

WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, WI 54305



April 12, 1985

Mr. J. G. Keppler, Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Dear Mr. Keppler:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Response to Notice of Violation (Inspection Report 50-305/84-23)

- References:
- 1) Letter from C. E. Norelius (NRC) to P. D. Ziemer (WPSC) dated January 31, 1985, transmitting Inspection Report 50-305/84-23
 - 2) Letter from J. G. Keppler (NRC) to P. D. Ziemer (WPSC) dated March 15, 1985
 - 3) Letter from D. C. Hintz (WPSC) to J. G. Keppler (NRC) dated March 13, 1985

On December 18, 1984, the automatic transfer feature provided to ensure adequate suction head for the safety injection pumps during accident conditions was discovered in a disabled condition. In response to this event, an enforcement conference was held in the NRC Region III offices on January 7, 1985, to discuss the initial findings of the special inspection conducted by Mr. R. L. Nelson of your office. Also at this conference, WPSC presented the contributing factors and safety significance of the event along with descriptions of completed and planned corrective actions. The formal results of the NRC special inspection were provided by reference 1. Three items of noncompliance were identified by the inspection.

Your letter dated March 5, 1985 (reference 2) issued a Notice of Violation identifying three violations of NRC requirements. The Notice, under the provisions of 10 CFR 2.201, requires a written response. The attachment to this letter provides our response to the Notice of Violation.

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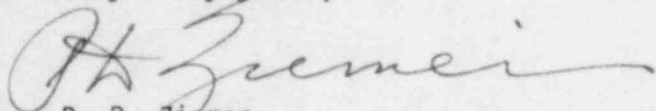
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Mr. J. G. Keppler
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WPSC is dedicated to correcting any and all deficiencies contributing to the event of December 18, 1984. Consequently, WPSC has taken prompt and comprehensive corrective actions to not only prevent reoccurrence of this specific event but also to reduce the probability of the occurrence of any similar events. We will keep you apprised of the progress of these corrective actions through periodic updates similar to the initial update provided March 13, 1985 (reference 3).

Very truly yours,



P. D. Ziemer
President and Chief Executive Officer

KAH/jks

Attachment

cc - Mr. Robert Nelson, USNRC
Mr. S. A. Varga, USNRC

Attachment

To

Letter from P. D. Ziemer (WPSC) to J. G. Keppler (NRC-Region III)

Dated

April 12, 1985

RESPONSE TO NOTICE OF VIOLATION

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I. BACKGROUND

The Kewaunee Plant Technical Specifications require that whenever the reactor is critical the interlocks associated with the safety injection system and required to function during accident and/or postaccident conditions are operable. Figure 1 shows a simplified flow diagram of the Safety Injection System. Normal plant practice is to have either manually operated valve SI-1A or SI-1B open to provide concentrated boric acid flow from the selected Boric Acid Tank to the Safety Injection pump suction. Upon receipt of a Safety Injection signal, valves SI-2A, SI-2B and the normally open SI-3 receive an open signal. As the aligned Boric Acid Tank empties and indicated level reaches 10%,

- 1) Valves SI-4A and SI-4B open to provide suction from the Refueling Water Storage Tank, and
- 2) Valves SI-2A and SI-2B close to prevent backflow to the Boric Acid Tank due to the head of the Refueling Water Storage Tank.

Refer to Figure 2 for a simplified logic diagram. The position of the control room Boric Acid Tank selector switch and the Boric Acid Tank aligned for Safety Injection must be consistent. If this condition does not exist the logic matrix to open valves SI-4A and SI-4B and close valves SI-2A and SI-2B will not be completed. In addition, the monitor light on the SI Ready Status Panel, "Boric Acid Tank Out of Service", will become "BRIGHT" indicating an abnormal condition.

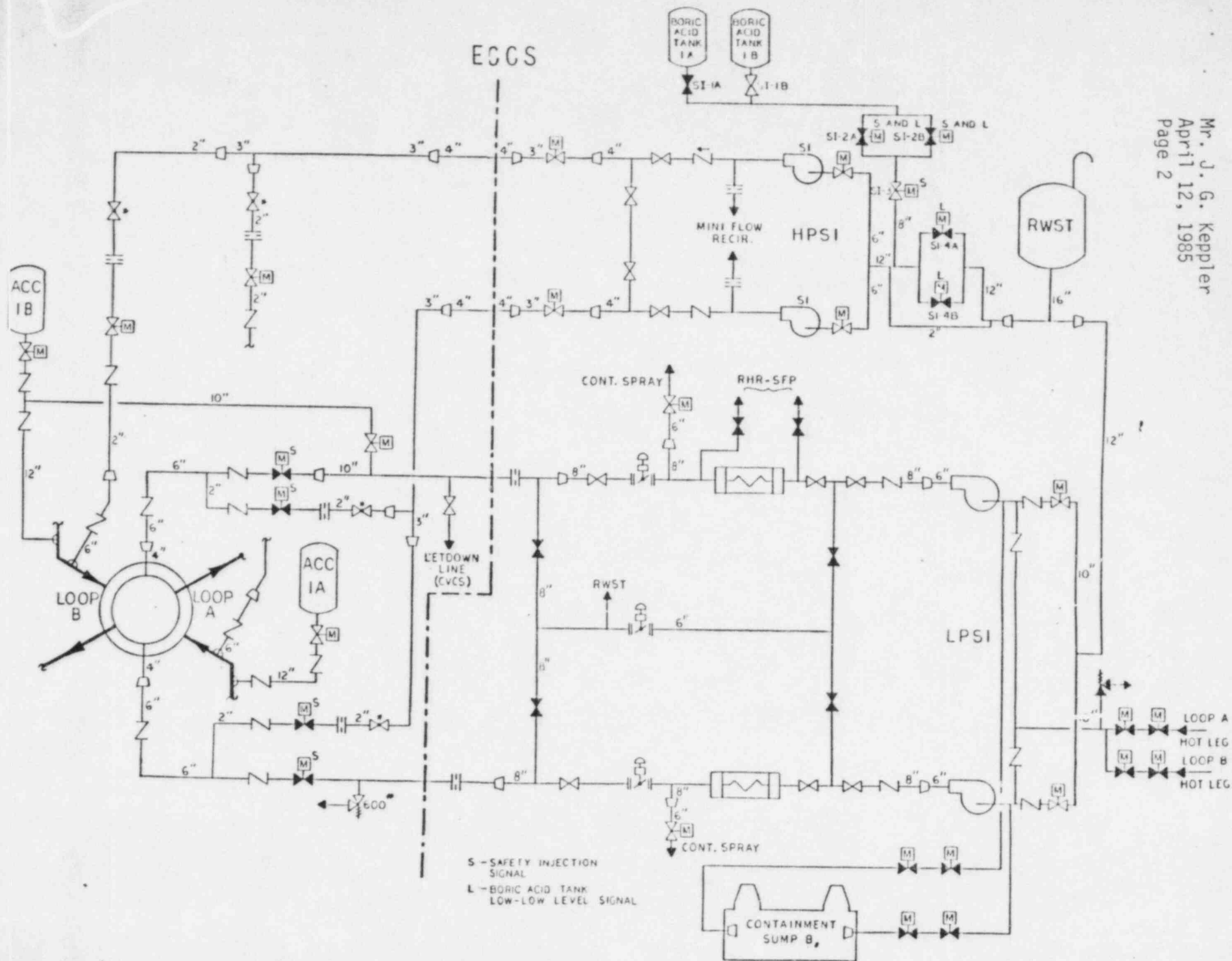


FIGURE 1

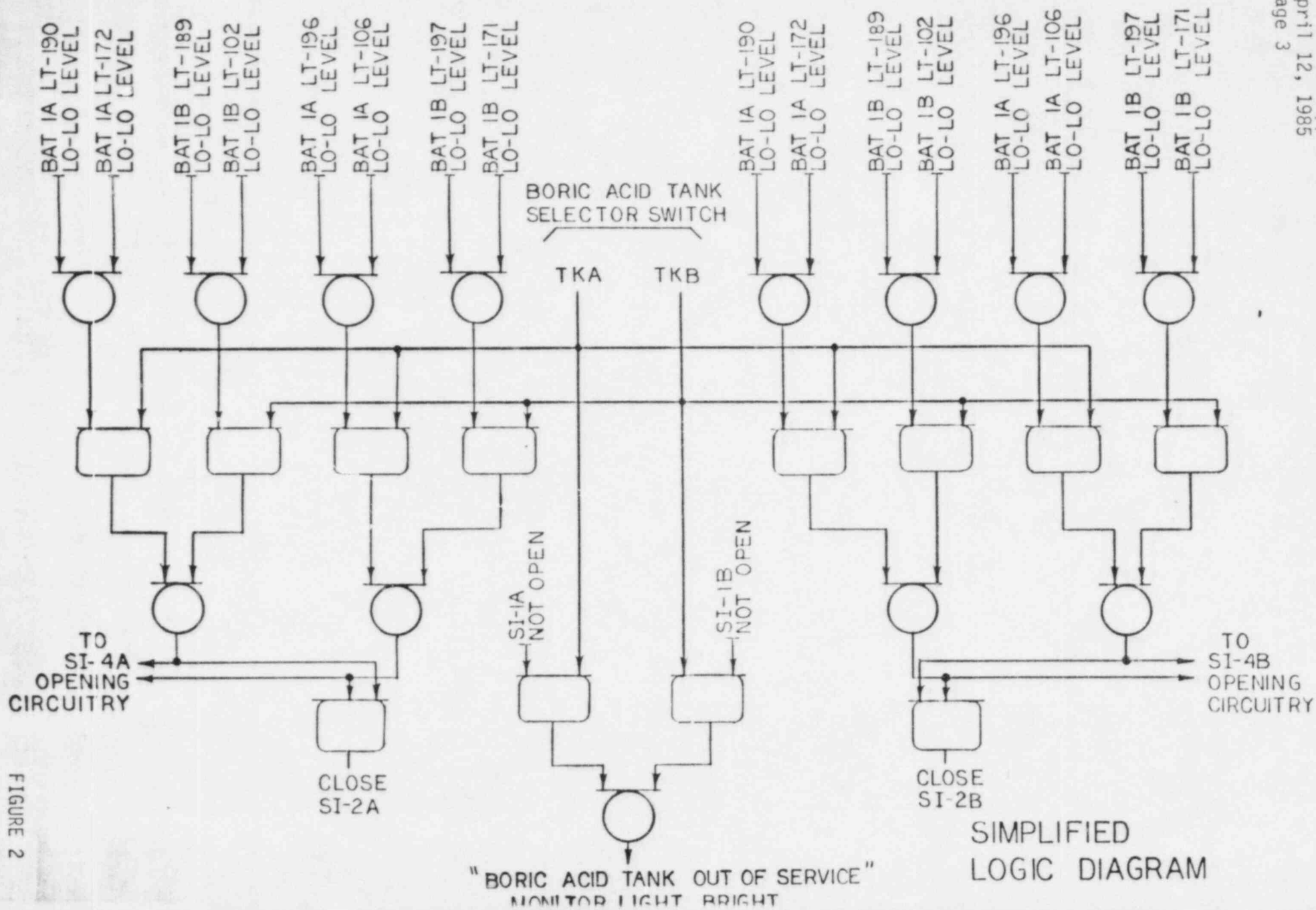


FIGURE 2

II. EVENT DESCRIPTION

At 2230 (CST) on December 18, 1984, with the plant at full power operation, the Control Room Supervisor was performing a review of the Control Room panels. He thought that there was something abnormal on the Safety Injection Ready Status Panel and upon closer examination determined that the "Boric Acid Tank Out of Service" monitor light appeared to be "BRIGHT". Investigating, he found that the control room Boric Acid Tank selector switch was in the "Tk A" position, but the 1B Boric Acid Tank was physically aligned to provide suction to the safety injection pumps. He immediately notified the Shift Supervisor and Control Room operators, and placed the selector switch in the "Tk B" position. This resulted in the monitor light going "DIM", which is its normal indication.

Upon investigation by the onshift operating crew, it was determined that the switch misalignment occurred earlier the same day during the performance of surveillance procedure SP 35-147 "Boric Acid Tank Level Instrument Test". This surveillance is performed monthly by the Instrument and Control (I&C) group as required by Plant Technical Specifications. The purpose of the procedure is to check the setpoints of the level instruments on each Boric Acid Tank. During the procedure the tank selector switch is positioned to the tank not under test. During the test, this prevents opening valves SI-4A and SI-4B, when the tested tank's instruments 10-10 level bistables are tripped.

The Shift Supervisor approved the start of the surveillance procedure at 1240 and the control room operators logged the test started at 1245. The I&C man began with the 1A Boric Acid Tank, and therefore the selector switch remained in the "Tk B" position. Upon completing the test on the 1A Boric Acid Tank, the

operator repositioned the switch to "Tk A", and the I&C man performed the check of the 1B Boric Acid Tank level instruments. This placed the "Boric Acid Tank Out of Service" monitor light in the "BRIGHT" condition.

The last step of the procedure stated "Place the BORIC ACID TANK SELECTOR switch to the desired position." No direction was given in the procedure to determine the "desired position" or who was to initial the step on the test data sheet. Since the procedure is under the responsibility of the I&C group, the I&C man initialed the step on the procedure data sheet. The I&C man then informed the control room operator that he had completed the test. The control room operators do not remember being told the test was completed. No operator log entry of test completion was made on the day shift. At 1355 the I&C man brought the procedure data sheet to the Shift Supervisor who signed off its completion in his log. The Shift Supervisor assumed that the control room operators had been following the test performance and were aware of its completion; therefore, he did not inform them that it was complete.

Prior to shift change, a "Control Room Shift Turnover Checklist" was completed by the control room operators. When completing the "BAT Selected" entry, the control room operator looked at the Boric Acid Tank Level indication in the control room that was marked with a grease pencil (Boric Acid Tank 1B) to indicate the manually aligned tank for Safety Injection. He verified that greater than 66% level was available as required and circled Boric Acid Tank 1B on the checklist. (As already described the operator was not aware of completion of the surveillance test.)

The "Boric Acid Tank Out of Service" monitor light on the SI Ready Status Panel is the only positive indication of proper valve and tank alignment. The

control operator did not notice the abnormal light status. Even though the monitor light was in the "BRIGHT" condition, it is difficult to distinguish "DIM" and "BRIGHT" on the Safety Injection Ready Status Panel. The difficulty in distinguishing "DIM" and "BRIGHT" is caused by the differences in bulb age, aging of the status window, circuit resistor age, variation in batch or lot of bulbs in use, and the control room operator perspective of the panel.

At 2200 hours, in preparation for the next turnover, the evening shift control room operators also used the Boric Acid Tank grease marking on the Boric Acid Tank level indicators and circled Boric Acid Tank 1B on the turnover checklist. When the Control Room Supervisor discovered the misaligned switch, he changed the checklist to reflect the "as found" position of the selector switch and added a note to indicate the correct switch and tank lineup.

At this time, the STA and Shift Supervisor began reviewing reporting requirements to determine the class of event applicable to the mispositioned switch. The STA and Shift Supervisor concluded that night that the event was not one-or four-hour reportable. Even so, an unsuccessful attempt was made that night to notify the Resident Inspector to make him aware of the event and the circumstances surrounding the event. The Resident Inspector was subsequently notified the first thing the next morning.

After some discussion the next day, some doubt entered into the reportability determination. Since WPSC's attitude has been and continues to be conservative, the event was phoned in under 10 CFR 50.72(b)(2)(iii), 4 hour reportable.

III. RESPONSE TO NOTICE OF VIOLATION, ITEM A

NRC Notice of Violation

- A. Technical Specification 3.3 sets forth the operability requirements of the Safety Injection and Residual Heat Removal Systems when the reactor is critical. Technical Specification 3.3.a.1.G states, "Automatic valves, instrumentation, piping, and interlocks associated with the above components and required to function during accident and/or post-accident conditions are operable."

Contrary to the above, on December 18, 1984, the plant was critical and operated for approximately nine hours with an inoperable automatic interlock in the safety injection pump system, after surveillance test SP 35-147, Boric Acid Tank Level Instrument Test, was completed on the system.

This is a Severity Level III violation (Supplement I).

WPSC Response

1. Admission or denial of the alleged violation:

WPSC agrees that on December 18, 1984, the plant was critical and operated for approximately nine hours with an inoperable automatic interlock in the safety injection pump system, after surveillance test SP 35-147, Boric Acid Tank Level Instrument Test, was completed on the system.

2. Reasons for the violation:

There are several factors that contributed to this event. They are as follows:

- a. Surveillance Procedure SP 35-147, Boric Acid Tank Level Instrument Test, improperly placed the plant in a condition in violation of Technical Specification 3.3.a.1.G. In addition, SP 35-147 did not

have provisions for control operator signoffs of completed steps or complete independent verification of safety related manipulations.

- b. There was a lack of communications between the I&C man, the control operators and the shift supervisor in ensuring everyone involved knew when the test was completed.
- c. The "Shift Turnover Checklist" did not explicitly require checking that the Boric Acid Tank selector switch was in the proper position or that the "Boric Acid Tank Out of Service" monitor light was "DIM".
- d. As described in Section II, the contrast of the monitor lights on the Safety Injection Ready Status Panel makes it difficult to distinguish the normal condition ("DIM") and the abnormal condition ("BRIGHT"). It should be noted that this problem was previously identified by the Control Room Design Review.

3. Corrective steps which have been taken and the results achieved:

Several immediate corrective actions were taken by the shift that discovered the misalignment. They were as follows:

- a. Upon discovery of the misalignment, the Boric Acid Tank selector switch was returned to the "Tk B" position to properly align the System for normal operation.
- b. The cause of this switch misalignment was investigated by the operations shift crew. After a review of logs and surveillance procedures performed on the day shift, it was concluded that the

misalignment had occurred during performance of SP 35-147 "Boric Acid Tank Level Instrument Test".

- c. The safety significance and implications of the switch misalignment were discussed amongst the shift crew, the STA, and the relieving shift crew along with a review of the regulatory reporting requirements. An attempt was made to contact the Resident Inspector - when not immediately reached, it was decided to contact him the first thing in the morning.
- d. The plant SI Ready Status Panel and the surveillance procedures performed on the day shift were reviewed to ensure normal return of all Safeguards equipment.
- e. A plant Incident Report was completed by the Shift Supervisor.

Subsequently, many additional corrective actions have been completed. They are as follows:

- a. At 8 AM on the morning following the event, the Plant Manager conducted a meeting with the plant department heads. He briefed them on the event and emphasized the safety significance of the occurrence. He directed each department head to speak to his people about personnel errors and the importance of communications and attentiveness on the job to reduce these types of errors. Further, he emphasized that we must make every attempt to eliminate personnel errors at the Kewaunee Plant and we must be continuously alert to potential problems which can lead to personnel errors. Plant supervisors were similarly briefed by the Plant Manager at the daily 9 AM meeting.

- b. Also, on the morning following the event, the Plant Manager spoke with the I&C man and control operator involved in the event. Areas discussed were how and why the event happened, the safety significance of the switch misalignment, attentiveness and communications, and what could have been done to prevent this occurrence now or in the future.
- c. On the day following the event, the importance of job attentiveness relating to personnel errors was stressed to plant maintenance personnel by the Maintenance Superintendent.
- d. The Operations Superintendent spoke with all the operating shift crews concerning the event. He stressed attentiveness on the job and the importance of reducing personnel errors. Specifically, the cumulative effect that isolated personnel errors can have on the entire corporation was reviewed from both a nuclear safety and economic viewpoint.
- e. Disciplinary action was evaluated and it was concluded that this would not result in meaningful corrective actions because of the following considerations:
 - 1) The following factors contributed to the errors:
 - a) The procedure step to "Place the BORIC ACID TANK SELECTOR SWITCH to the desired position" was vague. In addition, it did not include an explicit signoff for the Control Operator - the person responsible for the manipulation.

- b) The contrast of the monitor lights on the SI Ready Status panel makes it difficult to distinguish the normal condition ("DIM") and the abnormal condition ("BRIGHT").
 - c) The Shift Turnover Checklist was also vague in how the "BAT Selected" should be verified. This has been inconsistently interpreted as switch, tank level indicator or ready status light.
- 2) The Control Operators involved have no past history of serious personal error and have proven to be very serious, conscientious employees.
- f. LER 84-021 was completed and transmitted to the NRC by letter from D. C. Hintz to NRC Document Control Desk dated January 17, 1985.
 - g. A review and evaluation of the current safety injection system hardware and technical specifications were performed. No changes to the hardware or technical specifications have been identified at this time. The revision of surveillance procedure SP 35-147 has minimized the difficulty in testing the boric acid tank level transmitters with the other tank still operable and therefore has minimized the chances of error.

Several additional corrective actions have been completed. However, these actions specifically address Items B and C from the Notice of

Violation. Therefore, these corrective actions will be discussed in Sections IV.3 and V.3, respectively.

4. Corrective steps which will be taken to avoid further violations:

Corrective actions in the process of being completed include the following:

- a. WPSC has contracted a consultant to perform an evaluation of the SI Ready Status Panel and the control room annunciator and panel system as a whole. This evaluation will identify modifications that address the concerns raised by this incident and the Control Room Design Review. A high priority will be assigned to the modification approved for the SI Ready Status Panels.
- b. An independent technical review team was created in response to the events of December 18, 1984. This team is reviewing plant incidents related to personnel errors, experience level of the personnel involved, root causes of the errors, and corrective actions taken.

The team provided a preliminary report for the Enforcement Conference based on their initial perceptions of available data. Since that time, the team has continued collecting data for inclusion in a computer data base. This data base will facilitate sorting and trending of the information collected by the review team. The results and recommendations of the

technical review will be incorporated into a final report which is tentatively scheduled for completion in May, 1985.

Additional corrective actions are in progress which specifically address Items B and C from the Notice of Violation. These corrective actions will be discussed in Sections IV.4 and V.4, respectively.

5. Date when full compliance will be achieved:

WPSC achieved full compliance on December 18, 1984, at approximately 2230, when the Boric Acid Tanks were properly aligned.

IV. RESPONSE TO NOTICE OF VIOLATION, ITEM B

NRC Notice of Violation

- B. 10 CFR Part 50, Appendix B, Criterion V states, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Contrary to the above requirement, Surveillance Procedure No. 35-147, Revision J, "Boric Acid Tank Level Instrument Test," did not include an explicit signoff for the Control Operator to verify the correct position for the Boric Acid Tank selector switch and Administrative Control Directive No. 4.5, Revision R, "Shift Operation and Turnover," did not specify a specific check to verify that the Boric Acid Tank had been properly aligned to assure compliance with the operability requirements set forth in Technical Specification 3.3.

This is a Severity Level IV violation (Supplement I).

WPSC Response

1. Admission or denial of the alleged violation:

WPSC agrees that Surveillance Procedure No. 35-147, Revision J, "Boric Acid Tank Level Instrument Test," did not include an explicit signoff for the Control Operator to verify the correct position for the Boric Acid Tank selector switch and Administrative Control Directive No. 4.5, Revision R, "Shift Operation and Turnover," did not specify a specific check to verify that the Boric Acid Tank had been properly aligned to assure compliance with the operability requirements set forth in Technical Specification 3.3.

2. Reasons for the violation:

- a. Generally speaking, past practice has not required operator signoffs of steps in surveillance procedures if control room indication exists. In this case, the control room indication was not of the quality anticipated. Therefore, the lack of explicit operator signoff coupled with difficulty in the use of the SI Ready Status Panel contributed to the incident.
- b. The "Control Room Shift Turnover Checklist" in ACD 4.5 was considered an adequate check for the Boric Acid Tank lineup. However, the incident showed that the checklist was sufficiently vague to allow a condition in violation of technical specifications to go undetected. Corrective actions should prevent future problems.

3. Corrective steps which have been taken and the results achieved:

The corrective steps taken in response to Item B from the Notice of Violation include not only the revision of the deficient procedures but also several other actions intended to prevent similar violations. The completed corrective actions are as follows:

- a. The "Control Room Shift Turnover Checklist" in Administrative Control Directive No. 4.5 has been revised appropriately. The checklist now specifically requires positive verification of proper Boric Acid Tank alignment.
- b. On January 21, 1985, surveillance procedures SP 35-147A and SP 35-147B were approved to replace SP 35-147. The following day SP

35-147A, "Boric Acid Tank 1A Level Instrument Test, 1B Logic Test," was performed with Boric Acid Tank (BAT) 1B operational. Following the completion of SP 35-147A, the other Boric Acid Tank, BAT 1A, was manually aligned for safety injection. On January 23, 1985, SP 35-147B, "Boric Acid Tank 1B Level Instrument Test, 1A Logic Test," was performed with BAT 1A operational.

Therefore, the revision of SP 35-147 allows the required surveillance to be performed in compliance with existing Technical Specifications using existing hardware. The new procedures also eliminated the need for operator manipulations within the body of the procedure. Any operator manipulations that may be required as a prerequisite for the performance of these procedures are now covered by a procedure under the responsibility of operations personnel. Following its revision on January 21, 1985, SP 35-147 was no longer in non-compliance with Item 8 from the Notice of Violation. However, SP 35-147A and SP 35-147B underwent even further review as part of the review of all plant surveillance procedures described under corrective steps to be taken (see 4.b below). Surveillance procedures SP 35-147A and SP 35-147B have completed this review and the new revisions were issued April 9, 1985.

- c. The Operations Superintendent has issued a standing order directing the shift crews to directly follow procedures in the Control Room when they affect plant safety, even if the procedures are the responsibility of another group. It also cautions against potential interface problems and states that these situations should be corrected

using a temporary procedure change. These temporary changes will be reviewed by PORC and subsequent permanent changes will be made to these procedures.

- d. A plant senior reactor operator has been assigned to assist the I&C group in procedure review. This will provide the I&C group with the operational knowledge and technical specification familiarity necessary to ensure that high quality I&C procedures are maintained and all technical specification requirements are fulfilled.

4. Corrective steps which will be taken to avoid further violations:

Corrective actions in the process of being completed include the following:

- a. Informal discussions have been held with many of the personnel responsible for SP 35-147A, SP 35-147B, and the "Control Room Shift Turnover Checklist." However, the changes to these procedures will be formally presented to the appropriate personnel by June 1, 1985, as examples of changes they can expect to see in other procedures. This will ensure the personnel actually responsible for performance of procedures are aware of the management philosophies concerning independent verification, signoff of steps by responsible individuals, and other pertinent areas.
- b. A review of all plant surveillance procedures will be performed, specifically addressing:
 - 1) Compliance with plant technical specifications during test performance,

- 2) ensuring that adequate provisions for independent verification of safety-related manipulations are included, and
- 3) ensuring provisions for operator signoffs if operator manipulations of equipment are required.

The committee established to perform this review consists of four senior reactor operators (SRO), a former SRO with an engineering degree, and five shift technical advisors (STA) with degrees in various engineering fields. The review committee draws personnel from the operations, maintenance, technical support, nuclear services, and nuclear licensing and systems groups. In addition, the individual that has been assigned to assist the I&C group in procedure review (see 3.d above) is a member of this committee. The makeup of the committee allows each procedure to be reviewed by an individual with SRO knowledge and an individual with an engineering degree and STA background.

The process of reviewing all plant surveillance procedures (SP) begins with the assignment of the SP to someone independent of the group responsible for performance of the procedure. The initial reviewer performs a review of the SP, ensuring the procedure addresses the three items listed above. The second review is performed by a reviewer with a Senior Reactor Operator license. Both reviews are documented and all recommendations are passed on to the review coordinator. The review coordinator then ensures that all reviews and recommendations are consistent. Finally, the recommendations are forwarded to the appropriate plant group supervisor for resolution. Any conflicts between the

reviewers' recommendations and the appropriate plant group supervisor's implementation will be resolved by the Plant Operations Review Committee. In all, at least four individuals are involved in the review process for each SP.

As stated at the January 7, 1985 enforcement conference the SRO and STA review will be complete by July 1, 1985. We expect all surveillance procedures (SP) to be completely revised by September 1, 1985. Of course, if the reviews discover any SP that must be revised to ensure technical specification compliance during procedure performance, the procedure will be revised prior to its next required performance.

5. Date when full compliance will be achieved:

WPSC achieved full compliance on January 21, 1985, when SP 35-147 was revised in a manner that no longer required operator manipulation of the Boric Acid Tank selector switch as part of the procedure. ACD 4.5 had earlier been revised to explicitly require a specific check to verify the Boric Acid Tank is properly aligned.

V. RESPONSE TO NOTICE OF VIOLATION, ITEM C

NRC Notice of Violation

- C. 10 CFR 50.72(b)(2) states in part, "...the licensee shall notify the NRC as soon as practical and in all cases within four hours of the occurrence of any of the following:...(iii) Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to:...(D) Mitigate the consequences of an accident."

Contrary to the above requirement, the condition of the boric acid storage tank selector switch which caused the automatic interlock to be inoperable was not reported to the NRC until approximately 17 hours after being identified by the licensee.

This is a Severity Level IV violation (Supplement I).

WPSC Response

1. Admission or denial of the alleged violation:

WPSC agrees that the incident was not reported to the NRC until approximately 17 hours after the identification of Item A from the Notice of Violation. It should be noted, however, that the incident was reported within four hours after the incident was determined to be four hour reportable.

2. Reasons for violation:

It was the judgement of the crew on-shift at the time of the discovery that the incident was not four hour reportable. While WPSC has always encouraged the STA's and Shift Supervisors to be conservative when determining reportability, the crew concluded at the time that the incident did not fall under the four hour reportability requirements.

3. Corrective steps which have been taken and the results achieved.

Reportability requirements were reinforced with Shift Supervisors, Control Room Supervisors, other personnel with active Senior Reactor Operator licenses, and Shift Technical Advisors, by further discussions stressing conservatism in the reporting requirements. The plant Technical Support Staff prepared a presentation highlighting the reportability requirements and emphasizing conservatism in reporting requirements. This presentation was provided to the Shift Technical Advisors (STA) by February 5, 1985.

Individuals with an active Senior Reactor Operator (SRO) license on the Kewaunee Nuclear Power Plant received the presentation by February 15, 1985.

4. Corrective steps which will be taken to avoid further violations:

The WPSC STA and SRO training programs will continue to stress conservatism in reportability determination in the training sections on reportability requirements.

5. Date when full compliance will be achieved:

WPSC achieved full compliance on December 19, 1984. At this time, the incident was reported as a four-hour reportable event. Subsequently, all individuals with an active SRO license on the KNPP and all STA's have received a presentation stressing conservatism in determining reportability.