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

Report No.: 50-261/94-27

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: October 23 - December 3, 1994

Lead Inspector: _____ 12/29/94
W. T. Orders, Senior Resident Inspector Date Signed

Accompanying Inspectors: C. R. Ogle, Resident Inspector
J. L. Starefos, Project Engineer
A. W. Salyers, Region II Inspector

Approved by: _____ 12/29/94
for 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, surveillance observation, maintenance observation, plant safety review committee activities, emergency preparedness assessment, and followup of previously identified items. The inspection effort included reviews of activities during non-regular work hours on October 31, November 1, 2, 7, 8, 15, 16, and 22.

RESULTS:

In the area of Plant Operations, one violation was identified which deals with the mispositioning of the control switch for one of the control room ventilation fans. This configuration control issue was caused by operator inattention to detail which led to his failing to follow the requisites of a surveillance procedure and resulted in the system being degraded. The system remained degraded for four days even though the control room panels were walked down by operators once per hour during the four day period. Operator failure to follow procedure and inattention to detail are chronic problems.

In the area of Maintenance, one violation, three non-cited violations, and two unresolved items were identified. The violation deals with inadequacies associated with the licensee's power range calorimetric program, specifically with calibration of instrumentation, control of assumptions and assessment of errors. One of the non-cited violations concerns the licensee's failure to adequately test redundant series mounted control room ventilation system dampers. The second non-cited violation concerns inadequacies identified in the procedure employed by the licensee to calibrate a component cooling water transmitter. The third non-cited violation deals with the licensee's failure to have a procedure to facilitate maintenance on safety-related auxiliary feedwater flow control valves. The first unresolved item concerns the use of unqualified oil in safety related equipment. The second unresolved item concerns the resolution of feedwater nozzle performance

In the area of Engineering, one non-cited violation was identified which deals with the licensee's failure to control the modification of the main control room panels.

In the area of Plant Support, one unresolved item was identified involving the modification of the TSC/EOF building and the resultant effect on the ventilation system.

The licensee conducted an annual emergency preparedness exercise on November 15, 1994. No exercises weakness, violations or deviations were identified.

A representative from the Boise Interagency Fire Center visited Robinson on November 30, 1994, as part of a contract to provide the NRC emergency communications equipment should the need arise. The objective of the site visit was to collect logistics information for preplanning purposes.

REPORT DETAILS

1. PERSONS CONTACTED

Licensee Employees:

W. Brand, Supervisor, Environmental Radiation Control
M. Brown, Manager, Design Engineering
*A. Carley, Manager, Site Communications
*B. Clark, Manager, Maintenance
*D. Crook, Licensing/Regulatory Programs
C. Gray, Manager, Materials and Contract Services
D. Gudger, Licensing/Regulatory Programs
*S. Hinnant, Vice President, Robinson Nuclear Project
*P. Jenny, Manager, Emergency Preparedness
*K. Jury, Manager, Licensing/Regulatory Programs
J. Kozyra, Licensing/Regulatory Programs
*R. Krich, Manager, Regulatory Affairs
*B. Meyer, Manager, Operations
D. Taylor, Plant Controller
G. Walters, Manager, Support Training
*R. Warden, Manager, Plant Support Nuclear Assessment Section
W. Whelan, Industrial Health and Safety Representative
*D. Whitehead, Manager, Plant Support Services
T. Wilkerson, Manager,Environmental Radiation Control
L. Woods, Manager, Technical Support
*D. Young, Plant General Manager

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

NRC Personnel

*W. Orders, Senior Resident Inspector
C. Ogle, Resident Inspector
*J. Starefos, Project Engineer
*G. Salyers, Region II Inspector

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

2. PLANT STATUS AND ACTIVITIES

Operating Status

The unit operated for the entire report period with no major operational perturbations. As of the end of the report period, the unit had been on line for 112 days.

3. OPERATIONS

a. Plant Operations (71707)

The inspectors evaluated licensee activities to determine if the facility was being operated safely and in conformance with regulatory requirements. These activities were assessed through direct observation, facility tours, interviews and discussions with licensee personnel, evaluation of safety system status, and review of facility records. The inspectors reviewed shift logs, operation's records, data sheets, instrument traces, and records of equipment malfunctions to assess equipment operability and compliance with TS. The inspectors evaluated the operating staff to determine if they were knowledgeable of plant conditions, responded properly to alarms, adhered to procedures and applicable administrative controls, were cognizant of in-progress surveillance and maintenance activities, and were aware of inoperable equipment status. The inspectors performed instrument channel checks, reviewed component status, and reviewed safety-related parameters to determine conformance with TS. Shift changes were routinely observed to determine if system status continuity was maintained and that proper control room staffing existed. Access to the control room was well managed, and in general, operations personnel carried out their assigned duties in an effective manner. Control room demeanor and communications were appropriate.

Routine plant tours were conducted to evaluate 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.

b. Onsite Response to Events (93702)

Control Room Ventilation Misalignment

At 8:35 p.m. on November 15, 1994, an operator found the control switch for control room air conditioning system fan HVA-1B in the "STOP" position instead of the required "AUTO" position. The switch was immediately placed in the "AUTO" position which returned the fan to operable status. In this mis-configuration, the fan would not have auto started during certain design basis accident scenarios.

Background

The control room air conditioning system, is comprised of two sub systems; an environmental control system and air cleanup system. The system is nuclear safety related and redundancy is provided for safety-related active components.

The environmental control system operates continuously during normal and emergency conditions. This system consists of two redundant 100 percent capacity centrifugal fans and gravity dampers arranged in parallel, and a stainless steel housing containing a medium efficiency filter and redundant cooling coils. Redundant safety-related equipment and controls are powered from separate safety-related power supplies. A nonsafety-related fan provides exhaust from the control room through the kitchen and toilet areas to the outdoors during normal operation.

The air cleanup system normally operates only during emergency conditions. This system consists of redundant centrifugal fans and gravity dampers arranged in parallel, and a stainless steel housing containing filter and charcoal absorber banks. The system contains a single outside air intake with connecting duct work containing redundant parallel air operated control dampers. The control room kitchen and toilet exhaust duct work contains redundant air operated control dampers arranged in series.

The system is designed to provide three operational modes, normal ventilation, emergency pressurization, and emergency recirculation.

During normal ventilation, one train of the environmental control system is in operation in conjunction with the kitchen and toilet area exhaust fan.

During emergency pressurization, a single train of both the environmental control system and the air cleaning system are in operation. The kitchen and toilet air exhaust fan is shutdown and exhaust dampers closed. A positive pressure is maintained in the control room envelope with respect to adjacent areas and the outdoors. A safety injection signal or a signal from the control room radiation monitor will automatically place the system in the emergency pressurization operating mode. The emergency pressurization mode may also be manually initiated.

The emergency recirculation mode of operation is achieved by first placing the system in the emergency pressurization and then closing both outside air intake dampers via their control switches in the control room. This mode of operation is not a design basis requirement, but is provided to allow isolation of the control room outside air makeup.

Event Details

On the morning of November 15, 1994, an operator found the control switch for control room air conditioning system fan HVA-1B in the STOP position instead of the required AUTO position. The switch was immediately placed in the AUTO position which returned the system to operable status. In this erroneous configuration, the fan would not have automatically started during design basis

accident scenarios. The licensee determined that the switch had been placed in the STOP position on November 11, 1994, when an operator, who was performing operations surveillance test OST-750, Control Room Emergency Ventilation System, placed the switch in STOP when the procedure required that he verify that the fan was OFF. Since the fan was already off, he should have merely verified that the fan was not running.

As described above, the system is designed to automatically align to the emergency pressurization mode upon the receipt of either a safety injection or control room high radiation signal. Upon the receipt of either of these signals, one of the redundant air cleanup fans start, the redundant control room exhaust dampers close, and outside air is used to pressurize the control room. To perform this pressurization function, at least one of the environmental control fans HVA-1A or HVA-1B must also be in operation. Although these fans do not get a direct AUTO start signal, one of the two redundant fans is always running, and the other is designed to start upon the receipt of a low flow signal from the opposite fan. With the switch for the HVA-1B fan in the STOP position, and assuming the single active failure of the A diesel generator, the system would not have been capable of pressurizing the control room without manual action by the operators to start fan HVA-1B.

It should be noted that the inspectors verified that current, in place, emergency procedures would have prompted the operators to verify that the system was operating properly and take action, if necessary, to initiate system function.

Conclusion

The operator performing OST-750 on November 11, 1994, failed to follow the requisites of the procedure which resulted in making the B train of the system inoperable.

The inspectors noted that even though the reactor operators performed a control panel walkdown once per hour during the period in question and the STA performed a control panel walkdown once every four hours, the mispositioned switch was not detected for four days. This event is of concern to the NRC because it is an example of inattention to detail on the part of the operating staff. It should also be noted that operators failing to follow procedures and not being aware of the status of controls and indications in the control room is a chronic problem.

Technical Specification 3.15.1 requires that during all modes of plant operation, the control room air conditioning system shall be operable with two trains of active safety-related components and shared safety-related passive components.

Technical Specification 3.15.1 requires the control room air conditioning system be operable during all modes of plant operation, including two trains of active safety-related components and shared safety-related passive components.

OST-750, Control Room Emergency Ventilation System requires in step 7.2.1 that HVA-1B be verified to be OFF but does not require the operator to take the switch to the STOP position.

On November 11, 1994, an operator failed to follow the requisites of operations surveillance test OST-750, Control Room Emergency Ventilation System, when he placed the control switch for idle control room air conditioning system fan HVA-1B in STOP when the procedure required that he verify that the fan was OFF. This misconfiguration resulted in the B train of the system being inoperable for four days, and rendered the system incapable of performing its intended safety function, assuming an active single failure in the opposite train. This is a Violation, VIO 94-27-01: Operator Procedure Non-Compliance Results In Control Room Ventilation Inoperability.

c. Effectiveness of Licensee Control in Identifying, Resolving, and Preventing Problems (40500)

The inspectors evaluated certain activities of the PNSC to determine whether the onsite review functions were conducted in accordance with TS and other regulatory requirements. In particular, the inspectors attended the PNSC meeting held on November 18, 1994, which dealt with a NAD audit of operations. It was determined that provisions of the TS dealing with membership, review process, frequency, and qualifications were satisfied. The inspectors also reviewed selected previously identified PNSC activities to independently determine if that corrective actions were progressing satisfactorily.

Based on the information obtained during the inspection, except as noted above, the operations program was adequately implemented.

4. MAINTENANCE

a. 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, approved procedures, and appropriate industry codes and standards. 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,

radiological, and fire prevention controls were adhered to. In particular, the inspectors observed/reviewed the following maintenance activities detailed below:

WR/JO 94-BWP471	Calibrate The Component Cooling Loop Flow Instrumentation (FT-613 only)
WR/JO 94-CBY003	End Of Core Life (EOL) Calibration Of Rod Insertion Limits
WR/JO 94-AQQJ1	Assist Tech Support In Testing Control Room Ventilation System

CCW Flow Transmitter Calibration

The inspectors witnessed calibration of FT-613 Component Cooling Water Flow transmitter accomplished in accordance with Process Instrument Calibration Procedure, PIC-002, D/P Electronic Transmitter (4-20 mA Output). While the overall conduct of the calibration was adequate, the inspectors noted several procedural deficiencies.

The generic transmitter isolation and restoration sequence specified in Attachment 8.3 of PIC-002 was inadequate. The valves shown on the valve manifold sketch in this attachment are labelled "A", "B", and "C." No designation is provided as to which letter represents the high and low pressure isolation valves. The generic isolation and restoration sequence is provided in terms of the "A", "B", and "C" designations only. The inspectors observed that the physical arrangement of these valves does vary in the plant between transmitters. This lack of specificity coupled with the in-plant variations in manifold configuration could result in a transmitter isolation or restoration in the reverse of the order specified.

The inspectors also noted that PIC-002 fails to provide instructions on repositioning the equalizing valve in the interval between instrument isolation and calibration as well as between calibration and restoration. Following instrument isolation, the equalizing valve is open. No procedural guidance exists in PIC-002 to shut this valve when the calibration is performed. (The equalizing valve must be shut in order to apply a differential pressure to the transmitter.) Likewise, following calibration nothing in PIC-002 prompts the technician to open the equalizing valve prior to performing the manifold block restoration sequence.

The inspectors also noted that the transmitter tolerance specified on the calibration data sheet was incorrect. Instead of a 20 millivolt tolerance, the calibration data sheet specified a 200 millivolt tolerance.

The inspectors noted that none of these errors was especially significant and the technician was able to accomplish the calibration in spite of the procedural deficiencies.

Nevertheless, the inspectors concluded that the procedure was not correct as written. The licensee committed to correcting the procedure to address the items identified above.

Technical Specification 6.5.1.1, Procedures, Tests, and Experiments, requires in part, that written procedures be established, implemented and maintained for the activities specified in Appendix A of Regulatory Guide 1.33, Rev. 2, February 1972, including maintenance.

Process Instrument Calibration Procedure, PIC-002, D/D Electronic Transmitter (4-20 mA Output) is provided for calibration of differential pressure transmitters including FT-613, Component Cooling Loop Flow.

On November 21, 1994, PIC-002 was inadequate in that not only did it not contain all necessary steps to perform the calibration, but if followed as written, it would have resulted in valving out the transmitter in reverse sequence.

This NRC identified violation is not being cited because criteria specified in Section VII.B of the NRC Enforcement Policy were satisfied. This item is identified as a non-cited violation NCV 94-27-02: Inadequate FT-613 Calibration Procedure.

The inspectors noted that FT-613 was also isolated at the instrument root stops in accordance with a local clearance and test request. The inspectors were advised that instruments are not always isolated at the root stops for calibration. However, when they are, the inspectors were informed that Operations personnel do not manipulate the manifold block equalizing valve when hanging or removing the clearance. (The operator who removed the FT-613 root valve clearance told the inspectors that he did not manipulate the equalizing valve when removing the clearance on the FT-613 root isolation valves.) The inspectors concluded that as a minimum this strategy can defeat the licensee's isolation and restoration sequence at the manifold valves. At worst, the manipulation of the root stops by Operations has the potential to subject one side of the transmitter to system pressure without corresponding system counter pressure on the other side of the transmitter diagram.

The inspectors also questioned the licensee's method for transmitter restoration and isolation. The inspectors were advised that the I & C technicians are trained that when isolating a differential pressure transmitter, the licensee's sequence is to shut the high side valve, open the equalizing valve, and shut the low pressure side valve. Conversely on restoration, the sequence is to open the low pressure side valve, close the equalizing valve, and open the high side valve. The inspectors were advised that this method is specified consistently in the licensee's procedures.

Following inspector questions on this technique, the licensee received the manufacturer's recommended practice for valving differential pressure transmitters in and out of service. The manufacturer recommends that when isolating a transmitter the desired sequence is to open the equalizing valve and then shut the low and high side valves. When restoring the transmitters to service, the manufacturer's recommended sequence is open the equalizing valve, open the high side and low side valves, and shut the equalizing valve. The manufacturer's letter on this subject stated that this technique "...insures that neither the transmitter high or low side will be subjected to an overpressure condition during the valve in and valve out process." Further, the letter stated that failure to properly equalize the transmitter "...can result in an overpressure condition which will cause a shift in transmitter zero." The manufacturer stated that this overpressure condition would not damage the transmitter. The inspectors were advised that the licensee's valve operating sequence was in part, developed to minimize potential consequences which could occur as a result of equalizing the two sides of the transmitters. The inspectors acknowledge that in some situations, use of the manufacturers' technique may have undesirable side-effects. However, these potential shortcomings do not apply to the FT-613 configuration. Further, the licensee was unable to furnish any historical analysis of the consequences of potential zero shifts on transmitters resulting from the licensee's procedure. The licensee is evaluating the potential for transmitter zero shifts using their technique. The inspectors will monitor this effort.

Use Of Unqualified Oil In WCCU

During the morning of November 30, 1994, the inspectors observed that the Texaco Capella Premium 68 oil being used in the ongoing maintenance on WCCU-1A was not designated as to its procurement quality. The inspectors questioned this and following a subsequent licensee review were advised that the oil was non-Q.

At 2:00 p.m., that day, the licensee declared WCCU-1B out-of-service due to the fact that the oil installed in the unit was also non-Q. Since WCCU-1A was inoperable for ongoing maintenance, the licensees entered TS 3.15.1b. This TS required that at least one WCCU be restored to an operable status within 48 hours or the unit be placed in hot shutdown within 8 hours. At 9:07 p.m., that evening, the licensee exited TS 3.15.1b when the WCCU-1B was declared back in service. This declaration occurred following the licensee's dedication of the Texaco Capella Oil Premium 68 installed in the WCCUs. This was based on analysis of samples of the Texaco Capella Oil Premium 68.

Pending a review of the licensee's procurement practices for oil for the WCCUs this item is identified as an unresolved item, URI 94-27-03: WCCU Oil Procurement Practices

Failure to Provide Procedure For Maintenance On Auxiliary Feedwater Valves

On November 9, 1994, during a routine inspection of the motor driven auxiliary feedwater pumps, the inspectors noted that the jam nuts designed to assist in securing the valve stem to actuator coupling on flow control FCV-1424 and FCV-1425 appeared to be improperly adjusted. Valve FCV-1424 had four jam nuts, all of which were located at the actuator end of the threaded coupling. Valve FCV-1425 had only three jam nuts, one of which was located at the valve end of the coupling and the other two were located at the actuator end. The licensee later determined that the nuts were loose.

The inspectors notified the system engineer of the observation, and reviewed the technical manual for the ITT Barton (Hydramotor) actuators. The manual clearly identified the correct location of the jam nuts as being two at either end of the coupling and specified a torque value of 100 inch pounds to be applied to the nuts. This meant that both FCV-1424 and FCV-1425 were set up incorrectly.

The system engineer contacted the vendor for the valve actuators to determine the significance of the as-found configuration. According to the engineer, the vendor stated that in the case of valves FCV-1424 and FCV-1425 which employs an ITT Barton NH-91 actuator with a Grinnel gate valve, the jam nuts were not necessary since no torque is applied to the coupling which could cause valve stroke misadjustment if the coupling become loosened.

During their inspection to determine why the actuator couplings were found improperly adjusted, the inspectors determined that these same jam nuts had been found loose on FCV-1424 in January 1991, and on FCV-1425 in June 1992. The inspectors also determined that although the valves are safety-related equipment, no procedure existed for maintenance on their actuators despite the fact that a request for a procedure was generated in September of 1993. The need for a procedure had also been identified in September of 1994, when an operability determination (94-035) was performed after it was determined that the flow controllers associated with the valves had been calibrated without a procedure.

The licensee has committed to write a procedure to provide specific instruction for the installation and required maintenance of the actuator/valve assemblies.

Failure to have a procedure for maintenance on safety-related equipment is a violation of TS 6.5.1.1. However, since this event meets the criteria specified in Section VII.B of the NRC Enforcement Policy, the violation will not be cited. This item

will be tracked as non-cited violation NCV 94-27-04, Failure To Provide Procedure For Safety-Related Maintenance.

b. Surveillance Observation (61726)

The inspectors observed certain safety-related surveillance activities on systems and components to ascertain that these activities were conducted in accordance with license requirements. For the surveillance test procedures listed below, the inspectors determined that precautions and LCOs were adhered to, the required administrative approvals and tagouts were obtained prior to test initiation, testing was accomplished by qualified personnel in accordance with an approved test procedure, test instrumentation was properly calibrated, the tests were completed at the required frequency, and that the tests conformed to TS requirements. Upon test completion, the inspectors verified the recorded test data was complete, accurate, and met TS requirements, test discrepancies were properly documented and rectified, and that the systems were properly returned to service. Specifically, the inspectors witnessed/reviewed portions of the following test activities:

OST-010	Power Range Calorimetric During Power Operation

Control Room Exhaust Dampers

Unresolved Item, URI 94-23-05, documents the resident inspectors' concerns associated with testing of the control room exhaust dampers, CR-D1A and CR-D1B. These in-series redundant dampers automatically close as part of the control room emergency pressurization sequence. Though both dampers were tested together during existing surveillance tests, the licensee performed no routine test of the capability of a single damper to close and facilitate control room pressurization.

On November 9, 1994, the licensee conducted testing which demonstrated the capability of the exhaust dampers to individually seal, thereby permitting adequate control room pressurization. This testing was performed using a revised version of EST-023, Control Room Emergency Ventilation System. The inspectors witnessed portions of the test and reviewed the completed EST and observed that the control room was pressurized adequately using either damper individually.

The failure of the licensee to test the capability of the individual control room exhaust dampers to individually permit control room pressurization is a violation of 10 CFR 50, Appendix B, Criterion XI, Test Control, which requires in part that a test program be established to assure that all testing required to demonstrate that systems will perform satisfactorily in service is identified and performed in accordance with written

test procedures which incorporate the acceptance limits contained in the applicable design documents.

The licensee's Updated Final Safety Analysis Report (UFSAR) sections 6.4 and 9.4.2 require, in part, that the control room ventilation system be capable of maintaining the control room at a positive differential pressure with respect to adjacent areas and the outdoors when the system is operated in the emergency pressurization mode of operation. Further, this reference specifies that the system will remain operable given the failure of a single active component. Each exhaust damper is an active component.

From February 1, 1991, until November 9, 1994, the licensee did not implement adequate testing to verify that the control room ventilation system was capable of performing its design function. Specifically, testing did not demonstrate that a positive pressure could be maintained in the control room assuming that a single exhaust damper failed to shut. This NRC identified violation is not being cited because criteria specified in Section VII.B of the NRC Enforcement Policy were satisfied. This item will be tracked as a non-cited violation NCV 94-27-05, Inadequate Testing Of Control Room Ventilation Dampers.

Assessment Of Calorimetric Program (61726, 61706)

The inspectors reviewed the licensee's power range calorimetric program. This inspection effort consisted of witnessing performances of OST-010, Power Range Calorimetric During Power Operation; verification of portions of the logic and assumptions used in the ERFIS calorimetric calculation; and a review of calibration of instruments used in the calorimetric. Additionally, the inspectors attempted to conduct a rudimentary cross-check of reactor power using diverse indications as a check on the validity of the calorimetric calculation.

Operations

While witnessing the performance of OST-010, the inspectors observed that the auxiliary operators collect differential pressure data from Barton differential pressure instruments installed in the turbine building. For feed flow, the operators record three differential pressure readings one minute apart, while for blowdown flow, a single differential pressure reading is taken. Using these readings, a control room operator calculates the average feed flow Barton differential pressures. This information is subsequently entered into the ERFIS calorimetric program to calculate the flow. The inspectors noted that the three-minute averaging of feed flow is not specified in the procedure. Further, the Barton readings are recorded on a scrap piece of paper which is not retained, hence eliminating any second check or

review of the data or the averaging process. The inspectors also noted that the timing of the reading of the Bartons and the automatic acquisition of other data points performed by the calorimetric program was not procedurally specified and varied among operators. While the calorimetric procedure specifies that plant power be held constant, the inspectors noted that slight variations in-plant parameters used in the calorimetric do occur. The inspectors concluded that given these variations, the lack of procedural guidance to specify the timing of these two separate steps in the data acquisition process could introduce errors.

The inspectors also observed that the computer generated data sheet for OST-010 states that F_a, the feed flow nozzle thermal area factor, is obtained from Attachment 8.3. No such attachment exists for OST-010. This error does not impact the performance of the calorimetric.

Instrument Calibration

The inspectors reviewed the licensee's calibration of instruments which provide inputs to the calorimetric. The following deficiencies were noted:

The inspectors observed that the feedwater temperature RTDs, used in the calculation of feedwater enthalpy are not included in the licensee's calibration program. A portion of the feedwater temperature signal path in ERFIS is calibrated, however, this calibration would not detect degradation in the sensors or the remaining portion of the circuits.

The inspectors also determined that no routine verification of feedwater flow nozzle performance is performed. The inspectors were advised by the licensee that a visual inspection of the three nozzles is conducted on a refueling interval basis. Further, the licensee advised the inspectors that these inspections have not detected problems with the nozzles. The inspectors reviewed the nozzle inspection work packages from the last outage and noted that the inspection results consisted of a single sentence which described the nozzles as being in a satisfactory condition. The licensee was unable to provide any quantitative data to demonstrate that feedwater flow nozzle characteristics have not changed over the last 24 years of service. The inspectors concluded that the lack of a quantitative assessment of feedwater nozzle performance could prevent detection of gradual feedwater flow nozzle degradation. Given the dramatic direct impact that even small changes in feedwater flow have on the calorimetric results, this shortcoming represents a key vulnerability in the licensee's

calorimetric program. This potential shortcoming was identified to the licensee. Pending the licensee's resolution of feedwater flow nozzle performance, this item will be tracked as an unresolved item, URI 94-27-06: Resolution of Feedwater Nozzle Performance and Impact On Calorimetric.

The inspectors reviewed completed calibration data sheets for the instruments used in the calorimetric. From this review, the inspectors determined that the licensee has not applied consistent controls to these instruments if an out of tolerance condition is identified. Specifically, the calibration data sheet for the feedwater flow Bartons requires that an operating supervisor be notified if the instrument is found out of calibration. However, no similar requirement exists for the steam generator blowdown Bartons. In fact, on January 7, 1994, DPI-1328B, Steam Generator B Blowdown Differential Pressure, was found out of tolerance during a licensee calibration. An assessment of this out of tolerance condition on the bottom of the calibration data sheet stated: "Indicating needle had moved; possibly due to a pressure shock, non-Q application non-reportable." No documentation existed which shows that the effect of this out of tolerance condition had on the calorimetric was considered at the time . During the course of the inspection, the inspectors were advised that data sheets for the blowdown Barton calibration are being revised to require review if out of tolerance conditions are detected. Additionally, the inspectors were advised that the licensee has implemented a post-calibration review for data sheets for trending purposes. A subsequent licensee assessment determined that this instrument miscalibration introduced an error of less than 1.5 megawatts thermal.

The inspectors also noted from their review of the calibration data sheets that the licensee is calibrating the feedwater flow and steam generator blowdown Bartons to a tolerance four times less restrictive than that specified by the manufacturer. (Manufacturer $\pm$1/2%; licensee $\pm$ 2%.) A review of the completed calibration sheets revealed that all three steam generator blowdown Bartons have exceeded the more restrictive manufacturer's tolerance on at least one calibration point during the most recent calibration. (All three Bartons met the licensee's less restrictive calibration tolerance.) Furthermore, DPI 1328B, Steam Generator B Blowdown Differential Pressure, has been readjusted during each of the last four calibrations (June 1991 to June 1994). It was not apparent to the inspectors that the impact on the calorimetric of this relaxed instrument tolerance or the repetitive adjustment had been evaluated by the licensee.

On October 20, 1994, the inspectors observed that the ERFIS indication for steam generator pressure for loop 3 channel 2 differed by approximately 40 psig from the corresponding RTGB indication. Steam generator pressure as recorded in ERFIS is used in the calorimetric. Similar, but smaller deviations between the RTGB indication and ERFIS existed on all other steam generator pressure channels. Subsequent licensee reviews on October 26 and October 27, 1994, indicated a deviation of between 47 psig and 48 psig for the loop 3 channel 2 steam generator pressure indicators. The licensee subsequently determined that the deviation was a result of signal isolator PM-494D (ERFIS input) being out of tolerance low and PI-494 (RTGB indicator) being out of tolerance high. This condition was corrected by the licensee on October 31, 1994. Simultaneous licensee calorimetrics performed with RTGB steam generator pressures versus ERFIS values performed on October 26, 1994, revealed that this disparity in pressure readings for all steam generators translated into a little less than a 2 megawatt difference in core thermal power.

The calorimetric is equipped with routines which verify that the input data falls within acceptable ranges. Typically, the acceptable range is the instrument span. Additionally, the calorimetric will flag unacceptable deviations between the redundant steam generator pressure channels input to ERFIS or unacceptable deviations from the average feedwater temperature by any feedwater temperature instrument. However, no mechanism exists by which to detect deviations such as that which developed in the loop 3 channel 2 steam generation pressure instrument between different indicators.

The inspectors also determined that the licensee's calibration program does not verify the signal from the instrument loops to the ERFIS computer. Hence, portions of the feedwater temperature and steam generator pressure circuitry which feed the calorimetric program are not verified in any licensee calibration program. The failure to conduct a verification of the entire ERFIS signal path for the steam generator pressure instruments was previously identified during a Regulatory Guide (RG) 1.97 inspection documented in NRC Inspection Report 90-08. The licensee did conduct testing to verify the entire signal path during SP-1150, Process Analog Indications Comparison To ERFIS Point Indication For RG 1.97 Commitments on July 22, 1992. However, this was not incorporated into a routine verification of the entire ERFIS path. The inspectors were advised that the licensee has implemented steps to verify the ERFIS outputs during instrument loop calibrations until complete verification of the ERFIS loop can be procedurally implemented.

Calorimetric Program

The inspectors reviewed the calorimetric program. The following items were observed.

The inspectors were advised by ERFIS personnel that input data for the 12 ERFIS points used in the calorimetric program are obtained from an instantaneous update when the program is activated. This strategy makes the calorimetric susceptible to errors as a result of normal variations in plant parameters. No adjustment, compensation, or administrative controls exist to correct for any error introduced as the result of this methodology.

Thermal power is calculated in the calorimetric program assuming a letdown flow of approximately 45 gpm. Though this is the normal letdown flow, the licensee does occasionally conduct power operations with approximately 100 gpm of letdown flow. There is no adjustment made to the calorimetric for this increased letdown. In fact, the assumed letdown flow is not discussed in the calorimetric procedure. Using licensee calculations of heat loss associated with letdown flow, the inspectors determined that this increased letdown could introduce almost a 3 megawatt thermal error into the calorimetric.

The calorimetric program uses a value of component heat loss obtained from testing performed in 1970. Discussions with plant personnel indicates that portions of the original asbestos containing lagging on some components in the CV were replaced in the mid 1980's. The impact in terms of calorimetric performance of this lagging replacement was not readily apparent from the information reviewed by the inspectors. However, the inspectors reviewed a 1987 insulation contractor's trip report which stated that following the insulation changeouts ".. the average containment air temperature reportedly increased from about 105° F to about 120° F." The inspectors did not independently verify this statement. The inspectors acknowledge that the component heat loss at 1.2 megawatts is a small part of the thermal power. Nevertheless, the inspectors concluded that relying on a heat loss calculation performed 24 years ago, in the face of even partial insulation changeout, may introduce errors into the calorimetric.

It was not apparent from the inspector's review of the calorimetric program that the overall accuracy of the calorimetric has been identified by the licensee. Instrument accuracies, errors introduced as a result of (curve fits) used in the calorimetric and gradual degradation of the component performance will affect the

accuracy of the alorimetric. This error has not been translated into a strategy which monitors the accuracy of the calorimetric and makes necessary changes or compensation to plant operations so as not to violate licensed thermal power limits.

Conclusion:

The inspectors acknowledge that the potential errors introduced into the calorimetric as a result of the items above, except for potential feed flow nozzle inaccuracies, are probably small. Additionally, conservatisms introduced into the calorimetric as a result of steam quality and feedwater enthalpy considerations may more than offset these items. Nevertheless, the inspectors observed that control of the calorimetric is weak. This weakness was reflected in deficiencies observed in the calibration of instrumentation, control of assumptions and initial conditions, and assessment of errors contained in the calorimetric. Overall, the inspectors concluded that the calorimetric program does not contain controls commensurate with its safety significance.

10 CFR 50, Appendix B, Criterion II, Quality Assurance Program, requires that the quality assurance program provide control over activities affecting quality of structures, systems, and components, to an extent commensurate with their importance to safety. Further, Criterion II requires that these activities be accomplished with the use of appropriate equipment and that all prerequisites have been identified and satisfied. Further, the program is required to take into account the need for special controls, test equipment, and the need for verification of quality by inspection or test.

On November 28, 1994, the inspectors determined that inadequate controls were applied to the licensee's calorimetric program. Deficiencies identified included use of uncalibrated instrumentation, failure to control the plant condition prerequisites under which the calorimetric program results were valid, failure to specify a method or timing for acquiring manually input data, lack of verification of automatically input data, and inconsistent controls on the instruments used in the calorimetric. This is identified as a violation, VIO 94-27-07: Failure To Adequately Control Calorimetric.

The inspectors attempted to independently assess the accuracy of the calorimetric using diverse indicators or the results of tests other than OST-010. However, the inspectors observed that most of the readily available information could be impacted by errors common to the

calorimetric. Given this limitation, the inspectors reviewed historical plant performance data which indicated that the current electrical output at an indicated power of 100 percent is consistent with that for similar conditions during the last three cycles.

Based on the information obtained during the inspection, except as noted above, the maintenance program was adequately implemented.

5. ENGINEERING

a. Onsite Engineering (37551)

RTGB Design Control

At approximately 3:00 p.m, on the afternoon of October 31, 1994, the inspectors were monitoring I & C work associated with the calibration of instrumentation on the RTGB, when they detected a piece of 1/2" electrical conduit attached by plastic tie wraps to two horizontal structural supports inside the panel. The piece of conduit had itself been used as a structural member to which bundles of wiring had been secured. The inspectors discussed their observations with the shift supervisor who in turn, notified the engineering department.

At 3:22 p.m. that afternoon, the shift supervisor initiated an operability determination on the RTGB due to the possible loss of associated controls and indications during a seismic event. The Licensee detected four other examples of unanalyzed wiring support material in the RTGB including a 6 foot length of one inch steel piping. An assortment of hardware had been used to secure these supports to the framework of the RTGB including 1/4" cable ties, 3/16" cable ties and metal clamps. The licensee's investigation failed to determine how or when the unanalyzed supports had been installed in the RTGB.

The licensee performed Operability Determination 94-01 which indicated that installation was acceptable, in that, the tie wraps provide sufficient structural support to resist the loadings which would occur during a design basis seismic event. The licensee's current plans are to replace the tie wrap supports with appropriately designed fasteners. This work is to be performed in compliance with the licensee's process for the modification of safety-related equipment.

10 CFR 50, Appendix B, Criterion III, Design Control requires in part, that design changes, including field changes, undergo the same review and meet the same standards as those applied to the original design. This review includes, but is not limited to the verification or checking the adequacy of the design.

The RTGB was modified with no review or verification of the adequacy of the design.

This NRC identified violation is not being cited because criteria specified in Section VII.B of the NRC Enforcement Policy were satisfied. This issue will be tracked as a non-cited violation, NCV 94-27-08; Unreviewed RTGB Modification.

Calibration Of Rod Insertion Limits

During post-calibration review, the inspectors noted that the control bank D end of life rod insertion limits specified on curve 1.9B, "Rod Insertion Limits," were incorrect. At 100 percent power, the curve specifies a control bank D insertion limit of 164 steps. However, the fuel vendor analysis for cycle 16 specifies 165 steps for this limit. The inspectors noted that the safety significance of this observation was minimal since alarms are provided prior to reaching this level of rod insertion. Further, the licensee routinely operates with the rods withdrawn well in excess of this limit. The inspectors concluded that this error represented a lack of attention to detail on the part of the engineering technical support personnel.

Based on the information obtained during the inspection, except as noted above, the engineering program was adequately implemented.

6. PLANT SUPPORT

a. Plant Support Activities (71750)

Annual Exercise (82301)

In Section 5.6.1.2.2, Exercises, of their RCP, the licensee committed to perform an off-hours exercise between midnight and 06:00 A.M. once every six years. This off-year annual exercise which started on November 15, 1994, at 2:30 A.M. satisfied that commitment.

This was the first exercise in which the licensee used the "Team" concept in staffing the ERO. A "Team" would be analogous to a "Crew" in staffing the control room. The "Team" concept appeared to work well.

The exercise scenario consisted of: a fire lasting greater than ten minutes resulting in a NOUE; a loss of annunciators resulting in an SAE; a radiation spill; and the declaration of a General Emergency due to multiple spent fuel assemblies being damaged when a spent fuel cask dropped into the spent fuel pool.

Security commenced their security search procedure for incorporating the TSC and EOF into the protected area at the NOUE declaration. The security search took 51 minutes to complete.

The licensee activated the TSC and EOF when the search was complete and after the Alert Emergency declaration.

The Control Room crew exhibited good communication skills. The crew was alert and actively pursued resolution to plant problems and potential plant problems that were scenario driven. From the control room, emergency event classifications were correct, activation procedures were followed, and offsite notifications were timely and complete. The SEC in the control room exhibited good command and control. The SECs used procedures when transferring SEC responsibilities from the Control Room to the TSC. The transfer was clear and concise.

The TSC was activated in a timely manner, approximately 44 minutes after the Alert Emergency declaration. In the TSC, briefings were held on the hour and half hour. The SEC exhibited good command and control. The TSC staff communicated effectively among themselves and with the OSC. Once activated, event declarations were made from the TSC. Event classifications were correct and procedures were followed.

The OSC prioritized missions. In forming a team, work missions were planned, radiation levels and plume exposure were considered. Once teams were formed, they were briefed on their mission, plant conditions, and radiation levels. Once deployed, teams were tracked and debriefed when missions were complete.

The EOF was activated in a timely manner, approximately 45 minutes after the Alert Emergency declaration. The EOF held their own briefings in addition to monitoring TSC briefings. The EOF staff functioned satisfactorily together as a team. Dose assessment personnel identified radiation levels increasing before the rest of the EOF staff was aware that the spent fuel cask had dropped into the spent fuel pool. The dose assessment individual immediately applied the data pertaining to increasing radiation levels to the appropriate general emergency EALs and PARs. Overall communications among ERFs were satisfactory.

Once activated, the EOF had responsibility for offsite notifications. During the exercise, a total of nine initial and follow-up offsite notifications were transmitted offsite. The inspector reviewed the nine notifications for timeliness and message content. The inspector concluded that all of the notifications were timely. The inspector determined that although adequate, several notifications should have contained additional pertinent information. Examples are:

- Offsite facilities were not informed when the fire was extinguished or when the annunciators alarm were back in service.

- In Notification message number 8, offsite agencies were not informed as to why the basis for the offsite dose release changed from an elevated release to one at ground level. This caused confusion with offsite agencies.

The inspectors noted that the licensee's press releases raised more question than they provided answers.

The inspectors observed the licensee's evaluator critique of the exercise. The inspectors noted that the critique was thorough and objective.

In IR 94-11, an EW was identified for delayed initial offsite notifications. Based on the inspector's review of the nine notifications for timeliness, the inspector considers EW 94-11-01: Delayed Initial Notification, closed.

While touring the EOF/TSC mechanical equipment area, the resident inspectors noted several uncapped cable penetrations in an outer wall. Additionally, the resident inspectors noted that the iodine channel of the R-38 radiation monitor was being carried in a source check log as out of service. While reviewing the EOF/TSC drawing, the inspectors also noted that the building may have been modified from the original design. The inspectors were concerned that each of these items may degrade the capability of the buildings ventilation system to perform its design function. These items were identified to the licensee. Pending further review by the inspectors, this concern is identified as an Unresolved Item, URI 94-27-09: Impact Of Potential System Deficiencies On EOF/TSC Ventilation System Design.

The inspectors observation of the exercise concluded the exercise was fully successful. No exercises weaknesses, violations or deviations were identified.

b. Site Visit By Boise Interagency Fire Center Representative

The NRC maintains a contract with the Boise Interagency Fire Center in Boise, Idaho, for providing emergency communications assistance. One of the terms of the contract is that the Boise personnel visit each site every five years. The purpose of the site visits is to collect information for preplanning which will give responding Boise Personnel advanced information about what emergency communications equipment would be required. The NRC contract with Boise requires that from the time of initial notification, Boise has twelve hours to respond to a site and be operational.

Boise schedules the site visits around times when major national or international emergencies such as hurricanes and forest fires are not anticipated.

A Boise representative visited the Robinson facility on November 30, 1994. The actual visit lasted approximately an hour during which the Boise representative met the resident inspector and the Emergency Response Coordinator, and was provided copies of the 10 and 50 mile EPZ maps, the EOF and TSC layout, and FSAR sections 2.1 and 2.2 (Geography and Demography).

c. Followup - Plant Support (92904)

Closed EW 50-261/94-11-01: Delayed initial notification

IFI 93-15-01, 261/93-15-01: Review Licensee Evaluation Of TI 2515/112 Weakness

In Inspection Report 93-15, the inspectors documented a review of the licensee's program for identifying, evaluating, and documenting changes in population distributions, or industrial, military, or transportation hazards on or near the site that may have occurred since the plant was originally licensed. As a constituent of this inspection, the licensee's program for updating the FSAR was also reviewed.

The FSAR is required to be updated annually, pursuant to CFR 50.71(e). The inspector reviewed Robinson Administrative Procedure AP-021, Development, Review, and Approval of Changes To The Safety Analysis Report, as well as, higher tier procedures such as NED-3.2 and NGGM 304-01, which describe the licensee's program intended to ensure that updates to the FSAR are accomplished. The inspectors noted that the guidance provided in those procedures dealt almost exclusively with the mechanism of processing the paperwork associated with an FSAR update, but did not embody the more universal instruction such as how, when, or why, an update is to be originated. This was not a formal documented program in place to facilitate the routine update of the FSAR.

The licensee indicated that they would evaluate their existing program for updating the FSAR. This item was identified IFI 261/93-15-01: Review Licensee Evaluation of TI 2515/.112 Weakness.

The licensee has since modified Administrative Procedure AP-021, Development, Review and Approval of Changes To the Updated Final Safety Analysis Report to require that a review of the UFSAR is performed within six month of the last refueling outage and annually, and to assure that identified changes result in a revision. This IFI is closed.

Based on the information obtained during the inspection, except as noted above, the plant support program was adequately implemented.

7. EXIT INTERVIEW

Preliminary exit findings regarding the EP drill inspection effort were communicated to the licensee on December 16, 1994, upon completion of inspection activities by the Regional Inspector.

Preliminary exit findings were communicated to the licensee regarding Project Engineer open item followup inspection efforts on November 18, 1994.

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on December 6, 1994. During this meeting, the inspectors summarized the scope and findings of the inspection as they are detailed in this report. The licensee representatives acknowledged the inspector's comments and did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. No dissenting comments from the licensee were received

Item Number	Status	Description/Reference Paragraph
VIO 94-27-01	OPEN	Operator Procedure Non-Compliance Results In Control Room Ventilation Inoperable (paragraph 3)
NCV 94-27-02	OPEN	Inadequate FT-613 Calibration Procedure (paragraph 4)
URI 94-27-03	OPEN	WCCU Oil Procurement Practices (paragraph 4)
NCV 94-27-04	OPEN	Failure To Provide Procedure For Safety-Related Maintenance (paragraph 4)
NCV 94-27-05	OPEN	Inadequate Testing Of Control Room Ventilation Dampers (paragraph 4)
URI 94-27-06	OPEN	Resolution of Feedwater Nozzle Performance and Impact On Calorimetric (paragraph 4)
VIO 94-27-07	OPEN	Failure To Adequately Control Calorimetric (Paragraph 4)
NCV 94-27-08	OPEN	Unreviewed RTGB Modification (Paragraph 5)
URI 94-27-09	OPEN	Impact Of Potential System Deficiencies on EOF/TSC Ventilation System Design (Paragraph 6)
URI 94-23-05	CLOSED	Control Room Exhaust Dampers (paragraph 4)

EW 94-11-01	CLOSED	Delayed Initial Notification (paragraph 6)
IFI 93-15-01	CLOSED	Review of Licensee Evaluation of TI 2515/112 Weakness (paragraph 6)

ACRONYMS AND INITIALISMS

CFR	Code of Federal Regulation
CV	Containment Vessel
CRVS	Control Room Vandalization System
DPI	Digital Position Indicator
EAL	Emergency Action Level
EOF	Emergency Operations Facility
EPZ	Emergency Planning Zone
ERF	Emergency Response Facility
EST	Engineering Surveillance Test
ERFIS	Emergency Response Facility Information System
EW	Exercise Weakness
FCV	Flow Control Valve
FSAR	Final Safety Analysis Report
FT	Flow Transmitter
gpm	Gallons Per Minute
HEPA	High Effective Particulate Absolute
HVE	Heating Ventilation Exhaust
I&C	Instrumentation & Control
LCO	Limiting Condition For Operation
Ma	Milliamp
NAD	Nuclear Assessment Department
NED	Nuclear Energy Division
NGGM	Nuclear Generation Group Manual
NOUE	Notice of Unusual Event
OSC	Operations Surveillance Center
OST	Operations Surveillance Test
PAR	Protective Action Recommendation
PI	Pressure Indicator
PIC	Process Instrument Calibration
PM	Preventative Maintenance
psig	Pounds per square inch-gauge
RCP	Reactor Coolant Pump
RTD	Resistance Thermal Device
RTGB	Reactor Turbine Gauge Board
SAE	Site Area Emergency
SEC	Site Emergency Coordinator
SP	Special Procedure
STA	Shift Technical Advisor
TSC	Technical Support Center
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation