Entergy

Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.
Indian Point 3 NPP
P.O. Box 308
Buchanan, NY 10511
Tel 914 736 8001 Fax 736 8012

Robert J. Barrett
Vice President, Operations–IP3

July 25, 2001
IPN-01-056

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

SUBJECT: Indian Point Nuclear Generating Unit No. 3
Docket No. 50-286
Supplement to the Proposed Revision of a One -Time Amendment to the Technical Specification Regarding Allowed Outage Time Associated with One Diesel Generator or Any Diesel Fuel Oil System and a Reply to an NRC Request for Additional Information

REFERENCES:

1. NRC letter, "Indian Point Nuclear Generating Unit No. 3 – Request For Additional Information Regarding Proposed Change To Allowed Outage Time (TAC No. MB1199)," G. Wunder to M. Kansler dated March 30, 2001.

2. Entergy letter, "Proposed One -Time Change to the Technical Specification Regarding Allowed Outage Time Associated With One Diesel Generator or Any Diesel Fuel Oil System," M. Kansler to U.S. NRC Document Control Desk dated February 14, 2001.

Dear Sir:

This letter transmits Entergy's responses to the NRC Request for Additional Information (Reference 1) involving Probabilistic Risk Assessment (PRA) in Risk Informed Decisions on Plant Specific Changes to the Licensing Basis associated with supporting on-line Emergency Diesel Generator (EDG) Fuel Oil Storage Tank (FOST) work. The initial request for this on-line EDG FOST work was discussed in a recently proposed EDG/FOST allowed outage time Technical Specification (TS) amendment (Reference 2). These responses follow up a telephone conference discussion of March 15, 2001.

Further, this letter transmits a revision to the proposed TS change to allow additional time frame for this one-time extended allowed outage time (AOT) change to be put into effect to more effectively support and prioritize EDG/FOST work scheduling activities between now and the next refueling outage in the 2nd Quarter of 2003.

A001

Attachment I is the proposed TS revision showing a revised one-time AOT change expiration date. These TS pages should be used in lieu of those submitted in Reference 2. The revised safety evaluation supporting this time frame change, deleting references to the previous TS and adding minor administrative changes is provided in Attachment II with revision bars on the affected pages. Attachment III contains the responses to NRC questions regarding various PRA aspects associated with the proposed TS amendment. Entergy is making no new commitments in this letter. If you have any questions, please call Mr. John Donnelly, IP3 Manager of Licensing, at 914-736-8310.

Very truly yours,

Robert J. Barrett
Vice President, Operations
Indian Point Nuclear Generating Unit No. 3

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and sworn to before me
this 25 day of July 2001.

Notary Public

Christina Leitmann
Notary Public, State of New York
Registration #01LE5070946
Qualified In Putnam County
My Commission Expires Jan. 6, 2003

Attachments/Enclosure

cc: Regional Administrator
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pa. 19046

Resident Inspector Office
Indian Point Nuclear Generating Unit No. 3
U. S. Nuclear Regulatory Commission
P.O. Box 308
Buchanan, NY10511

Mr. William M. Flynn, President
New York State Energy, Research
and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

Mr. Pat Milano, Project Manager
Project Directorate I
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Mail Stop 8G9
Washington, DC 20555-0001

Mr. Guy Vissing, Assistant to the Project Manager
Project Directorate I
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Mail Stop 8G9
Washington, DC 20555-0001

ATTACHMENT I TO IPN-01-056

PROPOSED TECHNICAL SPECIFICATION CHANGES REGARDING ONE-TIME ALLOWED OUTAGE TIME ASSOCIATED WITH ONE DIESEL GENERATOR OR ANY DIESEL FUEL OIL SYSTEM

Affected Technical Specification pages:

3.8.1-3
3.8.3-1

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286
DPR-64

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the offsite circuits.	1 hour AND Once per 8 hours thereafter
	AND	
	B.2 Declare inoperable the required features supported by the inoperable DG when its required redundant feature is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature
	AND	
	B.3.1 Determine OPERABLE DG(s) are not inoperable due to common cause failure. OR	24 hours
	B.3.2 Perform SR 3.8.1.2 for OPERABLE DGs.	24 hours
	AND	
	B.4 Restore DG to OPERABLE status.	72 hours *(see page 3.8.1-3a)

(continued)

Note for LCO 3.8.1 Required Action B.4 Completion Time:

*Each of 31, 32 or 33 emergency diesel generator (EDG) fuel oil storage tanks (FOSTs) may be inoperable and its associated EDG may be declared technically inoperable, but available and capable of automatic start, for up to 14 days, one-time if needed, during 2001 and 2002 prior to August 31, 2002. This condition may only be invoked to inspect/repair each of the 31, 32 or 33 EDG FOSTs once, if deemed necessary based on concerns with water in-leakage. The following additional requirements shall also be met for each FOST inspection/repair to invoke this extended one-time allowed outage time: (1) performance of offsite power source switching or maintenance evolutions for technical specification required offsite power sources shall not be scheduled during these 31, 32, or 33 FOST outages, and (2) these 31, 32, or 33 FOST outages shall not be scheduled during predicted severe weather.

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil and Starting Air

LCO 3.8.3 The stored diesel fuel oil and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable in MODES 1, 2, 3 and 4. ---------- One or more DGs with usable fuel oil in associated DG fuel oil storage tank < 5365 gal. *(see page 3.8.3-1a)	A.1 Declare associated DG inoperable.	Immediately

Note for Condition A:

*If this condition is met due to a deliberate one-time inspection/repair due to water in-leakage, of 31, 32, or 33 EDG FOST, then the asterisk note of LCO 3.8.1.B.4 completion time applies.

ATTACHMENT II TO IPN-01-056

SAFETY EVALUATION FOR PROPOSED CHANGE TO TECHNICAL SPECIFICATIONS REGARDING ONE-TIME ALLOWED OUTAGE TIME ASSOCIATED WITH ONE DIESEL GENERATOR OR ANY DIESEL FUEL OIL SYSTEM

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286
DPR-64

I. Description of Proposed Change

This application proposes an amendment to the Indian Point 3 (IP3) Technical Specifications (TS) to revise TS Limiting Conditions for Operation (LCO) 3.8.1 and 3.8.3 to provide a one-time 14-day allowed outage time (AOT) for the purpose of performing corrective maintenance/repairs for each of the 31, 32 and 33 Emergency Diesel Generator (EDG) Fuel Oil Storage Tanks (FOSTs). TS 3.8.1.B.4 presently allows 72 hours for one EDG to be inoperable when above cold shutdown, provided that offsite power sources are available, Engineered Safety Features (ESF) associated with the remaining EDGs are operable and the remaining EDGs are operable. TS 3.8.3.A provides that each EDG maintain at least 5365 gallons of useable fuel oil in its associated FOST. Included within this TS change is the requirement to maintain the associated EDG available and capable of automatic start during this proposed AOT, since the associated fuel oil day tank can be filled from the remaining two FOSTs. Several additional administrative requirements are added into this proposed one-time change to minimize risk of losing offsite power sources including: (1) not scheduling performance of switching or maintenance of TS required 13.8kV and 138 kV offsite power sources during the FOST outage time and (2) not scheduling this extended allowed outage time for the FOST during predicted severe weather. This potential FOST corrective maintenance could reasonably extend beyond 72 hours and take up to 14 days to complete. This change will not affect any other parts of the TS and would only be applicable for the specific instance of a one-time repair and restoration for each of 31, 32, and 33 EDG FOSTs, if needed, during 2001 and 2002 prior to August 31, 2002.

II. Purpose of Proposed Change

Because the 31 and 32 EDG FOSTs have recently been determined to have intermittent water intrusion, they may need to be opened, drained, repaired and tested if Entergy deems that repairs are required in connection with water in-leakage. This TS change would allow addressing potential concerns with water in-leakage to the 31 and 32 EDG FOSTs or 33 EDG FOST, if necessary, where tank repair is considered prudent or necessary. The proposed AOT extension would enable Entergy to continue operation of IP3 and avoid an unnecessary shutdown in the months just before RO-12, and prior to August 31, 2002, should tank repair(s) be necessary as emergent corrective maintenance items.

III. Safety Implication of Proposed Changes

In January 2001 water was found in the 31 and 32 EDG FOST during routine chemistry sampling. The fuel oil in these tanks was determined to be in-specification and the water was subsequently pumped out. IP3 Deviation Event Reports (DERs) were written to address these situations and consider extent of condition. An IP3 corrective action plan was prepared in January 2001 to pursue permanent resolution to the water in-leakage of these FOSTs (#31 and #32) and consider the impact on the remaining EDG FOST (# 33) as well.

This action plan includes, among other items, additional inspection of fuel oil pipes at the bottom of the FOST valve pit for through wall corrosion as well as increasing the frequency of fuel oil sampling as required. Provisions in this action plan also call for on-line repair of each of the 31, 32, or 33 tanks, if deemed necessary in connection with observed in-leakage. These emergent FOST planned inspection and repair efforts would exceed the available 72-hour LCO time. However, this corrective maintenance is expected to be able to be completed within a 14-day period. Although the 31 and 32 FOSTs and the fuel oil system and associated EDGs are presently considered operable based upon in-specification FOST capacity and bulk chemistry samples, this situation could degrade while IP3 is on-line. This could subsequently cause the fuel oil system for this EDG to become inoperable with an attendant plant shutdown probably needed for tank repair, since the expected repair will likely extend beyond 72 hours, from opening the tank through final system restoration testing. Besides the normal monthly FOST water sampling, additional samples are being taken on the 31, 32 and 33 EDG FOSTs, as required, in the event of excessive precipitation, such as heavy rains or snow. This more frequent sampling should allow IP3 to determine the need for tank maintenance with all deliberate speed. However, this sampling frequency may be altered based upon previous results and historic data of water in-leakage.

The Fuel Oil System of the three EDGs at IP3 is designed to provide individual FOSTs for each of the EDGs. These individual FOSTs are each equipped with a single vertical fuel oil transfer pump that discharges oil into either of two headers, normal and emergency, according to the manual valving arrangement selected. Both of these headers connect to 175-gallon fuel oil day tanks with one day tank dedicated to each of the three diesel engines. When the associated day tank level drops to a nominal setpoint just below 90%, the day tank inlet valves open. Upon decrease in level in any one of the three day tanks to the 65 percent level, an automatic start of the respective fuel oil transfer pump associated with that day tank would occur. Since each fuel oil transfer pump is capable of supplying fuel oil to all three EDGs via their respective day tanks, this arrangement assures the availability of fuel oil to each EDG. As per the IP3 Technical Specifications, 10,730 useable gallons of fuel oil (not including 230 gallons in two day tanks) is available assuming the unlikely event that one EDG FOST is unavailable. This capacity is sufficient to operate two EDGs at minimum safeguards for at least 48 hours.

An additional minimum, on-site storage of 26,826 useable gallons is necessary to assure continuous operation of two EDGs at minimum safeguards load for a total of 168 hours. This reserve is in addition to the storage requirements for other plants at the site.

For the purposes of this possible 14-day repair of each of the 31, 32 or 33 EDG FOSTs, the associated EDG would be considered available, although declared inoperable and aligned for automatic start capability. This is because, although its respective, associated FOST and fuel oil transfer pump are not available for the term of this corrective maintenance, the declared inoperable EDG is able to have its fuel oil day tank supplied with fuel oil from another FOST (either 31, 32 or 33, whichever of the two remains operable) via the normal or emergency fuel oil supply headers. As a further backup, if needed, operator action can be utilized to supply the associated EDG fuel oil day tank from another EDG FOST via existing System Operating Procedure (SOP) EL-1, "Diesel Generator Operation". The present design of the EDG fuel oil system as well as SOP-EL-1 operator manual action, allows the associated EDG to be available in the event there is a need for its use.

The two remaining FOSTs are designed to supply fuel oil to all three EDGs via the fuel oil supply headers (via the normal and emergency header arrangement) to each of the three EDG fuel oil day tanks. In doing this, any of the two remaining FOSTs being initially filled with at least 6391 gallons of fuel oil, have the ability to supply all three EDGs.

By maintaining the associated EDG available, additional backup support is provided during this 14-day AOT, if for some reason one of the remaining 2 operable EDGs does not start and load as required in response to an initiation signal. To compensate for three EDGs starting and running, in case of a extended DBA requiring their actuation, with any two underground FOSTs available, additional fuel oil would be required within the 48-hour and 168-hour design bases required time frames to assure continuous operation of two EDGs at minimum safeguards loads. This would require IP3 to closely monitor EDG fuel consumption and move needed additional fuel in the required time frame to ensure continued EDG operation to support minimum shutdown loads as necessary. This additional fuel, if needed, would be transported to the installed, underground EDG FOSTs by truck. Administrative controls, such as Indian Point 2/3 Memorandum of Understanding No.7, "Rules Governing The Maintenance And Use Of A Dedicated (By Consolidated Edison For The Power Authority) Diesel Fuel (No. 2) Supply" and IP3 operations procedure SOP-EL-9, "Filling The Diesel Fuel Oil Storage Tanks", are in place to assist in obtaining the necessary additional TS required fuel oil of 30,026 gallons from other normal supply tanks on the Indian Point site or at the Buchanan Substation. Further, additional fuel oil (beyond the TS required amounts) could also be provided from other Indian Point site/Buchanan Substation storage locations (30,000 and 200,000 gallon seismic class III tanks) or from locally available sources, where about 25,000 gallons can be delivered on a one or two-day notice.

Finally, additional fuel oil supplies are available in the region (about 40 miles from the site) and are available for use during emergencies, subject to extreme cold weather conditions (increased domestic heating usage) and available transportation. These various EDG fuel oil supply sources, along with the necessary administrative controls to supply them to the EDG FOSTs, provide Entergy the necessary EDG fuel oil for supporting extended operation of the three EDGs, if required, to meet FSAR design bases required time frames and provide at least two EDGs with continuous operation at minimum safeguards loads.

In conjunction with the above discussion of the associated EDG being made available during this AOT and the provisions for EDG fuel oil supplies to support EDG design bases continuous operation requirements, this one-time extended AOT for each of the EDG FOST repairs is further justified for several reasons:

(1) IP3 TS required off-site power 138kV and 13.8kV distribution systems are independent. There are two separate TS feeders each for 138kV and 13.8kV offsite sources as dependable power supplies to minimize the reliance on EDGs and supply the 480 VAC electrical distribution system;
(2) The additional requirements added to this proposed TS change to allow this one-time condition involve further minimization of potential risk associated with losing offsite power sources when extending this AOT to 14 days. By not scheduling TS offsite power switching or maintenance as well as not scheduling the selected FOST AOT during severe weather conditions, which could impact offsite power availability, greater defense in depth is provided during this evolution; and
(3) IP3 uses a proceduralized on-line work scheduling process. This station directive, SPO-SD-03, "On-Line Work Scheduling Process", provides decision-making and planning guidance for the execution of system and component outages, applicable when reactor coolant system (RCS) temperature is greater than 350 degrees F. This work process is based upon probabilistic risk assessment (PRA) and sound operating judgement. As mentioned, included within the overall process involving operation of the associated EDG, as it is still being maintained available and aligned for automatic start capability, is operator action, if necessary, to supply fuel oil to the associated fuel oil day tank as a backup method via operations procedure SOP-EL-1, "Diesel Generator Operation".

Entergy performed site-specific probabilistic risk assessment (PRA) calculations of the proposed one-time increased AOT duration of up to 14 days to quantify the risk. The PRA calculations concluded that, for the case of separately removing each of 31, 32 or 33 EDG FOSTs only and having the associated EDG and associated remainder of its fuel oil system available (though declared inoperable) for use if needed, the conditional core damage probability is below the threshold value of 1E-6. Therefore, sufficient risk-informed safety margin exists for the duration of the proposed, one-time extended 31, 32 or 33 EDG fuel oil system AOT, while keeping the associated EDG available throughout.

IV. Evaluation of Significant Hazards

Entergy has evaluated the proposed Technical Specification change using the criteria of 10CFR50.92 and found that no significant hazards consideration exists for the following reasons:

1) Does the proposed License amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   No. The proposed License amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated. The EDGs and their associated fuel oil systems are not part of any accident initiation; therefore there is no increase in the probability of an accident.

   At a minimum, two EDGs are still available with sufficient fuel oil supply to mitigate IP3 design basis accidents. The minimum safeguards equipment can still be powered even if one EDG and FOST is assumed to be lost due to single failure. This has been verified by EDG loading calculation, IP3-CALC-ED-00207, "480V Bus 2A, 3A, 5A & 6A and EDGs 31,32 and 33 Accident Loading". With the associated EDG available and aligned for automatic start capability (although declared inoperable) during this EDG FOST outage, further backup to the remaining two EDGs is provided. By the design of the overall EDG fuel oil system, the associated EDG fuel oil day tank is able to be supplied with sufficient fuel oil supply from either of the remaining two FOSTs, via their transfer pumps, in order to support operation of this associated EDG, if necessary.

   To support fuel oil needs of all three EDGs, if necessary, the FSAR describes that additional fuel oil supplies are available on the Indian Point site and locally near the site. Further EDG fuel oil supplies are available in the region, about 40 miles from IP3. Overall, the EDGs are designed as backup AC power sources in the event of a Loss of Offsite Power (LOOP). The proposed one-time AOT for each EDG/FOST does not change the conditions or minimum amount of safeguards equipment assumed in the safety analysis for design basis accident mitigation, since a minimum of two EDGs is assumed. No changes are proposed as to how the EDGs provide plant protection. Additionally, no new modes of overall plant operation are proposed as a result of this change. A PRA evaluation determined that the conditional core damage probability (CCDP) for these scenarios is less than the threshold value of 1 E-6. Therefore, the proposed one-time license amendment to TS 3.8.1.B.4 and 3.8.3.A does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2) Does the proposed License amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The proposed TS change does not create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed change does not introduce any new overall modes of plant operation or make any permanent physical changes to plant systems necessary for effective accident mitigation. The minimum required EDG operation remains unchanged by removal of a single FOST for repair. Additionally, added requirements to minimize risk associated with loss of offsite power also support this one-time extended AOT. Also, as previously stated, the EDGs and FOSTs are not part of any accident initiation scenario. Therefore the proposed one-time license amendment to TS 3.8.1.B.4 and 3.8.3.A does not create the possibility of a new or different kind of accident from any previously evaluated.

3) Does the proposed License amendment involve a significant reduction in a margin of safety?

No. The proposed License amendment does not involve a significant reduction in a margin of safety. The minimum safeguards loads can be maintained available if needed for design basis accident mitigation with two EDGs operable combined with their respective FOSTs. The selected, inoperable EDG will be available and aligned for automatic start capability (though declared inoperable) during this outage. The additional fuel oil needed to support three EDGs in this condition is available as indicated in the present design and licensing basis. The FSAR describes that this fuel can be provided from the Indian Point site, local sources and from a source about 40 miles away to support the additional minimum of 26,826 useable gallons TS required fuel oil, already existing at the Buchanan substation. Therefore, sufficient fuel oil will be available for potential events that could occur during this 14-day AOT. The PRA evaluation for the case of maintaining the 31, 32 or 33 EDG available (though declared inoperable) with its FOST out for repair indicates an acceptable safety margin below the risk-informed threshold of 1E - 6.

The 480VAC electrical distribution system can be fed from a number of TS independent 13.8kV and 138kV offsite power sources to minimize reliance of IP3 on EDG power sources during the extended AOT requested. Additional requirements to minimize risk associated with the potential for loss of offsite power sources within this TS change also ensure that this extended AOT does not involve a significant reduction in safety margin. On this basis, the proposed one-time license amendment to TS 3.8.1.B.4 and 3.8.3.A does not involve a significant reduction in the margin of safety.

V. Implementation of Proposed Changes

The proposed TS change will not adversely affect the ALARA Program, the Security and Fire Protection Programs, or the Emergency Plan. This conclusion is based on the type of change being made in comparison to the purpose, scope and content of these programs. The physical changes to the FOST(s) of concern would involve corrective maintenance repairs, if deemed necessary, and do not change the associated EDG fuel oil system licensing or design function, as design provision already exists for filling the associated EDG day tank with fuel oil from the other two EDG FOSTs. The proposed changes also do not effect the conclusions of the Final Safety Analysis Report or the Safety Evaluation Report because IP3 plant design in the analyzed Design Basis Accidents relies on two EDGs operating at minimum safeguard loads, if required. The single failure assumption is suspended while in LCO action statements. The associated EDG is still available and aligned for automatic start capability during this one-time extended AOT, if required for electrical loading. Additional fuel oil supplies as specified by current design and licensing bases are available to support extended fuel needs to all three EDGs, via an IP2/IP3 Memorandum of Understanding and use of SOP-EL-9, "Filling the Diesel Fuel Oil Storage Tanks", if needed, during this 14-day AOT. These design bases fuel oil supplies are available to assure continuous operation of two EDGs at minimum safeguards loads for the required design bases time frames of 48 and 168 hours. Further, System Operating Procedure, SOP-EL-1, "Diesel Generator Operation", has backup provision for operator action in filling the associated EDG fuel oil day tank from the remaining two EDG FOSTs to further ensure that the associated EDG can receive the necessary fuel oil and perform its function if required.

VI. Conclusions

The incorporation of these changes:

a) will not involve a significant increase in the probability or the consequence of an accident or malfunction of equipment important to safety as previously evaluated in the Final Safety Analysis Report;
b) will not create the possibility of a new or different kind of accident from any accident previously evaluated in the Final Safety Analysis Report;
c) will not significantly reduce the margin of safety as defined in the bases for any Technical Specifications; and
d) involves no significant hazards considerations as defined in 10CFR50.92.

The Plant Operating Review Committee (PORC) and Safety Review Committee (SRC) have reviewed this proposed one-time change to the TS and have concluded that it does not involve an unreviewed safety question (USQ) or a significant hazards consideration and will not endanger the health and safety of the public.

VII. References

1. Indian Point 3 Updated Final Safety Analysis Report (FSAR) , dated December 1997

2. NRC Safety Evaluation Report (SER) for Indian Point 3 Nuclear Generating Station and Supplements 1,2 and 3 dated September 21, 1973, February 21, 1975 and April 5, 1976.

3. RE-99-025, "IP3 – Evaluation of Fuel Oil Storage Tank Extended Outage", dated April 12, 1999.

4. IP3 System Operating Procedure, SOP-EL-1, "Diesel Generator Operation", Revision 23 dated October 10, 1997.

5. NRC Generic Letter 80-30, "NRC Letter Clarifying The Term Operable As It Applies To The Single Failure Criterion For Safety Systems", dated April 10, 1980.

6. IP3 Procedure, SPO-SD-03, "On-Line Work Scheduling Process", Revision 4, dated April 21, 1998.

7. IP3-DBD-307, "Design Basis Document for the 480VAC, 125VDC, 120 Vital AC Electrical Distribution Systems, Revision 2, dated February 19, 1998.

8. IP3-CALC-00207, "480V Bus 2A, 3A, 5A & 6A and EDGs 31, 32 and 33 Accident Loading", Revision 6, dated October 30, 1997.

9. IP3 System Operating Procedure, SOP-EL-9, "Filling the Diesel Fuel Oil Storage Tanks", Revision 11, dated February 21, 1997.

10. IP2/IP3 Memorandum of Understanding, SSZ-94-01, No. 1, "Rules Governing The Use Of Electrical Supplies And Interties Between Consolidated Edison And The Power Authority", Revision 1, dated September 25, 1993.

11. IP2/IP3 Memorandum of Understanding, SSZ-94-01, No.7, "Rules Governing The Maintenance And Use Of A Dedicated (By Consolidated Edison For The Power Authority) Diesel Fuel Oil (No. 2) Supply", Revision 2, dated October 13, 1994.

12. RE-01-018, "IP3 – Evaluation of Fuel Oil Storage Tanks Extended Outage", dated January 23, 2001.

13. RE-01-029, "IP3 – Follow up to Evaluation of Fuel Oil Storage Tanks Outage", dated January 29, 2001.

14. RE-01-117, "IP3- Response to NRC RAI on Fuel Oil Storage Tank TS Amendment", dated May 4, 2001.

ATTACHMENT III TO IPN-01-056

REPLY TO NRC RAI QUESTIONS REGARDING THE PROPOSED ONE-TIME EDG FOST AOT EXTENSION

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286
DPR-64

REPLY TO NRC RAI QUESTIONS REGARDING PROPOSED ONE-TIME EDG FOST AOT EXTENSION

Q1. Provide the following information for the proposed one-time TS change, consistent with Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis":

Answer:

See response in Question number 2 below.

Q2. Baseline (internal and external) Core Damage Frequency (CDF) and Large Early Release Frequency (LERF)

a. Change in CDF and LERF
b. Probabilistic Risk Analysis (PRA) quality assurance
c. Discussion of uncertainty in the analysis

Answer:

2a. The IP3 Individual Plant Examination (IPE) is currently in the process of being updated. Quantification of the revised accident sequences is in the process of being completed with development of a new single top gate model currently underway. To evaluate the change in Core Damage Frequency (CDF) for this case, a modified version of the existing single top gate model based upon IPE, Revision 0, was employed. This modification accounted for the impact of failure of remaining fuel transfer systems. In addition, common-cause failure of 125 VDC power panels was included to be consistent with the update.
Loss of offsite power-induced Station Blackout (SBO) is the second highest contributor to LERF with a frequency of 1.94 E-8 per year. Since the base LERF is 7.53 E-7 per year, SBO therefore contributes 2.58% of the frequency. For removal of each EDG FOST from service, individual quantification for the CDF contribution was performed involving these dominant SBO sequences. To compute the increase in LERF, the percent increase in each computed CDF was applied to the SBO LERF contribution to arrive at new increased frequencies. The resultant changes in CDF and LERF are summarized in the following table:

EDG FOST	Increase in CDF (per year)	Increase in LERF (per year)
31	1.50 E-7	8.74 E-10
32	3.12 E-6	8.66 E-10
33	7.00 E-8	1.96 E-8

A preliminary review of the updated loss of offsite power-initiated SBO sequences was conducted to ensure that there would be no appreciable change from that of the original model. The resultant increase in CDF for each fuel oil tank outage was found to be lower than that of the Revision 0 IPE model.

2b. Section 5 of the IP3 IPE submittal contains a detailed description of the internal and external reviews along with comments and resolutions. Regular updates to the IPE are governed by Nuclear Engineering Administrative Procedure, NEAP-41, "Individual Plant Examination Maintenance and Update (IP3)."

2c. From a review of the minimal cutsets and their associated importance measures, the largest degree of uncertainty exists in the recovery action modeling failure to transfer fuel manually to # 31 EDG day tank while # 31 EDG FOST is removed from service. It has risk achievement worth (RAW) of 1.68. Therefore, the results incorporated a conservative screening value of 0.1 for this event. Other events associated with the fuel transfer system (i.e., strainers, pumps and valves) were estimated with lognormal distributions with error factors of 10. None of them had RAW values greater than 1.0.

Q3. Discuss measures, if any, which are currently, or will be, taken to prevent water from getting into the emergency diesel generator (EDG) fuel oil storage tanks (FOSTs).

a. How often are the FOSTs tested for water content?
b. If excessive water is found in one FOST, how will it be assured that the remaining FOSTs are operable? (Include discussion of fuel oil sampling/testing procedure.)
c. What measures, if any, would be taken to ensure that possible corrective maintenance work on one EDG during the proposed Limiting Condition for Operation (LCO) will not cause additional impact on the EDG Fuel Oil System (FOS) reliability, or the EDGs' system reliability otherwise?

Answer:

3a. As indicated on page 2 of 8 of Attachment II in cover letter Reference 2, the 2/14/01 original TS change submittal, the station action plan created in January 2001 due to observed leakage in the 31 & 32 EDG FOSTs called for increased sampling of all EDG FOSTs to determine water content both on a normal, expedited basis as well as after excessive precipitation involving rain or snow. Specifically, EDG FOSTs # 31 and 32 were sampled daily and #33 sampled weekly for water content. As of 2/1/01, this enhanced EDG FOST sampling frequency added the requirement for sampling all three FOSTs for water content twice per day during periods of precipitation and for 3 days after the end of these precipitation periods.
During Refueling Outage 11 (RO -11), the EDG FOSTs were sampled for water content just prior to and after outage EDG work windows and the requirement for sampling twice per day during precipitation periods and for 3 days after precipitation also remained in effect. Since the completion of RO-11 and presently, the sampling frequency for the EDG FOSTs is daily for #31 and #32 FOSTs and weekly for #33 FOST. This frequency is based upon detecting water in-leakage promptly for all three FOSTs, but may be altered based upon previous results and historic data.

Water content has not been detected in any EDG FOST since the January 2001 sample results previously mentioned. The present Technical Specifications (TS) Surveillance Requirement (SR) 3.8.3.6 for the checking and removal of accumulated water in each EDG FOST has an allowed frequency of 92 days. TS basis for this SR is for preventative maintenance purposes. Unless the detected water volume is sufficient to impact EDG operability, presence of water in a FOST does not necessarily represent failure of this SR, provided this accumulated water is removed within 7 days of the performance of this SR. The volume of accumulated water at which a FOST and its associated EDG would be declared inoperable is approximately 3.5 inches (about 33 gallons) in the bottom of the tank.

3b. If excessive accumulated water is subsequently found in one of the EDG FOSTs and not in the other two, the declared inoperability of the affected FOST and associated EDG does not, on its face, cause the remaining EDGs or their respective FOSTs to be inoperable. However, the design of the EDG Fuel Oil System creates the potential for contamination of excessive accumulated water in one FOST to be moved by the Fuel Oil (FO) Transfer Pump in that FOST to the common headers for entry into the other two EDG day tanks. This potential is made remote at present based upon the aggressive sampling plan for all EDG FOSTs currently in place. The ability to detect water accumulation in any FOST is enhanced to prevent possible cross-contamination. Additionally, all previous accumulated water identified in the FOSTs has been of a volume below that which could cause the respective FOST to be declared inoperable. Upon declaration of the affected FOST and its EDG as inoperable causing entry into TS 3.8.1, the FOST oil supply containing the accumulated water is isolated from the fuel oil supplies of the other two EDGs. The inoperable EDG is tagged out in the "off" position. The FO transfer pump is also placed in the "Stop" position. This prevents the respective FOST transfer pump from starting. The accumulated water in the affected FOST is pumped out, among other actions, and the unaffected EDGs and their respective FOSTs are effectively isolated from the inoperable FOST. Thus, the unaffected EDGs and their respective fuel oil system will not be impacted by the water found in a single FOST. Additionally, sampling of fuel oil in the other unaffected FOSTs continues as required to ensure that accumulated water is not found in these tanks as well.

3c. Possible corrective maintenance work on a single EDG FOST will not impact the proper function and operation of the other remaining FOSTs and the fuel oil systems for these EDGs. Pages 2 and 3 of Attachment II provide further details as to the arrangement of the EDG Fuel Oil system so as to allow the two remaining operable EDGs and the affected EDG to operate as required in the event of a plant transient or design basis accident requiring the use of appropriate EDGs. Since the EDG Fuel Oil system is arranged to allow individual day tanks to automatically demand fuel oil supply from their associated FOST and to allow any one FOST to supply a fuel oil header and send oil to any day tank, the design and operation of the EDG Fuel Oil system supports this proposed one-time TS change safely and efficiently. Work on a FOST will be isolated from the other parts of the unaffected EDG Fuel Oil system by closure of those fuel oil header isolation valves that connect the affected FOST to the appropriate fuel oil header. This will also necessitate tagging out the affected FOST fuel oil transfer pump to allow intrusive work into the tank under repair.

Q4. Please provide a description of the EDG FOS configuration and expected operation, if required, during the proposed LCO.

Answer:

4. A detailed description of the EDG Fuel Oil System (FOS) is included in pages 2, 3 and 4 of Attachment II. This description also includes FOS intended operation when one EDG FOST has been declared inoperable and unavailable with its associated EDG technically inoperable, but available for automatic operation if desired. During the proposed 14-day LCO, additional protective measures and bases for allowing this AOT period are also mentioned on page 4 of Attachment II.

Q5. Please provide the following information for the EDG FOS as it is currently modeled in the supporting PRA model: 1) system unreliability, 2) system success criteria, 3) independent and common cause failure (CCF) component unreliabilities (indicate if they are plant-specific or generic), 4) important operator actions modeled in the system fault tree. How is the EDG FOS unreliability changed given one EDG FOST unavailable as would be the case in the proposed LCO?

Answer:

5 (1) The unavailability of each individual EDG is presented in the following table for both the base (Revision 0) and the updated (Revision 1) analyses.

MODEL	**EDG Unavailability**		
	EDG 31	**EDG 32**	**EDG 33**
Rev 0 Linked Fault Tree Model	7.71 E-2	8.49 E-2	8.81 E-2
Rev 1 Linked Fault Tree Model	1.23 E-1	1.28 E-1	1.14 E-1

The increased unavailability seen for EDGs in the updated model reflects past operating data for component failure probability taken from 1/1/92 to 10/31/99. Maintenance unavailability data was taken from 1/1/85 to 10/31/99. When evaluating each EDG, no dominant cutset level contributors from failures in the respective fuel transfer systems were seen.

5 (2) For the 480VAC electrical system, the success criterion is power to be available at two-out-of-three buses. Buses 2A and 3A, which are fed by EDG-31 are counted as one bus. EDG-31, 32 and 33 independently feed buses 2A/3A, 6A and 5A, respectively.

5 (3) Common cause failure events individually account for combinations of any two EDGs as well as three EDGs to start and run. Beta factors were used in the original IPE submittal and the multiple Greek letter (MGL) methodology was employed for the update. In both analyses, plant specific data were used.

5 (4) Operation of EDGs is automatic and does not require operator action. Fuel transfer is automatic except under one condition during the maintenance of FOST-31 should there be a loss of 125 VDC power panels 31 or 32. Under this condition, failure to fast transfer 6.9KV buses 2 and 3 to the Station Auxiliary Transformer will black out buses 2A/3A forcing a start of EDG-31 alone. Since buses 5A and 6A will still be energized, their respective EDGs will not start. As the day tank of EDG-31 depletes, operator action is required to manually start the fuel transfer pumps as per operating procedure SOP-EL-1. Although operations personnel are stationed locally and this action is covered by procedures, the event is modeled with a conservatively high value of 0.1.

Q6. Discuss the fuel oil system's electrical dependencies on the EDGs.

Answer:

6. Fuel oil is transferred from each FOST to each EDG day tank by a 480 VAC fuel transfer pump, powered by an EDG auxiliary Motor Control Center (MCC). MCCs-36C, 36D and 36E provide power and control to fuel oil transfer pumps 31, 32 and 33 respectively. Each day tank has two hydramotor actuator level control valves, one from the emergency fill line and the other from the normal fill line. Power and control to these valves comes from the respective MCC compartment control transformer. The failure of all associated pumps, valves and limit switches are modeled in the IPE.

Q7. Given any one of the EDG FOSTs out of service, provide the dominant PRA model sequences for that configuration. Discuss risk insights gained and any measures that may be taken as a result.

Answer:

7. The IP3 IPE uses a small event tree, linked-fault tree approach with a developed single top gate model. (see Answer to question 2a). For each FOST, quantification of this model was performed by initially setting the specific fuel transfer path failure logic to TRUE. For the case of each FOST, an additional quantification was made to assess the impact of not performing any other concurrent risk-significant maintenance activities. From evaluation of the resultant minimal cutsets, the greatest risk impact arises from losses of the 125 VDC power panels 31 or 32 either following a transient or loss of DC special initiator while removing FOST-31 from service. The dominant cutset involves a turbine trip with feedwater available initiating event (IE-T3) followed by common cause failure of 125VDC power panels 31 and 32. Under these conditions, 480V buses 2A/3A will de-energize following failure to fast transfer 6.9KV buses 2 and 3 to the Station Auxiliary Transformer. EDG-31 will automatically start and load to re-power buses 2A/3A. The remainder of the 480V buses will remain powered from offsite power (via station service transformers) and their respective EDGs will not start. In this scenario, since the other EDGs are not running, no fuel will be automatically transferred to the day tank of EDG-31. EDG-31 will eventually shut down blacking out buses 2A/3A.

Due to the loss of the two DC power panels, and 480 V buses 2A/3A, all auxiliary feedwater pumps will be unavailable. In addition, feed-and-bleed would be unavailable due to loss of control to pressurizer PORVs (PCV-455C and PCV-456) which will result in core damage. Operators are required to be stationed at the local EDG control panel and are instructed in following System Operating Procedure SOP-EL-1, "Diesel Generator Operation," to manually start fuel transfer pumps if the need arises. Power to the remaining fuel transfer pumps on buses 5A and 6A will be available. Therefore, it is proposed that Operations personnel be briefed on performing the required actions for this scenario. For removal of each of the other FOSTs from service, the impact is diminished from that of FOST-31.

Q8. Please provide the following from your supporting PRA model: 1) Risk Achievement Worth (RAW) for 1 and for 2 fuel oil transfer pumps, 2) RAW and the Fussel-Vesely importance measures for each EDG, and 3) the CCF probability for 2 of 3 EDGs.

Answer:

8 (1). In both the base and one FOST out-of-service configurations, the risk achievement worth (RAW) for one and two transfer pumps is 1.0. The two main reasons for this are that dominant accident sequences are initiated by loss of offsite power (IE-T1). And, while operating, fuel transfer from either emergency or normal fill line is automatic providing one of the remaining EDG day tank level switches is calling for fuel as well. If not, operators are instructed to manually start a transfer pump. Both normal and emergency valves will open automatically on low day tank level.
For two-transfer pump sensitivity, a better measure would be to quantify the unlikely configuration of a loss of two FOSTs simultaneously. For this exercise FOST-31 and FOST-32 were removed from service and operator action was not credited. The increased Fussel-Vesely and RAW measures for the fuel transfer components are presented in the following table.

Event Name	Description	Probability	FV	RAW
EDG-RCK-NO-FOT 33	FUEL OIL PMP 33 CNTL CKT NO OUTPUT	2.50E-03	3.86E-02	16.40
EDG-MDP-FR-FOT-33	FUEL OIL PMP 33 FLS TO RUN GIVEN ST	7.20E-04	9.72E-03	14.48
EDG-MDP-FS-FOT-33	FUEL OIL PMP 33 FLS TO STRT ON DEM	5.00E-04	6.67E-03	14.32

The relative contribution to CDF is approximately two magnitudes lower than that of common cause failure of 125VDC power panels and the reactor protection system given this configuration. Therefore, fuel transfer failures are not significant contributors to CDF.

8 (2). Fussel-Vessely and RAW importance measures are presented below for failure of EDGs and related components in the base case.

Event Name	Description	Probability	FV	RAW
EDG-CCF-HW-DG312	COMMON CAUSE FAILURE OF DG'S 31 & 32	1.00E-04	1.77E-03	18.66
EDG-CCF-HW-3EDGS	COMMON CAUSE FAILURE OF ALL 3 EDG'S	4.74E-05	4.98E-04	11.51
EDG-CCF-HW-DG313	COMMON CAUSE FAILURE OF DG'S 31 & 33	1.00E-04	5.91E-04	6.91
EDG-CCF-HW-DG323	COMMON CAUSE FAILURE OF DG'S 33 & 32	1.00E-04	5.91E-04	6.91
EDG-GEN-HW-EDG31	DG31 GEN FAILURE	2.57E-02	1.40E-01	6.32
EDG-ENG-FR-DG31R	DG31 FAILS TO RUN	4.66E-03	2.11E-02	5.51
EDG-MAI-MA-EDG31	DG31 IN MAINTENANCE	3.02E-02	1.40E-01	5.50
EDK-XHE-RE-31RHE	FAIL TO RES DG31 VOLT CNTRL RHEO AFT TST	3.00E-03	1.2E-02	4.98
EDG-GEN-HW-EDG32	DG32 GEN FAILURE	2.57E-02	6.04E-02	3.29
EDG-ENG-FR-DG32R	DG32 FAILS TO RUN	4.66E-03	7.27E-03	2.55
EDG-MAI-MA-EDG32	DG32 IN MAINTENANCE	2.92E-02	4.32E-02	2.44
EDG-XHE-RE-32RHE	FAIL TO RES DG32 VOLT CNTRL RHEO AFT TST	3.00E-03	3.83E-03	2.27
EDG-GEN-HW-EDG33	DG33 GEN FAILURE	2.75E-02	3.24E-02	2.23
DGV-CCF-HW-DG31F	CCF OF BOTH DG31 ROOM VENT FANS	6.50E-04	6.53E-04	2.00
EDG-ENG-FR-DG33R	DG33 FAILS TO RUN	4.66E-03	4.50E-03	1.96
EDG-MAI-MA-EDG33	DG33 IN MAINTENANCE	2.31E-02	1.70E-02	1.72
EDG-XHE-RE-33RHE	FAIL TO RES DG33 VOLT CNTRL RHEO AFT TST	3.00E-03	1.96E-03	1.65
EDG-RCK-NO-FOT31	FO PMP 31 CNTL CKT NO OUTPUT	2.50E-03	1.41E-03	1.56
EDG-MDP-FR-FOT31	FO PMP 31 FLS TO RUN GIVEN ST	7.20E-04	2.37E-04	1.33
EDG-MDP-FS-FOT31	FO PMP 31 FLS TO STRT ON DEM	5.00E-04	1.65E-04	1.33
DGV-CCF-HW-DG31D	CCF OF BOTH DG31 EXH FAN DAMPERS TO OPEN	1.06E-04	0.00E+0	1.00

DGV-CCF-HW-DG31L	CCF OF ALL THREE DG31 INLET LOUVER SECTS	1.06E-04	0.00E+0	1.00
EDG-ENG-FS-DG31S	DG31 ENGINE FAILS TO START	1.32E-04	0.00E+0	1.00
EDG-RCS-CC-31CVX	DG31 VOLT BU A.REL CVX (b)CT FL TO OPEN	1.80E-04	0.00E+0	1.00
EDG-RCS-CC-31INST	DG31 TD RELAY NST (b)CT FL TO RMN OP	1.80E-04	0.00E+0	1.00
EDG-RCS-CC-D31K1	DG31 REL K1(b) CONT FL TO OPEN	1.80E-04	0.00E+0	1.00
EDG-RCS-OO-332A1	RELAY 3-3/2A1 CONT FL TO CLS	3.00E-04	0.00E+0	1.00
EDG-RCS-OO-D31CV	DG31 VOLT BUILD UP REL CV CT FL TO OPEN	3.00E-04	0.00E+0	1.00

8(3). In the base IP3 IPE model, the common cause failure (CCF) probability of three EDGs to start and run is 4.74E-05. In the IP3 IPE update, the CCF of all three EDGs to start is 1.03E-04 and the failure to run is 1.03E-03.

Q9. How do the current EDG unreliability values compare with the EDG unreliabilities assumed in the supporting PRA analysis (discuss failure to start on demand and failure to run frequency for each diesel)?

Answer:

9. IP3 EDG unavailability trending (Enclosure 1), a 24 month rolling average, from the fourth quarter of 1997 to date, shows all three EDGs well below the calculated (PRA) allowable SSC unavailability limit of 2.5%. IP3 EDG performance test procedure, PFM-57, "Emergency Diesel Generator Reliability Program," data indicates that the last total 100 EDG starts (since about May 1999) and the last total 100 EDG loadings (since about Jan 1999) have not experienced a failure to start on demand nor a failure to run as required.

Q10. Are there currently any trends in any of the EDGs reliability?

Answer: Trend information for "EDG Unavailability" is included in Enclosure 1 for all three EDGs. This trending information shows that unavailability time for each EDG has generally been favorably trending downward since about 4th quarter 1997.

Q11. What system/train maintenance will not be planned during the proposed LCO per procedures?

Answer: Related EDG system/train maintenance that is not planned during this proposed 14-day AOT is discussed on page 4 of 8 of Attachment II.

As previously mentioned, IP3 procedure SPO-SD-03, "On-Line Work Scheduling Process," is utilized by Operations Work Control Center personnel to control maintenance associated with the remaining operable EDGs and their auxiliary equipment, the 480V buses and their associated safety equipment powered from those buses, as well as the remaining affected, yet available EDG. The control of any scheduled work by use of this procedure is based upon PRA and sound operating judgment.

Q12. Describe your configuration risk management process of planned and unplanned equipment outages during the proposed LCO, including use of the PRA model or other risk assessment tools.

Answer:

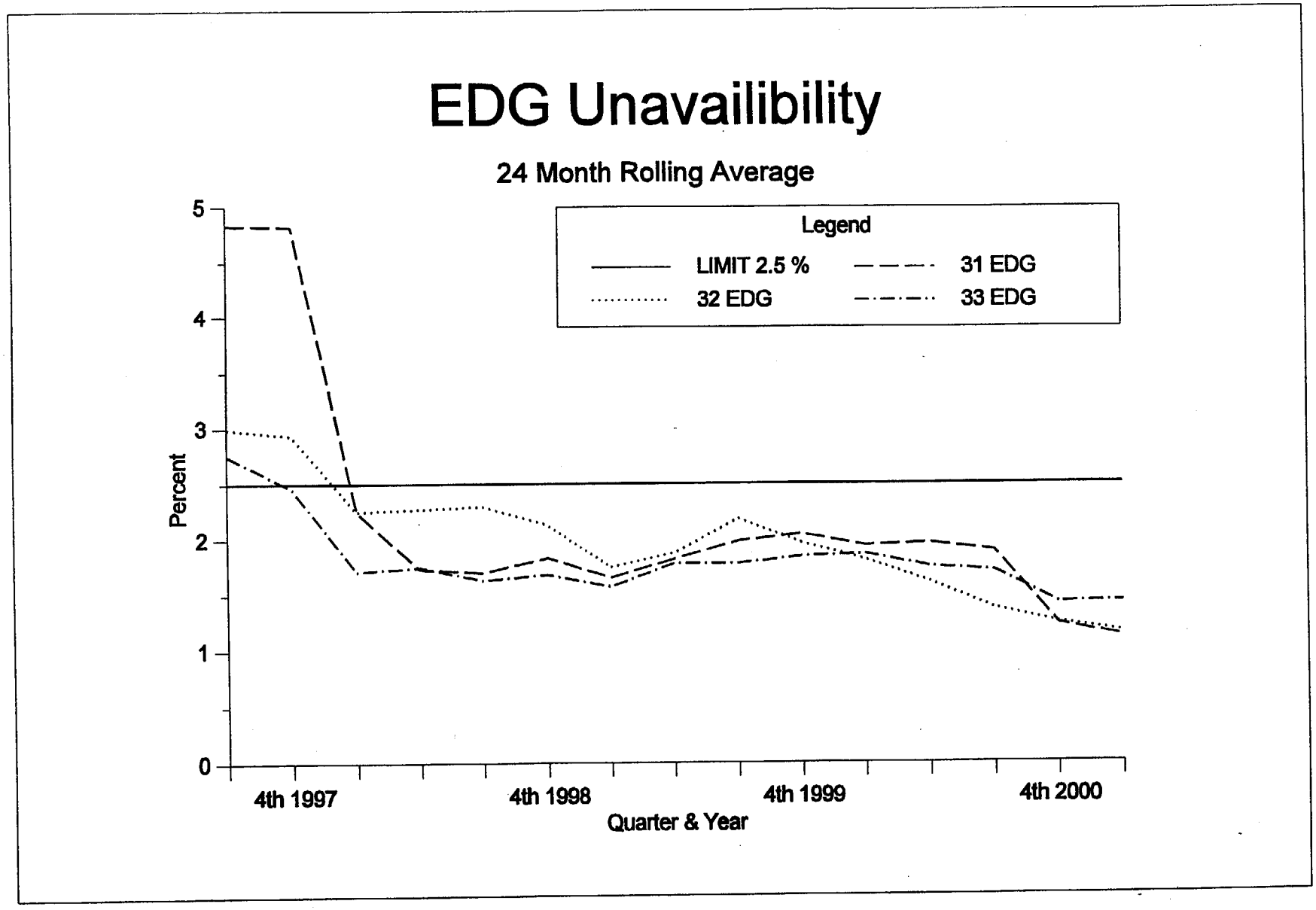
12. Work on risk-significant and Maintenance Rule SSCs is governed by Station Directive SPO-SD-03. This is also discussed on page 4 of 8 of Attachment II in. This procedure provides guidance to the Site Planning and Outage Services (Work Control Coordination) Department personnel for scheduling any additional activities during the FOST outage. For risk-significant SSCs, a screening procedure is used to determine high-risk significance or multiple train impact. If so, further evaluation is required by the Entergy Nuclear Northeast headquarters office. A quantification of the configuration is made using the IP3 IPE single top gate model. In addition to reporting the increase in CDF, remain-in-service and other contingencies based upon the minimal cutsets are sent officially. These evaluations have been done on a routine weekly basis to support the workweek schedule.

Q13. Describe the latest updates to the PRA model that are relevant and important to your supporting PRA analysis of the proposed TS change, including changes that may have resulted from the August 31, 1999, partial loss of offsite power event at Indian Point 2.

Answer:

13. The EDG system modeling was modified to include the addition of two new MCCs (MCC-36D and MCC-36E) to power auxiliary components as well as fuel transfer. In addition, EDG failure to run and start data was updated. There were no changes in the model required to reflect the loss of bus 6A incident experienced at IP2 since control of the electrical system differs from that of IP3. A loss of voltage to each individual 480V bus (2A/3A, 5A and 6A) forces a start of only the impacted EDG. At IP2, the loss of a single bus will force a start of the three EDGs.

Enclosure 1


EDG Unavailibility
24 Month Rolling Average
Legend
LIMIT 2.5 %
31 EDG
32 EDG
33 EDG
Percent
5
4
3
2
1
0
4th 1997
4th 1998
4th 1999
4th 2000
Quarter & Year