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March 19, 1999

SERIAL: BSEP 99-0042

U. S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
ADDITIONAL INFORMATION REGARDING
BALANCE OF PLANT/EMERGENCY BUS ALLOWED OUTAGE TIME EXTENSION
(NRC TAC NOS. MA3738 AND MA3739)

Gentlemen:

As part of the application for conversion of the Technical Specifications for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2 from the current Technical Specifications (CTS) to the improved Technical Specifications (ITS), as contained in Revision 1 of NUREG-1433, "Standard Technical Specifications General Electric Plants, BWR/4," Carolina Power & Light (CP&L) Company proposed lengthening the allowed outage times (AOTs) for the balance of plant and emergency electrical buses to 7 days. In letters dated September 14, 1998 (Serial: BSEP 98-0172), and January 4, 1999 (Serial: BSEP 98-0229), CP&L provided supplemental information in support of the AOT extension. In a telephone conversation held on February 16, 1999, the NRC requested additional information regarding the proposed AOT. Enclosure 1 to this letter provides the requested information.

Enclosures 2 and 3 to this letter provide updated Technical Specifications pages, for Units 1 and 2 respectively, which incorporate NRC comments received during the course of reviewing the proposed amendment. These changes (1) insert notes which clarify the applicability of the new Condition B of Technical Specification (TS) 3.8.1, "AC Sources - Operating" and (2) delete the word "offsite" from the new Required Action B.1 of TS 3.8.1. These changes provide clarification and do not change the overall intent or allowances of the proposed amendment. As such, the conclusions of the Significant Hazards Determinations, published in the Federal Register on February 11, 1998 (i.e., 63 FR 6977 and 63 FR 6978) that the proposed amendment does not involve a significant hazards consideration remain valid. The revised Bases pages associated with the proposed amendment are included in Enclosures 4 and 5. These pages are provided for information purposes only and do not require issuance by the NRC.

A001

Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," dated August 1998, includes guidance concerning the requirements of a Configuration Risk Management Program (CRMP). Regulatory Guide 1.177 recommends that the CRMP be described in the Technical Specification Administrative Controls section. In lieu of this recommendation, CP&L will describe the CRMP in Section 5.5.13 of the Technical Requirements Manual (TRM). The TRM was developed in conjunction with conversion to the ITS and contains various plant conditions, actions, and testing similar to the Technical Specifications, which are required to support appropriate operation in accordance with commitments. The TRM is incorporated by reference into the Updated Final Safety Analysis Report and, as such, changes to the TRM are subject to the requirements of 10 CFR 50.59. Enclosure 6 provides a draft of the CRMP description to be incorporated into the TRM for each unit.

Please refer any questions regarding this submittal to Mr. Keith R. Jury, Manager - Regulatory Affairs, at (910) 457-2783.

Sincerely,

John S. Keenan

John. S. Keenan

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Enclosures:
1. Response To Request For Additional Information
2. Technical Specification Pages - Unit 1
3. Technical Specification Pages - Unit 2
4. Technical Specification Bases Pages - Unit 1
5. Technical Specification Bases Pages - Unit 2
6. Technical Requirements Manual - Unit 1 Sample Section 5.5.13
7. List of Regulatory Commitments

John S. Keenan, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

Dean S. Mason

Notary (Seal)

My commission expires:

August 21, 1999

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ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324
LICENSE NOS. DPR-71 AND DPR-62
ADDITIONAL INFORMATION REGARDING
BALANCE OF PLANT/EMERGENCY BUS ALLOWED OUTAGE TIME EXTENSION

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Summary

The following questions were received during a telephone conversation between Carolina Power & Light (CP&L) Company and the NRC which was held on February 16, 1999.

Questions from Peter Kang

1. Please provide a sequence of the proposed work scope associated with the bus work.

   Response

   During the upcoming Brunswick Steam Electric Plant (BSEP), Unit 2 outage, Division II (i.e., Buses E-4 and E-8) will be taken out of service by the hanging of a single clearance. This clearance will allow work on E-4 (4160V) and also testing of an E-8 (480V) Auto Transfer Switch. The Bus E-4 clearance will be removed and Buses E-4 and E-8 will be returned to service.

   After completion of the Division II work, Division I (i.e., Buses E-3 and E-7) will be taken out of service. Clearances will be hung, simultaneously, for Bus E-3 (4160V) and Bus E7 (480V). After all work is completed on Bus E-3, the Bus E-3 clearance will be removed and the bus will be returned to service. Once the Bus E-7 work is completed the Bus E-7 clearance will be removed and Bus E-7 will be returned to service.

   During the upcoming outage, no emergency diesel generator (EDG) work is scheduled to be performed coincident with the proposed bus work. During future outages, any EDG work performed coincident with the proposed bus work would be limited to the diesel associated with the affected emergency bus (E-Bus) (e.g., EDG 1 when Bus E-1 is out of service). Work on any other EDG would be prohibited by procedure 0AP-025, "BNP Integrated Scheduling."

2. Has CP&L reviewed the impact of non-safety related equipment failure on Class 1E equipment during the planned bus work? If so, provide the details of risk assessment and was this a deterministic and/or a probabilistic review? Describe the findings of this review.

Response

The Probabilistic Safety Analysis (PSA) model includes safety and non-safety systems whose failure contribute to core damage. The cutsets generated to address the NRC's December 2, 1998, request for additional information (RAI) include probability of failure and/or unavailability of both safety and non-safety systems. In addition, the Equipment Out Of Service (EOOS) model is used to evaluate the core damage frequency (CDF) associated with any scheduled configuration. Procedure 0AP-025 addresses work control practices for the operating unit. Similarly, the Outage Risk Analysis and Management model (ORAM) is used to evaluate the level of defense in depth associated with the unit that is in an outage. A description of some of the systems addressed in these models is included below.

The BSEP's present shutdown analysis techniques credit inventory make-up defense in depth from diverse sources, such as Fire Water pumps and the Condensate/Feedwater system, which are both non Category I. However, in present outage plans, CP&L currently assumes the Condensate/Feedwater system is unavailable. Deterministic reviews of the inventory functions are addressed by a division of diverse sources such as Control Rod Drive system, the Core Spray (CS) system, the Low Pressure Coolant Injection (LPCI) system, and Motor or Diesel Driven Fire Water pumps. The decay heat removal analysis includes use of supplemental fuel pool cooling with a time-to-boil of approximately 10 hours in the vessel and 40 hours in the spent fuel pool. There are two diversely powered pumps in one shutdown cooling train and a loop each of fuel pool cooling and shutdown cooling with some power unavailable. The secondary heat exchange on the supplemental skid is non Class 1E powered, with contingency plans for power in the event of a loss of offsite power (LOOP).

The at power probabilistic analysis is typically completed approximately one week in advance of the plan's use, accommodating a frozen, Management approved work plan per AP-025. This includes elements of both safety and non-safety related systems. Because of the nature of the proposed bus work, the EOOS evaluation will not accept any other risk relevant work during the same time, on the at power unit. As mentioned previously, the PSA includes safety and non-safety equipment consistent with PSA modeling practices.

3. Explain how the existing on-line work control procedures and the Safety Function Determination Program (SFDP) program are used to evaluate the impact of non-safety related equipment loss. Also, do these procedures and the program are used to identify any single failure concerns?

Response

The BSEP's current on-line work control procedure, 0AP-25, has provisions to evaluate emergent work on a case-by-case basis. Each emergent work item, added to the approved schedule, receives a risk analysis by the Work Week Manager according to established criteria in the procedure. This includes safety-related equipment and non-safety related items. The procedure also has criteria for performing a new EOOS on the approved schedule, depending on the amount or type of work added. During an outage on one unit, the operating unit's schedules are developed per the normal 12 week rolling schedule process with consideration given to the outage unit impact.

4. During the proposed 7-day AOT, does BSEP need to reconfigure the DC system?

Response

The DC system will be reconfigured, per procedure 0OP-50.1, "Diesel Generator Emergency Power System Operating Procedure," during the proposed 7-day allowed out-of-service time (AOT). When removing an E-Bus, either 4160V or 480V, from service, the batteries are load shed per procedure 0OWP-51/1, "Removal Of 125 VDC Battery System From Service Including DC Control Power Alignment." This allows the battery to operate as long as possible without damaging battery cells during the battery charger down time. There is no load shedding of individual DC loads, such as pumps and valves. During the planning stage, however, DC pump and valve operation is limited to those absolutely required from the particular DC Bus. DC component operation is limited by adding a special instruction to the clearance to have all unnecessary loads secured. Additionally, there are contingencies available if battery operation is jeopardized, such as installing temporary power to the charger or opening the battery output breaker at a preset voltage level.

5. What are the TS requirements for the shutdown unit's DC system? (Also responds to Question 7 from Peter Kang)

Response

While in a condition that Emergency Core Cooling systems (ECCS) are required to be operable by Limiting Condition for Operation (LCO) 3.5.2, both divisions of the DC Distribution system are required to be operable by LCO 3.8.8 to support the ECCS actuation instrumentation operability requirements of LCO 3.3.5.1. This applies when in Mode 4 or 5 when the cavity is not flooded or when the fuel pool gates are installed. LCO 3.3.5.1 allows 24 hours prior to taking further action.

6. The risk assessment includes vulnerabilities for loss of a single DC system. Are there any discussions in CP&L's previous submittals regarding this?

Response

The initiators TDCA (Loss of 125V DC Battery Bus A1) and TDCB (Loss of 125V DC Battery Bus B2) address the initiator contribution for loss of DC power. The initiator distributions are included in Table PSA-03 of the BOP/E-Bus Allowable Outage Time Extension Request for Additional Information, dated January 4, 1999. The analysis showed that there was not a significant increase in the contribution of these initiators for the corresponding configurations.

In addition, for the top 30 cutsets provided in Tables PSA-04a, b, and c, there are no single failure events which lead to core damage for the operating unit.

7. Under TS 3.8.8, are one or two divisions of DC power required to be operable for the shutdown unit?

Response

See response to Question 5 from Peter Kang.

8. Does CP&L plan to use alternative DC power (or alternative AC power to the battery charger) during the planned bus outage? If so, how will this be accomplished (i.e., what type of tie to the charger will be required)? (Also responds to Question 9 from Dan O'Neal)

Response

For the upcoming outage, the bus outages are scheduled to occur at the end of the outage. The work is scheduled for less than 24 hours for each bus since the 4.16kV Balance of Plant (BOP) buses are not included. Due to the reduced load on the DC distribution system (i.e., DC loads which have alternate sources will be transferred to their alternate sources per 0OWP-51/1), the batteries will last more than 52 hours while maintaining a terminal voltage above the minimum required 105VDC. Since expected battery life far exceeds the scheduled duration for the work, an alternate source of power to the battery chargers is not needed.

Future refuel outages which involve a full-scope of bus maintenance will increase the period of time that the batteries are without chargers. For future outages, CP&L will develop temporary modifications to provide a nonsafety-related alternate source of power to the chargers. These temporary modifications will be ready to install (i.e., parts required for the implementation of the modification will be available on-site and the documentation required for the installation and removal of the temporary alternate power will be developed and approved in advance) if the need to protect the batteries from excessive discharge were to arise.

9. Provide a list of compensatory measures to be taken during the proposed AOT.

Response

The list of compensatory measures is dependent upon which bus is removed from service. 0OP-50.1, "Diesel Generator Emergency Power System Operating Procedure," provides initial conditions and procedural guidance for deenergizing the 4160V and 480V emergency buses. Other plant procedures, such as 0OWP-51/1, "Removal Of 125 Vdc Battery System From Service Including DC Control Power Alignment," provides additional actions to compensate for the power interruption.

Generically, these procedures require the following verifications and actions:

- Verification of unaffected Unit status (i.e., non-emergency condition);
- Verify that the equipment to be deenergized was reviewed for LCO applicability;
- Ensure that the affected Unit is in Mode 4 or 5;
- Obtain Shift Management permission to remove bus from service;
- For loads with alternate power available, transfer the power to alternate;
- Secure large equipment prior to deenergizing the bus;
- Defeat the automatic initiation of the associated Emergency Diesel Generator;
- Pump down sumps which will have the associated sump pumps deenergized;
- Verify availability of alternate power to the Engineered Safeguards System Panel;
- Secure loads, such as uninterruptible power supply inverters, which would deplete station batteries during the loss of power to the associated battery charger.

Additionally, procedure 0AP-025 Attachment 4, "Methodology For Assessing And Managing Plant Risk," Step 8 contains specific steps and actions for the operating unit to take when removing a 4160V E-Bus from service. No high risk evolutions or system outages on the operating unit will be planned to be performed concurrent with a 4160V E-Bus outage. This includes high risk surveillance tests. Should unforeseen events occur which would require concurrent outages on a 4160V E-Bus and another high safety significant system, continued operation of the operating unit requires approval by the Plant General Manager with risk information being considered in the decision. In such cases, the basis for continued operation or shutdown will be documented.

Based upon PSA insights, the dominant accidents types for BSEP include station blackout, transients at high pressure, loss of decay heat removal, small break loss of coolant accident, and anticipated transients without scram. Attachment 4, Step 15 contains scheduling guidelines specific to each dominant accident type.

Questions from Dan O'Neal

1. During the proposed AOT, what measures are in place to prevent wrong train maintenance that could cause an electrical fault on the operating unit (e.g., independent verification to ensure correct equipment is worked on)?

Response

First, the schedule has provisions to perform a 0PLP-17, "Identification, Development, Review, And Conduct Of Infrequently Performed Tests Or Evolutions," briefing. This is a management level briefing which focuses not on the details of the task, but rather on the importance of removing error precursors. Examples of items discussed are: cautions to not be schedule or time pressured, reviews of industry operating experience, and the importance of using human performance tools such as STAR (i.e., Stop Think, Act, Review) and self check. During this briefing the lead personnel are identified, and criteria for stopping the evolution if unknowns exist are discussed.

A separate briefing is held by the work crews on the details of the tasks to be performed and the equipment effected. This briefing will include the operators removing the equipment from service and hanging the clearance, support required for the removal (e.g., ground strap installation), and details on what is to be worked. This briefing will enforce the use of independent and peer verification, as well going over plant effects expected.

Physical measures taken are the labeling of the E-Bus and Substations with bold lettering, as well as color coding the units (i.e., yellow for Unit 1, blue for Unit 2). Also, physical barriers are set up to keep personnel out of the incorrect unit switch gear rooms.

In addition to the above measures, plant procedures 0PLP-21, "Independent Verification," and OPS-NGGC-1301, "Equipment Clearance" require independent verification of all clearances and two individuals present when racking out breakers or when working on energized equipment.

The last measure is supervisory oversight. There is supervisory oversight of the evolution at all times during the E-Bus and Substation work.

The above measures will, to the extent practical, prevent wrong train maintenance that could cause an electrical fault on the operating unit during the time the proposed AOT is in effect.

2. The RAI response indicated that the proposed change results in an annual risk increase from fires of approximately 1E-5. Provide the means CP&L intends to use to limit work on the operating unit to alleviate this concern. For example, performing no work on the operating unit which could cause a fire.

Response

Several months prior to the outage, the on-line schedulers and Work Week Managers review the work items scheduled for the operating unit during the outage. High Safety Significant system outages are rescheduled out of the outage window. Additionally, no large tasks are undertaken which will require excessive manpower use. This analysis of the operating units work schedule considers critical times when E-Bus work is in progress. Additional limitations are placed on operating unit activities during these times. The operating unit has a separate work force which is primarily assigned to work required Technical Specification surveillances and preventive maintenance items. These items are scheduled per the on-line scheduling process and receive numerous reviews prior to work approval. Additionally, emergent issues and failures which arise during this time period are worked.

During the outage, the operating unit manager attends the outage meeting daily to ensure no shutdown unit work is affecting the operating unit. During the upcoming outage, no welding, grinding , or hot work is scheduled for the operating unit. Should emergent work arise, procedure 0FPP-017, "Hot Work Permit," requires a hot work permit for any welding, grinding , or hot work. This permit must be approved by Operations prior to beginning the work. Operations review of the proposed work would identify potential concerns with increased risk of fires. In addition, CP&L will revise procedure Step 8 of Attachment 4 to 0AP-025 to address hot work in the operating unit during the bus outage. Specifically, Step 8 deals with system outages of a 4160V E-Bus. An additional requirement will be added which states:

> The risk impact of ignition sources, such as grinding and welding, in the operating unit will be reviewed and appropriate compensatory measures implemented.

In the event of an emergent item occurring on the operating unit which requires any welding, grinding, or hot work, the following compensatory measures would take place. The operating unit would complete required permits and determine the impact this emergent work would have on the AOT for the 4160V E-Bus outage, as well as any other outage evolution that might increase risk. If the impact is unacceptably high, the task would be postponed until the 4160V E-Bus is returned to service. Should hot work repair be required on the operating unit while the 4160V E-Bus is out of service, conservative actions such as increased supervision, simulation of the required repairs at the technical training center, and having the most qualified personnel perform the task would be taken. Additional procedurally required actions which would take place include establishing fire watches and placing fire retardant blankets around the hot work area.

3. In the risk assessment, there is strong emphasis on using containment venting should the operating RHR train be lost. Does CP&L have contingency plans to place the maintenance affected loop of RHR in suppression pool cooling should the operating unit's operating RHR loop be lost.

Response

During the proposed E-Bus outage, the effect on the operating unit is the loss of one Residual Heat Removal (RHR) system pump in the maintenance-affected loop and power to the suppression cooling discharge valve. If a failure on the operating unit occurred which affected the entire remaining loop operation, shift operations personnel would use procedure 1(2)OP-17, "Residual Heat Removal System Operating Procedure," to manually place any available suppression pool cooling into service if required by the emergency operating procedures. Additionally, procedure 0EOP-01-UG, "Users Guide," provides guidance to manually place systems into service by available means. Depending on what caused the loss of suppression pool cooling, guidance is also available in procedure 0AOP-36.1, "Loss Of

Any 4160V Buses Or 480V E-Buses," to cross-tie electrical power and restore operation to the maintenance-affected valve of the operating loop of RHR that was lost.

Pre-job briefings and shift turnovers will ensure that shift operations personnel will be fully aware of what equipment is out of service as a result of an E-Bus outage. As a result, shift operations personnel will be cognizant of the means of restoration of the maintenance affected loop of RHR (i.e., manually opening the suppression pool cooling discharge valve). The actions required to return an affected loop of RHR to service are well within the shift operations personnel's training and capabilities. It is expected that the actions required to return an affected loop of RHR to service would take approximately one half hour to perform.

4. Explain the sequence for cutset #1 (i.e., Turbine Trip Initiator) on page 1 of 6 of Table PSA-04B or CP&L's January 4, 1999, RAI response.

Response

This cutset represents a turbine trip involving a successful reactor scram, successful high pressure injection, successful depressurization, successful low pressure injection, failure of suppression pool cooling, failure of the condenser, and failure to vent the containment. This represents a core damage sequence due to failure to remove decay heat. The initial condition involves the following equipment out of service: Bus E1, EDG 1, Bus 1D. The configuration specific contribution for this cutset is 9.42E-7. The following describes the reason for the unavailability of the systems listed in this cutset:

Suppression Pool Cooling - Bus E1 out of service causes unavailability of train A, and failure of Bus E8 causes valve failure in train B.

Condenser - Bus E1 out of service, and failure of Bus E8 cause failure of two Conventional Service Water Pumps. Failure of two conventional service water pumps leads to failure of Turbine Building Component Cooling Water (TBCCW) which causes failure of either the circulating water pumps or condensate pumps.

Hardened Vent - Operator failure to line up nitrogen, Bus E1 out of service, and Bus E8 failure lead to failure to open an air operated valve needed for venting.

5. During the proposed AOT, the electrical cross-tie is risk significant. How is this protected during this time? Also, how will CP&L protect the containment venting function for the operating unit during the AOT?

Response

During the proposed AOT on a particular E-Bus, the cross-tie breakers for that particular bus are under clearance for safety. The cross-tie breakers for the other division of the shutdown unit and the operating unit's E-Buses are controlled per procedure 0OP-50.1, "Diesel Generator Emergency Power System Operating Procedure." These breakers are controlled during emergency situations where plant transients require cross-tie of E-Bus power only. These situations would be loss of a 4160 E-Bus or a station blackout. The cross-tie breakers are inspected and cleaned on a routine bases during normal plant operations per the on-line scheduling process. As such, with the exception of the cross-tie breakers which would be under clearance to support a given E-Bus outage, the other E-Bus cross-tie breakers would be available, per procedure 0OP-50.1. Activities and maintenance specific to these cross-tie breakers would not be allowed per 0AP-025.

Containment venting in the operating unit is not affected by the AOT on an E-Bus. Several months prior to the outage taking place the on-line schedulers and work week managers review the work items scheduled for the operating unit during the outage. No high safety significant system outages are scheduled during the outage window. The analysis of the operating unit's work schedule considers critical times when E-Bus work is in progress and additional limitations are placed on operating unit activities during these times. The operating unit has a separate work force which is primarily assigned to work required Technical Specification surveillances and preventive maintenance items. These items are scheduled per the on-line scheduling process and receive numerous reviews prior to work approval. There is an operating unit manager who attends the daily outage meeting to ensure no shutdown unit work is affecting the operating unit.

6. During the proposed maintenance (e.g., when Bus E7 is down), there is a shutdown cooling isolation valve without AC power. Does planned work involving the transfer switch (i.e., "maintenance on bus transfer switch associated with normal and alternate sources of DC control power") affect power to the remaining DC shutdown cooling isolation valve?

Response

No, the transfer switch supplies only DC control power to the affected bus.

7. Is auto isolation of shutdown cooling active during this period? If so, provide reference to the plant procedures and/or Technical Specifications which require this.

Response

For the upcoming outage, both RHR systems will be available for their normal function of shutdown cooling prior to the 4160V E-Bus out of service period. The opposite division of shutdown cooling will be placed in service prior to deenergizing an E-Bus (i.e., B Loop (Division II) of RHR will be in shutdown cooling during the E3 (Division I) bus outage). The out of service period is currently scheduled with the reactor in Mode 4.

Valves 2-E11-F009 (i.e., Inboard Shutdown Cooling Suction Isolation), 2-Ell-F008 (i.e., Outboard Shutdown Cooling Suction Isolation), and 2-E11-F015A(B) (i.e., Inboard Injection

Isolation Valves) are Group 8 Primary Containment Isolation system (PCIS) isolation valves. This isolation is designed to conserve reactor coolant if a low reactor pressure vessel (RPV) level signal indicates a potential system rupture or malfunction by sending a close signal to the suction isolation and injection valves when in shutdown cooling. High reactor pressure generates a close signal to 2-E11-F008 and 2-E11-F009 to prevent damage to the RHR system piping and components from excessive pressure.

The RPV low level isolation function is required to be operable to at least one valve by Technical Specification 3.3.6.1 during the period that the bus outage will occur. This function will be available during both bus outages. During the Bus E-3 (i.e., Division I) outage, 2-E11-F009 will not have power to its motor operator and, therefore, would not close if an isolation signal were received. However, 2-E11-F008 which receives its power from Division II DC, and 2-E11-F015A(B) which receive their power from the opposite unit E-Buses, will close if they were to receive an isolation signal. Adequate instrumentation will be operable or placed in a tripped condition to ensure that isolation capability is maintained in accordance with Technical Specification 3.3.6.1. During the Bus E-4 (i.e., Division II) outage, all of the Group 8 PCIS valves would close if they were to receive an isolation signal since there is no power lost to any of the above listed valves as long as DC bus voltage is maintained. Even if the DC bus voltage were lost, 2-E11-F009 would still provide the isolation function. Adequate logic is also available as discussed above.

Therefore, the isolation function of shutdown cooling will be available during the bus outages.

8. Does the plant have procedures for failure of shutdown cooling isolation?

Response

Yes, for example 0OI-01.02, "Shift Routines And Operating Practices," directs the following:

> If automatic actions fail to occur with valid initiation signals present, operators shall initiate associated manual actions. If the manual actions will result in an automatic reactor scram, then insert a manual reactor scram prior to performing the manual actions. Examples include:
>
> 1. Inserting manual scrams.
> 2. Inserting manual turbine trips.
> 3. Manually executing isolations (if they fail to occur or fail to complete).
> 4. Diesel Generator auto starts.
> 5. ECCS initiations

Procedure 0EOP-01-UG, "User's Guide," directs similar actions:

> The EOPs contain automatic actions of sufficient importance to require prompt consideration for controlling reactor vessel level and Primary Containment integrity. Other automatic actions of lesser importance are subordinate to actions directly affecting these functions. The automatic actions that meet this criteria are defined as:
>
> a) PCIS Group Isolations
> b) ECCS Actuations
> c) Diesel Generators
>
> In all cases when executing the EOPs, the operator should be aware of plant conditions. If a parameter which would cause any of the automatic actions described in this section reaches its setpoint, the operator shall verify or manually initiate (ensure) the automatic action.

Additionally, procedure 0AOP-15.0, "Loss of Shutdown Cooling," deals with restoration from a loss of shutdown cooling. This procedure is symptom based and covers all aspects of the loss of shutdown cooling, including the return of Secondary Containment to available status and establishment of alternate means of shutdown cooling.

In summary, procedural guidance exists to respond to a loss of shutdown cooling and to provide operational flexibility to take manual actions if automatic actions fail to occur. The actions required to restore shutdown cooling to service are well within the shift operations personnel's training and capabilities.

9. Does CP&L plan to establish an alternate supply of power to the battery charger during this period? If so, how will this be done and are there any contingency plans for the loss of the alternate power source?

Response

See response to Question 8 from Peter Kang.

10. What is the minimum makeup capability for the shutdown unit during this period?

Response

Makeup from the following systems will be available when Bus E-3 is out of service.

> Condensate system
> B Loop RHR, must be realigned from shutdown cooling to provide make up
> A Loop RHR, one pump only

B Loop CS
Control Rod Drive (CRD) system, one pump only

Makeup from the following systems will be available when Bus E-4 is out of service.

Condensate system
A Loop RHR, must be realigned from shutdown cooling to provide make up
B Loop RHR, one pump only
A Loop CS
CRD system, one pump only

In addition to the above systems, alternate coolant injection alignments are available in the Emergency Operating Procedures.

11. Expand on the concerns raised in the last paragraph of the response to Question 9 in CP&L's RAI response dated January 4, 1999.

Response

As stated in CP&L's January 4, 1999, submittal, a dual unit outage requires consideration of higher cumulative heat loads. BSEP has a "swing" Supplemental Fuel Pool Cooling Secondary Heat Exchanger. This heat exchanger is only available for one unit at a time and is committed to handle offloading fuel heat for the unit which is in a refueling outage. As such, it is unavailable as a second or backup fuel pool heat exchanger system for the non-refuel unit. During a dual unit outage (i.e., one unit in refuel and the other shutdown, non-refuel), CP&L would maximize the amount of maintenance performed which requires a dual unit shutdown, including bus maintenance on the non-refueling plant. Although the heat in a non-offloaded pool is low and can still be maintained by installed fuel pool cooling systems, the lack of this backup pool heat exchanger system for the non-refuel unit could limit the scope of work which could be performed on the non-refueling unit.

12. The proposed work will affect power on the discharge and discharge bypass valves on one recirculation loop on the operating unit. Is this bounded by the GE analysis referenced in the RAI response, dated January 4, 1999, regarding RHR pump capability?

Response

The condition where the discharge and discharge bypass valves on one recirculation loop (i.e., either an intact recirculation loop or a faulted recirculation loop) of an operating unit fail to close is bounded by existing analysis.

Assume initial conditions of (1) Unit 2 shutdown, with the proposed AOT in effect on one E-Bus, (2) Unit 1 operating and (3) a Unit 1 recirculation line break on the recirculation loop which does not contain valves powered by the bus under clearance. In this case, LPCI injection is not possible through the faulted loop (i.e., for a discharge break) and is not available through the intact loop because the inboard LPCI injection valve will not have power, depending on which E-Bus is out: Unit 1 valves are powered by Bus E-3 or Bus E-4. However, both loops of CS will be operable since, under LCO conditions, additional single failures are not required to be assumed and, given a loss of offsite power, the affected unit's diesel generators will be operable. Two CS pumps will provide sufficient makeup capability. Additionally, if accessible, the LPCI injection valve can be opened manually and the LPCI injection capability of the remaining pump in the intact loop restored, which is not credited by the analysis.

In the event the faulted recirculation loop is the same loop which contains valves powered by the buses under clearance, the situation is less of a concern. In this case, LPCI injection is not possible through the faulted recirculation loop. However, one fully operable LPCI loop and two fully operable CS loops are available for injection. Again, this provides sufficient makeup capability.

The SAFER/GESTR analysis (i.e., NEDC-31624P) is the licensing/design bases for LOCA events at Brunswick. This was approved by the NRC SAFER/GESTR Safety Evaluation Report, dated June 1, 1989, based on CP&L's request dated March 29, 1989, and supplemented May 17, 1989. The SAFER/GESTR analysis is a deterministic analysis which demonstrates that equipment available given various single failures, which include single failures of DC power, an EDG, LPCI injection valve and the HPCI system for both suction and discharge breaks, will prevent core damage following the most limiting design basis loss of coolant accident (LOCA). The SAFER/GESTR analysis does not calculate minimum flow necessary to mitigate a LOCA nor does it attempt to account for equipment taken out of service for maintenance since under LCO conditions, an additional single failure is not required to be assumed. The SAFER/GESTR analysis demonstrates that, for a recirculation discharge line break, any two low pressure injection pumps will provide adequate makeup capability. As discussed above, at least two CS pumps are available for the postulated scenarios. Four low pressure injection pumps (i.e., RHR or CS) are available for a recirculation suction line break, which provide adequate makeup capability.

As stated in CP&L's response dated January 4, 1999, the PSA does not credit either LPCI pump in a given loop of LPCI in scenarios where the large break LOCA is located in the portion of the recirculation loop such that flow would be diverted from the vessel. For those cases, the LPCI success criteria becomes one of two LPCI pumps in the other LPCI loop (i.e., the one injecting into the intact recirculation loop). General Electric (GE) report GE-NE-208-05-0393, "Low Pressure Core Spray Out-of-Service for BSEP Units 1 and 2," dated September 1993 provides additional LOCA analyses. This analysis includes two recirculation loop discharge line break (i.e., less severe flow break) accident scenarios where, in one case one core spray pump remains, and in the other one LPCI remains for core cooling. In each case, the core and containment remain protected. Although this report is not part of the licensing/design basis for BSEP, it substantiates the assumed PSA LPCI success criteria.

The PSA evaluation results included the likelihood of a LOCA combined with failure of the remaining operable injection sources. The contribution for LOCA scenarios is included in Table PSA-03 of CP&L's submittal dated January 4, 1999. The PSA also models failure of decay heat removal and a recirculation line break, and the configuration specific evaluation includes the contribution of the out of service E-Bus. Suppression pool cooling is available via the faulted loop, once the LPCI injection valve is closed (i.e., isolating the break), and the non faulted loop since the suppression pool cooling inlet valve affected by the out of service E-Bus could be manually opened, if accessible. Again, the PSA evaluation results included the likelihood of a LOCA combined with failure of decay heat removal. The results listed in Table PSA-03 demonstrate that the described LOCA scenario is not a significant contributor to risk.

Based on the above, when applying deterministic requirements to the postulated event, the SAFER/GESTR analysis demonstrates that sufficient low pressure injection capability is maintained for the operating unit. From a PSA standpoint, CDFs during the proposed AOT remain acceptably low. The one pump LPCI success criteria assumed in the PSA has been substantiated by existing GE analysis.