U.S. NUCLEAR REGULATORY COMMISSION
REGION I
OYSTER CREEK NUCLEAR GENERATING STATION
RECIRCULATION LOOP CLOSURE FOLLOW-UP INSPECTION

REPORT NO.	91-29
FACILITY DOCKET NO.	50-219
FACILITY LICENSE NO.	DRP-16
LICENSEE:	GPU Nuclear Corporation P. O. Box 388 Forked River, New Jersey 08731
FACILITY:	Oyster Creek Nuclear Generating Station
INSPECTION AT:	Forked River, New Jersey
INSPECTION DATES:	September 11, 12, and 24, 1991
INSPECTOR:	S. Hansell, Operations Engineer

LEAD INSPECTOR: Richard J Conte for 12/10/91
S. Hansell, Operations Engineer Date

APPROVED BY: Richard J Conte 12/10/91
Richard J. Conte, Chief, BWR Section Date
Operations Branch, DRS

Inspection Summary: Follow-up safety inspection on September 11, 12, and 24, 1991.

Areas Inspected: This inspection was conducted to review the events surrounding the August, 22, 1991, closure of all five recirculation loop discharge valves, subsequent plant cooldown, Independent Offsite Safety Review Group (IOSRG) evaluation, and the corrective actions taken in response to the event.

Inspection Results: This inspection resulted in the identification of apparent violations of NRC requirements. The violations are: (1) failure to take adequate corrective actions, as required by 10 CFR 50, Appendix "B," Criterion XVI, to preclude repetition of significant conditions adverse to quality; (2) failure to follow Isolation Condenser technical specification 3.8.A, and (3) a failure to follow and control procedures as stated in station procedure 107, "Procedure Control" and failure to follow system operating procedures for the

Recirculation, Shutdown Cooling, and Isolation Condenser systems. There was one unresolved item regarding the issue of correcting significant plant problems prior to restart (section 4).

The IOSRG evaluation was a detailed and thorough review of the August 22, 1991, event. The IOSRG root cause was accurate and included the major contributing factors which led to the isolation of all five recirculation loops.

The safety significance of the August 22, 1991, recirculation loop isolation event was minimal due to the short time of recirculation discharge valves were closed. However, the event amplified noteworthy procedural and operator performance problems. Further, the most significant aspect as a result of NRC staff review was that precursor events identified the need for improvement to licensee management, especially in the procedure adequacy area dealing with integrated plant operations with main steam valve isolation, but corrective actions from these precursor events were not fully effective. As a result, the operators were unnecessarily challenged and, in some cases, apparently failed to perform in accordance with facility administrative and operating procedures.

Licensee actions resolved a previous unresolved item dealing with experience requirements for operator licensed candidates.

DETAILS

1.0 Persons Contacted

GPU Nuclear Corporation

* J. Hildebrand, Assistant to Director, Oyster Creek
  S. Levin, Director Plant Operations/Maintenance
  R. Barrett, Plant Operations Director
* L. Lammers, Plant Maintenance Director
* P. Thompson, Site Audit Manager
* D. Robillard, Operations QA Manager (Acting)
* C. Tracy, Engineer Project Director, Oyster Creek
* E. Roessler, Manager Nuclear Safety
* E. Griffin, HPES Coordinator
* P. Scallon, Manager Plant Operations
* R. Tilton, Manager Site QA (Acting)
* J. Rogers, Senior Licensing Engineer
* G. Busch, Manager, Oyster Creek Licensing
  J. Williams, Plant Training
* G. Cropper, Operations Training Manager
  J. Solakiewicz, Operations QA, Oyster Creek
  H. Tritt, Supervisor Operations Training
  B. DeMerchant, Licensing Engineer
  M. Heller, Licensing Engineer

The inspector also held discussions with several licensed operators during the inspection.

Nuclear Regulatory Commission

* B. Ruland, Section Chief, RPS 4B
* D. Florek, Senior Operations Engineer
* D. Vito, Senior Resident Inspector
* S. Hansell, Operations Engineer
* J. Nakoski, Resident Inspector
  M. Banerjee, Resident Inspector

* Denotes those present for the exit meeting on September 24, 1991.

2.0 Background

In May 1979, Oyster Creek had an event where all five recirculation discharge valves were simultaneously closed isolating the downcomer annulus from the core region. Afterwards, requirements were incorporated into Technical Specifications (TS) as a Safety Limit which required two sets of recirculation suction and discharge valves to be full open. The reason for this limit was to ensure water level monitoring in the core region, based on instrumentation that monitors the annulas region of the reactor. In September 1987, a violation of the TS Safety Limit occurred

when the plant was in cold shutdown and less than two sets of recirculation valves were open for a short period of time. The licensee submitted a TS change request to delete the recirculation loop Safety Limit and to incorporate the requirements for recirculation loop operability into TS 3.3.F. The NRC issued TS amendment 135 dated December 30, 1989. On August 22, 1991, the requirements of TS 3.3.F.5. were not met when all five recirculation loop discharge valves were fully closed, with reactor coolant temperature greater than 212 degrees Fahrenheit. One recirculation loop discharge valve was opened approximately one minute later to comply with the TS action statement. Section 3.0 of the report discusses the event in detail.

3.0 Event Description

On August 22, 1991, an Unusual Event was declared at the Oyster Creek Nuclear Generating Station due to reactor and primary containment isolations, concurrent with a low-low reactor water level. As a result of low reactor water level, the plant was scrammed at approximately 03:07 a.m. A reactor cooldown was started using the "A" and "B" Isolation Condensers (ICs).

The plant cooldown, to less than 212°F, was required to restart the recirculation pumps which tripped due to the low-low reactor water level condition. The recirculation pumps could not be restarted with reactor coolant temperature above 212°F due to TS temperature requirements for recirculation pump restart. The Main Steam Isolation Valves (MSIVs) were not opened after a closure with a high pressure differential because of potential valve damage considerations. The MSIV bypass valves, which are normally used to equalize the pressure across the MSIV's, have blank flanges installed because the four valves are not environmentally qualified. The closure of the MSIVs prevents the use of the main condenser as a heat sink to cool down the reactor plant.

The night shift continued the plant cooldown using the ICs. The shift needed to reduce reactor coolant temperature below 350°F to clear the temperature interlock for placing the Shutdown Cooling system in service. The control room personnel were using the Isolation Condenser system procedure to operate the ICs and cooldown the plant.

The oncoming 8-4 Group Shift Supervisor (GSS) reported to work and walked down the control room panels to monitor activities that were in progress. The GSS developed a plan that included continued use of the ICs to cool down and depressurize the reactor, raising reactor water level to above 185 inches, and then establishing shutdown cooling to complete the plant cooldown. The GSS reviewed Shutdown Cooling System Operating Procedure 305 which requires that reactor water level be raised to above 185 inches to maintain water circulation between the core and the annulus.

The GSS was concerned about a conflict between procedure 305, "Shutdown Cooling System Operation" and procedure 307, "Isolation Condenser System."

Procedure 305 requires that reactor water level be above 185 inches to start Shutdown Cooling System, while Procedure 307 requires that reactor water level be below 180 inches for the ICs to be operable.

The GSS discussed the conflict of procedures with the oncoming Group Operating Supervisor (GOS).

The 8-4 shift relieved the 12-8 shift and continued the plant cooldown with the ICs. The GOS suggested the GSS discuss the procedure conflicts with operations management. The GSS left the control room to contact operations management about the conflict in procedures. Operations management was at a Post-Trip Review Group meeting and was not immediately available to discuss the procedure problem. The GSS decided not to search for the operations management and proceeded on his own.

The "A" and "B" Shutdown Cooling pumps were started at 9:30 a.m. with reactor water level at approximately 166 inches. However, because the shutdown cooling procedure required water level to be above 185 inches, the GSS took steps to increase level from 166 to 185. One of these steps was to remove the ICs from service since their steam lines would have flooded when level reached 180 inches. Therefore, at 9:44 and with reactor coolant temperature approximately 300°F, the GSS removed the ICs from service and began raising level. Level reached 185 inches at 10:01 a.m. Just prior to reaching 185 inches, the "E" recirculation discharge valve was closed to align the shutdown cooling pumps in the normal suction/discharge flowpath. The four remaining recirculation discharge valves were closed as follows:

10:04 a.m. - Closed "D" recirculation discharge valve.

10:05 a.m. - Closed "C" recirculation discharge valve.

10:09 a.m. - Closed "B" recirculation discharge valve.

10:11 a.m. - "A" recirculation discharge valve control switch placed to the close position.

10:12 a.m. - ALL RECIRCULATION DISCHARGE VALVES CLOSED.

Reactor coolant temperature was approximately 285°F when all five recirculation discharge valves were fully closed. The recirculation discharge valves remained full closed for approximately one minute.

10:13 a.m. - "A" recirculation discharge valve control switch placed to the open position.

The plant cooldown to less than 212°F was completed using the "A" and "B" shutdown cooling loops.

The facility conducted a Post-Transient Review (PTR), report number 91-136, to decide if a plant restart was appropriate. The plant management approved the restart on August 24, 1991.

The operations department performed a critique of the closure of all five recirculation discharge valve event (Critique Report No. 2100-91-023, dated August 23, 1991). The plant was restarted on August 24, 1991. An IOSRG evaluation was conducted from August 28, 1991, through September 9, 1991, to review the event. A memorandum from the plant management to the operations personnel was signed the afternoon of September 13, 1991, to provide interim written guidance in the event a reactor isolation should occur before the permanent plant procedures were corrected.

4.0 Event Analysis

4.1 Scope of Review

The inspector reviewed procedures and records and interviewed operators to assess plant, operator and management performance to identify causes of the problems noted in the sequence of events (section 3).

4.2 Procedures

The inspector reviewed the plant procedures associated with the recirculation loop discharge valve closure, plant cooldown and a reactor isolation (MSIV closure) event to determine their adequacy. The results of the review are provided below.

Integrated Operations

The plant procedures available to the plant operators do not contain sufficient guidance to perform a plant cooldown with a reactor isolation after a plant shutdown. The existing plant procedures do not contain adequate written direction to transition from the Isolation Condensers to the Shutdown Cooling system. The Emergency Operating Procedure EMG-3200.01, "RPV Control" and General Plant Operating Procedure 203.2, "Plant Cooldown From Hot Standby to Cold Shutdown" contain guidance to use the Isolation Condenser to start the plant cooldown and place the Shutdown Cooling system in service when reactor pressure and temperature interlocks are clear. The above-mentioned procedures do not contain specific direction to remove the Isolation Condensers before 212°F and how to control reactor water level when securing the ICs and placing shutdown cooling system in service. The plant conditions following the reactor scram did not match the Applicability and Prerequisite sections of procedure 203.2, "Plant Cooldown From Hot Standby to Cold Shutdown." The failure to have an adequate written procedure in this area is a result of ineffective corrective action to a prior MSIV closure event. The details are discussed in section 6.0 of this report.

In conclusion, the station did not have an integrated operating procedure to provide the operators written information to cooldown the plant after MSIV isolation. The existing procedures did not provide clear guidance to transition from isolation condenser operation to shutdown cooling system operation.

Recirculation Discharge Valves Operation

Technical Specification 3.3.F.4 requires that one recirculation loop shall remain open if reactor coolant temperature is greater than 212°F. Reactor coolant temperature was approximately 285°F when all five recirculation discharge valves were fully closed. The recirculation discharge valves remained full closed for approximately one minute.

The requirement to maintain at least one recirculation loop suction and discharge valve full open, if reactor coolant temperature is greater than 212°F, is listed in the five plant procedures listed below.

-- Station Procedure 203.2, "Plant Cooldown From Hot Standby to Cold Shutdown," section 3.14.

-- Station Procedure 305, "Shutdown Cooling System Operation," section 3.2.6.1.

-- Station Procedure 307, "Isolation Condenser System," sections 2.2.2, 3.2.2, and 4.2.4.

-- Abnormal Procedure 2000-ABN-3200.02, "Recirc. Pump Trip," section 3.3 caution statement.

-- Alarm Response "E-4-b" 2000-RAP-3024.01, "Less Than 2 Recirc. Loops Open," section manual corrective actions.

The recirculation discharge valve closure weaknesses were identified by the licensee staff conducting independent reviews of this event. Licensee Event Report (LER) No. 91-05 noted the closing of all five recirculation discharge valves as a violation of written operating procedures.

The licensee's corrective action for a previous 1987 violation of the recirculation discharge valve safety limit could have reasonably been expected to prevent the event. In conclusion, the plant does not have a written procedure to direct closing all five recirculation discharge valves. The operators closed all five recirculation discharge valves, utilizing a known "operating practice," to maximize shutdown cooling flow.

4.3 Procedure Conflict

The Isolation Condenser and Shutdown Cooling operating procedures contained conflicting guidance and requirements between the two procedures. A comparison of both system requirements are listed below.

Isolation Condenser

Technical Specification 3.8.C and IC procedure 307 section 2.2.4 require both isolation condensers to be operable greater than 212°F. The ICs are required to remove decay heat from the reactor. IC procedure 307 section 2.2.9 requires reactor water level to be less than 180 inches for system operation since a reactor water level above 180 inches will result in water flooding the IC steam lines and render the system inoperable. IC procedure 307 section 9.3.1 states: "When an isolation condenser is taken out-of-service it is considered inoperable and Technical Specification 3.8.C must be complied with." The "A" and "B" Isolation Condenser's were taken out of service at 9:44 a.m., reactor coolant temperature was approximately 300 degrees F. The Isolation Condensers were removed from service to raise reactor water level to 185 inches. Both Isolation Condensers are required to be operable in accordance with Technical Specification 3.8.C, anytime reactor coolant temperature is greater than 212°F. Both ICs remained out of service with reactor coolant temperature greater than 212°F for approximately 70 minutes. This was an apparent failure to meet TS 3.8.C and is an example of failure to meet TS 6.8.1 (Station Procedure 307, section 2.2.4). TS 6.8.1 (219/91-29-01).

Shutdown Cooling

The Shutdown Cooling procedure 305 section 3.2.6 contains the following direction: "To prevent stratification and to maintain circulation within the core, with no recirculation pumps running and the isolation condensers not required for the current plant status, level should be raised above 185 inches TAF." The above guidance is misleading because the isolation condensers are required for operation anytime the reactor coolant temperature is above 212°F. If reactor water level is raised to 185 inches, the ICs would be inoperable because the IC procedure directs the operators to isolate the ICs when reactor water level is raised above 180 inches.

Technical Specifications do not contain requirements for the shutdown cooling system. Shutdown cooling procedure sections 3.1.7 and 3.1.8 list reactor pressure less than 150 psig and reactor recirculation temperature less than 350°F as prerequisites for system operation. Shutdown cooling procedure section 3.3.2.2 requires reactor water level be raised to greater than 185 inches to maintain circulation between the core and the annulus. The "A" and "B" Shutdown Cooling loops were started at 9:30 a.m. with reactor water level at approximately 166 inches and the "E" recirculation discharge valve full open. Operating Procedure 305 does not contain written guidance to operate the shutdown cooling system in this alignment. Section 3.1.10 directs the operator to close the Recirculation loop "E" discharge valve prior to placing shutdown cooling in service. Shutdown Cooling procedure 305, sections 3.1.10 and 3.3.2.2, requires reactor water level be raised to greater than 185 inches to maintain circulation between the core and the annulus. The operators lowered water level below the isolation condenser steam line. The reactor water level

was lowered to 174 inches to vent a steam pocket in the top of the reactor vessel. The operators failed to follow the Shutdown Cooling system operating procedure 305.

The operations personnel failed to follow the written requirements in the Isolation Condenser and Shutdown Cooling system operating procedures as stated in the above information. The ICs were rendered inoperable and the Shutdown Cooling system was not operated as designed. The failure to follow both system operating procedures resulted in the removal of one safety-related decay heat removal system (ICs), and mis-operation of a second decay heat removal system (Shutdown Cooling). The licensee's failure to follow system operating procedures for the two decay heat removal and recirculation systems is a violation of the NRC requirement to implement system operating procedures. The licensee's actions were apparently contrary to the TS requirements for implementing system operating procedure 305 and is another example of failure to meet technical specification section 6.8.1 and Reg Guide 1.33 (50-219/91-19-02).

4.5 Operator Performance

As discussed above, the operators in the control room were confronted with an area of plant operation that was not adequately covered in a detailed written station procedure. The inadequate procedures were recognized. The GSS was concerned about a conflict between procedure 305, "Shutdown Cooling System Operation" and procedure 307, "Isolation Condenser System." Procedure 305 requires that reactor water level be above 185 inches to start Shutdown Cooling System, and Procedure 307 requires that reactor water level be below 180 inches for the Isolation Condensers to be operable. The General Plant Operating Procedure 203.2, "Plant Cooldown From Hot Standby to Cold Shutdown," does not contain written guidance to transition from the ICs to Shutdown Cooling. Furthermore, the IC and Shutdown Cooling Operating procedures do not contain written guidance to transition from the ICs to Shutdown Cooling system.

The GSS discussed the conflict of procedures with the oncoming Group Operating Supervisor (GOS). The GOS suggested the GSS discuss the procedure conflicts with operations management. The GSS left the control room to contact operations management about the conflict in procedures. Operations management were at a Post-Trip Review Group meeting and were not immediately available to discuss the procedure problem. The GSS decided not to search for the operations management and proceeded to cooldown the plant on his own.

The GSS's decision to continue the plant cooldown with inadequate procedures is an apparent failure with Station Administrative Procedure 107, "Procedure Control," section 5.1.3. The Station Administrative Procedure 107, "Procedure Control," section 5.1.3 specifies that when, "written procedures are determined to be inadequate they shall be revised, temporarily if necessary, so that the operation of the station will be

conducted at all times in such a manner to protect the health and safety of the general public, plant personnel, and plant equipment." The plant personnel did not pursue a temporary change to the procedures containing errors. The plant cooldown should have been stopped at this point until the problem was corrected. The licensed operator failed to place the plant in a stable condition until the procedure conflict was resolved.

Further, section 5.1.5.1 states, "Strict compliance with approved, controlled procedures is absolutely essential for safe operation of the plant." The operators did not follow the above-noted procedure requirements the day of the event. The failure to follow Station Administrative Procedures is another example of failure to meet the requirements stated in technical specification section 6.8.1 and Reg. Guide 1.33 (219/91-29-02).

4.6 Hardware Limitations

The capability of several plant systems limited the operators flexibility to solve the problems encountered during the August 22, 1991, event.

- The plant does not have a reactor vessel bottom head drain temperature indication. Due to this condition, the plant is required to enter cold shutdown to restart the recirculation pumps after a plant shutdown. General Electric S.I. L. #251 recommended installation of a thermocouple on the bottom head drain line. This would allow the operators to restart recirculation pumps after a trip, without going to cold shutdown since temperature differentials could be monitored. The recirculation pumps would be able to provide forced circulation through the core when the plant is shut down.

- MSIVs are normally precluded by procedure from being re-opened after a closure with a high pressure differential because of potential valve damage. The MSIV bypass valves, which are normally used to equalize the pressure across the MSIVs, have blank flanges installed because the four bypass valves are not environmentally qualified. The closure of the MSIVs prevents the use of the main condenser as a heat sink to cool down the reactor plant and forces reliant upon the ICs to remove heat each time the MSIVs are shut.

- The control room overhead alarm "LESS THAN 2 RECIRC LOOPS OPEN" did not function per design or procedure. The alarm response procedure stated that the recirculation overhead alarm should flash when "less than two recirculation loops with their suction and/or discharge valves not fully open." The initial alarm was received when less than three recirculation loop suction and discharge valves were full open. The alarm re-flash would occur on the closure of the fifth recirculation loop. Based on review of the alarm printout and operator interviews, the inspector could not determine if the recirculation alarm reflashed on the closure of the fourth or fifth discharge valve. After the event, the plant performed troubleshooting to determine the overhead alarm problem. The

technicians lifted the recirculation discharge valve position wires to simulate the required number of closed discharge valves. The overhead annunciator alarmed as designed. The licensee wrote a work order to continue the alarm troubleshooting when the plant is shut down and the recirculation valves can be stroked closed.

- The reactor head vent line was manually isolated because the valves failed leak rate test requirements. When reactor level was raised above the isolation condenser steam line, a steam bubble was formed in the reactor and confused the operators. The reactor pressure was approximately 20-30 psig at the steam dome, with shutdown cooling outlet temperature reading approximately 145°F. The operators lowered water level below the isolation condenser steam line, less than 180 inches, to vent the steam pocket. The reactor water level was lowered at a time when shutdown cooling system was in operation. As noted before, reactor water level should be greater than 185 inches with shutdown cooling in service.

4.7 IOSRG Review

The inspector reviewed the Independent Offsite Safety Review Group (IOSRG) report number 91-05, which evaluated the August 22, 1991, event. The IOSRG evaluation was a detailed and thorough review of the event. The IOSRG root cause was accurate, with one exception, and included the major contributing factors which led to the isolation of all five recirculation loops.

The licensee staff, conducting independent reviews of this event, noted most of the weaknesses described above. The IOSRG report did not list the following procedure problems: IC procedure 307, sections 2.2.9 (reactor water level less than 180 inches). Shutdown Cooling procedure 305, section 3.1.10 (Prerequisites to have the "E" discharge valve closed and reactor water level > 185 inches). Reactor water level was lowered to less than 185 inches to vent the steam bubble, with shutdown cooling system in operation.

The IOSRG evaluation did not specifically address the plant personnel's failure to follow the requirements of Station Administrative Procedure 107, "Procedure Control." The report identified that there were many contributing factors to this event, including procedural inadequacies, work practices, and equipment performance. The procedural deficiencies deficiencies played a significant role in that procedural requirements lacked clarity and were often inconsistent between as well as within procedures. Furthermore, there is no single integrated plant operations procedure that directs or controls plant shutdown evolutions from a reactor isolation.

The IOSRG review committee submitted fifteen (15) corrective action recommendations to the plant management. The recommendations covered most of the problem areas from the event. One additional corrective action

which was not listed in the IOSRG evaluation was the need for written interim procedure guidance from plant management to the operating shifts. The event occurred on August 22, 1991, and plant restart took place on August 24, 1991. A memorandum providing guidance to the operators was signed on September 13, 1991. The three week timeframe to provide written operator guidance, in the event that a reactor isolation should occur, did not meet NRC staff expectations for prompt corrective action.

5.0 Safety Significance of this Event

All five recirculation loop discharge valves were fully closed for one minute. The recirculation loop suction and discharge bypass valves remained open for the entire event. One opened suction and discharge valve in a recirculation loop will provide hydraulic communication between the core region and the downcomer annulus. The communication between the core region and annulus is required to maintain circulation through the core and provide an accurate reactor water level indication. The reactor water level was maintained greater than 185 inches during the entire time the recirculation discharge valves were full closed. A reactor water level of 185 inches ensures communication between the core region and annulus. The safety significance of the event is minimal due to the short time all recirculation discharge valves were closed.

If the five closed recirculation loops had gone undetected or reactor water level had dropped during the event the safety significance would have been significantly higher. The above could have resulted in reduced core circulation and possible loss of reactor level instrumentation for key safety functions, as had occurred in the May 1979 event.

6.0 Licensee Corrective Actions

The inspector conducted a review to evaluate the effectiveness and proper implementation of the facility's corrective actions from the September 11, 1987, event and subsequent implementation of Technical Specification amendment #135. The recirculation discharge valve placard was not updated when the Recirculation safety limit became a technical specification LCO. The recirculation discharge valve placard, in place the day of the event, required that "at least two recirculation loops be fully open." The Technical Specification amendment #135 became effective on December 30, 1989. The change requires one recirculation loop be fully open and allows all five recirculation loops to be closed if reactor coolant temperature is less than 212°F and reactor water level is greater than 185 inches. The placard in the control room contains outdated information that does not alert the operators to a potential problem of isolating all five recirculation loops. The operators interviewed stated that the placard would be more useful if it stated the new requirements in Technical Specifications 3.3.F.3 and 3.3.F.6. The placard update is in the process of being evaluated and corrected by the plant staff.

Further, the inspector reviewed the Transient Assessment Report (TAR) TAR-OC-008, a MSIV closure scram event from June 12, 1985. TAR-OC-008, addressed a MSIV closure scram event similar to the August 22, 1991, event. Report section B.4.b. described procedural inadequacies between procedure 203.2, "Plant Cooldown from Hot Standby to Cold Shutdown" and 305, "Shutdown Cooling System Operating Procedure." Section D.7.c. of the TAR contained a Corrective Action task to revise procedure 203.2 to reflect the possible difficulties in achieving cold shutdown with the MSIVs closed and recirculation pumps off. The licensee did not revise procedure 203.2 to provide adequate written guidance for the operators to cool down the plant. Consequently on August 22, 1991, the operators encountered procedural inadequacies between the Plant Cooldown Procedure 203.2, Shutdown Cooling System Operating Procedure 305, and Isolation Condenser Procedure 307. The ineffective corrective actions from the 1985 event did not preclude the repetition of a similar event on August 22, 1991.

The operations department critique of the event determined the root cause to be operator failure to adequately review and perform procedures. The critique noted the "incomplete procedural guidance available to the operators for completing the entire evolution, i.e., changeover from cool down, using the isolation condensers to use of shutdown cooling." The plant was restarted on August 24, 1991, without correcting the known procedural deficiencies. The plant management did not provide interim written guidance to the operators prior to startup in the event an MSIV closure occurred prior to correcting the existing plant procedures.

The PTR did not evaluate the problems noted during the plant cooldown. The facility stated that the PTR only covers the reactor scram event and not the subsequent cooldown for the plant restart decision. The plant restart was conducted without taking into consideration the problems encountered by the operators to place the plant in a cold shutdown condition as stated in the operations critique. The inspector's review of the plant procedures did not reveal another mechanism to correct a significant plant problem prior to restart. In light of the concerns noted above, the adequacy of the facility's post-transient review procedure to take corrective actions prior to restart requires further staff review and is considered unresolved (219/91-29-03).

During the onsite inspection from September 11-12, 1991, the inspector questioned the plant staff about the lack of procedure guidance to cool down the plant with the MSIVs closed. In a telephone call with NRC management on September 13, 1991, the facility indicated that interim written guidance to the operators, if the plant experienced a MSIV isolation and needed to cool down, was being developed. A memorandum from the plant management to the operations personnel was signed the afternoon of September 13, 1991, to provide interim written guidance in the event a reactor isolation should occur before the permanent plant procedures are corrected.

The apparent failure to update the control room recirculation discharge valve placard and make an adequate revision to the plant procedures noted in the licensee's report, TAR-OC-008, contributed to the recurrence of similar problems on August 22, 1991. The apparent failure to take corrective actions to preclude the repetition of a significant condition adverse to quality is contrary to 10 CFR 50, Appendix "B," Criterion XVI, which requires the facility to take measures that assure the cause of the condition is determined and corrective actions taken to preclude repetition. This is considered an apparent violation of 10 CFR 50, Appendix B, Criterion XVI, (Violation 50-219/91-29-04).

7.0 Overall Conclusions

A number of problems were identified as contributing factors in the closure of all five recirculation loop discharge valves and the problems encountered during the subsequent plant cooldown.

- The plant does not have an integrated station procedure or combination of operating procedures that provide specific operator direction to perform a plant cooldown with a reactor isolation after a plant shutdown.

- The inspector reviewed the TAR TAR-OC-008, a MSIV closure scram event from June 12, 1985. The event was similar to the August 22, 1991, event and noted "procedural inadequacies" between the Plant Cooldown Procedure 203.2 and Shutdown Cooling System Operating Procedure 305. The TAR contained a Corrective Action task to revise procedure 203.2 to reflect the possible difficulties in achieving cold shutdown with the MSIVs closed and recirculation pumps off.

- The operators failed to follow procedural steps requiring the suction and discharge valves in at least one recirculation loop to remain fully open with reactor coolant temperature greater than 212°F.

- The plant procedures available to the plant operators contained conflicting information and were inconsistent between procedures and within procedures.

- The plant did not provide interim short term procedure guidance to the operators, before the plant restart, for actions to take if a MSIV isolation were to occur before existing procedure problems were corrected.

- The capability of the plant limited the operators flexibility to combat and evaluate the problems encountered during the August 22, 1991, event.

- Both ICs were made inoperable by the operators' raising reactor water level to > 180 inches. At the time, reactor coolant temperature was 250°F, and the shutdown cooling procedure required a reactor level > 185" TAF.

- The personnel involved did not make temporary changes to the incorrect procedures during the plant cooldown or after the event. The personnel did not place the plant in a stable condition when they encountered conflicting procedures.

- The plant did not revise the recirculation discharge valve placard when the recirculation loop technical specification was changed from a safety limit to an LCO.

- The IOSRG evaluation was a detailed and thorough review of the event The IOSRG root cause was accurate, with one exception, and included the major contributing factors which led to the isolation of all five recirculation loops.

7.0 Licensee's Action On Previously Identified Inspection Findings

7.1 (Closed) Unresolved Item 219/89-24-01

During an NRC initial license examination, an NRC inspector noted deficiencies in the submittal of the reactor operator (RO) license applications (NRC Form 398). Eight RO applications did not meet the minimum experience requirement, of six months on site as a nonlicensed operator, to take the RO examination.

The NRC asked the licensee personnel for a commitment to Regulatory Guide (RG) 1.8, Revision 2, dated April 1987, in order to avoid future problems with the experience requirements for RO applicants. The licensee's Quality Assurance Program (QAP) makes a commitment to RG 1.8, Revision 1-R (September 1975) which does not reflect the above requirements.

In a letter dated October 3, 1989, the facility committed to modify the QAP to reflect, "six months of operating experience as a prerequisite for an initial operator license application until the site specific simulator has been certified."

The inspector reviewed the facility's QAP and noted that the QAP commits to meeting the experience requirements of ANSI/ANS 3.1 - 1981, for licensed operators, until the site specific simulator has been certified and the training programs are INPO accredited. The QAP written commitment meets the NRC requirements for initial licensed operator eligibility.

The inspector reviewed the license applications from 1989 to the present and did not note any significant problems with the applicant's 398 forms. Based on the above, this item is closed.

8.0 Exit Meeting

The inspectors met with those denoted in Section 1.0 on September 24, 1991, to discuss the preliminary inspection findings. The inspectors did not provide any written material to the licensee. The licensee did not indicate that the inspectors were provided any proprietary information during this inspection.