the DBDs, as-built documents, procedures, UFSAR, and Operating License. Over 500 open items were identified and resolved, and the remaining items are being tracked to completion. The DBD program improved the degree of conformance with the design bases and improved the accessibility of design bases information. The DBDs are considered to be living documents and as such, are reviewed for impact during the design modification process.

Program Approach

Even though the DBD program was initiated before NUMARC 90-12, the DBD program generally conforms to the NUMARC 90-12, Design Basis Program Guidelines. All of the DBDs were prepared under either applicable quality assurance programs in accordance with Fermi 2 DBD program procedures and instructions. DBD development included retrieval and review of potential source documents, preparation and review of the DBD, design calculation assessments (see separate description in Appendix A), validation, and open item resolution, and issuance. System DBDs for the systems within the scope of the program contain system-level and component-level (for key components) information in a standard format. Topical DBDs contain

information that is common to a number of systems that is best consolidated in one place rather than being repeated in many of the system DBDs. The three Fermi 2 topical DBDs include Motor-Operated Valves, Equipment Seismic Qualification, and the Design Basis Events Combination Matrix. This third topical DBD provides fundamentals on how the various design bases events were considered with respect to each other within the design bases of the plant. The Design Basis Event Combination and Equipment Seismic Qualification topical DBDs identify plant level design attributes.

Certain attributes of the program and the DBDs are discussed separately in the following paragraphs due to their role in establishing and maintaining the plant SSCs and procedures in accordance with the design bases of the plant.

It was recognized at the inception of the program that the activities required to produce a DBD had the potential to identify apparent discrepancies between various source documents or between the design bases and either the as-built plant or plant practices or procedures. An "open item" process was established as part of the program to document, evaluate and resolve these discrepancies. As part of the process, potentially significant issues were given higher management attention and resolved within the corrective action program. The Fermi 2 site corrective action program is described in Section 6.0.

Fermi 2 conducted design reviews, plant procedure reviews, and licensing document reviews as part of the Design Basis Document (DBD) program. A DBD validation was performed, as part of the program, with an emphasis on consistency among DBDs, UFSAR, and Technical Specifications. During the DBD program, reconstitution of the design bases consisted of (1) collating the "hard to find" design bases information into a standard structured, readily available set of documents; (2) recreating missing documents needed to support the design bases; and (3) correcting inconsistent documents. The validation provided reasonable assurance that the DBD information is consistently reflected in the physical plant and those controlled documents (procedures) used to support plant operation.

The DBDs were formally added to the design and configuration control process. As such, the DBDs are required to be reviewed for applicable plant modifications. They are reviewed and updated in a similar manner as design calculations and drawings. These requirements to maintain the accuracy of the DBDs as well as consistency with the as-built plant. Formal controls are in place to review design changes against procedures and supporting documents. The intent is to keep the plant procedures and other supporting documents such as surveillances, testing requirements, and maintenance activities consistent with the design bases. The DBDs are considered approved Base Configuration Design Documents, and are readily available to all site personnel in easily identifiable controlled copy sets or through ARMS, the Fermi 2 records management system. The design and configuration control processes are described in Section 3.0.

Further details regarding the Fermi 2 DBD Program are available in Appendix A.

Table 8-1 Listing of Issued Fermi 2 Design Basis Documents

DBD No.	Description
A3100	Motor Operated Valves (Topical)
A7100	Primary Containment Isolation System
B2100	Nuclear Boiler System
B2104	Automatic Depressurization System
B2106	Main Steam Isolation Valve Leakage Control
B3100	Reactor Recirculation System
C1100	CRD Hydraulics System
C1107	Reactor Manual Control System
C1108	Rod Worth Minimizer System
C3200	Feedwater Control System
C3500	Remote Shutdown System
C3600	Dedicated Shutdown System
C4100	Standby Liquid Control System
C5100	Neutron Monitoring System
C7100	Reactor Protection System
D1100	Process Radiation Monitoring System
E1100	Residual Heat Removal System
E11XX	Residual Heat Removal Service Water
E2100	Core Spray System
E4100	High Pressure Coolant Injection System
E5100	Reactor Coolant Isolation System
G3300	Reactor Water Cleanup System
G5100	Torus Water Management System
N2102	Feedwater System
P3400	Post Accident Sampling System
P4400	Emergency Equipment Cooling Water
P4500	Emergency Equipment Service Water
P5002	Control Air System
P8000	Fire Protection/Detection (1M)
R1100	Combustion Turbine Generator - 11 (1M)
R3000	Emergency Diesel Generator System
R31XX	Uninterruptible Power Supplies & MPUs
R3200	DC Electrical System
RXX00	AC Electrical System
T2300	Primary Containment Integrity
T4100	Reactor Building HVAC
T4102	Control Center HVAC System
T4600	Standby Gas Treatment System
T4700	Primary Containment Cooling
T4900	Primary Containment Pneumatic Supply System
T5000	Primary Containment Monitoring
XXX02	Design Basis Event Comb. Matrix (Topical)
XXX03	Equipment Seismic Qualification (Topical)
X4103	Residual Heat Removal Complex HVAC

Appendix A

Descriptions of Selected Fermi 2 Activities and Programs

Appendix A contains summary descriptions of the selected programs and activities at Fermi 2 spanning the period preoperation to the present listed below. The programs have been selected for inclusion because they have provided opportunities to develop or review information related to the actual plant configuration, design and as-built documents, design bases, and other configuration control issues, and thereby contribute to the answers provided in this response. It is important to note that many of the programs and activities were not undertaken for the specific purpose of developing or reviewing the type of information discussed in the response.

Each of the summaries includes a brief description of the program or activity, and the effectiveness of the program or activity in providing information about conformance with the design bases is described, with an emphasis on the attributes presented in Table 2-1 of this response.

Section	Program or Activity
A.1	Self-Initiated SSFI Program
A.2	Electrical Design Calculation Improvement Program
A.3	NRC Electrical Distribution System Functional Inspection (EDSFI)
A.4	Self-Assessment Service Water System Operational Performance Inspection (SWSOPI)
A.5	NRC SSFIs (HPCI & NIAS)
A.6	UFSAR Overview (IN 96-17)
A.7	Design Basis Document (DBD) Program
A.8	Calculation Assessment Program
A.9	ISEG Studies
A.10	Biennial Design Control Audit
A.11	Backlog Elimination Project
A.12	Fuse Control Program
A.13	IPE/IPEEE
A.14	MOV Program
A.15	ISI/IST and ISI/NDE Programs
A.16	Maintenance Rule Implementation
A.17	Station Blackout (SBO) Rule Implementation
A.18	System Engineering Walkdowns
A.19	Electrical / I&C As-Built Program
A.20	Improved Technical Specification (ITS) Conversion Program
A.21	Procedures Generation Package (PGPs)
A.22	Employee Concerns Program
A.23	PST Program
A.24	Preventive Maintenance Program
A.25	Plant Labeling Program
A.26	Q-List Improvement Program
A.27	Surveillance Testing Overlap Review

A.1 Self-Initiated SSFI Program (HPCI, LPCI, & Safety-Related HVAC)

Description

In 1987, Fermi 2 began a three-year program of self-initiated Safety System Functional Inspections (SSFIs) as directed by senior station management in order to assess the operational readiness of selected plant safety systems.

SSFIs were performed for the HPCI, LPCI mode of RHR, and Safety-Related HVAC systems (including the Standby Gas Treatment System), and included selected support systems. A fourth self-initiated SSFI of safety related electrical systems was planned, but was replaced by the NRC Electrical Distribution System Functional Inspection (EDSFI) as described in A.3.

Each self-initiated SSFI was conducted by multi-discipline teams comprised of contract personnel supplemented by Fermi 2 staff. The inspections were patterned after and incorporated key elements of NRC SSFIs, including techniques, criteria, inspection schedule, and documentation. Individual inspectors performed detailed reviews of calculations, drawings, logic diagrams, procedures, and other plant design documentation including selected sections of the UFSAR and Technical Specifications. Team members also walked down the selected systems to verify the as-built condition. The inspection teams used a vertical slice verification technique to validate objective and subjective decisions related to safety system functional performance.

Each inspection identified both strengths and weaknesses, and each concluded that the subject systems were capable of supporting designed safety functions. Weaknesses, ranging from isolated documentation discrepancies to more generic issues, were generally of low safety significance, and their dispositions were tracked and completed.

Effectiveness

The self-initiated SSFI program was effective in challenging and revisiting a significant population of design documentation and procedural controls associated with the design and operation of these three groups of systems. This is reflected in Table 2-1 where all of the single activity and comparison attributes are applicable. The inclusion of both in-house and contract team members optimize the depth of coverage and independence from the plant.

These vertical slice reviews provided an added degree of confidence that programs and processes at Fermi 2 have resulted in systems designed, modified, operated, maintained and tested in a manner consistent with their design bases.

Of equal benefit to confirming system functional capability were resultant enhancements including training initiatives and documentation improvements that supported improving overall operational readiness and future performance in response to identified weaknesses.

A.2 Electrical Design Calculation Improvement Program

Description

The Electrical Design Calculations Improvement Program, initiated in 1990 and completed in 1991, consisted of the following tasks to achieve the objectives of upgrading existing electrical design calculations to consistent and current standards and to establish efficient, effective and reliable methods, including software, to perform electrical design calculations:

- Review and revise all QA-1 electrical design calculations to justify assumptions, basis methodology, references, and hand calculations.
- Develop design instructions for sizing motor starters, thermal overload heaters, fuses, cables and molded case circuit breakers. Sizing of the above components was done in the past by design calculations.
- Develop the Electrical Load Monitoring System (ELMS) computer program to calculate and monitor loading, short circuit currents and voltage drops on electrical equipment.

Effectiveness

The calculation review and revision task was effective in systematically verifying that the design bases of equipment within the scope of the program were accurate, properly documented, and controlled. Establishing preapproved methods for performing routine future design tasks and standardizing and automating the ELMS calculations minimized the potential for variation and mathematical errors in future sizing calculations. Completion of the program also required the verification of a significant population of related as-built design information.

Internal and external oversight activities have independently confirmed the effectiveness of the program. The NRC Electrical Distribution System Functional Inspection (EDSFI) team reviewed most of the electrical design calculations at Fermi 2 and considered them a strength, as documented in the associated NRC Inspection Report. (See Section A.3 for additional information on the NRC EDSFI). In addition, Fermi 2 Quality Assurance assessments since the performance of the EDSFI have identified only a few minor problems, which have been corrected. These independent reviews provide additional assurance that actual operation and potential challenges to the electrical system are well understood and the electrical system is capable of performing reliably and effectively.

A.3 NRC Electrical Distribution System Functional Inspection (EDSFI)

Description

An Electrical Distribution System Functional Inspection (EDSFI) was conducted by the NRC in August 1991. The inspection team assessed the performance capability of the Fermi 2 Electrical Distribution System (EDS), including all emergency sources of power to systems required to remain functional during and following design basis events. The team also reviewed the capability and performance of the Fermi 2 engineering and technical support staff in this area, since NRC believed that weaknesses in engineering and technical support had contributed to EDS deficiencies at other utilities. The results of the inspection are documented in NRC Inspection Report 91-017(DRS) dated October 8, 1991.

The inspection reviewed many of the EDS components, including the Emergency Diesel Generators (EDGs), 130Vdc Class 1E batteries, offsite circuits and switchyard, 4kV switchgear, 480Vac load centers, 480 and 120Vac motor control centers (MCCs), 260Vdc MCCs, ac and dc distribution cabinets, battery chargers, inverters, associated busses, breakers, relays, and other miscellaneous components. Mechanical systems interfacing with the EDS were also reviewed. The team walked down originally installed and as-modified EDS equipment for configuration and equipment ratings, and reviewed qualification, testing, and calibration records.

Assessment of engineering and technical support capability included review of personnel qualifications and staffing, timeliness and adequacy of root-cause analyses for failures and recurring problems, and engineering involvement in design and operations. The team also reviewed training for operations and engineering personnel relative to the EDS, and conducted interviews with engineering and technical support staff.

Among the documentation reviewed were the UFSAR, applicable Technical Specifications, system design basis documents, design calculations, protection coordination studies, equipment specifications, LERs, test and operating procedures, one-line electrical diagrams, control logic diagrams, MCC front elevations, elementary schematic diagrams, selected modifications and safety evaluations, process and instrument diagrams, pump performance curves and motor data sheets, annunciator and abnormal operating procedures, and EDG manufacturer technical manuals, selected schematics, detailed component drawings and procurement specifications.

Programmatic assessments of engineering and technical support included review of the temporary modification program, permanent modification program, 10 CFR § 50.59 evaluation program, QA/QC audit and verification program, root cause analysis for LERs, and the adequacy of interfaces between departments.

The inspection found the design and operation of the EDS acceptable, and that the EDS appeared to be functional under design conditions.

The team did not identify any operability concerns, and there were no violations of NRC requirements identified. The inspection concluded that emergency power sources were sized properly and adequate voltage was available to essential buses to accommodate EDS loads. Protection and coordination of the protective equipment was good, and the scope of EDS testing was appropriate. Design attributes of the EDS were retrievable and verifiable, and engineering calculations were found to be acceptable. Technical support for the EDS was rated adequate, and the Fermi 2 staff was found to be knowledgeable and competent.

The inspection identified both strengths and weaknesses in the areas reviewed. The weaknesses identified were not safety-significant, and in several instances corrective or mitigative actions were underway when the issues were identified. Failure to recognize a declining performance trend as early as possible, lack of design margin in battery sizing calculations, potential for water hammer in the RHR Service Water system, testing of Topaz brand static inverters, and the design of the dc ground detection system were among specific identified weaknesses. Coordination of dc systems using an all-fuses design, documentation supporting coordination of ac systems, the methodology for sizing MOV thermal overloads, and the small number of active temporary modifications were among the strengths noted.

Effectiveness

This inspection was effective beyond evaluating the adequacy of the EDS and associated engineering support. Due to the inclusion of a larger group of related systems in one inspection, the EDSFI provided a broader perspective than the vertical slice evaluation of the SSFIs. In so doing, the EDSFI provided Fermi 2 staff a programmatic view of engineering and design processes, which when combined with both vertical and horizontal slice evaluations, provides a more balanced look at the health of programs and processes. As reflected in Table 2-1 and the above description of the inspection scope, the EDSFI exhibited all of the single activity and comparison attributes shown by the table. The findings of the EDSFI are consistent with those of other Fermi 2 vertical and horizontal slice review activities in that although issues and discrepancies were identified, they did not impair functional capability of the systems.

The results of this inspection confirmed the integrity of the Electrical Distribution System and provided confidence in its ability to successfully perform its function.

A.4 Self-Assessment Service Water System Operational Performance Inspection (SWSOPI)

Description

The NRC developed a program to perform special Service Water System Operational Performance Inspections (SWSOPI) due to concerns over a historical lack of attention to the design, operation, and maintenance of service water systems throughout the nuclear industry. These problems included inadequate heat removal capability, biofouling, silting, single failure concerns, erosion, corrosion, insufficient original design margin, lapses in configuration control, improper 10 CFR § 50.59 evaluations, and inadequate testing. Detroit Edison chose to conduct its own inspection, as allowed by the NRC. The team that performed the self-SWSOPI was comprised of nine individuals from both Detroit Edison and outside contractors, including industry recognized experts that have been utilized by the NRC for performance of similar type inspections.

The safety related service water systems (SWS) that were included in the scope of the SWSOPI were emergency equipment service water (EESW), emergency diesel generator service water (EDGSW), residual heat removal service water (RHRSW), and the emergency equipment cooling water (EECW). In addition, the non-safety related general service water (GSW) system was reviewed due to NRC concerns related to its operation and performance. The inspection was performed to meet the objectives of NRC Temporary Instruction TI 2515/118, and to achieve these objectives, various documents, including procedures, UFSAR, Technical Specifications, calculations, modification packages, licensing correspondence, and safety evaluations were reviewed. The Fermi 2 heat exchanger performance testing, piping inspection, and biofouling monitoring programs were also reviewed in the course of the SWSOPI, and the assessment team also performed an in-depth review of Fermi's response to Generic Letter 89-13, including follow-up actions.

Effectiveness

As pointed out in the description above, this inspection exhibited all of the individual and comparison attributes covered by Table 2-1. As with the EDSFI, this assessment activity provided a broader perspective than a single-system SSFI while still using a vertical slice evaluation technique for the individual constituent systems.

A total of 63 issues were formally documented regarding various aspects of the SWS, including one that resulted in a plant shutdown and subsequent modification to restore the EECW system's ability to operate in accordance with its design bases under all postulated combinations of events. Forty-two Deviation Event Reports were initiated.

As a further measure of effectiveness, NRC inspectors performed a follow-up inspection on the self assessment. Overall, the inspectors concluded that the self-assessment was adequately performed.

A.5 NRC SSFIs (HPCI & NIAS)

Description

Safety System Functional Inspections (SSFIs) of the High Pressure Cooling Injection (HPCI) system and the Non-Interruptible Air Supply (NIAS) System were conducted by the NRC as part of their Operational Safety Inspection in 1996. They employed a vertical slice assessment technique in reviewing the functional areas of operations, maintenance, surveillance and testing, engineering design, design control, and quality assurance and self-assessment as related to the subject systems. Within these areas, emphasis was placed on functionality of systems and hardware, rather than focusing review on programmatic requirements.

The HPCI and NIAS system evaluations included design documentation review, system walkdowns, and discussions with cognizant engineers. Document reviews covered selected portions of the UFSAR, Technical Specifications, applicable Design Basis Documents (DBDs), design calculations, drawings, selected Environmental Qualification (EQ) documents, Deviation Event Reports (DERs), Engineering Design Packages (EDPs), inservice and surveillance test procedures, and operating procedures. Included in these reviews were verification of the appropriateness and correctness of design assumptions, boundary conditions, and system models; verification that the design bases were in accordance with the licensing bases and commitments and regulatory requirements; and verification of the adequacy of the testing requirements.

The inspection findings are documented in NRC Inspection Report IR 96-201 dated November 12, 1996. The SSFI concluded that the HPCI and NIAS systems are capable of performing their intended safety functions. Review of the UFSAR and DBDs for the subject systems identified technical discrepancies of the same nature as the Fermi 2 UFSAR Overview and self-initiated SSFIs.

Effectiveness

All of the single and comparison activity attributes covered in Table 2-1 were performed for these vertical slice inspections, concluding that this activity was effective in reviewing information relating to design and configuration control, including procedures.

This inspection proved timely in that when combined with the recent horizontal-slice UFSAR Overview Project, these vertical slice SSFIs provided Fermi 2 with insight into the overall effectiveness of Fermi 2 programs and processes. Of particular importance to this response is that although discrepancies exist within the documentation that seem to be consistent with the types of discrepancies identified in other Fermi 2 vertical and horizontal slice reviews, the SSFIs concluded that the systems were found to be capable of performing their intended safety functions. These findings provide added confidence that Fermi 2 has a understanding of the issues and their resolution as well as providing adequate assurance that Fermi 2 has maintained conformance with the design bases, recognizing the need for improvement in areas noted.

A.6 UFSAR Overview Project

Description

As a result of the FSAR conformance problems at another utility described by NRC Notice 96-17, Detroit Edison conducted an assessment of the Fermi 2 UFSAR to determine whether a similar situation existed at Fermi 2. This was seen as a cost effective method to identify the maximum number of discrepancies, with objectives to increase the level of confidence that Fermi 2 design and operation are consistent with the licensing basis, that programs are maintaining the UFSAR accuracy as required, and that any deviations are corrected.

The overview project could be described as a horizontal slice evaluation encompassing the entire UFSAR, with the exception of Technical Specifications and Regulatory Guide positions. However, in cases where Regulatory Guides were referenced in the UFSAR section being reviewed, the applicable Regulatory Guide position was also reviewed. Reviews were aimed at ensuring completeness as well as accuracy, with direction given to consider design features that may have been omitted from UFSAR system descriptions. System Engineers were asked to focus on system operation and testing, and although no specific plant "walkdowns" were directed, the expectation that they would verify UFSAR information during the course of routine system walkdowns was made clear.

The UFSAR was divided into 440 individual review packages, which were assigned to reviewers, such that each area would be reviewed by a least one subject matter expert. Reviewers were asked to judge UFSAR accuracy based on their knowledge of equipment design, configuration, and operation, but were not required to research and validate each point in the UFSAR. Reviewers were also asked to recommend additional reviews if they felt special expertise was warranted, which increased the total number of reviews by approximately ten percent.

A management team oversaw activities, ensuring that actions were timely, that discrepancies identified received appropriate attention, and that necessary resources were made available to the overview team. The oversight team also coordinated with Quality Assurance to arrange a special surveillance to evaluate the effectiveness of the project.

UFSAR discrepancies identified with the overview program were addressed by the Deviation Event Report (DER) process in accordance with site procedures to ensure timely operability and reportability determinations. Additionally, problems identified though the project were characterized according to the program that introduced the discrepancy, the process that was being implemented, and the barrier(s) broken that allowed the discrepancy to be introduced in an effort to ensure effective programs are in place to maintain the licensing basis.

The project identified approximately 180 discrepancies (including problems from other DERs initiated during 1995 and 1996), identified common characteristics of the discrepancies, and resulted in the following conclusions:

1. More than half of the identified problems existed from initial issuance of the Updated FSAR (UFSAR revision 0).
2. The initial evaluation of the deficiencies that occurred since original issuance of the UFSAR determined that most were related to inadequate determination of UFSAR impact in the Preliminary Evaluation (part of the two stage 10 CFR § 50.59 review process).
3. No change process (i.e., design change, procedure change, etc.) could be singled out as the predominant source of discrepancies.
4. A small number of the discrepancies occurred when plant changes were effected using the improper process, e.g., work requests.
5. None of the individual discrepancies were determined to significantly impact safety.

Effectiveness

This activity is an example of a horizontal slice of a single document (UFSAR) over a wide spectrum of systems, subjects, and processes. As a result, all of the activity attributes interfacing with the UFSAR depicted in Table 2-1 apply to this activity. Because of the overview nature of this effort, it must be assumed that a number of discrepancies remain unidentified. The nature of the discrepancies identified in the UFSAR Overview are consistent with those identified in recent vertical slice activities such as the internal SSFIs, NRC SSFIs, and SWSOPI. Therefore, while additional effort is needed to improve the UFSAR, the review has provided reasonable confidence that Fermi 2 is configured and operated in a manner consistent with the design bases. This review has also identified areas where improvement is necessary to enhance ongoing UFSAR conformance.

Due to the overview nature of this effort there were recognized limits to its overall effectiveness. For example, the scope did not include a detailed comparison of procedures to the UFSAR content. However, within the bounds of its scope, the project effectively identified and provided for correction of discrepancies. Further, the UFSAR Overview increased the level of confidence in the effectiveness of programs and processes that maintain the licensing bases while providing insight into areas where improvements are needed.

Nuclear Quality Assurance has performed an assessment of the UFSAR Overview effort. Based on the scope of the UFSAR review and expected results, the review effort was assessed as effective.

A.7 Design Basis Document (DBD) Program

Description

The Design Basis Document Program began as a self-initiated program in response to heightened industry awareness and NRC interest during the late 1980s. It became a "committed" program in 1989 as a corrective action to NOV 89-006-1, related to a portion of the secondary containment boundary that did not meet original design criteria.

Section 8 of this Response describes the scope, approach, and status of the Fermi 2 DBD Program, and these details are not repeated here. The discussion of the effectiveness of the program as it relates to this Response and its attributes as summarized in Table 2-1 are provided below.

Effectiveness

The DBD Program created a new series of design documents, requiring a significant degree of comparison with many other types of documents during the course of source document review, DBD preparation, and validation. Accordingly, Table 2-1 reflects the design document attribute and all of the comparison attributes involving design documents. The DBD validations identified and corrected additional discrepancies between the DBDs, as-built documents, procedures, the UFSAR, and the Operating License. Over 500 DBD Open Items were identified and resolved and the remaining items are being tracked to completion.

Quality Assurance has performed assessments of the DBDs during their development. Areas of concern were addressed as the development progressed. Following implementation, the DBDs were added to the scope of the Design Control Audit as an item to be reviewed for impact due to plant modifications. Discrepancies involving the DBDs identified during QA activities have not impacted the overall assessment for the Design Control Audit as being satisfactory.

In 1996, the NRC conducted two SSFIs as described in Appendix Section A.5, which included an in-depth review of the two associated system DBDs (HPCI & NIAS). As pointed out in A.5, although discrepancies involving the DBDs were identified, they were not safety-significant and did not affect the ability of either system to perform its required safety related functions.

A.8 Calculation Assessment Program

Description

Design calculation assessments (DCA) were undertaken from 1993 to 1995 as part of the Design Basis Documents (DBD) validation effort and met the intent of NUMARC 90-12, "Design Basis Program Guidelines." The program verified that the available design calculations met current standards at the time of the assessment and that they supported the conclusions of the DBDs.

The program first identified calculations that provide the basis for the system or a major component within the scope of the Fermi 2 DBD program, and subsequently documented the answers and bases to standard questions relating to the adequacy of the calculation assumptions, methodology, and suitability for use as a DBD reference. If the calculation assessment concluded that revision was needed to support its use in the DBDs, the required revisions were implemented through the DBD Open Item resolution process. The need for calculation assessments was addressed for all of the systems for which DBDs were prepared. Calculations were assessed for 35 systems, no calculations were associated with two systems, and were determined to not be required for four BWR-4 NSSS systems where the design calculations are not plant-specific and reside at General Electric.

Effectiveness

This program reviewed a key subset of calculations over a wide spectrum of systems and topics for suitability as DBD source documents. This program is characterized in Table 2 primarily as a design document activity with comparison to as-built information. This effort was successful in identifying and correcting design calculation errors and discrepancies. Of the over 400 design calculations reviewed, 84 DBD open items were created, of which only 3 were identified as being potentially significant. After further review, only 1 was transferred to the site corrective action program. No operability issues were identified.

Quality Assurance assesses design calculations as part of the plant modification process. In 1995 and 1996, discrepancies were identified in the LVELMS and other calculations. These discrepancies were not significant and did not impact the assessment of the area being evaluated, nor did they require an individual assessment of the design calculation process.

A.9 ISEG Studies

The Independent Safety Engineering Group (ISEG) has performed oversight activities related to design and configuration control that related to the subject of this response. Examples of these activities performed over the past ten years are provided in the following subsections. The year of each is reflected in the associated ISEG Report number, e.g., 86-010.

Effectiveness

All of the ISEG studies are reflected by a single entry in Table 2-1. The individual ISEG studies that are discussed in this section have been selected on the basis of providing total coverage of single activity and comparison activity attributes. ISEG is an internal oversight organization, and as such, all of the studies described are designated as Internal Oversight activities in Table 2-1.

A.9.1 Technical Specification Surveillance Program Functional Evaluation (ISEG 86-010)

Description

The objective of this functional evaluation was to assess the adequacy of the Technical Specification Surveillance Program. The elements of the assessment included verification that Tech Spec surveillance requirements were included in procedures, that tasks were identified in a schedule and would be initiated at the appropriate time, that a one-for-one correspondence existed between the "Limiting Condition for Operation" statement and the specified surveillance tasks, and that surveillance procedures were adequate as verified by an in-depth review of a random sample of procedures.

As a result of the in-depth review of a selected sample of surveillance test procedures, deficiencies were found in the areas of in-service inspection, overlap criteria, allowance for Emergency Diesel Generator (EDG) start and sequence loading times, independent verification, and procedural accuracy. These findings and all other comments were sent to Nuclear Production under separate cover as they were identified. Some of the findings were determined to be reportable to the Nuclear Regulatory Commission (Reference LER 86-022).

With exceptions as noted in the Evaluation, Technical Specification requirements were covered by procedures, were performed within the required time periods, and were found to blanket the Limiting Condition for Operation requirements. Although a larger than desired number of discrepancies were identified in the procedure review activity, many of those items had been or would have been detected and corrected during procedure performance. Based on the above and consideration of the total scope of the surveillance program, the overall program was judged to be adequate. Actions were taken to resolve the discrepancies identified.

Effectiveness

This activity occurred during the initial operating period of the Fermi 2 plant. Because it represented a 100% verification of the Technical Surveillance Requirements at that time, and because deficiencies were resolved, it was extremely important in establishing a baseline for the procedural control of Technical Specification surveillances. Table 2-1 represents Technical Specification and procedure activity attributes. The evaluation also compared Technical Specifications with procedures. Although this specific comparison attribute is not part of the Table.

A.9.2 Surveillance Evaluation of Operations - Locked Valve Guidelines (ISEG 89-005)

Description

In the spring of 1989, an evaluation was performed by ISEG of the Locked Valve Guidelines and their implementation by the Nuclear Generation Organization. The evaluation consisted of the following two major activities:

- a review of the Nuclear Engineering and Nuclear Production procedures and design calculations to assure that Fermi-2 meets the requirements and/or commitments made in the UFSAR and other related correspondence,

- performance-based plant inspections of two systems (Core Spray and Standby Liquid Control) to verify that implementation requirements of the existing approved procedures were being met.

The evaluation found that Nuclear Production/Nuclear Engineering procedures were in general compliance with Locked Valve Guidelines and accessible valves required to be locked in the Core Spray and Standby Liquid Control systems were verified to be locked in their proper position. However, a few discrepancies resulting in the issuance of four DERs, were identified during this evaluation. For the most part, these deviations involved discrepancies between UFSAR drawings and Functional Operating Sketches. The Locked Valve Calculation (DC-4959) issued by Nuclear Engineering in January, 1989 was concluded to be comprehensive and capable of complying with requirements and/or commitments.

Effectiveness

This evaluation represented a vertical slice evaluation involving a number of design documents and processes for a specific scope of Fermi 2 components. Table 2-1 attributes reflected by this activity include UFSAR, design document, procedures, and their comparison with each other.

Subsequent assessments by Quality Assurance has found discrepancies associated with the locked valve program. An extensive review of the locked valve program has been conducted by Plant Engineering to correct these deficiencies.

A.9.3 ISEG Selected Narrow Scope (i.e. Vertical Slice) Evaluations

Description

ISEG periodically conducts narrow scope evaluations of selected systems, subsystems, structures or components or in other cases specific implementation documents such as EDPs. These evaluations typically involve the review of design bases documents, Technical Specification procedures, training and calculations as appropriate, to ensure that the current design(s) are capable of performing their intended functions. In the case of configuration changes, the evaluations include evaluation of preliminary or full safety evaluations to ensure that no unreviewed safety questions exist. The list following this write-up is an example of such evaluations, and represents a wide spectrum of evaluation types and scopes.

Effectiveness

These activities collectively represent a significant population of as-built design document, UFSAR, Technical Specification, and Procedure reviews, as well as various comparisons of these documents, as reflected in Table 2-1.

Certain of the activities listed below identified discrepancies or deficiencies not described in this Response. Deficiencies meeting the criteria of the corrective action programs in place at the time of the evaluations were resolved through that program. ISEG recommendations for enhancements were provided to appropriate levels of Fermi 2 management and resolved to ISEG's satisfaction.

List of Selected ISEG Narrow Scope Evaluations

1 **ISEG 88-004, Rev. 1** **Evaluation of an EDP from a Safety Viewpoint**

This evaluation concluded that a single selected EDP, including the Safety Evaluation, was adequately prepared.

2 **ISEG 89-008** **Evaluation of Selected Instrumentation for Adherence to the Technical Specifications**

This evaluation reviewed eight completed surveillance packages involving numerous instruments. In each case the acceptance criteria specified was verified to be consistent with the limits required in the Technical Specifications. In addition, the design calculations associated with the creation of the setpoints were determined to be in agreement with the GE setpoint methodology and the surveillance procedures.

3 **ISEG 89-017** **Technical Evaluation of Suppression Pool Water Temperature**

This evaluation reviewed the procedures that are used to implement the

Technical Specifications and Emergency Operating Procedure guidelines and verified that they contained the required steps to implement the applicable requirements.

4 **ISEG 89-018** **Technical Evaluation of High Drywell Pressure Signals**

This review verified that the design intent is met by the current design and procedures through comparing the various Design Bases Documents with calculations. Various UFSAR sections, approximately forty procedures, twenty drawings, and several design calculations were reviewed during this task for consistency with the design bases.

5 **ISEG 89-019** **Technical Evaluation of the Minimum Rated Core Spray Flow**

Various documents were reviewed, including design calculations, procedures, the UFSAR, and vendor specifications, concluding that the Core Spray minimum rated flow was consistently and correctly reflected in the various documents.

6 **ISEG 90-005 & 90-005, Rev. 1** **Technical Evaluation of Fuel Pool Level Design Requirements**

This study reviewed the spent fuel pool water depth design and associated plant changes and concluded that the changes do not compromise the original design intent and were found to meet applicable requirements.

7 **ISEG 90-006** **Technical Evaluation of Standby Liquid Control System**

This review looked at various aspects of the electrical design bases of the SLC system and concluded that the system would operate as designed.

8 **ISEG 90-009** **Technical Evaluation of Direct Current System (R3200) Div. II 130/260 VDC**

This evaluation confirmed the adequacy and reliability of the 130/260Vdc system during both normal conditions as well as in the event of loss of offsite power. In addition to reviewing the design, the maintenance and surveillance program for the system was evaluated.

9 **ISEG 90-011** **Surveillance Evaluation of Residual Heat Removal Complex Ventilation System Damper Actuators**

This evaluation verified that the RHR Complex ventilation system dampers were properly configured to support EDG operability as required by Technical Specifications, the maintenance activities were generally adequate, and that design documents were adequately reflected by the as-built configuration. The supporting review included reviewing operating procedures, maintenance activities, and design documents associated with the system.

10 **ISEG 90-015** **Technical Evaluation of EDP 11044 (Drywell Power and Lighting)**

and EDP 9828 (MSIV Control Room Status Indications)

This report verified that the design requirements as established by existing specifications were addressed for the referenced EDPs from their inception to implementation.

11 **ISEG 92-003** **Implementation Review of Technical Specification Amendment 80**

This review evaluated the elements needed to effectively implement Technical Specification (TS) Amendment 80, including training for licensed operators and revising related procedures.

12 **ISEG 93-015** **Independent As-built EDP Review**

EDP 13863 replaced an obsolete transmitter in the South Offgas Ring Water pump indication loop. This study verified that the EDP was properly implemented with respect to hardware installation requirements, and recommendations were made concerning post-maintenance/design change acceptance testing.

A.9.4 Evaluation of the HPCI System, January-February 1986 (ISEG 86-003)

Description

This evaluation was patterned after a Safety System Functional Inspection (SSFI) type inspection and involved over 1000 ISEG Engineering hours. The assessment included a determination of:

- The capability of the High Pressure Coolant Injection (HPCI) system to perform its safety function.
- Adequacy of testing to demonstrate that the system would perform its required safety functions.
- Adequacy of system maintenance to support operability.
- Adequacy of the system procedures to support proper system operation under normal and accident conditions.

Recommendations regarding design basis and configuration control findings were made in the following general categories:

- Documentation
  - maintain design basis
  - independent design review documentation
  - correct discrepancies
- Design Changes and Implementation
  - 10 CFR § 50.59 training
  - follow EDP or document approved deviations
- Modification Completion Turnover
  - field verifications and associated documentation
  - NSS signoff, turnover, and return to service
- Procedures and Procedure Changes
  - technical reviews
  - operator training
  - timely processing of revisions
- Operability Determinations as part of DER process

Effectiveness

The findings of this early "SSFI" were effective in addressing discrepancies and identifying process improvements early in the operating life of the plant. In comparing the findings of this activity with those of more recent vertical and horizontal slice review activities, it is apparent that many of the same topics appear in recent reviews. This is primarily due to raised expectations as processes evolve rather than the processes being ineffective. This supports the conclusion that maintaining the accuracy of plant documents is an ongoing process that is supported by periodic horizontal and vertical slice reviews, in conjunction with required corrective actions.

A.10 Biennial Design Control Audit

Description

The Design Control Audit is a biennial audit required by the Technical Specification 6.5.2.8.d and UFSAR Chapter 17.2 that is performed as part of the Fermi 2 Nuclear Quality Assurance (NQA) program. The audit has been a part of the audit and surveillance program since initial plant operation, the most recent being performed in 1996. This audit includes those activities performed by Nuclear Generation that affect Configuration Control, Design Basis, Environmental Qualification, Seismic Qualification, Change Control, ALARA, PE and SE (10 CFR § 50.59) evaluations, procedure updates, UFSAR updates and training impact of design changes. NQA utilizes Peer Evaluators and Technical Specialists when feasible. In addition to the biennial audit NQA conducts surveillances and oversight activities on implementation of modifications during refueling outages.

The Audit Scope includes configuration control and the design process; preparation and conduct of design change packages, subsequent testing, and the results of the change after implementation.

The following elements are reviewed for adequacy as part of the audit:

- Configuration Control
    - a) agreement of various design and commitment documents
    - b) agreement of the actual plant configuration with the documentation
- EDPs/plant modifications (including temporary modifications)
    - a) scoping documents
    - b) problem solution
    - c) EDPs/plant modifications communicated effectively to personnel doing modification?
    - d) affected design calculation revision
    - e) design change safety evaluation
    - f) EDPs/plant modification constructable, maintainable, operable?
    - g) LCRs issued to cover necessary changes to the UFSAR
- Interfaces, walkdowns, and communications
    - a) within engineering
    - b) external
- Change requests (ECRs and TSRs)
- Design Evaluations (tests, calculations, etc.)
- Design Verifications
- Impacted operating/emergency operating procedures and/or simulator/training
- ASME Code reconciliations
- Needed materials/equipment specified in EDP/plant modification packages
- Post modification tests
- EDP impact on Equipment Qualifications program (required records)
- Applicable Technical Specification Changes
- CECO

The Design Control Program adequately designs plant modifications and maintains design bases. Weaknesses have been identified in Engineering Design Packages and maintaining plant configuration controls during NQA Audits, Surveillances and Engineering oversight activities. Configuration Control is relatively well maintained in the QA Level I (safety related) Systems in comparison with the balance of plant (BOP) systems. For all DERs originated by NQA with a significance level 1 or 2, NQA provides an in-line review of corrective actions taken before closure of the DERs. NQA reviews the previously identified deficiencies during audits to see if problems are recurring.

Effectiveness

In the context of this response related to design basis and configuration control, this particular biennial program audit reviews virtually all of the key related topics. Specifically, the past audits have looked at the UFSAR content and update process, modification process and 10 CFR § 50.59 safety evaluation implementation, consistency of design bases with plant configuration, UFSAR content, operating license, and procedures. Table 2-1 reflects the applicability of all of these attributes and their comparison.

The series of Biennial Design Control Audits have concluded that the Design Control Program adequately implements plant modifications and maintains design bases, notwithstanding the discrepancies identified and corrected through the audits.

A.11 Backlog Elimination Project

Description

A large engineering backlog was first identified in a 1992 Quality Assurance audit as contributing to configuration control discrepancies, and a follow-up audit in 1994 confirmed that the backlog continued to be a potential problem. In recognition that existence of excessive engineering backlog could challenge properly designed configuration control processes and that the individual and collective safety significance of the backlog items was not known, the Fermi 2 Backlog Elimination Project was initiated in 1995 to work off the backlog of engineering tasks that had developed over the preceding few years. The project was supported by a dedicated multi-discipline staff, which utilized existing Fermi 2 processes and procedures to complete engineering tasks.

The Backlog Elimination Project consisted of the following subprojects, which parallel project objectives:

- Reduce number of Open Level 1 and Level 2 Deviation Event Reports (DERs)
- Clear Restraints for Partially Installed Engineering Design Packages (EDP)s
- Reduce Plant Support Engineering Backlog for other types of design-related documents.

The project was completed with the following key results:

- The project eliminated backlog items that had been open for a considerable period of time (several years in some cases), resulting in remaining work consisting of recent work items.

- The backlog reduction project did not identify safety-significant issues that were attributed to the existence of the backlog.

Effectiveness

Due to the wide spectrum of document change and review subtasks associated with the project including design documents, As-Built Notices, and UFSAR changes, Table 2-1 reflects project attributes including as-built information, design documentation, and UFSAR, as well as comparisons between design documents and as-built information and UFSAR content.

This project was effective in confirming that the engineering backlog did not contain safety-significant issues, correcting known discrepancies, and in confirming the accuracy and validity of design information within the scope of the project.

A.12 Fuse Control Program

Description

The Fuse Control Program was established in 1984 to provide positive assurance that correct fuse installation and control existed at Fermi-2.

Specification 3071-128, Section EJ was established to list all QA Level 1 fuses with type, rating, location and associated drawings. This specification is a BCDD and Control Room document that is used by Operations for fuse replacement. Subsequent revisions of this specification added BOP fuses as part of the ongoing effort to complete this list. The fuses that are listed in this specification were verified by field walkdown to confirm the fuse type, size, and adequacy of circuit protection in accordance with Detroit Edison standards.

Effectiveness

The Fuse Control Program provided a single source document for accurate information on fuses, which helps operation, maintenance and engineering personnel to perform their activities more effectively. Development of each of the phases of the program involved establishing the requirements for each fuse, verifying that the proper fuses are installed, and establishing processes for assuring that the proper fuses are provided, stocked, and used for replacement. The determination and installation of correct fuse sizes has provided increased confidence that electrical systems will both operate within their design bases, and that malfunctions will be effectively mitigated.

The NRC EDSFI has reviewed the fuse control program at Fermi 2 and considered it a strength as documented in Inspection Report 91-017(DRS) dated October 8, 1991. (See Appendix A.3)

Quality Assurance assesses the fuse control program as part of engineering evaluations or other activities where it may be impacted. Discrepancies identified with the "EJ Spec" during QA evaluations have been mostly related to failure to update the specification after completion of a modification. These discrepancies do not occur on a regular basis, and therefore have not required this area to be specifically assessed. Discrepancies in this area have not impacted the overall rating of the programs being assessed.

A.13 IPE / IPEEE

Description

Fermi 2 has conducted an Individual Plant Examination (IPE) in accordance with Generic Letter 88-20 for both internal events and external events (IPEEE). The purpose of these examinations was to provide assurance that Fermi 2 did not constitute an "outlier" with respect to vulnerability to severe accidents as well as to better understand and appreciate severe accident behavior. While these examinations did not constitute a formal program to verify compliance with the UFSAR, the IPE and IPEEE did provide an independent means of evaluating overall plant safety. In some cases the conduct of the IPE and IPEEE did validate the adequacy and accuracy of various plant design documents and procedures.

The conduct of the IPE included developing success criteria for accident mitigation and compiling system dependencies to a level of detail that provided a check of many aspects of the Fermi 2 design and operation. Similarly, the IPEEE portion of the analysis resulted in the verification of as-built information including the location of key plant systems and components in the course of modeling spatial interactions. In addition, the IPEEE treatment of "other" external events (high winds, floods, and transportation and nearby facility accidents) included a comparison of the currently existing hazard with the Fermi 2 UFSAR.

Effectiveness

While the IPE and IPEEE efforts were not intended to provide direct assurance of licensing basis compliance, their method of conduct provided a degree of independent review of such conformance in selected areas as discussed above. The activity provided a structured review of SSCs that support plant shutdown, as-built document and design basis reviews, and plant walkdowns. The activity also provided independent verification of certain plant attributes, design documents, operating procedures, maintenance practices and maintenance procedures.

A.14 MOV Program

Description

Fermi 2 had established a Long Term Motor Operated Valve (MOV) program for the Program Action Plan for the Safety related MOVs and Balance of Plant (BOP) MOVs in 1988 prior to the issuance of NRC Generic Letter 89-10 (GL 89-10) for Safety related MOV Testing and Surveillance. The Long Term MOV Program Action Plan submitted the NRC in December 1988 included the following two documents for BOP and Safety-Related MOVs:

- BOP MOVs Torque and Limit Switch Settings Verification Plan
- Follow-up Program Plan for Safety-Related Motor-Operated Valves

Subsequently, in response to GL 89-10, Fermi 2 committed to performing design basis review, static testing and limited dynamic testing of all safety related MOVs within 5 years or 3 refueling cycles, whichever occurs later.

Fermi 2 revised the MOV Program Action Plan for the safety related MOVs to comply with the NRC commitment. The design basis reviews for all safety related MOVs (147-MOVs), which are included in the GL 89-10 Program, have been completed. The design parameters such as valve factor, rate of loading, and coefficient of friction have been validated by either in-plant-MOV testing data or industry MOV testing data from other plants. Fermi 2 also participated in EPRI MOV Performance Protection Prediction (PPM) and have used EPRI PPM for certain MOVs that are non-testable under dynamic conditions. Fermi 2 Plant Procedures are in place for controlling switch setting and diagnostic evaluation for post plant maintenance testing for these GL 89-10 MOVs as well as other MOVs. NRC GL 89-10 also required utilities to establish a Periodic Verification Program (PVP) for MOV to periodically performance test capabilities of applicable MOVs. Fermi 2 has established the PVP and started implementing it during RFO5. However, in response to currently issued NRC Generic Letter 96-05 for PVP, Fermi 2 is in the process of revising the existing PVP for complying with the new Generic Letter 96-05.

Fermi 2 has established an MOV Program for both the safety related as well as BOP MOVs. Plant procedures are in place for diagnosis and configuration control. The measures taken at Fermi 2 will ensure the reliable performance of all MOVs once the total program implementation is completed.

Effectiveness

The MOV program provided the opportunity to review the design bases and performance requirements for MOVs within the scope of the GL 89-10 program. The attributes shown for the MOV program in Table 2-1 reflect the wide range of single-purpose and comparison activities involving various as-built information, design documents, procedures, UFSAR, and Technical Specifications. The extensive MOV static and dynamic testing performed at Fermi 2 have corrected certain weaknesses such as lower available trust, weak spring packs, and have improved MOV performance, which is reflected in fewer inadequate MOV performance incidents.

NRC Region III has performed three (3) inspections of the GL 89-10 MOV Program during the implementation phase. The third NRC inspection was for closing the initial phase of GL 89-10 activities. The NRC issued NRC Inspection Report No. 50-341/95010 dated October 12, 1995 for satisfactory completion of the program and advised Fermi 2 that the NRC will continue to inspect various MOV program elements as part of NRC ongoing inspection activities.

QA assessments during the development and implementation of this program noted deficiencies requiring action by engineering to correct isolated deficiencies in design calculations and database entries. The overall conclusion of the Fermi 2 GL 89-10 MOV program is satisfactory.

A.15 ISI / IST and ISI / NDE Programs

Description

The Fermi 2 Inservice Inspection - Non Destructive Examination (ISI-NDE) and Inservice Testing (ISI-IST) Programs have been implemented as required by 10 CFR § 50.55a "Codes and Standards". ASME Section III, Class 1, 2, 3 and other essential components, necessary to bring the plant to a safe shutdown condition following an accident as defined in ASME Section XI, are included in the ISI/IST Program. The purpose of the ISI-IST Program is to detect degradation in pumps and valves, thus identifying the necessity to repair the components before they become inoperable. The purpose of the ISI-NDE Program is to verify the continued structural integrity of components required during normal and abnormal seismic plant operation. Additionally, the Performance Evaluation Program (PEP) is responsible for Predictive Monitoring (vibration, oil, thermography), Lost Megawatt recovery, heat exchanger monitoring, and data consolidation and trending.

Pump and valve tests (pump performance, valve stroke time, SRV, Type B & C LLRT & GL 89-10 MOV tests) are conducted in accordance with the ISI-IST Program which provide for the monitoring of selected performance parameters. Typically, acceptance criteria for these parameters are identified in the UFSAR, Technical Specifications, Design Calculations, or applicable ASME Codes or established based on reference test values. Routine testing is performed to identify adverse trends in pump and valve performance so that corrective actions can be implemented before the component becomes inoperable. If performance degradation to specified Code values is identified, the component's testing frequency is increased as required by Code.

The ISI-NDE Program verifies the continued structural integrity of the ASME Section XI Class 1, 2 and 3 components, integral attachments and supports required during normal and abnormal seismic plant conditions. Additional augmented inspection recommendations and requirements are also included in the ISI-NDE Program. Structural integrity is verified by performing UT, PT, MT and/or VT examinations of: Integral attachments for vessels, piping pumps and valves; Pressure retaining welds in vessels, piping, pump casings and valve bodies; Reactor Pressure Vessel Invessel Visual Inspections (IVVI); Valve internals and bolting visual inspections; Snubber and hanger visual examinations; Snubber functional testing; and, System hydrostatic and pressure testing.

Effectiveness

These programs provide an important link between the actual performance of key plant components and acceptance limits as derived from their design bases. Accordingly, Table 2-1 reflects attributes related to the sources of performance requirements (design documents, UFSAR, Technical Specifications, Surveillance procedures), as-built information (actual performance data and trending), and associated comparisons. The program provides periodic validation of many design basis parameters and valves.

A.16 Maintenance Rule Implementation

Description

Fermi 2 has recently implemented 10 CFR § 50.65, referred to as the "Maintenance Rule" (MR). The purpose of the MR is to 1) monitor the performance of safety related and certain significant non-safety related structures, systems and components (SSCs) and 2) assess the effectiveness of maintenance activities in order to minimize the likelihood of failures and events caused by lack of effective maintenance. It is designed to focus maintenance resources directly on systems and components important to plant safety.

In the process of MR implementation, SSCs were selected, their function(s) identified, and performance criteria established. These reviews involved the following major design and operating documents to ensure that the required SSCs, their function(s) and associated performance criteria were accurately defined:

- DBDs & Design Specifications
- UFSAR & SER
- Technical Specifications and Bases
- PSA/IPE/IPEEE
- Environmental Qualification (EQ) Program
- EOPs/AOPs

The fully implemented program has:

- Identified SSCs (systems) most important for the safe operation of the plant.
- Identified systems that require additional management attention and a "get well" plan.
- Established routine monitoring and performance-based assessment criteria to identify declining trends so that appropriate corrective action can be applied.

Effectiveness

The development phase of the MR implementation provided diverse review and validation of selected design bases of SSCs within the scope of the Rule. Accordingly, Table 2-1 reflects attributes related to as-built, design documents, UFSAR, procedures, and Technical Specifications. The program has, therefore, provided additional verification of the accuracy of its design bases sources.

Quality Assurance performed five (5) surveillances and one (1) audit of the Maintenance Rule Program during the development and implementation of the program prior to the July 1996 required implementation date. Concerns identified during these activities were corrected as part of the ongoing process prior to the implementation date. Quality Assurance has assessed the implementation effort and final approved program as satisfactory in fulfilling the Maintenance Rule requirements of 10 CFR § 50.65.

A.17 Station Blackout (SBO) Rule Implementation

Description

The object of the 10 CFR § 50.63, the Station Blackout (SBO) Rule is to reduce the risk of severe accidents resulting from SBO by maintaining highly reliable ac electric power systems and, as additional defense-in-depth, assure that nuclear plants can cope with an SBO for a specific period of time. A program has been completed to implement the rule at Fermi 2, which makes use of an existing Combustion Turbine Generator (CTG 11-1) as an alternate ac power source that can be aligned within one hour of an SBO event.

During the course of implementing the SBO Rule the reactor core and associated systems have been reviewed to determine that there are sufficient capacity and capability to ensure that the core is cooled, the reactor coolant system is isolated, and appropriate containment integrity is maintained in the event of an SBO for the required duration. In addition, systems required for decay heat removal have been reviewed to ensure that those portions of the systems, which are required to cope with the consequences of SBO, are available. Effects of non-availability of support systems such as instrument air, HVAC, and ac power have been considered, and condensate storage tank and battery capacities have been reviewed for adequacy.

Combustion Turbine Generator (CTG) 11-1 is designated as an alternate ac (AAC) power source for the plant and is available within one (1) hour to the blacked out unit. The coping analysis evaluated the numerous issues to support the capability to cope for the four hour coping duration identified for the Fermi 2 plant:

- Decay heat removal and make-up (HPCI, RCIC, CST) system availability
- Key support system availability (battery/charger, compressed air, ventilation)
- Ability to maintain RCS inventory (including RCS and main steam isolation)
- Ability to maintain containment integrity
- Loss of ventilation and equipment environmental evaluation
- Emergency lighting requirements
- Operator actions and training
- Diesel Generator Reliability Program reviewed
- Quality Assurance requirements
- Procedures required

Effectiveness

The SBO rule implementation provided an opportunity to review the functions and performance requirements for systems and components required for plant shutdown under conditions characteristic of the SBO scenario. The project demonstrated the ability of the Fermi 2 processes to implement a change that affected numerous safety related systems, the interface between non-safety and safety related electrical power distributions systems, and implementation of Technical

Specifications, surveillance and maintenance activities and procedures, and Emergency Operation Instructions and associated training.

The NRC performed an inspection of the SBO implementation in November 1995 (IR 93-021), and has accepted the Fermi 2 SBO implementation program. Although this inspection found minor weaknesses in some calculations, these weaknesses did not change the overall results of the calculations. The inspection was able to conclude that the design, procurement, and documentation process was adequately controlled and that surveillance, calibration, and operational procedures adequately described inspections, tests, administrative controls, and training necessary for compliance with 10 CFR § 50.63.

The Quality Assurance department has conducted several audit and surveillance activities on the implementation of the Station Blackout rule since 1993; discrepancies identified consisted primarily of discrepancies between wiring drawings and field configuration. During the 1996 refurbishment of CTG-11-1, a complete wiring verification was conducted by Plant Support Engineering and General Electric, and all noted discrepancies corrected prior to returning CTG 11-1 to service and declaring it operable. Overall results of QA assessments have found that the program is adequately maintained and provides reasonable assurance that power can be restored within the Fermi 2 4-hour coping time requirement.

A.18 System Engineering Walkdowns

Description

Per the System Engineering Handbook, System Engineers are required to perform system walkdowns of their assigned systems on, as a minimum, a bi-weekly basis. A system walkdown is much more than the physical tour of a location, component or area and is regarded as a vital part of the System Engineers' responsibilities. The walkdowns are intended to provide an assessment of the material condition and system performance (or readiness of the system if the system is normally in standby) such that proactive measures can be implemented prior to equipment failure or unavailability.

The System Engineering Handbook lists the Systems that require formal walkdowns and provides guidelines for these walkdowns. The list of Systems was developed by reviewing 1) the systems within the scope of the Maintenance Rule (systems important to plant safety), 2) the systems included in operator training, and 3) system performance.

Bi-weekly walkdowns include system performance and material condition monitoring. Performance monitoring data is analyzed to determine trends, confirm known component and system performance trends, assess effectiveness of corrective actions and determine if functional failures have occurred. Walkdowns may also be performed after system transients. It is the intent that system walkdowns be completed in a consistent manner, using a check list, and be documented in the System Engineering log books so that the information is not lost. Corrective actions, including initiation of DERs, Work Requests, and Housekeeping Requests are initiated for identified problems in accordance with plant procedures.

Effectiveness

System engineer walkdowns have documented several potential discrepancies between the plant and its description in the UFSAR in DERs, and the walkdowns have resulted in a number of Work Requests and Housekeeping Requests. While many of the other activities and programs described in this response provide opportunities to compare different plant documents with each other, the System Engineer walkdowns involve the plant hardware directly. The frequency of coverage and the use of System Engineers to perform the walkdowns enhance the ability to discover and evaluate potential configuration discrepancies.

A QA assessment of System Engineering Walkdowns was conducted in 1995, and noted the program as being effective.

A.19 Electrical / I&C As-Built Program

Description

On December 19, 1984 Detroit Edison informed the NRC about a potential deficiency concerning deviations in instrument racks from applicable Instrumentation and Control (I&C) design documents and subsequently reported the event under 10 CFR § 50.55 (e) (Item No. 143). The deviations represented a small percentage of the applicable drawing details; however their importance was recognized and prompt corrective actions were taken by establishing the Electrical and I&C As-Built Program.

The scope of the Electrical and I&C As-Built Program included the following activities:

- Walkdown inspections to verify design document conformance with the as-built plant on Quality Assurance Level 1 (QA-1) electrical and I&C equipment including electrical buses, motor control centers, electrical panels and cabinets, MPUs and I&C panels.

- Walkdown inspections of wiring drawings for other I&C equipment and electrical equipment, including the remote shutdown panels, and wiring contained in QA-1 equipment.

- Documentation of and resolution discrepancies in accordance with the applicable Fermi 2 corrective action process (Nonconformance Reports NCRs and Deviation Event Reports DERs).

Effectiveness

The As-Built Program and its corrective actions helped the Fermi 2 Project to establish a baseline for the design documents which in turn helped engineering, operations and maintenance personnel to perform their activities effectively. The As-Built Program also resolved deficiencies, which were considered to have had potential safety implications, that if left undetected, could have resulted in the loss of or incorrect function of a safety related component or system. Table 2-1 reflects applicability as an as-built activity, as well as comparison of as-built information with design documents.

A.20 Improved Technical Specification (ITS) Conversion Program

Description

Detroit Edison has undertaken an initiative to convert the Fermi 2 Technical Specifications to the Improved Technical Specifications (ITS). Major benefits sought by this conversion include improved operational safety, clearer understanding of Technical Specification requirements, and reduced administrative burden. This conversion includes the development of improved and significantly expanded Bases for the ITS. The expanded Bases are expected to provide a concise and readily available source of information for reference when using the ITS. This condensed source of design and licensing bases information is expected to enhance correct application of the ITS and to reduce uncertainty in understanding the intent of the ITS. The expanded Bases can also help preparation of 10 CFR § 50.59 Safety Evaluations by clearly stating the intent and assumptions associated with ITS requirements.

The development phase of the Fermi 2 ITS began in November of 1995 and continues until submittal of the proposed Fermi 2 ITS (expected in second quarter of 1997). A project team, consisting of representatives from Licensing, Operations, Engineering, Training, Nuclear Fuel and Reactor Engineering, Maintenance, Radiation Protection/Chemistry, Work Control, and ISI/IST, was formed to coordinate the development of ITS and close open items identified during ITS development. During this development phase, the ITS review packages are technically reviewed in parallel by appropriate individuals identified by team members. Once comments are addressed from this review, the Onsite Review Organization (OSRO) reviews the packages, and the Nuclear Safety Review Group reviews them following resolution of any OSRO concerns. These organizations also perform a final integrated review of the draft ITS prior to submittal.

In addition to the benefits expected after implementation, the effort involved in developing the ITS Bases is providing additional confidence in the adequacy and accessibility of design bases information. Development of the Bases requires incorporation of Fermi 2 design information into the generic ITS Bases. This is providing an opportunity to clearly document the origin and intent of the requirements in the Technical Specifications. The levels of review of these ITS drafts, including the Onsite Review Organization, provide further assurance that the design and licensing bases are accurately understood and adequately addressed in the ITS Bases. DERs are being written to evaluate concerns arising from this effort, including their safety implications.

Effectiveness

The ITS effort is still in progress and does not constitute a comprehensive design basis review. However, this effort is expected to improve the accessibility of design basis information, and as the effort proceeds, it provides further confidence that the design and operation of Fermi 2 is consistent with these design bases.

A.21 Procedures Generation Package (PGPs)

Description

NUREG 0737, Supplement 1, Section 7 required nuclear facilities to complete training on and have implemented Emergency Operating Procedures (EOPs) based on the Procedures Generation Package (PGP).

The Boiling Water Reactor Owners Group (BWROG) developed Emergency Procedure Guidelines (EPGs). EOP Guidelines that would provide a standard format for all plants. The NRC approved Revision 4 to the Boiling Water Reactor Owners Group (BWROG).

Fermi 2 completed development and training on the EOPs based on BWROG EPG Revision 4 during 1988.

The process used in the development and continued revisions to the EOPs includes verification and validation of changes. A requirement to check if design changes impact the EOPs is built into the Engineering modification process.

Effectiveness

This activity is an important example whereby the design bases were incorporated into plant procedures. The design bases were communicated in part through the BWROG EPGs, and plant-specific as-built information and additional design bases from other design documents integrated into the EOPs. These attributes are reflected in Table 2-1.

An NRC inspection conducted shortly after the Fermi 2 EOPs were developed based on the BWROG Revision 4 EPG and associated operator training noted that the EOPs in place during the inspection would allow operators to adequately control emergency operating conditions, although several deficiencies were identified. The NRC team also concluded that the overall quality, legibility and readability of the EOPs was very good, and that both the EOPs and the plant-specific technical guidelines were prepared in accordance with Revision 4 of the BWROG EPGs. Two subsequent NRC inspections identified human factors concerns associated with the EOP flowcharts and one design operating parameter not being adhered to. However, the EOPs remained effective in that the operators could adequately control emergency operating conditions.

Quality Assurance audits of the EOP program have found similar problems as those identified by the NRC inspections, including EOP design calculations not being maintained current with the plant design. Overall conclusions of Fermi 2 QA activities regarding the EOP Program maintain that the EOPs adequately enable Operations personnel to perform necessary functions to mitigate accident scenarios, which is consistent with the NRC inspection results.

A.22 Employee Concerns Program

Description

The Ombudsman, or Employee Concerns Program, provides a means for Detroit Edison employees and contractors to raise nuclear safety and nuclear quality concerns in a confidential manner. This process, replacing the SAFETEAM Program in 1988, provides an alternate means for employees to use for issues they believe were not adequately addressed through other processes available. If requested the Ombudsman does not identify the concerned individual and will take measures to keep the identity of the concerned individual from being known to anyone else.

Nuclear safety and nuclear quality concerns are the focal point of the Ombudsman program. These include such areas as procedures, license compliance, configuration, and public safety. Experience has shown that a variety of concerns will be raised, including some concerns related to nuclear safety and quality. The Ombudsman will, for issues within the scope of nuclear safety and nuclear quality, take ov/nership of the concern.

Effectiveness

Since the initiation of the Ombudsman program, employees and contractors have made use of the Ombudsman program. Of the nuclear safety and nuclear quality concerns raised from the beginning of 1994 to October 1996, 41% of the concerns were substantiated.

A 1995 inspection report of the employee concerns program (Ombudsman Program) by the NRC states, "On the basis of our review of selected employee concerns and ECP attributes, the inspectors found that the Fermi ECP process effectively resolved those issues brought to it and programmatic controls were in place to prevent retaliatory action against those who reported concerns."

Starting in 1996, following the resolution of a concern, the concerned individuals are asked to complete a confidential survey. Survey results are indicative of a program that is viewed as effective from the perspective of the individuals who have used the program.

A.23 Performance/Scheduling Tracking (PST) Program

Description

The Performance Scheduling/Tracking (PST) Program schedules Fermi 2 non-Technical Specification required testing and tasks. The following list describes types of activities scheduled by the PST program:

1) UFSAR Fire Protection Tests (Surveillances)
2) Onsite Dose Calculation Manual Requirements
3) Insurance Requirements
4) DER Requirements
5) Regulatory Commitments
6) State Regulatory Requirements
7) Equipment Oil Sampling
8) Routine Procedure Reviews
9) Engineering/Operations Interfaces (e.g., System Walkdowns which require operation of equipment)

Effectiveness

This flexible system allows tracking and scheduling of tests, inspections, and other activities beyond the requirements of Technical Specifications. Some of these activities provide ongoing assessment of equipment performance and status in support of design functions.

A.24 Preventive Maintenance Program

Description

The Preventive Maintenance (PM) Program encompasses routine, periodically recurring maintenance activities, including rounds, to ensure that structures, systems and components important to safety or reliability are maintained at the frequency required for them to perform their intended functions.

The program includes periodic inspections and testing of significant equipment, beyond that required by plant Technical Specifications, to identify abnormal conditions that could lead to failures. The scope, type and frequency of such activities is based on equipment importance and historical data, and includes the following types of inspections, testing, and checks, as appropriate:

- Infrared surveys of electrical equipment/components
- Vibration measurements of rotating equipment
- Electrical insulation resistance checks
- Bearing and motor housing temperature measurements
- Visual inspections to identify leaks, unusual noises, or other signs of deterioration
- Oil and grease analysis
- Calibrations
- Replacement of equipment to satisfy EQ requirements

Configuration and design bases control are maintained in part as follows:

- PM events required to maintain reliability and availability of safety related equipment are performed or justified. Specific environmental qualification (EQ) PM events are performed at the frequency specified by the EQ Program.
- When revising PM events, commitments are reviewed for impact on the proposed revision.
- Replacement parts, lubricants, etc. utilized in PM activities are identified in FMM or CECO, as approved for application.
- Design changes are evaluated for impact on the PM program via the PPRN process.

Effectiveness

The PM program provides an ongoing vehicle to assess the as-built configuration and the material condition of plant SSCs. Table 2-1 reflects as-built information and procedures as attributes addressed by the PM program.

A.25 Plant Labeling Program

Description

The Plant Labeling Team PLT was formed to resolve inconsistencies or missing information (including equipment identification) in plant labeling.

The current relabeling program is being carried out in two phases. Phase I includes all externally mounted equipment (not inside a panel/cabinet), whereas Phase II will include the equipment mounted internally to panels/cabinets and any instrument valves not labeled during Phase I. The program is being implemented on a system-by-system basis.

Once a system review is started, the PLT walks down the system to verify the accuracy of the completeness and applicable Functional Operating Sketch (FOS) or other key drawings. Where an FOS dces not exist, the appropriate drawing is used. Equipment that has not been labeled before, such as instrument valves and small bore valves, are labeled as part of the program.

Configuration errors or concerns are identified and resolved using approved engineering change documents to change the design documentation or engineering data base.

Effectiveness

The Plant Labeling Program has required establishing a uniform information base of component IDs and component descriptions and verifying that the standard nomenclature is used throughout the plant, including field tags as well as various plant documents. This is a key configuration control activity that primarily involves as-built information (including nameplate date and physical labels), procedures that refer to equipment, and design documents including the CECO component database. This horizontal slice across virtually all of the plant systems and components supports the configuration reviews provided by vertical slice activities.

A.26 Q-List Improvement Program

Description

In 1986, the Q-List Improvement Program (QLIP) was established in response to the need to have a single, complete, accurate, and controlled list of quality related equipment. The Q-List Improvement Program approach was to update/revise the plant computerized database for component technical information (CECO) to identify all QA1 and QA1M components and subcomponents including valves, valve actuators/motors, pumps/motors, pressure retaining vessels, instruments, relays, control room and local panel pushbuttons and switches. A methodology was developed to provide clear and understandable definitions of safety related, QA1 and QA1M equipment; establish the level of detail of equipment/items to be classified as QA1 or QA1M (ex. valve and actuator evaluated separately) and provide guidelines to determine the QA level of the component based on its system/component function and impacts of its credible failure modes.

Base Configuration Design Documents (P&ID, FOS, Schematic, Panel/Rack drawings) for safety related systems & subsystems and non-safety related systems that contained either QA1 or QA1M equipment were reviewed. The QA level of plant equipment/components shown on these drawings were determined in accordance with the established methodology, and design change documents (ABNs) were prepared to update/revise the CECO database to identify QA1 and QA1M components.

As a result of this effort, CECO has been updated to identify QA1 and QA1M components/subcomponents to a level of detail not previously addressed. In addition, relays, pushbuttons, CMC switches, selector switches and other assemblies/equipment were added to the CECO database and classified, and new information fields were added to CECO such as component location, manufacturer/model, drawing references, and seismic information. As it is a living database (BCDD) it is available to all site personnel to identify QA Level 1 and 1M components.

Effectiveness

The QLIP provided numerous opportunities to review component identification, as-built information, and component design data, as well as to classify components consistent with their design bases functions. Table 2-1 reflects the as-built and design document attributes, as well as their comparison. In addition, the CECO data base containing the Q-List information, is accessible to all desktop PCs operating from the Fermi 2 Local Area Network, providing consistent, real-time, and easy access to the data.

Fermi 2 Quality Assurance does not assess this program individually but includes reviews of the program through Design Control audits, assessments of plant modifications, or other program assessments. Discrepancies associated with the CECO database have been identified during QA assessments. However, the discrepancies identified have been minor and did not impact the overall assessment of the area being reviewed or necessitate an evaluation of the CECO database.

A.27 Surveillance Testing Overlap Review

Description

In 1994, during a periodic review of electrical surveillance testing procedures for logic system functional surveillance testing of safety related equipment, Detroit Edison identified problems associated with inadequate overlap of surveillance test procedures. For example, permissive interlocks for the bus undervoltage relays for the Division 1 4160 Volt Emergency Bus 64B and 11EA Undervoltage Circuits had not been tested to the degree necessary to fully meet the requirements of the Technical Specifications. The logic had not been tested with sufficient overlap to check all portions of the circuit. Corrective actions included revising the deficient procedures and performing the surveillances, and reviewing similar surveillances. A dedicated team of approximately 40 people was established to conduct this review and correct identified deficiencies. When similar deficiencies were discovered in other logic functional test surveillances, the investigation was expanded. Detroit Edison performed extensive comparisons between schematic diagrams and plant surveillance procedures. A review of associated non-I&C procedures was also initiated. This initial effort took place over approximately four months and involved review or revision of approximately 100 surveillance procedures. Detroit Edison reported this condition to the NRC in LER 94-003.

Subsequent to this initial effort, electrical surveillance overlap drawings were prepared to document testing overlap. These drawings serve as a tool for maintaining surveillance procedure overlap. To support preparing the electrical overlap drawings, surveillance overview tables were prepared, and further verification of adequate surveillance testing was performed. This involved 14 Technical Specification surveillances and 27 surveillance procedures, and resulted in the development of approximately 180 overlap drawings.

Effectiveness

This condition was identified during a periodic review of surveillance test procedures. When the initial problem was identified, a team was established to investigate the extent and causes for this condition. The effort identified and corrected omissions in the logic functional test surveillance procedures in order to comply with the Technical Specifications. As a result, more comprehensive testing of the plant design is accomplished by logic system functional surveillance procedures.

NRC review and inspection of this effort indicated that the Detroit Edison review and findings were a good effort to thoroughly identify and correct the problems in this area and that actions taken to address the issue were comprehensive and thorough. NRC development of Information Notice 95-15 and Generic Letter 96-01 was based, in part, on this self identified problem.