

RESOLUTION OF POTENTIAL RELAY CHATTER ISSUES BY CREDITING OPERATOR ACTION  
(HADDAM NECK PLANT USI A-46)  
(RAI - SUMMARY REPORT QUESTION 7 RESPONSE)

**Question 7:**

Describe the extent to which operator action was credited for resolving potential relay chatter issues (e.g., number of instances in which operator action is relied upon, required effort for the operators to perform system resets, and the time restraints for which operators will need to perform system resets).

**Response:**

A database search of the Relay Screening and Evaluation Table<sup>1</sup> identified seventeen individual Safe Shutdown Equipment List (SSEL) components which take credit for operator action (i.e., OA (Operator Action) was entered as the or one of the screening methods). These components have been combined into eight groups based on functional similarity and are listed in Table 1. Please note that the search identified two components (BKR 4-4A and BKR 5-5C) which are no longer required, because pumps they support have been recently deleted from the SSEL.

Table 1  
SSEL Components Which Take Credit For Operator Action

Equipment ID Numbers.	SSEL Equipment Description	Required for Shutdown?
BKR 4-4A	Feeder Breaker to MCC 9-4	No
BKR 5-5C	Feeder Breaker to MCC 10-5	No
FW-FCV-1301-1 through 4	Feedwater Regulating Valves	Yes
P-13-1A through C	Component Cooling Pumps	Yes
P-18-1A & B	Charging Pumps	Yes
P-37-1A through D	Service Water Pumps	Yes
P-4-1A	Electric Driven Fire Pump	Yes
P-5-1A	Diesel Driven Fire Pump	Yes

The following section provides a detailed discussion of each of the SSEL component groups identified in Table 1. The discussion provides the following information:

- a description of the SSEL component for which the actions need to be performed
- the specific operator action relied upon
- the required effort for the operators to perform system resets
- the time restraints for which operators will need to perform system resets

**BKR 4-4A, Feeder Breaker to MCC 9-4****Equipment Description:**

This breaker is no longer required for safe shutdown. This breaker was previously listed, because it supplies power to MCC 9-4 which, in turn, powers Recycled Primary Water Transfer Pump P-118A. Since P-118A has been removed from the SSEL, BKR 4-4A is no longer required.

**Operator Action:**

N/A

<sup>1</sup>Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays", Relay Evaluation Report for Connecticut Yankee, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

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Effort to Perform System Reset: N/A

Time Restraints for System Reset: N/A

**BKR 5-5C, Feeder Breaker to MCC 10-5**

Equipment Description: This breaker is no longer required for safe shutdown. This breaker was previously listed, because it supplies power to MCC 10-5 which, in turn, powers Recycled Primary Water Transfer Pump P-118B. Since P-118B has been removed from the SSEL, BKR 5-5C is no longer required.

Operator Action: N/A

Effort to Perform System Reset: N/A

Time Restraints for System Reset: N/A

**FW-FCV-1301-1 through 4, Feedwater Regulating Valves**

Equipment Description: Operator action may be required to close these valves using the Hagan manual control stations in the control room<sup>2</sup>. The analysis takes credit for closure of these feedwater valves to prevent diversion of auxiliary feedwater flow back through the main feedwater system. However, check valves in the main feedwater system should prevent flow diversion.

Operator Action: The operator action is to manually close the steam generator feedwater control valves at the Hagan stations on Control Room Panel CB/F.

Effort to Perform System Reset: The effort is minimal, because the Hagan stations are located on Control Room Panel CB/F. Adjustments to control station settings are addressed in Procedure ES-0.1, "Reactor Trip Response."

Time Restraints for System Reset: There is no minimum time restraint. The operator will perform this function in accordance with Procedure ES-0.1.

**P-13-1A through C, Component Cooling Pumps**

Equipment Description: P-13-1A through C are component cooling (CC) water pumps. Relay chatter will not trip a running CC pump. However, operator action

<sup>2</sup>Note 24 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays"", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

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may be required to stop a CC pump that was idle but may have started during the earthquake<sup>3</sup>."

**Operator Action:** The operator action is to manually trip any component cooling water pumps which are inadvertently started by the relay chatter. The operator can determine pump operating status by observing the red, green and amber indicating lights at the CC pump control switches on Control Room Panel CB/DE.

**Effort to Perform System Reset:** The effort is minimal. The operator can trip these pumps from Control Room Panel CB/DE.

**Time Restraints for System Reset:** There is no minimum time restraint. The operator will perform this trip function as part of panel supervisory duties.

**P-18-1A & B, CVCS Charging Pumps**

**Equipment Description:** CVCS Charging Pumps P-18-1A & B are backups to the designated primary pump<sup>4</sup> (Metering Pump P-11-1A). Relay chatter will not trip a running CVCS charging pump. However, operator action may be required to stop a CVCS charging pump that was idle but may have started during the earthquake<sup>5</sup>.

**Operator Action:** The operator action is to manually trip any CVCS charging pumps which are inadvertently started by the relay chatter. The operator can determine pump operating status by observing the red, green and amber indicating lights at the CVCS charging pump control switches on Control Room Panel CB/C.

**Effort to Perform System Reset:** The effort is minimal. The operator can trip these pumps from Control Room Panel CB/C.

**Time Restraints for System Reset:** There is no minimum time restraint. The operator will perform this trip function as part of panel supervisory duties.

**P-37-1A through D, Service Water Pumps**

**Equipment Description:** P-37-1A through D are service water (SW) pumps. Relay chatter will not trip a running SW pump. However, operator action may be

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<sup>3</sup>Note 26 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

<sup>4</sup>Section 3.4.3, *Preferred Safe Shutdown Paths for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1351, Rev. 3.

<sup>5</sup>Note 26 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

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required to stop a SW pump that was idle but may have started during the earthquake<sup>6</sup>.

- Operator Action: The operator action is to manually trip any service water pumps which are inadvertently started by the relay chatter. The operator can determine pump operating status by observing the red, green and amber indicating lights at the SW pump control switches on Control Room Panel CB/F.
- Effort to Perform System Reset: The effort is minimal. The operator can trip these pumps from Control Room Panel CB/F.
- Time Restraints for System Reset: There is no minimum time restraint. The operator will perform this trip function as part of panel supervisory duties.

#### P-4-IA, Electric Driven Fire Pump

Equipment Description: This electric fire pump is part of the backup shutdown path<sup>7</sup> (Train 2). If no other method to fill the DWST is available, the electric and diesel fire pumps may be used to transfer river water to the DWST in accordance with Procedure AOP 3.2-51, "Local Manual Operation of the Auxiliary Feedwater System". Relay chatter will not trip a running electric fire pump. However, operator action may be required to stop a pump that was idle but may have started during the earthquake<sup>8</sup>. Also, in certain relay chatter cases, the operator may have to reset relays 27Y-9 and 27Y-4B before the fire pump can be restarted<sup>9</sup>.

- Operator Actions: There are two possible types of operator actions.
1. One type of operator action is to manually trip the pump if it is inadvertently started by the relay chatter. The operator can determine pump operating status by observing the red, green, amber and white indicating lights at the pump control switch on Control Room Panel CB/F.
  2. The other type of operator action is to reset relay 27Y-4 at Auxiliary Control Board Panel A4 and relay 27Y-4B at Auxiliary Control Board Panel A6 in the Control Room. The operator can determine that these relays may need to be reset if the power is available to the pump but the pump does not start using the pump control switch on Control Room Panel CB/F.

<sup>6</sup>Note 26 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays"", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

<sup>7</sup>Section 4.2, *Preferred Safe Shutdown Paths for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1351, Rev. 3.

<sup>8</sup>Note 26 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays"", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

<sup>9</sup>Note 27 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays"", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.

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- Effort to Perform System Reset: The effort for each operator action is minimal.
1. The operator can trip this pump from Control Room Panel CB/F.
  2. The operator can reset these relays at Auxiliary Control Board Panels A4 and A6 in the Control Room.
- Time Restraints for System Reset: The time restraint for each operator action is based on the required function of P-4-1A.
1. The operator will perform the trip function as part of panel supervisory duties.
  2. Since P-4-1A is not required for ~200 minutes, there is sufficient time for manual actions to reset both relays, if required, to start P-4-1A.

**P-5-1A, Diesel Driven Fire Pump**

- Equipment Description: This diesel fire pump is part of the primary shutdown path<sup>10</sup> (Train 1). If no other method to fill the DWST is available, the electric and diesel fire pumps are used to transfer river water to the DWST in accordance with Procedure AOP 3.2-51, "Local Manual Operation of the Auxiliary Feedwater System". If this pump is needed, the operator action is to operate the Diesel Driven Fire Pump locally/manually<sup>11</sup>.
- Operator Actions: The operator action is to run this pump locally/manually. The operator will reset relays at the local control panel, if required, to operate the diesel pump.
- Effort to Perform System Reset: The operator effort to start and run the diesel fire pump locally/manually represents a small additional effort. This effort only occurs if the diesel driven fire pump is the only available pump to fill the DWST. Any additional operator effort to reset relays, if required, at the local panel during the diesel starting process is minimal.
- Time Restraints for System Reset: The time restraint is based on the required function of P-5-1A. Since P-5-1A is not required for ~200 minutes, there is sufficient time for the operator to start and run the pump locally/manually.

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<sup>10</sup>Section 4.2, *Preferred Safe Shutdown Paths for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1351, Rev. 3.

<sup>11</sup>Note 17 to Attachment B, "Connecticut Yankee - Relay Screening and Evaluation Tabulation "Associated Relays"", *Relay Evaluation Report for Connecticut Yankee*, ABB Impell Doc. No. 03-0240-1352, Rev. 0.