November 8, 2004

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000454/2004007;
05000455/2004007

Dear Mr. Crane:

On September 30, 2004, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 6, 2004, with Mr. D. Hoots and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and to 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, one inspector-identified finding and five self-revealing findings of very low safety significance (Green) are identified in the report. These findings were all determined to involve violations of NRC requirements. However, because these violations were of very low significance and because the issues were entered into your corrective action program, the NRC is treating these findings as Non-Cited Violations in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

In addition, an unresolved item was identified during a surveillance test of the Unit 2 train A auxiliary feedwater pump when high bearing temperatures resulted in the operators aborting the test on June 28, 2004 and declaring the pump inoperable. We noted that your staff failed to establish preventive maintenance for, or monitor the performance of the cooling water valve that later failed to open during the test. Your staff made the necessary repairs to the valve and returned the system to service; therefore, we have no immediate safety concern. At the conclusion of the inspection, several questions remained regarding the past operability of the auxiliary feedwater pump with the cooling valve incapable of opening. The outcome of these operability questions will directly affect the significance characterization of this event and any enforcement action taken by the NRC.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U. S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector office at the Byron 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 made 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/

Ann Marie Stone, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure: Inspection Report 05000454/2004007; 05000455/2004007
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Byron Station
Plant Manager - Byron Station
Regulatory Assurance Manager - Byron Station
Chief Operating Officer
Senior Vice President - Nuclear Services
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-454; 50-455
License Nos:	NPF-37; NPF-66
Report Nos:	05000454/2004007; 05000455/2004007
Licensee:	Exelon Generation Company, LLC
Facility:	Byron Station, Units 1 and 2
Location:	4450 N. German Church Road Byron, IL 61010
Dates:	July 1, 2004, through September 30, 2004
Inspectors:	R. Skokowski, Senior Resident Inspector P. Snyder, Resident Inspector R. Alexander, Radiation Specialist B. Palagi, Senior Operations Engineer, Lead Inspector S. Ray, Senior Resident Inspector, Braidwood N. Shah, Resident Inspector, Braidwood T. Tongue, Project Engineer N. Valos, Operations Engineer R. Winter, Reactor Engineer C. Zoia, Operator Licensing Examiner C. Thompson, Illinois Emergency Management Agency, Resident Inspector
Approved by:	Ann Marie Stone, Chief Branch 3 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000454/2004007; 05000455/2004007; on 07/01/2004-09/30/2004; Byron Station, Units 1 and 2; Equipment Alignment, Maintenance Effectiveness, Maintenance Risk Assessment, and Temporary Plant Modifications.

This report covers a 3-month period of baseline resident inspection and announced baseline inspections on licensed operator requalification training and radiation protection. The inspections were conducted by Region III inspectors, and the resident inspectors. Six Green findings, which were violations of NRC requirements and one unresolved item (URI) were identified by the NRC or self-revealed. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (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. Inspector-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and an associated Non-Cited Violation (NCV) of 10 CFR 50 Appendix B Criterion III, "Design Control," was self-revealed on September 15, 2004 when a known leak on a gland seal cooling line on the Unit 2 train A (2A) essential service water (SX) pump worsened resulting in the licensee declaring the pump inoperable. The leakage from cracked pipe threads in gland seal cooling lines resulted from a combination of the use of thinner wall thickness pipe and hand-cut pipe threads. The thinner pipe was used because the incorrect thickness was specified in the associated drawings. The licensee replaced the existing pipe with the correct wall thickness pipe, and initiated a corrective action to revise the associated drawings. The primary cause of this violation was related to the cross-cutting area of Problem Identification and Resolution because, although the licensee had prior opportunities to identify and correct the drawing, it was not corrected.

  This finding was more than minor because the failure to correctly translate the correct schedule number for the SX pump gland water line into Piping and Instrumentation Diagram Drawing was similar to the greater than minor examples of Section 3 of Appendix E of IMC 0612. The finding was of very low safety significance because even though there was a design deficiency, there was no actual loss of safety function, no single train loss of safety function for greater than the Technical Specification (TS) allowed outage time, and no risk due to external events. (Section 1R04)

- Green. A finding of very low safety significance and an associated NCV of TS 5.4.1 regarding procedure adherence was self-revealed on July 2, 2004 when, as a result of an equipment control error, the licensee ran the Unit 0 train A (0A) deep well pump with an inadequate flow path such that it was no longer capable of performing its safety function. The licensee had since repaired the pump and placed it back into service. The primary cause of this violation was related to the cross-cutting area of Human

Performance. Although procedure requirements stated that effects on components outside the clearance order boundary must be identified as acceptable or properly dispositioned, the effects of work on the 0A deep well pump discharge valve to the SX cooling tower basin were not understood. This was evidenced by the fact that the pump continued to run when the operators expected it to automatically shut off.

This finding was more than minor because the failure to follow the procedure for clearance and tagging was similar to the greater than minor examples of Section 4 of Appendix E of IMC 0612. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, and no single train loss of safety function for greater than the TS allowed outage time. Also, there was no risk due to external events because the loss of this equipment by would not degrade two or more trains of a multi-train safety system function. (Section 1R12)

- Green. A finding of very low safety significance and an associated NCV of 10 CFR 50 Appendix B Criterion XVI, "Corrective Actions" was self-revealed when the licensee failed to correct a condition adverse to quality. Specifically, the licensee failed to take prompt corrective actions to correct engine damage resulting from overheating the diesel engine of the Unit 2 train B (2B) AFW pump in April 2004. On August 1, 2004, the discovery of jacket water leakage into the pump bed plate indicated that adequate corrective actions were not taken to correct the consequences of the overheated condition in April 2004. The licensee has since replaced the affected parts in the pump's diesel engine. This deficiency affected the cross-cutting area of Problem Identification and Resolution because, although the licensee had an opportunity to identify and correct the engine damage in April 2004, the extent of the damage was not identified or corrected at that time.

  The issue was more than minor because it affected the equipment performance attribute of the mitigating systems cornerstone objective. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the technical specification allowed outage time and no risk due to external events. (Section 1R12)

- Green. A finding of very low safety significance and an associated NCV of TS 5.4.1 regarding procedure quality was self-revealed when the licensee found less than minimum required valve-to-actuator coupling on three safety-related valves. Specifically, the licensee failed to document the correct minimum shaft coupling engagement length for maintenance on Unit 2 containment chiller SX inlet/outlet valves; 2SX112B, 2SX114A, 2SX114B in early 2003. Following the identification of the problem, the licensee adjusted the coupling to ensure proper engagement. The primary cause of this violation was related to the cross-cutting area of Human Performance because the licensee did not provide the specifications for proper shaft coupling engagement length in the work instructions work maintenance on the valves.

  This finding was more than minor because it involved the procedure quality attribute associated with the mitigating system cornerstone objective. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. (Section 1R12)

- Green. A finding of very low safety significance and an associated NCV of 10 CFR 50.65 was self-revealed when it was determined that Unit 2 was in a higher risk condition than was communicated by the licensee. Specifically, on July 23, 2004, Unit 2 risk was incorrectly changed from slightly elevated risk back to normal risk while the Unit 2 train A emergency diesel generator was in a configuration where it would not automatically start if called upon in an accident. Upon discovery of the error, the licensee reassigned online risk to the proper designation. The primary cause of this violation was related to the cross-cutting area of Human Performance because after the performance of a concurrent surveillance test, operators mistakenly assigned online risk to a condition of normal even though the emergency diesel generator remained unable to automatically start.

  This finding was more than minor because, if left uncorrected it could have been a more significant safety concern, in that, other maintenance activities that would have raised online risk to a level higher than expected could have been started. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. (Section 1R13)

- Green. A finding of very low safety significance was identified by the inspectors for a NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control." Specifically, the licencee failed to assess the adequacy of a bracing structure installed to protect safety-related conduits in the event of the tip-over of a nonseismically mounted tank during an earthquake. Subsequently the licensee evaluated the design in accordance with their temporary modification program. The primary cause of this violation was related to the cross-cutting area of Human Performance because prior to the installation, the engineers failed to assess the adequacy of the design of the bracing structure.

  This finding was more than minor because it involved the design control attribute associated with the mitigating system cornerstone objective. The finding was of very low safety significance because although there was a design deficiency, it did not result in a loss of function. (Section 1R23)

B. <u>Licensee Identified Violations</u>

No violations of significance were identified.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power throughout the inspection period except on July 24, 2004, when power was reduced about thirteen percent for a turbine throttle valve and governor valve surveillance test, and on July 31, 2004 when power was reduced by about ten percent to isolate the 15B/16B feedwater low pressure heaters for repair of the 16B feedwater heater tube side relief valve.

Unit 2 operated at or near full power throughout the inspection period except on September 4, 2004 when power was reduced about four percent due to the unexpected automatic isolation of the moisture separator reheater, September 7, 2004 when power was reduced about fourteen percent for load following and on September 27, 2004 when power was reduced about seven percent to isolate and repair a leak on the 27A feedwater high pressure heater drain valve.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

The inspectors completed two inspection samples. On July 21, and August 3, 2004, the inspectors reviewed the licensee's response to severe thunderstorms and high winds warnings. The inspectors evaluated licensee performance by comparing actual performance to the licensee management expectations and guidelines as presented in Byron Abnormal Operating Procedures:

- 0BOA ENV-1, Adverse Weather Conditions, Revision 101;
- 1BOA ENV-1, Adverse Weather Conditions, Revision 3; and
- 2BOA ENV-1, Adverse Weather Conditions, Revision 3.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdowns

a. Inspection Scope

The inspectors performed five partial walkdowns of accessible portions of trains of risk-significant mitigating systems equipment during times when the trains were of increased

importance due to the redundant trains or other related equipment being unavailable. The inspectors utilized the valve and electric breaker lineups and applicable system drawings to determine that the components were properly positioned and that support systems were lined up as needed. The inspectors also examined the material condition of the components and observed operating parameters of equipment to determine that there were no obvious deficiencies. The inspectors used the information in the appropriate sections of the Updated Final Safety Analysis Report (UFSAR) and Technical Specifications (TS) to determine the functional requirements of the systems.

The inspectors verified the alignment of the following trains:

- Unit 2 train B emergency diesel generator (EDG) while the train A EDG was out of service;
- Unit 2 train A component cooling water pump while the train B pump was out of service;
- Unit 2 train A auxiliary feedwater (AFW) pump while the train B was out of service;
- Unit 2 train A EDG while the train B was out of service for emergent work; and
- Unit 2 train B essential service water (SX) pump while train A was out of service for emergent work.

The inspectors utilized the following references during the completion of their review:

- BOP DO-17; Filling a Diesel Generator Fuel Oil Day Tank, Revision 2;
- BOP DG-1; Unit 1 and 2 Diesel Generator Alignment to Standby Condition, Revision 10;
- BOP DG-M1B; Train “B” Diesel Generator System Valve Lineup, Revision 9;
- BOP DO-E2; Unit 2 Diesel Oil Electrical Lineup, Revision 1;
- BOP DO-E2B; Unit 2 Diesel Oil Train “B” Electrical Lineup, Revision 2;
- BOP CC-M1; Component Cooling System Valve Lineup, Revision 24;
- BOP CC-M2; Component Cooling System Valve Lineup, Revision 19;
- BOP CC-E1; Unit 1 Component Cooling System Electrical Lineup, Revision 5;
- BOP CC-E2; Unit 2 Component Cooling System Electrical Lineup, Revision 3;
- BOP AF-2; Securing the Auxiliary Feedwater System After Initiation, Revision 12;
- BOP AF-E2; Auxiliary Feedwater Unit 2 Electrical Lineup, Revision 4;
- BOP AF-M2; Auxiliary Feedwater System Valve Lineup, Revision 9;
- BOP AF-6; Unit 1 and 2 Motor Driven Auxiliary Feedwater Pump A Shutdown, Revision 17;
- BOP SX E2; Unit 2 Essential Service Water Electrical Lineup, Revision 7; and
- BOP SX-E2B; Unit 2 Essential Service Water Train “B” Electrical Lineup, Revision 1.

The documents reviewed during this inspection were listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

During the inspection, the inspectors finished one complete system alignment inspection of the accessible portions of the Unit 2 SX system. This system was selected because it was considered both safety-related, and risk significant in the licensee's probabilistic risk assessment. The inspection consisted of the following activities:

- a review of plant procedures (including selected abnormal and emergency procedures), drawings, and the UFSAR to identify proper system alignment;
- a review of outstanding work requests on the system;
- a review of outstanding temporary modifications on the system;
- a review of the system health information; and
- a walkdown of the system to determine proper alignment, component accessibility, availability, and current condition.

The inspectors used the following references during the completion of their review:

- BOP SX-M2A; Train "A" Essential Service Water System Valve Lineup, Revision 3;
- BOP SX-M2B; Train"B" Essential Service Water System Valve Lineup, Revision 6;
- BOP SX-M2C; Train "C" Essential Service Water System Valve Lineup, Revision 1;
- BOP SX-E2; Unit 2 Essential Service Water Electrical Lineup, Revision 7; and
- BOP SX-E2B; Unit 2 Essential Service Water Train "B" Electrical Lineup, Revision 1.

The inspectors also reviewed selected issues documented in condition reports (CRs), to determine if they had been properly addressed in the licensee's corrective actions program. The documents reviewed during this inspection were listed in the Attachment at the end of this report.

b. Findings

Unit 2 Train A Essential Service Water Pump Gland Seal Leakage

Introduction: A Non-Cited Violation (NCV) of 10 CFR Part 50 Appendix B, Criterion III, having very low safety significance was self-revealed when the Unit 2 train A (2A) essential service water (SX) pump was declared inoperable because of a leak on the gland water line. The leakage from cracked pipe threads in gland seal cooling line resulted from a combination of the use of thinner wall thickness pipe and hand-cut pipe threads. The thinner pipe was used because the incorrect thickness was specified in the associated drawings.

Description: On September 9, 2004, the licensee noted a leak on the 2A SX pump. The leak was on gland cooling water line to the pump at an interface between a pipe and the pump housing at a threaded connection. Subsequently on September 15, 2004,

the leak on the 2A SX pump worsened. After reevaluating the condition, the licensee declared the pump inoperable.

The licensee performed an investigation and determined that the gland water cooling pipes had been replaced on August 27, 2004, as part of a preventive maintenance action and that the problem was probably caused by a combination of using schedule 40 vs. schedule 80 pipe and manual threading of the pipe threads.

Regarding the incorrect pipe schedule, the licensee contacted the pump vendor and determined that schedule 80 pipe was originally supplied with the pumps and was the correct thickness pipe to be installed for the gland cooling lines. However, the system drawing for the pipes incorrectly specified schedule 40 pipe which was a thinner walled pipe.

Regarding the manual pipe threads, the licensee routinely threads pipes using a threading machine; however, on the 2A pump, the licensee elected to prefabricate a flanged joint on the pipe prior to threading the pipe ends. The resulting pipe was too short to be mounted in the threading machine, therefore, maintenance personnel manually threaded the pipes. While it was determined that the manual threading was done correctly, manual threading did introduce more variability into the threaded joint resulting in a deeper thread cut into the pipe.

This effect combined with the fact that thinner walled schedule 40 pipe was used resulted in the failures. The gland water pipes on the 2A SX pump were replaced with schedule 80 pipe after the failure. The licensee plans to replace the existing schedule 40 gland seal lines on the other pumps with schedule 80 pipe.

Also during the licensee's review, they had determined that earlier preventive maintenance replacements were also made on other SX pumps. One of these included replacing the gland water pipes with schedule 80 pipe on November 5, 2002. Also, in 2002 the licensee initiated a corrective action to change the hard piped gland water lines with flexible hoses due to fatigue concerns at the threaded connection resulting in the pipes breaking at the threads. The licensee also determined at that time that the proposed replacement was a modification and would be postponed. That corrective action was closed without the replacements being done.

Analysis: The inspectors determined that incorrectly specifying schedule 40 vs. schedule 80 pipe in the drawing was a performance deficiency requiring significance evaluation in accordance with Inspection Manual Chapter (IMC) 0612 "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor because of its similarity to the more than minor examples of Section 3 of Appendix E of IMC 0612. The inspectors also determined that the finding impacted the cross-cutting area of problem identification and resolution because, although the licensee had identified prior opportunities to correct the problem at an earlier time they failed to do so.

The inspectors determined that the finding could be evaluated using the Significance Determination Process (SDP) in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and

reliability of a train in the mitigating system cornerstone. For the Phase 1 screening, the inspectors answered the questions in the Mitigating System column and determined that even though the finding involved a design deficiency, there was no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement: 10 CFR Part 50 Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into drawings, procedures and instructions. Contrary to the above, the licensee failed to translate the correct schedule number for the SX pump gland water line into Piping and Instrumentation Diagram Drawing M-81 Sheet 1. On August 26, 2004, the licensee replaced the gland water line on the 2A SX pump with a thinner walled pipe, which subsequently failed. The licensee replaced the pipe with the proper schedule pipe and initiated corrective actions to revise the associated drawings. The licensee entered the problem into its corrective action system as Condition Report 253061, "1A /1B /2B SX Pumps Seal Cooling Water Piping," dated September 15, 2004. Because this violation was of very low safety significance and was captured in the licensee's corrective action program, this violation was being treated as a NCV consistent with Section VI.A of NRC Enforcement Policy (NCV 05000455/2004007-01).

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of fire fighting equipment; the control of transient combustibles and ignition sources; and on the condition and operating status of installed fire barriers. The inspectors reviewed applicable portions of the Byron Station Fire Protection Report and selected fire areas for inspection based on their overall contribution to internal fire risk, as documented in the Individual Plant Examination of External Events Report. In addition, during these inspections, the inspectors used the following reference documents:

- OP-AA-201-006; Control of Temporary Heat Sources, Revision 0;
- OP-MW-201-007; Fire Protection System Impairment Control, Revision 0; and
- OP-AA-201-009; Control of Transient Combustible Material, Revision 4.

The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The Byron Station Pre-Fire Plans applicable for each area inspected were used by the inspectors to determine approximate locations of firefighting equipment.

The inspectors completed nine inspection samples by examining the plant areas listed below to observe conditions related to fire protection:

- Division 22 engineered safety features switchgear room (Zone 5.4-2);
- Division 21 miscellaneous electrical equipment room (Zone 5.6-2);
- Unit 2 lower cable spreading room non-segregated bus duct area (Zone 3.2A-2);
- Turbine building 451 elevation (Zone 8.6-0);
- Unit 1 lower cable spreading room non-segregated bus duct area (Zone 3.2A-1);
- Unit 1 train B diesel generator room (Zone 9.1-1);
- Auxiliary building elevation 426 laundry room (Zone 11.6C-0);
- Unit 1 turbine building 426 elevation (Zone 8.5-1); and
- Unit 2 turbine building 426 elevation (Zone 8.5-2);

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective actions program. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

Section 1R11.1 represents completion of one sample for the quarterly testing/training activity inspection.

Sections 1R11.2 through 1R11.11 represent completion of one sample for the biennial licensed operator requalification program inspection.

.1 Resident Inspector Quarterly Review

a. Inspection Scope

On July 13, 2004, the inspectors completed one inspection sample by observing and evaluating an operating crew during an "out-of-the-box" requalification examination on the simulator using Scenario "Number 04-4-OOB," Revision 0. The inspectors evaluated crew performance in the areas of:

- clarity and formality of communications;
- ability to take timely actions;
- prioritization, interpretation and verification of alarms;
- procedure use;
- control board manipulations;
- supervisor's command and control;
- management oversight; and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following documents:

- OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel, Revision 0;
- OP-AA-103-102, Watchstanding Practices, Revision 2;

- OP-AA-103-103, Operation of Plant Equipment, Revision 0;
- OP-AA-103-104, Reactivity Management Controls, Revision 2; and
- OP-AA-104-101, Communications, Revision 1.

The inspectors verified that the crew completed the critical tasks listed in the above simulator guide. The inspectors also compared simulator configurations with actual control board configurations. For any weaknesses identified, the inspectors observed the licensee evaluators to determine that they also noted the issues and discussed them in the critique at the end of the session.

In addition, the inspectors utilized the following references during the completion of their review:

- Unit 1 Emergency Operating Procedure 1BEP-0, Reactor Trip or Safety Injection, Revision 106;
- Unit 1 Emergency Operating Procedure 1BEP-1, Loss of Reactor or Secondary Coolant, Revision 104; and
- Unit 1 Emergency Operating Procedure 1BEP ES-1.3, Transfer to Cold Leg Recirculation, Revision 102.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective actions program. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Facility Operating History

a. Inspection Scope

The inspectors reviewed the plant's operating history from January 2003 through June 2004, to assess whether the Licensed Operator Requalification Training (LORT) program had identified and addressed operator performance deficiencies at the plant.

b. Findings

No findings of significance were identified.

.3 Licensee Requalification Examinations

a. Inspection Scope

The inspectors performed a biennial inspection of the licensee's LORT program. The inspectors reviewed the annual requalification operating test and biennial written examination material to evaluate general quality, construction, and difficulty level. The operating examination material reviewed consisted of the operating test administered the week of September 16, 2004, which contained two dynamic simulator scenarios and

six job performance measures (JPMs). The biennial written examinations reviewed consisted of three Senior Reactor Operator and three Reactor Operator examinations to be administered in 2003. The inspectors reviewed the methodology for developing the examinations, including the LORT program 2-year sample plan, probabilistic risk assessment insights, previously identified operator performance deficiencies, and plant modifications. The inspectors also reviewed the licensee's program and assessed the level of examination material duplication during the current year annual examinations as compared to the previous year's annual examinations.

b. Findings

No findings of significance were identified.

.4 Licensee Administration of Requalification Examinations

a. Inspection Scope

The inspectors observed the administration of the requalification operating test to assess the licensee's effectiveness in conducting the test and to assess the facility evaluators' ability to determine adequate performance using objective, measurable performance standards. The inspectors evaluated the performance of one shift crew in parallel with the facility evaluators during two dynamic simulator scenarios. In addition, the inspectors observed licensee evaluators administer several JPMs to various licensed crew members. The inspectors observed the training staff personnel administer the operating test, including pre-examination briefings, observations of operator performance, and individual and crew evaluations after dynamic scenarios. The inspectors evaluated the ability of the simulator to support the examinations. A specific evaluation of simulator performance was conducted and documented under Section 1R11.9, "Conformance With Simulator Requirements Specified in 10 CFR 55.46," of this report. The inspectors also reviewed the licensee's overall examination security program.

b. Findings

No findings of significance were identified.

.5 Examination Security

a. Inspection Scope

The inspectors observed and reviewed the licensee's overall licensed operator requalification examination security program related to examination physical security (e.g., access restrictions and simulator considerations) and integrity (e.g., predictability and bias). The inspectors also reviewed the facility licensee's examination security procedure, and the implementation of security and integrity measures (e.g., security agreements, sampling criteria, bank use, and test item repetition) throughout the examination process.

b. Findings

No findings of significance were identified.

.6 Licensee Training Feedback System

a. Inspection Scope

The inspectors assessed the methods and effectiveness of the licensee's processes for revising and maintaining its LORT program up to date, including the use of feedback from plant events and industry experience information. The inspectors reviewed the licensee's quality assurance oversight activities, including licensee training department self-assessment reports. The inspectors evaluated the licensee's ability to assess the effectiveness of its LORT program and their ability to implement appropriate corrective actions.

b. Findings

No findings of significance were identified.

.7 Licensee Remedial Training Program

a. Inspection Scope

The inspectors assessed the adequacy and effectiveness of the remedial training conducted since the previous annual requalification examinations and the training planned for the current examination cycle to ensure that they addressed weaknesses in licensed operator or crew performance identified during training and plant operations. The inspectors reviewed remedial training procedures and individual remedial training plans.

b. Findings

No findings of significance were identified.

.8 Conformance With Operator License Conditions

a. Inspection Scope

The inspectors reviewed the facility and individual operator licensees' conformance with the requirements of 10 CFR Part 55. The inspectors reviewed the facility licensee's program for maintaining active operator licenses and to assess compliance with 10 CFR 55.53 (e) and (f). The inspectors reviewed the procedural guidance and the process for tracking on-shift hours for licensed operators and which control room positions were granted credit for maintaining active operator licenses. In addition, the inspectors reviewed the facility licensee's LORT program to assess compliance with the requalification program requirements as described by 10 CFR 55.59 (c).

b. Findings

No findings of significance were identified.

.9 Conformance With Simulator Requirements Specified in 10 CFR 55.46

a. Inspection Scope

The inspectors assessed the adequacy of the licensee's simulation facility (simulator) for use in operator licensing examinations and for satisfying experience requirements as prescribed in 10 CFR 55.46, "Simulation Facilities." The inspectors also reviewed a sample of simulator performance test records (i.e., transient tests, scenario test and discrepancy resolution validation test), simulator discrepancy and modification records, and the process for ensuring continued assurance of simulator fidelity in accordance with 10 CFR 55.46. The inspectors reviewed and evaluated the discrepancy process to ensure that simulator fidelity was maintained. Open simulator discrepancies were reviewed for importance relative to the impact on 10 CFR 55.45 and 55.59 operator actions as well as on nuclear and thermal hydraulic operating characteristics. The inspectors conducted interviews with members of the licensee's simulator staff about the configuration control process and completed the IP 71111.11, Appendix C, checklist to evaluate whether or not the licensee's plant-referenced simulator was operating adequately as required by 10 CFR 55.46 (c) and (d).

b. Findings

No findings of significance were identified.

.10 Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the pass/fail results of individual written tests administered in 2003, and the operating and simulator tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee during calender year 2004. Year 2004 was the first year of the current 2 year training program; therefore, no biennial comprehensive written examination was administered. As stated earlier, this inspection represents one sample. The overall written examination and operating test results were compared with the significance determination process in accordance with NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process."

b. Findings

No findings of significance were identified.

.11 Biennial Sample Review

a. Inspection Scope

The inspectors reviewed the most recent licensee training department self-assessment report. The licensee's self-assessment reviewed the licensed operator training program through April 2004. The self-assessment was reviewed to ensure that any issues identified during the self-assessment were appropriately evaluated, prioritized, and controlled.

b. Findings

There were no findings of significance.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors completed three inspection samples by evaluating the licensee's implementation of the maintenance rule, 10 CFR 50.65, as it pertained to identified performance problems associated with the following structures, systems, and/or components:

- Reactor Coolant Drain System;
- Well Water System; and
- Auxiliary Feedwater System.

During this inspection, the inspectors evaluated the licensee's monitoring and trending of performance data for the past 2 years, verified that performance criteria were established commensurate with safety, and verified that equipment failures were appropriately evaluated in accordance with the maintenance rule. These aspects were evaluated using the maintenance rule scoping and report documents. The inspectors also verified the basis for classification as (a)(1) or (a)(2) and the criteria for change of classification. For the system reviewed, the inspectors also reviewed the significant work orders, condition reports and other documents listed in the Attachment to this report to determine that failures were properly identified, classified, and corrected, and that unavailable time had been properly calculated.

The inspectors utilized the following reference during the completion of their review:

- OP-MW-109-101, Clearance and Tagging, Revision 2.

b. Findings

There were two findings and one unresolved item associated with the samples in this area:

- Failure of lubricating oil cooling to the Unit 1 train A (A1) AFW pump;
- Failure of the Unit 0 train A (0A) deep well pump; and

- Inadequate corrective actions for the Unit 2 train B (2B) AFW pump overheating event.

Also, during the review an operability evaluation associated with the SX valve coupling engagement (Operability Determination 04-001) reviewed in Section 1R15, an additional maintenance effectiveness-related finding was identified.

.1 Failure of Lubricating Oil Cooling to the Unit 1 Train A Auxiliary Feedwater Pump

Introduction: An unresolved item (URI) was identified during a surveillance test failure of the 1A AFW pump. Specifically, during the June 28, 2004 surveillance test, high bearing temperatures caused operators to abort the test and declare the pump inoperable. Subsequent review determined that the licensee failed to establish preventive maintenance for, or monitor the performance of the lubrication oil cooling water valve that later failed to open during the test. The issue is considered a URI pending the licensee's completion and NRC review of past operability of the pump.

Description: On June 28, 2004, during the performance of a routine quarterly surveillance on the 1A AFW pump, lube oil temperatures exceeded the licensee's acceptance criteria limit, and operators secured the pump. After troubleshooting the licensee determined that the cooling water outlet isolation valve (1SX101A) to the lube oil cooler was stuck in the closed position and did not automatically open during the pump start as designed. This valve was normally closed and opened when the AFW pump received a start signal. The function of the oil cooler was to provide a means of removing heat from the lubricating oil, which circulates to lubricate the pump bearings, to ensure that oil temperature remains below design limits. Proper operation of the motor driven AFW pump requires that the oil cooler outlet solenoid valve open and remain in the open position while the AFW pump was running.

The licensee restored flow to the oil cooler by de-energizing and mechanically agitating the solenoid operated cooling water valve (1SX101A). The licensee then reran the pump to determine that the valve was open and that bearing oil temperatures were within the expected range. Subsequent oil analysis confirmed that no damage was done to the pump bearings during the short time period when the lubricating oil temperatures were elevated. Additionally, as corrective actions, the licensee completed a temporary modification to fail the valve in the open position to ensure adequate cooling water flow. This temporary modification was completed on both units, and the inspectors reviewed the temporary modification as described in Section 1R23 of this report.

The licensee performed a root cause analysis and issued a root cause report. The risk assessment section of the licensee's root cause analysis indicated that the pump would eventually fail when bearing temperatures became hot enough and this essentially made the motor driven pump incapable of performing its intended safety function. The report also indicated that the most likely cause of the 1SX101A not opening was silt plugging the internal passages of the valve's pilot assembly.

Overall the licensee's root cause report determined that the causes for the problem included:

- misapplication of a tight clearance pilot operated globe valve in a raw water system;
- not implementing a preventive maintenance corrective action which had been implemented at the Braidwood Station;
- identifying critical preventive maintenance in 1998 but not assigning a preventive maintenance activity; and
- not assigning the appropriate priority to a proposed modification to remove the valve.

The root cause report indicated that in May 1995, the same valve in a similar system failed a stroke time test at the Braidwood Station. In addition, the Braidwood Station licensee noted and corrected slow stroke times due to silting in the valve internals. The Braidwood licensee implemented preventive maintenance to clean the valve internals on a periodic basis. No similar preventive maintenance was implemented at the Byron Station. However, in 1998, the Byron licensee identified that this preventive maintenance for the 1SX101A valve was critical but did not implement these actions. The licensee later determined that the valve could be removed from the system and made plans to remove the valves from their AFW systems. However, the licensee did not assign a priority to the modification; therefore, it had not been completed prior to the June 28, 2004 failure.

At the conclusion of the inspection period, the licensee was still evaluating past operability of the 2A AFW pump. Therefore, this issue is considered an Unresolved Item (URI 0500454/2004007-02) pending the licensee's completion and NRC review of the operability assessment. This issue was entered into the licensee's corrective action program as Condition Report 232158.

.2 Failure of the Unit 0 Train A Deep Well Water Pump

Introduction: A finding of very low safety significance and an associated NCV of TS 5.4.1 regarding procedure adherence was self-revealed on July 2, 2004, when, as a result of an equipment control error, the licensee ran the 0A deep well pump with an inadequate flow path until its performance was degraded such that it was no longer capable of performing its safety function.

Description: On July 2, 2004, while work was ongoing on the 0A deep well water (WW) pump discharge valve (0WW019A) to the SX cooling tower (SXCT) basin, the 0A WW pump was run to fill the filtered water storage tanks (FWST) to accommodate filling of the condensate storage tanks (CST). After the CSTs and FWSTs were full, the pump continued to run without an adequate flow path. Because of the system design, the operators had expected the pump to automatically shut off when the CSTs and FWSTs were full. When the 0A WW pump was discovered still running, the operators stopped the pump. The next day, the licensee performed a surveillance test which established that the 0A WW pump had degraded such that it could no longer provide the flow required to perform its safety function. Subsequently the licensee repaired the 0A WW pump and placed it back into service.

In the case of a probable maximum flood at the Rock River, the safety-related SX make-up pumps would be rendered incapable of providing makeup water to the SXCT basin.

Because the WW pumps were located in an area where they would not be subject to the probable maximum flood, the WW pumps would perform a safety function to provide makeup water to the SXCT basin in the case that the SX make-up pumps were rendered unable to perform that function.

The licensee performed an investigation which determined during maintenance on the 0WW019A valve, the pump would not automatically shut off. Therefore, the interactions associated with the removal of the 0WW019A valve from service were not completely understood by the operators. The licensee's clearance and tagging procedure required that the clearance include an evaluation on the impact on systems and components outside the clearance boundary.

Additionally, during their review of this event, the licensee discovered that a similar event occurred on June 12, 2002. At that time the Unit 0 train B WW pump automatic shut off feature was impacted as a result of a clearance order error on the train B applicable discharge valve 0WW019B to the Unit 0 train B SXCT basin.

Analysis: The inspectors determined that the failure to understand the effects on the system outside the clearance boundary was a performance deficiency requiring significance evaluation in accordance with IMC 0612 "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor because of its similarity to the more than minor examples of Section 4 of Appendix E of IMC 0612. The inspectors also determined that the finding impacted the cross-cutting area of Human Performance because the operators did not sufficiently determine the impact of taking the discharge valve out of service.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. In the Phase 1 screening, the inspectors answered "no" to questions 1 through 4 in the Mitigating System cornerstone column because there was no design deficiency, no actual loss of safety function, and no single train loss of safety function for greater than the TS allowed outage time. For question 5 the inspectors determined the use of page 3 of the Phase 1 screening worksheet was warranted. The inspectors answered "no" to question 2 of that sheet because during the external event (flooding), the loss of this equipment by itself would not degrade two or more trains of a multi-train safety system function. Therefore, the inspectors determined that the finding was of very low safety significance (Green).

Enforcement: Technical Specification 5.4.1 (a) required in part that written procedures be established, implemented, and maintained covering the applicable procedures recommended by Regulatory Guide 1.33, Revision 2, Appendix A. Paragraph 1.c of Appendix A of Regulatory Guide 1.33 states that recommended administrative procedures include those for safety-related activities associated with equipment control (e. g. Locking and Tagging). Procedure OP-MW-109-101 Revision 2 entitled "Clearance and Tagging" was established to meet this criteria and in step 7.1.3 it states that clearance impacts must be evaluated to ensure that affects on systems and components outside the clearance order boundary as acceptable or properly

dispositioned. Contrary to the above, on July 2, 2004, the impact of removing valve 0WW019A from service was not appropriately evaluated, in that, the affect on the 0A Deep Well pump was not properly dispositioned. Specifically, the pump did not automatically shutoff when the valve was out of service which led to degradation of the pump. The licensee entered the problem into its corrective action system as Condition Report 233576, "System Interaction Not Identified During Work Planning," dated July 2, 2004. Because this violation was of very low safety significance and was captured in the licensee's corrective action program, this violation was being treated as a NCV consistent with Section VI.A of NRC Enforcement Policy (NCV 05000454/2004007-03; 05000455/2004007-03).

.3 Inadequate Corrective Actions for the Unit 2 Train B Auxiliary Feedwater Pump Overheating Event

Introduction: An NCV of Criterion XVI of 10 CFR 50 Appendix B having very low safety significance (Green) was self-revealed when the licensee failed to promptly correct a condition adverse to quality. Specifically, the licensee failed to take prompt corrective actions to correct engine damage resulting from overheating the diesel engine of the 2B AFW pump.

Description: On April 7, 2004 during the performance of a post maintenance test on the 2B AFW pump, the pump tripped due to high jacket water temperature. The licensee determined that this was due to the failure to properly fill the diesel engine with jacket water coolant. The licensee concluded at the time that no engine damage occurred. The diesel engine was then properly filled with jacket water, rerun successfully, and returned to service.

On August 1, 2004, an operator noticed that cooling water had leaked onto the pump bed plate. Initially the leak was thought to be a minor leak from a gasket in the jacket water system of the pump's diesel engine. Later the licensee determined that the leak was from a crankcase vent on the 2B AFW diesel engine, and the problem was determined to be more significant than originally thought. On August 2, the licensee declared the 2B AFW pump inoperable. During the following disassembly of the diesel, the licensee found that jacket water had leaked through internal seals in and around the cylinder heads resulting in about three and one half gallons of standing water in the exhaust manifold. The licensee found no standing water in the cylinders. During troubleshooting of the engine the licensee identified leakage and damage to seals on three different cylinders. The licensee characterized this damage as that typically expected from an overheating event. Further analysis by the licensee determined that even with the jacket water in leakage into the cylinders the diesel engine remained operable and would have started on demand.

The licensee had since replaced the damaged parts in the diesel engine and returned the 2B AFW pump to service.

Analysis: The inspectors determined that the failure to promptly identify and correct the engine damage in the diesel engine of the 2B AFW pump in April 2004 was a performance deficiency warranting a significance evaluation. This determination was made in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B,

"Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor since it involved the equipment reliability attribute of the Mitigating System cornerstone objective. Although the licensee later determined that the jacket water leaks caused by the engine overheat event did not render the pump inoperable, the failure to correct the engine damage in April 2004 impacted the reliability of the pump and resulted in additional unavailability time in August 2004.

This deficiency affected the cross-cutting area of Problem Identification and Resolution. Problem Identification and Resolution was affected because, although the licensee had an opportunity to correct the engine damage in April 2004, the extent of the damage was not identified or corrected at that time.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered "no" to the questions in the Mitigating System column, because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement: Criterion XVI of 10 CFR Part 50 Appendix B states, in part, that measures shall be established to assure that conditions adverse to quality such as malfunctions are promptly identified and corrected. Contrary to the above, in April 2004, the licensee failed to promptly correct damage following overheating in the 2B AFW pump that led to jacket water leakage into the cylinders, exhaust manifold and pump bedplate. The licensee entered this into their corrective action program as CR 240718, "2B AFW Jacket Water Leak," dated August 1, 2004. Because this violation was of very low safety significance and was captured in the licensee's corrective action program, this violation was being treated as a NCV consistent with Section VI.A of NRC Enforcement Policy (NCV 05000455/2004007-04).

.4 Less than Specified Essential Service Water Valve Coupling Engagement

Introduction: An NCV of TS 5.4.1 having very low safety significance (Green) was self-revealed when the licensee found less than minimum required valve-to-actuator coupling on three safety-related valves. Specifically, the licensee failed to specify the correct minimum shaft coupling engagement length in the work instructions for maintenance on Unit 2 containment chiller SX inlet/outlet valves; 2SX112B, 2SX114A, 2SX114B in early 2003.

Description: On March 21, 2003, during troubleshooting of a trip of Unit 2 train B containment chiller, the SX outlet valve, (2SX114B), was found shut even though both local and remote indicators showed open. The licensee documented this issue in CR 150224. Subsequently the licensee found that this valve shaft was disconnected from the actuator. The licensee investigated the condition and determined that maintenance was last performed on January 10, 2003 per Work Order 99037437. The valve shaft coupling was repaired and successfully tested. The licensee also determined that during the time between the maintenance and the identification of the

problem, the valve was closed. Since the safety function of this valve was to close and isolate non-safety SX loads, the licensee concluded that the valve was operable during the period from January to March.

As part of cause determination for CR 150224, the licensee determined in February 2004, that for maintenance activities on these valves the vendor required 3/4" valve to actuator engagement to for proper operation. This specification was not included in the work instructions for maintenance activities on this valve type. As a result the licensee reviewed the valve to actuator engagement for selected valves and identified that the SX outlet valve to the Unit 2 train A containment chiller, (2SX114A) had an engagement less than 3/4". This issue was documented in CR 200844. Therefore, the licensee completed an extent of condition review and determined two other SX valves also associated with the containment chillers (2SX112B and 2SX114B) with less than the specified valve to actuator engagement, and documented the issues in CR 202230. The licensee initiated work orders and restored the valve to actuator engagement to greater 3/4" for these three valves.

The licensee determined that the maintenance was performed on these valves in early 2003. Additionally, the licensee evaluated the impact of the less than specified valve to actuator engagement, and determined that the valves were degraded but remained operable. The inspectors acknowledged the results of the licensee's operability evaluation, and completed a review of this operability determination as described in Section 1R15 of this report.

Analysis: The inspectors determined that the failure to provide the vendor's specified required actuator to valve coupling engagement in the maintenance work instructions for the applicable SX valves was a performance deficiency warranting a significance evaluation. This determination was made in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor since it involved the procedure quality attribute that affected the Mitigating System cornerstone objective.

The inspectors determined that this deficiency affected the cross-cutting area of Human Performance because the licensee did not provide the specifications for proper shaft coupling engagement length in the work instructions work maintenance on 2SX114A, 2SX112B and 2XSX114B.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability, and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered "no" to the questions in the Mitigating System column, because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement: Technical Specification 5.4.1, states, in part, that "Written procedures shall be established, implemented, and maintained covering the following activities: The

applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." Paragraph 9.c of this Regulatory Guide states, in part, that procedures for performing maintenance that can affect the performance of safety-related valves shall be prepared and activities shall be performed in accordance with these procedures. Contrary to the above, prior to February 2004, work orders used to perform maintenance on safety-related valves did not specify the proper shaft coupling engagement length to ensure proper operability. Because this violation was of very low safety significance and was captured in the licensee's corrective action program (CR 202230), this violation was being treated as a NCV consistent with Section VI.A of NRC Enforcement Policy (NCV 0500455/2004007-05).

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the licensee's management of plant risk during emergent maintenance activities or during activities where more than one significant system or train was unavailable. The inspectors chose activities based on their potential to increase the probability of an initiating event or impact the operation of safety-significant equipment. The inspectors verified that the evaluation, planning, control, and performance of the work were done in a manner to reduce the risk and the work duration was minimized where practical. The inspectors also verified that contingency plans were in place where appropriate.

The inspectors reviewed configuration risk assessment records, UFSAR, TS, and Individual Plant Examination. The inspectors also observed operator turnovers, observed plan-of-the-day meetings, and reviewed the documents listed in the Attachment to this report to determine that the equipment configurations had been properly listed, that protected equipment had been identified and was being controlled where appropriate, and that significant aspects of plant risk were being communicated to the necessary personnel. The inspectors verified that the licensee controlled work activities in accordance with the following:

- WC-AA-101, On-Line Work Control Process, Revision 9;
- ER-AA-600, Risk Management, Revision 3;
- ER-AA-310, Implementation of the Maintenance Rule, Revision 3;
- Byron Operating Department Policy 400-47, June 23, 2004, Revision 5; and.
- Byron Nuclear Power Station Probabilistic Risk Assessment, Revision 5B.

The inspectors completed ten inspection samples by reviewing the following activities:

- Emergent Unit 2 direct current bus 212 ground on July 7, 2004;
- Unit 2 SX train B out of service concurrent with Unit 2 train B component cooling water pump;
- Emergent Unit 1 direct current bus 112 ground on July 16, 2004;
- Unit 2 train A EDG out of service concurrent with Unit 2 train A diesel oil storage tank;
- Emergent increase of Unit 1 reactor coolant system leakage to about 0.8 gpm on July 27, 2004;

- Emergent SX booster pump leak on the Unit 1 train B AFW pump on August 9 -11, 2004;
- Emergent failure of Unit 2 train B EDG to start correctly on August 11, 2004;
- Emergent failure of the Unit 0 train A control room ventilation return fan and emergent work on the Unit 1 train A reactor containment fan cooler;
- Emergent leak repairs noted through Unit 2 train B AFW jacket water leak on August 2 - 4, 2004; and
- Emergent out of service of the Unit 2 train B SX pump concurrent with Unit 2 train A safety injection pump work on September 15, 2004.

The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

Introduction: An NCV of 10 CFR 50.65 (a)(4) having very low safety significance (Green) was self-reveled when the licensee failed to properly manage the increase in risk during the return to service of the Unit 2 train A EDG. Specifically, the licensee noted that the 2A EDG was in a state where it would not have automatically started if called upon in an accident condition without contingency actions in place. This specific condition placed the licensee in a higher risk condition than what was communicated by the licensee.

Description: During a designated work window for preventive maintenance on the 2A EDG and other scheduled work, online risk was evaluated by the licensee to be at a slightly elevated level. Early on or about July 23, 2004, the licensee had completed the maintenance portion of the work and proceeded to perform a series of post maintenance tests. At the same time, the licensee performed a surveillance test on the Unit 2 Solid State Protection System (SSPS) which also resulted on online risk being at a slightly elevated level. After completion of the SSPS surveillance, while the 2A EDG was still unavailable, the licensee mistakenly designated online risk as normal.

The operators turned over from one crew to the next. Later that same morning, an operator on the new operations crew noted that the emergency stop push-button on the 2A EDG was pushed in. In that configuration, the 2A EDG was unable to automatically start if called upon in an accident. The operator recognized that this meant that the 2A EDG was unavailable and that risk configuration was higher than presented at the shift turnover and informed his management. The shift manager acknowledged that risk should have been slightly evaluated because the 2A EDG would not have automatically started if called upon, and the operator's actions required to return the 2A EDG to a state to where it could automatically start were considered more complex than routine operator skill. The licensee returned the risk designation to the appropriate level and generated CR 238709 to address the issue in their corrective action program.

Analysis: The inspectors determined that the failure to manage the increase in risk associated with the maintenance activities on the 2A EDG was a performance deficiency warranting a significance evaluation. This determination was made in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," issued

on June 20, 2003. The inspectors determined the issue was more than minor because if left uncorrected, it could become a more significant safety concern, in that, the licensee could have begun other maintenance activities that would have raised online risk to a level higher than expected. The inspectors identified that the finding impacted the equipment performance attribute of the Mitigating Systems Cornerstone objective. The inspectors also determined that the finding impacted the cross-cutting area of Human Performance because, although the actual risk condition of the Unit was higher due to the 2B EDG work, the operators returned the risk designation to the normal level following completion of the SSPS surveillance even though the EDG was still unavailable.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered "no" to the questions in the Mitigating System column, because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement: 10 CFR 50.65 (a)(4) states, in part, that the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on July 23, 2004, the licensee inadequately managed risk when they designated online risk to be normal following the completion of the SSPS surveillance even though the EDG was still unavailable. Upon discovery of the error, the licensee reassigned risk to the proper level. The licensee entered the problem into their corrective action program as Condition Report 238709, "Online Risk Potentially Impacted During 2A Diesel Generator Testing," dated July 23, 2004. Because this violation was of very low safety significance and was captured in the licensee's corrective action program, this violation was being treated as a NCV consistent with Section VI.A of NRC Enforcement Policy (NCV 05000455/2004007-06).

1R14 Personnel Performance Related to Non-routine Plant Evolutions and Events (71111.14)

a. Inspection Scope

The inspectors completed one inspection sample by observing and evaluating control room operators during the following non-routine evolutions:

- Emergent increase of Unit 1 reactor coolant system leakage to about 0.8 gpm on July 27, 2004.

The inspectors evaluated crew performance in the areas of:

- prioritization, interpretation and verification of alarms,
- procedure use,
- control board manipulations,
- supervisor's command and control,

- management oversight, and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following documents:

- OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel, Revision 0,
- OP-AA-103-102, Watchstanding Practices, Revision 2,
- OP-AA-103-103, Operation of Plant Equipment, Revision 0,
- OP-AA-300, Reactivity Management Controls, Revision 000, and
- OP-AA-104-101, Communications, Revision 1.

The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors evaluated plant conditions, selected condition reports, engineering evaluations and operability determinations for risk-significant components and systems in which operability issues were questioned. These conditions were evaluated to determine whether the operability of components was justified.

The inspectors completed six inspection samples by reviewing the following evaluations and issues:

- Operability Determination 04-001, essential service water valve coupling engagement, Revision 3;
- Condition Report 236258, the stop light for the Unit 1train B EDG was found not lit;
- Engineering Change 350601, Unit 2 train B auxiliary feedwater pump jacket water leakage, Revision 0;
- Operability Determination 03-006 instrument degraded voltage value below manufacturer's minimum, Revision 4;
- Condition Report 245125 on low flow in the Unit 1 train A essential service water loops to the Unit 1 train A reactor containment fan cooler;
- Condition Report 242823 on Unit 1train B auxiliary feedwater pump essential service water booster pump excessive seal leakage on August 9, 2004.

The inspectors compared the operability and design criteria in the appropriate section of the TS including the TS Basis, the technical requirements manual (TRM) and UFSAR to the licensee's evaluations to determine that the components or systems were operable. The inspectors determined whether compensatory measures, if needed, were taken, and determined whether the evaluations were consistent with the requirements of

licensee's Procedure LS-AA-105, "Operability Determination Process," Revision 1. The inspectors also discussed the details of the evaluations with the shift managers and appropriate members of the licensee's engineering staff.

The inspectors utilized the following references during the completion of their review:

- NRC Inspection Manual Part 9900: Technical Guidance; Operable/Operability: Ensuring the Functional Capability of a System or Component;
- NRC Inspection Manual Part 9900: Technical Guidance; Resolution of Degraded and Nonconforming Conditions; October 8, 1997; and
- NRC Generic Letter No 91-18: Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions, Revision 1.

The documents reviewed during this inspection were listed in the Attachment to this report.

b. Findings

No findings of significance were identified with the operability evaluations reviewed. However, during the review of the operability associated with the SX valve coupling engagement (Operability Determination 04-001), a finding associated with maintenance effectiveness was identified. This finding was described in Section 1R12 of this report.

1R16 Operator Workarounds (71111.16)

The inspectors completed four operator workaround samples by evaluating the following conditions to determine if they reached the threshold for being considered operator workarounds or operator challenges:

- operations with the moisture separator reheater temperature control valves failed open;
- individual and aggregate impact of the adverse condition monitoring plans on the operators; and
- individual and aggregate impact of the installed temporary modifications on the operators.

The inspectors compared these conditions to the threshold provided in the licensee's Procedure OP-AA-102-103, "Operator Work-around Program," Revision 1.

The fourth sample was a semi-annual sample of the licensee's aggregate review of operator workarounds. The inspectors assessed the cumulative effects of operator workarounds and operator challenges to determine that they did not adversely impact the ability to operate the plant. In particular, the inspectors focused on the following attributes:

- the cumulative effects of operator workarounds and challenges on the reliability, availability and potential for missed operation of a system,

- the cumulative effects of operator workarounds and challenges that could affect multiple mitigating systems,
- the cumulative effects of operator workarounds and challenges on the ability of operators to respond in a correct and timely manner to plant transients and accidents, and
- assessed the classification of existing operator workarounds and challenges.

During these reviews, the inspectors interviewed operating and engineering department personnel and reviewed applicable documents.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective actions program. The documents reviewed during this inspection are listed in the Attachment to this report.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post maintenance testing activities associated with maintenance or modification of mitigating, barrier integrity, and support systems that were identified as risk significant in the licensee's risk analysis. The inspectors reviewed these activities to determine that the post maintenance testing was performed adequately, demonstrated that the maintenance was successful, and that operability was restored. During this inspection activity, the inspectors interviewed maintenance and engineering department personnel and reviewed the completed post maintenance testing documentation. The inspectors used the appropriate sections of the TS, TRM, and UFSAR, as well as the documents listed in the Attachment to this report, to evaluate this area. The inspectors verified that the licensee controlled post maintenance testing in accordance with the following:

- Byron Administrative Procedure (BAP) 1600-11; Work Request Post Maintenance Testing Guidance; Revision 12, and
- Nuclear Station Procedure MA-AA-716-012; Post Maintenance Testing, Revision 2.

The inspectors completed nine inspection samples by observing and evaluating the post maintenance testing subsequent to the following activities:

- Unit 1 train B SX pump following work to clear a blockage in the pipe to the room cooling unit;
- Unit 2 train A EDG return to service;
- Unit 1 train A centrifugal charging pump return to service;
- Unit 2 train A centrifugal charging pump return to service;
- Unit 0 train A control room ventilation return fan motor replacement;
- Unit 2 train B EDG following work to replace a failed magnetic speed sensor;
- Unit 2 train B AFW pump following jacket water leak repair;
- Unit 1 reactor containment fan coolers following the identification of low SX flow; and
- Unit 2 AFW pump diesel cylinder head replacements.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors witnessed selected surveillance testing and/or reviewed test data to determine that the equipment tested using the surveillance procedures met the TS, the TRM, the UFSAR, and licensee procedural requirements. The inspectors also verified that the surveillance tests demonstrated that the equipment was capable of performing its intended safety functions. The activities were selected based on their importance in ensuring mitigating systems capability and barrier integrity.

The inspectors completed five inspection samples by observing and evaluating the following surveillance tests:

- Unit 0 train B SX makeup pump surveillance test;
- Unit 2 train B AFW pump monthly surveillance test;
- Unit 2 reactor coolant leak rate surveillance test;
- Unit 1 train A residual heat removal pump surveillance test; and
- Unit 1 10 year simultaneous EDG starts.

During this inspection, the inspectors used the following references:

- BOP AF-7; Diesel Driven Auxiliary Feedwater Pump 2B Startup on Recirculation, Revision 25,
- BOP AF-1; Diesel Driven Auxiliary Feedwater Pump Alignment to Standby Condition, Revision 21,
- BOP 7T-1; Diesel Driven Auxiliary Feedwater Pump Operators Log, Revision 13,
- BOP AF-8; Diesel Driven Auxiliary Feedwater Pump 2B Shutdown, Revision 17,
- BOP SX-10; Essential Service Water Makeup Pump Shutdown, Revision 7,
- BOP RH-2; Securing the RH system from recirculation, Revision 7,
- BOP RH-5; RH system startup for recirculation, Revision 20, and
- BOP RH-12; Depressurizing the RH discharge piping, Revision 2.

Additionally the inspectors used the documents listed in the Attachment to this report to determine that the testing met the frequency requirements; that the tests were conducted in accordance with the procedures including establishing the proper plant conditions and prerequisites; that the test acceptance criteria were met; and that the results of the tests were properly reviewed and recorded. In addition, the inspectors interviewed operations, maintenance and engineering department personnel regarding the tests and test results.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors completed three inspection samples by evaluating the following temporary plant modification on risk-significant equipment:

- Engineering change packages for three similar safety-related temporary modifications for SX: 1SX178 (344383); 0SX63B (344257); and 2SX173 (343159);
- Engineering change packages for two similar safety-related temporary modifications for SX: fail open valve 1SX101A to allow SX flow to 1AF01AA (349953); fail open valve 2SX101A to allow SX flow to 2AF01AA (350082); and
- Work Order 690229, provide scaffolding for protection of conduits;

The inspectors reviewed these temporary plant modifications to determine that the instructions were consistent with applicable design modification documents and that the modification did not adversely impact system operability or availability. The inspectors used the following documents as references when completing the review: UFSAR, TS including the basis, and the TRM. The inspectors verified that the licensee controlled temporary modifications in accordance with Procedure NSP CC-AA-112, "Temporary Configuration Changes," Revision 7.

The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

Introduction: The inspectors identified a Non-Cited Violation (NCV) of 10 CFR Part 50 Appendix B Criterion III, "Design Control," having very low safety significance (Green). Specifically, the licencee failed to assess the adequacy of a bracing structure installed to protect safety-related conduits in the event of the tip-over of a nonseismically mounted tank during an earthquake.

Description: On June 16, 2004, during a walkdown of the auxiliary building, the inspectors noted a bracing structure installed on the 414-foot elevation. The structure was made out of scaffolding material and was installed to prevent the unanchored Unit 2 containment chiller surge tank from impacting nearby safety-related components in the event of an earthquake. Specifically, the safety-related components were several 3/4 inch conduits containing cables associated with emergency core cooling system controls. Subsequent discussions with the licensee revealed that on April 22, 2004, they discovered that the containment chiller surge tank for both units, non-safety components, were not seismically mounted to the floor. The licensee's engineering staff assessed the condition and determined that there was no adverse impact should the Unit 1 tank tip over, however, due to the proximity and size of the safety-related conduits on Unit 2, there was a potential these conduits would be damaged. As a result, the licensee installed the bracing structure.

The inspectors discussed the installation of the structure with the licensee's engineering staff, and ascertained that since the structure was made using scaffolding material, it was being controlled under the scaffolding program. The inspectors also ascertained that even though this was not the normal application of scaffolding, no additional measures were taking to check the adequacy of the design.

After the discussions with the inspectors, the licensee initiated an effort to evaluate the adequacy of the structure under the temporary modification process (Temporary Modification 349824). They also reviewed the condition of the unanchored containment chiller surge tanks (Engineering Change 349930) and concluded that the tanks would not have tipped over during a seismic event. The inspectors reviewed these two evaluations with no further concerns noted.

Analysis: The inspectors determined that the licensee's failure to check the adequacy of the design of the bracing structure installed to protect the safety-related conduit in the event that the non-seismically mounted Unit 2 containment chiller would have tip-over during an earthquake was a performance deficiency warranting a significancy evaluation. The inspectors concluded that the finding was greater than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor since it involved the design control attribute associated with the mitigating system cornerstone objective.

The inspectors determined that this deficiency affected the cross-cutting area of Human Performance, because prior to installation, the engineers failed to assess the adequacy of the design of the bracing structure.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered the questions in the Mitigating System column, such that, although there was a design deficiency, it did not result in a loss of safety function. Therefore, the finding was of very low safety significance (Green).

Enforcement: 10 CFR 50 Appendix B, Criterion III, "Design Control," states that the design control measures shall provide for verifying or checking the adequacy of design. Contrary to the above, on April 22, 2004 the licensee installed a bracing structure to protect safety-related conduit in the event that the non-seismically mounted Unit 2 containment chiller would tip-over during an earthquake from damage without verifying or checking the adequacy of the design. Upon the identification of the concern by the inspectors, the licensee completed an adequate review of the design change and entered the issue into their corrective action program as CR 229220. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation was being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy. (NCV 0500455/2004007-07)

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed the emergency response activities associated with the simulator training completed on August 16, 2004. Specifically, the inspectors determined that the emergency classification and simulated notifications were properly completed, and that the licensee adequately critiqued the training. Additionally, the inspectors determined that the results were properly counted in the Performance Indicators for emergency preparedness.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2PS1 Radioactive Gaseous And Liquid Effluent Treatment And Monitoring Systems (71122.01)

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed the calendar year 2003 Radiological Effluent Release Reports to verify that the program was implemented as described in Radiological Effluent Technical Specifications (RETS)/Offsite Dose Calculation Manual (ODCM) and to determine if ODCM changes if any, were made in accordance with Regulatory Guide 1.109 and NUREG-0133. The inspectors reviewed the Radiological Effluent Release Reports and ODCM, to determine if any changes to the design and/or operation of the radioactive waste systems changed the dose consequence to the public. Additionally, the most recent corporate audit of the licensee's radiological environmental monitoring program (REMP) vendor was reviewed to verify that the vendor laboratory performance was consistent with licensee and NRC requirements.

The inspectors reviewed RETS/ODCM to identify the effluent radiation monitoring systems and its flow measurement devices, effluent radiological occurrence performance indicator incidents in preparation for onsite follow-up, and the UFSAR description of all radioactive waste systems.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

.2 Onsite Inspection - Walkdown of Effluent Control Systems, System/Program Modifications, Air Cleaning System Surveillances, and Instrument Calibrations

a. Inspection Scope

The inspectors walked down the major components of the gaseous and liquid release systems (e.g., radiation and flow monitors, demineralizers and filters, tanks, and vessels) to observe current system configuration with respect to the description in the UFSAR, ongoing activities, and equipment material condition.

The inspectors reviewed air cleaning system surveillance test results to ensure that the system was operating within the licensee's acceptance criteria. The inspectors reviewed and discussed the test results of in-place high efficiency particulate air (HEPA) and charcoal absorber penetration tests, laboratory tests of charcoal absorber methyl iodide penetration, and in-place combined HEPA filter and charcoal absorber train pressure drop tests for the systems with system engineering staff.

The inspectors reviewed records of instrument calibrations performed since the last inspection for each point of discharge effluent radiation monitor and flow measurement device and reviewed any completed system modifications and the current effluent radiation monitor alarm setpoint value for conformance with RETS/ODCM requirements. The inspectors also reviewed calibration records of radiation measurement (i.e., counting room) instrumentation associated with effluent monitoring and release activities and the quality control records for the radiation measurement instruments.

The inspectors accompanied the REMP vendor representative during his weekly sample collection surveillance of six environmental air sampling stations and six environmental thermoluminescent dosimeters (TLDs) to verify that their locations were consistent with their descriptions in the ODCM and to evaluate the material condition of these stations.

The meteorological monitoring site was observed to validate that sensors were adequately positioned and operable. The inspectors reviewed the 2003 Annual Radiological Environmental Operating Reports and a sampling of monthly reports provided by the meteorological services vendor, to evaluate the onsite meteorological monitoring program's data recovery rates, routine calibration, and maintenance activities, and non-scheduled maintenance activities. The review was conducted to verify that the meteorological instrumentation was operable, calibrated, and maintained in accordance with licensee procedures. The inspectors also verified that readouts of wind speed, wind direction, and atmospheric stability measurements were available in the control room.

These reviews represented four inspection samples: one for the walkdown of the effluent control systems; one for the air cleaning system surveillance review; one for the review of instrument calibration records; one for observation of the REMP vendor; and one for review of the meteorological monitoring.

b. Findings

No findings of significance were identified.

.3 Onsite Inspection - Effluent Release Packages, Abnormal Releases, Dose Calculations, and Laboratory Quality Control and Assurance

a. Inspection Scope

The inspectors reviewed several radioactive liquid waste release permits, including the projected doses to members of the public, to verify that appropriate treatment equipment was used and that radioactive liquid waste was processed and released in accordance with RETS/ODCM and procedure requirements. The inspectors observed the routine processing (including sample collection and analysis) of containment radioactive gaseous activity and Tritium concentration, and reviewed several other radioactive gaseous effluent release permits, to verify that appropriate treatment equipment was used and that the radioactive gaseous effluent was processed and released in accordance with RETS/ODCM and procedure requirements.

No abnormal releases were made since the last inspection. The inspectors reviewed the licensee's contingency actions for these releases to ensure an adequate defense-in-depth was maintained against an unmonitored, unanticipated release of radioactive material to the environment.

The inspectors reviewed a selection of monthly, quarterly, and annual dose calculations to ensure that the licensee properly calculated the offsite dose from radiological effluent releases and to determine if any annual RETS/ODCM (i.e., Appendix I to 10 CFR Part 50 values) limits were exceeded.

The inspectors accompanied the REMP vendor representative to observe the collection and preparation of particulate air filters to verify that representative samples were collected in accordance with vendor procedures and the ODCM. The inspectors observed the technician perform air sampler field check maintenance to verify that the air samplers were functioning in accordance with vendor and licensee procedures. A sample of calibration and maintenance records for the air sampling stations were reviewed, and vendor and licensee personnel were interviewed to verify that the equipment was being maintained as required. Additionally, the inspectors observed the collection of surface water samples from the Rock River (upstream and downstream of the effluent discharge point) to assess the licensee's compliance with ODCM and TRM requirements. The environmental sample collection program was compared with the ODCM to verify that samples were representative of the licensee's release pathways. Additionally, the inspectors reviewed results of the vendor laboratory's interlaboratory comparison program to verify that the vendor was capable of adequately preparing and analyzing environmental samples for a variety of radioisotopes.

The inspectors reviewed the results of the interlaboratory comparison program to verify the quality of radioactive effluent sample analyses performed by the licensee. The inspectors reviewed the licensee's quality control evaluation of the interlaboratory comparison test and associated corrective actions for any deficiencies identified. The

inspectors reviewed the licensee's assessment of any identified bias in the sample analysis results and the overall effect on calculated projected doses to members of the public. In addition, the inspectors reviewed the results from the licensee's Quality Assurance audits to determine whether the licensee met the requirements of the RETS/ODCM.

These reviews represented four inspection samples: one for the review of effluent release packages; one for the abnormal release contingency reviews; one for the dose calculation reviews; two for the air samples and water samples; and one for the review of laboratory quality control and assurance.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed licensee self-assessments, audits, and Special Reports related to the radioactive effluent treatment and monitoring program since the last inspection to determine if identified problems were entered into the corrective action program for resolution. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors also reviewed corrective action reports from the radioactive effluent treatment and monitoring program since the previous inspection, interviewed staff, and reviewed documents to determine if the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- Initial problem identification, characterization, and tracking;
- Disposition of operability/reportability issues;
- Evaluation of safety significance/risk and priority for resolution;
- Identification of repetitive problems;
- Identification of contributing causes;
- Identification and implementation of effective corrective actions;
- Resolution of NCVs tracked in the corrective action system; and
- Implementation/consideration of risk significant operational experience feedback.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Radioactive Waste System Description and Waste Generation

a. Inspection Scope

The inspectors reviewed the liquid and solid radioactive waste system description in the UFSAR and the 2002 and 2003 Annual Radioactive Effluent Release Reports for information on the types and amounts of radioactive waste generated and disposed.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

.2 Radioactive Waste System Walkdowns

a. Inspection Scope

The inspectors performed walkdowns of the liquid and solid radwaste processing systems to verify that the systems agreed with the descriptions in the UFSAR and the Process Control Program, and to assess the material condition and operability of the systems. The inspectors reviewed the status of radioactive waste process equipment that was not operational and/or was abandoned in place. The inspectors reviewed the licensee's administrative and physical controls to ensure that the equipment would not contribute to an unmonitored release path or be a source of unnecessary personnel exposure.

The inspectors reviewed changes to the waste processing system since the last inspection (i.e., installation of the Advanced Liquid Processing System) to verify the changes were reviewed and documented in accordance with 10 CFR 50.59 (as necessary) and to assess the impact of the changes on radiation dose to members of the public. The inspectors reviewed the current processes for transferring waste resin into shipping containers to determine if appropriate waste stream mixing and/or sampling procedures were utilized. The inspectors also reviewed the methodologies for waste concentration averaging to determine if representative samples of the waste product were provided for the purposes of waste classification in 10 CFR 61.55.

This review represented one inspection sample.

b. Findings

No findings of significance were identified.

.3 Waste Characterization and Classification

a. Inspection Scope

The inspectors reviewed the licensee's radiochemical sample analysis results used to develop and modify the licensee's waste stream calculations. The inspectors also reviewed the licensee's use of scaling factors to quantify difficult-to-measure radionuclides (e.g., pure alpha or beta emitting radionuclides). The reviews were conducted to verify that the licensee's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20. The inspectors also reviewed the licensee's waste characterization and classification program to ensure that the waste stream composition data accounted for changing operational parameters and thus remained valid between the sample analysis updates.

This review represented one inspection sample.

b. Findings

No findings of significance were identified.

.4 Shipment Preparation and Shipping Records

a. Inspection Scope

The inspectors reviewed the documentation for shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness for 7 non-excepted radioactive material and waste shipments during calendar years 2002 through 2004. These shipments included:

- High Integrity Container of Dewatered Resin to Chem-Nuclear, Barnwell, SC - Low Specific Activity (LSA)-II [RWS 04-004];
- High Integrity Container of Dewatered Resin to Chem-Nuclear, Barnwell, SC - LSA-II [RWS 04-006];
- SeaVan of Steam Generator Equipment to Braidwood Generating Station, Braidwood, IL - LSA-II [RMS 04-061];
- SeaVan of Contaminated Laundry to Unitech, Morris, IL - LSA-II [RMS 03-049];
- High Integrity Container of Dewatered Bead Resin/Charcoal to Envirocare, Clive, UT - LSA-II [RWS 03-002];
- High Integrity Container of Filters to GTS-Duratek, Oak Ridge, TN - LSA-II [RWS 03-020]; and
- SeaVan of Dry Active Waste (DAW) to ALARON Corporation, Wampam, PA - LSA-II [RWS 02-014].

The inspectors additionally reviewed the documentation packages to verify that the requirements of any applicable transport cask Certificate of Compliance were met and that the receiving licensee was authorized to receive the shipment packages. The inspectors also reviewed the licensee's procedures for cask loading, handling, and closure to verify they were consistent with the vendor's approved procedures.

Additionally, the inspectors observed the removal and loading of waste filters from the spent fuel pool into a high integrity container/shipping cask, in preparation for shipment to GTS-Duratek, Oak Ridge, Tennessee for segregation, and ultimately burial disposal. The inspectors also observed the final surveying, labeling, marking, placarding, vehicle checks, emergency instructions, and disposal manifest for a shipment of DAW to ALARON Corporation, Wampam, Pennsylvania. The inspectors observed radiation worker practices during these activities to verify that the workers had adequate skills to accomplish each task and to determine if the shippers were knowledgeable of the shipping regulations and whether shipping personnel demonstrate adequate skills to accomplish the package preparation requirements for public transport with respect to NRC Bulletin 79-19 and 49 CFR Part 172 Subpart H.

These reviews represented two inspection samples.

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed Corrective Action Program documents, audits and self-assessments that addressed radioactive waste and radioactive materials shipping program deficiencies since the last inspection to verify that the licensee had effectively implemented the corrective action program and that problems were identified, characterized, prioritized and corrected. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors also reviewed corrective action reports from the radioactive material and shipping programs since the previous inspection, interviewed staff and reviewed documents to determine if the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- Initial problem identification, characterization, and tracking;
- Disposition of operability/reportability issues;
- Evaluation of safety significance/risk and priority for resolution;
- Identification of repetitive problems;
- Identification of contributing causes;
- Identification and implementation of effective corrective actions;
- Resolution of NCVs tracked in corrective action system(s); and
- Implementation/consideration of risk significant operational experience feedback.

Finally, the inspectors reviewed the scope of the licensee’s audit program with regard to radioactive material processing and transportation programs to verify that it met the requirements of 10 CFR 20.1101(c).

This review represented one inspection sample.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

Cornerstones: Mitigating Systems, Barrier Integrity, Public Radiation Safety

4OA1 Performance Indicator Verification (71151)

.1 Reactor Safety Strategic Area

a. Inspection Scope

The inspectors sampled the licensee's submitted materials for performance indicators (PIs) and periods listed below. The inspectors used PI definitions and guidance contained in Revision 2 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline" to determine the accuracy of the PI data. The reactor coolant system leakage PI for Unit 1 and Unit 2 (2 samples) was reviewed.

The inspectors reviewed selected applicable condition reports and data from logs, licensee event reports, and work orders from July 2003 through May 2004 for each PI area specified above. The inspectors independently reperformed calculations where applicable. The inspectors compared that information with the performance indicator definitions in the guideline to ensure that the licensee reported the data accurately.

b. Findings

No findings of significance were identified.

.2 Radiation Protection Strategic Area

a. Inspection Scope

The inspectors sampled the licensee's submittals for performance indicators (PIs) and periods listed below. The inspectors used PI definitions and guidance contained in Revision 2 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify the accuracy of the PI data. The following PI was reviewed:

- RETS/ODCM Radiological Effluent Occurrence

  Since no reportable occurrences were identified by the licensee for 2nd through the 4th Quarter 2003 and the 1st Quarter 2004, the inspectors compared the licensee's data and reviewed corrective action documents generated during the time period to identify any potential occurrences such as unmonitored, uncontrolled or improperly calculated effluent releases that may have impacted offsite dose. Also, the inspectors evaluated the licensee's methods for

determining offsite dose and selectively verified that liquid and gaseous effluent release data and associated offsite dose calculations performed since this indicator was last reviewed were accurate.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to determine that they were being entered into the licensee's corrective action system at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Minor issues entered into the licensee's corrective action system as a result of inspectors' observations are generally denoted in the list of documents reviewed at the back of the report.

b. Findings

No findings of significance were identified.

.2 Annual Sample - Licensee Focused Area Self Assessments (FASA) Conducted Prior to NRC Team Inspections

Introduction

As a part of their corrective action program the licensee performed FASAs prior to NRC team inspections per their procedural guidance to prepare for NRC inspections in LS-AA-1003 "NRC Inspection Preparation," Revision 4. LS-AA-126 "Self-Assessment Program," Revision 3 described the licensee's program for self assessment. The inspectors reviewed nine licensee prepared FASAs as part of this review to assess the prioritization and evaluation of issues and effectiveness of the corrective actions initiated by the licensee as a result of these reports. This review represented one annual inspection sample or identification and resolution of problems.

During the course of this review the inspectors utilized the following licensee's procedures as references:

- LS-AA-125, Corrective Action Program Procedure, Revision 8;
- LS-AA-126, Self Assessment Program, Revision 3; and
- LS-AA-126-1001, Focused Area Self Assessments, Revision 1.

The following were the specific FASA reports reviewed during the course of this inspection:

- Component Cooling Water, Safety System Design and Performance Capability Inspection, January 21, 2001;
- Safety System Design Inspection Readiness for Auxiliary Feedwater and Direct Current Systems, April 18, 2003;
- Permanent Plant Modifications, Action Tracking Number 40605, March 1, 2002;
- Permanent Plant Modifications, Action Tracking Number 148114, January 13, 2004;
- Byron Post-Fire Safe Shutdown Analysis, September 28, 2001;
- Byron Fire Protection Issues, June 17, 2004;
- Identification and Resolution of Problems, October 27, 2000;
- Identification and Resolution of Problems, October 3, 2001; and
- Identification and Resolution of Problems, October 19, 2003

Additional documents reviewed as part of this inspection were listed in the attachment to this report.

a. Prioritization and Evaluation of Issues

(1) Inspection Scope

The inspectors reviewed FASA reports listed above to determine if the issues identified in the reports were properly prioritized and evaluated for resolution.

(2) Issues

In general the technical adequacy and depth of the self assessment reports were consistent with the licensee's procedures in this area. The inspectors noted one example of where the evaluations were inconsistent with the procedures.

The licensee's self assessment program implementation documents LS-AA-126 and LS-AA-126-1001 stated in the respective document purposes that the self assessments should be critical in nature. The FASA prepared on April 18, 2003 before the NRC's Safety System Design and Performance Capability inspection determined that the design basis was retrievable and supported by design documents. It also noted that reference inaccuracies and outdated references existed. Several condition reports were generated as a result of this review.

The FASA also noted that calculational discrepancies, inaccuracies, and errors existed. Although the design basis was deemed to be satisfactory and none of the discrepancies resulted in system inoperability, the licensee used language to summarize the issues were not critical in nature. In the FASA summary, the licensee characterized the items needed as "improvements" and "enhancements." It should be noted that these similar issues identified during the NRC's Safety System Design and Performance Capability inspection (Inspection Report 50-454/03-04(DRS), 50-455/03-04(DRS)) were determined to be a violation of 10 CFR Part 50, Appendix B, "Design Control." Because the licensee's characterization of the issues, the licensee missed an opportunity to fully

evaluate the extent of condition and implement effective actions to address the discrepancies. No other issues or findings of significance were identified.

b. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors sampled licensee FASA Reports written prior to successive NRC team inspections to determine if the licensee's problems identified in these assessments and corrective actions implemented were effective or if repeat problems were identified.

(2) Issues

Although in the earlier problem identification and resolution FASA's the licensee identified some common problems, the problems did not appear in the latest FASA. The inspectors determined that the repeat issues had been resolved. No issues or findings of significance were identified.

4OA3 Event Follow-up (71153)

.1 (Closed) Licensee Event Report (LER) 50-454/2002-001-03: Multiple Main Steam Safety Valve (MSSV) Relief Tests Exceeded Required Tolerance Due to Disk to Nozzle Metallic Bonding and Setpoint Drift: This LER supplement provided new information associated with recent MSSV test results. The tests were performed on MSSVs at both Byron Units and both Braidwood units between September 2003 and April 2004. These test results were documented in this LER supplement and are being factored into the licensee's ongoing evaluation of this issue. The inspectors reviewed this LER supplement and no findings of significance were identified. The original LER was reviewed by the NRC in Inspection Report 50-454/02-05; Supplement 1 to the LER was reviewed in Inspection Report 50-454/02-07; and Supplement 2 was reviewed in NR Inspection Report 50-454/2003-006. Supplement 3 of the LER did not raise any new issues or change the conclusions of the initial reviews. This LER supplement was closed.

4OA4 Cross-Cutting Aspects of Findings

- A finding identified in Section 1R04 of this report affected the cross cutting area of Problem Identification and Resolution because, although the licensee had prior opportunities to identify that the incorrect pipe schedule was provided on the drawing for the SX gland seal cooling pipe, it was not corrected until after a leak occurred on the associated pipe.

- A finding identified in Section 1R12 of this report affected the cross cutting area of Human Performance because despite the fact that the licensee's procedure required that the effects of system interactions outside the clearance order boundary be understood, the effects of the clearance order on the discharge valve to the SX cooling tower basin was not properly controlled and resulted in the WW pump not automatically shutting off while operating without an adequate discharge flow path.

- A finding identified in Section 1R12 of this report affected the cross cutting area of Problem Identification and Resolution because, although the licensee had an opportunity to identify and correct the 2B AFW diesel engine damage in April 2004, when the engine was overheated, the extent of the damage was not identified or corrected at that time

- A finding identified in Section 1R12 of this report affected the cross cutting area of Human Performance because the licensee did not provide the specifications for proper shaft coupling engagement length in the work instructions work maintenance on 2SX114A, 2SX112B and 2XSX114B, which resulted in adequate engagement of the actuators to the valves.

- A finding identified in Section 1R13 of this report affected the cross cutting area of Human Performance because although the actual risk condition of the Unit was higher due to the 2B EDG work the operators returned the risk designation to the normal level following completion of the SSPS Surveillance, while the EDG work was still in progress.

- A finding identified in Section 1R23 of this report affected the cross cutting area of Human Performance, because prior to installation, the engineers failed to assess the adequacy of the design of the bracing structure used to protect safety-related conduits in the event of the tip-over of a nonseismically mounted tank during an earthquake.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. D. Hoots and other members of licensee management at the conclusion of the inspection on October 6, 2004. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Interim Exit Meetings

An interim exit meeting was conducted for:

- Radiation Protection inspection with Mr. S. Kuczynski on July 23, 2004;

- Biennial Operator Requalification Program Inspection with Mr. D. Hoots on August 25, 2004; and

- Public Radiation Safety radioactive waste processing and transportation programs inspection with Mr. S. Kuczynski on September 17, 2004.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

S. Kuczynski, Site Vice President
D. Hoots, Plant Manager
B. Adams, Engineering Director
S. Briggs, Shift Operations Supervisor
D. Combs, Site Security Manager
B. Dean, Maintenance Rule Coordinator
D. Goldsmith, Radiation Protection Director
W. Grundmann, Regulatory Assurance Manager
K. Hansing, Nuclear Oversight
S. Houseman, Site Nurse
S. Kerr, Chemistry Manager
P. Knarr, Training Staff
R. Kolo, Training Manager
S. Kovall, Radiation Protection Shipper
R. Meyer, Training Staff
D. Palmer, Radiation Protection - ALARA
M. Snow, Work Management Director
W. Spahr, Operations Training Manager
S. Stimac, Operations Manager
B. Youman, Maintenance Manager

Nuclear Regulatory Commission

A. Stone, Chief, Projects Branch 3, Division of Reactor Projects
D. Thatcher, Chief, Plant Support Branch, NRR
S. Alexander, Reactor Engineer, Plant Support Branch, NRR
S. Burton, Monticello Senior Resident Inspector
G. Dick, Project Manager, Office of Nuclear Reactor Regulation
J. Gavula, Senior Reactor Engineer

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000454/2004007-02	URI	Potential Past Inoperability of the 1A AFW Pump due to Failure to Establish Preventive Maintenance for, or Monitor the Performance of the 1A AFW Oil Cooler Outlet Valve (Section 1R12)

Opened and Closed

05000455/2004007-01	NCV	Failure to Properly Specify the Correct Schedule Number for the SX Pump Gland Cooling Water Piping in the Associated Drawings (Section 1R04)
05000454/2004007-03 05000455/2004007-03	NCV	Failure to Follow Clearance Order Procedures Results in Damage to Deep Well Pump Due to Operations Without Adequate Discharge Path (Section 1R12)
05000455/2004007-04	NCV	Failure to Take Prompt Corrective Actions to Correct Engine Damage Resulting from Engine Overheating of the 2B AFW Pump Diesel (1R12)
05000455/2004007-05	NCV	Lack of Coupling Specifications Provided in Work Instructions Results in Inadequate Actuator to Valve Engagement (Section 1R12)
05000455/2004007-06	NCV	Failure to Manage the Increase in risk Due to 2A EDG Maintenance (Section 1R13)
05000455/2004007-07	NCV	Failure to Assess the Adequacy of a Bracing Structure Installed to Protect Safety Related Conduit in the Event of the Tip-over of a Nonseismically Mounted Tank During an Earthquake (Section 1R23)

Closed

50-454/2002-001-03	LER	Multiple Main Steam Safety Valve Relief Tests Exceeded Required Tolerance Due to Disk to Nozzle Metallic Bonding and Setpoint Drift (Section 4OA3.1)

Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

1R04 Equipment Alignment

Schematic Diagram 6E-2-4030CC11; Component Cooling (CC) Pump Pressure Control and Level Switches, Revision 0
Sargent & Lundy Schematic Diagram 6E-2-4030-CC02; CC Pump 2B-2CC01PB, Revision M
Sargent & Lundy Schematic Diagram 6E-0-4030CC04; CC Pump 0 (Div. 22), Revision N
Clearance Order 00028928 Checklist 001; 2CC01PB Window-GTD, U2 CC Surge Tank
Clearance Order 00028928 Checklist 003; 2CC01PB-2B-CC PP Window-GTD, U2 CC Surge Tank
List of Open Work Orders on Unit 2 Essential Service Water (SX); September 8, 2004
List of Open Work Requests on Unit 2 SX; September 8, 2004
List of Open Engineering Changes (EC) on Unit 2 SX; September 8, 2004
List of Open Action Requests on Unit 2 SX; September 8, 2004
List of Open Temporary Configuration Change Permits (TCCP) on Unit 2 SX; September 8, 2004
Training Drawing SX-1 Essential Service Water; August 18, 2004, Revision 7
CR 212990; B2R11 - 1 SX Cubicle Cooler Fans Not running When Pump (PP) Running, April 04, 2004
CR 224118; Item Commercial Grade Dedication Inadequate, May 27, 2004
CR 251276; Water Leak At Threaded Pipe On 2A SX Pump Outboard Seal, September 9, 2004
CR 252206; 0B SX Makeup Pump Needs Oil In The Right Angle Drive, September 13, 2004
CR 252376; 2A SX Pump Inboard Seal Cooling Line Also Leaking, September 13, 2004
CR 253321; 1A/1B/2B Essential Service Water Pumps Seal Cooling Water Piping, September 15, 2004
CR 253340; Gland Cooling Line Wrong Pipe Schedule, September 15, 2004
Engineering Change 344257; TCCP to Remove Internals of Valve 0SX063 (Contingency TCCP), August 12, 2003
Prompt Investigation Report/CR 253061; 2A Essential (SX) Pump Was Declared Inoperable Due to Leakage of the Inboard and Outboard Gland Injection Lines, September 15, 2004

1R05 Fire Protection

Byron Station Pre-Fire Plans; Auxiliary Building 426' Elevation-Laundry Room, Revision 4
Fire Protection Report #21-006
CR 228707; Auxiliary Building Storage Potential Seismic Concern, June 15, 2004, (NRC Identified)
CR 236707; Fire Extinguishing Not Contained Properly in Wall Holder, July 16, 2004 (NRC Identified)
CR 236711; C02 Extinguisher Loose In It's Wall Mounted Holder, July 16, 2004 (NRC Identified)
CR 248940; Fire Damper Issues Identified by NRC, August 31, 2004 (NRC Identified)
CR 249486; Fire Damper "S" Hook Issue Identified by NRC (NRC Identified), August 31, 2004

WO 722328 01; Unplanned Limiting Condition for Operation Action Requirement (LCOAR) Entry for 2A EDG Due to 2VD024YB Damper, August 6, 2004
WO 722588 01; Fire Damper "S" Hook Installed Improperly, August 13, 2004
Issue Report (IR) 240597; Unplanned LCOAR Entry for 2A EDG Due to 2VD024YB Damper, July 31, 2004
IR 240972; Fire Damper "S" Hook Installed Improperly, August 2, 2004
IR 240985; Need Work Request (WR) for Fire Damper Inspections, August 2, 2004
IR 243995 Diesel Generator Damper Local Position Indication Incorrect, August 12, 2004, (NRC Identified)
IR 248940; Fire Damper Issues Identified by NRC, August 31, 2004, (NRC Identified)
0BMSR 3.10.g.7; TRM Fire Damper 18-Month Visual Inspection, Revision 5

1R11 Licensed Operator Requalification

Byron Examination Numbers:
03-3-1SRO NRC EXAM;
03-3-1RO NRC EXAM;
03-3-1Static NRC EXAM;
03-3-2SRO NRC EXAM;
03-3-2RO NRC EXAM;
03-3-3RO NRC EXAM;
03-3-6SRO NRC EXAM;
Simulator Scenarios BY-48 signed 8/4/04, and BY-63 signed 8/9/04
Byron Job Performance Measures Numbers
N-79 Rev 9
N-32 Rev 8
N-46 Rev 5
N-87 Rev 6
N-27b Rev 3
S-07 Rev 3
Byron Reactor Oversight Process (ROP) Plant Issue Matrix from 01/01/2000 to 07/21/2004; dated July 21, 2004
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 50-454/02-07; 50-455/02-07; dated January 29, 2003
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 50-454/03-02; 50-455/03-02; dated April 24, 2003
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 05000454/2003003; 05000455/2003003; dated July 25, 2003
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 05000454/2003006; 05000455/2003006; dated October 30, 2003
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 05000454/2003007; 05000455/2003007; dated January 26, 2004
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 05000454/2004002; 05000455/2004002; dated April 29, 2004
Byron Station, Units 1 and 2 NRC Integrated Inspection Report 05000454/2004004; 05000455/2004004; dated July 20, 2004
Design Basis Steam Generator Tube Rupture Response Time Summary; dated various from January 7, 2004 through February 11, 2004

Loss of All AC Power Response Time Summary; dated various from April 3, 2004 through June 8, 2004
Cold Leg Recirculation Response Time Summary; dated various from June 15, 2004 through July 23, 2004
Byron Station Ownership Committee Issue 239184; Labels Being Made for Control Room and Not for the Simulator
TR# 04-566; Update Existing Low Pressure Material for UFSAR/EOP Operator Action Times to Include All Critical Steps; dated July 27, 2004
OP-AA-102-104; Attachment 2; Unit ½ Standing Order Log Number 04-049; New Revision to BEP ES-1.3, Transfer to Cold leg Recirculation; dated July 30, 2004
1BEP ES-1.3; Transfer to Cold Leg Recirculation Unit 1; Revision 102 & 103
ANSI/ANS-3.4-1983; Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants; dated April 29, 1983
Regulatory Guide 1.134; Medical Evaluation of Licensed Personnel for Nuclear Power Plants; Revision 2; dated April 1987
Nine Licensed Operators Medical Records; dated various
Pre-71111.11 Audit; dated April 19, 2004 through April 23, 2004
Byron Self Assessment; Training PO&C Status; dated 2nd Quarter 2003
Byron Self Assessment; Training PO&C Status; dated 3rd Quarter 2003
Byron Self Assessment; Training PO&C Status; dated 4th Quarter 2003
Audit # NOSA-BYR-03-07 (AR 175168); Operations Functional Area Audit Report; dated October 13, 2003 through October 24, 2003
Audit # NOSA-BYR-04-06 (AR 190223); Organization and Administration, Training and Staffing; dated June 28, 2004 through July 2, 2004
Completed TQ-AA-210-4101; Remedial Training Notification and Action on Failure; dated various from October 10, 2002 through July 29, 2004
Licensed Operator Requalification Long Range Training Plan; dated 2002 through 2005
Completed TQ-AA-106-0102; Licensed Operator Requal Training Classroom Attendance Sheet; dated various
Completed TQ-AA-106-0103; Licensed Operator Requal Training (Simulator Attendance); dated various
Completed TQ-AA-210-5101; Training Observation Form; dated various
Completed OP-AA-105-102; Attachment 1; Active License Tracking Log; dated various
LORT Cycle Lesson Plan; dated various
NRC Exam - 2003 Cycle 3 Requalification Examination Results
2003 Annual Operating Exam (Dynamics) Results
TQ-AA-106; Licensed Operator Requal Training Program; Revision 3
TQ-AA-106-0302; Licensed Operator Training Simulator Training Scenario Development Job Aid; Revision 0
TQ-AA-106-0303; Licensed Operator Training Job Performance Measure Development Job Aid; Revision 0
TQ-AA-106-0304; Licensed Operator Training Exam Development Job Aid; Revision 2
Policy No: 700-10; Operating Department Ownership of Requalification Training; dated February 1, 2002
Simulator Review Board #04-05, Byron Simulator ANSI/ANS-3.5-1985 Testing Annual Update, August 1985; dated August 10, 2004
TQ-AA-301; Simulator Configuration Management; Revision 4

TQ-AA-301-0301; Simulator SWR Prioritization Maintenance, Modification, and Enhancements; Revision 1
TQ-AA-302; Simulator Testing and Documentation; Revision 4
ANSI/ANS-3.5-1985; Nuclear Power Plant Simulators for Use in Operator Training; dated October 25, 1985
Regulatory Guide 1.149; Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations; Revision 1; dated April 1987
Simulator Review Board Meeting Minutes; dated various from June 6, 2003 through July 27, 2004
List of Open Simulator Work Requests; dated August 16, 2004
Open SWR# 3397; Use of 1A FW Pp and 4 CD/CB Pumps Not Accurate at Full Power; dated April 5, 2002
Open SWR# 3618; PR11J response is Too fast for Minor leaks; dated May 24, 2002
Open SWR# 4952; PZR heaters Changes RCS H/U; dated May 20, 2003
Open SWR# 5413; Add the Effects of Reference Leg Heating to the SG and PZR; dated September 24, 2003
Open SWR# 6106; Pressurizer Master Controller Response; dated April 22, 2004
Open SWR# 6455; The Rod positions on 1ZR-412 Did Not Go to 0 as per Test for MF-RP-01; dated July 2, 2004
List of Closed Simulator Work Requests for Last 12 Months; dated August 2, 2004
Closed SWR# 4237; Pressurizer Relief Tank (PRT) Response When Primary Water is Added; dated November 18, 2002
Closed SWR# 5387; Manual Safety Injection (SI) Phase A Procedure Exit Simulator Response; dated September 17, 2003
Closed SWR# 5581; PRT High Pressure Alarm Setpoint; dated November 18, 2003
Closed SWR# 5603; Evaluate Rx Trip During Large Break Loss of Coolant Accident (LOCA); dated November 24, 2003
Closed SWR# 5645; Malfunction TC01 Did Not Work Properly; dated December 11, 2003
Closed SWR# 5997; F&O Sump Level Did Not Increase as required (FW21); dated April 1, 2004
Training Performance Indicators - Simulator Manager Input; dated January 2003 through July 2004
LORT Cycle Curriculum Review Committee Meeting Agenda; dated various from May 2, 2003 through June 11, 2004
CR 141332-02; Focus Area Self Assessment Report; Critical Reactor Component (CRC) Effectiveness; dated May 12, 2003 through May 14, 2004
CR 173071 Report; Byron Station Operations Accreditation Team Observations; dated August 26, 2003
CR 176177 Report; Simulator Modeling Problem; dated September 17, 2003
CR 191732 Report; NOS Identified Missed Licensed Operator Requalification requirement; dated December 12, 2003
CR 193241; Licensed Operator Requal Training (LORT) & Initial Licensed Operator Training (ILT) Short Notice Schedule Change, January 2, 2004
CR 201186; Operator Response Time to Steam Generator Tube Rupture Scenarios; dated June 2004
CR 216529; Training Request Completed Without Meeting Intent, October 23, 2003

CR 216546 Report; Inconsistencies in Reactivation Documentation; dated April 23, 2004
CR 217272 Report; Facility Operating History (pre-7111.11 FASA); dated April 27, 2004
CR 217274 Report; Bi-Annual Exam Items (pre-7111.11 FASA); dated April 27, 2004
CR 217476 Report; Operational Exam Banks (pre-7111.11 FASA); dated April 28, 2004
CR 217503 Report; Simulator Requirements are Not Properly Implemented (pre-7111.11 FASA); dated April 28, 2004
CR 219339 Report; LORT Exam Failure Rates; dated May 6, 2004
CR 223047; Ultimate Heat Sink (UHS) Limiting Condition for Operation (LCO) 7.9 Not Entered for Tornado Warning, May 21, 2004
CR 233490 Report; NOS Identified Deficiencies in the Simulator Critique Process; dated July 2, 2004
CR 233496 Report; NOS Identified Deficiencies in the Simulator Evaluation Process; dated July 2, 2004
CR 233499 Report; NOS Identified Missed Opportunities in Simulator Training; dated July 2, 2004
CR 233523 Report; NOS Identified Progress & Disposition of LORT FASA Inadequate; dated July 2, 2004
CR 233558; Not Otherwise Specified (NOS) Identified Deficiencies in Conduct of Classroom Training
CR 233960 NOS Documentation Deficiencies for LORT Attendance
CR 236237; NOSPA-BY-04-2Q Identifies Declining Performance, Training, July 14, 2004
CR 237472; Operating Crew Failures During Simulator Performance of Byron Emergency Procedure (BEP) ES-1.3; dated July 20, 2004
CR 239604; Procedure Adherence Contributes to Evaluation Failures, July 20, 2004
CR 246607; Procedure Enhancement ½ BEP-3
Apparent Cause Evaluation; LCO Entry Not Made for “Tornado Watch”, 0BOL 7.9, Ultimate Heat Sink, July 19, 2004

1R12 Maintenance Effectiveness

Byron Archival Operations Narrative Logs, July 02 - July 08, 2004
CR 213628; 2B Auxiliary Feedwater Pump Tripped on High Jacket Water Temperature During Surveillance, April 7, 2004
CR 229149; Inadvertent Pump down of the Unit 2 Reactor Coolant Drain Tank During Instrument Maintenance Calibration, June 16, 2004
CR 232158; High Bearing Oil Temperatures During ASME Run, June 28, 2004
CR 233576; System Interaction Not Identified During Work Planning, July 2, 2004
CR 236194; Unit 0 A Well Water Pump Repair, July 15, 2004
CR 238577; Unit 0 B Deep Well Pump Has No Preventive Maintenance Identified for Refurbishment, July 23, 2004
CR 240718; 2B AF Pump Jacket Water Leak, August 1, 2004
CR 241546; 2B AF Discovery of Moisture on the 5L Piston, August 4, 2004

CR 241938; 2B Diesel Driven Auxiliary Feedwater Pump Head Measurement, August 3, 2004
CR 242168; Valve is Degraded and Needs to be Repaired, August 6, 2004
CR 242823 1B AF Pump SX Booster Pump Seal Excessive Leakage, August 9, 2004
CR 248380; Thermostats Reserved at Byron/Installed at BRW Without Evaluation, August 30, 2004
CR 248397; AF Diesel Turbo-Charger Gasket Obsolete, August 27, 2004
CR 248773; Items Do Not Conform to the Original Procurement Requirement, August 31, 2004
CR 249313; Torque Value for AF Diesel Fuel Injectors, September 1, 2004
CR 249377; Capture Lesson Learned, Reference to Match Marking, September 1, 2004 (NRC Identified)
CR 249386; FME Socket Was Dropped 8L Cylinder Liner and Recovered, September 01, 2004
CR 249691; Items Near Unit 1 and Unit 2 MPTS and Systematic Approach to training, September 2, 2004 (NRC Identified)
CR 249903; Potential Concerns with OPEX Program, September 02, 2004 (NRC Identified)
Operations Daily Orders, August 30 to September 4, 2004
Project Summary for 2B Auxiliary Feedwater Pump Cylinder Head Replacement, August 31, 2004
BOP AF-7TI; Diesel Driven Auxiliary Feedwater Pump Operating Log, Revision 13
BMP 3203-1; Preventive Maintenance of Auxiliary Feedwater Pump Diesel Drive Unit, Revision 12
OP-AA-108-111; Adverse Condition Monitoring and Contingency Plan, 2B AF Pump Jacket Water Leak, August 5, 2004
EC 250601; 2B AF Pump Jacket Water Leakage, Revision 0
EC 350840; 2B Auxiliary Feedwater Jacket Water Leak Operability Evaluation, August 19, 2004
WO 722467; 2B Auxiliary Feedwater Pp Jacket Water Leak, August 5, 2004
WO 724029 01; Replace 13 Engine Heads on the 2B AF Diesel Engine, August 11, 2004
IR 233576; Prompt Investigation for Unit 0 A Well Water Pump Degradation, July 2, 2004
IR 236409; Ultrasonic Non Destructive Evaluation Results if the Well Water Piping, July 15, 2004
IR 240718; 2B AF Pump Jacket Water Leak, August 1, 2004
IR 241225; Unit 2 AF Diesel Has One O-Ring Not Accounted For, August 3, 2004
IR 241229; Missing 2B AF Pump Cylinder Head Seal Ring, August 3, 2004
IR 241492; Observed Water Leakage from Cylinder 6R on 2B AF Pump, August 4, 2004
IR 242281; 2B AF Maintenance Rule Unavailability Performance Criteria Exceeded, August 6, 2004
IR 243715; Unit 0 B Deep Well Pump Deadheading Historical Event, August 11, 2004
Prompt Investigation for 2B AF Jacket Water Leak, August 1, 2004
Maintenance Rule Performance Criteria AF1
Maintenance Rule - Evaluation History, Auxiliary Feedwater System
Maintenance Rule - Expert Panel Scoping Determination, Auxiliary Feedwater System

Maintenance Rule Performance Monitoring; AF1 Train A Unit 1 - Provide Emergency Water Supply to Steam Generators
Maintenance Rule Performance Monitoring; AF1 Train B Unit 1 - Provide Emergency Water Supply to Steam Generators
Maintenance Rule Performance Monitoring; AF1 Train A Unit 2 - Provide Emergency Water Supply to Steam Generators
Maintenance Rule Performance Monitoring; AF1 Train B Unit 2 - Provide Emergency Water Supply to Steam Generators
Troubleshooting Log, involving Equipment 2AF01PB-K
OPEX Processing Package, IEN 91-62, Diesel Engine Damage Caused by Hydraulic Lockup Resulting from Fluid Leakage into cylinders
OPEX Processing Package; IEN 91-85, Potential Failures of Thermostatic Control Valves for Diesel Generator, April 10, 1992
Information Notice 91-62; Diesel Engine Damage Cause by Hydraulic Lockup Resulting from Fluid Leakage into Cylinders, September 30, 1991
LS-AA-115; Operating Experience Procedure, Revision 4
Maintenance Rule Performance Criteria WW1
Maintenance Rule Performance Monitoring; WW1 Train A Unit 0 - Backup Water Supply to SX Basin Makeup
Maintenance Rule Performance Monitoring; WW1 Train B Unit 0 - Backup Water Supply to SX Basin Makeup
Maintenance Rule (a)(1) Disposition Checklist and Documentation Summary for AF1, Revision 00, May 17, 2004
Apparent Cause Evaluation 236194-02; Unit 0 A Deep Well Pump Repair, August 17, 2004

1R13 Maintenance Risk Assessments and Emergent Work Control

WO 00473447 02; OPS Post Maintenance Testing, July 23, 2004
WO 00716075; Functional Test of Auxiliary Feedwater Pump Suction Pressure, August 3, 2004
Drawing M-2122, Sheet 2 of 3; P&ID/C&I Diagrams of Auxiliary Feedwater Systems, Byron Station Unit 2, Revision E
BAR 1-22 D6; 125V DC Bus 112 Ground, Revision 5
2BOL DC1; Engineered Safety Features (ESF) Bus DC Grounds, Revision 3
2BOSR 8.1.1-1; Normal and Reserve Offsite AC Power Availability Weekly Surveillance, Revision 4
Risk Configuration Week of August 16, 2004, Revision 2
Risk Configuration Week of August 16, 2004, Revision 3
CR 233689; DC 212 80 Volt Ground, Unplanned LCOAR, B-2 Work Request, July 04, 2004
CR 238687; Byron Abnormal Procedures Electric - 3 Procedures Steps Not in Correct Order, July 23, 2004
CR 238709; Online Risk Potentially Impacted During 2A Diesel Generator Testing, July 23, 2004
CR 239374; Abnormal Trend in VCT Level, July 27, 2004
CR 240718; 2B AF Pump Jacket Water Leak, August 1, 2004
CR 241732; Parts IR d to Maintenance on QA Hold, August 4, 2004

CR 249152; ORAM Model for Byron is Not Consistent with Braidwood Model, August 31, 2004, (NRC Identified)
CR 249156; On-Line Risk Difference Between Braidwood and Byron, September 1, 2004, (NRC Identified)
CR249187; Not All Protective Barriers Placed in Field, September 1, 2004
CR 249224; Byron Protected Equipment for OLR Does Not Match Braidwoods, September 1, 2004 (NRC Identified)
Risk Configuration Week of July 05, 2004, Revision 3
Volume Control Tank level trend graph from 8 AM to 3:30 PM on July 27, 2004
Risk Configuration Week of September 02, 2004, Revision 8
Risk Configuration Week of September 13, 2004, Revision 2
2B AF Troubleshooting and Repair Schedule
WC-AA-101; On-Line Maintenance Approval Form for 2B Auxiliary Feedwater Pump, August 31, 2004, Revision 8
WC-AA-101; On-Line Work Control Process, Revision 10
Byron's Archival Operations Narrative Logs, July 23-26, 2004
Byron's Archival Operations Narrative Logs, 8/31/04
IR 244799; Torque Values not Meeting Technical Standards, August 12, 2004
Online risk Evaluation for Week of July 19, 2004, Revision 3

1R14 Personnel Performance Related to Non-routine Plant Evolutions and Events

Volume Control Tank Level Traces on July 27, 2004
Byron Operator Logs for July 27, 2004

1R15 Operability Evaluations

Adverse Condition Monitoring and Contingency Plan; Unit 1 RCFC Flow Revision 0, August 20, 2004
IR 241229; Missing 2B AF Pump Cylinder Head Seal Ring, August 3, 2004
IR 245180; 1FI-SX122 & 1FI-SX124 Indicating High Compared to Ultrasonic-Needed Work Request, August 18, 2004
IR 249190; SX1 Performance Criteria Potentially Maintenance Rule (A)(1) Status, August 17, 2004
CR 150224; 2SX114B Valve Actuator Found Not Connected to Valve Coupling, March 21, 2003
CR 173650; Device Minimum Operating Voltage Not Reflected in Passport, August 28, 2003
CR 174155; Device Minimum Operating Voltage, September 3, 2003
CR 200844; Actuator to Valve Coupling Not Properly Engaged, February 10, 2004
CR 202230; Actuator to Valve Coupling Engagement Extent of Condition, February 17, 2004
CR 215931; 1D RCFC Flow Below Acceptance on During Surveillance, April 20, 2004
CR 226880; Potential Missed LER on SX Valve Inoperabilities, June 8, 2004, (NRC Identified).
CR 236258; Unplanned LCOAR Entry Due to 1B EDG, July 15, 2004
CR 241054; Unplanned LCOAR for 2B AF Pump, August 2, 2004
CR 241546; 2B AF Discovery of Moisture on the 5L Piston, August 4, 2004

CR 241895; Entered S/D Clock But Unit is Not Being Ramped, August 5, 2004
CR 241925; Potential LER Reportable Event for 2B AF Train Inoperability, August 4, 2004
CR 241938; 2B Diesel Driven Auxiliary Feedwater Pump Head Measurement, August 3, 2004
CR 242071; Replace 13 Engine Heads on the 2B AF Diesel Engine, August 5, 2004
CR 242168; Valve is Degraded and Needs to be Repaired, August 6, 2004
CR 242446; 2B AF Diesel Contingency Monitoring Support WR/Schedule, August 6, 2004
CR 245125; Low Flow in 1A SX Service Loops in the 1A RCFC Train, August 17, 2004
CR 245179; 1FI-SX122 Indicating High Compared to Ultrasonic-Needed Work Request, August 18, 2004
CR 246485; Poor Technical Rigor in the OCC, August 20, 2004 (NRC Identified)
LS-AA-105; Operability Determinations, Revision 1
1BOSR 6.6.2-1; Unit 1 Reactor Containment Fan Cooler Monthly Surveillance, Revision 7 Interim
1BVSR 5.5.8.SX.1-1; Unit 1 Test of the 1A Essential Service Water (SX) Pump and Unit 1 SX Pumps Discharge Check Valves, Revision 4
2BOSR 8.1.2-1; Unit 2A Diesel Generator Operability Surveillance, Revision 15
EC 349940; Evaluation of Past Operability of 2SX112B and 2SX114B
EC 350601; 2B AF Pump Jacket Water Leakage, Revision 0
EC 250837; Evaluation of Thermal Performance of the 1C RCFC Based on a Comparison with Testing of the 1A RCFC, August 19, 2004
EC 350840; 2B Auxiliary Feedwater Jacket Water Leak Operability Evaluation, August 19, 2004
IR 236258; Prompt Investigation 1B DG Loss of Control Power, July 15, 2004
Byron's Archival Operations Narrative Logs, July 15, 2004
2B AF Diesel Jacket Water Leak Logs
Operations Manager OCC Log, 2B AF Pp Jacket Water Leak
Engineering OCC Manager Status/Turnover, August 2 - August 3, 2004
Active Operator Log, August 5, 2004
WR 990157073 01; Essential Service Water Flow Verification, April 20, 2001
WO 722467; 2B Auxiliary Feedwater Pp Jacket Water Leak, August 5, 2004
Project Number BYR-19941; Failure Analysis of Sealing Rings 2B AF Pump, Detroit Diesel, 2AF01PB, Byron Station
Guidance to Recognize Signs of Jacket Water Leakage
IR 241492; Observed Water Leakage from Cylinder 6R on 2B AF Pump, August 4, 2004
IR 242047; 2B AF Pump Turbo-Charger Operability, August 5, 2004
IR 244293; NOS Identified Potential Need for Re-Evaluation of 2B AF Event, August 13, 2004
Troubleshooting Log; Equipment Involved; 2AF01PB-K
Prompt Investigation for 2B AF Jacket Water Leak, August 1, 2004
1A SX Low Flow Troubleshooting Summary
Byron's Active Operations Narrative Logs, August 17, 2004

1R16 Operator Workarounds

Unit 2 Standing Order Log # 04-052; Operations with Temperature Control Values Failed Open, Revision 0
Engineering Change 343159; TCCP to Remove Internals of Valve 2SX173, June 3, 2003
Engineering Change 344257; TCCP to Remove Internals of 0SX063B, August 12, 2003
Engineering Change 344383; TCCP to Remove Internals of Valve 1SX178, September 4, 2004
Adverse Condition Monitoring and Contingency Plan; Unit 1 Safety Injection Pump Elevated Discharge Pressure Revision 1, October 17, 2003
Adverse Condition Monitoring and Contingency Plan; 1D Safety Injection Accumulator Level Increase Trend, October 24, 2003
Adverse Condition Monitoring and Contingency Plan; Unit 2 No. 1 Governor Valve (2MS5006A) LVDT Feedback Signal, August 16, 2004
Adverse Condition Monitoring and Contingency Plan; RCS Activity Monitoring Due to Failed Fuel, May 7, 2004
Adverse Condition Monitoring and Contingency Plan; Unit 1A Diesel Generator Pre-Lube Pump Motor Bearing Vibration, August 30, 2004
Adverse Condition Monitoring and Contingency Plan; Unit 1E Main Power Transformer (MPT) Cooling System, July 13, 2004
Adverse Condition Monitoring and Contingency Plan; Unit 1 Main Generator Liquid Level Detector, May 19, 2004
Adverse Condition Monitoring and Contingency Plan; 2B CV Pump External Seal Leakage, July 20, 2004
Adverse Condition Monitoring and Contingency Plan; May 10, 2004
Adverse Condition Monitoring and Contingency Plan; 1B/2B AF Diesel Governor Oil Reservoir Level Monitoring Plan (Rev.0), July 13, 2004
Adverse Condition Monitoring and Contingency Plan; Unit 1 RCFC Flow Revision 1, August 27, 2004
Second Quarter 2004 Operator Work Around Aggregate Impact Assessment, September 15, 2004
CR 141389; Manual Lineup of VC in Emergency Mode (Unplanned LCO Entry) January 27, 2003
CR 141542; Operability of the Control Room Radiation Monitors, January 27, 2003
CR 142529; Daily Order for VC Makeup Fan, February 2, 2003

1R19 Post Maintenance Testing

WO 333478 02; Operations (OPS) Post Maintenance Test (PMT) - Engine Start With No Malfunction Alarm, July 24, 2004
WO 333479 02; OPS PMT, Engine Start With No Malfunction Alarm, July 24, 2004
WO 333480 02; OPS PMT, Engine Run With No Malfunction Alarm
WO 391977 02; OPS PMT, 2DG58042A, July 24, 2004
WO 412627 02; OPS PMT, Full Load Run, July 24, 2004
WO 441538 02; OPS PMT, Run Pump, July 23, 2004
WO 453282 02; OPS PMT, Diesel Generator Run Visual (Non-ISI) at Normal Operating Pressure, July 24, 2004

WO 4624348 02; OPS PMT, Replace Solenoid and Valve, July 24, 2004
WO 472130 02; OPS PMT - Test Mode Engine Run and Verify Voltage Adjust Response, July 24, 2004
WO 473301 01; 2A Diesel Generator Relay Operation Verification, July 22, 2004
WO 473430 02; OPS PMT - 2BOSR Diesel Generator -2, July 24, 2004
WO 473431 02; OP Perform Post Maintenance Test, July 23, 2004
WO 473446 02; OPS Post Maintenance Testing, July 23, 2004
WO 474304 02; OPS PMT, Engine Run, July 24, 2004
WO 485104 02; OPS PMT, Engine Run, July 24, 2004
WO 485106 02; OPS PMT, Engine Run, July 24, 2004
WO 496943 01; 2BOSR 8.1.12-1; 2A Diesel Generator ESF Auto Start, July 24, 2004
WO 503305 02; OPS PMT, Panel Alarm Check, July 23, 2004
WO 505945 02; OPS PMT, Full Load Engine Run, July 24, 2004
WO 516240 03; Clear Obstruction in High Side Sensing Line, July 6, 2004
WO 575142 02; See PMT Add Jumper to Power Supply 65 PWR for 2A Diesel Generator, July 22, 2004
WO 575550 & 575550 01 & 02; 2A CV Pump Outboard Bearing Temperature Drops Immediately APX 6F, July 28, 2004
WO 580113 02; OPS PMT, Exercise/Readjust Voltage Regulator R3 Pot, July 24, 2004
WO 596757 04; Operations Post Maintenance Test Run Engine, July 24, 2004
WO 604160 02; OPS PMT, Run Engine, July 24, 2004
WO 610858 03; Operations PMT - Run 1A CV Pump Auxiliary Oil Pump, July 30, 2004
WO 615597 01; 2DG01KB Contingency Troubleshooting, August 12, 2004
WO 615597 02; Operations Post Maintenance Test, August 13, 2004
WO 615597 03; EM Setup of 2301A Electronic Governor Speed Control, August 12, 2004
WO 615597 04; EM Replace 2301A Electronic Governor Speed Control Unit, August 12, 2004
WO 615597 05; EM Setup of Digital Reference Unit, August 13, 2004
WO 615597 06; EM Replace Governor Digital Reference Unit, August 13, 2004
WO 615597 07; SEE Post Maintenance Testing, August 12, 2004
WO 615597 08; EM Replace Speed Module 14SM with New or Refurbished Unit, August 12, 2004
WO 615597 09; IM Perform Commercial Grade Dedication Testing CAT ID 5729, August 12, 2004
WO 615597 10; EM Perform Commercial Grade Dedication Testing CAT ID 451630, August 12, 2004
WO 615597 11; EM Replace Engine Speed Sensor on 2B DG, August 12, 2004
WO 615597 12; 2DG01KB Contingency Troubleshooting Work Order, August 12, 2004
WO 631375; Flow Indicating Lower Than Expected, August 24, 2004
WO 631375 07; Operations - Perform Post Maintenance Test, August 24, 2004
WO 632011 02; Functionally Test 1A CV Pump Breaker, August 03, 2004
WO 650370; Perform Various Post Maintenance Activities, August 24, 2004
WO 652271; Instrument Maintenance Minor Leak at “T” Fitting
WO 659971; 1CV8114 Closed Limit Switch Did Not Actuate, July 29, 2004
WO 659971 02; Operations Post Maintenance Test - Perform 1BOSR 0.5-2.CV.1.1 and 1BOSR 0.5-2.CV.3-1, July 29, 2004

WO 6787639, Support SEB 89-13 Inspection for 2A CV Pump Cub Cooler, August 24, 2004
WO 687639-02; Operations Functional Run Fan and Check for Leaks and Proper Operation, August 24, 2004
WO 679209 03; OPS PMT, Ru Engine at Full Load, July 24, 2004
WO 702088; ASME Surveillance Requirements for 2A CV pump, August 24, 2004
WO 713706 01; 2BOSR 8.1.2-1, 2A Diesel Generator Monthly Surveillance, July 26, 2004
WO 722467; 2B Auxiliary Feedwater Pp Jacket Water Leak, August 5, 2004
Project Number BYR-19941; Failure Analysis of Sealing Rings 2B AF Pump, Detroit Diesel, 2AF01PB, Byron Station
WO 726805 02; Post Maintenance Testing, August 18, 2004
WO 726805 03; CMO Vibration Analysis, August 18, 2004
Schematic Diagram Diesel Generator 2B Starting Sequence Control 2DG01KB Part 1, sheet #6E-2-4030DG51, Revision AE
CR 215931; 1D RCFC Flow Below Acceptance on During Surveillance, April 20, 2004
CR 232158; High Bearing Oil Temperatures During ASME Run, June 28, 2004
CR 238818; Mechanical Maintenance Department Lessons Learned From 2A EDG Work Window, July 23, 2004
CR 239955; As Left Indication for 1CV8114, July 28, 2004
CR 240718; 2B AF Pump Jacket Water Leak, August 1, 2004
CR 241225; Unit 2 Auxiliary Feedwater Diesel Has One O-Ring Not Accounted For; August 3, 2004
CR 241546; 2B AF Discovery of Moisture on the 5L Piston, August 4, 2004
CR 241938; 2B Diesel Driven Auxiliary Feedwater Pump Head Measurement, August 3, 2004
CR 242012; NOS Identified Behavior on 2B AF LED to Ground Strap IR , August 3, 2004
CR 242168; Valve is Degraded and Needs to be Repaired, August 6, 2004
CR 243775; Concerns Raised During Reinstallation of 14SM
CR 244846; OA VC Train Trip, August 16, 2004
CR 245125; Low Flow in 1A SX Service Loops to the 1A RCFC Train, August 17, 2004
CR 245577; 1SX147A/B Not Returned to As Found By Surveillance, August 19, 2004
2B AF Engine Repair Schedule
Prompt Investigation Report OA VC Train Trip, Revision 1
1BOSR 6.6.2-1; Unit 1 Reactor Containment Fan Cooler Monthly Surveillance, Revision 7 Interim
2BOSR 8.1.2-1; Unit 2A Diesel Generator Operability Surveillance, Revision 15
2BOSR 8.1.2-2; Unit 2B Diesel Generator Operability Surveillance, Revision 14
2BOSR 8.1.12-1; Unit 2A Diesel Generator ESF Actuation Test Signal Start and Non-Emergency Trip Bypass Test, and Generator Differential Trip Test, Revision 4
2BOSR DG-2; Unit 2A Diesel Generator Relay Operation Verification, Revision 3
2BVSR 5.2.4-5; ASME Surveillance Requirements for 2A CV Pump and Check Valve 2CV8480A Stroke Test, Revision 8
2BVSR5.5.8.AF.1-2; Unit 2 ASME Surveillance Requirements for the Diesel Driven Auxiliary Feedwater Pump, Revision 12
2BVSR AF-3; Unit 2 Simultaneous Start of Both AF Pumps with Flow to the Steam Generators, Revision 15

BOP DG-11, Unit ½ Diesel Generator Startup, Revision 18
IR 240718; 2B AF Pump Jacket Water Leak, August 1, 2004
IR 241229; Missing 2B AF Pump Cylinder Head Seal Ring, August 3, 2004
IR 241492; Observed Water Leakage from Cylinder 6R on 2B AF Pump, August 4, 2004
IR 249410; 2B AFP Diesel Oil Return Valve Not Listed in Clearance Order, September 1, 2004
IR 249418; Rusty Appearance of Engine Jacket Water Manifold Internals, September 2, 2004
1A SX Low Flow Troubleshooting Summary
EC 350601; 2B AF Pump Jacket Water Leakage, Revision 0
EC 350837; Evaluation of Thermal Performance of the 1C RCFC Based on a Comparison with Testing of the 1A RCFC, August 19, 2004
1BVSR SX-1; Unit 1 Heat Exchanger Test Procedure for the Reactor Containment Fan Cooler Essential Service Water, Revision 7

1R22 Surveillance Testing

1BVSR 5.2.4-3; Unit 1 ASME surveillance requirements for residual heat removal pump 1RH01PA, Revision 10
1BVSR 8.1.20-1; Unit 1 10 Year Simultaneous Diesel Generator Start Surveillance, September 14, 2004, Revision 2
2BOSR 4.13.1-1; Unit 2 Reactor Coolant System Water Inventory Balance 72 Hour Surveillance, Revision 8
2BOSR 7.5.4-2; Unit two Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance, Revision 5
0BOSR 7.9.6-2; Essential Service Water Makeup Pump 0B Monthly Operability Surveillance, Revision 15
WO 557121; Diesel Generator 1A/1B Simultaneous Start, September 14, 2004
WO 701687 01; ASME surveillance REQ for RH pump 1RH01PA, July 30, 2004
WO 703027; 2B Auxiliary Feedwater Pump Surveillance, July 6, 2004
WO 705093; Essential Service Water Makeup Pump 0B Monthly Operability, July 6, 2004

1R23 Temporary Plant Modifications

EC 343159; TCCP to Remove Internals of Valve 2SX173, June 3, 2003
EC 344257; TCCP to Remove Internals of Valve 0SX63B, August 12, 2003
EC 344383; TCCP to Remove Internals of Valve 1SX178, September 5, 2003
EC 349824; Temporary Barrier for Seismic Interaction of Unit 2 Containment Chiller Surge Tank - 2WO05M, June 19, 2004
EC 349930; Evaluation of the Unanchored Containment Chilled Water Surge Tanks During a Seismic Event, August 6, 2004
EC 349953; Fail Open Valve 1SX101A to Allow SX Flow to 1AF01AA, June 30, 2004
EC 350082; Fail Open Valve 2SX101A to Allow SX Flow to 2AF01AA, July 1, 2004
EC 351220; Documentation of Appropriate Administrative Controls to Allow Exclusion From the Requirements of CC-AA-112 for Use of Non-Engineered Test Points at 1PA22J, September 9, 2004
EC 343159; TCCP to Remove Internals of Valve 2SX173, June 3, 2003

CR 216438; Containment Chiller Compression Tank Not Anchored, April 22, 2004
CR 229220; VP Surge Tank Seismic IR s, June 16, 2004 (NRC Identified)
CR 250879; Unit 1 DEHC Transferred into Manual, September 8, 2004
WR 142212; Provide Scaffolding for Protection of Conduits, April 22, 2004
WO 690229; Provide Scaffolding for Protection of Conduits, May 6, 2004

1EP6 Drill Evaluation

IR 244886; Preliminary Results - Byron 2004 Off-Year EP Exercise, August 17, 2004
IR 245068; EP Exercise - Failed Exercise Objective in TSC, August 17, 2004
IR 245079; EP Duty Team Environs Team Members Staffing, August 17, 2004
IR 247315; NOS Observation From EP Off-Year Exercise, August 25, 2004
IR 247324; NO Observations of OPS Performance During EP Exercise, August 25, 2004
NOS Comments from EP Off-Year Exercise, August 16, 2004
Byron 2004 Off-Year Exercise Findings and Observation Report, August 17, 2004

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

2003 Annual Radioactive Effluent Release Report dated April 30, 2004

2PS2 Radioactive Material Processing and Transportation

AT 188570-02; Check-In Self-Assessment: Radioactive Material Transportation; dated August 19, 2004
BRP 5600-3; Classification of Radioactive Waste; Revision 9
BRP 5600-13; Trending for Shifts in Scaling Factors and Waste Stream Sampling; Revision 4
Braidwood/Byron UFSAR; Chapter 11.2 - Liquid Waste Management Systems; Revision 9
Braidwood/Byron UFSAR; Chapter 11.4 - Solid Waste Management Systems; Revision 9
Byron Station, Units 1 and 2, 2002 Annual Radioactive Effluent Release Report; dated April 26, 2003
Byron Station, Units 1 and 2, 2003 Annual Radioactive Effluent Release Report; dated April 30, 2004
BYSQR-02-19; Station Qualified Review Report for Vendor Procedure
DM-OP-046-4678, Operation of the Duratek ALPS at Byron Station; dated July 11, 2002
CR 153772; Teledyne Vendor Radioanalytical Data Results for Part 61; dated April 10, 2003
CR 157472; Byron Station Is Not Complying with RP-AA-630; dated January 8, 2003
CR 217461; Radwaste Shipment Canceled; dated April 28, 2004
CR 219137; NOS Identified Material Condition IR s in Radwaste; dated May 3, 2004
CR 252648; Resin Found in Bottom of Radwaste Cask Shipped from Vendor; dated September 13, 2004
CR 252804; NRC Observations of Incoming Cask Survey; dated September 13, 2004 [NRC-Identified IR]

CR 253345; 49CFR172.704 Training for Fuel Handlers - NRC Identified; dated September 15, 2004 [NRC-Identified IR]
IR 227564; Radwaste Crane Not Working Correctly; dated June 10, 2004
IR 248383; Radwaste Vendor Removed Resin from Wrong Vessel; dated August 30, 2004
NOSA-BYR-03-02; Byron Materials Management and Procurement Audit; dated February 21, 2003
NOSA-BYR-04-04; Chemistry, Radwaste, and Process Control Program Audit; dated May 5, 2004
RMS 03-049; SeaVan of Contaminated Laundry to Unitech, Morris, IL - LSA-II; dated September 3, 2003
RMS 04-061; SeaVan of Steam Generator Equipment to Braidwood Generating Station, Braidwood, IL - LSA-II; dated May 18, 2004
RP-AA-600; Radioactive Material/Waste Shipments; Revision 5
RP-BY-601-1001; RP Loading of DAW Seavans; Revision 1
RP-AA-602; Packaging of Radioactive Material Shipments; Revision 7
RP-AA-602-1001; Packaging of Radioactive Material/Waste Shipments; Revision 3
RP-AA-605; 10 CFR 61 Program; Revision 0
RW-AA-100; Process Control Program for Radioactive Wastes; Revision 2
RWS 02-014; SeaVan of Dry Active Waste to ALARON Corporation, Wampam, PA - LSA-II; dated October 11, 2002
RWS 03-002; High Integrity Container of Dewatered Bead Resin/Charcoal to Envirocare, Clive, UT - LSA-II; dated January 27, 2003
RWS 03-020; High Integrity Container of Filters to GTS-Duratek, Oak Ridge, TN - LSA-II; dated December 30, 2003
RWS 04-004; Shipment: High Integrity Container of Dewatered Resin to Chem-Nuclear, Barnwell, SC - LSA-II; dated June 15, 2004
RWS 04-006; Shipment: High Integrity Container of Dewatered Resin to Chem-Nuclear, Barnwell, SC - LSA-II; dated June 29, 2004
Scaling Factors for Radioactive Waste and Radioactive Material Shipments; dated September 3, 2003 and March 16, 2004

4OA1 Performance Indicator Verification

CY-AA-170-000; Radioactive Effluent and Environmental Monitoring Programs; Revision 2
CY-AA-170-200; Radioactive Effluent Controls Program; Revision 1
CY-AA-170-300; Offsite Dose Calculation Manual Administration; Revision 0
CY-AA-170-1000; Radiological Environmental Monitoring Program and Meteorological Program Implementation; Revision 0
CY-AA-170-2100; Estimated Errors of Effluent Measurements; Revision 0
CY-AP-110-010; Contingency Plan for Accident Conditions; Revision 0
CY-AP-110-011; Contingency Sampling of Undiluted Reactor Coolant or Containment Recirculation Sump; Revision 1
CY-AP-110-012; Contingency Sampling of Diluted Reactor Coolant or Containment Recirculation Sump; Revision 0
CY-AP-110-013; Contingency Sampling of Diluted Containment Floor Drain Sump; Revision 0

CY-AP-110-014; Contingency Sample Transfer from Primary Sample Room; Revision 0
CY-AP-110-015; Dilution Criteria - Contingency Sampling Isotopic; Revision 0
CY-AP-110-016; Contingency Sampled Diluted Reactor Coolant Disposal; Revision 0
CY-AP-110-017; Contingency Sampling Low Level Boron Analysis; Revision 1
BOP PS-9; Post LOCA Containment Hydrogen Monitoring System Operation; Revision 4
BCP 300-69; Compositing continuous Liquid Effluent Samples; Revision 8
BCP 300-21; Compositing the Monthly/Quarterly Release Tank Samples; Revision 4
0BCSR 11.c.1-3; Radioactive Liquid Effluents - Monthly; Revision 1
0BCSR 11.d.1-1; Radioactive Liquid Effluents Dose Calculation - Monthly; Rev. 0
0BCSR 11.e.1-1; Radioactive Liquid Effluents, Radwaste Inoperable - Monthly; Rev. 0
0BCSR 11.e.1-2; Radioactive Liquid Effluents, Radwaste Inoperable - Monthly; Rev. 0
0BCSR 11.f.1-2; Auxiliary Building Radioactive Gaseous Effluents - Monthly; Rev. 0
0BCSR 11.f.2-6; Unit 1 and 2 Auxiliary Building Vent Stack Tritium Radioactive Gaseous Effluents - Monthly; Rev. 0
0BCSR 11.g.1-1; Noble Gas Effluents Dose Calculation - Monthly; Rev. 0
0BCSR 11.h.1-1; Particulate and Iodine Effluents Dose Calculation - Monthly; Rev. 0
0BCSR 11.i.1-1; Gaseous Radwaste Treatment Effluents Dose Calculation - Monthly; Rev. 0
0BCSR 11.i.1-2; Gaseous Radwaste Treatment Systems Operability - Monthly; Rev. 0
2BOSR 4.13.1-1; Unit 2 Reactor Coolant System Water Inventory Balance 72 Hour Surveillance, Revision 8
Byron Self-assessment; 2nd Quarter 2003, CY6 Radioactive Effluent Control
Byron Self-assessment; 3rd Quarter 2003, CY6 Radioactive Effluent Control
Byron Self-assessment; 4th Quarter 2003, CY6 Radioactive Effluent Control
QAP 0403 Instant Results by Laboratory; Lab: TI Teledyne Brown Engineering Environmental Services, Knoxville, TN; Split Sample Results with DOE
CR 214088; 0PR02J Alert Alarm on Initiation of 0E GDT Release; dated April 8, 2004
CR 214331; OB AB Monitor Tank Release Above Admin Limit; dated April 9, 2004
CR 214571; Unplanned LCOAR Entry 0PR10J Loss of Sample Flow; dated April 13, 2004
CR 215033; Unknown In-leakage into Waste Gas System; dated April 14, 2004
CR 216858; Unexpected Alarm on 0PR13J; dated April 25, 2004
CR 217112; Liquid Release Tank 0WX26T High in Radioactivity; dated April 27, 2004
CR 218032; Unexpected RM-11 Responses; dated April 30, 2004
CR 218041; 1PR11J Unplanned LOCAR Entry; dated April 30, 2004
CR 218097; Error Identified in the Byron Station AREOR; dated April 30, 2004
CR 218288; RM-80 Port A Shutdown Caused Brief Unplanned LCOAR Entry; dated May 2, 2004
CR 218754; Excess Dose Received Due to Emergency Core Cooling System Vent Hoses Moved; dated May 4, 2004
CR 218827; NOS Identified Inadequate Guidance in BOP; dated May 4, 2004
CR 219676; Unplanned LCOAR Entries; dated May 7, 2004
CR 219996; Unplanned LCOAR Due to RM-11 Due to Auto Reboot; dated April 29, 2004
CR 224406; Evaluation of Analysis Difference Not Documented; dated May 27, 2004
CR 224419; FASA Recommendation Not Tracked Through Implementation; dated May 27, 2004

CR 229753; Byron Loses a Participant in the R. E. M. P. Program; dated June 15, 2004
IR 225217; 0PR25J Filtered Vent Header Process Monitor in High Alarm; dated June 2, 2004
IR 227977; U-2 SJAE Rad Mon Hourly Average Reading Not Acceptable; dated June 11, 2004
NRC Letter; Issuance of Amendments for Byron Station, Units 1 and 2, and To Eliminate Requirements for Post Accident Sampling System; dated December 27, 2001
AR/PR-3; WR Gas Monitor; Revision 1; dated March 17, 1998
AR/PR-2; Detectors; Revision 3; dated January 16, 2001
RW-1; Liquid Radwaste; Revision 0; dated June 4, 1999
RW-2; Gaseous Radwaste; Revision 1; dated January 24, 2001
VA-1; Auxiliary Building Ventilation; Revision 5; dated January 22, 2001
VP-2; Containment Purge; Revision 3; dated October 21, 1997
QAP 0403; Instant Results by Laboratory (preliminary) Split Sample Results with DOE
Byron Self-assessment 2nd Quarter 2003 Chemistry - Specifically Radioactive Effluent Control
EIML Sampling Procedures Manual; Revision 7; dated May 20, 2003
Teledyne Brown Engineering, Inc, Report of Analysis/Certificate of Conformance; dated June 4, 2004
Focus Area Self-assessment Report - Radiological Environmental Monitoring and Offsite Dose Calculation Manual; dated March 17, 2003 - April 4, 2003
Focus Area Self-assessment Report - Radiological Environmental Monitoring Program; dated September 8, 2003 - September 12, 2003
Assessment No. SPA-BY-04-2Q; Liquid Radwaste Program Controls CJ1.2; dated May 27, 2004
NOSPA-BY-04-1Q; CJ3 - Gaseous Radwaste Program Controls - and Effective Sampling Program is Established - CJ3.3
NOSPA-BY-04-1Q; Gaseous Radwaste Program Controls - Gaseous Radwaste Effluents are Maintained ALARA CJ3.5; dated January 1, 2004 - March 31, 2004
NOSPA-BY-03-4Q; CLI-ODCM - Release to Environment Controlled to Lowest Levels; dated December 6, 2003
Self-assessments of Liquid Gaseous Release Procedures; dated April 2003 - April 2004
NOSA-BYR-03-08 - REMP, ODCM, Non-Radiological Effluent Monitoring/NPDES Audit Report; dated November 11, 2003
Gaseous and Liquid Release and Dose Summary Reports; dated April 2003 - April 2004
Liquid and Gaseous Release Packages; dated April 2003 - April 2004
Environmental, Inc Midwest Laboratory; Radiological Environmental Monitoring Program (REMP) for Byron Station, Byron, Illinois, Monthly and Annual Reports; dated January 2003 - December 2003
Environmental, Inc Midwest; Quality Assurance Program QAP-1; dated October 21, 2003
NUPIC Joint Audit/Survey of Environmental, Inc, Northbrook, IL; dated April 11, 2003
Radiochemistry Cross Check Records; 2003 - 2004
HP Ge Calibration Records; April 2003 - April 2004
AR 00156262; AR/PR System Failures/Excessive B2 Work Orders; dated April 29, 2003
AR 00161102; Liquid Release Maximum Flowrate Exceeded; dated May 29, 2003
AR 00172301; Release Tk Pp 0WX53P Not Operated at Design Press on Recirc; dated August 20, 2003

AR 00172455; Release Tank Pump Still Leaking After 6 Months; dated August 21, 2003
AR 00176948; Unexplained Operation of 1PR 11J; dated September 23, 2003
AR 00192608; 0PR02J Setpoints Not Set Correctly for WGDT Release; dated December 26, 2003
AR 00194155; Liquid Release Package Has Wrong Setpoints; dated January 8, 2004
AR 00207751; 1RE-PR011J Gas Sample Isotopic Unexpected Condition; dated March 10, 2004
LS-AA-2150; Monthly Data Element for NRC Reactor Coolant System Leakage, Rev. 5
LS-AA-2150; Monthly Performance Indicator (PI) Data Elements for RETS/ODCM Radiological Effluent Occurrences; Revisions 3 and 4 (data for April 2003 - April 2004)

LIST OF ACRONYMS USED

ADAMS	Agency wide Documents Access and Management System
AFW	Auxiliary Feedwater
CFR	Code of Federal Regulations
CR	Condition Report
DAW	Dry Active Waste
DRP	Division of Reactor Projects; Region RIII
DRS	Division of Reactor Safety; Region RIII
EDG	Emergency Diesel Generator
FASA	Focused Area Self Assessment
HEPA	High Energy Particulate Air
IMC	Inspection Manual Chapter
IR	Inspection Report
JPM	Job Performance Measure
LER	Licensee Event Report
LORT	Licensed Operator Requalification Training
LSA	Low Specific Activity
MSSV	Multiple Main steam Safety Valve
NCV	Non-Cited Violation
NRC	United States Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OPS	Offsite Power Systems
PI	Performance Indicator
REMP	Radiological Environmental Monitoring Program
ROP	Reactor Oversight Process
SDP	Significance Determination Process
SRO	Senior Reactor Operator
SSC	System, Structure, and Component
SSPS	Solid State Protection System
STA	Shift Technical Advisor
SWR	Simulator Work Request
SX	Essential Service Water
SXCT	Essential Service Water Cooling Tower
TBD	To Be Determined
TLD	Thermoluminescent Dosimeter

TRM	Technical Requirements Manual
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WW	Well Water