U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/94008(DRP)

Docket No. 50-255 License Nos. DPR-20

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Facility

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: May 10 through June 30, 1994

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7/14/94
Date

Inspection Summary

Inspection from May 10 through June 30, 1994; Report No. 50-255/94008(DRP)
Areas Inspected: Routine, unannounced safety inspection by resident and regional inspectors of actions on previous inspection findings, operational safety verification, NRC Restart Team, engineered safety feature systems, onsite event follow-up, current material condition, housekeeping and plant cleanliness, radiological controls, safety assessment and quality verification, maintenance, surveillance, engineering and technical support, dry fuel storage activities, and review of licensee reports.

Results: Within the 13 areas inspected, no violations or deviations were identified in 12 areas. One violation was identified in the remaining area (paragraph 6.a). Two Unresolved Items were identified that pertained to containment closeout (paragraph 3.f) and a control rod interlock surveillance (paragraph 5.b).

The following is a summary of the licensee's performance during this inspection period:

Plant Operations

As a result of the extensive amount of time the plant was shutdown and the concerns expressed by the Diagnostic Evaluation Team (DET) in the area of operations, the NRC assembled a restart team to assess the readiness of the operations department to restart the plant. Operators on several shifts were observed prior to and during plant startup. Overall performance was satisfactory; some specific concerns included the lack of an effective containment closeout program and the informal review of plant checklists following changes.

The inspector reviewed the licensee's inspection and maintenance results for components involved in heavy load lift applications for the dry fuel storage project. The inspector identified no significant problems.

On June 20, 1994, the licensee commenced Dry Fuel Storage activities by loading spent fuel assemblies into the multi-assembly sealed basket (MSB). Dry Cask loading activities are scheduled to be accomplished over the next five months, with completion scheduled in November 1994.

Safety Assessment/Quality Verification

A management advisory group, consisting of four senior nuclear executives, performed an independent assessment of Palisades during the week of June 20, 1994. Management oversight was also provided during the plant startup for critical evolutions and throughout power escalation.

Maintenance and Surveillance

The licensee's performance in this area was adequate. A surveillance test in hot shutdown required withdrawing a control rod less than two inches. This is considered an unresolved item pending further review by the NRC into whether or not the withdrawal of a control rod (less than two inches) constitutes a mode change.

Troubleshooting of High Pressure Safety Injection (HPSI) pump P-66A was observed after the pump failed to meet minimum flow requirements. Although no definitive root cause was identified, the licensee thoroughly explored the possible causes and instituted frequent testing to verify operability. No problems have been observed to date.

Engineering and Technical Support

The licensee's performance in this area was less than adequate. A violation was issued involving the failure to test the spent fuel pool crane using the correct interlock bypass keys. Post-modification testing failed to detect that the interlock bypass keys on the spent fuel pool crane control box were miswired.

DETAILS

1. Persons Contacted

Consumers Power Company

*R. A. Fenech, Vice President, Nuclear Operations
*T. J. Palmisano, Plant General Manager
*J. W. Muffet, Nuclear Engineering & Construction Manager
*W. F. Peabody, NECO Manager (Interim)
*R. D. Orosz, Director, NOD Services
*R. M. Swanson, Director, NPAD
*D. D. Hice, Nuclear Training Manager
*S. Y. Wawro, Acting Operations Manager
*D. W. Rogers, Safety & Licensing Director
*R. B. Kasper, Maintenance Manager
*R. C. Miller, System Engineering Manager
K. M. Haas, Radiological Services Manager
*C. R. Ritt, Administrative Manager
*J. C. Griggs, Human Resource Director
*H. A. Heavin, Controller
*M. A. Savage, Corporate Communications
D. G. Malone, Shift Operations Superintendent
*D. J. Malone, Radiological Services Supervisor
*J. H. Kuemin, Licensing Administrator

Nuclear Regulatory Commission (NRC)

W. J. Kropp, Reactor Projects Section Chief
*M. E. Parker, Senior Resident Inspector
*D. G. Passehl, Resident Inspector
J. H. Neisler, Reactor Inspector
J. L. Hansen, Reactor Examiner/Inspector
C. N. Orsini, Reactor Engineer

*Denotes those attending the exit interview conducted on June 30, 1994.

The inspectors also had discussions with other licensee employees, including members of the technical and engineering staffs, reactor and auxiliary operators, shift engineers and electrical, mechanical and instrument maintenance personnel, and contract security personnel.

2. Action on Previous Inspection Findings (92701)

a. (Closed) Inspection Followup Item (255/91019-19(DRS): The battery charger rating exceeded the de-rated ampacity of the charger input and output cables under certain conditions. The inspector reviewed the results of the licensee's ampacity study. The cables were instrumented in the trays with the greatest amount of cable where the highest temperatures were expected to occur. Approximately full charger load was applied for nine hours until cable temperatures reached equilibrium. Cable temperatures at

full load were well below the cable design temperature of 90° C. Also, battery charger loads were well below the rated loads for the chargers. This item is closed.

b. (Closed) Inspection Followup Item (255/91019-23(DRS) and (255/92015-02(DRP): The EDSFI team questioned the ability of the Emergency Diesel Generator (EDG) room heating ventilation and air conditioning (HVAC) system to maintain room temperature below 104° F with only one of two fans fed from class 1E power. The inspector confirmed by review of completed modification FC-939 and applicable revised electrical drawings that the EDG room HVAC had been modified so that all four EDG room fans were powered from Class 1E sources. This item is closed.

c. (Closed) Inspection Followup Item (255/91019-24(DRS): Ability of emergency diesel generator exhaust system to function after an earthquake. The EDSFI team questioned the lack of a documented anchoring design for the exhaust system including the mufflers whose anchor bolts were found to be cut off. The inspector reviewed licensee's specification change SC-92-079 with stress package 07003, DG Exhaust Piping Support Modification, that documents the piping, including muffler, system stress analysis, and seismic support design. The inspector's walkdown of the diesel exhaust system confirmed that the supports had been installed according to drawings and that the mufflers' restraints were in place. This item is closed.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

3. Plant Operations (71707, 93702)

The plant was taken critical and synchronized to the grid on June 18, 1994, after an extensive forced outage that began on February 17, 1994. Several significant issues were identified during the forced outage with most findings and issues raised during the Diagnostic Evaluation Team (DET) visits in March and April 1994. DET and license identified issues that required resolution prior to plant restart were properly addressed.

On June 20, 1994, the licensee commenced Dry Fuel Storage activities by loading spent fuel assemblies into the multi-assembly sealed basket (MSB). The licensee currently anticipates loading 11 casks this year. Two casks were previously loaded in 1993. Each cask can accommodate up to 24 spent fuel assemblies. Dry Cask loading activities were scheduled to be accomplished over the next five months with completion scheduled in November 1994.

a. Operational Safety Verification (71707)

The inspectors verified that the facility was being operated in conformance with the license and regulatory requirements and that

the licensee's management control system was effective in ensuring safe operation of the plant. On a sampling basis, the inspectors verified proper control room staffing and coordination of plant activities; verified operator adherence with procedures and technical specifications; monitored control room indications for abnormalities; verified that electrical power was available; and observed the frequency of plant and control room visits by station management. The inspectors reviewed applicable logs and conducted discussions with control room operators throughout the inspection period. The inspectors observed a number of control room shift turnovers. The turnovers were conducted in a professional manner and included log reviews, panel walkdowns, discussions of maintenance and surveillance activities in progress or planned, and associated LCO time restraints, as applicable.

The inspectors made the following observations with regard to plant activities:

- Personnel on several shifts were observed with no actual or perceived schedule pressure identified. Pre-job briefings and shift turnover meetings were adequate.

- Several plant evolutions were observed having adequate supervisory oversight. Shift supervisors were observed not to be overburdened with collateral duties.

- Operator logs were checked for several crews on several days. One concern was identified with the completeness of auxiliary operator log sheets. Several items were circled as being out of the specified range but were not explained or discussed in the "comments" section as required by a NOTE on the individual log sheets.

- A condensate pump recirculation valve (FV-0730) did not open during the condensate pump start due to the air to the valve being secured. The condensate system valve lineup checklist had been completed, but this valve had been left off of the checklist.

In response to the above items, the licensee evaluated the conditions and took appropriate action.

b. NRC Restart Team

As a result of the extensive amount of time the plant was shutdown and the concerns expressed by the Diagnostic Evaluation Team (DET) in the area of plant operations, the NRC assembled a restart team. The purpose of the team was to assess the readiness of the operations department to restart the plant and to directly observe restart activities. The team made extensive observations of operations activities for a two week period prior to bringing the

plant on-line. This included overviewing activities performed around the clock. Specific activities observed included: valve lineup checks, plant walkdowns, startup surveillances, maintenance activities, equipment protective tagging, operability and reportability determinations, shift briefings, shift turnovers, pre-job briefings, rod manipulations, approach to critical, criticality, turbine generator synchronization, and power escalation.

Specific weaknesses or areas of concern identified by the DET that were reviewed by the team included the following:

- Poor planning and direction by operations department management
- Poor onshift supervisory oversight
- Low performance expectations
- Repetitive protective tagging problems
- Operations department poorly supported by licensing and engineering
- Weak self assessment and corrective action

The inspectors generally found that the licensee had taken action or initiated steps to address the DET's concerns. In the area of operability determinations, the licensee had implemented a completely new program. Extensive management oversight was provided throughout the plant startup. Specific areas of concern are addressed in this inspection report. Overall, the team concluded that the licensee had a successful startup.

c. Engineered Safety Feature (ESF) Systems (71707)

During the inspection period, the inspectors selected accessible portions of several ESF systems to verify status. Consideration was given to the plant mode, applicable Technical Specifications, Limiting Conditions for Operation requirements, and other applicable requirements.

Various observations, where applicable, were made of hangers and supports; housekeeping; whether freeze protection, if required, was installed and operational; valve position and conditions; potential ignition sources; major component labeling, lubrication, cooling, etc.; whether instrumentation was properly installed and functioning and significant process parameter values were

consistent with expected values; whether instrumentation was calibrated; whether necessary support systems were operational; and whether locally and remotely indicated breaker and valve positions agreed.

During the inspection, the accessible portions of the following systems were walked down:

1) Containment

2) Low Pressure Safety Injection, Train A and B

3) High Pressure Safety Injection, Train A and B

4) Auxiliary Feedwater, Train A and B

5) Emergency Diesel Generator, Train A and B

The following items were identified during the walkdowns:

- Several bearing cooling water valves (MV-FW140, MV-FW142, MV-FW144, and MV-FW146) for auxiliary feedwater pump P-8B were not included on CL No. 12.5, "Auxiliary Feedwater System Checklist (Except K-8 Steam Supply)." The licensee confirmed that these valves were covered under CL No. 12.6, "P-8B Steam Supply Checklist."

- The inspector identified that the chemical addition tank T-35 to auxiliary feedwater pump P-8C discharge valve MV-FW249 should have been closed per CL 12.5 but was open. This deviation was approved by the shift supervisor because this valve needs to be open to add chemicals during start-up.

- There was a concern regarding the review of changes to the plant checklists. The licensee requires the Plant Review Committee to review all procedure changes, but not changes made to checklists. It appears that the checklists, which are an integral part of procedures, are not subject to the same controls as procedures. The licensee has agreed to evaluate this concern.

d. Onsite Event Follow-up (93702)

During the inspection period, the licensee experienced several events, some of which required prompt notification of the NRC pursuant to 10 CFR 50.72. The inspectors pursued the events onsite with licensee and/or other NRC officials. In each case, the inspectors verified that any required notification was correct

and timely. The inspectors also verified that the licensee initiated prompt and appropriate actions. The specific events were as follows:

1) On May 23, 1994, while performing a special test on the service water system, the as-found flows to the two control room heating, ventilation, and air conditioning (HVAC) coolers was less than the minimum required flow. The coolers were designed to provide cooling to control room equipment and personnel during accident conditions. The plant accident analyses required 46 gallons per minute at 81.5 degrees F. to each cooler.

   The measured flow for the two coolers was 45 gallons per minute and 44 gallons per minute. All other flow requirements for the service water system were measured satisfactorily. Upon disassembly of the condenser, the licensee discovered that gasket material used to channel flow through the six-pass condenser had blocked some of the inlet and outlet flowpaths in the condenser. Plant workers removed the gaskets from both end bells of the condenser and installed new gaskets and retested the system. Service water flows through the coolers increased approximately 35 percent, exceeding minimum design requirements. The licensee's corrective actions for this event will be assessed during the review of the associated Licensee Event Report.

2) On May 30, 1994, the licensee identified a potential containment sump blockage caused from signs, adhesive labels, and tape. The inspectors will assess the licensee's corrective action during the review of Licensee Event Report 94-014.

e. Current Material Condition (71707)

The inspectors performed general plant as well as selected system and component walkdowns to assess the general and specific material condition of the plant, to verify that work requests had been initiated for identified equipment problems, and to evaluate housekeeping. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls, or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting.

Some minor material condition deficiencies were identified by the inspectors during plant tours:

1) A funnel and hose routed to a floor drain from 1-1 diesel generator jacket and lube oil cooler service water outlet valves MV-SW-677 and MV-SW-676 had no work request tag and did not appear to be leaking.

2) The inspector identified that pressurizer wide range pressure indicator PI-105D was out of calibration.

3) Several light bulbs for valve position indication on the hot shutdown panel were burned out.

4) Several oil bubblers were dripping oil and other oil leaks existed on equipment in the safeguards equipment rooms. Many of these leaks were not identified with deficiency (CPIT) tags.

5) Service water leaks on containment air coolers VHX-2 and VHX-3 were identified during a containment closeout tour.

In response to the above items, the licensee evaluated the conditions and took appropriate action.

f. Housekeeping and Plant Cleanliness (71707)

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of safety-related equipment from intrusion of foreign matter. The inspectors identified the following concerns:

1) The inspector and an operations department supervisor identified several housekeeping and plant cleanliness deficiencies in containment during a closeout tour on June 5, 1994. The deficiencies were of concern as mechanical maintenance and radiation protection personnel had just informed operations department personnel that the containment was ready for closeout inspection. Among the items found in containment were bags of tools, ladders, flashlights, plastic bags, attachments for various hand power tools, and pieces of debris scattered about on different containment elevations.

Further discussions found that some of the tools were staged for motor-operated valve testing that was to be performed with the unit in Hot Shutdown. This was an apparent miscommunication, since the operations supervisor believed this equipment would be removed from containment until testing was set to start.

The inspector found the licensee's program for performing containment closeout was not fully effective. Although the licensee's checklist 1.3, "250# Heatup Checklist Containment Building," Rev.24, required removal of transient equipment

and other loose material from containment prior to plant startup, there was no mechanism, other than verbal notification to operations department, that other plant departments had the areas clean and ready for containment closeout inspection. The inspectors were concerned with the lack of coordination between station departments during the containment closeout.

This matter is considered an Unresolved Item pending further review by the licensee and the NRC (50-255/94008-01(DRP)). To facilitate timely resolution of this item, the licensee has agreed to respond in writing within 60 days to describe what actions are planned to ensure future containment closeouts will be effective.

2) The cleanliness of the "West" safeguards room was not commensurate with the rest of the auxiliary building, especially in the area of the Shutdown Cooling heat exchangers. Some examples were ladders not secured properly and personnel protective clothing being on the floor and not in the proper storage bag.

g. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc., and randomly examined radiation protection instrumentation for use, operability, and calibration.

One unresolved item was identified. No violations, deviations, or inspection followup items were identified in this area.

4. Safety Assessment/Quality Verification (40500 and 92700)

The inspector noted that a management advisory group, consisting of four senior nuclear executives, was scheduled to perform an independent outside assessment of Palisades' performance progress during the week of June 20, 1994.

Through direct observations, discussions with licensee personnel, and review of records, the following Licensee Event Reports (LER) were reviewed to determine that reportability requirements were fulfilled, that immediate corrective action was accomplished, and that corrective action to prevent recurrence had been or would be accomplished in accordance with Technical Specifications (TS):

(Closed) LER 255/94001: Failure to maintain minimum pressure in the control room with the HVAC system in the emergency mode because the intake plenum was plugged with ice and snow. On January 21, 1994, while the plant was at 100 percent power, operations department personnel were performing monthly surveillance test MO-33, "Control Room Ventilation Emergency Operation," Rev.3, on the "B" train and observed that control

room pressure had dropped to 0.07 inches water gauge (WG) pressure. The procedure requires that control room pressure be greater than or equal to 0.125 WG. The licensee attempted to place both "A and B" trains of control room heating, ventilation, and air conditioning (CR HVAC) systems in the emergency mode and was unable to maintain the 0.125 WG pressure. The licensee declared both trains of CR HVAC inoperable and entered Technical Specification 3.0.3.

Subsequent investigation found that the common intake plenum was clogged with ice and snow. Plant workers removed the ice and snow from the plenum intake screen and control room pressure was restored within a few minutes and the licensee exited Technical Specification 3.0.3.

The inspector found the licensee took appropriate preventive actions. Those actions included changing MO-33 to record control room pressure from once per ten hours to once per hour. In addition, the licensee changed the alarm response procedure to instruct operators to inspect the plenum intake for blockage if control room pressure is low. This item is closed.

(Closed) LER 255/92029: Inadvertent activation of left channel sequencer caused by operator error. On April 4, 1992, an operator opened the output breaker of Diesel Generator (DG) 1-1 without first paralleling the alternate power supply to bus "1C" as required by Standard Operating Procedure 22, Section 7.5.4. This resulted in de-energization of bus "1C," re-closing of the DG 1-1 output breaker, and activation of the Left Channel Normal Shutdown Sequencer. The licensee's corrective actions for this incident were to discuss the importance of procedural compliance with all shifts and to discipline the operator who made the error.

This incident was one of five examples included in a violation issued in Inspection Report No. 50-255/92015 for failure to follow procedures. The generic issue of procedure compliance at Palisades is addressed in the licensee's response to this violation. This item is closed.

(Closed) LER 255/92020: SIS check valve leakage PCVs were not closed by each SIS channel as assumed in analyses. On March 3, 1992, the licensee discovered that four safety injection header pressure control valves (PCVs), which should have each been closed by each safety injection signal (SIS) channel, were arranged with two closed by one SIS channel and two closed by the other. The four PCVs are required to close on an SIS to prevent diversion of high pressure safety injection (HPSI) flow.

This condition had been previously identified in 1988. However, the resolution was to use the normal PCV pressure controllers to assure valve closure rather than to modify the SIS circuitry. These pressure controllers were non-safety/non-environmentally qualified, and therefore cannot be relied upon to ensure that the PCVs remain closed.

In April 1992 the PCV control circuits were modified such that both SIS channels provided a close signal to each PCV. This item is closed.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

5. Maintenance/Surveillance (62703 & 61726)

a. Maintenance Activities (62703)

Routinely, station maintenance activities were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with technical specifications.

The following items were also considered during this review: limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; and activities were accomplished by qualified personnel.

Portions of the following maintenance activities were observed and reviewed:

1) Work Order 24303995: Perform yearly inspection of spent fuel pool crane.

2) Work Order 24410673: Perform miscellaneous mechanical work as directed by Consumers Power Company. This work order was the controlling document used to document various dry fuel storage project preoperational activities (see paragraph 8 of this report).

b. Surveillance Activities (61726)

During the inspection period, the inspectors observed technical specification required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with technical specifications and procedure requirements and were reviewed, and that any deficiencies identified during the testing were properly resolved.

The inspectors also witnessed or reviewed portions of the following surveillances:

1) QO-6, "Cold Shutdown Valve Test Procedure (Including Containment Isolation Valves)," Rev.23

2) QO-19, "Inservice Test Procedure - HPSI Pump and ESS Check Valve Operability Test," Rev.11

The inspector observed the licensee's troubleshooting when High Pressure Safety Injection (HPSI) pump P-66A failed to meet minimum flow requirements during testing. The minimum flow required was 30 gpm through the discharge orifice. The flow rate during the test was approximately 12 gpm.

The licensee drained the fluid from the pump discharge to the orifice, replaced the orifice, and retested the pump. The inspector noted the following:

- Step 5.3.6.e instructed the operator to record pump discharge temperature "...on the pump casing at the location identified by T or as identified by the system engineer." Neither of the two auxiliary operators knew what the "T" meant, indicating this step needed clarification. The operators did receive instruction from the system engineer.

- Step 2.4 of Attachment 2 instructed the operator to lightly tap miniflow check valve CK-ES3340. The operators obtained a piping and instrument diagram to identify the valve since the valve was not labelled. Although the lack of proper labelling was a problem, operators took the proper action.

After replacing the orifice, the licensee ran three tests and each had satisfactory results indicating the orifice was probably blocked. However, the licensee found no evidence of blockage of the original orifice. The licensee removed and examined the original orifice, and used a boroscope to inspect accessible piping upstream and downstream from the removed orifice and found no blockage or debris.

In order to assure adequate minimum flow, the licensee performed additional daily testing of the pump for one week and found no other significant performance problems.

3) RI-47, "Rod Withdrawal Prohibit Interlock Matrix Check," Rev.6

On June 12, 1994, during the performance of surveillance testing, the reactor operators were directed by procedure to withdraw a control rod to verify a rod withdrawal permissive. Prior to signing on this test, the control room supervisor (CRS) discussed with the shift supervisor (SS), the appropriateness of performing this test, and determined that the test was acceptable to perform under present plant conditions. The reactor was in a hot shutdown condition with all control rods fully inserted and T_{ave} at approximately 532°F.

During the performance of RI-47, step 5.12.4, the reactor operator was required to verify that a control rod could be withdrawn while in the manual individual rod drive control system mode. At this time the operator withdrew a single control rod less than 2 inches to verify that the control rods could be withdrawn, and then subsequently inserted the control rod back to its original position of fully inserted.

Technical Specifications 1.0, Definitions, Hot Standby, states: "The reactor is considered to be in a hot standby condition if the average temperature of the primary coolant (T_{ave}) is greater than 525°F and any of the control rods are withdrawn and the neutron flux power range instrumentation indicates less than 2% of rated power."

The inspectors had the following concerns:

- Neither the SS or the CRS were aware that the operator withdrew a control rod or that the procedure, RI-47, required a partial withdrawal of a control rod to verify no rod withdrawal prohibit (interlock) existed.

- When the surveillance was authorized, neither the SS or CRS were aware that at the conclusion of the I & C surveillance the operator would be directed to withdraw a control rod. The CRS was not alerted to the required control rod movement when he authorized performance of RI-47, as Sections 1.0 though 4.0 did not acknowledge that a control rod withdrawal or a mode change would be required.

- The reactor operator did not notify the SS or CRS when he performed Step 5.12.4 of RI-47 by withdrawing the control rod.

In reviewing plant conditions during the performance of this evolution, the inspectors noted that the high pressure safety injection pump, P66A, was declared inoperable due to its inability to provide minimum flow through the recirculation line. Technical Specifications 3.0.4. states that: "Entry into a reactor operating condition or other specified condition shall not be made when the conditions for the Limiting Conditions for Operation are not met and the associated action requires a shutdown if they are not met within a specified time interval." Thus, plant conditions were not appropriate under the circumstances to go from Hot Shutdown to Hot Standby conditions.

In addition, the inspectors noted the following factors that contributed to the concern:

- Most notably, the failure of the reactor operator to notify the senior reactor operator of the control rod movement.

- The lack of procedural guidance that clearly recognized the mode change or control rod withdrawal.

- The failure to conduct a prejob briefing to discuss the required procedure steps.

Subsequent to the event, the licensee has had extensive internal dialogue to clearly define what constitutes control rod withdrawal and to provide a basis for those assumptions. Pending review by the NRC of the licensee's position of what defines a rod withdraw, the withdrawal of a control rod (less than two inches) on June 12, 1994, is considered an Unresolved Item (50-255/94008-02(DRP)).

One unresolved item was identified. No violations, deviations, or inspection followup items were identified in this area.

6. Engineering and Technical Support (37700)

a. Spent Fuel Pool Crane Unexpectedly Stopped During Preoperational Testing For The Dry Fuel Storage Project

On May 23, 1994, the licensee lifted the Multi-Assembly Transfer Cask (MTC) and the Multi-Assembly Sealed Basket (MSB) out of the cask washdown pit with the spent fuel pool crane (L-3) and attempted to move the load to its designated location in the SFP. During the lift, L-3 unexpectedly stopped near the edge of the SFP. The licensee returned the load to the cask washdown pit and commenced an investigation. The licensee's investigation determined that the problem was caused by operation of the two interlock override keys, designated as Key Number 20 and Key Number 21 on the L-3 control box. The override keys allow certain crane interlocks to be bypassed so that the crane can be moved over the SFP.

The inspectors reviewed this event and determined that the safety significance was minor. However, the inspectors identified several problems associated with inadequate post-modification testing procedures, poor work practices, and lack of appropriate management involvement.

The operation of L-3 interlocks was designed as follows:

- When operated, Key 20 allows the main hook on L-3 to travel only over the cask loading area in the north end of the SFP.

- When operated, Key 21 allows no movement of the main hook over any part of the SFP.

- When operated, Keys 20 and 21 allow the main hook on L-3 to traverse the entire SFP, including the cask loading area.

The licensee's investigation found that the two override keys were electrically reversed, such that Key 20 functioned as Key 21 and vice-versa. Thus when the licensee attempted to move the main hook on L-3 to the cask laydown area with Key 20, the crane stopped.

The inspectors determined that the functions of Key 20 and 21 were electrically reversed during an unapproved modification that involved rewiring of the L-3 control box in 1986. At that time, the licensee replaced the L-3 control box with an updated analog "Control Chief" transmitter/receiver. Plant personnel involved with testing the new transmitter/receiver found the two override keys were electrically reversed as-received from the vendor. Plant personnel resolved the problem by reversing the wiring in the L-3 control box. Although the keys operated properly after the reversal, no documentation was generated to record the change. No design change was implemented and no drawings were updated. Furthermore, had a design change been implemented, plant personnel would have likely changed the panel wiring on the crane rather than in the control box. Correcting the panel wiring would have been the preferred method of repair since the spare control boxes would not need to be reconfigured.

The undocumented wiring change in 1986 remained in place until the recent modification of L-3 performed in 1994 under Specification Change (SC) 93-094. Part of SC-93-094 called for updating the analog L-3 control box to a new digital model. When the new control boxes were ordered under SC 93-094, the vendor configured the control box identical to the earlier analog design. Consequently, the keys on the new control boxes operated in the incorrect fashion.

The inspector reviewed the licensee's investigation and identified the following root causes:

- The plant modification process was not used to document the wiring changes made to the control box in 1986. Hence, no documentation existed to reflect the change in the plant drawings or the vendor files. Further, the modification process would likely have identified the preferred method of repair being changes to the panel wiring versus changes to the control box wiring.

- The procedure for testing the crane following the recent modification in 1994 was inadequate since there were no

instructions to test or verify proper operation of the SFP interlocks.

Work instruction WI-SC-93-094-01, "Spent Fuel Pool Crane Control Chief Modification," Rev.3, Step 8.4 required electrical maintenance personnel to satisfactorily perform an operational check of the crane via a separate work instruction, WI-MSE-E-07, "Overhead Crane Electrical Inspection," Rev.0. However, WI-MSE-E-07 did not have explicit instructions to test the SFP and cask laydown area interlock bypass keys. The only requirement was to verify that "control station switches" at Step 5.1.2, and "crane limit switches" at Step 5.1.3, operated properly. The instructions were a bare outline of what was required, with no details or acceptance criteria to guide maintenance personnel through the various checks that needed to be performed.

- Although they checked that both keys allowed the main hook on L-3 to traverse the entire SFP, the crew that performed the post-modification testing on May 6, 1994, only arbitrarily checked one of the keys for the north end of the SFP. When one key did not allow movement of the main hook over the north end of the SFP, they tried the other, without noting which key they had used to allow the interlock to be bypassed. They failed to verify that Key Number 20 operated as intended, and that Key Number 21 operated as intended.

- The inspectors found oversight by maintenance and engineering supervisors was lacking. No supervisors were present to observe the testing during the May 6, 1994, post-modification testing on L-3 crane.

The inspectors determined that the licensee remained in compliance with the Technical Specifications (TS) during this event. The applicable TS, 3.21.2.d, required that heavy loads shall not be moved over the 649 foot elevation of the auxiliary building (SFP floor) unless no fuel handling operations were in progress and,

- The L-3 interlocks were operable or

- The L-3 interlocks were bypassed and under the administrative control of a supervisor.

In this instance, no fuel handling was in progress. The L-3 interlocks were effectively bypassed with the functions on the L-3 control box reversed. A heavy loads supervisor was present and in control during the entire evolution.

Safety significance was minor since at no time was a heavy load moved over or in danger of moving over fuel stored in the SFP.

All other prerequisites of crane operation had been fulfilled prior to beginning the evolution.

The failure to thoroughly test the L-3 crane during a 1994 modification, including the control box override keys, to assure the interlock/override keys functioned as designed, is considered a violation of 10 CFR 50 Appendix B, Criterion XI, Test Control (50-255/94008-03(DRP)).

The licensee implemented appropriate corrective actions as warranted by this event. The corrective actions included:

- Correcting the wiring problem with the keys.
- Verifying that the bypass keys and limit switches operated as intended.
- Reviewing test documentation to ensure that other aspects of crane operation were properly tested; and
- Clarifying the scope and intent of WI-MSE-E-07.

One violation was identified. No deviations, unresolved, or inspection followup items were identified in this area.

7. Dry Fuel Storage Activities (42700, 86700)

The inspector reviewed the licensee's inspection and maintenance results for components involved in heavy load lift applications for the dry fuel storage project. Included in the review were nondestructive examination (NDE) results of critical components or highly stressed welds, and preventive maintenance results on the spent fuel pool crane (L-3). The inspector identified no significant problems.

The inspector reviewed the licensee's package of NDE reports documented in procedure CLP-M-6, "Inspection of Heavy Load Lift Devices," Rev.2. The licensee performed visual examinations (VT), magnetic particle testing (MT), and liquid dye penetrant examinations (PT) in accordance with the procedure, on the following components:

- Structural Lid Hoist Rings (VT)
- Multi-Assembly Sealed Basket Spreader Bars (VT)
- Multi-Assembly Transfer Cask Lifting Yoke (MT)
- Multi-Assembly Transfer Cask (MT)
- Spent Fuel Pool Crane Main Hook (PT)
- Spent Fuel Pool Crane Auxiliary Hook (PT)

These items were reviewed with records for the spent fuel pool crane as described below.

In addition, the inspector reviewed the licensee's preventive maintenance records for spent fuel pool crane L-3, last performed in January 1994. The work was performed according to procedure MSM-M-13, "Overhead Mechanical Crane Inspection," Rev.17. The documentation showed that most components associated with the bridge, trolley, auxiliary hoist, and main hoist were inspected with satisfactory results. Some minor items were identified and dispositioned with work orders. The work orders were completed prior to commencement of dry fuel loading.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

8. Report Review

During the inspection period, the inspectors reviewed the licensee's monthly operating report for May 1994. The inspectors confirmed that the information provided met the reporting requirements of TS 6.9.1.C and Regulatory Guide 1.16, "Reporting of Operating information."

No violations, deviations, unresolved, or inspection followup items were identified in this area.

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. Unresolved items disclosed during the inspection are discussed in paragraphs 3.f and 5.b.

10. Meetings and Other Activities (30703)

Exit Interview (30703)

The inspectors met with the licensee representatives denoted in paragraph 1 during the inspection period and at the conclusion of the inspection on June 30, 1994. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.