PSNH PUBLIC SERVICE
Company of New Hampshire

SEABROOK STATION
Engineering Office:
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March 26, 1982

SBN-243
T.F. B7.1.2

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Frank J. Miraglia, Chief
Licensing Branch No. 3
Division of Licensing

References:
(a) Construction Permits CPPR-135 and CPPR-136
Docket Nos. 50-443 and 50-444
(b) USNRC Letter, dated February 12, 1982, "Request for Additional Information," F.J. Miraglia to W.C. Tallman
(c) PSNH Letter, dated March 12, 1982, "Response to 440 Series RAIs (Reactor Systems Branch)," J. DeVincentis to F.J. Miraglia

Subject: Response to RAI 440.61; (Reactor Systems Branch)

Dear Sir:

We have enclosed the response to the subject RAI, which you forwarded in Reference (b):

This response was not included in the Reference (c) responses.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

John DeVincentis

John DeVincentis
Project Manager

Attachments

B001
S 1/1

440.61 Provide a discussion of long-term effects and events for each accident analyzed in Chapter 15, assuming no operator action prior to times justified by ANSI-N660. When operator action is needed, provide a complete assessment of the operator's role and show that sufficient time is allowed for operator action to be accomplished. Verify that the acceptance criteria for each accident are not exceeded in the long-term.

RESPONSE: For most of the events analyzed in Chapter 15, the plant will be in a safe and stable hot standby condition following the automatic actuation of reactor trip. This condition will in fact be similar to plant conditions following any normal, orderly shutdown of the reactor. At this point, the actions taken by the operator would be no different than normal operating procedures. The exact actions taken, and the time these actions would occur, will depend on what systems are available (e.g., steam dump system, main feedwater system, etc.) and the plans for further plant operation. As a minimum, to maintain the hot stabilized condition, decay heat must be removed via the steam generators. The main feedwater system and the steam dump or atmospheric relief system could be used for this purpose. Alternatively, the emergency feedwater system and the steam generator safety valves may be used, both of which are safety grade systems. Although the emergency feed system may be started manually, it will be automatically actuated if needed by one of the signals shown on Figure 7.2-1, sheet 15, such as low-low steam generator water level. If hot standby conditions are maintained for an extended period of time, operator action may be required to transfer the emergency feedwater source. The time at which such action is required will be sufficiently long after initiation of the event to permit operator action. Also, if the hot standby condition is maintained for an extended period of time (greater than approximately 18 hours), operator action may be required to add boric acid via the CVCS to compensate for xenon decay and maintain shutdown margin. Again, the actions taken by the operator would be no different than during normal plant shutdown.

Many Chapter 15 events result in a stable condition being reached automatically following a reactor trip and only actions typical or normal operation are required from the operator. For several events involving breaks in the reactor coolant system or secondary system piping, additional requirements for operator action can be identified. (Additional information about the impact of equipment failures or erroneous operator actions may be found in WCAP-9691 "NUREG-0578 2.1.9.C, Transient and Accident Analysis".)

Steamline Break: See Table 440.61-1

Following the hypothetical steamline break incident, a steamline isolation signal will be generated almost immediately, causing the main steam isolation valves to close within a few seconds. If the break is downstream of the isolation valves, all of which subsequently close, the break will be isolated. If the break is upstream of the isolation valves, or if one valve fails to close, the break will be isolated to three steam generators while the

faulted steam generator will continue to blow down. Only the case in which the steam generator continues to blowdown is discussed here since the downstream break followed by isolation of all steam generators will terminate the transient.

An excessive cooldown protection signal will cause main feedwater isolation to occur. The only source of water available to the faulted steam generator is then the emergency feedwater system. The first required operator action is to identify the faulted steam generator and verify that automatic isolation of emergency feedwater flow to the faulted steam generator has taken place. Automatic isolation of EFW flow to a faulted steam generator is accomplished by flow sensing devices which sense an abnormally high EFW flow to one of the four steam generators and automatically close the isolation valve to that steam generator. In the case of smaller steamline breaks where an abnormally high EFW flow is not created, manual isolation capability exists once the operator has determined the faulted steam generator. Following steamline isolation, steam pressure in the steamline with the faulted steam generator will continue to fall rapidly, while the pressure stabilizes in the remaining three steamlines. The indication of the different steam pressures will be available to the operator within a few seconds of the steamline isolation. Additionally, EFW flow indication to each of the four steam generators is provided on the main control board. This will provide the necessary information to identify the faulted steam generator so that emergency feedwater to it can be isolated if automatic isolation has not yet occurred. The operator is instructed by Emergency Operating Procedures to isolate the affected steam generator by shutting the steam generator EFW isolation valve. Manual controls are provided in the control room for start and stop of the EFW pumps and for the control of isolation valves associated with the EFW system. The means for detecting the faulted steam generator and isolating emergency feedwater to it requires only the use of safety grade equipment available following the break.

Following the automatic safety injection actuation and after the faulted steam generator is completely isolated, the continued operation of the safety injection system will repressurize the reactor coolant system and continue to increase the RCS volume inventory. The second required operator action is to manually control the repressurization of the reactor coolant system and modulate safety injection pumps to control pressurizer level. The operator may then restore normal pressure and level control and stop the safety injection pumps. The operator has available, in the control room, an indication of pressurizer level from the instrumentation in the reactor protection system. To maintain the indicated water level, the operator can start and stop the centrifugal charging pumps as necessary. As soon as an indicated water level returns to the pressurizer, RCS pressure has returned to the normal range and the RCS is sufficiently subcooled, the operator is instructed to stop the safety injection pumps, re-establish normal charging and letdown flows, and re-establish

operation of the pressurizer heaters to maintain a steam bubble in the pressurizer to limit system repressurization. The pressurizer level instrumentation and manual controls for operation of the high head SI pumps meet the required standards for safety systems.

The removal of decay heat in the long-term (following the initial cooldown) using the remaining intact steam generators requires only the emergency feedwater system as a water source and the secondary system safety valves to relieve steam.

The requirements to terminate emergency feedwater flow to the faulted steam generator, re-establishing normal charging and letdown flows, and re-establishing operation of the pressurizer heaters can be met by simple switch actions by the operator. Thus, the required actions to limit the cooldown and repressurization can be easily recognized, planned and performed within ten minutes. For decay heat removal and plant cooldown the operator has a considerably longer time period in which to respond because of the large initial cooldown associated with a steamline break transient.

Feedwater Line Break: See Table 440.61-2

For a feedwater line break, emergency feedwater is initiated automatically, as is safety injection. For the feedline break downstream of the main feedwater isolation valves, the required operator actions are similar in nature to the required actions for the steamline break.

The first required operator action is to identify the faulted steam generator and verify that automatic isolation of EFW flow to that steam generator has taken place. The primary indication to the operator will be a comparison of individual steamline pressures after steamline isolation has occurred and EFW flow indication to each steam generator. After identifying the faulted steam generator, the operator is instructed to isolate EFW flow to that steam generator by shutting the steam generator EFW isolation valve if automatic isolation has not yet occurred. The steamline pressure indicators, EFW flow indicators and EFW isolation valves are safety grade.

The operator must provide for decay heat removal through the intact steam generators by maintaining steam generator water level using emergency feedwater as a makeup supply. The operator can use the steam dump system or the steam generator ARV's to begin a controlled cooldown, or the unit may be maintained in hot standby by using the steam side safety valves for decay heat removal.

Finally, the operator must modulate the high head safety injection pumps to control primary pressure and pressurizer level. The operator must observe the primary steam pressure-temperature relationship to ensure that voiding does not occur in the reactor coolant system. The operator uses safety grade instrumentation and controls to manually control the primary system pressure and maintain normal pressurizer level.

The analysis presented in FSAR Section 15.2.8 assumes a 30-minute delay until these actions occur.

Boron Dilution

(Later)

Steam Generator Tube Rupture: See Table 440.61-3

The accident examined is the complete severance of a single steam generator tube. The operator is expected to determine that a steam generator tube rupture has occurred, and to identify and isolate the faulty steam generator on a restricted time scale in order to minimize contamination of the secondary system and ensure termination of radioactive release to the atmosphere from the faulty unit. The recovery procedure can be carried out on a time scale which ensures that break flow to the secondary system is terminated before water level in the affected steam generator rises into the main steamline. Sufficient indications and controls are provided to enable the operator to carry out these functions satisfactorily. Consideration of the indications provided at the control board, together with the magnitude of the break flow, leads to the conclusion that the isolation procedure can be completed within 30 minutes of accident initiation. Included in this 30-minute time period would be an allowance of 5 minutes to trip the reactor and actuate the safety injection system (automatic actions), 10 minutes to identify the accident as a steam generator tube rupture and 15 minutes to isolate the faulted steam generator.

Immediately apparent symptoms of a tube rupture accident such as falling pressurizer pressure and level and increased charging pump flow are also symptoms of small steamline breaks and loss of coolant accidents. It is therefore important for the operator to determine that the accident is a rupture of a steam generator tube in order that he may carry out the correct recovery procedure. The accident under discussion can be identified by the following method: in the event of a complete tube rupture, it will be clear soon after the trip that the level in one steam generator is rising more rapidly than in the others.

Also, this accident could be identified by either a condenser vacuum pump exhaust high radiation alarm or a steam generator blowdown radiation alarm.

The operator carries out the following major operator actions subsequent to reactor trip which lead to isolation of the faulted steam generator and minimizing primary to secondary leakage:

1. Identification of the faulted steam generator.

2. Isolation of the faulted steam generator.

3. Subcooling of RCS fluid to 50° below no-load temperature.

4. Depressurization of the RCS to terminate breakflow, and

5. Terminating safety injection.

Sufficient indications and controls are provided to enable the operator to complete these functions satisfactorily. Table 440.61-3 lists applicable instrumentation and equipment, their associated safety grade classifications, and the impact of a single active component failure.

Loss of Coolant Accident: See Table 440.61-4

No manual actions are required of the operator for proper operation of the ECCS during the injection mode of operation. Only limited manual actions are required by the operator to realign the system for the cold leg recirculation mode of operation, and, at approximately 17 hours, for the hot leg recirculation mode of operation. These actions are delineated in Table 440.61-4.

The changeover from the injection mode to recirculation mode is initiated automatically and completed manually by operator action from the control room. Protection logic is provided to automatically open the two safety injection system (SIS) recirculation sump isolation valves when two of four refueling water storage tank level channels indicate a refueling water storage tank level less than a low level setpoint in conjunction with the initiation of the engineered safeguards actuation signal ("S" signal). This automatic action would align the two residual heat removal pumps to take suction from the containment sump and to deliver directly to the RCS. It should be noted that the residual heat removal pumps would continue to operate during this changeover from injection mode to recirculation mode.

The two charging pumps and the two safety injection pumps would continue to take suction from the refueling water storage tank, following the above automatic action, until manual operator action is taken to align these pumps in series with the residual heat removal pumps.

The refueling water storage tank low level protection logic consists of four level channels with each level channel assigned to a separate process control protection set. Four refueling water storage tank level transmitters provide level signals to corresponding normally deenergized level channel bistables. Each level channel bistable would be energized on receipt of a refueling water storage tank level signal less than the low level setpoint.

A two out of four coincident logic is utilized in both protection cabinets A and B to ensure a trip signal in the event that two of the four level channel bistables are energized. This trip signal, in conjunction with the "S" signal, provides the actuation signal to automatically open the corresponding containment sump isolation valves.

The low refueling water storage tank level signal is also alarmed to inform the operator to initiate the manual action required to realign the charging and safety injection pumps for the recirculation mode. The manual switchover sequence that must be performed by the operator is delineated in Table 440.61-4. Following the automatic and manual switchover sequence, the two residual heat removal pumps would take suction from the containment sump and deliver borated water directly to the RCS cold legs. A portion of the number 1 residual heat removal pump discharge flow would be used to provide suction to the two charging pumps which also deliver directly to the RCS cold legs. A portion of the discharge flow from the number 2 residual heat removal pump would be used to provide suction to the two safety injection pumps which would also deliver directly to the RCS cold legs. As part of the manual switchover procedure, the suctions of the safety injection and charging pumps are cross connected so that one residual heat removal pump can deliver flow to the RCS and both safety injection and charging pumps, in the event of the failure of the second residual heat removal pump.

TABLE 440.61-1

STEAMLINE BREAK

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
A. Identify the faulted steam generator and isolate emergency feedwater to that steam generator if automatic isolation has not yet occurred.	A. Primary indication to the operator is steamline pressure indication and individual EFW flow indication to each steam generator. A possible alarm is the steam flow-feed flow mismatch.	A. Within 10 minutes	A. Identify the faulted steam generator by comparing steamline pressures and individual EFW flow indication to each steam generator. Terminate emergency feedwater to that steam generator by shutting the EFW isolation valves if automatic isolation has not occurred.	A.1 Steam line pressure indicators. A.2 Steam generator EFW control valves. A.3 Steam generator level indicators. A.4 EFW flow indication. (All safety grade.)	None None None	A. The operator does not isolate EFW to any steam generator or isolates EFW to wrong steam generator: The faulted steam generator will continue to blowdown.
B. The operator must reset the safety injection and manually control the repressurization of RCS and maintain normal pressure control.	B. Primary indications to the operator are: pressurizer level, pressurizer pressure and RCS temperature. Possible alarms include: - high pressurizer level - high pressurizer pressure.	B. Within 10 minutes	B. The conditions for resetting safety injection are given to the operator. The operator is instructed to manually control the high head SI pumps and re-establish normal pressurizer level control.	B.1 Pressurizer level indicators. B.2 Pressurizer pressure indicators. B.3 RCS temperature indicators. (All safety grade.)	None None None	B.1 The operator fails to modulate SI pumps after the pressurizer level returns to the indicating range: Water relief through pressurizer relief valves may occur.

TABLE 440.61-1 (Continued)

STEAMLINE BREAK

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
				B.4 High head safety injection pumps. (All safety grade.)	None	
						B.2 The operator stops SI before peak reactivity is reached: If criticality is attained, the core power will increase until it reaches equilibrium with steam demand.

TABLE 440.61-2

FEEDLINE BREAK

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Zrroneous Action
A. The operator should identify the faulted steam generator and isolate EFW to that if automatic isolation has not yet occurred.	A. Primary indication to the operator will be a comparison of steamline pressures and individual EFW flow indication to each steam generator. Possible alarms include: - steam/feed flow mismatch - high EFW flow - low steam generator level - low main steam pressure	A. Within 30 minutes	A. Identify the faulted S/G by comparing individual steamline pressures and individual EFW flow indication to each steam generator. Secure EFW flow to the faulted S/G by shutting the EFW isolation valves for that S/G if automatic isolation has not yet occurred.	A.1 Steamline pressure indicators. A.2 Steam generator EFW control valves. A.3 Steam generator level indications. A.4 EFW flow indication. (All safety grade.)	None None None	A.1 Operator does not recognize the accident and does not isolate EFW to any steam generator: Faulted steam generator will continue to blowdown. A.2 Operator isolates EFW to wrong steam generator: The faulted steam generator will continue to blowdown.
B. The operator controls EFW to the intact steam generators and controls cooldown.	B. The operator will use individual S/G level indication to control EFW flow to each of the steam generators. High level and low level alarms are provided.	B. Within 30 minutes	B. Maintain proper S/G level in intact S/G's. If possible, maximize EFW flow to intact S/G's to help lower primary temperature.	B.1 Steam Generator EFW valves and controls. (Safety grade.)	None	B.1 The operator fails to control EFW flows to intact steam generators: Overfilling of a steam generator may occur.

TABLE 440.61-2 (Continued)

FEEDLINE BREAK

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
C. The operator modulates the high head SI pumps to control primary system pressure and pressurizer level.	C. Pressurizer level and pressure indication and high and low level alarms are provided.	C. Within 30 minutes	C. Reset SI and modulate high head SI pump flow to control primary system pressure and pressurizer level. Observe the primary system pressure-temperature relationship to ensure that the RCS is sufficiently subcooled.	C.1 HI head SI pump controls.	None	C.1 Operator immediately resets the SI signal and stops the pumps: Voiding in the reactor coolant system may occur
				C.2 Pressurizer pressure indicators.	None	C.2 The operator does not modulate SI after pressurizer level returns to the indicating range: Water relief through the pressurizer relief valves may occur.
				C.3 Pressurizer level indicators.	None	
				C.4 RCS temperature indicators. (All safety grade.)	None	

TABLE 440.61-3

STEAM GENERATOR TUBE RUPTURE

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action and Their Safety Grade Class	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
A. Identify faulted steam generator (S/G).	A. Possible alarms include: - steam generator level (high) - steam/feed flow mismatch - blowdown radiation (high) - main steam radiation (high)	A. 30 minutes*	A. The operator is instructed to identify faulted S/G by one or more of the following methods: a) high S/G level in one S/G; b) high radiation from any one steam; generator blowdown line radiation monitor c) high radiation from any one steam generator (e.g., sampling); d) high radiation from any one steam generator main steamline.	A.1 Steam Generator Level Indicators are Safety Grade (PAMS). A.2 Blowdown Line radiation monitor is non-safety grade. A.3 Means for determining high radiation in one S/G, e.g., sampling is non-safety grade.	A. Several diverse instrument indications are included so that any single active component failure would not preclude the operator from identifying the faulted S/G.	A. Failure to identify the faulted S/G would result in not isolating the faulted S/G which is addressed in the Westinghouse Owners Group Procedures Development and Evaluation Program for NUREG-0737, Item I.C.1.
B. Isolate Faulted S/G.	B. No alarms necessary	B. 30 minutes*	B. The operator is instructed to:	B.1 EFW control valves are safety grade.	B.1 None	B. Failure to isolate Faulted S/G is addressed in

TABLE 440.61-3

STEAM GENERATOR TUBE RUPTURE (Continued)

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action and Their Safety Grade Class	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
			a) stop all feedwater flow to faulted steam generator; b) close the main steam isolation valve and bypass valves associated with the with the faulted S/G; c) verify closure of all atmospheric relief valves associated with the faulted S/G; d) close the isolation valve in the steam line to the emergency feedwater pump associated with the faulted S/G;	B.2 MSIV's are safety grade. B.3 Steam generator ARVs are non-safety grade. B.4 Isolation valve(s) to steam driven EFW pumps are safety grade.	B.2 None B.3 Discussed in WCAP-9691 for event tree sequences associated with secondary side relief valves failure to open and reclose.	the Westinghouse Owners Group Procedure Development and Evaluation Program for NUREG-0737, Item I.C.1.
C. Cool down RCS to 50°F below no-load temperature by use of steam dump.	Primary indications are steamline pressure and RCS temperature.	C. 30 minutes*	The operator is instructed to rapidly cooldown the RCS to 50°F below no-load temperature by steam dump from non-faulted S/G to condenser, if off-site power and condenser are available, or by opening S/G ARV's.	C.1 Steamline pressure indicators are safety grade. C.2 Reactor coolant temperature indicators are safety grade. C.3 Steam dump cooldown valves are non-safety grade.	C.1 None C.2 None	C. Failure to cool down RCS via non-faulted S/G is addressed in the Westinghouse Owners Group Procedure Development and Evaluation Program for NUREG-0737, Item I.C.1.

TABLE 440.61-3

STEAM GENERATOR TUBE RUPTURE (Continued)

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action and Their Safety Grade Class	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
			if off-site power or condenser are not available.	C.4 Steam generator ARV's are non-safety grade.		
D. Depressurize RCS to faulted S/G pressure.	Primary indications and SG and RCS pressure.	D. 30 minutes*	D. The operator is instructed to depressurize RCS to faulted S/G pressure by utilizing the following methods: a) if RCP's in service, using normal pressurizer spray; b) If RCP's are not in service, using pressurizer PORV; c) If above 2 methods are unavailable, using auxiliary spray;	D.1 Normal pressurizer spray is non-safety grade. D.2 Pressurizer PORV's are safety grade. D.3 Auxiliary spray is non-safety grade.	D.1 Pressurizer spray is provided by 2 out of the four RCP's. With loss of off-site power RCP's will not be available to provide normal spray. D.2 Two pressurizer PORV's are provided in the pressurizer and one is sufficient to depressurize RCS. D.3 Impact of losing all means of depressurizing RCS is addressed in the	D. Failure to depressurize RCS is addressed in the Westinghouse Owners Group Procedure Development and Evaluation Program for NUREG-0737, Item I.C.1

TABLE 440.61-3

STEAM GENERATOR TUBE RUPTURE (Continued)

Required Operator Action	Alarms to Alert the Operator to Initiate A Particular Action and Their Safety Grade Class	Delay Time Assumed	Instructions Given to the Operator for Performing the Required Action	Safety Grade Classification of the Components and Instrumentation Necessary to Complete Indicated Action	Impact of Single Active Component Failure Westinghouse Owner's Group Procedures Development and Evaluation Program for NUREG-0737, Item I.C.1.	Impact of Operator's Failure to Take Action or the Operator Taking a Closely Related but Erroneous Action
E. Terminate SI.	E. Primary indications are pressurizer level, RCS pressure, and RCS temperature	E. 30 minutes*	E. The operator is instructed to terminate SI when RCS pressure increased by 200 psi, there is an indicated pressurizer level, and RCS subcooling is verified.	E.1 Safety injection system is safety grade.	E.1 None	E. The failure to terminate SI is addressed in the Westinghouse Owner's Group Procedures Development and Evaluation Program for NUREG-0737, Item I.C.1
				E.2 pressurizer level indications are safety grade (PAMS).	E.2 None	
				E.3 Reactor coolant system pressure indications are safety grade (PAMS).	E.3 None	
				E.4 Reactor coolant system temperature indications are safety grade (PAMS).	E.4 None	

* The above 5 steps are sequential and it is assumed that for a full double-ended steam generator tube rupture that all 5 will be completed in 30 minutes after initiation of the event.

TABLE 440.61-4

LOSS OF COOLANT ACCIDENT

Required Operator Action	Instructions Given to the Operator for Performing the Required Action	Impact of the Operator's Failure to Take Action or the Operator Taking A Closely Related but Erroneous Action
A. The operator must manually complete the changeover of the ECCS system from the injection mode to the cold leg recirculation mode.	1) Verify that the containment sump isolation valves are open. 2) Close the isolation valve in each RHR suction line from the RWST. 3) Close the two isolation valves in the crossover line downstream of the RHR heat exchangers 4) Close the isolation valve in each SI pump miniflow line. 5) Open the valve in the discharge line from the number 1 RHR heat exchanger to the suction of the centrifugal charging pumps; open the valve in the discharge line from the number 2 RHR heat exchanger to the suction of the SI pumps. 6) Open the two parallel valves in the common suction line between the centrifugal charging pump suction and the SI pump suction. 7) Close the two parallel isolation valves in the centrifugal charging pump suction line from the RWST; close the isolation valve in the SI pump suction line from the RWST.	A.&B. The plant emergency operating procedures include instructions and verification steps to ensure proper manual realignment of the ECCS for recirculation by the operator. The failure to perform one step or the performance of one step out of order, as a single failure, should not reduce ECCS recirculation capability below minimum safeguards. Should the operator fail to take any action following automatic ECCS switchover initiation, the consequences will be the loss of the safety injection and charging pumps. The residual heat removal pumps will be protected from damage by automatic ECCS switchover initiation. For a small break LOCA in the unlikely event of losing all high head pump delivery capability this situation could lead to core uncovery and inadequate core cooling. This situation is addressed in WCAP-9691 as the loss of the emergency coolant recirculation (ECR) function following a small break LOCA. Analyses have been performed for loss of high head safety injection for small LOCA
B. At approximately 17 hours after the transient	1) Insure that the "S" signals have been reset and defeated if not previously accomplished.	

TABLE 440.61-4 (Continued)

LOSS OF COOLANT ACCIDENT

Required Operator Action	Instructions Given to the Operator for performing the Required Action	Impact of the Operator's Failure to Take Action or the Operator Taking A Closely Related but Erroneous Action
is initiated, the operator must manually switch over to the hot leg recirculation mode.	2) Terminate RHR pump flow to the RCS cold legs and establish RHR pump flow to the RCS hot legs by: a) closing the RHR cold leg header isolation valves; b) opening the two isolation valves in the crossover line downstream of the RHR heat exchangers; c) opening the RHR hot leg header isolation valve;	which are presented in WCAP-9753. Inadequate core cooling guidelines are addressed in the Westinghouse Owners Group Procedures Develment and Evaluation Program for NUREG-0737 Item I.C.1. For large break LOCA the residual heat removal pump delivery to the RCS would be sufficient to provide adequate core cooling during recirculation.
	3) Terminate SI pump flow to the RCS cold legs and establish SI pump flow to the RCS hot legs by: a) stop SI pump no. 1 and close its corresponding cold leg crossover header isolation valve; b) open its corresponding hot leg header isolation valve; c) restart SI pump no. 1; d) stop SI pump no. 2 and close its corresponding cold leg crossover header isolation valve; e) close the SI common cold leg header isolation valve; f) open SI pump no. 2's hot leg header isolation valve;	

TABLE 440.61-4 (Continued)

LOSS OF COOLANT ACCIDENT

Required Operator Action	Instructions Given to the Operator for Performing the Required Action	Impact of the Operator's Failure to Take Action or the Operator Taking A Closely Related but Erroneous Action
	g) restart SI pump no. 2.	
C. Check reactor coolant pump trip criteria.	C. The operator is instructed to trip all RCP's when the RCS pressure reaches a specified pressure and SI operation is verified.	C. Discussed in WCAP-9584.