UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-261/93-21

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-261 License No.: DPR-23

Facility Name: H. B. Robinson Unit 2

Inspection Conducted: September 12 - October 16, 1993

Lead Inspector: Robert Haag for 11/5/93
W. T. Orders, Senior Resident Inspector Date Signed

Other Inspector: C. R. Ogle, Resident Inspector
C. W. Rapp, Regional Inspector
N. Merriweather, Regional Inspector

Approved by: 11/8/93
H. O. Christensen, Chief Date Signed
Reactor Projects Section 1A
Division of Reactor Projects

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of operational safety verification, maintenance observation, followup of previously identified items, and routine followup .

Results:

One violation was identified which involved two examples of personnel failing to follow procedures. The issues concerned an operator opening the incorrect electrical breaker, and the failure to control a sludge lance vent path. (paragraph 3)

A second violation was identified which concerned a failure to establish containment integrity before commencing refueling operations. (paragraph 3)

Two non cited violations were identified involving an STA who departed the site before the end of his shift and an area fire watch who vacated his post before being relieved of his duties. (paragraph 3)

Two inspector followup items were identified involving a loose part in a fuel assembly, and fractures in the terminal posts of the vital batteries. (paragraphs 3 and 4)

REPORT DETAILS

1. Persons Contacted

R. Barnett, Manager, Project Management
J. Benjamin, Shift Outage Manager, Outages and Modifications
S. Billings, Technical Aide, Regulatory Compliance
B. Clark, Manager, Maintenance
*T. Cleary, Manager, Technical Support
*D. Crook, Senior Specialist, Regulatory Compliance
*C. Dietz, Vice President, Robinson Nuclear Project
R. Downey, Shift Supervisor, Operations
J. Eaddy, Manager, Environmental and Radiation Support
G. Elam, Program Manager, EGS Corporation
S. Farmer, Manager, Engineering Programs, Technical Support
R. Femal, Shift Supervisor, Operations
*W. Flanagan Jr., Operations Manager
R. Hardy, Test Director, Wyle Laboratories
B. Harward, Manager, Engineering Site Support, Nuclear Engineering Department
P. Jenny, Manager, Emergency Preparedness
D. Knight, Shift Supervisor, Operations
D. Labelle, Project Engineer, Nuclear Assessment Department Site Unit
A. McCauley, Manager, Electrical Systems, Technical Support
R. Moore, Shift Supervisor, Operations
D. Morrison, Shift Supervisor, Operations
*T. Niemi, Project Engineer, Nuclear Assessment Department
D. Nelson, Shift Outage Manager, Outages and Modifications
A. Padgett, Manager, Environmental and Radiation Control
H. Patel, EQ Engineer, CP&L
*M. Pearson, Plant General Manager
D. Seagle, Shift Supervisor, Operations
M. Scott, Manager, Reactor Systems, Technical Support
*E. Shoemaker, Manager, Mechanical Systems, Technical Support
W. Stover, Shift Supervisor, Operations
*A. Wallace, Manager, Shift Operations, Operations
D. Waters, Manager Regulatory Affairs
*D. Whitehead, Manager, Plant Support Services
D. Winters, Shift Supervisor, Operations
P. Yandow, EQ Coordinator, CP&L

Other licensee employees contacted included technicians, operators, engineers, mechanics, security force members, and office personnel.

NRC Managements Visits

H. Christensen, Chief, Projects Section 1A, Division of Reactor Projects, visited the site on October 15, 1993. Mr. Christensen toured the facility with the residents and attended the exit meeting on October 15, 1993. He also met with members of the licensee's management organization.

*Attended exit interview on October 15, 1993.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status

Refueling Outage 15 continued during the report period with fuel assembly reload ongoing at the end of the inspection period. The outage is currently scheduled to end on November 3, 1993.

3. Operational Safety Verification (71707)

The inspectors evaluated licensee activities to confirm that the facility was being operated safely and in conformance with regulatory requirements. These activities were confirmed by direct observation, facility tours, interviews and discussions with licensee personnel and management, verification of safety system status, and review of facility records.

To verify equipment operability and compliance with TS, the inspectors reviewed shift logs, Operation's records, data sheets, instrument traces, and records of equipment malfunctions. Through work observations and discussions with Operations staff members, the inspectors verified the staff was knowledgeable of plant conditions, responded properly to alarms, adhered to procedures and applicable administrative controls, cognizant of in-progress surveillance and maintenance activities, and aware of inoperable equipment status. The inspectors performed channel verifications and reviewed component status and safety-related parameters to verify conformance with TS. Shift changes were routinely observed, verifying that system status continuity was maintained and that proper control room staffing existed. Access to the control room was controlled and operations personnel carried out their assigned duties in an effective manner. Control room demeanor and communications were appropriate.

Plant tours and perimeter walkdowns were conducted to verify equipment operability, assess the general condition of plant equipment, and to verify that radiological controls, fire protection controls, physical protection controls, and equipment tagging procedures were properly implemented.

Shift Technical Advisor (STA) Departs Before End Of Shift

On the morning of September 16, 1993, the inspectors were present in the control room during turnover of the oncoming day shift, when it was noted that the off-going STA was absent. From a subsequent review of security access records, the inspector determined that the offgoing STA had left the protected area approximately 5 minutes prior to the arrival of the oncoming STA.

Although the inspectors noted from a review of TS 6.2.3.c, that the STA was not required during cold shutdown conditions, an individual was specified to fill the STA position by the watchstanders listing posted

in the control room. Operations Management Manual, OMM-008, Minimum Equipment List and Shift Relief, discusses turnover responsibilities for the STA position. Though some of the responsibilities of OMM-008 are not applicable while in cold shutdown, some are meaningful during a turnover in any plant condition. Additionally, OMM-008 specifically requires that shift operating personnel remain on duty with full responsibilities of their position until properly relieved. OMM-008 requires that this turnover be conducted at the normal watchstation.

The inspectors requested that the licensee provide details concerning the premature departure of the STA. Licensee management advised the inspectors that the individual left without having been granted permission by the onwatch shift supervisor and that he had done so of his own volition because he felt that he was not needed due to plant conditions.

The licensee counselled the individual concerning management's expectation that watchstanders remain until properly relieved. The licensee also stated their intention to review this expectation with all watchstanders.

The failure of the STA to conduct a watch turnover is a violation of the requirements of OMM-008. However, this identified violation is not being cited because criteria specified in Section VII.B of the NRC Enforcement Policy were satisfied. This is identified as a non-cited violation, NCV 93-21-01: Failure Of STA To Conduct Turnover Required By OMM-008.

Sewage Overflow In Protected Area

At approximately 8:00 a.m. on September 17, 1993, the licensee discovered sewage overflowing a manhole in the protected area. The licensee stopped the overflow and a septic tank service was utilized to lower the system level.

In response to this overflow, the licensee notified the South Carolina Department of Health and Environmental Control on September 17, 1993. As a result of the notification to the state, the licensee made a 4-hour non-emergency notification to the NRC in accordance with the requirements of 10 CFR 50.72 (b) (2) VI. The licensee notified the resident inspectors prior to the 10 CFR 50.72 notification.

On October 7, 1993, two subsequent sewage spills occurred at the site. These spills were stopped and recovery actions were taken by the licensee. As a result of notification of state authorities, the licensee made initial and followup notifications to the NRC in accordance with 10 CFR 50.72 (b) (2) VI at 2:25 p.m. and at 5:30 p.m. on October 7, 1993.

Based on their review of these events, the inspectors concluded that the licensee met the requirements for NRC notification specified in 10 CFR 50.72. The inspectors have no further questions on these events.

Reactor Coolant System Draindown

On September 17, 1993, the inspectors witnessed the performance of General Procedure, GP-008, Draining The Reactor Coolant System. This draindown was accomplished to reduce RCS level to approximately 10 inches below the reactor vessel flange to support vessel head removal. The inspection effort included a partial walkdown of the reactor coolant level standpipe system prior to the draindown, attending the pre-shift briefing for the evolution, and observation of control room activities during the level change.

Overall, the inspectors concluded that the evolution was well controlled with a proper emphasis on safety. There was a strong effort by operations personnel to ensure that RCS level was closely monitored and that appropriate overlap existed in available level instruments. The Management Designated Monitor conducted the pre-shift briefing which included information from previous draindown events. He also remained present in the control room during the level change. The inspectors have no further questions on this evolution.

Operator Inadvertently Deenergized Motor Control Center MCC-5

At approximately 10:00 p.m. on September 19, 1993, power to MCC-5 was interrupted when an operator inadvertently opened the normal power supply breaker for the MCC. The operator had been dispatched to transfer service water pump D to the emergency power supply, but in fact, commenced the transfer sequence at the wrong switchboard. After power to MCC-5 was interrupted, the operator recognized the mistake, reclosed the normal power supply breaker, and informed the control room of his actions. The MCC-5 loads which were stopped as a result of the power interruption were then restarted. Service water pump D was subsequently transferred to its alternate power supply.

The inspectors interviewed the operator involved; reviewed log entries in the shift supervisor's and control operator's logs; and reviewed an Off Normal Condition Analysis (ONCA) form generated for the event. Based on this effort, the inspectors determined that the operator became distracted while enroute to accomplish the transfer of service water pump D to the alternate power supply. This distraction occurred while the operator explained the operation of the plant's interlocked power supply breakers to a watchstander trainee. As a result, the operator positioned himself at the MCC-5 normal and emergency supply breakers as opposed to the normal and emergency supply breakers for service water pump D. These switchboards are similar in appearance and function, and though not adjacent, are in close proximity to one another.

Technical Specification 6.5.1.1, Procedures, Tests, and Experiments requires, in part, that written procedures be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Rev. 2. 1978. Appendix A, Paragraph 4 requires instructions for operation of onsite electrical systems. Operating Procedure, OP-603, Electrical Distribution is provided these instructions.

Contrary to the above, on September 19, 1993, an operator deviated from OP-603 while transferring service water pump D from normal to emergency power. As a result of this deviation, power was lost to motor control center, MCC-5. This is the first of two examples which in the aggregate comprise a violation, VIO 93-21-02: Failure To Follow Procedures, Two Examples.

Sludge Lance Rig Vent Valve Misaligned

During the ongoing refueling outage the licensee accomplished sludge lancing on the steam generators secondary sides. The equipment used to accomplish this work was mounted on a tractor trailer external to the containment. Two containment vent valves, V12-12 and V12-13, were removed and necessary hoses and electrical cables to support the evolution were routed through the idle penetration. To permit lancing while containment integrity or containment closure were required, the system incorporated a foam-filled CV penetration collar which bolted onto the V12-12 flange, a "closed" sludge lance system outside of containment and a vent hose from the sludge lancing equipment back into containment. Each of the hoses which penetrated containment were also equipped with a pair of isolation valves on either side of the containment penetration. Special Procedure, SP-1231, S/G Sludge Lance and Inspection was developed to provide the guidance necessary to accomplish the lancing.

On September 21, 1993, during a routine tour, the inspectors observed that a vent valve for the slurry tank on the trailer mounted rig was open. At the inspector's request, the valve was confirmed to be open by a contractor assigned to operate the sludge lancing rig. The valve was then closed by the contractor.

This open valve on the slurry tank provided a direct vent path from the rig to atmosphere and hence, since sludge lancing was in progress, a direct path from the containment to atmosphere. The contractor indicated that he was unsure why the valve was open. CV closure was in effect at the time of this observation, however, CV integrity was not required.

SP-1231 required that all vent paths on the sludge lance rig be identified by the system engineer and caution tagged prior to opening the isolation valves for the rig. The open vent valve identified by the inspectors was not caution tagged. When questioned on the lack of a caution tag, the cognizant supervisor stated that a walkdown had been performed but failed to identity this valve as a potential vent path.

Technical Specification 6.5.1.1. Procedures, Tests, and Experiments, requires, in part, that written procedures be established, implemented, and maintained, for the activities recommended in Appendix A of Regulatory Guide 1.33, Rev 2. 1978. Paragraph 9 of Appendix A requires that maintenance be performed in accordance with written procedures. Special Procedure, SP-1231, Steam Generator Sludge Lance and Inspection, was written to provide instructions for conducting sludge lancing of the steam generators secondary sides.

Contrary to the above, on September 21, 1993, a vent path to atmosphere was not identified and caution tagged as required by SP-1231. As a result, a vent valve on the sludge lancing rig was open and a vent path from the containment existed. This is the second of two examples which in the aggregate comprise a violation, VIO 93-21-02: Failure To Follow Procedures, Two Examples.

The inspectors also noted that there was no procedural requirement in SP-1231 to conduct another verification that the potential vent paths in the sludge rig were properly isolated prior to establishing integrity for refueling. When questioned by the inspectors, the system engineer stated his intentions were to perform an additional system walkdown of the sludge lancing rig prior to establishing integrity.

Area Fire Watch Vacates Post

On September 22, 1993, the licensee determined that an area firewatch had vacated his assigned post prematurely. The watch had been stationed in the Emergency Switchgear/Safeguards Room as required by Fire Protection Procedure (FP-012), Fire Protection Systems Minimum Equipment and Compensatory Actions, when the halon suppression system for that area (zone 20) was disabled. The system was disabled at 8:34 p.m. on September 22, 1993, to support maintenance in the room. At 11:50 p.m. Operations personnel noted that the area fire watch had left the room while zone 20 was still disabled.

The inspectors reviewed the shift supervisor's log and the on-shift fire technician's log. Additionally, the inspectors interviewed the cognizant maintenance and fire protection supervisors. Based on the information obtained from this effort, the inspectors concluded that the area fire watch was unaware of his responsibility to remain at his assigned station until the fire suppression system was restored to service.

In response to this event, the licensee committed to providing training to area fire watches reiterating the need for the watch to remain posted until the fire suppression system is fully returned to service. The licensee has also developed a sheet which outlines the responsibilities of area fire watches. As described by the licensee, this information sheet will be provided to area fire watches upon deactivation of fire zones. The inspectors reviewed the sheet and noted that it specifically addressed the responsibility of area fire watches to remain in assigned zones until authorized to depart by the on-shift fire technician.

The failure of the area fire watch to remain in Zone 20 is a violation of the requirements of FP-012. This violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B of the Enforcement Policy. This is identified as a non-cited violation, NCV 93-21-03: Area Fire Watch Vacates Post.

Failure To Maintain Containment Integrity During Fuel Movement

On September 27, 1993, the unit was in cold shutdown condition, in a scheduled refueling outage with core off-load underway. At approximately 10:30 a.m. that morning, licensee Technical Support personnel were requested to check the adequacy of the containment building equipment hatch seals after the Resident Inspectors noted that the hatch was leaking air into the building. The licensee visually verified air inleakage, and at approximately 11:30 a.m., Operations personnel were notified of the existence of the leakage. Although core off-load had been completed approximately 10 minutes earlier, the leak path existed during fuel movement operations.

The NRC operations duty officer was notified of this event at 3:21 P.M. that afternoon as a condition that alone could have prevented the fulfillment of the safety function of the structures or systems needed to control the release of radioactive material.

Upon discovery of this event, attempts were made to eliminate the leakage by tightening the hatch bolts, but these attempts were unsuccessful. Subsequently, the equipment hatch was removed and the seals and flange surfaces were inspected. The results of the inspection revealed that the seals and seating surfaces were in relatively good condition with one of the seals intact, and only minor damage noted on the other seal.

The cause of this event is attributed to the lack of controls for the re-installation of the equipment hatch during an outage, to support activities requiring containment integrity, such as fuel movement. Operations management manual procedure OMM-033 provides only limited guidance for the re-installation of the hatch for containment closure/refueling integrity. Adverse Condition Report 93-173 was initiated to document this condition and to facilitate a root cause investigation.

Plant Procedure CM-603 is used to secure the equipment hatch to meet containment integrity requirements for reactor operations. Procedure OMM-033, was developed to provide guidance for equipment hatch installation to support, in part, refueling operation. However, this procedure appeared to be inadequate to ensure that containment closure (integrity) was achieved. In addition, the procedure was not used on September 23, 1993, when the hatch was installed to support refueling operations.

Technical Specification 3.8.1., refueling operations, requires that the equipment hatch be "properly closed". Implicit in this requirement is the requisite that the hatch be capable of performing its intended safety function, which in this case is to prevent the release of radioactive material to the environment given a fuel handling accident or a prolonged loss of core cooling.

Furthermore, Technical Specification 6.5.1.1, Procedures, Tests, and Experiments requires, in part, that written procedures be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Rev. 2. 1978. Appendix A, Section 3.f(1) requires instructions for maintaining containment integrity. Implicit in this requirement are the requisites that the procedures be adequate to facilitate the applicable evolution and that personnel use the procedures during the performance of the evolution.

Contrary to those requirements, on September 23, 1993, the licensee did not use a procedure to facilitate the re-installation of the containment building equipment hatch when they were preparing for refueling operations. This resulted in the inadequate installation of the equipment hatch in that it was not "properly closed" and as such was not capable of performing its intended safety function. This is a Violation, 93-21-04: Failure To Maintain Containment Integrity During Fuel Movement.

A review of this event revealed that there was only minor safety significance involved with the leak at the equipment hatch. The major vulnerability involves fuel damage during refueling operations which could lead to the release of fission products to the containment atmosphere. However, there does not appear to be a viable scenario which would result in containment pressurization which in turn would result in release of radioactive material to the environment.

Loose Part In Fuel Assembly

During the ongoing refueling outage, the licensee examined a number of fuel assemblies for damage. To facilitate this inspection, the fuel assembly tie plates were replaced with a special vendor supplied guide plate. This guide plate was fastened to the control rod guide tubes with three anchors. The anchors consist of a shaft and nut which interface to expand a split tube. This expanded split tube provides a grip with the guide tube inner diameter to hold the guide plate in place. When the guide plate was removed from assembly U24, the shaft of one of the three anchors was broken. The retaining nut, the split tube, and the end of the shaft were missing from the tool. At that time, the vendor technicians performing this service, assumed that the pieces had fallen into the spent fuel pit, but failed to notify the licensee.

Following the inspection of assembly U24, an attempt was made to load an RCCA in the assembly. The vertical travel of the RCCA was blocked approximately 2 feet above its fully loaded position. When the RCCA would not insert into the assembly, it was inspected with a camera. The

split tube from the aforementioned fuel inspection tool was found to be on the end of one of the RCCA fingers and consequently removed. Thus, the remaining pieces in the guide tube were the retaining nut and the shaft end. During a later inspection, it was verified that the retaining nut is lodged at the transition area. Because of the design of the tool, the shaft end is free of the retaining nut and is located in the bottom of the guide tube, below the retaining nut.

The licensee elected to leave the tool fragments in the guide tube and move the assembly to a non-controlled (no control rod) position in the core. This decision was justified by the licensee's fuel vendor, Siemens.

A copy of that evaluation was forwarded to the RII office for followup. Pending completion of that analysis, this issue will be tracked as IFI 93-21-05: Fuel Assembly Loose Part.

ECCS Piping Flush

On September 27, 1993, the inspectors witnessed accomplishment of Special Procedure, SP-1163: SI-891 C, SI-891 D, and SI-863 B Flush. This special procedure was accomplished to flush selected ECCS piping to the RWST to ensure that no white plastic remained in any uninspected or unflushed portion of the system. Additional information concerning the discovery and removal of the white plastic material is contained in NRC Inspection Report 50-261/92-24. This procedure was accomplished coincident with cavity draindown and directed flow to the RWST through the flushed piping.

Overall, the accomplishment of SP-1163 was satisfactory. However, the inspectors noted that total flowrate through the operating RHR pump exceeded the maximum flow rate specified in Operating Procedure, OP-201, Residual Heat Removal System. This was identified to the system engineer and cognizant engineering supervisor. The inspectors requested that the licensee review this issue to determine if the maximum runout flow for the RHR pump had been exceeded. After their review, the licensee provided documentation that despite exceeding the precautional limit of OP-201, the pump flow had not exceeded runout conditions. The inspectors independently reviewed the documentation and concurred with the licensee's conclusions. The inspectors had no further questions on SP-1163.

Summary

Two separate noncited violations for watchstanders (an STA and a fire watch) leaving their assigned duty prematurely indicates that improvements in this area are warranted. The RCS partial draindown activity was well controlled and received adequate monument attention. A violation with two examples of failure to follow procedural requirements is a concern because they represent a continuing pattern of plant personnel not complying with procedures. A second violation was

identified for accomplishing a maintenance task without using the applicable procedure. An inspector followup item was identified for loose parts in a fuel assembly guide tube.

4. Maintenance Observation (62703)

The inspectors observed safety-related maintenance activities on systems and components to ascertain that these activities were conducted in accordance with TS, and approved procedures. The inspectors determined that these activities did not violate LCOs and that required redundant components were operable. The inspectors verified that required administrative, material, testing, and radiological controls were adhered to. In particular, the inspectors observed/reviewed the following maintenance activities:

WR/JO	92ARSN4	Discharge Testing of Battery Charger A1
WR/JO	93AHYL1	Replace Flow Switch For HVE-16
GP-010		Refueling (Fuel Offload)

Retest Program For Environmental Qualification Of The Patel Conduit Seals

On August 2, 1993, the NRC conducted a special inspection at Wyle Labs in Huntsville Alabama to review the retest program for the EGS (formerly Patel) conduit seals. This program was implemented by the licensee to resolve 10 CFR 50.49 Environmental Qualification (EQ) issues identified by the NRC in Inspection Report 50-261/91-03. The inspector met with representatives from CP&L, EGS, and Wyle Labs to discuss the preliminary results of the retest program. The licensee stated during this meeting that the four test specimens exposed to the H.B. Robinson LOCA/ Submergence accident profiles did not experience any leakage past the seals during the entire test. One anomaly was identified during the test and it was resolved by extending the duration of the test. The test specimens were examined prior to being removed from the LOCA chamber. The test specimens/setup was observed to be similar to that described in, Re-Test Procedure for Submergence Qualification of Conduit Seals, (Report No. EGS-TR-841215-07, Revision B), however, unlike the procedure end caps were added to the specimens to protect the wires against direct spray. The test specimens were removed from the LOCA chamber and were inspected for visual signs of leakage past the seals (e.g. grommet and wire integrity). In addition the break away torque was measured for one of the samples. The above inspections had satisfactory results. The inspector examined the data sheets for the last six days of the test which covered the period July 27 - August 1, 1993, with no anomalies observed. The inspection concluded with the specimens being packaged for transporting to EGS for further examination and study. The licensee indicated that the final test report should be issued by the end of the year. This issue will remain open pending review of the final test report and the revised EQ files.

Discharge Testing Of Battery Charger A-1

On September 21, 1993, the inspectors witnessed the setup and initial steps accomplished to perform discharge testing of battery charger A-1. The discharge test was aborted when the system engineer recognized that the load bank had been incorrectly attached to charger A-1.

During installation of the cables to the load bank, the output power leads to the output terminal block in the charger were removed. The load bank cables were then attached to this terminal block. The intent of the procedure was to remove the cables between the terminal block and the DC bus and attach the load bank cables in their place.

Following the recognition of this deficiency, the load bank cables were removed, the charger restored to normal configuration, and the test rescheduled for a later date.

RWST Inspection

On September 30, 1993, the inspectors witnessed preparations for and the subsequent entry of a diver into the RWST. This entry was accomplished to permit an inspection of the RWST following a flush of selected ECCS piping to the RWST in accordance with Special Procedure, SP-1163, SI-891C, SI-891D, and SI-863B flush. The diver's efforts were tracked by personnel outside the tank on a monitor fed from a camera operated by the diver.

As described by the diver, visibility in the tank was good with only a few pieces of debris observed on the bottom. A few flakes of white material were reported on the tank floor, however, they could not be recovered due to their small size. No discrete pieces of plastic were reported by the diver (see paragraph 3 for additional information on the plastic material). Items recovered included small pieces of string, a short piece of wire, and a bolt.

The overall performance of the evolution was satisfactory. However, the inspectors noted that the benefit provided by monitoring the screen outside the tank was marginal. Both poor lighting used with the camera and the small monitor size made vidio evaluation of objects by support personnel difficult. This was a marked reduction in capability over that observed by the inspectors during previous dives into the RWST. The inspectors were informed that this particular camera/monitor setup was used for this inspection due to the desired camera/monitor rig being unavailable. The inspectors were also advised that the camera output was being videotaped for potential future review. The inspectors had no further questions on this evolution.

Use of Temporary Leak Sealants

The inspectors conducted a review of the controls associated with the use of temporary leak sealants. This review included procedures, management oversight, engineering and safety evaluations, and

application of temporary leak sealants on plant equipment. The inspectors found that temporary leak sealants are used on both safety and non-safety related equipment. Application of temporary leak sealants was controlled by the temporary modification process. The vendors procedures for installing the temporary leak sealant were included in the temporary modification package and reviewed with the temporary modification. The temporary modification also delineated the type and amount of temporary leak sealant that could be used. If additional sealant was necessary, an engineering evaluations was typically required. TMM-031, Evaluation of On-Line Flowable Packing, provided additional guidance for evaluating the temporary leak sealant. As required by the temporary modification process, all temporary modifications were subject to a 10 CFR 50.59 safety evaluation. Furthermore, temporary modifications to safety related equipment were reviewed as design changes. Typically QC was involved in the review process when a "Q" component was affected. Temporary modifications to non-safety related equipment received a technical review. Each temporary modification was reviewed and approved by senior plant management before being implemented. As required by the temporary modification process, temporary leak sealants were required to be replaced at the next refueling outage.

Battery Post Fractures

While performing routine maintenance of the "B" battery during RF015, the licensee detected that the battery posts on many of the cells were deformed, and some of the terminal posts had experienced fractures.

One of the cells of the "B" battery (cell 31) was sent to the Harris E&E Center, where the posts were examined. Some subsurface fracturing was observed, with evidence of oxidation along the fracture lines.

This condition raised concerns over the acceptability of the battery with respect to meeting the electrical requirements of providing the required output for safety-related functions, and the seismic integrity of the battery. The "B" battery is a safety-related battery, which supplies power to the "B" train of safety-related equipment, as well as some non-safety related loads. The "B" safety train is one of the two redundant trains of equipment designed to safely shut the plant down in case of an accident. Cell 31 is one of the original cells installed in the battery in 1978 and was chosen as representing the most significant fracturing visually observed on the battery. The positive post of Cell 31 was determined to have had random fractures extending over approximately 90 percent of a cross-sectional area for a section taken through the bolt hole parallel to the top surface of the battery cell. The cause of the fracturing is apparently due to over-torquing.

The major concern is that the fractures and deformation of the posts could cause an increase in the resistance of the intercell connections. This would result in a reduction in the load carrying capability of the battery and a reduction in voltage from individual cells, which would result in an overall reduction in the battery voltage.

The capability of the battery to support the electrical load requirements is documented during refueling outages by the performance of either MST-920 or MST-921. MST-921 is a service test which tests the load profile for the battery for a one hour duration. This test is done every refueling outage. MST-920 is a performance test, which tests the performance of the battery with a continuous load for an eight hour duration. MST-920 is performed every five years.

MST-920 was performed on the "B" battery on September 26, 1993, and showed that the "B" battery had a capacity of 103.1 percent. This test was performed before the fracturing was observed. The licensee stated that this test demonstrated that the battery capacity had not been adversely impacted by the fracturing. MST-920 was also performed during RF013 in 1988 and showed a capacity of 102.1 percent.

Preventative Maintenance Procedure, PM-411 measures the resistance of the intercell connections with an acceptance level of less than 50 micro-ohms across the strap connections. These tests are consistently below the acceptance criteria and have not shown an increasing trend toward higher resistance levels. PM-411 also covers torquing values for the intercell connections. Torque values for these connections did not exist prior to 1987.

The licensee stated that the effect of battery cell-to-cell seismic load transfer is not addressed by design basis documents for the Robinson site. However, considerable information is available to demonstrate that there is little likelihood of battery cell failure due to battery cell terminal post or connecting strap malfunction. The licensee stated that this conclusion is valid even considering the as-found condition of the "B" battery cells at Robinson.

The licensee concluded that the battery will perform its safety functions with the observed fractures in the posts.

This issue is being referred to the Region II Division of Reactor Safety for followup and will be tracked as IFI 93-21-06: Vital Battery Terminal Fractures.

For the maintenance observations no violations or deviations were identified. One inspector followup item concerning battery post fractures was identified.

5. Followup (92700, 92701, 92702)

(Closed) URI 93-19-05, Ventilation System Damper Manipulation During Performance Of Surveillance Testing. Inspection Report 93-19 discusses manipulation of air cleaning unit dampers on May 1, 1992, during Engineering Surveillance Test Procedure, EST-023, Control Room Emergency Ventilation System. As documented in the completed EST, this manipulation was required to eliminate backflow through the idle ACU fans due to the backdraft dampers not fully shutting. When questioned on the appropriateness of this action, the system engineer stated that

counterweights had been added to the dampers to eliminate this problem. However, the system engineer was unsure if these additional weights were added before or after the May 1, 1992, performance of EST-023.

On September 27, 1993, the system engineer informed the inspectors that the damper counterweights had been added approximately 5 months prior to the May 1 performance of the EST. Hence, the counterweights failed to ensure that the backdraft dampers shut during performance of the EST. The system engineer stated that no further corrective actions, beyond manipulating the dampers during the test had been performed.

The licensee also stated that this manipulation would not be necessary with an ACU fan operating since the fans aid in damper closing. An ACU fan starts when the ventilation system shifts to its safeguards configuration.

Additionally, the system engineer pointed out that the operation of these dampers is also checked every two weeks during the performance of Operations Surveillance Testing, OST-750, Control Room Emergency Ventilation System Test and that failure of these dampers to operate has not been observed. Based on this information and observations by the inspectors of control room ventilation system operation, the inspectors concluded that there was no safety significance to the initial damper manipulation.

(Closed) IFI 91-16-01, Review Methods to Achieve Criticality in the Source Range. The SRNIs and IRNIs were retracted about two feet as part of corrective actions for ACR 91-285. A decrease in SRNI indication by about a factor of two was observed. The inspector reviewed EST-050, Refueling Startup Procedure, completed for Cycle 14 and Cycle 15 startups. The inspector compared the data taken during initial criticality by boron dilution and found that criticality for Cycle 15 was achieved about a decade below the P-6 IRNI Low Flux Reactor Trip block and SRNI de-energization setpoint. However, because new IRNI detectors were installed during RFO 14, no meaningful comparison between Cycle 14 and Cycle 15 data could be made. The inspector noted that the POAH value for Cycle 15 was about a full decade below the value for Cycle 14. The inspector concluded that retracting the SRNIs and IRNIs would allow criticality to be achieved before de-energizing the SRNIs.

(Closed) IFI 91-16-02, Review Enhancements to Procedure EST-050 to Increase Guidance. This IFI dealt with additional guidance in EST-050 for activities associated with determining the POAH and establishing a margin for the ZPTR, MTC calculation, and reactivity computer calibration accuracy. The inspector reviewed EST-050, Revision 12, for changes in response to this IFI.

A note was added before step 7.1.20 which listed plant parameter changes that would indicate the POAH. These parameters included an increase in pressurizer level, RCS T_{avg}, or RCS T_{Hot} or a decrease in reactivity computer flux or reactivity. The inspector discussed these indications

with the licensee to verify which indication would be the most responsive. The licensee stated the reactivity computer would respond first due to the increased sensitivity to small flux changes. The inspector then questioned if the other indications were sufficiently responsive. The licensee stated that pressurizer level was the least responsive indicator, but RCS T_{avg} and RCS T_{Hot} responded quickly because the bypass manifold had been removed. Based on this review, the inspector concluded these parameter changes were acceptable as indications of the POAH.

EST-050 had been revised to establish the ZPTR Upper Limit up to one decade below the POAH. The inspector reviewed the ZPTR limits determined for the Cycle 15 startup and discussed these limits with the licensee. The licensee stated that a 3/4 ZPTR decade Upper Limit was used due to insufficient S/N for a full decade. The reduced S/N was evidently due to lower neutron leakage for this particular core loading. The inspector concluded that the one decade established sufficient margin between the POAH and the ZPTR Upper Limit.

To provide additional resolution for the reactivity-temperature trace used for MTC determination, an X-Y plotter was used to record the reactivity-temperature data. Also, EST-050 directed the plotter scaled to the maximum spans available for the paper size being used. The inspector concluded the use of an X-Y plotter and maximizing the span would enhance the ability to analyze the reactivity-temperature data. The amount of data to be taken was specified as up to a 5°F change or three or more inches of trace length. Because a heatup or cooldown rate of 10°F/hr was required, the inspector questioned if trace length was sufficient to obtain an acceptable reactivity-temperature relationship. The licensee stated that the three inches of trace length historically represented about a 4°F temperature change. The inspector concluded the specified trace length was an acceptable indication that sufficient data was obtained.

Also EST-050 Attachment 8.4 was changed to require the two reactivity computer calibration data set averages agree within ±4%. The inspector concluded this requirement was sufficiently accurate.

(Closed) IFI 93-12-05, NRC Review and Follow-up of Any SWS Heat Exchanger Inspections and Tests During the 1993 Refueling Outage. The inspector reviewed photographs of the EDG 'A' heat exchangers, the CCW 'A' heat exchanger, and the AFW 'A' lube oil cooler. These photographs were taken immediately after these components were opened to record the as-found condition.

The end bells for the EDG 'A' heat exchangers had soft sludge deposited in defined rows. Also, nodules of the same soft sludge had deposited in the water box of the heat exchangers. This sludge was easily removed and there was insufficient accumulation to interfere with water flow through the heat exchangers. There was a noticeable decrease in the amount of sludge deposited when compared to the photographs for the previous

inspection. Small pebbles of manganese dioxide were found inside several tubes. These pebbles did not obstruct flow. Some scale had developed inside the tubes and some tubes were plugged with soft sludge. The scale and soft sludge were removed during mechanical cleaning. Prior to the heat exchanger final flush and closure, the inspector checked the condition of the tubes. Based on the visual examination, the tubes were clear of any plugging, but some pebbles of manganese dioxide were present. The licensee said these would be removed by the final flush.

The AFW lube oil coolers were a four-pass heat exchanger in a four foot long by six inch diameter jacket. The lube oil coolers were found to have substantial fouling. The end bell was 90 percent fouled as were 30 percent of the tubes. The AFW 'A' lube oil cooler failed hydrostatic testing and was replaced. The AFW 'B' lube oil cooler was mechanically cleaned and reinstalled. The inspector reviewed the data for the last six performances of OST-201, Motor Driven Auxiliary Feedwater System Component Test, for indications of lube oil cooler degradation. The lube oil differential temperature, which remained between 5°F and 7°F over the last six performances, did not indicate any degradation. The inspector discussed the substantial fouling of the lube oil coolers with the licensee. The licensee stated the lube oil coolers historically have had substantial fouling with no degradation indicated by OST-201.

The photographs of the CCW 'A' heat exchanger indicated minimal fouling. Small quantities of the soft sludge had accumulated only in pockets and crevices in the coating of the water box. The tubes appeared to be clear of any fouling. Subsequent inside dimensional testing was inconclusive and will be the subject of future inspection effort.

(Closed) LER 93-10, Diesel Generator Fire. At approximately 3:00 p.m. on August 16, 1993, a small oil fire occurred on the exhaust manifold of "A" Emergency Diesel Generator (EDG) during the performance of OST-401, Emergency Diesels Slow Speed Start. The Unit was operating at 100 percent power at the time of the event. The fire was immediately extinguished by the operator using a portable fire extinguisher. The "A" EDG continued to operate for the period of time required by the OST and the plant continued to operate at 100 percent power.

At approximately 3:20 p.m. the licensee declared an Alert, based on a fire with the potential to affect safety-related equipment. The Emergency Response Organization (ERO) was notified and the Technical Support Center (TSC) was activated. Appropriate notifications were made to State and Counties, the NRC, and other organizations as required. Based on the fire being extinguished and the "A" EDG continuing to operate in a loaded condition, the Alert was downgraded and the emergency terminated at 4:37 p.m..

The licensee formed an incident evaluation team to determine the cause of the fire and to recommend corrective actions. The incident

evaluation team identified that the gasket installed on the exhaust manifold had been misaligned and crimped allowing oil from the pre-lube process to leak into the heat shield where it later ignited and caused a small fire.

The exhaust manifold gasket was replaced and the "A" EDG tested satisfactorily. The licensee has committed to revising procedure CM-640, EDG Exhaust System Maintenance, to include more specific guidance on the installation of the exhaust manifold gaskets. The procedure change is to be completed by November 12, 1993.

6. Exit Interview (71701)

The inspection scope and findings were summarized on October 15, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below and in the summary. Dissenting comments were not received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Item Number	Description/Reference Paragraph
93-21-01	NCV: Failure Of STA To Conduct Turnover Required By OMM-008 (Paragraph 3)
93-21-02	VIO: Failure To Follow Procedures, Two Examples Concerning Opening The Incorrect Electrical Breaker, and Sludge Lance Rig Vent Valve (Paragraph 3)
93-21-03	NCV: Area Fire Watch Vacates Post (Paragraph 3)
93-21-04	VIO: Failure To Maintain Containment Integrity During Refueling Operations (paragraph 3)
93-21-05	IFI: Fuel Assembly Loose Part (Paragraph 3)
93-21-06	IFI: Vital Battery Terminal Fractures (Paragraph 4)

7. List of Acronyms and Initialisms

ACR	Adverse Condition Report
ACU	Air Cooling Unit
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CM	Corrective Maintenance
CV	Containment Vessel
EE	Engineering Evaluation
ECCS	Emergency Core Cooling System

EDG	Emergency Diesel Generator
EQ	Environmental Qualification
ERO	Emergency Response Organization
EST	Engineering Surveillance Test
FP	Fire Protection
GP	General Procedure
IFI	Inspector Followup Item
IR	Inspection Report
IRNIs	Intermediate Range Nuclear Instruments
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
MCC	Motor Control Center
MST	Maintenance Surveillance Test
MTC	Moderator Temperature Coefficient
CV	Non-cited Violation
OMM	Operations Management Manual
ONCA	Off Normal Condition Analysis Form
OP	Operations Procedure
OST	Operations Surveillance Test
PM	Preventive Maintenance
POAH	Point Of Adding Heat
RCCA	Rod Control Cluster Assembly
RCS	Reactor Coolant System
REV	Revision
RHR	Residual Heat Removal
RO	Refueling Outage
RWST	Refueling Water Storage Tank
S/G	Steam Generator
SI	Safety Injection
S/N	Signal-to-Noise Ratio
SP	Special Procedure
SRNIs	Source Range Nuclear Instruments
STA	Shift Technical Advisor
SWS	Service Water System
TAVG	Temperature Average
TMM	Technical Support Management Manual
TS	Technical Specification
TSC	Technical Support Center
WR/JO	Work Request/Job Order
ZPTR	Zero Power Testing Range