Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

MAR 18 1996

Docket No. 50-336
B15581

Re: 10CFR50.90

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

Millstone Nuclear Power Station, Unit No. 2
Transmittal of Additional Information Regarding
Proposed Revision to Technical Specifications to
Extend Allowed Outage Times for the Emergency Diesel Generator,
Safety Injection Tanks, and Emergency Core Cooling Subsystem

In separate letters dated August 23 and November 3, 1995,[1][2][3] Northeast Nuclear Energy Company (NNECO) proposed license amendments to revise the Millstone Unit No. 2 Technical Specifications to extend the allowed outage times for the emergency diesel generator, the safety injection tanks, and the emergency core cooling subsystem. In a letter dated January 11, 1996, and received January 22, 1996,[4] the Nuclear Regulatory Commission requested that NNECO provide additional information which it needs to complete their

---

(1) J. F. Opeka to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2, Proposed Revision to Technical Specifications, Diesel Generator Allowed Outage Time Extension," dated August 23, 1995.

(2) J. F. Opeka to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2, Proposed Revision to Technical Specifications, Safety Injection Tanks Allowed Outage Time Extension," dated August 23, 1995.

(3) J. F. Opeka to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2, Proposed Revision to Technical Specifications, Emergency Core Cooling Subsystem Allowed Outage Time Extension," dated November 3, 1995.

(4) U.S. Nuclear Regulatory Commission to R. E. Busch, "Request for Additional Information Concerning the Requests for Allowed Outage Time Extensions for Emergency Diesel Generator Systems, the Safety Injection Tanks and the Low Pressure Safety Injection System and the Combustion Engineering Owners' Group Joint Application Reports Relating to These Requests," dated January 11, 1996.

A001
1/1

review of the proposed revision to the Technical Specifications by March 7, 1996, (within 45 days from the receipt of the NRC letter). In a telephone conversation with the NRC Staff, NNECO was granted a two week extension to provide the additional information by March 21, 1996. The Attachment to this letter provides the requested additional information.

There are no commitments contained in this letter. If you have any questions regarding this matter, please call Mr. Gerard P. van Noordennen at (860) 440-2084.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

F. R. Dacimo
Vice President - Nuclear Operations

cc: T. T. Martin, Region I Administrator
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2
P. D. Swetland, Senior Resident Inspector, Millstone Unit No. 2

Docket No. 50-336
B15581

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Transmittal of Additional Information Regarding
Proposed Revision to Technical Specifications to
Extend Allowed Outage Times for the Emergency Diesel Generator,
Safety Injection Tanks, and Emergency Core Cooling Subsystem

March 1996

Millstone Nuclear Power Station, Unit No. 2
Transmittal of Additional Information Regarding
Proposed Revision to Technical Specifications to
Extend Allowed Outage Times for the Emergency Diesel Generator,
Safety Injection Tanks, and Emergency Core Cooling Subsystem

1) We are assuming the Probabilistic Risk Assessment (PRA) used in the Millstone 2 "at power" analysis is the Individual Plant Examination (IPE) PRA submitted by Northeast Nuclear Energy Company to the NRC in December 1993, with clarification provided to the NRC by the Northeast Nuclear Energy Company on September 20, 1995, (Responses to the NRC request for additional information). Is this assumption correct?

ANSWEP: Yes. The IPE is based on Revision M2PRA1A of the level 1 internal events model.

2) The extended AOTs will be used, at least for Low Pressure Safety Injection (LPSI) trains and Emergency Diesel Generators (EDGs), to conduct on-line preventative maintenance (PM). Please indicate whether or not the system trains are presently being taken out simultaneously with other safety system equipment for "on-line" PM purposes.

ANSWER: The Work Planning and Control Group has, as an objective, to minimize the number of simultaneous system train outages because of the cumulative effect on plant risk. Therefore, this is not normally done, (especially opposite train systems). Weekly, there is a three week look ahead of planned maintenance/testing activities. Each week's activities schedule is "finalized" three weeks in advance and the PRA group performs a risk assessment of these activities. If the risk associated with planned activities represents a significant peak, further discussions take place to determine what scheduling options/changes are possible and to decide on what actions are appropriate.

3) What is the projected average corrective maintenance (CM) and PM downtime for the equipment for which extended AOTs are being requested?

ANSWER: Increased AOTs are being proposed to provide more flexibility in accommodating online preventative maintenance and repairs recognizing that much improved administrative mechanisms are in place to minimize plant risk due to undesirable plant configurations and carefully monitor equipment unavailability. If the proposed AOTs were granted, we would expect downtime, due to corrective maintenance at power, to remain consistent with past corrective maintenance history, since it is generally due to unanticipated occurrences. A conservative estimate of this is the maintenance unavailability assumed in the PRA. (This value includes both corrective and any preventative maintenance occurring at power). Historically, the following frequencies, expressed in hours per year of power operation, have been experienced (SIT unavailabiltiy has been estimated):

SIT - 2.5 hrs/year/ individual SIT
LPSI - 31 hrs/year/train
EDG - 92 hrs/year/train

In order to project the down time due to preventative maintenance during power operation, conservatively, all corrective and preventative maintenance practices performed during shutdowns could be assumed to occur at power. This is intended to estimate the effect of performing the majority of preventative maintenance online. (Note that preventative maintenance performed at power is already included as part of corrective maintenance performed at power). Given this assumption, the following estimated projections were made:

SIT - Level transmitter work or replacement and maintenance on the nitrogen cover gas system are typical maintenance activities that take place on the SIT system. Often these activities are performed during full power because they can be performed within the current LCO Action Statement or do not cause the system to be inoperable. Since the Fall of 1995 several problems/replacements of level transmitters have occurred. An extended AOT would greatly help to provide more maintenance flexibility and avoid unnecessary shutdowns. (Another maintenance activity that is common, but can only be performed at shutdown is maintenance on drain and fill valves (2" air operated valves). Since this activity is required to be performed at midloop, the maintenance time spent performing these activities is not being noted here). The estimated projection is 4 hours/18 months/SIT.

LPSI - Routine maintenance is not performed on the LPSI pumps each refueling unless corrective maintenance to restore operability is required (This worked would normally be performed during Mode 4, when

only 1 LPSI train is required, or during a full core offload). Pump and motor maintenance typically occurs at 5 year intervals. Most maintenance activities would typically occur because of testing/maintenance on the injection MOVs. An example of work performed during the last refueling outage on the pumps was the replacement of the pump casing gaskets. This activity takes approximately 2 shifts to perform. Currently, further corrective maintenance is desired on both LPSI pumps. If a 7 day AOT was available, the seal replacement and impeller to wear ring rub diagnostic could be performed online with less risk to the plant. (Seal replacement typically takes 3-5 days). The estimated projection is 75 hours/18 months/LPSI Train.

EDG - The estimated projection is 75 hours/18 months/train involved with teardown inspections.

Estimated projections were based on conversations with system engineers and their knowledge of maintenance activities during shutdown. If system availability is not required during shutdown, unavailability hours are not tracked. Also, non-critical path activities, many times, are performed during day shift hours only and, therefore, their OOS times do not reflect the actual time maintenance activities took place. If these activities were performed within an LCO, many would be performed in much less time.

4) The NRC staff has developed a "three tiered" approach for reviewing risk informed improvements to the Technical Specifications (TSs). Tier 1 involves setting the upper limit on AOT based on a Core Damage Frequency (CDF) and containment performance. Tier 2 involves pre-determined restrictions on high risk configurations by limiting simultaneous equipment outages. Tier 3 involves performance of a real-time assessment of the overall impact on the safety of proposed configurations prior to performing maintenance activities which will remove equipment from service. Please provide information on how you would address Tiers 2 and 3 for the proposed AOT extensions.

ANSWER: Plant configuration, due to test and maintenance activities, is evaluated through our risk monitoring program. With this program, the planning and scheduling of work activities considers the varying degrees of risk associated with plant configurations due to these activities. Work Planning and Outage Management (WP&OM) procedures are in place to ensure that Tiers 2 and 3 are addressed adequately. Safety Analysis Branch Procedure 3.08 "Risk Monitor" requires PRA perform a timely assessment of plant configuration risk. Millstone site procedure C-WPC-4 "Online Maintenance" requires Millstones Unit No. 2 to provide information to the PRA group to take into consideration PRA insights in their work planning schedule.

5) Are the compensatory measures presented for the AOT extension currently followed, or would they be implemented when the AOT extensions are granted?

ANSWER: The compensatory measures are currently being followed.

6) If the CDF is calculated with respect to a component that is not in the cutset list due to applying cut-off probabilities to cutsets, the application states that the eliminated cutsets containing the component are retrieved and the CDF is calculated. How is the analyst assured that all cutsets containing the component of interest are retrieved? Please explain the process used in this case.

ANSWER: It is very difficult to ensure that all cutsets containing a certain component are retrieved. However, this is not necessarily important if the analyst has a good degree of assurance that the relative importance of a component is not misrepresented by the cutsets being utilized. The potential of the truncation limit to affect the importance parameters or calculations particularly exists in those cases where risk significant components have high reliability (i.e., SIT tanks). In these cases, small changes in reliability are usually large compared to the original reliability. For the SITs, maintenance unavailability was represented by altering the unavailability of a single check valve to open. However, because of the success criteria (2 of 3 SITs) and the fact that common cause failure of 2 of 3 check valves dominates SIT unavailability, the impact of individual check valves failing is insignificant. In almost all other cases, such as the Emergency Diesels or LPSI, the cutsets represented, using a 10^{-9} truncation limit, is more than adequate. (See the response to question #7 for further discussion.)

7) Please provide the truncation cutoff used to quantify the CDFs presented. Particularly indicate what efforts were made to avoid underestimation when the impact calculated was negligible or nonexistent. For example, the impact of one Safety Injection Tank (SIT), unavailable, was calculated to be zero or negligible for Millstone 2.

ANSWER: A truncation cutoff of 1×10^{-09} was used to quantify the CDFs presented. If the impact of a system is found to be negligible, a qualitative assessment is done to better understand the results. In the case of evaluating one SIT being unavailable, importance measures such as Risk Achievement Worth were considered to assess what the impact is of not having one SIT available all of the time. Considering that SITs are credited only for large break LOCAs, have a success criteria of 2-of-3 (those not connected to the faulted loop) and have a high availability, the negligible impact of increasing the AOT (which has been translated into increased maintenance unavailability) makes sense. If it did not, further review of the cutsets and sensitivity tests would be pursued.

8) You are comparing delta's in risk from "at power," transition, and shutdown to make your case that the net effect of the AOT extensions reduces risk. What assurance do you have that each element of the comparison is equally a "best estimate" or equally conservative? Subtracting a best-estimate delta from a conservative delta could result in values for net effect that are only artifacts of the process and not real. For example, for the LPSI System AOT analysis, the shutdown portion appears to be conservative while the "at power" analysis appears to be best-estimate. Please discuss how you ensure that the elements are all based on the same assumptions.

ANSWER: The AOT analysis specifically accounts for the risk impact of taking equipment out of service during "at power", transition, and shutdown periods of time. For a given AOT extension, there is theoretically an increase in the "at power" component of risk and decreases in the transition and shutdown components of risk. The AOT extension analysis recognized these effects and thus assessed the delta CDF associated with each of these three risk components. Although all three components were calculated, the conclusions of the AOT risk impact analysis are based on the "at power" delta CDF results rather than a comparison between the "at power" delta CDF results and the transition risk.

The degree of conservatism and plant specificity associated with delta CDF estimates for each of these time periods varies. The delta CDF associated with the "at power" period was plant -specific and was calculated in a manner which maximized its value. The transition and shutdown risk impacts were quantified on a more generic basis. Combining these risk elements to justify a conclusion one way or the other was deemed inappropriate due to variations in the "completeness" of analysis. Therefore, in order to avoid misrepresenting the overall risk impact of the increased AOT, the "at power," transition and shutdown risk results were not numerically combined.

9) Explain how you addressed uncertainties in your calculations of "at power," transition, and shutdown.

ANSWER: The level 1 PRA does not quantify uncertainties associated with sequences or specifically attach uncertainties associated with basic events. The model is to identify risk significant sequences and analyst does not prioritize sequences strictly on the basis of their probabilities. Many factors are considered when reviewing risk significant sequences that implicitly consider uncertainty of data. An obvious example would be the high uncertainties associated with human performance or the high uncertainties associated with events having little or no historical data to form their basis. In these instances modeling can be performed to minimize the impact (such as not taking credit for an operator action even though in all likelihood it would be performed or using conservative screening values).

There are many PRA applications (e.g., cost-benefit analysis on plant modifications using PRA) where uncertainty analysis is immensely useful. However, in this application, uncertainty analysis does not provide useful insights. The risk of equipment out-of-service is governed primarily by (a) the duration for which equipment is out of service and, (b) plant configuration when equipment is taken out-of-service. Increasing the AOT does not affect these parameters directly. A great deal of uncertainty is associated with the total duration equipment is out-of-service if proper controls, limiting duration, are not in place. This uncertainty has far greater significance than the uncertainty associated with a delta CDF result based on conservative assumptions. What is important is how (a) and (b) are controlled. At MP2, items (a) and (b) are controlled through our procedures (C-WPC-4 and SAB 3.08). As a matter of interest, insights on the magnitude of uncertainties associated with delta CDF calculations can be sometimes indirectly gained by comparing results determined independently (i.e., between CEOG plants seeking these AOT extensions). A consistency of results is found.

10) What review of the PRA was made to ensure that the PRA represents the as-built, as operated plant, and contains the fine structure (resolution) necessary to evaluate the proposed TS requirements? Were any changes made to the PRA due to such reviews? If yes, please provide a list of these changes.

ANSWER: On a continual basis, plant design and procedure changes are reviewed to determine if the potential exists to impact level 1 PRA modeling assumptions. If a determination is made that a plant design or procedure change has the potential to impact the level 1 PRA results, a PRA Model Change Request is submitted and reviewed per Safety Analysis Branch (SAB) procedure 3.03. Upon the next update, changes would normally be implemented. In the interim, analysts making PRA evaluations can assess the importance of those changes to PRA evaluations and compensate as necessary. (In some cases, that may mean making temporary modeling changes). In the specific case of PRA evaluations done for LPSI, SIT and the Emergency Diesel Generators, no changes in the PRA model were determined necessary to support the Technical Specification change requests. In general, level 1 PRAs are very good tools for evaluating the risk associated with AOTs if bounding assumptions can be made with regard to the total allowed out of service time. In other words, the level 1 PRA model structure is sensitive to maintenance and testing out of service time.

11) An increased AOT is expected to reduce the number of entries into Limited Condition of Operation (LCO) action statements by allowing a more complete maintenance program during a single AOT. Please provide a detailed example to show the rearrangement of maintenance activities for your plant with the increased AOTs. (Also see related Question (SIC) 27 on EDGs.)

ANSWER: Conceptually, increased AOTs help in planning for more complete preventative and corrective maintenance and allows grouping of activities so the number of entries into LCO Action Statements can be reduced. In practice, however, a detailed example is difficult to provide since there are cases where the number of entries into the LCO action statement is dictated by other commitments. For example, Millstone Unit No. 2 currently has a commitment to perform quarterly hydrolasing of the EDG heat exchangers. We are presently investigating relaxing this commitment by establishing criteria for cleaning based on the presence of fouling rather than a preset periodic evolution. If the amount of hydrolasing can be reduced, then the extended AOT will provide the ability to reduce the number of entries into the EDG LCO action statement. The reduced number of entries into the LCO action statement will in turn reduce the risk associated with restoration human errors following maintenance. (See also response to Question 27 on EDGs.)

12) Please explain how extension of the AOT reduces the need for simultaneous common system PM operations (e.g., page 6 of LPSI System report)?

ANSWER: The intent of the AOT extension is to provide flexibility to the plant operating staff in performing preventative maintenance. One advantage of having longer AOTs is the greater ability to perform system train/component preventative maintenance activities in a serial manner rather than in parallel. By doing so, the likelihood of being able to maintain system functionality or minimize the time required to return the train/system to service (while performing PM), in an emergency, is greater. (This response assumes "common system" refers to "same system on a single train.")

13) Is repair time available for the events described in Table 5.2-1 of the SIT report?

ANSWER: The event for Millstone 2, identified in Table 5.2-1, relates to SIT level instrumentation and accounts for the time when SIT level indication was questionable. It does not necessarily related to the ability of the affected SIT to perform its' function. "Follow-on" repair times for the inoperable instrumentation is not readily available. However, based on more recent experience in replacing SIT level transmitters, follow-on repair time would be approximately 4 hours.

14) Given the use of the current PRA estimate to justify the requested extended AOT, will you periodically reexamine your "living PRA" to ensure that an increase in "at power" CDF due to the extended AOT is not significantly different than you estimate during future plant operation?

ANSWER: By itself, extending an AOT within an Action Statement does not correlate to more or less risk, as defined by PRA. The total amount of time a "System Train" is in an Action Statement, due to preventative maintenance or otherwise, is what is important to the unavailability of a train and, therefore, affects its risk impact. In the case of the requested AOTs, PRA was used to make a risk assessment based on a set of assumptions about how the AOT would be used considering the desire to perform more online maintenance. The evaluations for each of the three system trains showed that the associated risk was small to negligible. Unless any of the systems were to be credited for event mitigation in a significantly different way, periodic reexamination is not necessary.

Increased AOTs, without other internal or regulatory controls can potentially lead to increased risks due to AOT overuse since there are no regulatory controls that limit the number of times an LCO may be entered. With the implementation of the Maintenance Rule the time risk significant systems are out-of service will be controlled. By internal guidelines and procedures (SAB 3.03), PRA is committed to supporting the Maintenance Rule. SAB 3.08, "Risk Monitor" will also ensure PRA support to the plants per C-WPC-4.

15) In your submittal of August 23, 1995, you proposed to extend the AOT from 3 days to 7 days and once-per-fuel-cycle allowance for an AOT of 10 days for each EDG to perform PM or CM. It is not clear why a 7-day AOT time is needed for every EDG AOT. The NRC staff has been considering the extensions of EDG AOTs on a plant specific basis if the primary intent of extending the EDG AOT is to perform the 18-month manufacturer recommended maintenance such as teardowns or preplanned PM or modifications that would otherwise extend beyond the original AOT. Please state your reason for extending your current EDG AOT. Your response should include instances where your current AOT was insufficient to perform PM or CM.

ANSWER: Extending the current EDG AOT is being proposed to facilitate greater online maintenance with the intent to eventually perform the manufacturer recommended 18 month maintenance teardowns online. Presently, maintenance performed online is planned considering the company policy that planned work should consume no more than approximately one half of the allowed action time. This allows margin to handle unforeseen problems that may arise. Therefore, the current AOT limits the PM or CM that can be performed on-line. Temporary repairs have been needed on occasion to stay within the AOT. A longer AOT may give maintenance personnel the option to perform permanent repairs on more occasions when CM is needed. (It should be noted that our submittal did not request a once-per-fuel cycle allowance for an AOT of 10 days for each EDG.)

16) The staff is presently concerned that the extensions of EDG AOTs may increase the mean CDF for the station blackout (SBO) events, and impact resolution of the SBO issue. Provide the calculated CDF for SBO sequences without the proposed AOT extension and the CDF for SBO sequences with the proposed AOT extension. Also, provide the overall unavailability of the EDGs used in the PRA to calculate the CDFs for the SBO sequences requested.

ANSWER: The calculated CDF for SBO sequences without the proposed AOT extension is:

4.25E-07 events/year (- Assumes overall unavailability of 6.3E-02, 1.06E-02 of which can be attributed to maintenance activities.)

The calculated CDF for SBO sequences with the proposed AOT extension is: 4.87E-07 events/year (- Assumes overall unavailability of 7.75E-02, 2.51E-02 of which can be attributed to maintenance activities.) (This calculation has been made using a consistent unavailability per year assumption as made in the Combustion Engineering Owners Group "Joint Applications Report for Emergency Diesel Generators AOT Extension Report", Reference 1. The assumed downtime hours per year is 220 hours.)

17) Provide a discussion of the loss of offsite power events at your facility and include a quantitative discussion on how industry data on offsite power losses compares with your facility.

ANSWER: The three events detailed below had an impact on offsite power availability:

7/21/76 (from 100% power) Circulating Water pump start and resulting voltage drop caused offsite power to trip. The undervoltage relays were reset and loads were reconnected to the bus within 5 minutes.

8/10/76 (from 100% power) Hurricane Belle caused numerous faults in the Millstone switchyard during a 5 hour period. However, Unit 2 always had a normal or backup offrite source available. Following the storm, the switchyard was deenergized to wash away salt contamination. Unit 2 was disconnected from offsite power for 24 hours 37 minutes.

9/27/85 (shutdown) Hurricane Gloria prompted a controlled shutdown of both Unit 1 and Unit 2. Offsite power to Unit 2 was lost 50 minutes after the shutdown due to sparking at the RSST caused by salt spray.

The PRA model currently uses a loss of normal power (LNP) initiating event frequency of 0.091 events/year. This is based on one event (the 8/10/76 event) in 11 years of operation (the calculation was performed in 1987). The 7/21/76 event was discounted because: 1) it occurred in the first year of operation, 2) it was due to a subsequently corrected design flaw, and 3) it lasted less than 30 minutes (the 30 minute criteria is used to remain consistent with the MP2 Time-Dependant Station Blackout calculation). The 9/27/85 event was discounted because the unit was shutdown.

Recent industry data indicates that the loss of offsite power is significantly lower than 0.091 events/year. NSAC-203 calculates a frequency of 0.041/yr based on a tabulation of events that occurred between 1980 and 1993. A NUSCO review of the NSAC-203 data concluded that this 0.041/yr is appropriate for the Millstone units and is not significantly different when only northeastern units are used in the calculation.

18) The staff has recently granted an extension of an EDG AOT to a plant that has installed a weather-protected tie-line from a hydro station used as an Alternate AC (AAC) source which will be substituted for the inoperable EDG during the extension. The extension was granted based on the licensee's commitment to meet the following conditions. Provide a discussion of how you will address each condition listed below.

a. The TS should include verification that the required systems, subsystems, trains, components, and devices that depend on the remaining EDGs as a source of emergency power are operable before removing an EDG for PM. In addition, positive measures should be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices while the EDG is inoperable.

ANSWER: The current TS includes a Limiting Condition for Operation 3.0.5 which states that a system, subsystem, train, component or device that is determined to be inoperable solely because its emergency power source is inoperable (i.e., EDG out of service for preventative maintenance) may be considered operable for the purpose of satisfying its LCO if all of its redundant systems, trains, components and devices are operable. Unless this condition is satisfied, the unit shall be placed in Hot Shutdown within 6 hours, and in Cold Shutdown within 36 hours.

This LCO provides a positive measure to prevent the testing and maintenance of any redundant system, subsystem, train, component or device which renders that equipment inoperable. Testing of systems, subsystems, trains, components, and devices, that does not render that equipment inoperable (i.e., Technical Specification required Emergency Core Cooling System testing) can be performed without invoking the restrictions of LCO 3.0.5.

LCO 3.0.5 is considered as an adequate, positive measure to control testing and maintenance during EDG outages. Accordingly, no additional changes to the TSs are proposed.

b. The overall unavailability of the EDG should not exceed the value that was used in the PRA supporting the proposed AOT. Also, the EDG unavailability should be monitored and controlled in accordance with the maintenance rule performance criteria.

ANSWER: Among other things, the proposed TS change request evaluated the delta CDF impact of a single 7 day AOT/year. Seven days translates to 168 hours of maintenance unavailability. The Maintenance Rule performance criteria is 150 hours/train/year maintenance unavailability.

c. For those plants that have an AAC source, it may be appropriate to demonstrate, before taking an EDG out for an extended period, that the AAC source is functional by verifying that the power source is capable of being connected to the safety bus associated with the inoperable EDG, and verifying this capability of being connected to the safety bus periodically thereafter.

ANSWER: The seven day AOT is typical of that available to many PWRs and BWRs and is not considered an extended period. During this time frame, administrative controls will be put in place to minimize plant exposure to a loss of onsite or offsite power. Furthermore, planned plant maintenance or testing, that results in inoperability, on other risk significant components will be avoided.

d. Voluntary entry into an LCO action statement to perform PM should be contingent upon a determination that the decrease in plant safety is small enough and the level of risk the plant will be at with the AAC source is acceptable for the period and is warranted by the operational necessity, not by convenience.

ANSWER: The risk associated with plant configuration do to testing and maintenance is continually evaluated through our forward looking risk monitor program. (See the responses to question #2 and 4).

e. Voluntary entry into an LCO action statement should not be abused by repeated entry into and exit from the LCO.

ANSWER: We agree with this philosophy and will be tracking the total unavailability of equipment via Maintenance Rule compliance.

f. Removal from service of safety systems and important non-safety equipment, including offsite power sources, should be minimized during the outage of EDG for PM.

ANSWER: See the response to item d.

g. Voluntary entry into an LCO action statement should not be scheduled when adverse weather is expected.

ANSWER: We concur with this and have a Station procedure that addresses the actions to be taken to protect the plant in the event of anticipated weather conditions that may affect the availability of offsite power.

19) Indicate if your plant has any excess capacity in the onsite power system.

ANSWER: MP2 has two emergency diesels. In comparison to plants similar to MP2, this cannot be considered as "excess capacity". The cross-tie to MP1 is the only unique feature of MP2 that provides some amount of excess capacity.

20) Provide a list of typical PM or CM that can take over 72 hours to complete and explain how this task is accomplished within the current LCO. Include in your response the type of PM (which is required for your EDGs) that you intent to do during power operation and specify the time it takes to accomplish it.

ANSWER: Scheduled maintenance activities that take longer than approximately one half of the AOT are, by company policy, not performed within an LCO Action Statement. If the AOT extension is granted, 18 month maintenance activities would potentially be performed online. These activities typically take 96 hours to perform during an outage.

21) In the PRA, when an EDG is taken out of service, did you assume the whole electrical power division to be inoperable for the purpose of calculating the increased CDF? If not, why not?

ANSWER: No. Removal, from service, of a standby emergency power source (Emergency Diesel Generator) does not render its associated ESF (i.e., Safety Related) electrical power division non-functional. However, PRA results would show that the affected power division would have an increased probability of being unavailable due to the decrease in power source redundancy.

22) Provide the major electrical component failure rates used in your PRA.

ANSWER:

Rate	Hourly or per Demand	Description
4.00E-08	hourly	circuit breaker less than 480V fails to remain closed
1.25E-03	per demand	circuit breaker less than 480V fails to operate
7.76E-04	per demand	4.16KV circuit breaker fails to operate
3.84E-04	per demand	480V circuit breaker fails to operate
1.25E-06	hourly	circuit breaker greater than or equal to 480V fails to remain closed
7.50E-08	hourly	bus faults
9.83E-03	per demand	Diesel Generator fails to start
1.34E-03	hourly	Diesel Generator fails to run
1.06E-02	per demand	Diesel Generator OOS due to maintenance

Questions Applying to the SIT and LPSI Reports

23) How do you define core damage in your PRA?

ANSWER: Core damage is defined as a sustained core uncovering with no likelihood of recovering the core.

24) Table 6.3.2-1 of the SIT Report indicates a success criteria. Is this success criteria the success criteria that the plant was licensed to or is this a different criteria that was developed for the PRA? If it is not the criteria that the plant was licensed to, what is its basis for use in the PRA?

ANSWER: This is a different criteria that was developed for the PRA. It is based on a thermal-hydraulic analysis using the MAAP code.

25) Does the PRA take credit for any analysis that have not been approved by the NRC Staff?

ANSWER: Yes. The MP2 level 1 PRA employs realistic success criteria that is based on "best estimate" analysis. In some cases, design bases success criteria are used.

Generic Questions for the CEOG as a Whole

26) Does the statement on page 28 of the LPSI System Report, "Given the fact that the frequency of requiring LPSI at power is on the order of 1×10^{-4} per year (the frequency of a Large LOCA [Loss of Coolant Accident] event) ..." include consideration of the mitigation of non-large LOCAs? If so describe these initiators and their contribution to the 1×10^{-4} per year total.

ANSWER: Yes. LPSI is credited in the Small and Small-Small LOCA event trees (The IPE report is in error, page 3-15, in identifying LPSI as credited in mitigating SGTRs). Specifically, LPSI is credited in sequences where HPSI fails and there is success of rapid depressurization down to primary system pressures at which LPSI can successfully add primary system makeup. Since, in these cases, LPSI is credited as a backup to HPSI, the frequency of requiring LPSI can be approximated by multiplying the frequency of these events times the probability of failure of HPSI (i.e., approximately $[7 \times 10^{-3}] \times [1 \times 10^{-3}]$). This is approximately 2 orders of magnitude less than that of a Large LOCA where LPSI is essential to preventing core damage. Therefore, the frequency of a Large LOCA is a reasonable approximation for when LPSI is required. For Millstone Unit 2, the Large LOCA frequency was assumed as 6.4×10^{-4} per year.

27) On page 11 of the EDG Report it is stated that plants with 3-day AOTs have a mean yearly scheduled maintenance unavailability of about 77 hours per EDG per year compared to 132 hours per EDG for plants with a 7-day EDG AOT. Both groups show similar yearly repair time outages for unscheduled maintenance (46 verses 51 hours). The above suggests that the longer the EDG AOT, the longer it takes to perform CM or PM. The above numbers suggest that the plants with 72-hour AOTs manage their time better and have less total unavailability than the plants who have 7 - day AOTs. Based on the above, explain why the difference in mean yearly scheduled maintenance unavailability exists.

ANSWER: All plants in the group appear to adequately manage their EDG outages and fall within the industry average range for maintenance unavailability. The data differences may be due to how the data was collected, the cause of the specific unscheduled maintenance activity (precautionary vs functional failure), and plant maintenance philosophy.

In addition, the following should be noted:

- Plants licensed with a 3 day EDG AOT are typically of newer design and construction than those licensed with the 7 day EDG AOT. Thus, the increased average maintenance associated with these EDGs may be partially associated with EDG age or design.

- Many EDG maintenance activities can approach or exceed the 72 hour AOT if performed "at power". Plants with longer AOTs for the EDG will likely perform additional PM activities "at power". Thus, plants with licensed 3 day AOTs typically perform less maintenance "at power" than those with longer AOTs.

It should also be noted that some plants with 3 day AOTs have mean EDG PM and CM unavailabilities that exceed those of the plants licensed with 7 day AOTs.

28) On page 11 of the EDG Report it is stated that CM is performed on an EDG at a mean frequency of 3.3 times per year with a mean duration of 23.3 hours and a standard deviation of 46.7 hours. A mean duration of 23.3 hours and a standard deviation of 46.7 hours amounts to 70 hours which suggests that 84% of the plants are able to finish EDG repair in 70 hours, and therefore a 72-hour AOT appears to be adequate for the majority of plants. Based on the above, why should the 7-day AOT be allowed on a generic basis?

ANSWER: We agree that the existing AOT is adequate for most purposes and it is not our intention to use the extended AOT to prolong existing maintenance practices. The 7-day AOT should be allowed to provide greater flexibility in performing online preventative maintenance and more margin for unplanned corrective maintenance activities. By itself, the extension does not represent an increase in risk to the public. Properly managed, through programs such as risk monitoring and those that have been created to meet Maintenance Rule requirements, the potential exists for positive risk benefit and more efficiently managed maintenance activities.

29) On page 9 of the CEOG report it is stated that the mean PM on an EDG was 24.6 hours with a standard deviation of 37.6 hours. This suggests that maintenance done at power frequently exceeds one half of the AOT and in about one-quarter of the occurrences exceeds the typical 72-hour AOT. How many Combustion Engineering plants have exceeded the typical 72-hour AOT and how many plants required discretionary enforcement for such situations to continue plant operation in the past 5 years?

ANSWER: Three CE plants (or 20% of the CE plants) have 7-day AOTs. These plants may schedule PM activities that exceed 72 hours without violating the system AOT. In one instance a plant with a 7-day AOT requested and received an exigent one time extension to a 10-day EDG AOT to complete a CM operation "at power".

As was noted in the Joint Applications Report, at one site with a 3-day AOT, over the past five years, the units have approached the 72 AOT during PM activities nine times and exceeded the AOT once.

(1) Estimated projections were based on conversations with system engineers and their knowledge of maintenance activities during shutdown. If system availability is not required during shutdown, unavailability hours are not tracked. Also, non-critical path activities, many times, are performed during day shift hours only and, therefore, their OOS times do not reflect the actual time maintenance activities took place. If these activities were performed within an LCO, many would be performed in much less time.