October 27, 2005

Mr. David A. Christian
Senior Vice President and
Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: KEWAUNEE POWER STATION
NRC INTEGRATED INSPECTION REPORT 05000305/2005012

Dear Mr. Christian:

On September 30, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Kewaunee Power Station. The enclosed integrated inspection report documents the inspection findings which were discussed on October 6, 2005, with Mr. M. Gaffney and other members of your staff.

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

Based on the results of this inspection, there were three self-revealed findings of very low safety significance, which involved four violations of NRC requirements. In addition, one NRC inspector-identified issue was reviewed under the NRC traditional enforcement process and was also a violation of NRC requirements. However, because these violations were of very low safety significance and because the issues were entered into the licensee's corrective action program, the NRC is treating these findings and issue as Non-Cited Violations in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

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 Kewaunee Power Station.

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

Sincerely,

**/RA/**

Patrick Louden, Chief
Branch 5
Division of Reactor Projects

Docket No. 50-305
License No. DPR-43

Enclosure: Inspection Report 05000305/2005012
w/Attachment: Supplemental Information

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REGION III

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| Docket No: | 50-305 |
| License No: | DPR-43 |
| Report No: | 05000305/2005012 |
| Licensee: | Dominion Energy Kewaunee, Inc. |
| Facility: | Kewaunee Power Station |
| Location: | N490 Highway 42<br>Kewaunee, WI 54216 |
| Dates: | July 1 through September 30, 2005 |
| Inspectors: | S. Burton, Senior Resident Inspector<br>P. Higgins, Resident Inspector<br>J. Giessner, Reactor Engineer<br>L. Haeg, Reactor Engineer<br>S. Sheldon, Reactor Engineer<br>D. Chu, Reactor Engineer<br>R. Winter, Reactor Engineer<br>W. Slawinski, Reactor Engineer<br>J. Neurauter, Reactor Engineer<br>M. Phalen, Radiation Specialist |
| Approved by: | Patrick Louden, Chief<br>Branch 5<br>Division of Reactor Projects |

Enclosure

## SUMMARY OF FINDINGS

IR 05000305/2005012; July 1, 2005 - September 30, 2005; Kewaunee Power Station. Routine Integrated Report; Personnel Performance During Non-Routine Plant Evolutions and Events; Access Control to Radiologically Significant Areas.

This report covers a 3-month period of baseline resident inspection and announced baseline inspections of radiation protection (RP) and emergency preparedness. The inspections were conducted by Region III inspectors and the resident inspectors. 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**

- Non-Cited Violation. The inspectors identified a Non-Cited Violation (NCV) when the licensee failed to make a written report, within 60 days, to the NRC in accordance with 10 CFR 50.73(a)(2)(ii)(B), when an unanalyzed condition that significantly degraded plant safety was identified. Specifically, the licensee did not recognize the significance of a previously identified condition involving a potential runout issue with the component cooling water (CCW) pumps, and did not report this condition until the inspectors identified the requirement. The concern related to the CCW pump capability to provide required flow under certain conditions. Specifically, during a loss of power, and with specific system configurations, the loss of power could lead to a CCW pump runout condition. The primary cause of this finding was related to the cross-cutting area of human performance.

  Because this issue affects the NRC's ability to perform its regulatory function, it was evaluated using the traditional enforcement process. The inspectors determined that this violation is of very low safety significance and because the licensee entered the issue into their corrective action program (CAP026528), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. The licensee has taken actions to revise plant procedures to address this issue. (Section 1R14)

**Cornerstone: Occupational Radiation Safety**

- Green. A self-revealed finding of very low safety significance and two associated Non-Cited Violations of regulatory requirements were identified for an unposted and uncontrolled high radiation area in an auxiliary building elevator during the transfer of a radioactive seal water injection filter. As a result of this failure, workers could have unknowingly entered a high radiation area in the elevator without knowledge of the radiological conditions.

  The issue was more than minor because it was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone

objective to ensure adequate protection of worker health and safety from exposure to radiation. The issue represents a finding of very low safety significance because there was no overexposure or substantial potential for an overexposure given the circumstances and the actual radiological conditions in the area, nor was the licensee's ability to assess worker dose compromised. A Non-Cited Violation of Technical Specification 6.13(a) and 10 CFR 20.1601(b) was identified for the failure to comply with the RP requirements that govern the control of access into high radiation areas. This issue also represents a Non-Cited Violation of 10 CFR 20.1902(b)/20.1903 for failure to post a high radiation area. Corrective actions taken by the licensee included enhanced administrative measures (RP Job Guide) for change-out and transport of all radioactive filters. (Section 2OS1.7)

- Green. A self-revealed finding of very low safety significance and an associated Non-Cited Violation of NRC requirements were identified when a high radiation area boundary was breached by two workers during radiography. An unnecessary radiation exposure could have been received by the workers had they not been stopped by radiography personnel as they moved toward the exposed radiographic source.

  The issue was more than minor because it was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation. The issue represents a finding of very low safety significance because there was no overexposure or substantial potential for an overexposure given the actual radiological conditions in the area coupled with the duration of the radiographic operation and the presence of radiography personnel who provided surveillance of the area, nor was the licensee's ability to assess worker dose compromised. A Non-Cited Violation of Technical Specification 6.13(a) and 10 CFR 20.1601(b) was identified for the failure to comply with the RP requirements that govern the control of access into high radiation areas. Corrective actions taken by the licensee included enhanced administrative measures by revising the radiography procedure and counseling of involved staff. Since the cause of the problem included corrective action deficiencies from previous similar radiography boundary control events, the finding also relates to the cross-cutting area of problem identification and resolution. (Section 2OS1.5)

- Green. A self-revealed finding of very low safety significance and an associated Non-Cited Violation of NRC requirements were identified for an unposted/uncontrolled locked high radiation area in the turbine building during radiography activities. A radiography source created radiation levels such that a major portion of the whole body could have received in one hour a dose in excess of 1000 mrem in accessible areas of the turbine building, which were not posted or controlled in accordance with regulatory requirements. The areas with elevated dose rates were not positively controlled by locked door/gate, use of a barrier and flashing light, or maintained under continuous visual or electronic surveillance.

  The issue was more than minor because it was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation. The issue represents a finding of very low safety significance because there was no overexposure or substantial potential for an overexposure given the actual

radiological conditions in the uncontrolled areas coupled with the duration of the radiographic shot. A Non-Cited Violation of Technical Specification 6.13(b) and 10 CFR 20.1601(b) was identified for the failure to comply with the RP requirements that govern the control of access into locked high radiation areas. Corrective actions taken by the licensee included enhanced administrative measures by revising the radiography procedure, and counseling and training of RP staff. (Section 2OS1.5)

**B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### Summary of Plant Status

Kewaunee entered the inspection period performing a reactor startup following a forced outage which began on February 19, 2005. Full power was achieved on July 4, 2005. Kewaunee operated at full power for the remainder of the inspection period except for brief downpowers to conduct planned surveillance testing activities and for the following downpower:

- On August 27, 2005, power was reduced to approximately 70% full power to support a Heater Drain Pump repair which was completed in conjunction with planned Main Turbine Valve testing and Auxiliary Feedwater (AFW) full flow testing.

### 1. REACTOR SAFETY

**Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

1R01 Adverse Weather (71111.01)

a. Inspection Scope

During the onset of a thunderstorm, when the potential existed for high winds, the inspectors reviewed the facility's design and the licensee's procedures to verify that structures, systems and components would remain functional when challenged by the adverse weather conditions. The inspectors walked down selected plant areas to ensure that operator actions maintained the readiness of essential systems and that accessibility of controls, indications, and equipment would be maintained during these adverse weather conditions. Additionally, the inspectors verified proper implementation of preparatory procedures. As part of this inspection, the documents listed in the attachment were reviewed.

This review constituted one inspection sample.

b. Findings

No findings of significance were identified.

1R02 Evaluations of Changes, Tests, or Experiments (71111.02)

Review of Evaluations and Screenings for Changes, Tests, or Experiments

a. Inspection Scope

The inspectors reviewed three 10 CFR 50.59 safety evaluations. These documents were reviewed to ensure consistency with the requirements of 10 CFR 50.59. The inspectors used Nuclear Energy Institute (NEI) 96-07, "Guidelines of 50.59 Evaluations," Revision 1, to determine acceptability of the completed evaluations and screenings. The NEI document was endorsed by the NRC in Regulatory Guide 1.187, "Guidance for

Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," November 2000. The inspectors also consulted IMC, Part 9900, "10 CFR GUIDANCE: 50.59." As part of this inspection, the documents in the Attachment were utilized to evaluate the potential for an inspection finding.

This review constituted three inspection samples.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial walkdowns of accessible portions of trains of risk-significant mitigating systems equipment. The inspectors reviewed equipment alignment to identify any discrepancies that could impact the function of the system and potentially increase risk. Identified equipment alignment problems were verified by the inspectors to be properly resolved. The inspectors selected redundant or backup systems for inspection during times when equipment was of increased importance due to unavailability of the redundant train or other related equipment. Inspection activities included, but were not limited to, a review of the licensee's procedures, verification of equipment alignment, and an observation of material condition, including operating parameters of equipment in-service. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following equipment trains to assess operability and proper equipment line-up for a total of four samples:

- Main Feedwater System;
- Fire Protection System;
- 'B' and 'C' AFW pumps with 'A' AFW pump out-of-service; and
- Alternating Current (AC) Electrical System during Substation work.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a complete walkdown of equipment for one risk significant mitigating system. The inspectors walked down the system to review mechanical and electrical equipment line-ups, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to

ensure that ancillary equipment or debris did not interfere with equipment operation. A review of past and outstanding work orders was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program (CAP) database to ensure that any system equipment alignment problems were being identified and appropriately resolved. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following system to assess operability and proper equipment line-up for a total of one sample:

- Safety Injection System.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Fire Zone Walkdowns (71111.05Q)

a. Inspection Scope

The inspectors walked down risk significant fire areas to assess fire protection requirements. The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and had implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems or features. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events, or the potential to impact equipment which could initiate or mitigate a plant transient. The inspection activities included, but were not limited to, the control of transient combustibles and ignition sources, fire detection equipment, manual suppression capabilities, passive suppression capabilities, automatic suppression capabilities, compensatory measures, and barriers to fire propagation. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following areas for review for a total of ten samples:

- Plant Exterior, Protected Area;
- Fire Zones SC-70A, and SC-70B, Screen House;
- Fire Zone AX 20,21,22 SGBT Area, 4KV Bus 1&2 Area, and Waste Neutralizing Tank Area;
- Fire Zone AX 23A Refueling Water Storage Tank, Containment Spray and Safety Injection Pump Area;
- Fire Zone TU-22 Turbine Building Operating Floor;
- Fire Zone TU-22 Turbine Building Basement;
- Fire Zone TU-22 Turbine Building Mezzanine;

- Fire Zone TU-90,91 1A Emergency Diesel Generator (EDG) and Day Tank Room;
- Fire Zone TU-92,93 1B EDG and Day Tank Room; and
- Fire Zone TU-95 A,B,C 480-Volt Safeguards Buses and Auxiliaries Feedwater Pump Areas.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors performed an annual review of flood protection barriers and procedures for coping with internal and external flooding. The inspection focused on determining whether flood mitigation plans and equipment were consistent with design requirements and risk analysis assumptions. The inspection activities included, but were not limited to, a review and/or walkdown to assess design measures, seals, drain systems, contingency equipment condition and availability of temporary equipment and barriers, associated with a seiche barrier designed for protection of vital equipment against lake seiche. Additionally, this barrier is evaluated in its effects on for internal flooding events. The inspectors utilized the documents listed in the Attachment to accomplish the objectives of the inspection procedure.

The inspectors evaluated equipment discussed in the following document for a total of one sample:

- Operability Evaluation (OPR) 120, regarding seiche hump height determination.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope

The inspectors performed a quarterly review of licensed operator requalification training. The inspection assessed the licensee's effectiveness in evaluating the requalification program, ensuring that licensed individuals operate the facility safely and within the conditions of their license, and evaluated licensed operator mastery of high-risk operator actions. The inspection activities included, but were not limited to, a review of high risk activities, emergency plan performance, incorporation of lessons-learned, clarity and formality of communications, task prioritization, timeliness of actions, alarm response actions, control board operations, procedural adequacy and implementation, supervisory oversight, group dynamics, interpretations of Technical Specifications, (TSs) simulator fidelity, and licensee critique of performance. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors observed the following requalification activity for a total of one sample:

- a plant operating crew during a training simulator scenario that included a steam generator tube rupture with a loss of reactor coolant requiring the execution of the saturated recovery emergency operating procedure.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed systems to assess maintenance effectiveness, including maintenance rule activities, work practices, and common cause issues. Inspection activities included, but were not limited to, the licensee's categorization of specific issues including evaluation of performance criteria, appropriate work practices, identification of common cause errors, extent of condition, and trending of key parameters. Additionally, the inspectors reviewed implementation of the Maintenance Rule (10 CFR 50.65) requirements, including a review of scoping, goal-setting, performance monitoring, short-term and long-term corrective actions, functional failure determinations associated with reviewed CAP documents, and current equipment performance status. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors performed the following maintenance effectiveness reviews for a total of three samples:

- a function-oriented review of the Fire Protection system because the licensee designated it as risk significant under the Maintenance Rule;
- an issue/problem-oriented review of the Plant Instrument Air system because the licensee designated it as risk significant under the Maintenance Rule and the system experienced several high temperature alarms on the “G” Instrument Air Compressor. To ensure system reliability during maintenance work on the “G” Instrument Air Compressor, the licensee installed a temporary air compressor as a backup to the “F” Instrument Air Compressor; and
- an issue/problem-oriented review of the Main Transformer because the licensee designated it as risk significant under the Maintenance Rule and the system experienced recent abnormal conditions that could indicate problems.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed maintenance activities to review risk assessments (RAs) and emergent work control. The inspectors verified the performance and adequacy of RAs, management of resultant risk, entry into the appropriate licensee-established risk bands, and the effective planning and control of emergent work activities. The inspection activities included, but were not limited to, a verification that licensee RA procedures were followed and performed appropriately for routine and emergent maintenance, that RAs for the scope of work performed were accurate and complete, that necessary actions were taken to minimize the probability of initiating events, and that activities to ensure that the functionality of mitigating systems and barriers were performed. Reviews also assessed the licensee's evaluation of plant risk, risk management, scheduling, configuration control, and coordination with other scheduled risk significant work for these activities. Additionally, the assessment included an evaluation of external factors, the licensee's control of work activities, and appropriate consideration of baseline and cumulative risk. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors observed maintenance or planning for the following activities or risk significant systems undergoing scheduled or emergent maintenance for a total of seven samples:

- "B" feedwater level control in manual due to an unplanned level transient in the associated steam generator;
- "G" air compressor out-of-service for gasket replacement and the temporary instrument air compressor installed;
- routine review of on-line risk and safety monitor;
- "G" air compressor maintenance extended beyond its normally scheduled maintenance time which caused it to overlap with other risk significant activities;
- Safety Injection Pump and Valve Test Train "B" moving the daily safety monitor risk to a near-yellow risk condition and adding the Condenser Hotwell Level Transmitter into the same daily schedule on September 8, 2005;
- PS-1B Pressurizer Spray Valve troubleshooting and repair work moved into the daily schedule on September 9, 2005, without accounting for the risk increase in the daily safety monitor; and
- "B" Hotwell Level Indication malfunction effect on daily risk.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions and Events (71111.14)

a. Inspection Scope

The inspectors reviewed personnel performance to planned and unplanned non-routine evolutions to review operator performance and the potential for operator contribution to the evolution, transient, or event. Included in this review was an evaluation of a Licensee Event Report (LER) which appeared to be a result of personal performance issues. The inspectors observed or reviewed records of operator performance during the evolution. Reviews included, but were not limited to, operator logs, pre-job briefings, instrument recorder data, and procedures. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors evaluated the following evolutions for a total of four samples:

- unplanned manual level control of "B" steam generator due to automatic level control anomaly;
- planned substation re-alignment to perform corrective maintenance on oil circuit breaker 3450;
- operations response to partially PS-1B pressurizer spray valve not closing fully on full close auto demand signal; and
- LER 2005-007-00, "Unanalyzed Condition: Design Deficiency - Component Cooling Water System Inoperable Due to Run Out Conditions."

b. Findings

(Closed) LER 05000305/2005-007-00: "Unanalyzed Condition: Design Deficiency - Component Cooling Water System Inoperable Due to Run Out Conditions."

Introduction: The inspectors identified a Green finding for the failure to make a report required by 10 CFR 50.73(a)(2)(ii)(B), "Event Reporting," when an unanalyzed condition that significantly degraded plant safety was identified. The licensee did not recognize the significance of a previously identified condition involving a potential runout issue with the CCW pumps, and did not report this condition until the inspectors identified the requirement. The concern related to the CCW pump capability to provide required flow under certain conditions. Specifically, during a loss of power, and with specific system configurations, the loss of offsite power could lead to a CCW pump runout condition. The primary cause of this finding was related to the cross-cutting area of human performance. Subsequent to identifying this condition, the licensee installed a valve position limiter on a non-critical CCW system flow control valve to prevent the identified run-out condition. This issue could have affected the performance of the CCW system under post accident conditions.

Description: On March 28, 2005, with the plant in Refueling Shutdown Mode, a past operability concern was identified with the plant's CCW System. On January 23, 2002, plant personnel identified a potential runout concern with the CCW pumps. The runout condition was assumed to occur when CCW was aligned to both residual heat removal (RHR) heat exchangers with both CCW pumps running. The licensee postulated that a loss of power to one train would cause one CCW pump to trip and a failure-to-close of

the associated heat exchanger isolation valve. This configuration resulted in the operating system supplying flow to both heat exchangers and posed a potential runout condition on the operating pump.

The pump runout concern was determined to be an original plant design issue and was initially resolved by isolating the non-safeguards loads on the CCW system and installing a valve position limiter on a non-critical CCW system flow control valve. Both these actions were completed approximately 50 hours from the time the potential concern was identified. The valve position limiter that was installed was proven effective by completing special operating procedures which verified by testing that a single CCW pump would not experience runout flow conditions when all CCW safeguards loads, including both trains of RHR heat exchangers, were supplied by a single CCW pump.

Analysis: The inspectors determined that this issue constituted a performance deficiency because the licensee initially failed to report this unanalyzed condition which significantly degraded plant safety. This issue was greater than minor because it affected the NRC's ability to perform its regulatory function. Specifically, the licensee did not report until 2005 an event that was initially discovered in 2002 which was related to the ability of the CCW pump to provide the required flow under certain conditions. The primary cause of this finding was related to the cross-cutting area of human performance.

Because violations of 10 CFR 50.73 are considered to be violations that potentially impede or impact the regulatory process, they are dispositioned using the traditional enforcement process.

Enforcement: Title 10 CFR Part 50.73(a)(2)(ii)(B), "Event Reporting," requires, in part, that an unanalyzed condition that significantly degraded plant safety is reported to the NRC in a timely manner (within 60 days of the discovery of the event). Contrary to this requirement, the licensee did not report until 2005 an event that was initially discovered in 2002 and that concerned past operability of the CCW pump being capable of providing the required flow. The finding is not suitable for SDP evaluation, but has been reviewed by NRC management and determined to be a finding of very low safety significance (Green). Because this violation is of very low safety significance and because the licensee entered the issue into their corrective action program (CAP026528), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000305/2005012-01). The licensee took actions to revise plant procedures to address this issue.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed OPRs which affected mitigating systems or barrier integrity to ensure that operability was properly justified and that the component or system remained available. The inspection activities included, but were not limited to, a review of the technical adequacy of the OPRs to determine the impact on TSs, the significance

of the evaluations to ensure that adequate justifications were documented, and that risk was appropriately assessed. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors reviewed the following OPRs for a total of five samples:

- CAP028649; Problems Identified with Pipe Supports SW-H653 and SW-H657; August 1, 2005;
- CAP028481; Control Room Air Conditioning System Temperature Control Valve MV-32143 Found Seized in Mid-Position;
- CAP028953; Scaffold Pole Dropped into Circulating Water Intake Forebay During Traveling Water Screen Maintenance;
- CAP029078; Penetration 173 - Improper Closure on Cable Spreading Room Side; and
- CAP028474; Nonsafety-Related Potable Water Line Running Over Safety-Related MCC [Motor Control Center].

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors verified that the post-maintenance test procedures and activities were adequate to ensure system operability and functional capability. Activities were selected based upon the structure, system, or component's ability to impact risk. The inspection activities included, but were not limited to, witnessing or reviewing the integration of testing activities, applicability of acceptance criteria, test equipment calibration and control, procedural use and compliance, control of temporary modifications or jumpers required for test performance, documentation of test data, system restoration, and evaluation of test data. Also, the inspectors verified that maintenance and post-maintenance testing activities adequately ensured that the equipment met the licensing basis, TS, and Updated Safety Analysis Report design requirements. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors reviewed post-maintenance activities associated with the following components for a total of six samples:

- “B” Steam Generator Level Controller (LC-473F);
- Containment Spray Logic Bistable P0946A;
- Charging Pump 1B;
- Control Room Air Conditioning System 1A;
- Technical Support Center Diesel Generator; and
- Pressurizer Spray Valve PS-1B.

b. Findings

No findings of significance were identified.

1R20 Outage Activities (71111.20)

a. Inspection Scope

The inspectors evaluated startup activities from a maintenance outage that began on February 20, 2005. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule, developed mitigation strategies for loss of key safety functions, and adhered to operating license and TS requirements to ensure defense-in-depth. The inspection activities included, but were not limited to, a review of the outage plan, monitoring of startup activities, and control of outage activities and risk. As part of this inspection, the documents listed in the Attachment were reviewed. The activities reviewed included the following:

- review of both outage plans and the ready-backlog;
- control room turnover meetings and selected pre-job briefings;
- review and control of mode restraints;
- startup and heatup activities, including criticality, feed pump startup, main turbine generator startup and synchronization, and elements of power escalation to full power; and
- identification and resolution of problems associated with the outage.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed surveillance testing activities to assess operational readiness and to ensure that risk-significant structures, systems, and components were capable of performing their intended safety function. Activities were selected based upon risk significance and the potential risk impact from an unidentified deficiency or performance degradation that a system, structure, or component could impose on the unit if the condition was left unresolved. The inspection activities included, but were not limited to, a review for preconditioning, integration of testing activities, applicability of acceptance criteria, test equipment calibration and control, procedural use, control of temporary modifications or jumpers required for test performance, documentation of test data, TS applicability, impact of testing relative to performance indicator (PI) reporting, and evaluation of test data. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following surveillance testing activities for review for a total of eight samples:

- SP-47-316A, Reactor Protection System Channel 1 Instrument Test;
- SP-49-075, Control Rod Exercise;
- SP-45-049.11, Containment Particulate Radiation Monitor Quarterly Functional Test;
- SP-45-049.12, Containment Gas Radiation Monitor Quarterly Functional Test;
- SP-42-312A, Diesel Generator "A" Availability Test;
- SP-18-043, Containment Pressure Instrument Channel Test;
- SP-54-058, Turbine First Stage Pressure Instruments Channel Test; and
- ICS-202, testing performed under Work Order 04-8306.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed a temporary modification to assess the impact of the modification on the safety function of the associated system. The inspection activities included, but were not limited to, a review of design documents, safety screening documents, Updated Safety Analysis Report, and applicable TS to determine that the temporary modification was consistent with modification documents, drawings and procedures. The inspectors also reviewed the post-installation test results to confirm that tests were satisfactory and the actual impact of the temporary modification on the permanent system and interfacing systems were adequately verified. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following temporary modification for review for a total of one sample:

- Installation of a Temporary Instrument Air Compressor to support maintenance on the "G" Instrument Air Compressor.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspectors performed a screening review of Revision 27 of the Kewaunee Nuclear Power Plant Emergency Plan and reviewed the licensee's associated "description and evaluation of changes" submittal to determine whether the changes made in Revision 27 decreased the effectiveness of the licensee's emergency planning. The screening review of Revision 27 did not constitute an approval of the changes and, as such, the changes are subject to future NRC inspection to ensure that the emergency plan continues to meet NRC regulations. The inspectors also performed a screening review of Revision AK of Emergency Plan Implementing Procedure (EPIP)-AD-02, which contained site-specific Emergency Action Levels, to determine whether Revision AK of this EPIP accurately incorporated an Emergency Action Level change that was approved by NRC Headquarters staff in September 2004.

These activities completed one inspection sample.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors selected emergency preparedness exercises that the licensee had scheduled as providing input to the Drill/Exercise PI. The inspection activities included, but were not limited to, the classification of events, notifications to off-site agencies, protective action recommendation development, and drill critiques. Observations were compared with the licensee's observations and CAP entries. The inspectors verified that there were no discrepancies between observed performance and PI reported statistics. As part of this inspection, the documents listed in the Attachment were reviewed.

The inspectors selected the following emergency preparedness activity for review for a total of one sample:

- an emergency preparedness practice exercise conducted for September 21, 2004; drill notifications were made with state, county, and local agencies for an alert classification.

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

### Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 Review of Licensee Performance Indicators for the Occupational Exposure Cornerstone

a. Inspection Scope

The inspectors reviewed licensee event reports, corrective action documents, electronic dosimetry transaction data for radiologically controlled area egress, and data reported on the NRC's web site relative to the licensee's occupational exposure control PI to determine if the conditions surrounding any actual or potential PI occurrences had been evaluated, and identified problems had been entered into the corrective action program for resolution. Also, PI data collection and analysis methods used by the radiation protection (RP) staff for this indicator were evaluated by the inspectors as described in Section 4OA1.

Section 2OS1.5 describes the results of the inspectors' review of a radiography event, which the licensee reported as a TS high radiation area occurrence for the first quarter of 2005.

This review represented one inspection sample.

b. Findings

No findings of significance were identified.

.2 Plant Walkdowns/Boundary Verifications and Radiation Work Permit Reviews

a. Inspection Scope

The inspectors identified recently completed and ongoing exposure significant work within radiation, high radiation, and locked high radiation areas of the plant and selectively reviewed radiation work permit (RWP) packages and radiation surveys for these areas. The inspectors evaluated the radiological controls for these activities to determine if these controls including area postings and access control barriers were adequate.

The inspectors reviewed active and closed RWP packages which governed activities in radiologically significant areas to identify the work control instructions and control barriers that had been specified. For these work activities, electronic dosimeter alarm set points for both integrated dose and dose rate were evaluated for conformity with survey indications and plant procedures.

The inspectors walked down and surveyed (using an NRC survey meter) radiologically significant area boundaries and other radiological areas in the auxiliary building to verify that the prescribed radiological access controls were in place, that licensee postings were complete and accurate, and that physical barricades/barriers were adequate. During the

walkdowns, the inspectors physically challenged locked gate/door barriers to verify that high radiation area (HRA), locked high radiation area (LHRA) and very high radiation area (VHRA) access was controlled in compliance with the licensee's procedures, TSs, and the requirements of 10 CFR 20.1601 and were consistent with Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants."

The inspectors reviewed RWP packages for selected activities completed during approximately the 9-month period that preceded the inspection to verify barrier integrity and engineering controls performance (e.g., filtered ventilation system operation) and to determine if there was a potential for individual worker internal exposures of greater than 50 millirem committed effective dose equivalent. The inspectors reviewed the licensee's procedures and its methods for the assessment of internal dose as required by 10 CFR 20.1204, to ensure methodologies were technically sound and included assessment of the impact of hard to detect radionuclides such as pure beta and alpha emitters, as applicable. No worker intakes resulting in a committed effective dose equivalent greater than 10 millirem occurred since this area was last reviewed by the inspectors as described in Inspection Report 50-305/04-09.

The inspectors reviewed the licensee's physical and programmatic controls for highly activated and/or contaminated materials (non-fuel) that could be stored within the spent fuel pool. Specifically, applicable RP procedures were reviewed, RP staff were interviewed, and a walkdown of the refuel floor was conducted. Although highly activated/contaminated materials are not stored in the spent fuel pool in a manner that allowed their inadvertent movement, the radiological control for the storage of such materials was discussed with RP staff to ensure adequate barriers would be in place should the licensee change its practices.

These reviews represented six inspection samples.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems Associated with the Radiological Access Control Program

a. Inspection Scope

The inspectors reviewed the results of RP department self-assessments related to the radiological access control program, a Nuclear Oversight Department (quality assurance) audit of the RP program, and the corrective action program (CAP) database along with individual CAPs related to the radiological access and exposure control programs to determine if identified problems were entered into the corrective action program for resolution. In particular, the inspectors reviewed radiological problems which occurred over the 9-month period that preceded the inspection including the review of any HRA radiological incidents (non-PI occurrences identified by the licensee in high and locked high radiation areas) to determine if follow-up activities were conducted in an effective and timely manner commensurate with their importance to safety and risk based on the following:

- 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; and
- Identification and implementation of corrective actions.

The inspectors evaluated the licensee's process for problem identification, characterization and prioritization and determined if problems were entered into the corrective action program and were being resolved in a timely manner. For potential repetitive deficiencies or possible trends, the inspectors determined if the licensee's self-assessment activities were capable of identifying and addressing these deficiencies, if applicable.

The inspectors reviewed the licensee's documentation for all potential PI events occurring since the last radiological access control inspection performed in December 2004 to determine if any of these events involved dose rates greater than 25 Rem/hour at 30 centimeters or greater than 500 Rem/hour at 1 meter or involved unintended exposures greater than 100 millirem total effective dose equivalent (or greater than 5 Rem shallow dose equivalent or greater than 1.5 Rem lens dose equivalent). None were identified.

Additionally, the circumstances surrounding a radiography incident in January 2005, and problems during the transport of a radioactive seal water injection filter in June 2005, were reviewed, and the details were discussed with RP staff. For each of these incidents, the inspectors independently evaluated the actual and potential radiological consequences, assessed the regulatory significance using the NRC's significance determination process, and examined the adequacy of the licensee's problem identification, evaluation and corrective actions. The details associated with these incidents is described in Section 2OS1.5 and Section 2OS1.7.

These reviews represented four inspection samples. Specifically, the samples pertained to the licensee's self-assessment capabilities, its problem identification and resolution program for radiological incidents, a review of the licensee's ability to identify and address repetitive deficiencies, and a review of those radiological incidents and potential PI occurrences of greatest radiological risk.

b. Findings

No findings of significance were identified.

.4 Job-In-Progress Reviews and Review of Work Practices in Radiologically Significant Areas

a. Inspection Scope

The inspectors discussed with RP staff the controls for work recently performed in various radiologically significant areas of the plant. Radiation surveys for these activities were reviewed by the inspectors as were the radiological job requirements provided in the RWP package for conformity with high and locked high radiation area TSs and with the licensee's access control procedure. The inspectors discussed with RP staff the methods

for communicating radiological information to work crews, the methods for approving access into high and locked high radiation areas and the administrative and physical controls used over ingress/egress into HRAs and LHRAs.

The inspectors reviewed the licensee's procedures and discussed with RP staff its practices for at-power containment entry and for entry into the reactor pit and in-core detector instrument area to determine the adequacy of the radiological controls and hazards assessment associated with such entries. Work instructions provided in RWPs and in pre-entry briefing documents were discussed with RP staff to determine their adequacy relative to industry practices and NRC Information Notices.

The inspectors reviewed the RWP and HRA access controls associated with troubleshooting of the In-Core Detector 10-path unit. This review included assessing the adequacy of the information exchanged at the as-low-as-is-reasonably-achievable (ALARA) pre-job briefing and adequacy of the pre-job planning. The inspectors also performed in-field observations of radiation protection technician and radiation worker performance and the effectiveness of implementation of in-field ALARA controls, including use of cameras and headsets by the field crews.

The inspectors also reviewed the licensee's procedure and generic practices associated with dosimetry placement and for the use of multiple whole body dosimetry for work in high radiation areas having significant dose gradients for compliance with the requirements of 10 CFR 20.1201(c) and applicable industry guidelines. Additionally, previously completed work in areas where the dose rate gradients were subject to significant variation were reviewed (i.e., steam generator work) to evaluate the licensee's practices for dosimetry placement.

These reviews represented three inspection samples.

b. Findings

No findings of significance were identified.

.5 High Radiation Area, Locked High Radiation Area and Very High Radiation Area Access Controls

a. Inspection Scope

The inspectors reviewed the licensee's procedures and evaluated its practices for the control of access to radiologically significant areas (HRAs, LHRAs, and VHRAs). The inspectors assessed compliance with the licensee's TSs, procedures, the requirements of 10 CFR Part 20, and the guidance contained in Regulatory Guide 8.38. Additionally, the inspectors evaluated the RP staff's control of keys to LHRAs and VHRAs, the use of access control guards during work in LHRAs and VHRAs, and the verification that access doors were locked/secured upon area egress. The inspectors selectively reviewed the key issuance/return and door lock verification log for selected periods in 2005 through September 19, 2005, to verify the adequacy of accountability practices and documentation. The inspectors also reviewed selected records and evaluated the RP department's practices for obtaining RP management approval for access into high dose

rate LHRAs and VHRAs and for the use of flashing lights in lieu of locking areas to verify compliance with procedure requirements and those of 10 CFR 20.1602. In particular, the inspectors reviewed the circumstances associated with a January 2005 incident that involved the failure to control access into HRAs during radiography activities. For that incident, the inspectors performed dose rate calculations, walked down the areas where the radiography had been conducted, reviewed the licensee's Root Cause Evaluation (RCE) and interviewed staff knowledgeable of the incident details.

The inspectors discussed with RP staff the controls that were in place for areas that had the potential to become high radiation areas during certain plant operations to determine if these operations required communication before hand with the RP group, so as to allow corresponding timely actions to properly post and control the radiation hazards. Operations procedures for selected plant evolutions that could affect radiological conditions were reviewed as was any RP guidance to determine if mechanisms were in place to identify and control emerging changes in radiological conditions.

The inspectors conducted plant walkdowns to verify the posting, locking and barrier integrity of numerous high radiation areas and LHRAs.

These reviews represented three inspection samples.

b. Findings

Introduction: Two self-revealed findings of very low safety significance and associated violations of NRC requirements were identified for the failure to adequately control access to both high and locked high radiation areas during radiography activities in January 2005.

Description: On January 27, 2005, at approximately 2024 hours, radiography commenced using a collimated 38.9 Curie cobalt-60 source. The radiography was being performed by two contract radiography personnel near the condensate pumps on turbine building 586', and the cobalt source was oriented upward toward the 606' elevation of the turbine building. The licensee's RP staff and the two contractors worked together to post and control access into the radiographic area as required administratively by the licensee's radiography procedure. The licensee's procedure (HP-05.010, "Control of Radiography") specified that whenever industrial radiography was performed at the station, contractor personnel must operate within their own license as well as applicable Kewaunee Power Station (KPS) policies, procedures, and guidelines. The licensee's followup evaluation of the incident subsequent to the NRC site inspection confirmed that the cobalt source created high radiation levels in accessible areas (just above the floor grating level) on turbine building 606' elevation such that a major portion of the whole body could have received in one hour a dose in excess of 1000 mrem. According to the licensee, the area radiation levels met the threshold for implementing the controls for a locked high radiation area as defined by TSs.

To conduct the radiography, the licensee and radiographers determined through radiation surveys and calculations the location of the 2 mrem/hour boundary and conservatively posted it as an HRA. The licensee's RP staff and radiographers then attempted to control access into that large area through continuous visual surveillance. Both the 586' elevation of the turbine building where the actual radiography was being performed and the 606'

elevation directly above the radiography area were posted and controlled similarly. Only the two contract radiographers and licensee RP technicians were used to control access into and patrol the large area posted as an HRA over several elevations, while the radiography took place. No additional radiation hazard postings were in place that delineated the actual HRA field. Due to the large size of the HRA boundary and the limited number of personnel controlling access into the area, neither the actual high radiation area nor the entire boundary of the posted high radiation area were under continuous surveillance so as to provide positive control over area access. Moreover, although radiation levels in accessible areas of the 606' elevation were subsequently determined by the licensee to be such that a major portion of the body could receive in one hour a dose in excess of 1000 mrem, access to those areas were not controlled as required. Specifically, the failure to either: (1) provide locked doors to prevent unauthorized entry; (2) rope-off, conspicuously post and activate a flashing light; or (3) otherwise maintain continuous direct surveillance capable of preventing unauthorized entry into those areas on the 606' elevation where a major portion of the whole body could have received in one hour a dose in excess of 1000 mrem is a violation regulatory requirements.

Additionally, at approximately 8:57 p.m., with a second radiography shot in progress, two operations personnel breached the posted high radiation area radiography boundary on the 586' elevation of the turbine building where the radiography was being performed. The operators breached the HRA rope boundary and proceeded towards the radiographic area then stopped and left the area when they were observed by one of the radiographers who informed them of the shot in progress. The two operations personnel misunderstood a verbal communication from the radiographer moments earlier and wrongly assumed it was acceptable to cross the HRA boundary because they thought the radiography had not yet commenced. The operators were inside the HRA posted radiography boundary less than one minute and were in a dose field no more than 1 mrem/hr. No measurable dose was received by either of the two operations personnel. The breach of a HRA radiography boundary by the operations staff without a radiation dose rate monitoring device (survey instrument), without knowledge of the area radiological conditions, or otherwise accompanied by qualified health physics staff is a violation of regulatory requirements. The licensee has allowed HRA radiography boundaries to be crossed by workers in the past provided radiography was not actually taking place and the workers were escorted by RP personnel. This previous poor practice may have contributed to the misunderstanding.

Analysis: The failure to adequately control access into the accessible LHRA on the 606' elevation of the turbine building above the radiography area and the unauthorized HRA boundary breach by plant operations staff on the turbine building 586' elevation represent two separate findings and associated violations.

- The failure to meet the requirements for the control of access into a LHRA where the cause was reasonably within the licensee's ability to foresee and which should have been prevented represents a performance deficiency as defined in NRC Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening." The inspectors determined that the issue was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation. Therefore, the

issue was more than minor and represented a finding which was evaluated using the Significance Determination Process (SDP).

Since this finding involved a radiological access control problem and the potential for unauthorized entry into an LHRA, the inspectors utilized IMC 0609, Appendix C, "Occupational Radiation Safety SDP," to assess its significance. The inspectors determined that the finding did not involve ALARA planning or work controls. Since no unauthorized entry into the accessible areas above where the radiography took place actually occurred, there was no overexposure. Also, given the calculated radiation levels that existed on the 606' elevation coupled with the duration of the radiographic exposure, there was no substantial potential for an overexposure. The licensee's ability to assess dose would not have been compromised had an unauthorized entry into the area actually taken place. Consequently, the inspectors concluded that the SDP assessment for this finding was of very low safety significance (Green). The licensee reported this incident as a TS high radiation area occurrence under the Occupational Radiation Safety Cornerstone, as provided in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline."

- The failure to meet the requirements for HRA control where the cause was reasonably within the licensee's ability to foresee and which should have been prevented represents a performance deficiency as defined in IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening." The inspectors determined that the issue was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation. Therefore, the issue was more than minor and represented a finding which was evaluated using the SDP.

  Since this finding involved a radiological access control problem, the inspectors utilized IMC 0609, Appendix C, "Occupational Radiation Safety SDP," to assess its significance. The inspectors determined that although the operations personnel could have progressed deeper into the area where the radiography was being performed had they not been stopped by one of the radiographers, actual dose received by the individuals was minimal. Also, it was unlikely they could have proceeded close to the collimated cobalt source without detection so a substantial potential for an overexposure did not exist. Consequently, the inspectors concluded that the SDP assessment for this finding was of very low safety significance (Green).

The root cause evaluation (RCE000675) for this radiography event contained insufficient detail relative to its radiological and regulatory impact and contained limited data/information as to the basis by which the licensee categorized the event as an NRC PI occurrence for occupational exposure control effectiveness. Following discussions with the inspectors, the licensee acknowledged the deficiencies in its RCE, which the licensee entered into its corrective action program (CAP029340/029345). Additionally, this event was similar to previous events involving radiography boundary control that occurred in 1999 (RCE000244) and 2001 (RCE 01-048), and, as such, this represents a cross-cutting issue in the area of problem identification and resolution.

Enforcement: Two violations of regulatory requirements were associated with the radiography activities, one which involved the failure to adequately control access into an LHRA and the other which involved the unauthorized entry into a posted HRA.

- Technical Specification 6.13(b) requires, in part, that areas accessible to personnel with radiation levels such that a major portion of the body could receive in one hour a dose in excess of 1000 mrem be provided with locked doors to prevent unauthorized entry. Doors shall remain locked except during periods of access by personnel under an approved RWP. For areas accessible to personnel where no enclosure exists for purposes of locking, and no enclosure can be reasonably constructed around the individual areas, then that area shall be roped off, conspicuously posted and a flashing light shall be activated as a warning devise. 10 CFR 20.1601(b) allows the licensee to substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry in place of the aforementioned controls. Contrary to these requirements, accessible areas with radiation levels such that an individual's whole body could receive a dose greater than 1000 mrem in one hour existed on the 606' elevation of the turbine building and none of the required access control options were met.

  Corrective actions taken by the licensee included enhanced administrative measures to ensure high radiation area access controls during radiography and plans to develop guidance for additional physical controls to reduce the potential for creating future uncontrolled HRAs. Since the licensee documented this issue in its corrective action program (CAP025213/RCE000675) and because the violation is of very low safety significance, it is being treated as a Non-Cited Violation (NCV 50-305/2005012-02).

- Technical Specification 6.13(a) requires that for high radiation areas with the intensity of radiation greater than 100 mrem/hr but less than 1000 mrem/hr be barricaded and posted as a HRA and entrances thereto be controlled by an RWP. Any individual or group of individuals permitted to enter such areas were required to be provided with either: (1) a radiation monitoring device which continually indicates the radiation dose rate in the area; (2) electronic dosimetry together with knowledge of the area radiological conditions; and/or (3) accompanied by a health physics qualified individual who is responsible for providing positive control over the activities in that area and shall perform periodic radiation surveillance at the frequency specified by the RWP. 10 CFR 20.1601(b) allows the licensee to substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry in place of the aforementioned controls. Contrary to these requirements, two unauthorized workers crossed a posted HRA boundary without satisfying any of the TSs options for entry into the area. Also, given the large size of the posted HRA and limited number of licensee staff attempting to control access, continuous direct surveillance was insufficient to control the entire HRA boundary.

  Corrective actions taken by the licensee included enhanced administrative measures to ensure workers understand high radiation area access controls to reduce the potential for future unauthorized HRA entries. Since the licensee documented this issue in its corrective action program (CAP025213/RCE000675)

and because the violation is of very low safety significance, it is being treated as a Non-Cited Violation (NCV 50-305/2005012-03).

.6 Radiation Worker Performance

a. Inspection Scope

During the containment entry to troubleshoot the in-core instrument drive system, the inspectors evaluated radiation worker performance for conformity with RP work requirements and to determine whether workers were aware of the radiological conditions, the RWP controls and limits in place, and that their performance had accounted for the level of radiological hazards present.

The inspectors reviewed selected radiological condition reports which found that the cause of the event was due to radiation worker errors to determine if there was an observable pattern traceable to a similar cause and to determine if this matched the corrective action approach taken by the licensee to resolve the identified problems.

This review represented two inspection samples.

b. Findings

No findings of significance were identified.

.7 Radiation Protection Technician Work Coverage/Proficiency

a. Inspection Scope

During job observations, plant walkdowns and through discussions with RP staff, the inspectors evaluated RP technician performance and proficiency with respect to RP work requirements, station procedures, and health physics practices.

The inspectors reviewed selected radiological condition reports generated during the 9-month period that preceded the inspection to determine the extent of any specific problems or trends that may have been caused by deficiencies with RP work control and to determine if the corrective action approach taken by the licensee to resolve the reported problems, if applicable, was adequate. In particular, the inspectors reviewed the circumstances associated with a June 2005 incident that involved the failure to control access into an HRA that was created on an elevator while transporting a radioactive filter. For that incident, the inspectors walked down the areas involved, reviewed the licensee's RCE, and interviewed staff knowledgeable of the incident details.

These reviews represented two inspection samples.

b. Findings

Introduction: A self-revealed finding of very low safety significance and two associated violations of NRC requirements were identified for the failure to post and adequately control access to an HRA during the transport of a seal injection filter in June 2005.

Description: On June 10, 2005, the “B” Seal Water Injection Filter was replaced, and the licensee staff used a 55-gallon drum to transport the used filter from the work location on the 606' elevation of the auxiliary building to the radwaste area on the 586' elevation. The filter was to be transported to the drumming room for disposal into a high integrity container. Historically, the licensee used a shielded transfer cart designed for filter movement which significantly attenuated the radiation from spent filters so they could be transported safely without creating elevated radiation levels in the plant. However, recent changes in plant configuration included installation of a flood barrier at the entrance to the radwaste area which precluded the use of the shielded filter transfer cart because it could not be readily lifted over the flood barrier with existing equipment.

In this instance, use of the 55-gallon drum instead of the shielded cart created a HRA around the drum. Radiation levels measured on contact with the drum were 2.5 rem/hour and about 600 mrem/hour at a distance of 30 centimeters from the drum. After the filter was placed in the 55-gallon drum, the drum was moved from the work site and placed into the auxiliary building elevator on the 606' elevation. Station personnel then exited the elevator for ALARA considerations, and an RP technician pressed the “Down” button to send the elevator to the 586' elevation where other RP staff awaited its arrival. Adequate controls were not in place to ensure the elevator would be used only for the filter transport nor were radiological controls (physical barriers/postings or continuous visual surveillance) used to prevent access into the elevator on the various auxiliary building levels it serviced other than at the 586' level. Simultaneous to depressing the “Down” button, two maintenance personnel summoned the elevator to the 633' elevation. The elevator then traveled up to 633' elevation and not down as the RP technician expected. The RP technician recognized the problem and quickly proceeded up the stairs in an attempt to reach the elevator before it arrived at the 633' level. When the elevator door opened on the 633' level, the RP technician had not yet arrived. The maintenance personnel that summoned the elevator observed the drum, suspected the potential hazard, and did not enter the elevator. As they left the area and proceeded towards the stairwell, they

observed the RP technician run past them. Based on the radiation levels around the drum and the lack of adequate control to prevent personnel entry into the elevator at the 633' level, an uncontrolled and unposted HRA condition existed.

Analysis: The failure to adequately post and to control the accessible high radiation area created by the transport of the seal injection filter as required by NRC regulations represents a performance deficiency as defined in IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening." The inspectors determined that the issue was associated with the Program/Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation. Therefore, the issue was more than minor and represented a finding which was evaluated using the SDP.

Since this finding involved a radiological access control problem and the potential for unauthorized entry into an HRA, the inspectors utilized IMC 0609, Appendix C, "Occupational Radiation Safety SDP," to assess its significance. The inspectors determined that the finding did not involve ALARA planning or work controls as defined in the SDP. Since no unauthorized entry into the elevator occurred during the short time it was accessible to the maintenance workers and given the radiation levels present, there was no overexposure or substantial potential for an overexposure. The licensee's ability to assess dose was not compromised for this incident. Consequently, the inspectors concluded that the SDP assessment for this finding was of very low safety significance (Green).

Enforcement: Technical Specification 6.13(a) requires that for high radiation areas with the intensity of radiation greater than 100 mrem/hr but less than 1000 mrem/hr be barricaded and posted as an HRA and entrances thereto be controlled by an RWP. Any individual or group of individuals permitted to enter such areas were required to be provided with either: (1) a radiation monitoring device which continually indicates the radiation dose rate in the area; (2) electronic dosimetry together with knowledge of the area radiological conditions; and/or (3) accompanied by a health physics qualified individual who is responsible for providing positive control over the activities in that area and shall perform periodic radiation surveillance at the frequency specified by the RWP. 10 CFR 20.1601(b) allows the licensee to substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry in place of the aforementioned controls. Contrary to these requirements, an accessible area in which radiation levels from sources external to the body could result in an individual receiving a dose equivalent in excess of 100 mrem in one hour at 30 centimeters from the radiation source existed (i.e., an HRA) in the elevator at the 633' elevation of the auxiliary building and none of the required access control options were met.

10 CFR 20.1902, with exceptions provided in 10 CFR 20.1903, requires that each high radiation area be conspicuously posted with a sign or signs bearing the radiation symbol and the words "Caution" or "Danger High Radiation Area." Contrary to these requirements, the HRA that existed inside the auxiliary building elevator was not posted and none of the exceptions of 20.1903 were met.

Corrective actions taken by the licensee included revising a RP Job Guide to ensure filters and other high dose rate materials are transported in a radiologically safe manner within the plant. Since the licensee documented these issues in its corrective action program (CAP027932/RCE000689) and because these violations are of very low safety significance, they are being treated as Non-Cited Violations (NCV 50-305/2005012-04 and NCV 50-305/2005012-05).

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

**Cornerstone: Occupational Radiation Safety**

.1 Radiation Safety Strategic Area

a. Inspection Scope

The inspectors sampled the licensee's submittals for the PI listed below for the period of October 2004 through August 2005. The inspectors used PI definitions and guidance contained in Revision 3 of NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify the accuracy of the PI data. The following PI was reviewed:

- Occupational Exposure Control Effectiveness

For the period reviewed, one occurrence was reported by the licensee as described in Section 2OS1.5. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with the RP staff the scope and breadth of its PI data review and the results of those reviews. The inspectors independently reviewed electronic dosimetry dose rate and accumulated dose reports, dose assignments for any intakes that occurred during the period of review, and the licensee's CAP database along with individual CAPs generated during the period reviewed to verify there were no unidentified PI occurrences.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

**Cornerstone: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness**

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As part of the routine inspections documented above, the inspectors verified that the licensee entered the problems identified during the inspection into their CAP. Additionally, the inspectors verified that the licensee was identifying issues at an appropriate threshold and entering them in the CAP, and verified that problems included in the licensee's CAP were properly addressed for resolution. Attributes reviewed included: complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization and focus were commensurate with safety and sufficient to prevent recurrence of the issue.

b. Findings

No findings of significance were identified.

.2 Daily CAP Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily CAP summary reports and attending corrective action review board meetings.

b. Findings

No findings of significance were identified.

.3 Selected Issue Followup (Annual Sample): Reactor Trip Bypass Breaker Issues

a. Inspection Scope

The inspectors selected CAP029187, "Failure on Bypass Breaker A During Performance of SP 47-316A," dated September 12, 2005, for an annual sample review of the licensee's Problem Identification and Resolution program. This CAP described an issue where the "A" reactor trip bypass breaker would not re-close as expected during surveillance testing. The reactor trip bypass breakers are in place to ensure that a reactor trip will not inadvertently occur during reactor protection system testing.

Because inadvertent opening of the reactor trip breakers increase the likelihood of an initiating event, specifically a reactor trip, the inspectors conducted a historical review of CAPs in order to assess the effectiveness of the licensee's corrective actions for similar issues. Several CAPs were identified that included inadvertent opening of reactor trip bypass breakers, however, the inspectors did not identify a common cause among the reviewed issues. The evaluation and corrective action(s) for each reviewed CAP appeared to address the associated cause(s). The inspectors noted that Surveillance Procedure (SP) 47-316 included several steps before beginning reactor protection system testing to ensure, in a diverse fashion, that the reactor trip bypass breakers would not inadvertently open. The inspectors also noted that the proposed apparent cause evaluation for CAP 29187 was appropriate for the identified conditions. The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Follow-up (71153)

.1 (Closed) LER 05000305/2005-001-00 & -01: Reactor Thermal Power Eight-Hour Average Limit Exceeded.

This event was previously discussed in IR 05000305/2005003, Section 1R14 and Section 4OA4, and was considered to be a self-revealed NCV of very low safety significance. The issue was previously entered into the licensee's corrective action program as CAP025063, CAP025257, and CAP025263. There were no new concerns identified in the LER. This LER is closed.

.2 (Closed) LER 05000305/2005-002-00: Auxiliary Feedwater Pumps Assumed to Fail from Postulated Loss of Primary Water Source - Safe Shutdown and Accident Analysis Assumptions not Assured - Inadequate Design of Pump Protective Equipment.

This event was previously discussed in IR 05000305/2005002, Section 4OA5.2.1.10 as an URI and IR 05000305/20050010, Section 1R17 and was considered to be an apparent violation pending final determination of the safety significance. The issue was previously entered into the licensee's corrective action program as CAP025465, CAP025486, CAP025588, and CAP025725. There were no new concerns identified in the LER. This LER is closed.

.3 (Closed) LER 05000305/2005-003-01: Inadvertent Reactor Protection Trip While Shutdown - Caused by Procedure Adherence Deficiencies and Inadequate Shift Management Oversight.

On February 20, 2005, the licensee experienced a valid actuation of the reactor protection system on low steam generator level due to inadequate control of level during reactor shutdown. This issue, as discussed in IR 05000305/2005003, was evaluated to be a minor issue. Corrective actions included procedure revision and training and was entered

into the corrective action program as CAP025600. The LER was reviewed by the inspectors and no findings of significance were identified. This LER is closed.

.4 (Closed) LER 05000305/2005-005-01: Emergency Diesel Ductwork Not Adequately Protected from Potential Tornado Winds and Missiles.

On March 24, 2005, the licensee determined during an evaluation of turbine building response to design basis tornado winds that sections of the Class 3 portions of the 'A' and 'B' EDG exhaust ductwork were susceptible to missiles. This issue was identified by the licensee during design bases reviews while the plant was in the refueling shutdown mode to address AFW design issues as discussed in IR 05000305/2005003. The licensee evaluated the issue using tornado missile probability models and determined that the damage probability was not considered credible and of very low safety significance. This issue was entered into the corrective action program as CAP026448. Corrective actions included adding and modifying structural members to the exhaust ducts to strengthen and protect them from missiles. These modifications were made before the unit resumed power operation. The LER was reviewed by the inspectors and no findings of significance were identified. This LER is closed.

.5 (Closed) LER 05000305/2005-006-00: Auxiliary Feedwater Pumps Postulated to Fail Due to Air Ingestion Through Pump Packing.

This event was previously discussed in IR 05000305/2005010, Section 1R17.b.1 and was considered to be one aspect of several problems with the AFW pumps resulting in a White finding of low to moderate safety significance. The issue was previously entered into the licensee's corrective action program as CAP026497. There were no new concerns identified in the LER. This LER is closed.

.6 (Closed) LER 05000305/2005-008-00: Turbine Driven AFW Pump Inoperable Due to Insufficient Net Positive Suction Head.

This event was previously discussed in IR 05000305/2005010, Section 1R17.b.1 and was considered to be one aspect of several problems with the AFW pumps resulting in a White finding of low to moderate safety significance. The issue was previously entered into the licensee's corrective action program as CAP026237. There were no new concerns identified in the LER. This LER is closed.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 05000305/2004005-01: Actions to Address Electrical Coordination Concerns of 15 Appendix R Associated Circuits.

The inspectors identified a concern with the licensee's corrective actions to address lack of coordination between the downstream and the upstream protective devices of 15 Appendix R associated circuits which share a common power source with other circuits on the bus. On July 30, 2004, the licensee initiated CAP022033 to re-evaluate the coordination concerns identified with the 15 branch circuits. The circuits in question were re-evaluated to include the breaker contact resistance in the critical cable length calculation. The licensee concluded that all circuits now meet the critical cable length

criteria and electrical coordination between branch circuit breakers and upstream circuit breakers are assured. The inspectors reviewed the evaluation and agreed with the licensee. This item is closed.

.2 (Closed) URI 05000305/2004005-02: Coordination Concerns with EDG 1A Fuses and Translation of Calculation Results into the Safe Shutdown Procedure.

The inspectors initially identified a concern relating to the licensee's actions to address lack of coordination between the downstream and the upstream protective fuses for the EDG 1A control circuit. For a fire in the relay room, the lack of coordination would trip the credited EDG 1A. The post-fire safe shutdown procedure did not contain operator actions to recover the tripped EDG, i.e., replacing fuses.

The licensee re-evaluated the fuse coordination. Since the licensee could not identify the vintage, the minimum melting time-current characteristic curves (MMC), and total clearing time-current characteristic curves (TCC) for the 25-amp fuse, the licensee extrapolated the MMC and TCC for the 25-amp fuses using known curves and compared to the downstream 15-amp fuses. The upstream and downstream fuses did not coordinate at high fault current for a fire occurring outside of the relay room. For a fire affecting the EDG 1A control circuit outside of the relay room, EDG 1B would be available. For a relay room fire, the available fault current would be at a level where the upstream and downstream fuses would coordinate. Therefore, EDG 1A would remain available for a fire in the relay room and the post-fire safe shutdown procedure did not need to be updated. This item is closed.

.3 (Closed) URI 05000305/2004009-04: Discrepancies with American Society of Mechanical Engineers (ASME) Code Governing the Attachment of Reactor Vessel Closure Head (RVCH) Nozzles with Partial Penetration Welds.

Introduction: A concern was identified regarding compliance with ASME Code design requirements where replacement reactor vessel closure head (RRVCH) nozzles were attached using partial penetration J-groove welds.

Description: During the 2004 refueling outage, the inspectors reviewed the licensee's design changes associated with the replacement of the RVCH and control rod drive mechanism (CRDM) housings. The inspectors identified that the licensee's RRVCH design may have deviated from the ASME Boiler and Pressure Vessel Code (B&PVC) requirements as stipulated in Section III, Paragraph NB-3352.4(d) and Figure NB-4244(d)-1.

The inspectors identified the following discrepancies with respect to the requirements:

- The vent nozzles were ground flush with the inner surface of the RVCH. As such, the inside corner should have been rounded using a minimum ½ $t_n$ (thickness of the nozzle) radius in accordance with NB-3352.4(d)(3). However, the actual installed minimum radius was approximately 1/4 $t_n$.

- The head adapter nozzles have a 4-inch outside diameter and 0.625-inch nominal wall thickness. All corners were rounded with a minimum radius greater than 1/4 $t_n$ but less than ½ $t_n$. Therefore, in accordance with NB-3352.4(d)(3), these nozzles should extend not less than the square root of the nozzle diameter times $t_n$ beyond the inner surface of the part penetrated. The inspectors defined the inner surface of the part penetrated to be the J-groove weld toe. The inspectors identified nozzles where the minimum corner radius should have been ½ $t_n$ in accordance with NB-3352.4(d)(3).

- The threads of the bottom of the instrumentation port head adapter tubes were removed by machining which resulted in an outside diameter step change. The measured distance from the J-groove weld toe to the diameter step change at these locations was less than the square root of the nozzle diameter times $t_n$ cutoff specified by NB-3352.4(d)(3). As such, the diameter step change corners should have been rounded using ½ $t_n$ minimum radii. In addition, the corners at the bottom of the instrumentation port head adapter tubes should have been rounded using a minimum 1/4 $t_n$ radius in accordance with NB-3352.4(d)(2). Instead, two nozzle corner edges were chaffered between 0.005-inch and 0.03-inch, and the inside bottom corner edge was beveled at 30 degrees.

This matter was considered an unresolved item pending completion of the licensee's evaluation related to the ASME Code requirements for the installed RRVCH nozzles and NRC headquarters staff's input regarding the ASME Code requirements for nozzles attached using partial penetration welds.

Analysis: The licensee entered the concern into their corrective action program as CAP024611, "Unresolved Issue Regarding Question #16 of NRC Inspection for KPS RRVCH Project."

The licensee's RRVCH design and fabrication organizations submitted inquiries to the ASME B&PV Subcommittee III for Code interpretations related to requirements as stipulated in Section III, Paragraph NB-3352.4(d) and Figure NB-4244(d)-1. The ASME response to the inquiries were included as attachments to Westinghouse Internal Letter LTR-RCUMP-05-27:

Reference ASME File: NI04-007

Question: For a nozzle which is flush with the inside diameter of the vessel, such as illustrated in Figure NB-4244(d)-1(a), for the requirements for the inside nozzle corner radius r1, is it acceptable to meet the requirements of NB-3352.4(d)(2)?

Reply: Yes, the ½ $t_n$ radius applies when the nozzle neck extends beyond the inner surface of the part penetrated, not when the nozzle is flush. The work "neck" was inadvertently dropped from NB-3352.4(d)(3). This will be corrected as errata.

Reference ASME File: BC05-416

Question: For a nozzle neck extending more than the square root of the nozzle diameter times $t_n$ beyond the inner surface of the part penetrated, do the corners at the end of the nozzle neck have to comply with the minimum r1 requirements of 1/4 $t_n$ or 3/4 inch, whichever is less, specified in NB-3352.4(c)(3), NB3352.4(d)(2), NC-3352.4(c)(3), ND-3352.4(c)(3), NE-3352.4(c)(3), NE-3352.4(d)(2), and HB3352(d).

Reply: No.

The inspectors determined that the inner surface of the part penetrated should be the toe of the J-groove weld where the structural discontinuity begins. The licensee indicated that the RRVCH dimensional verifications were likely performed using the cladding as the inner surface of the part penetrated, and that since the J-groove welds were machined to a tapered transition, it was not practical to use the toe of the J-groove weld as the reference location. Inspectors were able to visually view the J-groove welds for the Point Beach Nuclear Plant Unit 2 RRVCH (similar design and same RRVCH fabricator as for the Kewaunee RRVCH) and confirmed the smooth J-groove weld transition from the cladding to the nozzles.

The CRDM head adapters were designed using NB-3200 rules and stresses were determined using finite element analysis methods as documented in design calculation CN-RCDA-03-119. Although the analysis grid size was not intended to model the effect of corner radii, the calculated stresses at these corner regions were small by comparison to the stress in the J-groove weld region. Therefore, for nozzles that extend less than the square root of the nozzle diameter times $t_n$ beyond toe of the J-groove weld, the impact of corner radii on the stress in the J-groove weld will not be significant. Also, these RRVCH nozzles are subject to volumetric examination at the areas of concern in accordance with NRC revised Order EA-03-009, “Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors.”

The inspectors, in consultation with NRC headquarters technical specialists, concurred that for nozzles that extend less than the square root of the nozzle diameter times $t_n$ beyond the toe of the J-groove weld, design by analysis to ASME NB-3200 rules is sufficient when the stress at the corner regions is demonstrated to be low in comparison to the stress in the J-groove weld region.

The RRVCH nozzles attached using partial penetration welds are determined to be in compliance with the ASME Section III, Subsection NB design code requirements. The vent nozzles were installed with a radius in accordance with the requirements of NB-3352.4(d)(2), there are no Code corner radius requirements for nozzles extending greater than the square root of the nozzle diameter times $t_n$ from the toe of the J-groove weld, and design by analysis to NB-3200 rules using finite element stress analysis methods demonstrated that the effect of corner radii on stress in the J-groove weld region

will not be significant for nozzles extending less than the square root of the nozzle diameter times $t_n$ from the toe of the J-groove weld. No violations were identified. This item is closed.

.4 Temporary Instruction (TI) 2515/163, “Operational Readiness of Offsite Power”

The inspectors completed additional reviews of the objective of TI 2515/163, "Operational Readiness of Offsite Power," which was to confirm, through inspections and interviews, the operational readiness of offsite power systems in accordance with NRC requirements. Additionally, on September 21, 2005, the inspectors provided the results of both this review and the prior activity with Mr. Rutter and other members of the licensee staff. Additionally, the results of the inspectors' review were forwarded to office of Nuclear Reactor Regulation for further review and evaluation.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. M. Gaffney and other members of licensee management on October 6, 2005. The licensee acknowledged the findings presented. 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

Interim exits were conducted for:

- Emergency Preparedness inspection with J. Coleman on April 29, 2005; and
- Radiation safety access and radiological work control with Mr. M. Gaffney on September 23, 2005. On October 12, 2005, the inspectors discussed with Mr. R. Adams the final outcome of the NRC’s review of the radiography incident based on additional information provided by the licensee subsequent to the site inspection.

4OA7 Licensee-Identified Violations

None.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee
M. Gaffney, Site Vice-President
K. Hoops, Site Operations Director
L. Hartz, Engineering Improvement Plan Director
K. Davison, Plant Manager
L. Armstrong, Site Engineering Director
W. Henry, Outage and Scheduling Manager
S. Baker, Radiation Protection Manager
T. Breene, Regulatory Affairs Manager
J. Ruttar, Operations Director
W. Flint, Chemistry Manager
W. Hunt, Maintenance Manager
J. Coleman, Emergency Preparedness Manager
L. Sutton, Design Engineer
T. Webb, Director, Nuclear Station Safety and Licensing
T. Schmidli, Acting Radiation Protection Manager
R. Adams, Radiation Protection Supervisor
W. Lehmbeck, Radiation Protection Supervisor
B. Steckler, Radiation Protection Supervisor

Nuclear Regulatory Commission
T. Kozak, Team Leader - TSS

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000315/2005012-01 | NCV | Failure to Report in a Timely Manner an Unanalyzed Condition Involving a Potential Runout Concern With the CCW Pumps (Section 1R14) |
| 05000315/2005012-02 | NCV | Failure to Post and Control Access Into a Locked High Radiation Area During Radiographic Activities (Section 2OS1.5) |
| 05000315/2005012-03 | NCV | Failure to Control Access Into a High Radiation Area During Radiographic Activities (Section 2OS1.5) |
| 05000305/2005012-04 | NCV | Failure to Control Access Into a High Radiation Area While Moving a Radioactive Filter (Section 2OS1.7) |
| 05000315/2005012-05 | NCV | Failure to Post a High Radiation Area While Moving a Radioactive Filter (Section 2OS1.7). |

Closed

| | | |
|---|---|---|
| 05000315/2005012-01 | NCV | Failure to Report in a Timely Manner an Unanalyzed Condition Involving a Potential Runout Concern With the CCW Pumps (Section 1R14) |
| 05000315/2005012-02 | NCV | Failure to Post and Control Access Into a Locked High Radiation Area During Radiographic Activities (Section 2OS1.5) |
| 05000315/2005012-03 | NCV | Failure to Control Access Into a High Radiation Area During Radiographic Activities (Section 2OS1.5) |
| 05000305/2005012-04 | NCV | Failure to Control Access Into a High Radiation Area While Moving a Radioactive Filter (Section 2OS1.7). |
| 05000315/2005012-05 | NCV | Failure to Post a High Radiation Area While Moving a Radioactive Filter (Section 2OS1.7) |
| 05000315/2005-007-00 | LER | Unanalyzed Condition: Design Deficiency - Component Cooling Water System Inoperable Due to Run Out Conditions (Section 1R14) |
| 05000305/2005-001-00 & -01 | LER | Reactor Thermal Power Eight-Hour Average Limit Exceeded (Section 4OA3.1) |

| | | |
|---|---|---|
| 05000305/2005-002-00 | LER | Auxiliary Feedwater Pumps Assumed to Fail from Postulated Loss of Primary Water Source - Safe Shutdown and Accident Analysis Assumptions not Assured - Inadequate Design of Pump Protective Equipment (Section 4OA3.2) |
| 05000305/2005-003-01 | LER | Inadvertent Reactor Protection Trip While Shutdown - Caused by Procedure Adherence Deficiencies and Inadequate Shift Management Oversight (Section 4OA3.3) |
| 05000305/2005-005-01 | LER | Emergency Diesel Ductwork Not Adequately Protected from Potential Tornado Winds and Missiles (Section 4OA3.4) |
| 05000305/2005-006-00 | LER | Auxiliary Feedwater Pumps Postulated to Fail Due to Air Ingestion Through Pump Packing (Section 4OA3.5) |
| 05000305/2005-008-00 | LER | Turbine Driven AFW Pump Inoperable Due to Insufficient Net Positive Suction Head (Section 4OA3.6) |
| 05000305/2004005-01 | URI | Actions to Address Electrical Coordination Concerns of 15 Appendix R Associated Circuits (Section 4OA5.1) |
| 05000305/2004005-02 | URI | Coordination Concerns With EDG 1A Fuses and Translation of Calculation Results Into the Safe Shutdown Procedure (Section 4OA5.2) |
| 05000305/2004009-04 | URI | Discrepancies With American Society of Mechanical Engineers (ASME) Code Governing the Attachment of Reactor Vessel Closure Head (RVCH) Nozzles With Partial Penetration Welds (Section 4OA5.3) |

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 or 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 reports.

1R01 Adverse Weather

E-0-05; Response to Natural Events; Revision P

1R02 Evaluations of Changes, Tests, or Experiments

Evaluation 03-05-00; Provide a Continuous Minimum (Recirculation) Flow Path for CC Pump 1A & 1B; Revision 0

Evaluation 04-01-002; Replace SI Pump Lube Oil Coolers; Revision 002

Evaluation 05-13-00; Use of TORMIS for Evaluating Tornado Missile Impact on EDG Components; Revision 0

SCRN 04-012-02; Replace SI Pump Lube Oil Coolers; Revision 02

1R04 Equipment Alignment

N-SI-33-CL; Safety Injection System Prestartup Checklist; Revision AH

DCR 3451; SI Pump Motor Overcurrent Relay Reset; June 2, 1998

N-FW-05A-CL; Feedwater System Prestartup Checklist; Revision Z

N-FP-08-CL; Fire Protection System Checklist; Revision AL

N-FW-05B-CL; Auxiliary Feedwater System Prestartup Checklist; Revision AL

N-DGM-10-CLB; Diesel Generator B Prestartup Checklist; Revision M

N-EHV-39; 4160V AC Supply and Distribution System Operation; Revision P

N-ELV-40; 480V AC Supply and Distribution System; Revision Q

CAP027920; Dry Boric Acid Accumulation on Three SI Valves; June 10, 2005

CAP028387; NAO Reports that SI-9B has a Packing Leak; July 14, 2005

CAP028701; Boric Acid Leak on Swagelok Connection Near Flow XMTR 23054 for A SI Pump; August 4, 2005 (NRC-identified issue)

CAP028004; Diesel Generator A Output Breaker Failed to Close; June 16, 2005

CAP02840; Diesel Generator A Output Cycling During SP-42-312A; July 21, 2005

1R05 Fire Protection

PFP-2; Protected Area Plant Layout; Revision B

PFP-4; Screen House; Revision B

1R06 Flood Protection Measures

OPR 120; Operability Evaluation for Seiche Hump Height Determinations

1R11 Licensed Operator Requalification Program

LRC-05-SEW403; SGTR with Loss of Reactor Coolant - Saturated Recovery Desired - ECA 3.2; Revision A

1R12 Maintenance Effectiveness

Maintenance Rule System Basis; Revision 8

SSC Performance Criteria Sheet TGS Turbine Generator ; Revision 0

Substation Inspection Report; August 12, 2005

OE 10777; High Temperature on Main Transformer Connection; March 9, 2000

OE 10993; 525/13.8 kV Start-up Transformer High Acetylene Concentration; May 16, 2000

OE 13532; Main Transformer High Combustible Gas Generation; April 5, 2002

OE 13564; Sampling for Moisture Content on Transformer Oil; April 15, 2002

OE 14036; Main Power Transformer Insulating Oil Low Dielectric Value; June 20, 2002

GNP-08.20.04; Maintenance Rule MRFF and MPFF Evaluations; Revision E

Station and Instrument Air Maintenance Rule Data Binder

Instrument Air Compressors Availability Data

Maintenance Rule System Basis; Revision 10

Maintenance Rule Scoping Questions; Revision 1

SSC Performance Criteria Sheet; Revision 2

Station Instrument Air System Failure Tracking Record

CAP 28804; Main Transformer Phase A, DGA Shows Elevated Levels Exceeding NEIL Limits; August 11, 2005

Apparent Cause Evaluation ACE003060; Main Transformer Phase A, DGA Shows Elevated Levels Exceeding NEIL Limits; August 15, 2005

CAP026892; Two Hose Failures While In Use For Echolochem; April 18, 2005

CAP028434; Fire Pump 1A Auto Started Following Maintenance on Jockey Pump; July 18, 2005

Maintenance Rule Evaluation MRE2459; Perform an MRE on WR 04-2802 - Fire Pump A Would Not Start From Control Room; October 9, 2004

MRE2474; Perform an MRE on WR 04-2841 - LD-2 Did Not Close; October 17, 2004

MRE2685; Perform an MRE on WR 05-2169 - Fire Pump B Auto Started Unexpectedly; June 28, 2005

MRE2698; Perform an MRE on WR 05-2369 - Air Compressor G Tripped on High HP Outlet Temp; July 21, 2005

MRE2613; Perform an MRE on WR 05-1273 - Broken 3/8" Tubing Line in Air Compressor G; April 18, 2005

MRE2561; Air Compressor G Tripped; January 10, 2005

MRE2447; Perform MRE on WR 04-2681 - Air Compressor G HP Air Out High Trip; September 30, 2004

MRE2388; Perform MRE on CWO 04-7056 - SW0402B; June 28, 2004

MRE2360; Perform MRE on CWR 04-1441 - 1A Compressor 1C; May 12, 2004

MRE2242; Perform an MRE on WR 04-42; January 6, 2004

MRE2232; Perform an MRE on WR 03-3960; December 30, 2003

MRE2156; Air Leak on Head Cover for A/C C; October 23, 2003

MRE2154; IA Comp C Cooling Water Backup Regulator Controlling Low; October 21, 2003

MRE2132; Station Air Compressor F Tripped on HP Air Outlet Temperature Hi; September 9, 2003

MRE2101; Air Leak on Line Between SV-33347 and SA-150B; August 15, 2003

MRE2113; Status of “F” Air Compressor; August 20, 2003

MRE2002; Air Compressor A Cylinder Water Temp; May 29, 2003

MRE1922; Train B SI Signal to Instrument Air Compressor A not Reset; May 2, 2003

1R13 Maintenance Risk Assessments and Emergent Work Control

GNP-03.01.03-1; Infrequently Performed Tests and Evolution Checklist for WO 05-8396; Revision R

Kewaunee Plant Configuration Changes and Relative Core Damage Frequency - Period July 1-September 30, 2005

Daily Safety Monitor Risk Look Ahead-period July 1- Sept. 30, 2005

GNP-08.21.01; Risk Assessment for Plant Configuration; Revision H

FP-PE-PRA-02; PRA Guideline for Model Maintenance and Update; Revision 1

ASME RA-S-02002; Standard For Probabilistic Risk Assessment for Nuclear Power Plant Applications

FP-E-TS-01; Troubleshooting Process; Revision 0

Procurement Technical Evaluation - Cover Sheet; Fisher Controls 67 Series Filter Regulators; September 8, 2005

Kewaunee Nuclear Power Plant Asset Information Report; September 3, 2005

Action Plans; PS-1B, Pressurizer Spray Valve B, Drifted Open. Operating Crew had to Take Manual Control of PS-1B

CAP028784; Steam Generator B Level Decrease; August 11, 2005

CAP003326; PS1A Has Signal to Open When Pressure is Below Setpoint; August 30, 1998

Work Order WO 05-008396-000; Controller - S/G Level Controller Loop B Mode Controller

WO 05-009560-000; Transducer-Przr Spray From Cold Leg Loop

1R14 Personnel Performance During Non-Routine Plant Evolutions and Events

GNP-03.01.03-1; Infrequently Performed Tests and Evolution Checklist for WO 05-8396; Revision R

A-FW-05A; Abnormal Feedwater System Operation; Revision S

American Transmission Company Switching Procedure for Scheduled Interruption; Outage Number 107958 RI; September 16, 2005

Operational Decision Making for B PRZR Spray Line Data

Action Plans; PS-1B, Pressurizer Spray Valve B, Drifted Open. Operating Crew had to Take Manual Control of PS-1B

FP-E-TS-01; Troubleshooting Process; Revision 0

Corrective Repair Procedure 36-009560; RC-Pressurizer Spray From Cold Leg Loop B Signal Converter-35014 Troubleshooting; Revision A

CAP028784; S/G B Level Decrease

CAP029235; 3450 Oil Covered Breaker (OCB) A Phase Concerns Identified; September 15, 2005

CAP029105; Pressurizer Pressure Transient; September 2, 2005

LER 2005-007-00; Component Cooling Water Pump Runout Issue from 1.23.2002

CAP026528; Past Reportability Identified by NRC Resident; March 28, 2005

Corrective Action CA018975; LER 2005-07 - Component Cooling Water Pump Runout Issue from 1.23.2002; March 31, 2005

ACE002936; Past Reportability Identified by NRC Resident; March 31, 2005

CAP000074; CCW Pump Performance; January 23, 2002

Condition Evaluation CE000061; Assume CCW Lineup to Both RHR Heat Exchangers and Loss of Power to One Train and the Associated Train's Valve not Closing Potential for Runout and CCW Pump Damage; January 23, 2002

TCR 02-01; Install Mechanical Stop on Valve CV-31100/CC-302, Let Down Heat Exchanger Flow Control Valve; January 25, 2002

DCR 9807; CC-302/CV-31100 Valve Travel Limiter; December 20, 2002

Calculation C11359; Component Cooling Flow Evaluation of 02-1932; January 28, 2002

1R15 Operability Evaluations

CAP028649; Problems Identified with Pipe Supports SW-H653 and SW-H657; August 1, 2005

CAP028953; Eight Foot Scaffold Pole Dropped into Circ Water Intake Forebay; August 24, 2005

CAP028474; Potable Water Line Discovered Over Safety Related MCC; July 20, 2005

CAP028481; NRC Questions on HS-2203A and CAP28457; July 20, 2005

CAP028457; HS-2203A Three Way Mixing Valve for Train 'A' CRAC Not Operating; July 19, 2005

CAP029078; Penetration 178 - Improper Closure on Cable Spreading Room Side; September 1, 2005

CAP020027; Control Room Emergency Zone (CREZ) Potential Design and Analysis Weaknesses; February 14, 2004

1R19 Post-Maintenance Testing

05A-008396; Steam Generator 1B Main Flow Control Valve Level Controller and Deviation Alarm Test; Revision A

SP-18-043; Containment Pressure Instrument Channel Test; Revision X

SP-47-316H; Channel 4 (Yellow) Reactor Protection Logic Test; Revision A

Action Request Form; Control Room Air Conditioning (CRAC) Temperature Documentation; July 26, 2005

Tracking and Processing Record; CRAC 1A Cooling Water Temp Control Calcs; July 13, 2005

Preventative Work Order; Pump-Charging Pump 1B; Lube Bearings; July 12, 2005

Preventative Work Order; Pump-Charging Pump 1B; Sample/Change Oil X-8; July 12, 2005

Preventative Work Order; Pump-Charging Pump 1B; Lube Shaft 10 Hand Pump G-19; July 12, 2005

Preventative Work Order; Pump-Charging Pump 1B; Check Pressure/Recharge Dampeners; July 12, 2005

PMP-35-09; CVC-QA-1 Charging Pump Pulsation Dampener Maintenance; Rev. Q; August 1, 2002

Preventative Work Order; Pump-Charging Pump 1B; Vibration Monitoring; July 12, 2005

Machine 1B Charging Pump Measurement Report; July 13, 2005

RT-DGM-10-TSC; Technical Support Center Diesel Generator; Revision AB

RT-DGM-10-TSC Pre-Job Brief Planning Checklist-TSC Two Hour Run; July 21, 2005

RT-DGM-10-TSC Post-Job Critique; August 30, 2005

TSC Diesel Generator Operation Log; August 30, 2005

CAP028784; S/G B Level Decrease

CAP028481; NRC Questions on HS-2203A and CAP28457 (NRC Identified)

WO 05-008205-000; Annunciator 47062-K Containment Pressure Header Isolation Channel Alert Was Received at 0142 and 0155 on 7-22-05

1R20 Outage Activities

N-CRD-49B; Reactor Startup; Revision AH; July 1, 2005

CAP028243; Reactor Start-up Aborted; July 1, 2005

1R22 Surveillance Testing

Calculation C10854-3; Hi-Hi Steam Flow; Revision 1

SP-18-043; Containment Pressure Instrument Channel Test; Revision X

SP-54-058; Turbine First Stage Pressure Instruments Channel Test; Revision S

SP-42-312A; Diesel Generator A Availability Test; Revision V

SP-49-075; Control Rod Exercise; Revision Y

SP-45-049.11; RMS Channel R-11 Containment Particulate Radiation Monitor Quarterly Functional Test; Revision S

50.59 Applicability Review of SP 45-049.11; Clarification of Tech Specs; July 11, 2005
Tracking and Processing Record of SP 45-049.11; July 11, 2005

SP-45-049.12; RMS Channel R-12 Containment Gas Radiation Monitor Quarterly Functional Test; Revision W

50.59 Applicability Review of SP 45-049.12; Clarification of Tech Specs; July 11, 2005
Tracking and Processing Record of SP 45-049.12; July 11, 2005

CAP028602; ICS-202 Problems Found During AOV Testing WO 04-8306; July 28, 2005

OPR000116; ICS-202 Problems Found During AOV Testing WO 04-8306; July 28, 2005

CAP028438; Red Channel Hi/Hi S.A.L. Bistable Found Out of Tolerance During SP-47-316A; July 18, 2005

CAP028435; Out of Spec Condition on Power Above Permissive P10 Reset; July 18, 2005

WO 05-008402-000; Bistable PC-946B, (Containment Pressure High Containment Spray Locid Loop 946), Was Found out of Tolerance High at 242.20

1R23 Temporary Plant Modifications

SOP-AS-01-7; Operation of Temporary Air Compressor; Revision A; July 25, 2005

Powell Valves Catalog No. 2000

Drawing 17266; Wm Powell Co.; 1/4" to 3" - 200 lb., Horizontal Swing Check Valves; February 7, 1966

Temporary Modification 05-07; “Stand-by” Temporary Air Compressor; July 21, 2005

CAP028954; Vertical Check Valve Installation; August 24, 2005

1EP4 Emergency Action Level and Emergency Plan Changes

Kewaunee Nuclear Power Plant Emergency Plan; Revision 27

Description of Changes and Effectiveness Evaluation - Revision 27 of Emergency Plan

EPIP-AD-02; Emergency Class Determination; Revision AK

1EP6 Drill Evaluation

EPIPF-CR-01-03; Control Room Notifier Checklist; Revision A

EPIPF-CR-01-01; Emergency Director (CR) Checklist; Revision A

EPIPF-TSC-01-11; Off-Site Communicator - (TSC) Checklist; Revision A

EPIPF-EOF-04-13; Off-Site Communicator - (EOF) Checklist; Revision A

EPIPF-AD-07-05; Initial State and County Notification (EOC Not Activated); Revision A

EPIPF-TSC-01-12; NRC Communicator - (TSC) Checklist; Revision A

CAP029320; Potential EPIP-TSC-09A Revision; September 21, 2005

CAP029332; 2005 Pre-Exercise Identified Issue; September 22, 2005

CAP029280; Both Component Cooling Pumps Inoperable When Shifting Running Equipment; September 18, 2005

2OS1 Access Control to Radiologically Significant Areas

EPIP - AD - 11; Emergency Radiation Controls; Revision U

GNP - 01.23.03; Non-Essential Personnel Participating in Significant Exposure Events; Revision C

HP - 01.004; Radiologically Controlled Area Entry and Exit; Revision R

HP - 01.016; Radiation Work Permit - Preparation, Issuance and Termination; Revision J

HP - 01.019; Radiological Postings, Boundaries and Barricades; Revision G

HP- 01.021; Issuance and Control of Locked High Radiation Area Keys; Revision D

HP - 03.008; Evaluation of Inhalations or Injections; Revision C

HP - 03.009; Calculating Internal Dose from Whole Body Counter Results; Revision E

HP - 03.011; Special Dosimetry Issuance; Revision G

HP - 04.001; ALARA Plan; Revision H

HP - 05.010; Control of Radiography; Revision H; Revision J

HP - 05.011; Radiological Precautions for Diving Operations; Revision C

HP - 06.025; Instrument Operating Procedure - BD-PND Neutron Bubble Dosimeter; Revision B

HPF - 103; Personnel Contamination Data Sheet; Revision D

HPF - 113; Auxiliary Building Weekly Radiation Survey; Revision G

HPF - 124; Survey Instrument Training Plan for Non-Health Physics Personnel; Revision B

HPF - 215; Very High Radiation Area Entry Checklist; Revision A

NAD - 01.11; Dosimetry and Personnel Monitoring; Revision L

NAD - 01.23; ALARA Program; Revision G

NAD - 08.03; Radiation Work Permit; Revision J

N - CCI - 56; Containment Access; Revision N

NGA01F001H; Plant Access Training; Revision 4

NGA02F001H; Radiation Worker (Training); Revision 3

RF-03.01; Fuel Movement During a Refueling Outage; Revision J

Weekly RP Walkdown Checklist (Various Dates)

CAP025213; Operators Inside radiography Boundary while Radiography Source Exposed; dated 01/28/2005

CAP026075; Radiography Corrective Actions from RCE 01-048 Ineffective; dated 03/09/2005

CAP029340; Inadequate Documentation Prepared for PI; Dated 09/23/2005

CAP029345; NRC Inspectors Commented that RCE 675 was not Adequate; dated 09/23/2005

RCE000689; High Radiation Area Not Controlled During Transfer of Filter; (CAP027932)

4OA1 Performance Indicator Verification

RCE000675; Personnel Inside Radiography Boundary While Radiography Source Was Exposed; dated January 27, 2005 (CAP025213)

4OA3 Event Follow-up

CAP026497; AFW Pump Operating Below Atmospheric Pressure. Suction Pressure May Cause Loss of Prime or Damage; March 26, 2005

CAP025600; Event Notification Required for Low Low Water Level B Steam Generator; February 20, 2005

CAP026448; Emergency Diesel Generator Exhaust Duct Operability Concern; March 24, 2005

4AO5 Other Activities

Calculation Note No. CN-RCDA-03-119; NMC Kewaunee Replacement Reactor Vessel Closure Head, ANSYS Thermal and Structural Analyses of CRDM Head Adapters; Revision 1

Westinghouse Letter WPS-05-25; Subject: Westinghouse Position Paper on Questions Related to Permissible Types of Welded Joints (NB-3352); April 21, 2005

Westinghouse Internal Letter LTR-RCUMP-05-27; Subject: Westinghouse Position Paper on Questions Related to Permissible Types of Welded Joints (NB-3352); April 12, 2005

ASME Code Inquiry NI04-007; Subject: ASME Section III, Division 1, NB-3352.4(d) Design of Nozzles Using Partial Penetration Welds; December 29, 2004

ASME Code Inquiry BC05-416; Subject: ASME Section III NB/NC/NE/NH-3352; April 7, 2005

## LIST OF ACRONYMS USED

| | |
|---|---|
| AC | Alternating Current |
| AFW | Auxiliary Feedwater |
| ALARA | As-Low-As-Reasonably-Achievable |
| ASME | American Society of Mechanical Engineers |
| B&PVC | Boiler and Pressure Vessel Code |
| CAP | Corrective Action Program |
| CCW | Component Cooling Water |
| CFR | Code of Federal Regulations |
| CRDM | Control Rod Drive Mechanism |
| DRP | Division of Reactor Projects |
| EDG | Emergency Diesel Generator |
| EPIP | Emergency Plan Implementing Procedure |
| HRA | High Radiation Area |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| IR | Inspection Report |
| KPS | Kewaunee Power Station |
| LER | Licensee Event Report |
| LHRA | Locked High Radiation Area |
| mrem | millirem |
| NCV | Non-Cited Violation |
| NEI | Nuclear Energy Institute |
| NMC | Nuclear Management Company |
| NRC | U.S. Nuclear Regulatory Commission |
| OPR | Operability Evaluation |
| PARS | Publicly Available Records |
| PI | Performance Indicator |
| RA | Risk Assessment |
| Radwaste | Radioactive Waste |
| RAM | Radioactive Material |
| RCE | Root Cause Evaluation |
| RHR | Residual Heat Removal |
| RP | Radiation Protection |
| RVCH | Reactor Vessel Closure Head |
| RRVCH | Replacement Reactor Vessel Closure Head |
| RWP | Radiation Work Permit |
| SDP | Significance Determination Process |
| SP | Surveillance Procedure |
| $t_n$ | Thickness of the Nozzle |
| TS | Technical Specification |
| URI | Unresolved Item |
| VHRA | Very High Radiation Area |
| WO | Work Order |