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


BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62  
RESPONSE TO NRC BULLETIN 93-02, SUPPLEMENT 1: DEBRIS PLUGGING OF  
EMERGENCY CORE COOLING SUCTION STRAINERS

Gentlemen:

The purpose of this letter is to provide Carolina Power & Light Company's (CP&L) response to a NRC staff request for information regarding NRC Bulletin 93-02, Supplement 1, Debris Plugging of Emergency Core Cooling Suction Strainers, for the Brunswick Nuclear Plant, Units 1 and 2.

Enclosure 1 of this document provides CP&L's response to the NRC staff questions. Enclosure 2 provides a summary of commitments made in this submittal. Please refer any questions regarding this submittal to Mr. G. Honma at (910) 457-2741.

Very truly yours,

  
for R. P. Lopriore  
Manager  
Regulatory Affairs Section

KAH/

Enclosures

cc: Mr. S. D. Ebnetter, Regional Administrator, Region II  
Mr. P. D. Milano, NRR Senior Project Manager - Brunswick Units 1 and 2  
Mr. C. A. Patterson Brunswick NRC Senior Resident Inspector

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## ENCLOSURE 1

### BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1 AND 2 NRC DOCKETS 50-325 & 50-324 OPERATING LICENSES DPR-71 & DPR-62

### RESPONSE TO NRC BULLETIN 93-02, SUPPLEMENT 1

#### Background

The NRC staff issued NRC Bulletin 93-02, Debris Plugging of Emergency Core Cooling Suction Strainers, on May 11, 1993. NRC Bulletin 93-02 requested all licensees:

to identify fibrous air filters or other temporary sources of fibrous material, not designed to withstand a loss-of-coolant accident (LOCA), which are installed or stored in your primary containment. Take any immediate compensatory measures which may be required to assure the functional capability of the emergency core cooling system (ECCS). Take prompt action to remove any such material. Because of the low probability of a LOCA event, the staff considers removal of this material at the next shutdown, or within 120 days, whichever comes first, to be sufficiently prompt. If the facility is currently in a shutdown, you are requested to remove such material prior to restart.

Carolina Power & Light Company (CP&L) responded to this bulletin on June 10, 1993 (reference NLS-93-148). CP&L noted in the June 10, 1993 response with respect to the Brunswick Plant, that fibrous air filters or other temporary fibrous materials not designed to withstand the effects of a LOCA are not installed or stored inside containment in a manner that would be impacted by a LOCA during power operations. The actions requested by NRC Bulletin 93-02 were therefore considered complete for the Brunswick Plant.

On February 18, 1994, the NRC staff issued Supplement 1 to NRC Bulletin 93-02:

- (1) to inform Action and Information addressees about the vulnerability of emergency core cooling system (ECCS) suction strainers in boiling-water reactors (BWRs) and containment sumps in pressurized-water reactors (PWRs) to clogging during the recirculation phase of a loss-of-coolant accident (LOCA).
- (2) to request that Action addressees take the appropriate actions to ensure the reliability of the ECCS in view of the information discussed in the bulletin supplement regarding the vulnerability of the ECCS strainers to clogging.
- (3) to require that Action addressees report to the NRC whether and to what extent the requested actions will be taken and to notify the NRC when the actions associated with this bulletin supplement are complete.

Specifically, the bulletin required Action addressees to submit, within 60 days of the date of the bulletin supplement, a report indicating whether or not the addressee intends to comply with the actions requested above, description of planned actions, and the schedule for completing them. The bulletin specifies that if an addressee chooses not to take the

requested actions, the report shall contain a description of a proposed alternative course of action, the schedule for completing this alternative course of action, and a justification for any deviations from the requested actions.

CP&L responded to NRC Bulletin 93-02, Supplement 1, on April 19, 1994. In that response, CP&L committed to complete training for certain Operations and Technical Support Center personnel by May 19, 1994. CP&L also committed to complete revisions to the Core Spray System Operating Procedure for both units to include an infrequent section that allows shifting the core spray pump suction from the suppression pool to the condensate storage tank if the suppression pool is not available as a source of water.

CP&L has completed the above actions, as committed in the April 19, 1994 response to NRC Bulletin 93-02, Supplement 1. On June 20, 1994, CP&L submitted the required 30-day confirmation of completion of actions taken.

Subsequent to the April 19, 1994 submittal, CP&L received additional questions/clarifications from the NRC staff. The NRC staff questions and CP&L's response to the NRC staff questions follows.

#### NRC STAFF QUESTION 1 - RECOGNITION OF PROBLEM

Question 1A: Do operators have a means of recognizing when strainers are clogged?

Question 1B: Do operators have a direct means of recognizing when strainers are clogged such as dp gauges, suction flow meters, or suction pressure?

Question 1C: Do operators have a secondary means of determining that strainers are clogged such as pump current meters?

Question 1D: Can operators readily determine if strainers are clogged from the front panels of the control room?

#### CP&L RESPONSE

Question 1A: Do operators have a means of recognizing when strainers are clogged?

Yes. For the Core Spray, RHR, and HPCI systems, indications available to the operator for recognizing strainer clogging include 1) a reduction in flow without a change in discharge valve position and 2) fluctuation in the flow or discharge pressure on the control board.

Question 1B: Do operators have a direct means of recognizing when strainers are clogged such as dp gauges, suction flow meters, or suction pressure?

Yes. Local suction pressure indicators are available in the reactor building near the Core Spray, RHR and HPCI pumps. Pump discharge pressure gauges are located on the Reactor-Turbine-Generator Board (RTGB) for the Core Spray, RHR, and HPCI systems. HPCI system pump suction pressure gauges are also located on the RTGB.

Question 1C: Do operators have a secondary means of determining that strainers are clogged such as pump current meters?

Yes. Individual current meters for the Core Spray and RHR system pumps are located on the breaker compartment in the diesel generator building. Pump motor current indication may be indicative of a clogged strainer.

Question 1D: Can operators readily determine if strainers are clogged from the front panels of the control room?

Yes. The operator would recognize that there is a problem with injection of water via the HPCI, Core Spray, and RHR systems from the front panels in the control room. Injection problems from these systems may indicate suction strainer clogging and could be deduced from a reduction in water level along with a reduction of flow from the individual systems without a change in the system discharge valve position. The operators would also recognize fluctuations in system flow rate, indicative of system pump cavitation, which may also indicate pump suction strainer clogging.

#### NRC STAFF QUESTION 2 - MITIGATION OF PROBLEM

Question 2A: How does the licensee intend to mitigate a strainer clogging event?

- a. Use of alternate water sources?
- b. Backflushing of clogged strainers?
- c. Reduction of ECCS flow?
- d. Intermittent spray operation to reduce debris transport?
- e. Other plant-specific measures?

Question 2B Are the present plant procedures adequate to mitigate a strainer clogging event?

#### CP&L RESPONSE

Question 2A: How does the licensee intend to mitigate a strainer clogging event?

Question 2A, Subitem a: Use of alternate water sources?

As previously stated, the core spray system operating procedure for both units has been revised to include actions to be taken, if the reactor building is accessible, to transfer the core spray system suction from the suppression pool to the condensate storage tank. In addition, the current Emergency Operating Procedures provide for the use of alternate sources of water for flooding the core, including the following:

- RHR service water system cross-tie
- Alignment of HPCI or RCIC to the Condensate Storage Tanks
- Alignment of fire protection water
- Alignment of the condensate transfer system
- Alignment of the SLC test tank or boron tank
- Alignment of demineralized water through the ECCS keepfill system.

Question 2A, Subitem b: Backflushing of clogged strainers?

The Brunswick Plant is not designed with backflushing capability.

Question 2A, Subitem c: Reduction of ECCS flow?

The Brunswick Emergency Operating Procedures (EOPs) are written to ensure necessary actions are taken to maintain reactor water level above the top of active fuel, normally within a range of 170 to 200 inches. Flow rates are varied to accomplish this objective. Flow rates would be reduced, as necessary, to maintain water level within the desired band.

EOPs rely on normal water injection systems as the initial source of water following a LOCA. If these systems do not supply sufficient water, alternate sources would be used. An infrequent operations section in the Core Spray Operating Procedure allows transfer of the Core Spray pump suction source from the suppression pool to the condensate storage tank when the reactor building is accessible. This action provides an additional source of water for operators to use in maintaining proper reactor vessel water level.

Question 2A, Subitem d: Intermittent spray operation to reduce debris transport?

Brunswick EOPs require the use of spray operation when certain containment limits are exceeded (suppression chamber pressure). Containment spray flow rate is adjusted to a range that ensures a proper spray pattern and is only used to meet the requirements of the procedure. Once drywell pressure is reduced to less than 2.5 psig, containment spray is terminated until the procedure requires reinitiation. Early termination of containment spray would be based on operator judgement; however, containment spray operation, as dictated by procedure, is an intermittent operation and therefore could be a means of reducing transport of debris to the suppression pool.

Question 2A, Subitem e: Other plant-specific measures?

Based on initial industry test results, cleanliness of the suppression pool appears to have a significant impact on the extent of suction strainer clogging, especially with the introduction of fibrous insulation. The Brunswick Unit 2 suppression pool was cleaned and partially recoated during the current refuel outage. CP&L plans to clean and refurbish the Brunswick Unit 1 suppression pool during the upcoming B110R1 refuel outage which is scheduled to begin March, 1995. These efforts are expected to have a beneficial impact on potential clogging of the suppression pool suction strainers at the Brunswick Plant.

Question 2B: Are the present plant procedures adequate to mitigate a strainer clogging event?

Yes. Present procedures are adequate to ensure core cooling by maintaining core coverage through the use of alternate injection sources and primary containment flooding. In addition, existing procedures provide a means to remove decay heat from containment by venting.

The Brunswick Plant suction strainer design is based on the capability of meeting long-term cooling requirements after a LOCA with allowance for a pressure drop associated with 50% clogged strainers. CP&L continues to support BWROG efforts to develop an effective model for the suction strainer clogging phenomena that would more accurately determine the extent of the strainer clogging concern for BWRs.



ENCLOSURE 2  
LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Carolina Power & Light Company in this document. Any other actions discussed in the submittal represent intended or planned actions by Carolina Power & Light Company. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Brunswick Nuclear Plant of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed date or outage
NONE	N/A