Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

October 10, 1996
3F1096-05

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

Subject: Licensee Event Report (LER) 96-020-00

Dear Sir:

Please find the enclosed Licensee Event Report (LER) 96-020-00 concerning an unreviewed safety question associated with Emergency Diesel Generator loading. This report is submitted as a voluntary report in accordance with 10 CFR 50.73.

Sincerely,

Larry Kelley for

P.M. Beard, Jr.,
Senior vice President
Nuclear Operations

PMB/TWC
Attachment

xc: Regional Administrator, Region II
Project Manager, NRR
Senior Resident Inspector

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NRC FORM 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
CRYSTAL RIVER UNIT 3 (CR-3)	0 5 0 0 0 3 0 2	1 OF 1 3

TITLE (4)

Unreviewed Safety Questions Concerning Diesel Generator Loading Caused by Interpretation of Regulatory Requirements Other than Prescribed

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
									N/A	0 5 0 0 0
0 9	1 0	9 6	9 6	0 2 0	0 0	1 0	1 0	9 6	N/A	0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (CHECK ONE OR MORE OF THE FOLLOWING) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
T. W. Catchpole, Sr. Nuclear Licensing Engineer	3 5 2 5 6 3 - 4 6 0 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On September 10, 1996, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN). An unreviewed safety question (USQ) was identified which was associated with a modification installed in May, 1996. The modification contributed to increases in kilowatt (kW) loading of the "A" Emergency Diesel Generator (EDG). It was discovered that, contrary to information contained in the Improved Technical Specification BASES, EDG Loading analyses indicated the worst case maximum automatically connected accident load at one-minute (3100 kW) would be exceeded, maximum EDG design rating of 3500 kW loading would be exceeded for up to 3 seconds during three of the six EDG block loading sequences, and the single largest rejected load was greater than previously identified. This report is being submitted as a voluntary LER.

Actual testing results indicate the intent of the affected BASES has been met. Root causes included personnel error in interpreting regulatory requirements on a basis other than strict conformance with established rules governing the need for changes to the operating license. Other errors were identified in the area of conformance to procedures. Changes to the applicable ITS BASES will be submitted to NRC for review. Corrective actions have been identified to address management expectations for and improvements in safety sensitivity, compliance with ITS requirements, content of 10CFR50.59 evaluations, and their oversight.

EVENT DESCRIPTION

On September 10, 1996, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN) to address a condition of degraded Main Turbine bearing lubricating oil [TD] pressure. Based on discussions with NRC Inspectors, FPC initiated Problem Report PR 96-0369 to document a potential Unreviewed Safety Question (USQ) as described in 10CFR50.59, associated with the most recent Emergency Diesel Generator [EK,DG] (EDG) loading calculations. The subject USQ was related to EDG loading limits reflected in the BASES for Improved Technical Specification 3.8.1, "AC Sources—Operating," in the following sections:

> ITS Surveillance Requirement SR 3.8.1.11 requires verification that each EDG operates for >/= 60 minutes at a load >/= 3100 kilowatts (kW) and </= 3250 kW. The BASES for SR 3.8.1.11 states the minimum load of 3100 kW provides margin above the predicted worst-case automatically connected accident load at one minute and the maximum load of 3250 kW is the upper limit of the EDG's 200 hour rating.
>
> The BACKGROUND section of B3.8.1 defines the EDG service ratings as 0 - 2850 kW on a continuous basis; 2851 to 3000 kW on a cumulative 2000 hour basis; 3001 to 3250 kW on a cumulative 200 hour basis; and, 3251 to 3500 kW on a cumulative 30 minute basis.
>
> The BASES for Surveillance Requirement (SR) 3.8.1.8 requires rejection of greater than or equal to the single largest post-accident load by either of FPC's two EDG's. The single largest load is identified in the BASES as 616 kW with reference to a high pressure injection pump [BQ,P].

In support of Modification Approval Record (MAR) 96-04-12-01, "ASV-204 EFIC Auto Open Removal," implemented in May, 1996 during refueling outage 10, the worst case automatically connected accident load at one minute, was calculated to be 3159 kW for the "A" EDG. Also, as a result of recent improvements in the block loading calculation modeling from the use of plant-specific motor start kW values in place of standard motor specifications previously used for loading calculations, the results indicated the maximum 3500 kW design rating of the EDG would be exceeded for up to 3 seconds during three of the six EDG block loading sequences assuming a Loss of Offsite Power (LOOP) coincident with a Loss of Coolant Accident (LOCA) and failure of the "B" Battery [EJ,BTRY]. In addition, the single largest load on the "A" EDG was changed to 690.9 kW.

This event is being submitted as a voluntary Licensee Event Report (LER).

BACKGROUND

The investigation of this event revealed it was influenced by several circumstances, including recent industry events involving 10CFR50.59. A sequence of events which led to the discovery of the USQ is provided as follows:

CR-3 has two 4160 volt diesel generators manufactured by Coltec Industries which provide the emergency backup power for Engineered Safeguard busses "A" and "B". Each unit is designed to provide the postulated power requirements needed in an Engineered Safeguards actuation, in the event of the loss or degradation of normal power sources. CR-3's emergency diesel generators (EDG) were upgraded in 1990 to increase the margin between accident loads and the EDG capability. At that time, changes were made to the Final Safety Analysis Report (FSAR) and Technical Specifications to incorporate the revised engine ratings which included a cumulative 30 minute rating from 3251 to 3500 kW. The 3500 kW rating was considered to be the maximum loading that would ensure a quick diesel generator frequency (speed) recovery following addition of a large load. The automatic sequential loading of each EDG is accomplished in six blocks. These blocks were selected to limit the maximum system voltage dip to 25 percent of nominal voltage.

Modification Approval Record (MAR) 96-03-12-01 was initiated on March 29, 1996 during Refuel 10 to install more accurate components in the EDG kilowatt meter [EK,MTR] indication loops on the basis of preliminary results of a calculation which showed uncertainties in excess of 200 kW. The EDG kW meters are relied on by operations personnel for performing load management actions in accordance with Abnormal Procedure AP-770, "Emergency Diesel Generator Actuation," for the purpose of manually applying loads in the event of a condition requiring EDG operation. Changes to AP-770 were initiated as a result of MAR 96-03-12-01.

A precursor card issued on March 31, 1996, identified a condition in which the Emergency Feedwater (EFW) control valves [BA,FCV] would fail open resulting in the steam-driven Emergency Feedwater Pump [BA,P](EFP-2) pumping at its maximum capability. This questioned the assumption in the EDG loading analysis which took credit for EFP-1, the motor-driven Emergency Feedwater Pump, and EFP-2 sharing the hydraulic load such that the electrical load from EFP-1 would be reduced at one minute into the transient. To ensure the availability of EFP-2, suggestions were made to revise AP-770 to cross-connect EFP-2 to the EFP-1 flow control valves since these components would have power in a loss of the "B" battery scenario.

In the process of generating changes to AP-770, a concern was identified with exceeding EFP-2 net positive suction head (NPSH) limits during the initial stages of the above described failures of EFW control valves. This concern resulted in the initiation of MAR 96-04-12-01 which was written within a short period of time (4 days) near the end of Refuel 10. The intent of the modification was to eliminate the automatic actuation of EFP-2 by removing the automatic opening of the redundant steam admission valve [SA,ISV](ASV-204) previously initiated from the "A"

train of the Emergency Feedwater Initiation and Control [JB](EFIC) system in applicable transient conditions. This would preserve EFP-2 until such time as operator action could be taken to cross-tie EFP-2 to the EFP-1 controls. Operators can manually open ASV-204 from the control room in order to start EFP-2.

Request for Engineering Assistance (REA) 96-0467 was initiated on April 9, 1996 to document the results of 18 "case studies" for changes in EDG block loading and post-block loading periods. FPC's EDG Load Configuration Management Program utilizes computer software in developing load calculations consisting of approximately 40 separate databases. A "case study" is used to assess the impact of a change in EDG loading by altering the inputs of selected databases without running the entire calculation. Recent improvements in the block loading calculation modeling resulted from the use of plant-specific motor "start kW" information in place of standard motor specifications which had been used for loading calculations since 1988. Taking into account the intended installation of MAR 96-04-12-01, the study assumed EFP-1 was running at 860 gallons per minute (gpm), approximately 2.5 times the previously assumed flow when EFP-2 was sharing flow which resulted in 665.6 kW, an increase from the previous value of 495.2. Several other motor loads increased due to increased pump flows resulting from system flow balancing conducted during Refuel 10. The study showed that during a "B" Battery failure coincident with a LOOP and intermediate or small break LOCA, the "A" EDG will momentarily exceed 3500 kW due to starting load excursions. FPC electrical design personnel were concerned that the results exceeded the maximum 3500 kW design rating of the engine in blocks 4, 5, and 6 and entered into discussions with the diesel manufacturer, Coltec Industries. The concerns were based on starting load excursions which occur for brief periods of time (up to 3 seconds). The excursions were calculated by taking the running kW load prior to each block and adding the new block peak kW starting load. Based on confirmation from the manufacturer on April 10, 1996 that these momentary transient loads would not have an adverse affect on the diesel generator, electrical design personnel concluded there was no safety significance associated with the excursions. Following this confirmation, Coltec Industries provided a letter to FPC dated April 25, 1996 stating that a one time 3700 kW event during motor starting is not expected to have an adverse affect on the diesel generator.

From May 31, 1996 until July 3, 1996 when Problem Report 96-0210 was issued to document the EDG issues as they relate to ITS BASES questions, there were several reviews and activities to evaluate the significance and consequences of EDG loading questions. These included:

- a Precursor Card initiated May 31, 1996 that questioned the use of vendor-supplied letters to modify licensing basis requirements;
- dialogue with NRC Inspectors;

- an Employee Concern initiated June 3, 1996 which questioned the adequacy of block loading excursions described in REA 96-0467; and,

- meetings to discuss the issues presented by the precursor card and employee concern.

During meetings conducted on June 6 and June 7, 1996 involving operations, engineering, and licensing personnel to discuss the employee concern, the differences between the ITS BASES and the automatically connected/maximum loads were discussed. The participants identified that a 10CFR50.59 evaluation had not been properly documented to describe the acceptability of these differences; however, subsequent discussions with management concluded that a Problem Report was not required due to lack of an operability concern and the presumption that conservatisms in the case study performed by REA 96-0467 could be removed in a formal calculation revision. A meeting on June 28, 1996 including senior management resulted in the decision to issue Problem Report 96-0210.

On September 9, 1996, an NRC Inspector following-up on previous inspector concerns regarding EDG loading identified that MAR 96-04-12-01 may have introduced an unreviewed safety question concerning reductions in margin above the 3500 kW maximum design rating of the EDG and the 3100 kW worst case one-minute accident loading value. This resulted in the generation of Problem Report 96-0369 to evaluate the condition for reportability.

EVENT EVALUATION

The following evaluation is based on the EDG ading values established by the EDG loading case study performed during Refuel 10. The verification of the formal EDG loading calculation which incorporates the case study has not been completed as of the issuance of this LER.

Worst Case One-Minute Loading Limit

The 3100 kW value assumed as a basis for SR 3.8.1.11 as providing margin to the worst case automatically connected accident load was evaluated for its impact on safety and operability of the "A" EDG. At one minute of EDG operation, steady state conditions have been achieved for the ES loads following a large break LOCA with a simultaneous LOOP. EDG's start in the first 10 seconds of the event and the block loading is completed in the following 35 seconds. FPC believes this was the original basis for selection of one minute as the point at which to evaluate EDG loading for the refueling interval load test. The data from the surveillance that satisfies ITS SR 3.8.1.11 was reviewed. This test, performed in accordance with Surveillance Procedure SP-354A, "Monthly Functional Test of the Emergency Diesel Generator EGDG-1A," was completed in April, 1996 during Refuel 10. The average total load value recorded was 3178 kW. This value is above the worst case

automatically connected one-minute calculated load value of 3159 kW depicted in REA 96-0467. Therefore, the surveillance test met the intent of the acceptance criteria.

For a spectrum of smaller break LOCA's, the actuation setpoints for ES protective functions will not be reached as soon. This means that, depending on the break size, some of these systems may still be in a transient condition at and beyond one minute. This loading on the EDG would not be below 3100 kW but would be below the maximum load of 3250 kW which is the upper limit of the EDG's 200 hour rating as specified in the ITS BASES for SR 3.8.1.11.

Maximum Auto-Connected Plus Manually Connected Load

FPC has evaluated the predicted transient loads during block loading following a simultaneous LOCA and LOOP. This evaluation has been performed with the assistance of engineering personnel from Coltec Industries and establishes that the diesel generators have the transient capability to produce 3910 kW for accelerating loads such as induction motors. The 3910 kW capability also includes margin for normal wear between overhauls. Since CR-3 diesel generators are strictly maintained within manufacturer's specifications and function as "standby" power sources, normal wear is minimal. Without accounting for wear, the EDG's have the transient capability to produce as much as 4000 kW for accelerating loads. Frequency response and voltage dips during transient loads has been calculated by the engine manufacturer and found to be within the limits recommended by Regulatory Guide 1.9, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants."

Diesel engine components have an increased potential for component distress when subject to engine overload conditions. Known effects of engine overload include piston ring breakage, piston insert cracking, liner/jacket cracking, and piston bushing extrusion. Transient loads caused by motor start kW excursions will not mechanically degrade the EDG engines. During the transient, the greatest component impact would most likely result in slightly higher pressure stress on the cylinder liner as a result of a larger exposed surface area. However, the expected pressures remain within design limits.

Based on the above, the transient peak loads have no adverse effects on the EDG performing their intended function following accident conditions.

Largest Single Rejected Load

The maximum single load rejection was evaluated for its impact on safety and operability of "A" EDG. The BASES for ITS SR 3.8.1.8 states that for the CR-3 EDG's, the largest single load is 616 kW. The results of the case study performed in support of REA 96-0467 for analysis of the "A" EDG during block loading for an intermediate (0.5 square feet) size break LOCA revealed the largest load was Makeup

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Based on the above, the transient peak loads have no adverse effects on the EDG performing their intended function following accident conditions.

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Pump & Purification Pump [BQ,P] (MUP-1B) at 690.9 kW. The SR 3.8.1.8 surveillance requirement is to demonstrate the EDG capability to reject the largest single load without exceeding predetermined voltage and frequency limits while maintaining a specified margin to the overspeed trip. The data from the surveillance that satisfies ITS SR 3.8.1.8 was reviewed. This test, performed in accordance with Surveillance Procedure SP-417, "Refueling Interval Integrated Plant Response to an Engineered Safeguards Actuation," was completed in April, 1996 during Refuel 10 and showed that the actual rejected load for the "A" EDG was 773.2 kW. This proves that the "A" EDG is capable of rejecting a load greater than the largest single load identified in REA 96-0467. The "B" EDG single largest load is also greater than 616 kW (690.9 kW) and it was also verified that a bounding test (812 kW) was performed on the "B" EDG. Therefore, the Refuel 10 surveillance tests met the intent of the acceptance criteria.

Based on the above information, the EDG's are fully capable of performing their safety function for all design basis accidents.

CAUSE

The root cause of this event was personnel error in evaluating the impact of regulatory requirements on a basis other than strict conformance with established rules governing the need for changes to the operating license. Personnel errors were also evident in failing to follow established procedures associated with plant changes, failing to promptly identify a condition adverse to quality, and inadequate oversight of the 10CFR50.59 process. In addition, time and schedule constraints which influenced the expedited development and issuance of a modification at the end of a refueling outage, may have resulted in a lack of thoroughness in the modification.

The following discussion provides further detail regarding contributing causes related to the three issues subject to this event:

Worst Case One-Minute Loading Limit

The 3159 kW loading depicted in REA 96-0467 was interpreted as being bounded by the 3100 kW to 3250 kW surveillance requirement testing range in ITS SR 3.8.1.11. This view represented a narrow definition of the licensing basis in that the focus was on operability with respect to ITS surveillance requirements and the testing actually conducted. The applicable ITS BASES would have identified 3100 kW as the bounding value but was not consulted during initial discussions. Nuclear Operations Engineering (NOE) determined there was no safety impact concerning the 3159 kW load by checking the data from testing conducted during the outage which confirmed the average total tested load was 3178 kW. A contributing factor was the knowledge that the 3159 kW value was established by a "preliminary" case study which was known to have conservatism built in. It was presumed that upon

completion of the verification process, the worst case one-minute loading limit would be below 3100 kW.

A contributing cause was the failure to clearly establish EDG loading limits in engineering procedures governing the EDG load management program. Nuclear Engineering Procedure NEP-224, "Emergency Diesel Generator Load Calculations," requires that any time NOE determines the identified limits (design ratings) for loading the Emergency Diesel Generator would be exceeded, the proposed work shall not be allowed. Had the procedure identified the more limiting acceptance criteria contained in the ITS BASES rather than engine design ratings, NOE would not have concluded that 3159 kW was bounded by the 3100 kW to 3250 kW testing range.

The design engineer and verification engineer for MAR 96-04-12-01 assumed the electrical engineer performing the EDG loading review had full responsibility for EDG loading concerns. Because of this assumption, the design and verification engineers failed to directly address EDG loading in the 10CFR50.59 evaluation for the MAR focusing primarily on the I&C aspects of the modification, and failed to recognize the MAR would place the plant in a condition where it would function differently than described in the ITS BASES. In the instructions for developing the 10CFR50.59 evaluation contained in NEP-210, "Modification Approval Records," a statement is included that requires a complete 10CFR50.59 Safety Evaluation when EDG loading is affected.

The failure to consider EDG loading in the 10CFR50.59 evaluation for MAR 96-04-12-01 represents a failure of corrective action established by a 1994 Problem Report (PR 94-0218) which identified several modifications whose 10CFR50.59 evaluations did not address EDG loading. The cause of the problem as described in the 1994 problem report was that personnel were of the opinion the EDG Loading Justification form was adequate review of the load change's impact on the EDG's and that updates of the FSAR would occur as part of the EDG loading program, as required. The corrective action plan for PR 94-0218 intended to redirect individuals by forwarding a copy of the problem report for their review. A copy of the problem report was distributed to Site Nuclear Engineering electrical and I&C personnel as well as the corporate engineering electrical and I&C supervisors. Note that corporate engineering staff relocated to the CR-3 site in 1995. Nevertheless, supervisory oversight of the 10CFR50.59 process did not assure adequate implementation of the NEP-210 requirement with respect to MAR 96-04-12-01.

The I&C Supervisor who approved MAR 96-04-12-01 also signed the EDG Loading Justification form. Although this approval was based on a phone conversation with the Electrical Design Supervisor, it incorrectly authorized the additional loading for the MAR in that it reflected a value which exceeded ITS BASES requirements. NEP-210 states: "by signature on the form, the Supervisor, Nuclear Engineering (Electrical) attests that the resulting total load does not exceed the commitments established in Technical Specifications." The I&C Supervisor indicated he checked the 10CFR50.59 evaluation and screening to determine if a technical specification

change was required. Although the screening for the MAR listed several BASES sections reviewed, none were related to EDG requirements and; therefore, the screening did not identify any changes required. Seeing no changes were required, the supervisor approved the EDG Loading Justification on the basis of input from the electrical engineer responsible for EDG loading review, that the new loading did not exceed established limits. It should be noted that this input provided revised loading values reflected in REA 96-0467, but may have provided a false sense of security to the supervisor in that no statement of impact was provided, nor was one required by the Loading Justification form.

Maximum Auto-Connected Plus Manually Connected Load

Electrical design personnel discussed the need to document the issue of exceeding 3500 kW in a problem report when it was initially identified; however, none was issued because there was no impact on safety after letters from Coltec established the transient loading would have no adverse affect. Subsequent discussions centered around consideration that technical specification and FSAR statements regarding the 3500 kW rating should be considered as only applicable to the "steady state" kW loading condition and not applicable to "transient" start kW loading conditions. Engineering personnel also interpreted the information contained in the Enhanced Design Basis Document (EDBD) for the Emergency Diesel Generator System as applicable only to steady state loading conditions without reviewing background information to determine the basis for the statement. The EDBD states that "each EDG auto-connected (block) plus manual peak loading during the first 30 minutes of the worst-case accident with LOOP must not exceed 3500 kW". The calculation referenced in this section of the EDBD shows that the 3500 kW loading was considered an absolute maximum value. In addition, LER 87-19-01, a previous LER concerning EDG loading, states "the correct application of the emergency diesel generator ratings, recently verified by the vendor, is to view these kW values as maximums". The introduction of the terms "transient" versus "steady state" was not recognized as an interpretation of the licensing and design basis which may have been different than that previously reviewed by the NRC. The conservative action at this point would have been to use the 10CFR50.59 evaluation process to determine if this interpretation involved an unreviewed safety question requiring NRC approval.

Largest Single Rejected Load

The numerical value included in the BASES for SR 3.8.1.8 (616 kW) was inaccurate at the time the Improved Technical Specifications were implemented in March, 1994. This value was chosen from the FSAR and the latest issued EDG Loading Calculation and represented the loading from the "A" High Pressure Injection Pump, MUP-1A. However, operational lineups since 1990 allowed for alignment of Makeup Pump MUP-1B to either the "A" or "B" EDG. MUP-1B produces a greater flow than MUP-1A and consequently, a higher kW load (690.9 kW). The operational lineups which allowed for selection of MUP-1B were not incorporated into the EDG loading calculations

were, at the time, managed by the corporate engineering staff. Note that corporate engineering staff relocated to the CR-3 site in 1995 which has resulted in improvements in the exchange of information between operations and engineering organizations.

The results of REA 96-0467 incorporated the changes to be implemented by MAR 96-04-12-01 and were used to support changes to Abnormal Procedure AP-770, "Emergency Diesel Generator Actuation." On April 30, 1996, the 10CFR50.59 evaluation for changes to AP-770 was discussed in a Plant Review Committee (PRC) meeting at which time the increase in the single largest load defined in the BASES for ITS SR 3.8.1.8 was identified. PRC participants were aware that the maximum rejected load for both EDG's actually tested during Refuel 10 was in excess of the new calculated largest load. Therefore, no immediate action was determined necessary since there was no safety significance attributed to the concern. An action item was assigned to Nuclear Licensing with a post-outage due date to prepare a change to the BASES. The decision to delay correction of the BASES appears to have been based on a presumption that the BASES change would easily be supported by a satisfactory 10CFR50.59 evaluation. However, at this point, the PRC had an opportunity to question whether or not the increase in the largest load affected the margin of safety as defined in BASES B3.8.1.8. The same PRC meeting included a presentation by the Diesel Loading Issues Manager who discussed the resolution of the issue, indicating it was resolved by MAR 96-04-12-01. Thus, the PRC had another opportunity to question the validity of the 10CFR50.59 evaluation for that modification. MAR 96-04-12-01 had been previously reviewed by the PRC during a meeting conducted April 27, 1996. As noted above, the 10CFR50.59 evaluation for MAR 96-04-12-01 did not address EDG loading issues.

IMMEDIATE CORRECTIVE ACTION

A startup restraint was imposed upon issuance of PR 96-0369 pending resolution of the diesel generator loading issues.

Coltec Industries was authorized to perform a diesel generator voltage and frequency study of the CR-3 block loading scheme. This calculation was completed on September 27, 1996 and reviewed by FPC as satisfactory on October 3, 1996.

ADDITIONAL CORRECTIVE ACTION

Final EDG Loading Calculations will be verified and issued.

FPC will submit a license amendment request to change the ITS BASES to define "steady state" and "transient start kW" loads, and to describe positions regarding the bases for the single largest rejected load and the worst case auto-connected load.

Interim guidance has been provided to NOE personnel informing them that 10CFR50.59 evaluations are to be considered "stand-alone" documents that must address all effects of the proposed plant change. Nuclear Engineering Procedure NEP-210 will be revised to incorporate this interim guidance and address requirements to ensure the 10CFR50.59 evaluation reflects a link to identified design inputs.

A multi-discipline group of individuals has been formed within NOE to provide a critical review of 10CFR50.59 evaluations generated by NOE.

A review will be performed of modifications issued since 1994 affecting EDG loading in order to identify any additional examples of inadequate 10CFR50.59 evaluations. This timeframe was selected because this assessment was previously performed for modifications prior to 1994 as part of the corrective action for PR 94-0218.

ACTION TO PREVENT RECURRENCE

The following corrective actions are separated into two categories. The first category recognizes the applicability of this event to several corrective actions already being implemented to improve CR-3's performance. These actions are associated with major initiatives stemming from a recently formulated Management Corrective Action Plan (MCAP) and actions resulting from the 1996 Integrated Performance Assessment Process (IPAP) inspection conducted by NRC which identified programmatic concerns. The second category lists corrective actions considered to be more event-specific.

MCAP/IPAP-related Programmatic Actions:

1. Establish a requirement for a 10CFR50.59 training qualification program to include PRC members, engineers, exempt operations personnel, the newly formed safety analysis group within NOE, and other selected individuals.

2. Issue a management directive addressing the threshold for problem report initiation to ensure issues receive a thorough review and evaluation.

3. Provide additional 10CFR50.59 sensitivity training with emphasis on unreviewed safety questions. This sensitivity training should recognize that elimination of safety significance as a concern is not a criterion for a determination that no unreviewed safety question exists.

4. Establish a management policy that clearly states the expectation for identifying a USQ and subsequent actions to be taken within the framework provided by NRC regulations.

Event-Specific Actions:

1. Evaluate the EDG Load Management and EDG Document Update program for changes. Items to be addressed will include:

   a) Revision to the EDG Loading Justification form to include a statement of impact on design basis, operating limits, and regulatory requirements;

   b) Timeliness of FSAR updates;

   c) Additional controls regarding the use of "preliminary" case studies and the RE process; and,

   d) Identification of clear acceptance criteria less subject to interpretation.

2. Prepare FSAR updates to address new EDG loads. These updates are predicated on NRC review and acceptance of the changes to ITS BASES referred to the Additional Corrective Action section, above.

3. Initiate changes to lower-tier documents including EDBD's, Nuclear Engineering Procedures, and Abnormal Procedures based on changes to ITS BASES and FSAR.

4. Establish management expectations within NOE to instill a questioning attitude by design and verification engineers assigned to proposed changes to ensure that input from large calculation programs such as EDG loading is not simply accepted, but evaluated and understood as to its impact on the scope of the change.

5. Establish management expectations within NOE which stress the use of ITS BASES whenever addressing issues related to technical specifications.

6. Revise Nuclear Engineering procedures to include ITS BASES wherever ITS is currently referenced as the governing criteria for engineering activities.

7. Issue clear expectations for engineers responsible for large calculation processes such as the EDG Loading Program to ensure the individual will be knowledgeable of all pertinent requirements including their bases.

PREVIOUS SIMILAR EVENTS

There have been four previously reported events involving EDG loading. LER 87-007 reported a design oversight resulting in the potential for exceeding EDG sequential

loading limits wherein, contrary to design, the decay heat closed cycle cooling pump could be loaded on to the emergency diesel generator in a degraded voltage condition coincident with an ES actuation resulting in a voltage dip below that provided in the FSAR. LER 87-019 reported a condition that exceeded the 30 minute design rating during surveillance testing. LER 92-005 reported a condition where during surveillance testing of either EDG with the EDG running in parallel with its respective 4160 volt ES bus, if a LOOP were to occur coincident with an Engineered Safeguards (ES) actuation, the EDG engine could be overloaded beyond its maximum rating of 3500 kW and may stall. LER 96-005 reported that, in certain accident conditions, inlet and outlet valves for all three Reactor Building Cooling Units (RBCU) would open with only one Nuclear Services Closed Cycle Cooling Water (SW) pump in operation resulting in increased SW flow to the RBCU's and the diesel generator loading for a few seconds above the approved kW load limits.

ATTACHMENT

None