



Commonwealth Edison  
1400 Opus Place  
Downers Grove, Illinois 60516

*Quate*  
*[Signature]*

November 5, 1990

PRIORITY ROUTING


*[Handwritten initials]*

Mr. A. Bert Davis  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, IL 60137

*DOO/DeB*  
*(CR/DS)*

Subject: Braidwood Station Event Investigation Report  
Regarding the Contaminated Water Spill that  
Occurred as a Result of Improper Sequencing of  
Residual Heat Removal Valving Operations on  
October 4, 1990

Dear Mr. Davis:

Attached please find the investigative report that was prepared and completed as a result of the subject incident. As stated in your Confirmatory Action Letter (CAL) of October 4, 1990, Commonwealth Edison Company (CECo) was requested to submit a formal report to Region III detailing the company's findings and conclusions including root cause analysis of the event and the associated corrective actions. The report was requested within 30 days of the receipt of the CAL.

CECo has reviewed the Augmented Inspection Team (AIT) report as discussed in NRC Inspection Report No. 50-456/90-020 (DRP) which was transmitted to CECo October 23, 1990. Our review found the report to be a thorough and concise evaluation of the event. The AIT members should be commended for their work. CECo has addressed the concerns and conclusions identified by the AIT as part of our report. A brief summary of the conclusions of the CECo Investigation Team Report is provided below.

The root cause of the event was a reduction of plant and procedural awareness that occurred when the Residual Heat Removal suction isolation valve was manipulated at the direction of the Technical Staff Engineer. The action was performed without verifying system alignment or procedure sequence. The reduction of awareness that occurred during the event is believed to be unique to the individuals involved and does not represent a normal characteristic of the Braidwood Station Operating Organization. The Technical Staff Engineer involved is a Licensed Reactor Operator and has been since initial plant licensing in 1986. He only recently (March 1990) transferred from the Operating Shift Organization to the Technical Staff. The inappropriate request by the Technical Staff Engineer has been attributed to a reduction in awareness that occurred due to the long hours on the job that day.

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Several other weaknesses were identified that had they been performed properly probably would have prevented the event. These items pertained to failure of both the Reactor Operator and the Technical Staff Engineer to inform personnel in the Control Room and in the plant of their intentions to open the Residual Heat Removal Suction Isolation Valve. Additionally, had the Operating Shift Supervisors viewed the activity as an Infrequent Evolution Awareness activity, and performed the discussions required by the program, the event could possibly have been avoided.

CECo acknowledges your concern that a lack of command and control of station activities by the operating line organization may have occurred. The CECo investigation team evaluated the performance of the operating crew during this event and the March 18, 1990 event. The deficiencies that led to the March 18 event were not evident in this case. While some weaknesses with the operating crew were identified, our investigation concluded that a loss of command and control did not occur; however, the actions of October 4, 1990 did not meet management's expectations for the performance of the surveillance activities.

Braidwood Station is aggressively pursuing corrective actions to address all the weaknesses identified in the investigation. Most notably, by the issuance of a station-wide interim overtime guideline and increasing the Operating Shift manning by adding an extra SRO to each crew. CECo is also conducting a corporate review of overtime practices within the Nuclear Division. The results of this review are expected by January 1, 1991. In addition, our corrective actions will further delineate and reinforce management's expectations for departments involved in surveillance activities.

CECo is looking forward to scheduling a meeting with NRC Region III Management to discuss the actions that have or will be taken as a result of the investigation of this event or to address any additional concerns that the Region may have. Please direct any questions concerning this submittal to this office.

Very truly yours,



T. J. Kovach  
Nuclear Licensing Manager

cc: S. Sands-NRR  
W. Shafer-RIII  
Resident Inspector Braidwood  
NRC Document Control Desk

Subject: Improper Sequencing of Residual Heat Removal Valving  
Operations Results in Contaminated Water Spill

Event Date: October 4, 1990

Event Date: 0117

Initial Conditions:

Mode 5-Cold Shutdown. Reactor Coolant System (RCS) Temperature/Pressure: 180 degrees F/ 360 psig. The Unit had entered Mode 5 at 2320 on September 30, 1990 to effect repairs to the B Train of the Solid State Protection System. Entry into Mode 5 for greater than 72 hours required the performance of Braidwood Technical Staff Surveillance (BwVS) 4.6.2.2-1, Reactor Coolant System Pressure Isolation Valve Leakage Surveillance, for the affected unit in accordance with the plant's Technical Specifications. Additionally, ASME valve testing was required to be performed in accordance with the ASME Inservice Inspection and Testing Program.

Event Description:

During the day shift on October 3, 1990 it was concluded that performance of BwVS 4.6.2.2-1 would be required due to the Unit 1 outage continuing in excess of 72 hours. The appropriate Technical Staff personnel were notified to perform the test. Performing BwVS 4.6.2.2-1 required that a train of the Residual Heat Removal System (RH) be rendered inoperable to perform leakage tests on the associated isolation valves. The test is performed by establishing a line up that has one isolation valve closed and the other in-series isolation valve open. A vent line on the down stream portion of the suction header is then opened and leakage is checked by measuring the amount of water collected in a graduated cylinder during a specific time period. The valves are then realigned and the process is repeated until all valves have been leak tested. To facilitate this requirement, testing for the idle train of RH was scheduled for October 3. Then during the night, Operating would shift trains of RH and the opposite train could be tested on October 4.

Later, during the day shift, it was identified that both Trains of RH would be required operable to perform Auxiliary Feedwater testing on October 4. It was determined that BwVS 4.6.2.2-1 should be treated as a critical path item and testing should be continuous until completion. The Technical Staff Engineers (TSE), all of whom had reported to work on October 3 for day shift, decided to form 2 work teams to facilitate this requirement. One team would start the surveillance and continue until 2300 hours. The second team would conclude their work day normally and then report back to work at 2300 hours and relieve the first team.

The first team consisted of four TSEs. Two of the TSEs conducted the test from the Control Room. One of these TSEs was a former Nuclear Station Operator (NSO) (Licensed Reactor Operator). This TSE assumed the role of functional team leader although no leader was formally identified. The in-plant portion of the test was performed by the two remaining TSEs, one of which was a trainee. The in-plant TSEs were assisted by an Equipment Attendant (EA) (Non-licensed Operator) who performed the local valve manipulations.

Prior to initiating the test, the TSE's group leader provided the team with three additional surveillances to be performed in parallel with BwVS 4.6.2.2-1. These were ASME valve stroke tests. The tests were not on the schedule but Work Planning personnel had requested that the group leader select additional surveillances to fulfill the ASME testing requirements. The valves would be cycled for performance of BwVS 4.6.2.2-1, so it seemed reasonable to the TSEs and their group leader to collect data for these tests while performing BwVS 4.6.2.2-1.

At 1430 the Station Control Room Engineer (SCRE) (Licensed Senior Reactor Operator) authorized the TSE to perform BwVS 4.6.2.2-1. Due to the fact that shift turnover was pending, the TSE performed several of the initial condition verification steps realizing that actual performance of the surveillance would not begin until the afternoon shift.

At 1515, during the afternoon shift briefing, the performance of BwVS 4.6.2.2-1 was discussed. It was identified that this was the top priority work activity for the shift. The TSE discussed the three additional ASME valve stroke tests with the SCRE. The SCRE reviewed the tests and concurred with the TSEs conclusion that it was prudent to collect data for the valve stroke surveillances while performing BwVS 4.6.2.2-1. The SCRE authorized the performance of the three tests and notified the Unit 1 and extra NSOs that these additional tests would be performed.

Between 1600 and 1800 the test was performed for the A RH train components. All leakage was within the acceptance criteria of the surveillance. All the stroke times that were being taken for ASME tests were within their specified range. When realigning the pump inboard suction isolation valve, 1RH8701A, during the restoration steps of the surveillance, the TSE neglected to time the valve. This necessitated recycling the valve to obtain that time. All other aspects of the tests went smoothly and efficiently. Upon completion of this section of the surveillance, the testing team took a break to eat supper while the Operating Shift placed the A RH train in operation so the B RH train could be shut down to facilitate testing.

At 1954 the A RH train was placed in operation in the recirculation mode to obtain a Boron Sample. The appropriate briefings between the SCRE, the NSOs and the Shift Engineer (SE) were conducted prior to performing the evolution in accordance with the Infrequent Evolution Awareness (IEA) Special Operating Order. The SE personally remained in the Unit 1 Control Area to monitor the evolution while valving manipulations were being performed.

At 2000 the test team returned to the control room to initiate performance of the section of BwVS 4.6.2.2-1 that tested valves associated with the RH and Safety Injection discharge header.

At 2130 the test team completed this section of the test. All leakages were verified within the acceptance criteria of the procedure. Additionally the portions of the ASME stroke tests that were performed during this section were also within acceptance criteria. At this time the test team, realizing that there was only one section of BwVS 4.6.2.2-1 to complete, made a decision to complete the test without assistance from the relief team. The relief team was notified by telephone shortly thereafter.

At 2247 the A RH train was placed in operation in the shutdown cooling mode of operation. The appropriate discussions regarding the evolution were conducted between the NSOs, SCRE and SE prior to performing the evolution in accordance with the IEA program. Additionally, shift turnover was taking place about this time. BwVS 4.6.2.2-1 was identified at these turnovers as the priority item for Unit 1. The ASME tests were not identified by name but were verbally referred to as "Valve Strokes" and "other additional BwVS's" at the SCRE and SE turnovers respectively.

At 2258 the B RH train was secured.

At 2300 a TSE discussed BwVS 4.6.2.2-1 with the midnight shift SCRE. The remaining ASME test was referred to as "doing some valve strokes also" by the TSE. The TSE obtained what he perceived as the SCRE's concurrence for continuation of both BwVS 4.6.2.2-1 and 1BwVS 0.5-2.RH.2-1, Residual Heat Removal System Valve Stroke Test, along with permission to work with the Unit 1 NSO and extra NSO as necessary to perform these tests.

At 2315 the performance of BwVS 4.6.2.2-1 was discussed at the Shift briefing. The TSE also briefed the midnight shift Unit 1 NSO and extra NSO about the test. It was decided that the extra NSO would work with the TSEs to perform the surveillances. The communications between the control room portion of the team and the in-plant portion of the team would be performed by the TSEs with the in-plant TSE directing the Equipment Attendant (EA) when local valve manipulations were necessary. This was similar to the organizational structure that had been used during the earlier portions of the testing.

Between 2315 and 0117 on October 4, 1990 the leakage checks of the B RH train suction valves were performed and the results were found within the acceptance criteria of the procedure. Additionally the stroke time of the inboard in series suction isolation valve 1RH8702A, was recorded and found to be satisfactory when the valve was manipulated in accordance with BwVS 4.6.2.2-1.

At 0117 the TSE performing the local portion of the test reported via the radio that the leakage check for the outboard suction isolation valve, 1RH8702B, was completed. The TSEs in the control room communicated to the EA through the in-plant TSE to close the suction header vent valve. The EA proceeded to the vent valve while the in-plant TSE and an additional TSE, who was observing the process for training purposes, prepared to remove the tygon drain hose that had been attached to the vent line for testing purposes.

While waiting for confirmation that the vent valve was closed, the Former NSO TSE reviewed the items to be performed during the restoration portion of the surveillance. The TSE observed that the 1RH8702B would need to be opened. Recalling that he had overlooked timing a valve on the similar portion of the A RH train restoration section, the TSE focused on ensuring that the stroke time was not overlooked when performing this portion of the procedure for the B RH Train. The TSE approached the extra NSO and requested that he open the 1RH8702B.



At 0119 the extra NSO placed the control switch for the 1RH8702B to the open position and the valve began to open. Locally, the EA had just started to close the suction header vent valve when the 1RH8702B began to open. This resulted in increased pressure in the RH suction header and initiated flow through the 3/4 inch vent line. The pressure in the tygon hose soon exceeded its capacity causing the hose to expand and split spraying the EA, who was at the valve, and sprinkling on the two TSEs who were below. All three began to leave the area. The in-plant TSE came upon a local telephone after several steps and immediately called the Main Control Room to inform them of the situation.

Upon being notified, the TSEs in the Control Room, and the extra NSO realized the flow path they had created. The 1RH8702B, which is a Motor Operated Valve on a 12 inch header, had just reached the full open position. (The valve requires approximately 90 seconds to open or close) The extra NSO immediately took the valve control switch to the closed position and the valve began to close. The NSO also placed the control switch for the redundant in series isolation valve, 1RH8702A, in the closed position and the valve also began to close.

At 0123 the 1RH8702B reached the full closed position and water flow through the vent terminated. The EA then returned to the valve and closed it.

The EA received external contamination on the head, arm and upper body at levels less than 3 K dpm, and a small second degree burn on the left forearm that was also slightly contaminated. The EA was successfully decontaminated and then taken to Saint Joseph's Hospital in Joliet IL. for treatment of the burn.

The in-plant TSE received external contamination on the face, chest, and forearm ranging from 6 K to 10 K dpm. The TSE was successfully decontaminated.

The TSE in training received a small degree of external contamination on the left cheek of 4 K dpm and on a spot in the middle of the back of 2 K dpm. The TSE was successfully decontaminated.

The decrease in Pressurizer Level associated with the event was 4.5 % which is equivalent to 550 gallons. RCS pressure and temperature remained stable throughout.

At 0520 a courtesy notification was made to the NRC v.a the ENS phone system.

## Facts and Findings:

An event investigation team was assembled consisting of Commonwealth Edison personnel from Braidwood Station, the Office of PWR Operations, Nuclear Quality Programs, and Corporate Emergency Planning. The Event was investigated using the methods of the INPO Human Performance Enhancement System (HPES). Based on the results of this investigation the following weaknesses have been identified.

1. TSE Work Schedule- The Former NSO TSE had been on site and performing his duties for 19 hours prior to making the inappropriate request.
2. TSE Work Practices - The TSE's intention was to follow the steps BwVS 4.6.2.2-1 without deviation and only collect data by timing the valves when the manipulation of the valve was directed in BwVS 4.6.2.2-1. BwVS 4.6.2.2-1 was not followed correctly. The step to open 1RH8702B was performed out of sequence.
3. NSO Work Practices- The NSO did not verify that the appropriate steps of BwVS 4.6.2.2-1 had been completed prior to opening the 1RH8702B nor did he maintain an awareness of system alignment and verify that the alignment was acceptable prior to performing the valve manipulation at the request of the TSE.
4. Technical Staff Managerial Methods-
  - a. The Technical Staff did not have a policy governing Overtime hours. This resulted in a situation where personnel at the task performance level could cancel their scheduled reliefs and work for periods in excess of 16 hours.
  - b. The Technical Staff did not have a policy of formally delineating responsibilities and expectations regarding performance of surveillances.
5. Operating Managerial Methods- The policy for the interface between the Technical Staff and Operating during the performance of Technical Staff Surveillances was not adequately defined.
6. Operating Shift Supervision Supervisory Methods- Neither the SE nor the SCRE regarded the continuation of the performance of BwVS 4.6.2.2-1 as an IEA activity.
7. Operating Written Communication -
  - a. Both the afternoon SE and SCRE were aware of the additional valve stroke surveillances. These items were not included on their turnover sheets.
  - b. The performance of additional BwVSs was not identified in the Unit Log for either afternoon shift when they were originally initiated, or on the midnight shift when 1BwVS 0.5-2.RH.2-1 was continued.

8. Operating Verbal Communication -

- a. The afternoon SE and SCRE verbally turned over the valve stroke surveillances as "some additional BwVSs" and "doing some valve strokes" respectively, instead of referring to the procedures by name. The midnight SE and SCRE did not query their reliefs regarding any specifics about these generalized references.
- b. The NSO was not in communication with the in-plant TSEs or the EA prior to manipulations of components from the control room.

9. TSE Verbal Communication - The TSEs in the control room were not keeping the in-plant TSEs and the EA informed of all the manipulations that were being performed. The Former NSO TSE did not inform the other control room TSE of his intention to open the 1RH8702B.

10. Work Organization- Coordination between Technical Staff and the Work Planning Group to ensure that the schedule was updated to reflect all pending activities was not effective.

Conclusions:

The ultimate responsibility for maintaining plant awareness and ensuring that actions that potentially effect the RCS are correct and appropriate prior to taking those actions resides with the Licensed Reactor Operator. While there were other actions or "inactions" that had they been properly performed could also have prevented the event, the responsibility firmly resides with those individuals whose hands are on the controls and their SRO supervisor. This responsibility can not be delegated. The failure to perform this responsibility is the root cause of the event.

It is recognized that the NSO's willingness to perform this manipulation at the direction of the TSE was significantly influenced by the NSO's confidence and trust in an individual whom, as recently as eight months ago, had been performing the duties of Licensed Reactor Operator alongside the NSO. It has also been concluded that the trust and confidence the extra NSO possessed in the Former NSO TSE contributed to the extra NSO's feeling comfortable with only periodic involvement with the procedures. It is believed that the reduction of awareness that occurred during this event was unique to the relationship between the extra NSO and the individual TSE involved and would not have occurred had a different TSE been involved.



The most significant contributing cause to the event was the Former NSO TSE requesting that the extra NSO open the 1RH8702B to collect data for 1BwVS 0.5-2.RH.2-1 prior to reaching the appropriate step in BwVS 4.6.2.2-1. It is recognized that this event would not have occurred without this request. As such this action should also be treated as a "root" cause. The TSE's intention was to follow BwVS 4.6.2.2-1 on a step by step basis and only take timing data for 1BwVS 0.5-2.RH.2-1 during the appropriate steps of BwVS 4.6.2.2-1. It has been concluded that the extensive amount of time the TSE had spent on the job that day reduced his awareness level and was the most significant factor regarding his loss of cognizance. It is also believed that these extensive hours may also have caused the TSE to rush completion of the procedure in a subconscious attempt to end the long work day. Additionally, having to repeat a valve stroke for stroke time data during earlier portions of the procedure caused the TSE to focus on 1BwVS 0.5-2.RH.2-1 contributing to the loss of cognizance of the BwVS 4.6.2.2-1 activities.

A contributing cause to the event was the lack of an overtime policy for Technical Staff personnel. This lack of policy permitted a condition to occur where TSEs were performing activities associated with RCS alignment after being on the job for a period in excess of 18 hours. It has been concluded that had the BwVS 4.6.2.2-1 been completed by the relief team as originally planned, this event probably would not have occurred.

A contributing cause to the event was the lack of a formal organizational structure by the Technical Staff for conducting tests. This deficiency created a condition where no single person was designated as the team leader with overall responsibilities for test coordination. This coordination function is viewed as a necessity when attempting to perform two or more tests concurrently. This condition resulted in one TSE basically following BwVS 4.6.2.2-1 with the second TSE following both BwVS 4.6.2.2-1 and 1BwVS 0.5-2.RH.2-1. Because there was no overall coordination, the Former NSO TSE was able to request that the NSO open 1RH8702B without informing the TSE who was only following BwVS 4.6.2.2-1. It has been concluded that had the Former NSO TSE who was following 1BwVS 0.5-2.RH.2-1 communicated his intentions to the TSE who was only following BwVS 4.6.2.2-1, this event probably would not have occurred. It is also recognized that the reduced awareness resulting from long hours was probably the precursor to the breakdown of the informal organizational structure that had developed within the team.

A contributing cause to the event was the lack of formal policy regarding the performance of Technical Staff Surveillances that require component manipulation by Operating personnel. This lack of policy created a condition which permitted the NSO to detach himself from being actively involved in directing the field activities and contributed to his being involved with both surveillances on only a periodic basis. It has been concluded that had the NSO been fully involved in the performance of the surveillances that this event probably would not have occurred.

A contributing cause to the event was the failure of both the NSO and the TSE to inform the in-plant personnel of their intentions to open the 1RH8702B. Interviews with the personnel involved have identified that for previous manipulations during the performance of the surveillances these notifications had been made but in this instance it was overlooked. It has been concluded that had this advance notification been provided, in-plant personnel would probably have immediately responded and this event would not have occurred.

A contributing cause to the event was the supervisory methods of the midnight shift SE and SCRE. While it is recognized that some interpretation is required to determine what constitutes an IEA activity, BwVS 4.6.2.2-1 should be considered an IEA activity. It has been concluded that had an IEA discussion regarding this activity occurred for the midnight shift, this event possibly could have been avoided.

The investigation team evaluated the identified weaknesses of failing to refer to 1BwVS 0.5-2.RH.2-1 by name during verbal turnovers and briefings and also the failure to identify the surveillance by name on the written turnover sheets. The team concluded that these weaknesses did not significantly impact the event. Had either the midnight SE queried his relief, or the midnight SCRE queried his relief or the TSE as to the specifics of the "also doing some stroke times" comments, it is believed that 1BwVS 0.5-2.RH.2-1 would have been characterized as timing the valves. The team concluded that if the SE and the SCRE did not consider the continuation of BwVS 4.6.2.2-1 as an IEA activity, valve timing with a stop watch while performing the steps of BwVS 4.6.2.2-1, would not have raised the activity above their perceived threshold for IEA entry.

The investigation team evaluated the failure of both the afternoon shift and midnight shift NSOs to record entry into 1BwVS 0.5.2.RH.2-1 in the Unit 1 Log. It has been concluded that this weakness had no significant impact on the event.

The investigation team evaluated the failure to enter the additional ASME surveillances, including 1BwVS 0.5-2.RH.2-1, on the work schedule. While this may have provided some small degree of elevated SE and SCRE awareness, as stated above, if continuation of BwVS 4.6.2.2-1 did not meet the threshold for IEA entry by the midnight crew it is unlikely that the action of having these items written on a schedule would have. It has been concluded that the failure to update the schedule had no significant impact on the event.

The investigation team evaluated the communications that occurred between the Unit 1 NSO and extra NSO on the midnight shift. The team concluded that the level of communication was acceptable. From the extra NSO's perception he was performing steps in approved procedures that had been authorized for performance by a SCRE from a previous shift and whose continuation had been approved by the SCRE on his shift. The procedures that he was performing would return the plant to the as found condition. The extra NSO viewed notification of the Unit NSO on a step by step basis as unnecessary. After a detailed review of the procedures, it has been identified that there would have been no impact on plant operation during performance of the surveillances, had the procedures been performed correctly. The team has concluded that no significant NSO to NSO communication deficiency existed.

The investigation team evaluated the SCRE to NSO communications. It was identified that the Former NSO TSE essentially functioned as a go between in the communication chain between the SCRE and the extra NSO. It is believed that both the SCRE and the extra NSO felt comfortable with this arrangement because of their trust and confidence in the Former NSO TSE. It was identified that after the initial communication, where it was assumed that the Former NSO TSE had the approval of the midnight SCRE to continue both BwVS 4.6.2.2-1 and 1BwVS 0.5-2.RH.2-1, the extra NSO's perception was to work with the TSEs and complete the surveillances. The team concluded that in spite of his trust and confidence in the Former NSO TSE, the SCRE should have briefed the extra NSO in person. It was also concluded, for reasons previously stated, this deficiency had no significant impact on the event.

The investigation team evaluated the decision to perform 1BwVS 0.5-2.RH.2-1. The team concluded that while there was no legal requirement to perform this specific surveillance, its selection as one of the surveillances to fulfill the ASME program requirements was an operationally sound decision. The team concluded that no deficiency existed in this area.

The investigation team evaluated the midnight SE, SCRE and Shift Advisor's unfamiliarity with the details of the specific stroke time surveillance being performed. The team concluded that there were several basic elements involved with this deficiency. The activity was in progress at shift turnover so it was assumed that the activity had already been screened for acceptability by the afternoon shift and found acceptable. Additionally, the Former NSO TSE was perceived by the shift personnel as conducting the test. It is believed that the trust and confidence that shift personnel had for this individual significantly diminished their inquisitiveness. The team concluded, for reasons previously stated, that this deficiency had no significant impact on this event. It has also been concluded that this deficiency did not constitute a loss of Command and Control on the part of the Operating Crew.

The investigation team compared this event with the March 18, 1990 loss of Pressurizer inventory event to determine if an adverse trend in communications between NSO and SRO supervisors has developed at Braidwood Station. It was the conclusion of the team that the communication deficiencies that were a significant contributing factor in the March 18 event were not evident in this event. In the March 18 event the Unit NSO alone completed a non-routine procedure and transitioned to another non-routine procedure without informing the SCRE. There was at no time any perception on the part of the NSO that he had prior approval of the SCRE to make this transition. Additionally, it was the intention of the SCRE to halt at a specific step in the first non-routine procedure but the SCRE failed to effectively communicate his intentions.

For this event the extra NSO perceived from the start that he had the full approval of the SCRE to complete two surveillances that were already in progress from a previous shift. While it is recognized that this perception came from a communication link that contained the Former NSO TSE, it has been concluded that even had the SCRE communicated directly with the NSO, and had he been informed at that or any other time of the specifics of the "stroke time tests", the SCRE would have issued his approval. As previously stated, this had no significant impact on the event.

The investigation team evaluated the IEA program. It was the conclusion of the team that the overall program was predicated on a sound concept. Increased discussion was considered a viable means for minimizing loss of awareness events such as this one. There were several areas where enhancements could strengthen the program. The concept that if an activity was already in progress an IEA discussion was not required for the oncoming shift is an incorrect perception. Additionally, the notion that IEA was only applicable to operating procedures is incorrect.

#### Corrective Actions:

The flowpath was isolated by taking the 1RH8702B to the closed position. The RH suction header vent was isolated shortly thereafter.

The components and the general area where the water from the vent line sprayed were inspected by an engineer from the Inservice Inspection group. Based on the results of this inspection it has been concluded that the effects of the water spray were negligible.

The Commonwealth Edison Company overtime policy has been invoked for all station personnel. This policy has been implemented as an interim measure pending the completion of a thorough review of overtime practices at the station. This action will be tracked to completion by Action Item 456-200-90-04110.

A Technical Staff guidance memo has been issued to provide specific guidance and requirements for performing Technical Staff Surveillances. This memo has been issued as an interim measure. This memo will be proceduralized. This action will be tracked to completion by action item 456-200-90-04101.

An Operating Order has been issued to require that any surveillance steps directing field operations from the Control Room will be performed by the NSO or other Operating Supervisory Personnel. This order has been issued as an interim measure and is currently being evaluated to determine if inclusion into permanent programs is appropriate. This action will be tracked to completion by action item 456-200-90-04102.

An Operating Order has been issued to require that any surveillances in progress or otherwise being re-initiated after receiving earlier authorization will be initiated by the current shift's SCRE prior to the performance of any actions for surveillance on the current shift. This order has been issued as an interim measure and is currently being evaluated to determine if inclusion into a permanent program is appropriate. This action will be tracked to completion by action item 456-200-90-04103.

The Technical Staff and Operating work split will be reviewed as they relate to the performance of surveillance requirements. This action will be tracked to completion by action item 456-200-90-04104.

This event will be reviewed by the Braidwood Station Event Frequency Reduction Committee. This action will be tracked to completion by action item 456-200-90-04105.

The Braidwood Administrative Procedure (BwAP) 335-1, Operating Shift Turnover and Relief, and its associated tables BwAP 335-1T1, Shift Engineer Turnover, and BwAP 335-1T2, SCRE Turnover, will be revised to include discussion and logging of all IEA activities that are in progress or pending. Additionally, the IEA Operating Order will be revised to provide additional guidance concerning when IEA should be implemented. This action will be tracked to completion by action item 456-200-90-04106.

BwAP 350-1, Operating Logs and Records, will be revised to provide the latitude for extra NSO or SRO entries to the Unit Log. This action will be tracked to completion by action item 456-200-90-04107.

The position of Operating Shift Advisor (OSA) will be redefined. The position was originally created as an interim overview/advisory position. This position is being redefined to become an in-line supervisory position and continues to be on an interim basis.

The OSA position will be an SRO licensed position that will report directly to the SCRE. The following responsibilities are being considered for the OSA position:

1. Responsibility for supervision of surveillance activities for those surveillances that are primarily performed or initiated from the main control room.
2. Responsibility for direct supervision of Unit activities during those operating conditions when the Unit is not synchronized to the 345KV transmission system.
3. Participate and maintain the current responsibility for Job Performance Measure (JPM) training for Licensed Operator Requalification.



4. Other supervisory activities as deemed appropriate by the SCRE.

Training will be conducted for both Operating and Technical Staff personnel to discuss the weaknesses identified in this investigation and provide instruction as applicable on the policies, programs, and procedures that have been enhanced as a result of this event. This action will be tracked to completion by action item 456-200-90-04108.

The weaknesses and associated corrective actions detailed above will be evaluated for applicability to other Station Departments and programs. This action will be tracked to completion by action item 456-200-90-04109.