U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Commonwealth Edison Company
Facility:	Zion Nuclear Plant, Units 1 and 2
Location:	Opus West III 1400 Opus West III Downers Grove, IL 60515
Dates:	July 13 - August 29, 1996
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EXECUTIVE SUMMARY

Zion Nuclear Plant, Units 1 and 2
NRC Inspection Reports 50-295/96010; 50-304/96010

This integrated inspection included aspects of licensee operations, engineering, maintenance and plant support as a result of the routine inspections by the resident inspectors, a regional radiation specialist, a regional security specialist, and a reactor engineer.

Operations

- The briefing for the Unit 1 startup was good (Section O1.2).
- There were a significant number of rod position indication system problems during the Unit 1 startup (Section O1.3).
- Licensed operators failed to include a valve in the partial clearing of an out-of-service on the auxiliary steam system which resulted in cross-tying the auxiliary steam system with the service air system. (Section O1.4).
- A violation was identified for the second occurrence of overfilling the OB lake discharge tank due to non-licensed operator error (Section O1.5).
- A non-licensed operator misaligned a 2B diesel generator air regulation isolation valve while performing a valve lineup verification. (Section O2.1).
- A violation was identified when fuel handling personnel inadvertently dropped two new fuel assemblies during new fuel assembly receipt inspection due to an inadequate procedure (Section O3.1).
- Rod position indication problems resulted in numerous individuals clustering around the process computer terminal.

Maintenance

- A violation was identified when inadequate corrective actions were implemented after scaffold interfering with the Unit 1 turbine stop valves was found on June 17. On August 5, the inspectors identified that a scaffold around the 1B containment spray pump obstructed operation of the 1B containment spray discharge valve (Section M1.2).
- A violation was identified for the failure of maintenance personnel to properly document all as-found discrepant conditions of the 1B centrifugal charging pump (CCP) shaft-driven oil pump during an inspection of the pump (Section M1.3).

- The licensee identified that poor preventive maintenance had been performed on the main steam isolation valve limit switches (Section M1.4).

Engineering

- Engineering personnel failed to include the necessary supporting information in an operability assessment to justify the conclusion that the 1B charging pump was operable with a degraded shaft driven lube oil pump (Section E2.2).

Plant Support

Radiological Protection and Chemistry

- The licensee dedicated additional resources to improve as low as reasonably achievable (ALARA) planning of work activities for the site construction staff. ALARA plans for site construction activities were well prepared and contained good radiation protection hold points and information. However, the ALARA plans were not formally incorporated by the licensee's procedures to ensure that significant RP requirements were reflected in radiation work permits (Section R1.1).

- Weaknesses were observed in the configuration of the portable air samplers. Sample pump exhaust ports were expelling filtered air into the sample pump intake (Section R2.1).

- Radiological posting problems were observed in the Auxiliary Building (Section R2.2).

- A violation was identified with ZRP 5820-12, "Out-of-Service Surveillance for Radiation Monitor," for failure to specify actions to meet the technical specification action statement requirement when containment high radiation monitor 2R-AR03 was inoperable (Section R3.1).

- Preparations for unloading new fuel were not well coordinated. Personnel were observed loitering in the Auxiliary Building for excessive periods of time (Section R4.1).

Security

- TI 2515/132, "Malevolent Use of Vehicles at Nuclear Power Plants," was closed, as the licensee had adequately developed and implemented an adequate Vehicle Barrier System as required (Section S1.1).

Report Details

Summary of Plant Status

Unit 1 began this inspection report period at 100 percent power. However, the unit tripped on August 18 due to low low level in the 1D steam generator as a result of the closure of the 1D main steam isolation valve (MSIV). The root cause of the MSIV closure was determined to be a faulty limit switch on the MSIV. The unit reached criticality on August 21; however, the unit was taken off-line again on August 26 for an inoperable power operated relief valve.

Unit 2 began this inspection report period at 100 percent power and remained there throughout the period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent review of ongoing plant operations.

O1.2 Briefing for the Unit 1 Startup

a. Inspection Scope (71707)

On August 20, the shift engineer and two nuclear engineers (NEs) conducted an infrequent evolution briefing in preparation for a Unit 1 startup. The inspectors attended the briefing and reviewed the Reactivity Management Oversight (RMO) memorandum which was issued by the operations manager.

b. Observations and Findings

The shift engineer and the NEs demonstrated leadership and provided good direction during the briefing. The briefing was thorough and appropriate emphasis was given to maintaining the proper safety focus during the startup activities. Clear communications and expectations were provided to the Unit 1 nuclear station operators (NSOs) regarding their roles and responsibilities for assuring safe reactor startup operations. Operations management also attended the briefing and reiterated many of the safe practices, consistent with the RMO's memorandum.

c. Conclusion

The inspectors considered that the briefing was well conducted and appropriately focused of safety. In addition, proper management oversight was provided as indicated by the plant manager's, the operations manager's, and the Unit 1 operating engineer's attendance at the briefing.

O1.3 Unit 1 Reactor Startup Observation

a. Inspection Scope (71715)

On August 21, the inspectors observed the Unit 1 startup from pulling of the shutdown rods through criticality.

b. Observations and Findings

Due to longstanding problems with the rod position indication (RPI) system, two Nuclear Engineers (NEs) were available to support the Unit 1 crew. One NE was dedicated solely to monitor rod position indication problems and the other was to provide technical support to the operators as the qualified nuclear engineer (QNE).

The startup was well controlled and the operators closely monitored the panels; however, frequent RPI out-of-tolerance alarms were received. It appeared that there were more than the usual number of RPI alarms during this startup. There were 35 alarms. In addition, the crew and the NEs were also hampered by the process computer failing during the startup, without any indication of failure. The process computer was being used to provide another indicator of individual rod positions. The frequent RPI problems also strained command and control during the startup, since the crew, NEs, and observers tended to cluster around the computer terminal when the RPI alarms were received.

c. Conclusion

Control room decorum was good. The operators were concentrating on the control boards and calling out the annunciators.

The control room was congested at times. When there were problems with the RPIs, everyone tended to cluster around the NE at the computer terminal.

The frequent RPI out-of-tolerances and failure of the process computer were a significant distraction to the crew during the startup.

O1.4 Auxiliary Steam Inadvertently Cross-Tied to Service Air

a. Inspection Scope (71707)

On August 15, the auxiliary steam system was inadvertently cross-tied to the service air (SA) system when a valve was overlooked during a partial removal of an out-of-service (OOS) on the auxiliary steam system. The inspectors interviewed operations and maintenance personnel reviewed the OOS and work request (WR) package, and performed an inspection of the OOS error.

b. Observations and Findings

When the OOS was placed for the auxiliary boiler, the WR package directed the mechanics to connect a hose from service air to valve, OAX321, "Auxiliary Steam Main Header Drain Valve," to facilitate cooling down the system's piping. However, the WR failed to direct the removal of the hose after the work was completed.

On August 15, operations personnel partially cleared the OOS of the auxiliary boiler system to facilitate generation of boric acid for the upcoming Unit 1 outage. In preparation, operations personnel failed to include valve OAX321. The inspectors noted that a contributing factor for this error was that the valve was not identified on the print. However, the valve was listed on the original OOS as an open valve with its end cap removed, and this valve did not require an OOS card according to the OOS. Subsequent to partially clearing the OOS and valving in the steam supply to the header, the control room was informed that there was water in the SA system. An equipment operator (EO) was dispatched and he identified that the hose was still connected between the two systems which allowed steam into the SA system. The EO immediately removed the hose and the control room notified plant personnel, via the paging system, not to use SA due to the cross-tie error.

The SA system low point drains were opened to remove any moisture; approximately 55 gallons of water was drained from the SA system. Instrument air (IA) lines were checked for water; no water was found in any of the IA lines. However, it was later identified that radiation protection technicians while performing a filter changeout on radiation monitor 1RIA-PR49, the Unit 1 vent stack monitor, saturated the radiation monitor with service water while purging the radiation monitor with SA. The technicians believed that the SA system had been purged of service water when it had not been purged. This error was due to miscommunication. The radiation monitor was appropriately declared inoperable by operations.

Additionally, corrective actions included:

1. Providing station direction to comply with the temporary alteration program.

2. Adding valve, OAX321, to the piping and instrumentation drawing and station operating procedures.

3. Verifying labelling on OAX321 is accurate.

4. Providing direction to the work analysts to obtain engineering's input for the installation of a cross-tie between systems and assuring that work instructions (including signatures for the cross-tie installation and removal steps) or a temporary alteration is used for the installation of the cross-tie.

c. Conclusion

The inspectors concluded that the following items contributed to this event: 1) operator error when partially clearing the OOS; 2) failure of the work package to specify the hose's removal as required by station procedures; and 3) miscommunications among radiation protection personnel.

O1-5 Overflow of the OB Lake Discharge Tank (LDT)

a. Inspection Scope (93702)

On August 16, an operator failed to close OWD-0018, the "OB LDT Inlet Isolation Valve," which resulted in another operator overflowing the OB LDT. Approximately 7000 gallons of slightly contaminated water was pumped onto the floor at the 542' level of the auxiliary building (AB). The inspectors interviewed personnel involved in this event; walked down the rad waste panel, the waste gas and boron recovery panel, and the 542' level of the AB; and inspected the LDT inlet isolation valve.

b. Observations and Findings

On the day of the event, both the OA and OB LDTs were already full. The LDTs have a total capacity of 30,000 gallons with overflow alarms set at the level corresponding to 27200 gallons. Because the LDTs were already full, the overflow annunciators were in the alarm position for both tanks. Therefore, adding additional water would not cause an alarm. The radwaste department, knowing the tanks were full, had planned to release the LDTs to the lake on Saturday morning, August 17.

In preparation for the release, the day shift operator had performed SOI-67F1, Section 5.2, "Recirculating for Sampling, " Step 1, which was to verify that OWD-0118, "Lake Discharge Tank Inlet Isolation Valve," was closed and locked. Procedure SOI-67F1 is a mandatory, in-hand procedure; however, the operator did section 5.2 from memory. When interviewed the operator stated that he was sure he closed the valve because the valve stem was down. Therefore, assuming the valve was closed, the operator locked the valve.

On the next shift, a different operator (night shift) performed SOI-36M, "Discharge Blowdown Monitor Tanks to Holdup Tanks," Section 5.1, Step 10, which was "verify locked OWD-0018." The night shift operator noted that the inlet valve appeared closed by observing the stem position and that there was a lock on the valve. The procedure did not require the operator to physically verify the valve position.

The night shift operator started the OA radwaste pump to pump from the blowdown monitor tanks to the hold up tanks (HUTs). However, valve OWD-18 was partially open, so two flow paths were created instead of one: one flow path was from the BDT to the HUT, while the other flow path was from the BDT to the LDT. The operator went to verify level on the HUT level gauge, 1LVS-190, located on the waste gas and boron recovery panel

in Unit 2. When the operator returned to the rad waste panel, he received a call from another operator reporting water on the floor of the AB 542' level. The operator then secured pumping to the HUT.

The addition of water from the blowdown monitor tanks directly to the OB LDT invalidated previous sampling of the OB LDT by the chemistry department, which had been required prior to the scheduled release. Therefore, the operator re-performed SOI-36M and found that the inlet isolation valve to the OB LDT was partially open. The operator repositioned the valve and locked it closed.

c. Conclusion

The inspectors concluded that this event was caused by inattention to detail by non-licensed operators.

This event was of concern for two reasons. First, it was a repeat of a previous event. On January 20, a non-licensed operator overflowed the OB lake discharge tank and caused approximately 560 gallons of slightly contaminated water to backup into various engineered safeguards pump rooms and other auxiliary building spaces. That event was included as an example of an apparent violation in inspection report 295/304-96007. Therefore, corrective actions taken for the January 20 event appeared to be ineffective. Secondly, an inappropriate practice was identified by the licensee of operating with the LDT tank overflow annunciators in the alarm position, which resulted in the second operator having no warning that the tank was being overfilled.

Failure to verify OWD-0118, "Lake Discharge Tank Inlet Isolation Valve," was closed and locked in accordance with SOI-67F1, Step 1, is a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/304-96010-01(DRP)).

An identical event was previously the subject of enforcement action, on August 23, 1996; therefore, this event will be included as an additional example of that violation. The inspectors observed that the response to that violation discussed and adequately addressed the August 16 occurrence. Therefore, no separate response is required for this violation.

O2 Operational Status of Facilities and Equipment

O2.1 2B Emergency Diesel Generator (DG) Improper Independent Verification

a. Inspection Scope (93702)

On July 26, a maintenance engineer identified that the 2B DG air regulator isolation valve to temperature control valve OTCV-SW186 was taken out-of-service in the wrong position. The inspectors reviewed applicable procedures; inspected the valve in the field; and interviewed the assistant operations manager, shift engineer, equipment operators, and the shift engineer responsible for preparing the OOS.

b. Observations and Findings

A maintenance engineer, performing a pre-job walkdown on the 2B DG, identified that the air isolation valve to OTCV-SW186 was open instead of closed. The OOS, No. 960009314, had designated the isolation valve as a closed valve that did not require an OOS card. The inspector's review of the event revealed that the second operator performing independent verification responsibilities did not follow the requirements of procedure ZAP 300-06B, "Equipment Verification," Revision 9. The second operator opened the valve instead of checking it closed as required. The second operator signed the independent verification (IV) that the valve was OOS closed, even though he had not actually performed the IV task.

The inspectors were informed by the second operator that he considered that there was no difference whether he observed or signed the independent verification as the first or second operator as long as he observed the valve position. The inspectors also questioned additional plant personnel on their understanding of ZAP 300-06B. In particular, the inspectors questioned if the operators understood the concept of independent verification. The answers given indicated the concept of independent verification was understood.

Corrective actions taken by the licensee included: 1) the operators were instructed by operations management personnel that independent verification of OOSs was to be done by the verifying operator after the operator hanging the OOS had left the area; 2) shift management reviewed the independent verification procedure requirements (ZAP 300-06B, "Equipment Verification") with operations personnel during the shift briefing; and 3) a standing order was issued that stated that OOSs would normally be done with the original OOS copy in the field and independent verification would be done with the original OOS copy after the first person had returned to the control room after completing the initial task for the OOS.

c. Conclusion

The inspectors concluded that the second operator did not understand ZAP 300-06B requirements for independent verification. The failure to properly independently verify the air regulator isolation valve to valve OTCV-SW186, as required by ZAP 300-06B is a violation of 10 CFR 50, Appendix B, Criterion V. However, this violation was identified by the licensee and could not have been reasonably prevented by the licensee's corrective action for a previous violation or a previous licensee finding that occurred within the past two years. Therefore, this licensee-identified and corrected violation is being treated as a Non-cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-304-96010-02(DRP)).

The inspectors also concluded that the maintenance engineer did a good job in identifying the mispositioned valve when he performed a routine walkdown of the OOS prior to the performance of scheduled work.

03 Operations Procedures and Documentation

03.1 New Fuel Assembly Shipping Container Dropped

a. Inspection Scope (93702)

While performing fuel assembly receipt inspection on July 30, the end of a shipping container containing two new fuel assemblies was inadvertently dropped approximately two inches. The inspectors discussed the incident with the fuel handling supervisor, the nuclear material custodian (NMC), a RP technician, and Westinghouse's representative. The inspectors also observed use of a new procedure step to lift the fuel assemblies after the incident and discussed the process with various fuel handlers (FHs).

b. Observations and Finding

On July 30, FHs were using Fuel Handling Instruction, FHI-02, "Handling of Shipping Containers and Site Removal of New Fuel Assemblies From Shipping Containers and Inspection of New Fuel," Revision 2, to prepare new fuel assemblies for receipt inspection. One end of a shipping container, which held two new fuel assemblies, was being raised using a nylon sling to allow the lateral lock tubes, at the one end of the shock mounted frame, to be telescoped into their support housings to facilitate the raising of the shipping container to a vertical position. The two inch wide nylon sling being used for the lift slipped off a three inch wide edge on the shipping container which caused it to fall approximately two inches. The nuclear material custodian (NMC) immediately stopped the evolution. Accelerometers affixed to the new fuel assemblies during transportation showed no excessive motion.

Westinghouse personnel documented in Field Anomaly Report 0-8G-02 that the two new fuel assemblies were not damaged. The licensee subsequently revised FHI-02 to require the use of two eyelets, located on the end of the shipping container, to attach the slings to the crane hook. Another option given in the revised procedure was to use a hydraulic jack for the lift.

Although there was no prior history of the occurrence of this type of incident, the inspectors observed that the rigging method did not use the readily available techniques that the revised procedure subsequently included.

Using the revised procedural rigging method, the shipping container was lifted by the attachment of slings to the two eyelets with shackles. Following the placement of the lateral lock tubes, the cradle was tilted upright from the other end, and the new fuel removed and placed over the new fuel storage area for visual inspection.

c. Conclusion

The licensee concluded that the cause of the event was an inadequate rigging step in the procedure. The licensee took immediate corrective action by revising the procedure. The inspectors considered that these actions were appropriate.

Fuel Handling Instruction, FHI-02, "Handling of Shipping Containers and Site Removal of New Fuel Assemblies From Shipping Containers and Inspection of New Fuel," Revision 2, Step 9, required that the fuel handling crew lift the one end of the shock mounted frame slowly with the overhead crane and a minimum rated two ton nylon sling, until the lateral lock tubes slide into their support housing. Failure to have an adequate rigging step in FHI-02, Step 9, that was not appropriate to the circumstances, which resulted in fuel handling personnel inadvertently dropping two new fuel assemblies is a violation of 10 CFR 50, Appendix B, Criterion V (50-295/304-96010-03(DRP)).

The inspectors concluded that the NMC showed conservative decision making when he stopped the evolution.

O8 Miscellaneous Operations Issues

O8.1 (Open) NUREG-0737, Item III.D.3.4, Control Room Habitability: This item was discussed in inspection reports: 90013/90015, 91027, and 92004. The licensee performed leakage testing in 1991 following modifications to the ventilation system in response to a 1986 event. The testing resulted in unacceptable inleakage (LER 91007-01) which prompted further repairs and another leakage test in 1992. The licensee submitted a re-analysis of control room habitability to the NRC in September 1993 using these latest test results.

As of August 22, 1996, this analysis remains under NRR review. Pending NRR's final review and approval of the latest 1992 reanalysis including the control room inleakage testing frequency, this issue will be an inspection follow-up item (50-295/304-96010-04(DRP)).

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62703)

The inspectors observed portions of the work associated with WR 960063817, "DG 1B Jacket Water Cooler Cleaning and Inspection;" WR 960063813, "DG 1B-1 Intake Air Intercooler Inspection;" and WR 960012091, "DG 1B Jacket Water M/U Isolation Valve Replacement."

b. Observations and Findings

The inspectors determined that the work request packages provided proper instructions to perform the work and that craft personnel were knowledgeable of their assigned tasks.

c. Conclusion

The inspectors observed that the above maintenance activities were properly performed.

M1.2 Scaffold Obstructing Operation of 1B Containment Spray (CS) Pump Discharge Valve

a. Inspection Scope (62703)

On August 5, the inspectors identified that a scaffold around the 1B CS pump was obstructing operation of valve CS0004, "1B CS discharge valve." The inspectors interviewed the site construction superintendent and reviewed the scaffold inspection procedure, ZAP 900-20, "Use of Scaffolding and Ladders" and form.

b. Observations and Findings

On April 24, contractors erected a scaffold around the 1B CS pump in preparation for valve testing. On August 5, the inspectors identified that the scaffold was in the path of the handwheel of valve, CS0004. The valve could not be manually operated due to the close proximity of the scaffold.

The inspectors informed on-shift operations personnel of the scaffold deficiency; the licensee initiated timely and effective corrective actions to remove the deficient condition by modifying the scaffold. In addition, on August 6, the licensee and contractors stopped all scaffold erection and walked down all existing scaffolds in the plant. The licensee identified five additional scaffolds which could interfere with the operation of non-safety related equipment.

On June 17, the licensee identified a scaffold deficiency around the Unit 1 high pressure turbine stop valves. At that time, the licensee informed the contractors of the scaffold interference issue and initiated a procedural revision to require an operations' review after the erection of scaffold. In addition, the licensee performed a cursory review of all the scaffold forms and identified no problems.

c. Conclusion

The inspectors concluded that the corrective actions for the June 17 event were inadequate which resulted in the identification of another deficient scaffold on August 5. Failure to take effective corrective

actions to prevent recurrence of a previous condition adverse to quality is a violation of 10 CFR 50, Appendix B, Criterion XVI (50-295-96010-05(DRP)).

M1.3 Inadequate Documentation of As-Found Condition of the 1B Centrifugal Charging Pump (CCP) Shaft Driven Oil Pump

a. Inspection Scope (62703)

On August 16, the inspectors identified that the as-found condition of the 1B CCP shaft driven oil pump was not documented in the work package as required by the work package. The inspector reviewed ZAP 400-02, "Initiating and Processing Work Requests," Revision 8, WR 960036505 02, which had been prepared to inspect and repair the 1B CCP shaft driven oil pump, and interviewed the involved maintenance engineer (ME).

b. Observations and Findings

After reviewing the work package for WR 960036505 02, the inspectors interviewed the ME who was present when the pump was inspected and removed. The ME informed the inspectors that the shaft driven lube oil pump had a missing bottom plate. The ME also commented that the combination of the missing plate, which had orifices that provided a back pressure for the lube oil in the pump internals, and pump wear could have caused degraded performance of the 1B CCP shaft driven pump.

However, the missing plate was not documented by maintenance personnel as part of the as-found condition of the work package. The documented as-found condition stated that "no problems were found during the inspection." In addition, another undocumented as-found condition noted during the inspection was that a flexible hose, which was connected to the lube oil reservoir, was only hand-tight instead of being properly secured.

c. Conclusions

Failure to adequately document the as-found condition of the 1B CCP shaft driven lube oil pump to furnish evidence of activities affecting quality is a violation of 10 CFR 50, Appendix B, Criterion XVII, "Quality Assurance Records."

M1.4 1D Main Steam Isolation Valve (MSIV) Limit Switch Material Condition

a. Inspection Scope (62703)

On August 18, Unit 1 tripped on low low steam generator level when testing the 1D MSIV. The 1D MSIV intermediate limit switch failed to operate properly to prevent more than 10 percent valve closure from fully open. The inspectors responded to the trip and observed the trip

recovery and subsequent post trip review, reviewed the Problem Identification Form (PIF) documenting the limit switch failure, reviewed a list of all valves with similar limit switches in both units, and interviewed the responsible system and maintenance engineers.

b. Observations and Findings

During performance of PT-3D, "1D MSIV Partial Stroke surveillance," the 1D MSIV closed approximately 50-75 percent instead of the required 10 percent closed. As a result, steam generator level decreased to less than its low-low steam generator water level setpoint of 10 percent, which caused a reactor trip and a subsequent turbine trip. The cause of the trip was determined by the licensee to be failure of the intermediate limit switch on the 1D MSIV. The MSIV limit switches were not in the Zion Preventative Maintenance (PM) program and subsequent inspection indicated that the grease in the limit switch had hardened and that the contact resistance was excessive. All four Unit 1 MSIV limit switches were replaced with upgraded Namco switches, prior to Unit 1 startup. The Unit 1 partial stroke surveillance was then successfully performed on all 4 MSIVs.

The MSIV intermediate limit switches are non-safety related switches that perform no safety function. However, the recently installed limit switches have a different alloy material for the cover and O-rings on the screws which should protect the switches in their hostile environment. Additional corrective actions included periodic switch replacement as part of the PM program. Further, a maintenance engineering action plan activity identified a population of switches that have critical control and/or safety functions in the plant; these switches will then be replaced as part of the PM program. Per the action plan, during the Z2R14 outage, Unit 2 MSIV limit switches and other applicable Unit 2 switches will be inspected and or replaced.

c. Conclusion

The inspectors concluded that the root cause of the limit switch failure was insufficient preventive maintenance. The inspectors concluded that the licensee's corrective action plans were adequate.

M8 **Miscellaneous Maintenance Activities**

M8.1 (Closed) Unresolved Item (50-295/94017-01 (DRS)): Effect of corrective actions from the April 1994 fire on the July 1994 fire. The inspectors reviewed the corrective actions following the turbine building generator bus duct fire in April and the effect of these actions on the July fire. The April fire was caused by a cracked generator phase "C" bushing, causing the escape of hydrogen and fire. The July fire was caused by the improper installation and an insufficient number of bus duct ground strap cables following the April fire. The inspectors reviewed the

corrective actions taken as a result of the April fire and determined that they constituted examples of inadequate corrective action as addressed in the December 1994 violation in inspection report 94021.

This item is closed.

III. Engineering

E1 Conduct of Engineering

During this inspection report period an engineering and technical support inspection was also conducted (See inspection report 50-295/304-96011(DRS)).

E2 Engineering Support of Facility and Equipment

E2.1 Inadequate Operability Assessment Performed for Degraded 1B Centrifugal Charging (CCP) Shaft Driven Lube Oil Pump

a. Inspection Scope (37551)

On April 5, an operability assessment, engineering request (ER) No. 9601784, was prepared to determine operability of the 1B CCP Pump with a degraded shaft driven lube oil pump. The inspectors reviewed the operability assessment, and interviewed system and site quality verification engineers.

b. Observations and Findings

On April 5, the system engineer prepared an operability assessment to determine the operability of the 1B CCP because of a degraded shaft driven lube oil pump. The shaft driven lube oil pump could not provide its design lube oil pressure of 10-12 psig.

The operability assessment addressed this deficient condition by stating that the 1B CCP pump was operable provided its associated auxiliary lube oil pump remained operable. The operability assessment action plan addressed the condition by specifying that a caution card be placed on the 1B CCP main control board control switch, to run the auxiliary lube oil pump when running the 1B CCP. On August 7, a site quality verification (SQV) engineer identified a concern with the operability assessment. The operability assessment failed to address that upon the occurrence of a safety injection (SI) signal, that the auxiliary lube oil pump would start and remain running after the SI signal was reset. Upon resetting the SI, the auxiliary lube oil pump would then continuously cycle on and off depending on lube oil pressure. When the pump was off, the 1B CCP would not have adequate oil pressure. Therefore, the SQV engineer considered the 1B CCP inoperable.

After this concern was raised, operations personnel initiated a new caution card that stated to continuously run the 1B CCP's auxiliary lube oil pump. On August 10, the 1B CCP's shaft driven lube oil pump was replaced. The shaft driven oil pump is being evaluated to determine the root cause of the pump's inability to develop design oil pressure.

Subsequently, after the inspector questioned the system engineer about the actual capability of the degraded shaft driven lube oil pump, the system engineer contacted the vendor and was informed that a lube oil pressure of six psig would be sufficient to maintain the 1B CCP's operation. Also, the system engineer researched the auxiliary lube oil pump breaker and determined that repeated cycling would not have tripped off the oil pump breaker unless the cycling was more than three times in one minute.

c. Conclusions

The inspectors agreed that the operability assessment was inadequate; the assessment failed to address the impact of resetting the SI signal on the 1B CCP's auxiliary lube oil pump operation. The inspectors also concluded that operating safety related equipment with degraded support systems over a long period of time (April 5 to August 10) did not demonstrate conservative operation of safety related equipment. Pending further review of the licensee's level 3 root cause analysis, this is an unresolved item (50-295/304-96010-07(DRP)).

E3 **Review of UFSAR Commitments**

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures and/or parameters.

E8 **Miscellaneous Engineering Activities**

E8.1 (Open) Violation 50-295/304-93009-02(DRP): Failure to use appropriate acceptance criteria to ensure that: 1) the ECCS cubicles would be maintained at a negative quarter-inch water pressure with respect to the main auxiliary building; and 2) the main building would be maintained at a negative quarter-inch water pressure with respect to the outside. Previously, the licensee stated that these concerns would be addressed in their improved technical specifications (TS). A review of their proposed TS indicated that the licensee addressed the ECCS cubicles but did not address the auxiliary building. Further review by the inspector indicated that the licensee updated section 9.4.3 of the UFSAR and deleted the ECCS cubicle and auxiliary building acceptance criteria which provided for a negative quarter-inch water pressure. This was

accomplished by a safety evaluation that concluded the change would not constitute an unreviewed safety question. The evaluation did not provide the bases for determining that this change did not involve an unreviewed safety question. Failure to perform an adequate safety evaluation on this issue was the basis for a previous civil penalty (Report Nos. 93009 and 93014). The current issue remains open pending NRR review of the acceptability of the relaxed acceptance criteria.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Unit 2 Refueling Outage Planning

a. Inspection Scope (83750)

The inspectors reviewed the licensee's planning for the Unit 2 refueling outage (Z2R14, September 14 - November 4, 1996). The inspectors reviewed radiation work permits (RWPs), As Low As Reasonably Achievable (ALARA) plans, and dose estimates for several planned outage activities. In addition, the inspectors reviewed the licensee's progress in reducing the number of cobalt containing valves.

b. Observations and Findings

The licensee dedicated additional ALARA planners to the site construction staff to prepare ALARA plans and to provide additional ALARA oversight. The ALARA planners were assembling job histories for the 35 construction jobs with the highest estimated dose and were preparing ALARA plans for these tasks. The ALARA plans contained information from industry experience and the station's historical performance information. The ALARA planners also stressed the use of training mockups and simulations to reduce worker exposures. In addition, the licensee had assured that the 12 cobalt containing valves which were planned to be worked on during the outage were rebuilt using non-cobalt containing components.

The inspectors reviewed the ALARA plan and RWPs for the construction of scaffolding in the auxiliary building (AB) and reactor containment. The ALARA plan was comprehensive, documenting good historic information, good radiation protection (RP) practices, and RP hold points. However, the inspectors observed that the licensee's procedures and program did not recognize the ALARA plan. The licensee did not have a formal process to assure that information and RP requirements contained in the ALARA plan were included in RWPs. The health physics supervisor indicated that the ALARA plan was a program enhancement and that the licensee planned to revise RWPs, as applicable, to contain significant instructions developed in the ALARA plans.

The ALARA planners indicated that job history files had a number of weaknesses. For example, lessons learned from previous outages (i.e.

1995 Unit 1 refueling and 1996 Unit 1 maintenance outage) were not well documented. The RP evaluations of the outage were informal. The ALARA staff planned to improve the job history files via a computer based approach. The licensee expected this system to provide better accessibility and more comprehensive job files. The licensee also planned to use separate RWPs for emergent and re-work dose to better account for the dose expended.

c. Conclusion

The licensee dedicated additional resources to improve RP ALARA planning of work activities for the site construction staff. ALARA plans for site construction activities were well prepared and contained good radiation protection hold points and information. However, the ALARA plans had not been incorporated in the licensee's procedures to ensure that significant RP requirements were reflected in RWPs.

R2 Status of RP&C Facilities and Equipment

R2.1 Air Sampling Instrumentation

a. Inspection Scope (83750)

The inspectors toured the radiologically restricted area and reviewed the licensee's use of portable air sampling equipment.

b. Observations and findings

The inspectors verified that air samplers were calibrated to ensure that flow measurements were accurate. However, the inspectors noted that the exhaust port for the air sampler in the fuel handling building (FHB) was located in close proximity to the sampler inlet. The inspectors identified that exhausted, filtered air was cycling back into the inlet and diluting the air sample. Subsequently, the licensee installed a diffuser on the exhaust port to correct the problem and reviewed other sampling equipment to ensure a similar situation did not exist. Although the air sampler was not required by Technical Specifications (TSs) nor the Offsite Dose Calculation Manual (ODCM), the licensee used the sampler to monitor the contribution of radioactive particulates and iodines from the FHB to the AB ventilation system.

c. Conclusion

The potential dilution of air samples indicated a weakness in the identification of problems by the RP personnel, who are responsible for establishing the air sampler, and the chemistry personnel, who are responsible changing the filters.

R3 Radiological Protection and Control Procedures and Documentation

R3.1 Radiation Procedure Weakness for Assuring Surveillance Requirements Are Met

a. Inspection Scope (83750)

On July 26, a system engineer generated a station deficiency report for not meeting the TS, when a radiation monitor was inoperable. The inspectors interviewed system engineering, radiation protection, and regulatory assurance personnel. The inspectors also reviewed the TSs and other appropriate procedures.

b. Observation and Findings

Radiation monitor, 2R-AR03, "High Containment Radiation," was taken out of service to effect repairs to inadequate wiring. The radiation monitor is one of two containment high radiation monitors; the other redundant radiation monitor is 2R-AR02 and it was available. With 2R-AR03 inoperable, TS Table 3.14, "Radiation Monitoring Instrumentation", Action Statement 31, required that an alternate method of monitoring containment be initiated within 72 hours. Radiation protection procedure, ZRP 5820-12, "Out of Service Surveillance for Radiation Monitors," Revision 5, was used to implement the requirements of the TS Table 3.14. The procedure was inadequate in that it specified that no routine surveillance was required. However, the redundant radiation monitor, 2R-AR03, was available and provided an alternate method of sampling containment; therefore, the TS action statement requirement was met.

During the exit meeting, the new radiation protection supervisor stated that the requirements of TS Table 3.14 were met by operability procedure, ZODM-AR, "Area Radiation Monitoring," Revision 5. The inspectors noted that Procedure ZODM-AR required for an inoperable monitor that an alternate method of monitoring containment be accomplished within 72 hours; which is the same requirement as the TS. However, the ZODM does not specify how to implement this action. Procedure, ZAP 5820-12, stated that the use of this procedure was to accomplish any applicable requirements of the TS and offsite dose calculation manual, but did not require containment monitoring within 72 hours for an inoperable radiation monitor. Therefore, as noted above ZAP 5820-12 and ZODM-AR were inconsistent.

c. Conclusion

The inspectors concluded that the TS action statement was met when 2R-AR03 was inoperable; however, Procedure ZAP 5820-12 was inadequate in that it incorrectly stated no action was required for the inoperability of 2R-AR03. This is a violation of 10 CFR 50 Appendix B, Criterion V (50-295/304-96010-09(DRP)).

R4 **Staff Knowledge and Performance in RP&C**

R4.1 RP Oversight of New Fuel Shipments

a. Inspection Scope (83750)

The inspectors observed preparation for the receipt of a shipment of new fuel in the FHB.

b. Observation and Findings

All personnel were wearing the correct dosimetry as required by procedures. Additionally all personnel, including two radiation protection technicians (RPTs), covering the evolution, were staged in low dose areas of less than 1 mrem/hr. However, the inspectors noted that personnel were spending an excessive amount of time in the FHB, while waiting for support from operations' personnel. About one hour later, the individuals left the area and determined that operations' personnel were working on a necessary procedure revision.

c. Conclusion

Although the persons were waiting in a low dose area, the lack of coordination indicated poor planning and communications prior to entering the radiologically posted area.

R8 **Miscellaneous RP&C Issues**

R8.1 (Open) Violation 50-295/304-95018-01: failure to adequately don protective clothing and to prevent the spread of contamination as required by RP procedure ZRP 500-7, "Unescorted Access To and Conduct in Radiological Posted Areas." The licensee reviewed the violation with RP and maintenance staff members to assure their understanding of proper radiation worker (radworker) practices. In addition, the licensee's corrective actions included additional training of RP, maintenance, and contractor personnel and revising RP procedure, ZRP 500-7. The inspectors reviewed the licensee's progress in completing the remaining corrective actions:

- The licensee had begun training first line RP and maintenance supervisors to improve their understanding of management expectations and oversight skills. The licensee had all applicable personnel scheduled for training through November 1996.

- The inspectors also reviewed the enhanced radworker training presented to maintenance personnel. The training was comprehensive and included both classroom and workshop instructions. During this inspection, the licensee was in the process of expanding its initial nuclear general employee training (NGET) to include the topics of the enhanced training, including contamination control techniques. The training staff indicated that the

revised NGET would assure that contract personnel hired for Z2R14 would receive radworker training at the depth of the enhanced training.

- The inspectors also reviewed a draft revision of ZRP 500-7, which provided instruction to personnel regarding removing items from contaminated areas and contamination control techniques. The inspectors verified that the above training was consistent with the licensee's RP procedures. Once personnel were trained on the revision, the licensee planned to approve the procedure.

This violation will remain open pending the completion of training, the revision of ZRP 500-7, and the observations of radworker performance during the 1996 Unit 2 re-fueling outage.

S1. Conduct of Security and Safeguards Activities

S1.1 (CLOSED) Temporary Instruction 2515/132, "Malevolent Use of Vehicles at Nuclear Power Plants"

a. Inspection Scope (TI 2525/132)

The inspectors examined the licensee's provisions for land control measures to protect against the malevolent use of a land vehicle to determine compliance with regulatory and licensee commitments.

b. Observations and Findings

(1) Vehicle Barrier System (VBS)

The inspector found that the features and structures that form the VBS met the design characteristics established by the NRC. The vehicle barrier components and the location of the barrier were as described in the revised summary description of the VBS submitted by the licensee to the NRC in February 1996.

A visual walkdown performed by the inspector confirmed that the general type of vehicle barrier described in the VBS summary description had been installed and that the barrier was continuous.

(2) Bomb Blast Analysis

Inspector field observations of standoff distances were consistent with those documented in the summary description. The licensee confirmed that calculation of minimum standoff distance was based on NUREG/CR-6190 or an independent engineering analysis.

(3) Procedural Controls

The licensee appropriately defined criteria for maintenance, surveillance, and compensating for the VBS system in Corporate Nuclear Security Guideline No. 4, "Operational Planning and Maintaining Integrity of Vehicle Barrier Systems (VBS)," Revision 0, dated February 1996.

Discussions with security management confirmed that procedures necessary to safely shutdown the units after a bomb blast were reviewed and found adequate.

c. Conclusion

The licensee's provisions for land vehicle control measures met regulatory requirements and licensee commitments. The VBS program was consistent with the summary description submitted to the NRC and adequate procedures addressing VBS maintenance and compensatory procedures were developed and implemented.

XI Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on August 29, 1996. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. Schwartz, Station Manager
W. Stone, Regulatory Assurance Supervisor
B. Fitzpatrick, Operations Manager
B. Giffin, Engineering Manager
K. Hansing, Site Quality Verification Director
W. Strodl, Radiation Protection Supervisor
D. St. Clair, Work Control Manager
M. Weis, Services Director

NRC

L. Miller, Chief, Reactor Projects Branch 4
R. Westberg, Senior Resident Inspector

IDNS

J. Yesinowski

List of Inspection Procedures Used

IP 37551	Engineering
IP 62703	Maintenance Observation
IP 71707	Plant Operations
IP 71715	Sustained Control Room Observation
IP 83750	Occupational Radiation Exposure
IP 93702	Prompt Onsite Response to Events at Operating Power Reactors
TI 2515/132	Malevolent Use of Vehicles at Nuclear Power Plants

List of Items Opened, Closed, and Discussed

Opened

50-295/304-96010-01(DRP)	VIO failure to follow procedures which resulted in overflowing the OB LDT. No response required
50-304-96010-02(DRP)	NCV failure to properly independently verify DG air regulator isolation valve
50-295/304-96010-03(DRP)	VIO failure to have an adequate procedure for rigging of new fuel containers
50-295/304-96010-04(DRP)	IFI testing of the control room ventilation system
50-295-96010-05(DRP)	VIO inadequate corrective actions taken to assure procedures were followed for scaffold interferences
50-295/304-96010-06(DRP)	VIO failure to document all as-found discrepancies during the inspection of the 1B CCP pump
50-295-96010-07(DRP)	URI inadequate operability assessment for 1B CCP
50-295/304-96010-08(DRP)	NCV failure to assure that radiological postings were conspicuous in accordance with 10 CFR 20.1902
50-295/304-96010-09(DRP)	VIO Procedure ZAP 5820-12 was inadequate in that it incorrectly stated no action was required for the inoperability of 2R-AR03.

Closed

50-295/304-96010-02(DRP)	NCV failure to properly independently verify DG air regulator isolation valve
50-295/304-96010-07(DRP)	NCV failure to assure that radiological postings were conspicuous in accordance with 10 CFR 20.1902
50-295/94017-01(DRS)	URI effects of corrective actions from April/July 1994 fire

Discussed

50-295/304/93009(DRP)	VIO failure to use appropriate acceptance criteria

List of Acronyms

AB	Auxiliary Building
ALARA	As Low As Reasonably Achievable
CCP	Centrifugal Charging Pump
CS	Containment Spray
CT	Chemistry Technician
DG	Diesel Generator
EO	Equipment Operator
ER	Engineering Request
FH	Fuel Handling
FHB	Fuel Handling Building
IFI	Inspection Followup Item
IP	Inspection Procedure
IR	Inspection Report
IV	Independent Verification
LDT	Lake Discharge Tank
ME	Maintenance Engineer
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NE	Nuclear Engineer
NGET	Nuclear General Employee Training
NMC	Nuclear Material Custodian
NRC	Nuclear Regulatory Commission
NSO	Nuclear Station Operator
ODCM	Off-site Dose Calculation Manual
OOS	Out of service
PDR	Public Document Room
PIF	Problem Identification Form
QNE	Qualified Nuclear Engineer
RMO	Reactivity Management Oversight
RP	Radiation Protection
RP&C	Radiological Protection and Chemistry
RPI	Rod Position Indicator
RPT	Radiation Protection Technician
RWP	Radiation Work Permit
SA	Service Air
SI	Safety Injection
SQV	Site Quality Verification
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VBS	Vehicle Barrier System
VIO	Violation
WR	Work Request