



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931**

July 9, 2004

Carolina Power and Light Company
ATTN: Mr. John Moyer
Vice President - Robinson Plant
H. B. Robinson Steam Electric Plant
Unit 2
3851 West Entrance Road
Hartsville, SC 29550

**SUBJECT: H.B. ROBINSON NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000261/2004003**

Dear Mr. Moyer:

On June 12, 2004, the US Nuclear Regulatory Commission (NRC) completed an inspection at your H.B. Robinson reactor facility. The enclosed integrated inspection report documents the inspection findings, which were discussed on June 24, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified. However, a licensee-identified violation which was determined to be of very low safety significance is listed in Section 40A7 of this report. This issue was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this issue as a non-cited violation (NCV), in accordance with Section VI.A of the NRC's Enforcement Policy. If you contest this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the H.B. Robinson facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA by G.MacDonald for/

Paul E. Fredrickson, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 05000261/2004003
w/Attachment: Supplemental Information

cc w/encl: (See page 2)

cc w/encl:

Chris L. Burton
Director, Site Operations
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant
Electronic Mail Distribution

T. P. Cleary
Plant General Manager
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant
Electronic Mail Distribution

James W. Holt, Manager
Performance Evaluation and
Regulatory Affairs CPB 9
Electronic Mail Distribution

C. T. Baucom, Supervisor
Licensing/Regulatory Programs
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant
Electronic Mail Distribution

J. F. Lucas, Manager
Support Services - Nuclear
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant
Electronic Mail Distribution

Henry J. Porter, Director
Div. of Radioactive Waste Mgmt.
Dept. of Health and Environmental
Control
Electronic Mail Distribution

R. Mike Gandy
Division of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

Beverly Hall, Acting Director
Division of Radiation Protection
N. C. Department of Environment,
Health and Natural Resources
Electronic Mail Distribution

Steven R. Carr
Associate General Counsel - Legal Dept.
Progress Energy Service Company, LLC
Electronic Mail Distribution

John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, NW
Washington, DC 20037-1128

Peggy Force
Assistant Attorney General
State of North Carolina
Electronic Mail Distribution

Chairman of the North Carolina
Utilities Commission
c/o Sam Watson, Staff Attorney
Electronic Mail Distribution

Robert P. Gruber
Executive Director
Public Staff - NCUC
4326 Mail Service Center
Raleigh, NC 27699-4326

Public Service Commission
State of South Carolina
P. O. Box 11649
Columbia, SC 29211

Distribution w/encl: (See page 4)

Distribution w/encl:
 C. Patel, NRR
 L. Slack, RII EICS
 RIDSNRRDIPMLIPB
 PUBLIC

OFFICE	DRP/RII	DRP/RII	DRS/RII	DRS/RII	DRS/RII	DRS/RII	DRS/RII
SIGNATURE	RCH	DAJ	MAB	FNW	RKH	GBK1	PKV
NAME	RHagar	DJones	MBates	FWright	KHamilton	GKuzo	PVanDoorn
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OFFICE	DRS/RII						
SIGNATURE	JJB1						
NAME	JBlake						
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-261

License No: DPR-23

Report No: 05000261/2004003

Facility: H. B. Robinson Steam Electric Plant, Unit 2

Location: 3581 West Entrance Road
Hartsville, SC 29550

Dates: March 14 - June 12, 2004

Inspectors: R. Hagar, Senior Resident Inspector
D. Jones, Resident Inspector
M. Bates, Operations Engineer (Section 1R11)
B. Crowley, Senior Reactor Inspector (Section 40A5.6)
F. Wright, Senior Health Physics Inspector (Section 20S1)
R. Hamilton, Health Physics Inspector (Section 20S1)
G. Kuzo, Senior Health Physics Inspector (Section 20S1)
P. VanDoorn, Senior Reactor Inspector (Section 1R08)
J. Blake, Senior Project Manager (Section 1R08)

Approved by: P. Fredrickson, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000261/2004-003; 03/14/2004-06/12/2004; H.B. Robinson Steam Electric Plant, Unit 2; Routine Integrated Report.

The report covered a three-month period of inspection by resident inspectors and announced inspections by an Operations Engineer, two Senior Reactor Inspectors, one Health Physics Inspector, two Senior Health Physics Inspectors, and a Senior Project Manager. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee, was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. The violation and corrective action tracking number are listed in Section 4OA7 of this report.

Enclosure

REPORT DETAILS

Summary of Plant Status The unit began the inspection period at full rated thermal power. On April 20, the unit was shut down for a refueling outage. The reactor was restarted on May 28, and the unit was returned to full power on June 1. The unit remained at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns

The inspectors performed the following two partial system walkdowns, while the indicated structures, systems, and/or components (SSCs) were out-of-service for maintenance and testing:

<u>System Walked Down</u>	<u>SSC Out of Service</u>	<u>Date Inspected</u>
A and B motor-driven auxiliary feedwater	Steam-driven auxiliary feedwater	March 22
A Emergency Diesel Generator and Emergency Bus E-1	B Emergency Diesel Generator and Emergency Bus E-2	May 3

To evaluate the operability of the selected trains or systems under these conditions, the inspectors compared observed positions of valves, switches, and electrical power breakers to the procedures and drawings listed in the Attachment.

Complete System Walkdown

The inspectors conducted a detailed review of the alignment and condition of the A and B trains of the Service Water system. To determine the proper system alignment, the inspectors reviewed the procedures, drawings, and Updated Final Safety Analysis Report (UFSAR) sections listed in the Attachment.

The inspectors walked down the system, to verify that the existing alignment of the system was consistent with the correct alignment. Items reviewed during the walkdown included the following:

- Valves are correctly positioned and do not exhibit leakage that would impact the functions of any given valve.
- Electrical power is available as required.

Enclosure

- Major system components are correctly labeled, lubricated, cooled, ventilated, etc.
- Hangers and supports are correctly installed and functional.
- Essential support systems are operational.
- Ancillary equipment or debris does not interfere with system performance.
- Tagging clearances are appropriate.
- Valves are locked as required by the licensee's locked valve program.

The inspectors reviewed the documents listed in the Attachment, to verify that the ability of the system to perform its functions could not be affected by outstanding design issues, temporary modifications, operator workarounds, adverse conditions, and other system-related issues tracked by the engineering department.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

For the six areas identified below, the inspectors reviewed the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures, to verify that those items were consistent with UFSAR Section 9.5.1, Fire Protection System, and UFSAR Appendix 9.5.A, Fire Hazards Analysis. The inspectors walked down accessible portions of each area and reviewed results from related surveillance tests, to verify that conditions in these areas were consistent with descriptions of the areas in the UFSAR. Documents reviewed are listed in the Attachment.

The following areas were inspected:

<u>Fire Zone</u>	<u>Description</u>
26	Main, Startup, and Auxiliary Transformers
12	A Emergency Diesel Generator Room
2	E-1/E-2 Electrical Switchgear Room
10	Dedicated Shutdown Diesel Generator Building
19	Cable Spreading Room
7	Auxiliary Building Hallway (Ground Floor)

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measuresa. Inspection ScopeInternal Flooding

Because the Component Cooling Water (CCW) room contains risk-significant SSCs which are susceptible to flooding from postulated pipe breaks, the inspectors walked down that room to verify that the configuration, features, and equipment functions were consistent with the descriptions and assumptions used in the Assessment of Internally Initiated Flooding Events, Section F.5, Component Cooling Water Room (Level 226) and UFSAR Section 9.5.1.4.4.4.3, Fire Suppression Water Damage Control Features. The inspectors also reviewed the operator actions credited in the assessment, to verify that the desired results could be achieved using the plant procedures listed in the Attachment.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) Activitiesa. Inspection Scope

The inspectors reviewed ISI procedures, observed in-process ISI work activities, and reviewed selected ISI records. To verify compliance, the observations and records were compared to the Technical Specifications (TS) and the applicable Code (ASME Boiler and Pressure Vessel Code, Section XI, 1995 Edition, 1996 Addenda).

The inspectors observed Ultrasonic (UT) examinations, Liquid Penetrant (PT) examinations, and Magnetic Particle (MT) examinations, and reviewed one PT record of welds as shown below:

Method	Drawing	Weld No.	Description/Comments
UT & MT	CPL-212	212/08	Main Steam to Steam Generator A, recordable indication dispositioned as geometry
UT	CPL-107	107/04DM	Reactor Coolant System Hot Leg
MT	CPL-212	212/09	Main Steam to Steam Generator A

Method	Drawing	Weld No.	Description/Comments
MT	CPL-212	212/B-WS	Main Steam to Steam Generator Elbow Support
PT	CPL-122	122/18	Alternate Charging Line, rejectable indication repaired
PT	CPL-122	122/19	Alternate Charging Line
PT, record only	CPL-107	107/04DM	Reactor Coolant System Hot Leg

The inspectors reviewed records of the above inspections including calibrations, equipment certifications, consumable certifications, and personnel qualifications.

The licensee's inservice inspection report for refueling outage 21 (Interval 4, Period 1, Outage 1) was reviewed for recordable indications. The inspectors reviewed the licensee's acceptance of a pipe support that did not match the construction drawing, which was to revise the drawing to match the field installation. The inspectors also reviewed the action request (AR) 125580, which was initiated when it was discovered that the drawing had not been changed as of the start of the current outage.

The inspectors inspected the hardware and reviewed records for Engineering Change 52753R0 involving the welding of Code Class 2 piping during the installation of replacement test piping on the outlet of each Containment Spray Pump and each Safety Injection Pump to provide for full flow testing on these pumps. The observed piping installation work also involved a Code weld-repair at weld W-70 on line No. 4-SI-245.

The inspectors reviewed activities, plans, and procedures for the inspection and evaluation of the steam generator Alloy 600TT tubing. Data gathering and evaluation activities were observed, with special emphasis on evaluation of the eddy current data for the leaking tube, (R23C72) and the tubes surrounding the leaker, in Steam Generator B. The inspectors also observed the special evaluation activities for a small family of tubes (5 tubes in SG A, 10 tubes in SG B and 27 tubes in SG C) which, during past inspections, had exhibited eddy current voltage shifts indicative of potential elevated residual stresses.

A sample of ISI issues in the licensee's corrective action program was reviewed to confirm that problems were being identified and placed in the corrective action program, and that appropriate corrective actions were being initiated. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

Enclosure

1R11 Licensed Operator Requalification

.1 Annual Operating Test Results

a. Inspection Scope

On March 16, the licensee completed the requalification annual operating tests, required to be given to all licensed operators by 10 CFR 55.59(a)(2). The inspectors reviewed the overall pass/fail results of the individual operating tests, and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 609 Appendix I, Operator Requalification Human Performance Significance Determination Process.

b. Findings

No findings of significance were identified.

.2 Licensed Operator Continuing Training

a. Inspection Scope

The inspectors observed licensed-operator performance during requalification simulator training for crew 2 to verify that operator performance was consistent with expected operator performance, as described in Exercise Guide LOCT-03-1. This training tested the operators' ability to respond to a pipe break in the Component Cooling Water system. That response included manually initiating and responding to a reactor trip, and diagnosing and responding to an automatic actuation of safety injection. The inspectors focused on clarity and formality of communication, the use of procedures, alarm response, control board manipulations, group dynamics, and supervisory oversight.

The inspectors observed the post-exercise critique, to verify that the licensee identified deficiencies and discrepancies that occurred during the simulator training.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the six degraded SSC/function performance problems or conditions listed below, to verify the licensee's appropriate handling of these performance problems or conditions in accordance with 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, and 10 CFR 50.65, Maintenance Rule. Documents reviewed by the inspectors are listed in the Attachment. The problems/conditions and their corresponding ARs were:

Enclosure

<u>Performance Problem/Condition</u>	<u>AR</u>
Degradation of the motor bearing on safety injection pump B	118549
Motor-driven auxiliary feedwater pump B out-of-service time extended by a tubing leak	119920
Nuclear instrumentation channel N-35 under-compensation during shutdown	75217
Spurious actuation of a safety-system bistable during steam-generator pressure-protection channel testing	121319
Failure of a feedwater-regulating valve to control level in automatic	123227
Rod control urgent failure alarm received on power cabinet 1BD	118220

The inspectors' reviews focused on the following:

- Appropriate work practices,
- Identifying and addressing common cause failures,
- Scoping in accordance with 10 CFR 50.65(b),
- Characterizing reliability issues (performance),
- Charging unavailability (performance),
- Trending key parameters (condition monitoring),
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification, and
- Appropriateness of performance criteria for SSCs/functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified (a)(1).

Documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For the four time periods and/or emergent activities listed below, the inspectors reviewed the licensee's risk assessments and the risk-management actions used by the licensee to manage risk. The inspectors verified that the licensee performed adequate risk assessments and implemented appropriate risk-management actions when required by 10CFR50.65(a)(4). For emergent work, the inspectors also verified that any increase in risk was promptly assessed, and that appropriate risk-management actions were promptly implemented. Those periods included the following:

Enclosure

- The work week of March 27-April 2, which included emergent work associated with removing a safety-injection pump from service and re-aligning another safety-injection pump from one electrical supply to another
- The work week of May 1-May 7, which included scheduled activities associated with high-risk load-shed testing on the emergency busses
- The work week of May 22-May 28, which included scheduled activities associated with starting the plant following a refueling outage, and emergent work associated with removing from service and repairing the steam-driven auxiliary feedwater pump
- The work week of June 5 - June 11, which included emergent work associated with removing a safety-injection pump from service and re-aligning another safety-injection pump from one electrical supply to another in order to conduct post maintenance testing

Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

During the reactor startup, secondary plant startup, and return to power operation on May 27 and 28, the inspectors observed plant instruments and operator performance to verify that the operators performed in accordance with the associated procedures and training. Documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed the cumulative effects of the operator workarounds that were active on March 25, to verify that those effects could not increase an initiating event frequency, affect multiple mitigating systems, or affect the ability of operators to respond in a correct and timely manner to plant transients and accidents. The specific workarounds reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testinga. Inspection Scope

For the seven post-maintenance tests listed below, the inspectors witnessed the test and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety functions described in the UFSAR and TS. The tests included the following:

<u>Test Procedure</u>	<u>Title</u>	<u>Related Maintenance Activity</u>	<u>Date Inspected</u>
OST-011	Rod Cluster Control Exercise & Rod Position Indication Monthly Interval	Repair of a failed rod-insertion-limit monitor	March 19
OST-201-1	Motor Driven Auxiliary Feedwater System Component Test - Train A	Calibration of discharge pressure switch	April 12
MST-009	Degraded Voltage Test on E1 and E2 Busses	Replacement of degraded-voltage relays	April 21 & 23
OST-703-4	Primary Side Inservice Valve Test for the CCW System	Replacement of motor pinion/worm shaft gear set on valve CC-730	May 14
OST-302-1	Service Water Pumps A & B Inservice Test	Header flow instrument installation	May 16
OST-202	Steam Driven Auxiliary Feedwater System Component Test	Disassembly, repair, and reassembly of the steam-driven auxiliary feedwater pump	May 27
OST-151-6	Comprehensive Flow Test for Safety Injection Pump C	Removal, disassembly, repair, and reinstallation of the C safety injection pump	June 11

Documents reviewed are listed in the Attachment.

Enclosure

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

The inspectors evaluated licensee outage activities as described below, to verify that licensees considered risk in developing outage schedules, adhered to administrative risk reduction methodologies they developed to control plant configuration, and adhered to operating license and technical specification requirements that maintained defense-in-depth. The inspectors also verified that the licensee developed mitigation strategies for losses of the following key safety functions:

- decay heat removal
- inventory control
- power availability
- reactivity control
- containment

Documents reviewed by the inspectors are listed in the Attachment.

.1 Review of Outage Plan

a. Inspection Scope

Prior to the outage, the inspectors reviewed the licensee's outage risk control plan to verify that the licensee had performed adequate risk assessments and had implemented appropriate risk-management strategies when required by 10CFR50.65(a)(4).

b. Findings

No findings of significance were identified.

.2 Monitoring of Shutdown Activities

a. Inspection Scope

The inspectors observed portions of the cooldown process to verify that technical specification cooldown restrictions were followed.

b. Findings

No findings of significance were identified.

.3 Licensee Control of Outage Activities

a. Inspection Scope

During the outage, the inspectors observed the items or activities described below, to verify that the licensee maintained defense-in-depth commensurate with the outage risk-control plan for key safety functions and applicable technical specifications when taking equipment out of service.

- Clearance Activities
- Reactor Coolant System Instrumentation
- Electrical Power
- Decay Heat Removal (DHR)
- Spent Fuel Pool Cooling
- Inventory Control
- Reactivity Control
- Containment Closure

The inspectors also reviewed the licensee's responses to emergent work and unexpected conditions, to verify that resulting configuration changes were controlled in accordance with the outage risk control plan, and to verify that control-room operators were kept cognizant of the plant configuration.

b. Findings

No findings of significance were identified.

.4 Refueling Activities

a. Inspection Scope

The inspectors observed fuel handling operations (removal, inspection, and insertion) and other ongoing activities, to verify that those operations and activities were being performed in accordance with technical specifications and approved procedures. Also, the inspectors observed refueling activities to verify that the location of the fuel assemblies was tracked, including new fuel, from core offload through core reload.

b. Findings

No findings of significance were identified.

.5 Monitoring of Heatup and Startup Activities

a. Inspection Scope

Prior to mode changes and on a sampling basis, the inspectors reviewed system lineups and/or control board indications to verify that TSs, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations. Also, the inspectors periodically reviewed RCS boundary leakage data, and observed the setting of containment integrity, to verify that the RCS and containment boundaries were in place and had integrity when necessary. Prior to reactor startup, the inspectors walked down containment to verify that debris has not been left which could affect performance of the containment sumps. The inspectors reviewed reactor physics testing results to verify that core operating limit parameters were consistent with the design.

b. Findings

No findings of significance were identified.

.6 Identification and Resolution of Problems

a. Inspection Scope

Periodically, the inspectors reviewed the items that had been entered into the licensee's corrective action program, to verify that the licensee had identified problems related to outage activities at an appropriate threshold and had entered them into the corrective action program. For the significant problems documented in the corrective action program and listed below, the inspectors reviewed the results of the licensee's investigations, to verify that the licensee had determined the root cause and implemented appropriate corrective actions, as required by 10CFR50, Appendix B, Criterion XVI, Corrective Action.

- AR 122961, All high pressure safety injection inoperable for about 25 minutes
- AR 124140, Feedwater transient
- AR 124647, Main steam safety valve setpoint failure while testing
- AR 126009, Plastic piece found downstream of safety-injection pump C discharge check valve

b. Findings

No findings of significance were identified.

1R22 Surveillance Testinga. Inspection Scope

For the nine surveillance tests identified below, the inspectors witnessed testing and/or reviewed the test data, to verify that the systems, structures, and components involved in these tests satisfied the requirements described in the technical specifications, the UFSAR, and applicable licensee procedures, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions. Documents reviewed are listed in the Attachment.

<u>Test Procedure</u>	<u>Title</u>	<u>Date Inspected</u>
OST-352-1	Containment Spray Component Test - Train A	March 16
OST-622	Fire Suppression Water System Motor Driven Fire Pump Test (Annual)	March 17
EST-028	Main Steam Safety Valve Testing	April 19
OST-154*	Comprehensive Flow Test for the Safety Injection Pumps	April 28
EST-023	Control Room Emergency Ventilation System	May 2
OST-253	Comprehensive Flow Test for the [Residual Heat Removal] Pumps	May 9
OST-163	Safety Injection Test and Emergency Diesel Generator Auto Start on Loss of Power and Safety Injection (Refueling)	May 18
OST-160	Pressure Isolation Valve Backleakage Test	May 24
OST-206	Comprehensive Flow Test for the Steam Driven Auxiliary Feedwater Pump	May 28

*This procedure included inservice testing requirements.

b. Findings

No findings of significance were identified.

Enclosure

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On June 8, the inspectors observed an emergency preparedness drill to verify licensee self-assessment of classification, notification, and protective action recommendation development in accordance with 10CFR50, Appendix E. The inspectors also attended the post-drill critique, to verify that the licensee properly identified failures in classification, notification and protective action recommendation development activities. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

Access Controls. The inspectors evaluated the licensee's procedures for posting, surveying, and controlling access to airborne radioactivity areas, radiation areas, high radiation areas, and very high radiation areas, against the requirements of 10 CFR Part 20 requirements. During walk-downs and RWP reviews conducted April 19-23, 2004 and May 3-7, 2004, the inspectors evaluated radiological postings and barricades against the current radiological surveys in areas of the reactor and auxiliary buildings, and the independent spent fuel storage Installation (ISFSI) to determine the appropriateness of the established radiological controls. In addition, the inspectors independently verified the dose rates recorded on current survey maps at various locations in plant areas, including the containment and ISFSI. General area dose rates and contamination levels were compared to licensee survey records. The inspectors observed health physics technician proficiency in performing and documenting the radiation surveys for outage work area.

Radiation Work Permits (RWPs) used to access radiation, high radiation areas, and very high radiation work areas were evaluated to verify the licensee was establishing appropriate radiation protection controls for those areas.

The inspectors evaluated the method for establishing dose alarms and doserate alarm setpoints to determine if they were conservative, and based on knowledge of the radiological conditions of the work areas and job activities.

The inspectors reviewed radiological worker knowledge of alarm set-points and their required alarm response.

Licensee internal dose controls were reviewed to determine the potential for individual radiation workers to exceed an internal dose greater than 50 mrem CEDE (20 DAC-Hours). The inspectors observed the use of licensee controls such as High Efficiency Particulate Air filters to minimize exposure to airborne materials and the spread of radioactive contamination.

The inspectors inspected the spent fuel pool and assessed underwater storage of radioactive material. The inspectors also reviewed radioactive material controls to verify that the licensee maintained an inventory of all materials stored in the pool.

Access control for locked high radiation areas were reviewed and discussed with radiation protection management and supervision. The inspectors directly inspected the licensee's designated locked door locations and reviewed documentation to verify the condition and status of the locked doors. The inspectors also evaluated implementation of key controls and postings for very high radiation areas and locked high radiation areas.

The Radiation Protection (RP) program activities and their implementation were evaluated against applicable requirements of Title 10 CFR Part 19 - Notices, Instructions And Reports To Workers and Title 10 CFR Part 20 - Standards for Protection Against Radiation. Additionally, the requirements of the following licensee Technical Specifications requirements were used in the review of Access Controls to Radiological Significant Areas:

- Section 5.3 Unit Staff Qualifications;
- Section 5.4.1 Written procedures shall be established implemented, and maintained radiation protection activities recommended in Regulatory Guide 1.33, Rev.2, Appendix A, February 1978; and
- Section 5.7, High Radiation Areas, Specify the controls for maintaining and entering areas greater than 1,000 mrem/hr.

Procedures and records reviewed within this inspection area are listed in the Attachment.

Problem Identification and Resolution. Issues identified through licensee self-assessments and corrective action program (CAP) documents for access control were reviewed and discussed with cognizant licensee representatives. The inspectors assessed the licensee's ability to characterize, prioritize, and resolve the issues identified in this radiation protection (RP) program area in accordance with Procedure CAP-NGGC-0200, Corrective Action Program, and Procedure CAP-NGGC-0205, Significant Adverse Condition Investigations, Rev. 0.

Enclosure

In addition, the inspectors interviewed involved occupational radiation workers, health physics personnel and line supervisors, and assessed their knowledge of occupational radiation safety.

The specific records, procedures, and documentation reviewed with respect to the licensee's problem identification and resolution program are identified in the Attachment. The inspectors reviewed a positive whole body counter analysis investigation which is described in section 4OA7.

The inspectors also reviewed the status and surveillances of the Horizontal Spent Fuel Storage Facility.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA). The inspectors evaluated ALARA program guidance and its implementation for ongoing refueling outage job tasks. The inspectors reviewed, and discussed with licensee staff, ALARA work plan documents including dose estimates and prescribed ALARA controls for selected outage work activities expected to incur significant collective doses. The inspectors reviewed the implementation of dose-reduction initiatives for high person-rem expenditure tasks and assessed the effectiveness of source-term reduction efforts. These elements of the ALARA program were evaluated for consistency with the methods and practices delineated in applicable licensee procedures.

The implementation and effectiveness of ALARA planning and program initiatives during work in progress were evaluated. The inspectors made direct field or closed-circuit-video observations of work activities involving the reactor head disassembly and lift, steam generator maintenance and eddy-current testing; in-service inspections; fuel movement; maintenance; and scaffolding activities. The inspectors interviewed radiation workers and health physics technician staff regarding understanding of dose reduction initiatives and their current and expected final accumulated occupational doses at completion of lower pressure vessel examinations, steam generator maintenance and eddy-current testing, refueling, containment vessel liner access and inspection, and shielding activities.

Projected ALARA work plan (AWP) dose expenditure estimates were compared to actual dose expenditures, and noted differences were discussed with cognizant ALARA staff. Changes to dose budgets relative to changes in job scope also were identified and discussed. The inspectors attended pre-job briefings and evaluated the communication of ALARA goals, radiation work permit requirements, and industry lessons-learned to job crew personnel. In addition, the inspectors reviewed air sampling

results and internal dosimetry assessments for adequacy of respiratory protection and engineering controls.

Implementation and effectiveness of selected program initiatives with respect to source-term reduction were evaluated. Shutdown chemistry program actions and cleanup initiatives, and their resultant effect on containment vessel and auxiliary area and equipment dose rate trending data and filter change-outs were reviewed and compared to previous refueling outage data. The effectiveness of selected shielding packages installed for the current outage was assessed through completion of independent radiation surveys and comparison to applicable licensee survey records and expected planning data. Cobalt reduction initiatives for reactor coolant system valve replacement activities were reviewed and discussed in detail.

The plant collective exposure histories for calendar years 2001 and 2002, based on the data reported to the NRC pursuant to 10 CFR 20.2206 (c), were reviewed and discussed with licensee staff, as were established goals for reducing collective exposure. The inspectors reviewed the applicable guidance and examined dose records of declared pregnant workers during calendar years 2002 and 2003 to evaluate current gestation doses for declared pregnant workers.

Radiation protection program activities and their implementation were evaluated against 10 CFR 19.12; 10 CFR Part 20, Subparts B, C, F, G, H, and J; and approved licensee procedures. In addition, licensee performance was evaluated against Regulatory Guide (RG) 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Reasonably Achievable, and RG 8.13, Instruction Concerning Prenatal Radiation Exposure. Procedures and records reviewed within this inspection area are listed in the Attachment.

Problem Identification and Resolution. Licensee corrective-action documents associated with ALARA activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with CAP-NGGC-0200, Corrective Action Program. Specific assessments, audits, and corrective-action documents reviewed and evaluated in detail are listed in the Attachment.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS2 Radioactive Material Processing and Transportation

a. Inspection Scope

Waste Processing and Characterization. The inspectors evaluated licensee procedures for processing and characterizing radioactive waste (radwaste). Inspection activities

Enclosure

included direct observation of processing equipment for solid and liquid radwaste and evaluation of waste stream characterization data.

Solid and liquid radwaste equipment was inspected for material condition and configuration. The configurations were compared with the UFSAR and with the Process Control Program (PCP) requirements. Inspected equipment included liquid radwaste hold-up tanks; resin transfer piping; abandoned waste evaporators and vendor liquid radwaste processing system. Inspectors discussed system changes and operability status with licensee Radiation Protection and Chemistry staff. Licensee procedures for resin transfer, collection and packaging were evaluated. Reviewed documents are listed in the Attachment.

Licensee radionuclide characterizations for selected waste streams were reviewed and discussed with the radwaste staff. Inspectors evaluated the analyses for hard to detect nuclides for the various waste streams including primary resin, filters and dry active waste. The analysis results were compared to the data contained in the plant's Annual Radiological Operating Report and to several shipping records to determine if appropriate scaling factors were being applied. The inspectors interviewed plant radwaste personnel and shared resource personnel assigned to radwaste for the outage on processes used by the utility to evaluate changing waste streams. These interviews included discussion of mixing resin waste streams, obtaining representative samples and concentration averaging.

Inspectors discussed with licensee personnel proposed changes to facilities including the elimination of a waste oil system, establishment of an on-site contaminated material storage facility to support ISFSI cask operations and changes to the UFSAR descriptions of the liquid waste processing system.

Radwaste processing activities were reviewed for consistency with the licensee's PCP, Rev. 8; and UFSAR, Chapter 11, Amendment 18. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 61.55 and guidance provided in the Branch Technical Position (BTP) on Waste Classification and Waste Form, 1983.

Transportation. The inspectors evaluated the licensee's activities related to transportation of radioactive material. The evaluation included direct observation of shipment preparation activities and review of shipping related documents.

The inspectors directly observed transportation activities associated with the outage. These observations included shipment of a charging pump, and receipt inspection of vendor eddy current and sludge lancing equipment. There were no Type B shipments to observe, none were scheduled during the inspection period.

As part of the document review inspectors reviewed shipping documents for ten (10) shipments. These included two Highway Route Controlled Quantity spent fuel cask shipments, two bulk Low Specific Activity, three cask Low Specific Activity, one Surface Contaminated Object, one limited quantity and one instruments and articles. The

inspectors evaluated the shipping records for consistency with licensee procedures and compliance with NRC and DOT regulations.

The inspectors reviewed the licensee's procedures for opening, closing, handling and maintaining the IF-300 series spent fuel shipping cask. The inspectors reviewed the maintenance activities that had been performed to remove scratches on the sealing surfaces of several IF-300 series (IF-302, IF-303 & IF-304) casks to determine if the work had complied with the cask vendor requirements, maintenance procedures and the certificates of compliance. Training records and training curriculum for individuals assigned to perform radioactive materials shipment was evaluated.

Documents reviewed during the inspection are listed in the Attachment.

Transportation program implementation was reviewed against regulations detailed in 10 CFR Parts 20 and 71, 49 CFR Parts 170-189; as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172 Subpart H.

Problem Identification and Resolution. Selected corrective-action documents associated with radwaste processing and transportation were reviewed. Five ARs and two Nuclear Assessment Section audits were reviewed in detail and discussed with HP supervision. The inspectors assessed the licensee's ability to characterize, prioritize, and resolve the identified issues in accordance with licensee procedure CAP-NGGC-0200, Corrective Action Program. Reviewed documents are listed in the Attachment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators (PIs) indicated below for the period from October 2003 through May 2004. To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 2, were used to verify the basis in reporting for each data element.

Occupational Radiation Safety Cornerstone

- Occupational Exposure Control Effectiveness PI

The inspectors reviewed the licensee's procedure for reporting PI data to the NRC (REG-NGGC-0009, NRC Performance Indicators, Rev. 2), as well as records relevant to this PI. Specifically, the inspectors reviewed selected corrective action issues and

Enclosure

individual RCA exit transactions with ED readings exceeding 100 millirem to assess reporting data for potential unplanned exposures.

Public Radiation Safety Cornerstone

- RETS/ODCM Radiological Effluent Occurrences

The inspectors reviewed a listing of radiological effluent related corrective action program records (PIs) generated from March 2003 through March 2004 and the most recent annual radioactive effluent release report to ensure that radiological effluent release occurrences were properly classified in accordance with NEI 99-02 guidance. In addition, licensee procedural guidance for classifying and reporting PI events was evaluated.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Daily Reviews

As required by NRC Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed frequent screenings of items entered into the licensee's corrective action program. These screenings were accomplished by reviewing daily AR summary reports and attending periodic AR review meetings.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program (CAP) and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspector's review was focused on repetitive equipment issues, but also considered the results of inspector CAP item screenings discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspector's review nominally considered the six-month period of January 2004, through June 2004, although some examples expanded beyond those dates when the scope of the trend warranted. The review also included issues documented outside the normal CAP in the site equipment priority list, daily lists of items of concern and new work requests, system health reports, quality assurance audit/surveillance reports, and self-assessment reports. The inspectors compared and contrasted their observations with the results contained in the licensee's most-recent monthly trend reports.

Corrective actions associated with a sample of the issues identified in the licensee's trend reports were reviewed for adequacy. Specific documents reviewed are listed in the Attachment.

The inspectors also evaluated the licensee's trend reports against the requirements of the CAP as specified in CAP-NGGC-0200, Corrective Action Program, and 10 CFR 50, Appendix B, Criterion XVI. Additional documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified. The inspectors observed that the licensee had performed detailed reviews. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in the CAP data. The inspectors did not identify any discrepancies or potential trends in the CAP data that the licensee had failed to identify. The inspectors noted an instance where an adverse condition investigation did not thoroughly document a completed corrective action associated with an ongoing investigation. The inspectors noted that the licensee's CAP procedure did not require documentation of corrective actions that are completed before or during an investigation.

40A5 Other Activities

.1 Review of INPO Report

The Inspectors reviewed the Institute of Nuclear Power Operations (INPO) evaluation of the Robinson plant that was published on May 10.

.2 (Closed) NRC Temporary Instruction 2515/152, Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02)

a. Inspection Scope

In accordance with Temporary Instruction 2515/152, Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02), the inspectors reviewed and observed the licensee's examination of the reactor pressure vessel (RPV) lower head, to verify that:

- the examinations were performed by qualified and knowledgeable personnel and in accordance with demonstrated procedures;
- the examinations were able to identify, disposition, and resolve any deficiencies identified; and
- the examinations were capable of identifying both pressure boundary leakage as described in the bulletin, and RPV lower head corrosion.

Enclosure

The specific documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

The inspectors observed that the licensee completed these examinations in accordance with special procedure SP-1500, Visual Examination of RPV Head and Vessel Bottom Penetration Nozzles, Revision 1, using a remotely-operated video camera. The inspectors verified that the licensee personnel who completed the examinations were currently and appropriately qualified in the performance of visual testing. The inspectors noted that the licensee qualified the as-configured video equipment by demonstrating the ability to resolve 0.105-inch (2.667mm) lower-case printed characters under conditions similar to those of the actual examinations. The inspectors considered that, using this equipment, licensee personnel would be able to identify and characterize small boric acid deposits representing reactor coolant system leakage, as described in the bulletin.

The inspectors noted that, to facilitate this examination, the licensee completely removed the thermal insulation that is normally installed on the RPV lower head. The inspectors noted that the video camera used for these examinations was configured to move along a temporary horizontal track that was positioned to rest at both ends on scaffolding erected for that purpose. The licensee repositioned that track several times, and positioned the video camera at various positions on the track, to enable the video camera to produce close-up views of opposite sides of every penetration. The inspectors considered that this scheme enabled the licensee to examine in detail the entire RPV lower head, with no obstructions.

For each penetration on the RPV lower head, the licensee compiled video records of the views through the camera as it was positioned close to and then zoomed in close to the penetration, from both sides. The licensee also recorded individual photographs of close-up views of both sides of each penetration. The video and photographic record thus compiled shows that the RPV lower head is heavily stained from fluid streams that had apparently flowed down the side of the RPV, past and around the penetrations, to the lowest point on the RPV. The inspectors verified that no fluid stream appeared to originate at a penetration. The licensee attributed the staining to previous outages during which the seal between the reactor vessel and the refueling cavity had leaked, allowing borated water from the refueling cavity to flow along the RPV and drip into the containment sump. Because the staining originated well above the RPV lower head, the inspectors considered that attribution to be reasonable.

The licensee's and the inspectors' real-time observations during the examinations also found no evidence of boric acid deposits. Furthermore, the video and photographic record shows no boric acid deposits anywhere on the RPV lower head. In particular, the video and photographic record shows no evidence of boric acid deposits at any interface between the RPV and any penetration.

Enclosure

.3 (Open) NRC Temporary Instruction 2515/153, Reactor Containment Sump Blockage (NRC Bulletin 2003-01)

a. Inspection Scope

In accordance with Temporary Instruction 2515/153, Reactor Containment Sump Blockage (NRC Bulletin 2003-01), the inspectors verified implementation of the compensatory measures described in the licensee's response to NRC Bulletin 2003-01, Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors. Specifically, the inspectors reviewed:

- The changes made to emergency operating procedures to diagnose and mitigate the effects of emergency sump blockage and to refill the refueling water storage tank;
- The changes made to the plant simulator software to model emergency sump blockage, and the effects of those changes on the indications available to control-room operators;
- The training materials used to familiarize control-room operators with the issue, the possible effects of the issue, and the actions they should take when they see those effects;
- The existing procedures used to ensure cleanliness in the containment vessel and to ensure that the containment sump screens are free of adverse gaps and breaches; and
- The other site-specific compensatory measures described in the subject response.

In addition, during the refueling outage, the inspectors visually examined the containment vessel sump to verify that sump screens were free of adverse gaps and breaches. The inspectors also verified that during the outage, the licensee performed containment walkdowns to quantify potential debris sources in accordance with NEI 02-01, Condition Assessment Guidelines: Debris Sources Inside [Pressurized Water Reactor] Containment, September, 2002. The specific documents reviewed by the inspectors are listed in the Attachment. This TI will remain open pending completion of the NRC review of the licensee response to NRC Bulletin 2003-01.

b. Findings and Observations

No findings of significance were identified.

.4 (Open) NRC Temporary Instruction 2515/154, Spent Fuel Material Control and Accounting at Nuclear Power Plants

a. Inspection Scope

The inspectors completed Phase I and II of Temporary Instruction 2515/154, Spent Fuel Material Control and Accounting at Nuclear Power Plants. The specific documents reviewed by the inspectors are listed in the Attachment. This TI will remain open pending the NRC decision as to whether a Phase III review will be conducted.

b. Findings

No findings of significance were identified.

.5 (Open) NRC Temporary Instruction 2515/156, Offsite Power System Operational Readiness

a. Inspection Scope

The inspectors collected data from licensee maintenance records, event reports, corrective action documents and procedures and through interviews of station engineering, maintenance, and operations staff, as required by the Temporary Instruction (TI) 2515/156. The data was gathered to assess the operational readiness of the offsite power systems in accordance with NRC requirements such as Appendix A to 10 CFR Part 50, General Design Criterion (GDC) 17; Criterion XVI of Appendix B to 10 CFR Part 50, Plant Technical Specifications (TS) for offsite power systems; 10 CFR 50.63; 10 CFR 50.65 (a)(4), and licensee procedures. The specific documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified. Based on the inspection, no immediate operability issues were identified. In accordance with TI 2515/156 reporting requirements, the inspectors provided the required data to the headquarters staff for further analysis. This TI will remain open pending completion of that analysis.

.6 (Closed) NRC Temporary Instruction 2515/150, Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles (NRC Order EA-03-009)

a. Inspection Scope

In accordance with Temporary Instruction 2515/150, the inspectors observed activities relative to inspection of the reactor pressure vessel head (RPVH) and RPVH penetration nozzles in response to NRC Bulletins 2001-01, 2002-01, 2002-02 and NRC Order EA-03-009 Modifying Licenses dated February 20, 2004. The inspection included review of nondestructive examination (NDE) procedures, assessment of NDE personnel training and qualification, and observation and assessment of visual (VT), ultrasonic (UT), and

eddy current (ET) examinations. Discussions were also held with contractor representatives and other licensee personnel. The activities were examined to verify licensee compliance with regulatory requirements and gather information to help the NRC staff identify possible further regulatory positions and generic communications. Specifically, the inspectors reviewed or observed the following:

(1) Bare Metal VT Examination

- observed a portion of in-process bare metal remote video VT inspection of RPVH surfaces between the outer ring of nozzles and the head flange
- reviewed RPVH bare metal VT video Inspection Tape 2 - specifically inspected 360 degrees of RPVH Nozzle Nos. 1, 2, 4, 5, 7, 9, 12, 15, 19, 31, 35, 48, 51, 54, and 55, and at least two quadrants of Nozzle Nos. 3, 8, 10, 11, 14, 15, 18, 22, 23, 26, 30, 36, 39, and 63 (including surrounding head surfaces)
- reviewed RPVH bare metal "still pictures" for at least two quadrants of 38 Nozzles

The inspections were conducted in order to verify absence of boron crystals indicative of a leak and to verify the integrity of the RPVH.

(2) UT and ET Examination of RPVH Nozzles

- observed a portion of in-process UT and ET scanning of RPVH Nozzle Nos. 30, 34, 43, 44, 62, and 68
- reviewed the UT and ET data and results for RPVH Nozzle Nos. 13, 20, 34, 43, 44, 47, 48, 52, 53, and 61
- reviewed ET data from last outage for RPVH Nozzle Nos. 47, 48, and 52, which had indications of minor craze cracking both this outage and last outage

UT observations/reviews included review of results intended to assess for leakage into the interference fit zone of the nozzles.

(3) The inspectors reviewed and discussed with licensee personnel the susceptibility ranking calculation. The basis for head temperature input was reviewed to verify appropriate plant specific information was used in the time-at-temperature model for determining RPVH susceptibility ranking.

(4) The inspectors reviewed licensee procedures and inspection results for visual examinations to identify potential boric acid leaks from pressure-retaining components above the RPVH.

Documents reviewed are listed in the Attachment.

Enclosure

b. Findings and Observations

- 1) Verification that the examinations were performed by qualified and knowledgeable personnel.

The inspectors found that visual and NDE inspections were being performed in accordance with approved and demonstrated procedures with trained and qualified inspection personnel. All examiners had significant experience, including experience inspecting RPVHs. In addition to qualification to Code requirements, UT and ET personnel had additional training on RPVH inspections.

- 2) Verification that the examinations were performed in accordance with approved and demonstrated procedures.

The Robinson RV head has 62 full length nozzles and 7 partial length nozzles for a total of 69 nozzles requiring inspection. The vent line nozzle is low alloy steel material welded to the head with a full-penetration weld and therefore, does not require inspection. The bare head remote visual inspection was performed in accordance with Progress Energy Procedure SP-1500. The procedure used crawler mounted cameras which scanned each nozzle quadrant and adjacent head material for the 69 nozzles. The entire bare metal head surface was covered with these scans.

All 69 nozzles received remote mechanized UT and/or ET examination in accordance with Westinghouse approved Procedures WDI-ET-002, WDI-ET-004, WDI-ET-008, WDI-UT-010, and WDI-UT-013. The planned inspection coverage was from a minimum of 2" above the J-groove weld to the bottom of the nozzle below the J-groove weld. Seventeen nozzles did not have thermal sleeves and were inspected with an open-housing tool employing: two sets of "time-of-flight diffraction" (TOFD) 55 degree, 5 MHz, L wave transducers (one set directed circumferentially and the other directed axially); a 0 degree, 2.25 MHz, L Wave UT transducer; and a +point ET coil. Thirty-five nozzles (twenty-eight with thermal sleeves and seven partial length) were scanned with the Westinghouse GapsScanner and the Trinity blade probe. The blade probe employed: a set of TOFD, 44 degree, 6 MHz, Longitudinal (L) Wave UT transducers directed in the axial direction; a 0 degree, 2.25 MHz L Wave UT transducer; and a +point ET coil. Scanning was in the axial direction. Due to nozzle geometry and probe design, for eight of the thirty-five nozzles, it was not possible to achieve the required 1" examination coverage below the lowest portion of the J-groove weld on the OD surfaces using the TOFD UT technique. For these eight nozzles, UT coverage below the weld varied from 0.6" to 0.96". For these eight nozzles, ET examination of the nozzle OD was used to achieve at least 1" coverage below the lowest elevation of the J-groove weld.

The remaining seventeen nozzles (69 less the seventeen open-housing nozzles and the 35 nozzles scanned with the trinity probe) could not be scanned with the Trinity Probe (UT and ET) because of excessive variations around the circumference of the gap between the OD of the thermal sleeves and the ID of the nozzles. For these

seventeen nozzles, the ID was scanned with a dual-pancake ET probe. In addition, the OD of the nozzles and the surface of the J-groove welds were scanned using ET techniques.

The inspectors reviewed the Westinghouse procedures and observed in-process examinations as noted above. Approved acceptance criteria and/or critical parameters for RPVH leakage were applied in accordance with the procedures.

The NDE techniques and procedures being used had been previously demonstrated under the MRP Inspection Demonstration Program.

- 3) Verification that the licensee was able to identify, disposition, and resolve deficiencies.

All indications of cracks, leakage or head wastage were required to be reported for further inspection and disposition. Based on observation of the inspection process, the inspectors considered deficiencies would be appropriately identified, dispositioned and resolved. No significant cracks, leakage or wastage were identified. The only indications identified were ET indications (considered to be minor craze cracking) on some of the nozzle ID surfaces below the J-groove welds. In cases where this condition was identified, the results were compared with data from the last outage with no significant change since the last inspection.

- 4) Verification that the licensee was capable of identifying the primary water stress corrosion cracking (PWSCC) and/or RPVH corrosion phenomenon described in NRC Order EA-03-009.

The licensee performed NDE examinations and bare metal visual inspection of all of the RPVH nozzles and the RPVH surfaces during the outage. As noted above, the NDE techniques had been previously demonstrated under the MRP Inspection Demonstration Program as capable of detecting PWSCC type manufactured cracks as well as cracks from actual samples from another site. Based on the demonstration, observation of in-process inspections, and review of inspection data for NDE and bare metal visual inspections, the inspectors concluded the licensee was capable of identifying cracking and/or corrosion as described in the NRC Order.

- 5) Evaluate condition of the reactor vessel head (debris, insulation, dirt, boron from other sources, physical layout, viewing obstructions).

Although minor debris was observed, the inspectors noted that it did not appear to be associated with nozzle leakage, and allowed visual inspection of 100 percent of each of the 69 RPVH nozzles and head surfaces during the remote visual inspection of the head. There were no obstructions to preclude inspection of the bare metal surface in accordance with the Order.

- 6) Evaluate ability for small boron deposits, as described in NRC Bulletin 2001-01, to be identified and characterized.

The inspectors observed that the resolution of the video camera provided capability of detecting any debris or small boron deposits on the bare metal head. There were no obstructions to preclude a 100% visual inspection of the RPVH penetrations. As noted above only minor debris was noted at the head to penetration area. This did not preclude inspection of the bare metal surface. In addition to the video, a series of good resolution digital still pictures was taken of each nozzle to head area.

- 7) Determine the extent of material deficiencies (i.e., cracks, corrosion, etc.) that required repair.

No examples of RPVH leakage or material deficiencies requiring repair were identified during the visual or NDE examinations.

- 8) For each inspection method, determine if any significant impediments (e.g., centering rings, insulation, thermal sleeves, nozzle distortion, etc.) to effective examinations were identified.

As noted above 17 nozzles had gap variations around the circumference that precluded use of the Trinity Probe (UT and ET) examination. However, ET surface examinations were performed on the ID and OD wetted surfaces as required by the Order. No significant items to impede the examination process were noted during observation of the visual or NDE examinations.

- 9) Determine the basis for the temperatures used in the susceptibility ranking calculation. Were the temperatures plant-specific measurements, generic calculations, etc.?

The inspectors reviewed the Robinson susceptibility calculation and the basis for the RPVH temperatures used in the calculation. Based on review of the calculation and discussions with licensee personnel, the temperatures used for the Robinson susceptibility calculation were based on plant specific measurements and calculations. A new increased temperature was used in calculations after the power uprate (cycle 21).

- 10) Determine if the methods used for disposition of NDE identified flaws were consistent with NRC flaw evaluation guidance. If not, was the method more restrictive?

No flaws were identified.

- 11) Determine if procedures existed to identify potential boric acid leaks from pressure-retaining components above the RPVH and if the licensee performed proper followup for indications of boric acid leaks.

The licensee inspects components above the RPVH each refueling outage for evidence of leakage in accordance with Operating Procedure EST-083-1. In addition, the licensee performs inspection of the insulation above the head for evidence of boric acid prior to disturbing the insulation. Prior to the NRC inspection, the licensee had determined that the requirements for inspection of components above the head needed to be enhanced and added to Special Procedure SP-1500, the procedure for visual inspection of the RPVH. Action Request 001125701 had been issued to enhance Special Procedure SP-1500. During inspection of the insulation above the head, the licensee identified a light film of boric acid residue below the Control Rod Drive Mechanism (CRDM) seal welds on penetrations 30 and 50. The residue was on the CRDM tube above the insulation but not on the insulation. There had been a history of seal weld leaks and the residue was determined to be from these previous leaks. Action Item Identification 00125699 had been written to resolve this issue.

40A6 Meetings, Including Exit

On June 24, 2004, the resident inspectors presented the inspection results to Mr. John Moyer and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

40A7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for disposition as a non-cited violation (NCV).

Technical Specification 5.4.1(a) requires written procedures to be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33 Appendix A, Section 7 specifies that guidance for personnel monitoring and bioassay program implementation be established. Procedure DOS-NGGC-0021, Whole Body Counter (WBC) System Operation requires, in part, that the licensee investigate any positive WBC results, excluding K-40, to determine if an actual intake has occurred. Contrary to the above, on April 30, 2004, the licensee failed to properly investigate an occupational worker's positive WBC analysis in accordance with procedural guidance prior to his release from the site.

The positive WBC results, approximately 50 nanocuries of cobalt-60, was inappropriately attributed to a previous intake at another facility without any evaluation relating to a potential intake or an external contamination event during the current site work. This event is documented in the licensee's corrective action program as AR 125879. This violation is of very low safety significance because the general quantities reported were near or below detection capabilities of the personnel monitors used to screen workers exiting the radiologically controlled areas and would not result in any significant exposures to the worker or other individuals.

ATTACHMENT : SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

C. Burton, Director of Site Operations
E. Caba, Engineering Superintendent
A. Cheatham, Radiation Protection Superintendent
C. Church, Engineering Manager
B. Clark, Training Manager, then Nuclear Assurance Manager
T. Cleary, Plant General Manager
P. Fagan, Supervisor, Mechanical/Civil Design, Design Engineering
W. Farmer, System Engineering Superintendent
R. Howell, Supervisor, Regulatory Support
R. Ivey , Operations Manager
E. Kapopoulos, Outage Management Manager
J. Lucas, Manager, Support Services - Nuclear
G. Ludlum, Superintendent Operations Training, then Training Manager
J. Moyer, Vice President, Robinson Nuclear Plant
E. Rothe, Nuclear Assurance Manager
J. Stanley, Technical Services Engineering Superintendent
D. Stoddard, Maintenance Manager
V. Wagoner, Manager Head Replacement Project

Contractors

D. Adamonis, WESDYNE Level III NDE Examiner
J. Zook, Westinghouse Project Manager

NRC personnel

P. Fredrickson, Chief, Reactor Projects Branch 4

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

None

Closed

2515/150	TI	Reactor Pressure Vessel Head and Head Penetration Nozzles (Section 4OA5.6)
2515/152	TI	Reactor Pressure Vessel Lower Head Penetration Nozzles (Section 4OA5.2)

Discussed

2515/153	TI	Reactor Containment Sump Blockage (Section 4OA5.3)
2515/154	TI	Spent Fuel Material Control and Accounting at Nuclear Power Plants (Section 4OA5.4)
2515/156	TI	Offsite Power System Operational Readiness (Section 4OA5.5)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Partial System Walkdown

Auxiliary Feedwater System

Drawing G-190197, Feedwater, Condensate and Air Evacuation System Flow Diagram, Sheet 1 of 4, Rev. 73
 Drawing G-190197, Feedwater, Condensate and Air Evacuation System Flow Diagram, Sheet 4 of 4, Rev. 51
 Procedure OP-402, Auxiliary Feedwater System, Rev. 59
 UFSAR section 10.4.8, Auxiliary Feedwater System,

Emergency Diesel Generator System

SD-005, Emergency Diesel Generators, Rev. 7
 OP-604, Diesel Generators A and B, Rev. 56

Complete System Walkdown

Procedure OP-903, Service Water System, Rev. 90
 System Description SD-4, Service Water, Rev.8
 Design Basis Document, DBD/R87038/SD04, Service Water System, Rev. 0
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 2 of 13, Rev. 62
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 4 of 13, Rev. 50
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 5 of 13, Rev. 43
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 6 of 13, Rev. 40
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 7 of 13, Rev. 38
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 8 of 13, Rev. 30
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 9 of 13, Rev. 52
 Drawing, G-190199, Service and Cooling Water System Flow Diagram, Sheet 10 of 13, Rev. 43
 UFSAR section 9.2.1, Service Water
 A list of open work orders on service water components from August, 2002 through March, 2004
 A list of ARs that involved the service water system components from March, 1999 through November, 2003
 A list of ARs that involved configuration management from January, 2003 through March, 2004
 A list of active workarounds dated April 1, 2004
 A list of compensatory actions dated March 30, 2004
 The system health report for the service water system, dated January 8, 2004

Section 1R05: Fire Protection

Procedures

Results from OST-611-1, Low Voltage Fire Detection and Actuation System Zones 1 & 2 (Semi-Annual)

Results from OST-611-11, Low Voltage Fire Detection and Actuation System Zones 19 & 20 (Semi-Annual)

Results from OST-611-13, Low Voltage Fire Detection and Actuation System Zones 24, 25A, 25B, 25C and 26 Cold Shutdown Exceeding Twenty-Four (24) Hours if not Performed in the Previous Six (6) Months

Results from OST-620, Carbon Dioxide Suppression System Total Weight Test (Semiannual)

Results from OST-624, Fire Damper Inspection (18 Month)

Results from OST-628, Function Test of the Halon 1301 System (Annual)

Results from OST-630, Halon 1301 Suppression System Weight Test (Semi-Annual)

Results from OST-624, Fire Damper Inspection (18 month)

Results from OST-625, Fire Door Inspection, (Semi-Annually)

OMM-003, Fire Protection Pre-Plans / Unit #2

Sections in UFSAR Appendix 9.5.1A, Fire Hazards Analysis

3.1.2, Fire Zone 2 - Appendix R Fire Area A2 (Fire Zone 2) - Diesel Generator "A" Room

3.1.5.5, Fire Zone 19 - Unit 2 Cable Spreading Room

3.1.5.6, Fire Zone 20 - Electrical Switchgear Room

3.7, Fire Zone 25 - Appendix R Fire Area G1 - Turbine Building (Fire Zones 25A, 25B, 25C, 25E, 25F, 25G), Dedicated Shutdown Diesel Generator (Fire Zone 25D), Main Transformers (Fire Zone 26), and Condensate Storage Tank (Fire Zone 33).

3.7.8, Fire Zone 26 - Yard Transformers

3.1.3.2, Fire Zone 7 - Auxiliary Building Hallway (Ground Floor)

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Procedures

AOP-014, Component Cooling Water System Malfunction, Rev. 20

AOP-022, Loss of Service Water, Rev. 26

AOP-032, Response to Flooding from the Fire Protection System, Rev. 5

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 AR 118974, Auxiliary building sump B failure results in sump overflow
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Section 1R08: Inservice Inspection ActivitiesProcedures

83A6101, Liquid Penetrant Examination Procedure for Robinson Nuclear Plant, Rev. 6
 83A6111, Magnetic Particle Examination for Robinson Nuclear Plant, Rev. 3
 83A6211, Ultrasonic Examination Procedure for Ferritic Piping Welds and Vessels ≤ 2 Inches Thickness for Robinson Nuclear Plant, Rev. 1
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 AR 90725, Self-Assessment identified ISI program weaknesses
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Section 1R12: Maintenance EffectivenessAction Requests

75217, Nuclear instrumentation channel N-35 under-compensated during shutdown
 86284, B [safety injection] pump motor concern is more than 90 days old
 92946, Unexpected bistable actuation during MST-014
 111663, Limiting condition for operation entry due to failure of the C feedwater regulating valve bypass valve
 118549, Safety injection pump motor bearing degradation
 119920, Motor-driven auxiliary feedwater pump B out-of-service time extended due to a leak on flow transmitter FT-1425
 121319, Unexpected annunciator received during MST-014
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 118220, Unplanned [limiting condition for operation] entry due to Rod Control failure during OST-011

Procedures

GP-006, Normal Plant Shutdown from Power Operation to Hot Shutdown, Rev. 45
 LP-704, Nuclear Instrumentation System Intermediate Range Channels N35 and N36, Rev. 11
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Procedure EST-050, Refueling Startup Procedure, Rev. 39
 Procedure GP-005, Power Operation, Rev. 75

Section 1R16: Operator Work-Arounds

02-006, Valve CVC-244 will not stroke from the main control board
 02-008, Vent the B & D hydrogen coolers shiftly
 03-006, Rod position for rod H-10 is out of service
 03-008, Continuous operation of one train of the reactor vessel support cooling system
 04-01, Check heat trace circuit 2 while alarm is locked in
 04-02, Frequent alarms for C reactor coolant pump oil reservoir HI/LO level
 04-03, Manual checks to compensate for out-of-service flow indicator
 04-04, Heat tracing evaporates fluid in reference leg level of degassifier level control valve
 04-05, Throttle valve MS-61 manually while pressure control valve is awaiting repair.

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Procedures

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 PIC-301, Pressure Switches and Vacuum Switches, Rev. 7
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 OMM-033, Implementation of CV Closure, Rev. 13
 APP-036, Auxiliary Annunciator, Rev. 43
 AOP-036, Spent Fuel Pool Events, Rev. 0
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 FP-012, Fire Protection System Minimum Equipment and Compensatory Actions, Rev. 9
 FP-013, Fire Protection Systems Surveillance Requirements, Rev. 9
 EST-028, Main Steam Safety Valve Testing, Rev. 25
 OST-154, Comprehensive Flow Test For The Safety Injection Pumps, Rev. 25
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 5379-1082, Safety Injection System Flow Diagram, Sheet 4 of 5, Rev. 27

5379-1484, Residual Heat Removal System Flow Diagram, Sheet 1 of 1, Rev. 40
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Spent Fuel Material Control and Accounting

Procedure FMP-004, Special Nuclear Material (SNM) Inventory, Rev. 16
 Procedure FHP-003, Fuel Assembly Movement in the Spent Fuel Pit, Rev. 29
 Procedure FMP-019, Fuel and Insert Shuffle, Rev. 26
 Adverse Condition Report 92-190, A Total of 8 Fuel Pins Were Placed in the Incorrect Location of Fuel Assembly S15H During Performance of SP-1121
 Procedure PRO-NGGC-0204, Procedure Review and Approval, Rev. 5
 Procedure [no number], Onsite Fuel Inspection Procedure, Spring 1974 Outage
 Special Procedure SP-568, Procedure for the Reconstitution of Failed Fuel Assemblies, Rev. 0
 Special Procedure SP-702, Ultrasonic Testing and Repair of Fuel Assemblies, Rev. 2
 Special Procedure SP-843, Fuel Assembly Inspection and Repair, Rev. 0
 Special Procedure SP-1121, Fuel Assembly Examination and Rebuild, Rev. 0
 Special Procedure SP-1326, Cycle 17 Fuel Assembly Inspection and Repair, Rev. 0
 Special Procedure SP-1480, Fuel Assembly S15H Reconstitution and Related Activities, Rev. 1

Offsite Power System Operational Readiness

Document NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants, Rev. 3
 Document SORMC-GD-22, Robinson Plant Voltage Support & Coordination, Rev. 12
 Procedure OMM-048, Work Coordination and Risk Assessment, Rev. 20
 Procedure ADM-NGGC-0006, Online EOOS Models for Risk Assessment, Rev. 3
 AR 101985-02, [Significant Operating Experience Report] 99-1, Rec. 1, Re-Review

Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles

- WDI-ET-002, IntraSpect Eddy Current Inspection of JOGroove Welds In Vessel Head Penetrations, Revision 4, FCN 01
- WDI-ET-004, IntraSpect Eddy Current Analysis Guidelines, Revision 5, FCNs 01 and 02
- WDI-ET-008, Eddy Current Imaging Procedure for Inspection of Reactor Vessel Head Penetrations with GAP Scanners, Revision 3, FCN 01
- WDI-UT-010, IntraSpect Ultrasonic Procedure for Inspection of Reactor Vessel Head Penetration, Time of Flight Ultrasonic, Longitudinal Wave & Shear Wave, Revision 7, FCNs 01 02, and 03
- WDI-UT-013, IntraSpect UT Analysis Guidelines, Revision 5, FCNs 01 and 02
- MRS-SSP-1391, Reactor Vessel Head Penetration Inspection Tool Operation for H. B. Robinson (CPL), Revision 2, FCN 01
- Progress Energy Procedure SP-1500, Visual Examination of RPV Head and Vessel Bottom penetration Nozzles, Revision 1, including completed Attachment 11.5 documenting RPV Head Examination Results
- EPRI Materials Reliability Program (MRP) Demonstration of Vendor Equipment and Procedures for Inspection of Control Rod Drive Mechanism Head Penetrations (MRP - 89), dated September, 2003
- Westinghouse Certification Records for the following Inspection Equipment
Automated Ultrasonic Examination Calibration Data Sheets and Automated Eddy Current Examination Data Sheets for Probe SAPs 2582, 2598, 2605 and 2630, including UT transducers and eddy current probes
UT Pulser/Receiver SAPs 171, 173, 174, and 189
PC Eddy Current Card Serial Nos. 010, 022, and 024
- Personnel Certification Records for Westinghouse and Progress Energy Inspection Personnel, including:
H. B. Robinson Unit 2 RO22 Reactor Vessel Head Penetration Inspection Acquisition and Analysis Training Outline and Attendance Roster Revision 1
WESDYNE Qualification and Certification Records for five UT Level II Examiners, two UT Level III Examiners, one ET Level II Examiner, one ET Level I Examiner, one ET Level IIA-QDA Examiner, and one ET Level III examiner
Progress Energy Qualification and Certification Records for five VT Level II Examiners
- Progress Energy Plant Operating Procedure EST-083-1, Inservice Inspection Pressure Retaining VT-2 Bolting Examination of the Reactor Coolant System (Refueling Shutdown Interval), Revision 1, including completed Attachment 10.2 for components above the RPVH
- Visual Examination Data Sheet for System Leakage (Part A) documenting inspection of the RPVH for evidence of boric acid prior to removal of head insulation
- AR 00125701, Improvements to Procedure SP-1500, Visual Examination of RPV Head
- AR 00125699, Boric Acid Below Canopy Seal Welds on Penetrations 30 and 50
- Robinson Calculation RNP-R/MECH-1390, RNP Reactor Vessel Effective Degradation Years, Revision 0
- Robinson Document 32-5015594-00, RNP Appendix K Power Uprate Operating Conditions