UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

August 5, 2010

Mr. Mark Bezilla
Site Vice President
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
P. O. Box 97, 10 Center Road, A-PY-A290
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT NRC INTEGRATED INSPECTION REPORT 05000440/2010003

Dear Mr. Bezilla:

On June 30, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Perry Nuclear Power Plant. The enclosed report documents the inspection findings which were discussed on July 14, 2010, with you and 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, one NRC-identified finding and four self-revealed findings of very low safety significance (Green) were identified. All of the findings were determined to involve violations of NRC requirements. Additionally, one licensee-identified violation, which was determined to be of very low safety significance, is listed in Section 4OA7 of this report. However, because of the findings' very low safety significance and because they are entered into your corrective action program, the NRC is treating the findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy.

If you contest the subject or severity of any NCV, 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 Perry Nuclear Power Plant. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the Perry Nuclear Power Plant

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), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Jamnes L. Cameron, Chief
Branch 6
Division of Reactor Projects

Docket No. 50-440
License No. NPF-58

Enclosure: Inspection Report 05000440/2010003
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-440
License No:	NPF-58
Report No:	050000440/2010003
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Perry Nuclear Power Plant, Unit 1
Location:	Perry, Ohio
Dates:	April 1, 2010, through June 30, 2010
Inspectors:	M. Marshfield, Senior Resident Inspector T. Hartman, Resident Inspector R. Baker, Resident Inspector, Duane Arnold Energy Center F. Ramirez, Project Engineer W. Slawinski, Senior Health Physicist T. Bilik, Senior Reactor Engineer J. Bozga, Reactor Inspector M. Phalen, Health Physicist N. Feliz Adorno, Reactor Engineer R. Winter, Reactor Engineer
Observer:	V. Myers, Nuclear Safety Professional Development Program
Approved by:	Jamnes L. Cameron, Chief Branch 6 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000440/2010003; 04/01/2010 – 06/30/2010; Radiological Hazard Assessment and Exposure Controls; Occupational ALARA Planning and Controls; In-Plant Airborne Radioactivity Control and Mitigation.

The inspection was conducted by resident and regional inspectors. The report covers a 3-month period of resident inspection. Five Green findings, all of which were non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609 “Significance Determination Process” (SDP); the cross-cutting aspects were determined using IMC 0310, "Components Within The Cross-Cutting Areas." 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 4, dated December 2006.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Occupational Radiation Safety

Green. A finding of very low safety significance and an associated NCV of Technical Specification 5.7.1 was self-revealed following worker entry into the fuel pool cooling and cleanup (FPCC) heat exchanger room. At the time, the FPCC heat exchanger room was being controlled as a locked high radiation area (HRA). The licensee failed to adequately determine radiological dose rates in the room to ensure workers were briefed accurately on the radiological conditions prior to entry. On March 12, 2010, workers involved in tag-out activities in the room encountered greater than expected dose rates. After completion of the tag-out activity, the licensee identified that the electronic dosimeter (ED) worn by one of the workers had a dose rate of 550 mrem/hour and had alarmed. The workers were briefed to expect dose rates no greater than 150 mrem/hour based on the radiation survey used to support the briefing. The radiological information conveyed to the workers through a briefing by the radiation protection (RP) staff was inadequate because it was based on an incomplete survey. As part of the licensee’s corrective actions, lessons learned were shared with the RP staff to address survey adequacy and for enhanced communications with workers during pre-job briefings.

The inspectors identified Example 6(h) of IMC 0612, Appendix E, as similar to the performance issue. The workers were not made aware of the radiological conditions before entry into the room. Therefore, as provided in Example 6(h), the inspectors determined that the performance deficiency was more than minor. Additionally, the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that, worker entry into areas without knowledge of the radiological conditions placed them at increased risk for unnecessary radiation exposure. The finding was determined to be of very low safety significance because the problem was not an as-low-as-reasonably-achievable (ALARA) planning issue, there was no overexposure, nor substantial potential for an overexposure, and the licensee’s ability to assess dose was not compromised. The inspectors determined that the cause of this issue involved the cross-cutting component of work control in the human performance cross-cutting area (H.3.(a)), in that work activities were not adequately planned by incorporating job site

radiological conditions. Specifically, the pre-job briefing did not utilize complete and accurate survey maps for the areas being entered into by the workers assigned to conduct tasks in the FPCC heat exchanger room. (Section 2RS1.2)

Green. A finding of very low safety significance and an associated NCV of Technical Specification 5.7.1 was self-revealed after workers entered into high radiation areas (HRAs) on March 28, 2010. On two occasions, workers entered HRAs without knowledge of the radiological (dose rate) conditions of the areas entered. As a result, the EDs worn by the workers alarmed on high dose rate. The involved individuals were authorized to work in specified locations within the HRAs and were informed of the radiological conditions by the radiation protection (RP) staff for those specific areas. However, the workers took actions inconsistent with the briefings because they moved to other locations without authorization from RP and without knowledge of the radiological conditions of the area they entered. The individuals were briefed to expect dose rates of approximately 100 mrem/hour but traversed into other locations within the HRA with dose rates three to six times greater than those briefed. As corrective actions, the licensee is developing a means to improve its pre-job briefings and contemplating other approaches to ensure workers do not work beyond the scope of the pre-job brief.

The inspectors identified Example 6(h) of IMC 0612, Appendix E, as similar to the performance issue. In both instances the workers took unauthorized actions and entered into other HRAs unaware of the elevated radiological conditions in those areas. Therefore, as provided in Example 6(h), the inspectors determined that the performance deficiency was more than minor. Additionally, the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that, worker entry into areas without knowledge of the radiological conditions placed them at increased risk for unnecessary radiation exposure. The finding was determined to be of very low safety significance because the problem was not an ALARA planning issue, there were no overexposures, nor substantial potential for overexposures, and the licensee's ability to assess dose was not compromised. The inspectors determined that the cause of the examples each involved the cross-cutting component of work practices in the human performance cross-cutting area (H.4.(b)). Specifically, personnel work practices did not support human performance because the licensee did not effectively communicate expectations regarding procedural compliance and personnel failed to follow procedures. (Section 2RS1.3)

Green. The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR 20.1101.b for inadequate ALARA planning and radiological controls. The inspectors determined that as a result of these inadequacies, the licensee's ALARA program did not prevent unplanned, unintended dose for several work activities during refueling outage 12 (RFO-12). As a result, the licensee failed to achieve occupational radiation exposures that were ALARA. The issue was entered into the licensee's CAP as CR 09-59216, and corrective actions were implemented to address the outage planning and work execution issues.

The inspectors identified Example 6(i) of IMC 0612, Appendix E, as similar to the performance issue. Therefore, as provided in Example 6(i), the inspectors determined that the performance deficiency was more than minor. Additionally, the performance

deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that worker exposures were not maintained ALARA. The inspectors concluded that the finding did not result in overexposures, a substantial potential for overexposures, or a compromised ability to assess dose. The inspectors determined that the finding involved ALARA planning and work controls. Since the licensee's 3-year rolling collective dose average was less than 240 person-rem per unit at the time the performance deficiency occurred, the inspectors determined that the SDP assessment for this finding was of very low safety significance. The inspectors concluded that the finding was associated with the cross-cutting component of work control in the human performance cross-cutting area (H.3.(a)), in that the licensee did not appropriately plan work activities by incorporating radiological safety. (Section 2RS2.2)

Green. A finding of very low safety significance and an associated NCV of 10 CFR 20.1501 was self-revealed during an activity associated with the installation of a contamination control cover element (i.e., the parachute) over the drywell head. The inspectors concluded that the licensee failed to perform an evaluation to determine the need for process or other engineering controls as required by 10 CFR 20.1701 and 20.1702. On February 24, 2009, 15 individuals working on the refuel floor were contaminated and several received small intakes of radioactive material during installation of the cover. Low levels of airborne radioactivity were created and contamination was spread over large areas of the refuel floor. The individuals involved in the work activity were not provided with instruction for the installation and were unfamiliar with the task. Also, neither an ALARA Plan nor radiation work permit (RWP) specified if or how the drywell head was to be covered because the work package lacked sufficient detail. As corrective actions, the licensee removed the parachute cover and applied a fixative to the drywell head to minimize further spread of contamination. An experienced supervisor was assigned to the refuel floor to better oversee work activities.

The inspectors did not identify any examples in IMC 0612, Appendix E, similar to the performance issue. However, the inspectors determined that the finding was more than minor because it impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to evaluate the methods used to install the parachute cover and use engineering controls resulted in personal contaminations and intakes to several workers. The finding was determined to be of very low safety significance because it was not an ALARA planning issue, there was no overexposure nor substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised. The work package was incomplete and failed to prescribe if and how the cover was to be installed over the drywell head to ensure a successful outcome. Consequently, the cause of the problem involved the cross-cutting component of resources in the human performance cross-cutting area (H.2.(c)), in that the licensee did not ensure that personnel, equipment and procedures, including the work package, were available and adequate. (Section 2RS3.1).

Green. A finding of very low safety significance and an associated NCV of Technical Specification 5.4.1 was self-revealed during reactor cavity drain down. On March 14, 2009, an airborne radioactivity condition (about 3.3 DAC (derived air concentration)) was generated on the refuel floor when the cavity water level was

lowered to support decontamination activities. The inspectors concluded that the licensee failed to effectively implement intended radiological engineering controls in accordance with the ALARA Plan, which caused the event. Due to a communication problem, cavity drain-down commenced before the decontamination crew already positioned on the refuel floor was ready to support the activity. Moreover, the drain-down proceeded at a rate faster than expected by the work crew. The work plan called for the cavity walls to be misted with water as the drain-down took place. Five workers had small (low dose) unplanned intakes. Corrective actions focused on the communications problem and better controlling the rate of drain-down through a procedural modification.

The inspectors did not identify any examples in IMC 0612, Appendix E, similar to the performance issue. However, the inspectors determined that the finding was more than minor because it impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to effectively implement intended engineering controls during cavity drain-down caused several unplanned worker intakes and placed workers at increased radiological risk. The finding was determined to be of very low safety significance because it was not an ALARA planning issue, there was no overexposure nor substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised. The cause of the problem involved the cross-cutting component of work control in the human performance cross-cutting area (H.3.(b)), in that the licensee did not appropriately coordinate work activities by incorporating actions to address the need for work groups to communicate and coordinate with each other during activities in which interdepartmental coordination was necessary to assure human performance. (Section 2RS3.2)

B. Licensee-Identified Violations

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

REPORT DETAILS

Summary of Plant Status

The plant began the inspection period at 100 percent power. On May 11, 2010, a manual SCRAM was initiated by the operators after a loss of both control rod drive (CRD) pumps in accordance with Technical Specification (TS) requirements. The cause of the CRD loss was an electrical fault initiated when a card, replaced during a maintenance window for reactor core isolation cooling (RCIC), suffered an early life failure. The reactor was started up on May 17, 2010, and synchronized to the grid on May 19, 2010. Reactor power was returned to 100 percent on May 21, 2010. On June 4, 2010, a power reduction to 58 percent power occurred due to the trip of one recirculation pump. The cause of the recirculation pump loss was due to a failed optical isolator card which de-energized the recirculation pump logic. Reactor power was lowered to 22 percent to support restart of the recirculation pump on June 5, 2010. Reactor power was returned to 100 percent on June 9, 2010, and remained there for the remainder of the inspection period with the exception of planned power reductions for routine surveillance testing and control rod pattern alignments.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

1R01 Adverse Weather Protection (71111.01)

.1 Impending Adverse Weather Conditions

a. Inspection Scope

Because tornado and high wind watches were issued in the vicinity of the facility on May 7, 2010, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. The inspectors evaluated the licensee's preparations against the site's procedures and determined that the actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado or high wind condition. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. The inspectors also reviewed a sample of the corrective action program (CAP) to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment.

This inspection constituted one sample for readiness for impending adverse weather conditions as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

.2 Summer Seasonal Readiness Preparations

a. Inspection Scope

The inspectors performed a review of the licensee's preparations for summer weather for selected systems, including conditions that could lead to an extended drought.

During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. Specific documents reviewed during this inspection are listed in the Attachment. The inspectors also reviewed CAP items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the turbine building closed cooling system.

This inspection constituted one sample for seasonal adverse weather as defined in IP 71111.01-05.

b. Findings

No findings were identified.

.3 Readiness of Offsite and Alternate AC Power Systems

a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- coordination between the TSO and the plant during off-normal or emergency events;
- explanations for the events;
- estimates of when the offsite power system would be returned to a normal state; and
- notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite

alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;
- re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed CAP items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

This inspection constituted one sample for readiness of offsite and alternate AC power systems as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04Q)

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- RCIC with high pressure core spray inoperable for maintenance on April 23, 2010;
- control room emergency recirculation (CRER) ‘B’ system with ‘A’ CRER inoperable on June 3, 2010; and
- emergency diesel generator (EDG), Division 1, with the Division 2 EDG starting air compressors inoperable on June 10, 2010.

The inspectors selected these systems based on their risk-significance relative to the Reactor Safety Cornerstone at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, UFSAR, TS requirements, outstanding work orders (WOs), condition reports (CRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were

aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These inspections constituted three partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05AQ)

.1 Quarterly Fire Protection Inspection

Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Fire Zone 0CC-1; Control Complex 574';
- Fire Zones 1CC-5A & 2CC-5A; Unit 1 & 2 Control Rooms;
- Fire Zone 0IB-2; Intermediate Building 599';
- Fire Zone 0FH-3; Fuel Handling Building 620'; and
- Fire Zone 0IB-5; Intermediate Building 682'.

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 implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. 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 with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment, the inspectors verified the following:

- fire hoses and extinguishers were in their designated locations and available for immediate use;
- fire detectors and sprinklers were unobstructed;
- transient material loading was within the analyzed limits; and
- fire doors, dampers, and penetration seals appeared to be in satisfactory condition.

The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These inspections constituted five quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings were identified.

.2 Annual Fire Protection Inspection

Inspection Scope

On June 17, 2010, the inspectors observed a fire brigade activation caused by a simulated fire in a flammable/chemical liquid storage cabinet in the intermediate building. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus;
- proper use and layout of fire hoses;
- employment of appropriate fire fighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment to this report.

These activities constituted one annual fire protection sample as defined in IP 71111.05-05.

b. Findings

No findings were identified.

1R07 Annual Heat Sink Performance (71111.07)

Inspection Scope

The inspectors reviewed the licensee's testing of residual heat removal (RHR) 'B' heat exchangers to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The

inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. The inspectors also verified that test acceptance criteria considered differences between test conditions and design conditions. Documents reviewed for this inspection are listed in the Attachment to this document.

This annual heat sink performance inspection constituted one sample as defined in IP 71111.07-05.

Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope

On May 10, 2010, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- the ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly sample for licensed operator requalification program as defined in IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the standby diesel generator starting air system during the week of June 28, 2010.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components/functions classified as (a)(2) or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These inspections constituted one quarterly sample for maintenance effectiveness as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- control room annunciator problem with complex troubleshooting challenges on April 15 and 16, 2010;
- RCIC scheduled maintenance outage involving several jobs and more than half of the allowed outage time scheduled, the week of May 3, 2010;
- recirculation pump ‘A’ trip problem with troubleshooting, June 4-5, 2010; and
- scheduled maintenance of ‘B’ emergency service water (ESW) on June 8, 2010.

These activities were selected based on their potential risk-significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were

consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

These maintenance risk assessments and emergent work control activities constituted four samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

Inspection Scope

The inspectors reviewed the following issues:

- digital feedwater operations with one power supply out of service;
- operations with the power for CRD pump 'A' automatic bus transfer switch locked on the alternate power supply;
- RCIC suction transfer logic during remote shutdown panel testing;
- lower containment airlock seals with the air supply isolated; and
- single loop operations and recovery plan following recirculation pump 'A' trip.

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and Updated Safety Analysis Report (USAR) to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This operability inspection constituted five samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications - Temporary (71111.18)

Inspection Scope

The inspectors reviewed the temporary modification for the RFBP 'B' discharge check valve clamp during the week of May 24, 2010. The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation

information against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system(s). The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance. Documents reviewed in the course of this inspection are listed in the Attachment to this report.

This inspection constituted one sample of a temporary modification as defined in IP 71111.18-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following post-maintenance (PM) activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- main control room annunciator optical isolation card replacement during the week of April 12, 2010;
- hydraulic control unit (HCU) 06-15 accumulator replacement during the week of April 19, 2010;
- RCIC planned outage PM after forced outage heat-up on May 18, 2010;
- recirculation pump breaker optical isolation card replacement during the week of May 31, 2010;
- recirculation pump 'A' optical isolation card replacement during the week of June 7, 2010; and
- drywell high pressure channel D functional card replacement during week of June 14, 2010.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable):

- the effect of testing on the plant had been adequately addressed;
- testing was adequate for the maintenance performed;
- acceptance criteria were clear and demonstrated operational readiness;
- test instrumentation was appropriate;
- tests were performed as written in accordance with properly reviewed and approved procedures;

- equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and
- test documentation was properly evaluated.

The inspectors evaluated the activities against TS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with PM tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted six post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

Inspection Scope

The inspectors evaluated outage activities for a forced outage that began on May 11, 2010, and continued through May 19, 2010. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule.

The inspectors observed or reviewed the reactor shutdown and cooldown, outage equipment configuration and risk management, electrical lineups, selected clearances, control and monitoring of decay heat removal, control of containment activities, startup and heatup activities, and identification and resolution of problems associated with the outage. The outage was caused when a trip card installed in the RCIC circuitry during planned maintenance failed, causing a 10 amp fuse to blow and resulting in an invalid loss-of-coolant accident (LOCA) signal on Division 2 of emergency core cooling. The subsequent effects of the LOCA isolations and load shedding caused a loss of all CRD pumps, partially due to a previously identified material problem with CRD pump power supplies, and ultimately leading to a manual SCRAM of the reactor by the operators in compliance with TS for the plant.

This inspection constituted one outage sample as defined in IP 71111.20-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- Emergency core cooling system (ECCS)/low pressure core injection (LPCI) Pump 'A' start time delay relay functional test and calibration on April 5, 2010 (routine);
- main turbine and bypass valve testing on April 10, 2010 (routine);
- 24-month remote shutdown control test for RHR and RCIC on May 6-9, 2010 (routine);
- RHR/RCIC steam line isolation valve calibrations on May 6-7, 2010 (isolation valve);
- standby liquid control pump and valve testing on May 27, 2010 (IST); and
- Division 3 diesel generator start and load on June 16, 2010 (routine).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrate operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges;
- calibration frequencies were in accordance with TS, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy;
- applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability;
- tests were performed in accordance with the test procedures and other applicable procedures;
- jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for in-service testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers Code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;

- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

These inspection activities constituted four routine surveillance testing samples; one in-service testing sample; and one containment isolation valve inspection sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

This inspection constituted a partial sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed licensee performance indicators (PIs) for the Occupational Exposure Cornerstone for follow-up. The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the operational reports to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors reviewed radiological surveys from several selected plant areas that were performed during the spring 2009 refueling outage (RFO-12) and other selected surveys completed more recently. The inspectors determined if the thoroughness and frequency of the surveys was appropriate for the given radiological hazard.

The inspectors selected the following radiologically risk-significant work activities that involved exposure to radiation.

a. various work activities performed on the refuel floor during RFO-12; and
b. various work activities in high and locked HRAs between March 2009 and March 2010.

For these work activities, the inspectors assessed whether the pre-work surveys were appropriate to identify and quantify the radiological hazard and to establish adequate protective measures. The inspectors partially evaluated the radiological survey program to determine if hazards were properly identified, including the following:

a. the potential for airborne radioactive materials, including the potential presence of transuranics and/or other hard-to-detect radioactive materials;
b. the hazards associated with work activities that could suddenly and severely increase radiological conditions and that the licensee has established a means to inform workers of changes that could significantly impact their occupational dose; and
c. severe radiation field dose gradients that can result in non-uniform exposures of the body.

The inspectors discussed work that was performed in potential airborne areas and evaluated whether the air samples were representative of the breathing air zone. The inspectors evaluated whether continuous air monitors were located in areas with low background to minimize false alarms and were representative of actual work areas.

.3 Findings

Introduction: A finding of very low safety significance and an associated NCV of TS 5.7.1 was self-revealed following entry into the FPCC heat exchanger room. The inspectors determined that the licensee failed to determine the radiological conditions in the FPCC heat exchanger room to ensure the workers were accurately briefed on the conditions prior to entry. As a result, workers entered areas with greater than expected dose rates and one worker received a dose rate alarm on the ED used to monitor his dose.

Description: On March 12, 2010, one of two workers involved in valve tag-out activities in the FPCC heat exchanger room, a room posted and controlled as a locked HRA, received an unexpected dose rate alarm on his ED. Prior to entry into the room, the workers were briefed by RP staff on the radiological conditions in the room based on the scope of the job and the specific travel path to be taken to perform the work. A survey dated March 5, 2010, was used for the briefing because RP deemed it adequate for the work to be performed. While other historical radiological survey data was available, it was not used for the worker briefing. An RP technician that allowed entry into the room did not enter the room himself since conditions were not expected to have changed from the March 5, 2010, survey. The maximum dose rate expected for the tag-out activity was 150 mrem/hour based on the March 5, 2010, survey and a detailed discussion of the work activity. The dose rate alarm setpoint for the EDs worn by the workers was established at 502 mrem/hour.

The tag-out activity was completed without incident and both workers exited the room. However, upon logging-out of the radiologically controlled area, one of the workers was alerted that an ED dose rate alarm of 550 mrem/hour occurred, which went unnoticed by the worker while inside the FPCC room. The ED histogram showed that the dose rate

alarm existed for only 3 seconds then cleared. Follow-up surveys by the RP staff identified radiation levels in the room that ranged to 570 mrem/hour but in an area which the workers did not enter. Subsequently, during surveys to support other work, the RP staff discovered dose rates of 600 mrem/hour in the location that was identified on the March 5, 2010, survey to be only 150 mrem/hour. The licensee also discovered that the battery in the ED worn by one of the workers on March 12, 2010, was weak, which impacted the ability to hear the dose rate alarm or feel its vibration. Consequently, the radiological information conveyed to the workers for the March 12, 2010, tag-out activity was inadequate and failed to correctly establish the dose rate conditions for the work activity. As corrective actions, lessons learned were shared with the RP staff to ensure survey adequacy and for enhanced communications with workers during pre-job briefings.

Analysis: The inspectors determined that the issue of concern was a performance deficiency because entry was made into an HRA without adequately establishing the radiological conditions to allow workers to be accurately briefed, as provided in TS. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented. The finding was not subject to traditional enforcement since the incident did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, Examples of Minor Issues, and identified Example 6(h) as similar to the performance issue. Although both individuals were authorized to enter the room to conduct tag-out activities, the workers were not made aware of the correct radiological conditions because the radiation survey used failed to accurately identify those conditions. Therefore, in accordance with IMC 0612 and Example 6(h) of Appendix E, the inspectors determined that the performance deficiency was more than minor. Additionally, the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that, worker entry into HRAs without knowledge of the radiological conditions placed them at increased risk for unnecessary radiation exposure. The finding was assessed using the Occupational Radiation Safety SDP and was determined to be of very low safety significance because the problem was not an ALARA planning issue, there were no overexposures nor substantial potential for overexposures given the highest dose rates present in the room and the scope of work, and the licensee's ability to assess dose was not compromised.

The licensee failed to adequately establish the radiological conditions for the work activity within the HRA and, therefore, workers were not made aware of the actual conditions. The inspectors determined that the cause of this issue involved the cross-cutting component of work control in the human performance cross-cutting area (H.3.(a)). Specifically, work activities were not adequately planned by incorporating job site radiological conditions.

Enforcement: Technical Specification 5.7.1 states, in part, that entry into high and locked HRAs be made after the dose rate levels in the area have been established and personnel are made aware of them. Contrary to the above, on March 12, 2010, workers were allowed to enter HRAs without being aware of the radiological conditions of the areas entered because they were not adequately established for the work activity. Since

the failure to comply with the TS was of very low safety significance and has been entered in the licensee's CAP as CR 10-73255, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy (**NCV 05000440/20010003-01; Failure to Adequately Establish the Radiological Conditions in a Locked High Radiation Area to Allow Workers to be Properly Briefed Prior to Entry**).

.4 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors reviewed the following RWPs used to access HRAs and evaluated the specified work control instructions or control barriers.

- RWP 096018, RFO-12-Reactor Vessel Disassembly/Reassembly Activities;
- RWP 096042, RFO-12-2A RHR Motor Replacement Activities; and
- RWP 096010, RFO-12–Chemical Decontamination Activities.

For these RWPs, the inspectors assessed whether allowable stay times or permissible dose (including from the intake of radioactive material) for radiologically significant work under each RWP were clearly identified. The inspectors evaluated whether ED alarm set-points were in conformance with survey indications and plant policy.

The inspectors reviewed selected occurrences where a worker's ED noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the CAP and dose evaluations were conducted as appropriate.

b. Findings

Introduction: A finding of very low safety significance and an associated NCV of TS 5.7.1 was self-revealed after workers entered into HRAs on March 28, 2010. On two occasions, workers entered HRAs without knowledge of the radiological (dose rates) conditions of the areas entered. As a result, the EDs worn by the workers alarmed on high dose rates. The inspectors identified two examples where the licensee failed to comply with radiological protective measures for work within HRAs.

Description of Example No. 1: On March 28, 2009, an individual working in the 'A' RHR heat exchanger room, a room posted and controlled as a HRA, crossed over from one work platform to another in order to retrieve a flashlight. The individual was authorized to work in the heat exchanger room and was correctly briefed on the radiological conditions of the immediate work area (scaffold platform) by the RP staff. Maximum dose rates on the platform were determined to be 120 mrem/hour. The individual was informed of those conditions and was not to work in other locations beyond that briefed without the consent of the RP staff. The ED worn by the worker was set to alarm at 500 mrem/hour.

During the course of the work activity, the individual moved to an adjacent platform towards a shielded work area of the room without the consent of RP staff, and encountered dose rates of over 700 mrem/hour. The worker was alerted to the higher dose rate conditions through an ED alarm and exited the work area. Subsequent surveys by the RP staff identified dose rates that were accessible to the worker near the

location where the flashlight was retrieved of 900 mrem/hour. The worker entered into an area beyond the scope of the HRA brief and consequently was unaware of the elevated dose rates in that area.

Description of Example No. 2: On March 28, 2009, an individual working in the RHR pump room, a room posted and controlled as a locked HRA, traversed under the grating of the work area to extract bolts from the flange of the motor that was being removed. The individual was authorized to work in the RHR pump room and was briefed by RP staff on the radiological conditions of the work area, which was to be limited to the 574' elevation of the room. Maximum dose rates on the grating platform of the 574' elevation were determined to be about 105 mrem/hour. The individual was informed of those conditions and was not to work in other locations beyond that briefed without the consent of the RP staff. The worker's ED was set to alarm at 275 mrem/hour.

Similar to Incident No.1, during the course of the work activity, the individual traversed below the grating down into the 568' elevation to remove bolts from the motor flange without informing the RP staff. Prior to commencing the work, the RP staff believed that work under the grating was not required because the flange bolts had been previously removed. Therefore, the RP technician covering the work only surveyed the 574' elevation. The worker encountered dose rates of 284 mrem/hour, received an ED alarm and notified the RP staff. Subsequent surveys by the RP staff identified dose rates that were accessible to the worker on the 568' elevation of about 500 mrem/hour. The worker entered into areas beyond the scope of the HRA brief and consequently was unaware of the elevated dose rates below the grating. As corrective actions for these incidents, the licensee developed a means to improve its pre-job briefings for HRAs and was contemplating other approaches to ensure workers do not work beyond the scope of what was briefed.

Analysis: The inspectors determined that both of these issues of concern shared a common performance deficiency because workers did not comply with established radiological protective measures as specified for entry into and work within HRAs, as provided in the licensee's TS. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented. The finding was not subject to traditional enforcement since the incidents did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and were not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, Examples of Minor Issues, and identified Example 6(h) as similar to the performance issue. Although both individuals were authorized to work in specific locations within the rooms, the workers took unauthorized actions and entered into other HRAs unaware of the elevated radiological conditions. Therefore, in accordance with IMC 0612 and Example 6(h) of Appendix E, the inspectors determined that the performance deficiency was more than minor. Additionally, the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that worker entry into areas without knowledge of the radiological conditions placed them at increased risk for unnecessary radiation exposure. The finding was assessed using the Occupational Radiation Safety SDP and was determined to be of very low safety significance because these problems were not ALARA planning issues, there were no overexposures nor substantial potential for

overexposures given the workers reaction to the ED alarms and the dose rate ranges, and the licensee's ability to assess dose was not compromised.

The workers failed to follow established radiological protective measures for work in HRAs and worked beyond the scope of what was briefed. The inspectors determined that the cause of both these examples involved the cross-cutting component of work practices in the human performance cross-cutting area (H.4(b)). Specifically, personnel work practices did not support human performance because the licensee did not effectively communicate expectations regarding procedural compliance and personnel failed to follow procedures.

Enforcement: Technical Specification 5.7.1 states, in part, that entry into high and locked high radiation areas be made after the dose rate levels in the area have been established and personnel are made aware of them. Contrary to the above, in two separate instances on March 28, 2009, individuals traversed into HRAs without being aware of the radiological conditions of the areas entered. Since the failures to comply with the TS were of very low safety significance and have been entered in the licensee's CAP as CR 09-56265 and CR 09-56266, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy (**NCV 05000440/2010-003-02; Failure to Work in High Radiation Areas Within the Bounds of the Radiological Briefing Resulting in the Entry Into Areas Without Knowledge of the Radiological Conditions**).

.5 Radiological Hazards Control and Work Coverage (02.04)

a. Inspection Scope

The inspectors evaluated the adequacy of radiological controls, such as required surveys, RP job coverage (including audio and visual surveillance for remote job coverage), and contamination controls for selected work activities performed during RFO-12. The inspectors evaluated the licensee's use of EDs in high noise areas as monitoring devices.

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with licensee procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in high radiation work areas with significant dose rate gradients.

b. Findings

No findings were identified.

.6 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed

the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved radiation monitoring and exposure controls.

b. Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02)

This inspection constituted one partial sample as defined in IP 71124.02-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed pertinent information regarding plant collective exposure history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's 3-year rolling average collective exposure.

The inspectors reviewed the site-specific trends in collective exposures (using NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities," and plant historical data) and source term (average contact dose rate with reactor coolant piping) measurements (using Electric Power Research Institute (EPRI) TR-108737, "BWR Iron Control Monitoring Interim Report," issued December 1998, and/or plant historical data, when available).

The inspectors reviewed site-specific procedures associated with maintaining occupational exposures ALARA, which included a review of processes used to estimate and track exposures from specific work activities.

b. Findings

No findings were identified.

.2 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors selected numerous work activities completed during RFO-12 of the highest exposure significance with greater than 5 person-rem of exposure. The inspectors determined whether the licensee reasonably grouped the radiological work into work activities based on historical precedence, industry norms, and/or special circumstances. The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements.

The inspectors assessed whether the licensee's planning identified appropriate dose mitigation features; considered alternate mitigation features; and defined reasonable dose goals. The inspectors determined whether the licensee's work planning considered the use of remote technologies (e.g., teledosimetry, remote visual monitoring, and robotics) as a means to reduce dose and the use of dose reduction insights from industry operating experience and plant-specific lessons learned. The

inspectors assessed the integration of ALARA requirements into work procedure and RWP documents.

The inspectors compared the dose results achieved with the intended dose established in the licensee's ALARA planning for 13 work activities that accrued a dose greater than 5 rem and exceeded the projected dose by 50 percent or more. The inspectors determined the reasons for the inconsistencies between the intended and actual work activity doses.

The inspectors determined if work activity post-job reviews were conducted and if identified problems were entered into the licensee's CAP.

b. Findings

Introduction: The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR 20.1101(b) for inadequate ALARA planning and radiological controls. The inspectors determined that the planning performed by the licensee did not prevent unplanned, unintended dose for several work activities during RFO12.

Description: The initial dose estimates for the outage was 375 person-rem. Actual dose received was 568 person-rem. This was 193 person-rem (~151 percent) over the dose goal. Several RWPs from the outage were attributable to a common performance deficiency, had a total actual dose of more than 5 person-rem and greater than 150 percent of their initial dose estimates. A review of the circumstances of the specific dose overruns for each RWP revealed that the causes of the dose overruns were varied. Some issues were beyond the licensee's ability to reasonably control, while other performance issues were well within the licensee's ability to control. Specifically, during RFO-12, the initial post-outage crud burst released soluble and insoluble radioactive contaminants into the reactor coolant system. The physical and chemical properties of this material made it difficult to clean up, resulting in increases in ambient radiation fields throughout the auxiliary building. The regulatory process embeds a dose margin of 50 percent when assessing a licensee's dose outcomes for ALARA performance and quantifiable dose attributable to circumstances beyond the licensee's ability to control were discounted for purposes of the inspectors' regulatory review.

In situations where performance issues were reasonably within the licensee's ability to foresee and correct and should have been prevented; and the actual accumulated dose was greater than 5 person-rem; and the unplanned, unintended collective dose for a work activity was greater than 50 percent of the planned, intended dose; the issue was determined to be more than minor and subject to detailed regulatory review.

Specifically, during RFO-12, the station was slow to respond to the elevated dose rates in the auxiliary building as evidenced by delays in installing applicable shielding packages. Additionally, the licensee failed to develop sufficiently detailed work plans, develop contingency plans, establish radiological abort criteria, and change its work plans as work was about to be executed in the field for activities within the licensee's ability to foresee and control. Moreover, the licensee's work control process required that changes in work scope and work methods be re-evaluated for radiological impact prior to work being executed in the field, which was not always done. Other performance issues that were within the licensee's ability to foresee and control and adversely impacted the station's overall occupational dose performance are documented below.

The specific RWPs identified by the inspectors for regulatory review included:

RWP	Description	Actual Dose (Person-Rem)	Percent Over Estimates
096004	Decontamination Activities	12.007	269%
096008	Balance of Plant General Maintenance	17.840	251%
096009	Drywell / Containment General Maintenance	19.526	224%
096011	1G33 Activities	7.385	162%
096018	Vessel Dis/Reassembly Activities	84.245	170%
096026	LLRT Activities	5.830	154%
096029	MOVAT Activities	9.282	188%
096030	Valve Repair Activities	7.674	158%
096041	1B33F0067 A/B Activities	11.057	170%
096042	1E12C0001A Motor Activities	5.598	250%

Specific performance issues associated with radiological work planning that adversely affected the outage dose outcome included:

- delays associated with RCIC head check valve disassembly on the refuel floor;
- unplanned scaffold builds on the reactor recirculation pump motor replacement project that blocked access to work areas and impacted other scheduled activities;
- scheduling and planning issues on the refuel floor associated with hydro-lazing and decontaminating the 360 Platform, the refuel mast, the weir structure, and bathtub ring;
- feedwater check valve testing originally classified as non-radiological restricted area work when the actual work locations were in the Drywell and Auxiliary Steam Tunnel (LLRT Activities);
- 1G33 Activities RWP not written to support work in the Drywell and needed to be revised to support actual work locations;
- no snubber team (specialty workers) on night shift, night shift work was performed by other pipefitters less familiar with the actual work tasks;
- refuel floor core off-load activities RWP written for a fuel shuffle when a full core off-load was to be performed;
- reactor recirculation pump motor replacement RWP work crews estimated at 3-4 persons, when the actual crew sizes were to be 4-6 people;
- feedwater system not drained prior to system breach (system draining was not a scheduled activity);
- no dose allocated for refuel floor coordinator work activities;
- allowing inboard main steam isolation valve work to begin prior to refilling the vessel;

- steam dryer lift and rotation was not identified in the RFO-12 outage schedule;
- outsourced maintenance work (i.e., Atlantic etc.) was not reviewed by the maintenance organization during the planning process; and
- 1E12F0010 initial dose estimating and ALARA plan development did not include personnel from the valve team that would be performing the work.

Specific performance issues associated with work execution that adversely affected the outage dose outcome included:

- station drained sludge and debris from the reactor cavity through the shutdown cooling system instead of wet-vacuuming the sludge and debris from the reactor cavity as was originally planned; thereby, increasing auxiliary building 599' ambient dose rates;
- E51 piping not hydrolased until day 28 of the outage (main travel path on floor);
- eight separate airborne radioactivity events on the refuel floor leading to increased outage dose for area recovery and schedule impact;
- bolts not removed prior to attempting to lift the 'A' RHR motor causing an increase in work scope;
- lack of timely removal of highly radioactive material and trash increasing ambient radiation fields from the refuel floor;
- insulation panels for the reactor head insulation frame was misplaced leading to search and recovery efforts;
- realignment of the 'B' recirculation pump;
- specialty work performed on the 'B' reactor recirculation pump performed by personnel with inadequate knowledge;
- reinstallation of correct gaskets in the 1E12F0086 Valve (Valve Repair RWP);
- installation of the wrong valve gaskets causing rework (LLRT RWP); and
- rework of the under-vessel shoot out steel cabling.

Analysis: The licensee's ALARA planning and radiological controls did not prevent unplanned, unintended dose for several work activities during RFO12. This issue represents a performance deficiency as defined in IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening" in that the licensee failed to maintain occupational radiation exposures as far below the limits specified in CFR Part 20 as is reasonably achievable.

The performance deficiency should have been prevented, in that, several of the performance issues were activities within the licensee's ability to foresee and control. The finding was not subject to traditional enforcement since the various issues did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and were not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, Examples of Minor Issues, and identified Example 6(i) as similar to this performance deficiency. Additionally, the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that, worker exposures were not maintained ALARA.

Since this finding involved radiological controls and ALARA planning, the inspectors utilized IMC 0609, Appendix C, "Occupational Radiation Safety SDP," to assess its

significance. The inspectors concluded that the finding did not result in an occupational overexposure, a substantial potential for an overexposure, or a compromised ability to assess dose. The inspectors determined that the finding involved ALARA planning and work controls. Since the licensee's 3-year rolling collective dose average was less than 240 person-rem, per unit, at the time the performance deficiency occurred, the inspectors determined that the SDP assessment for this finding was of very low safety significance. The inspectors concluded that the finding was associated with the cross-cutting component of work controls in the human performance cross-cutting area (H.3.(a)), in that the licensee did not appropriately plan work activities by incorporating radiological safety.

Enforcement: Title 10 CFR 20.1101.b states, in part, that the licensee shall use, to the extent practical, procedures and engineering controls based on sound RP principles to achieve occupational doses ALARA. Contrary to the above, during RFO-12 several RWPs with an actual dose of greater than 5 person-rem exceeded their planned dose threshold by more than 150 percent due to inadequate ALARA planning and radiological controls. The issue was entered into the licensee's CAP as CR 09-59216, and corrective actions were implemented to address the outage planning and work execution issues (**NCV 05000440/2010003-03; Inadequate ALARA Planning and Radiological Controls That Did Not Prevent Unplanned, Unintended Dose for Several Work Activities in RFO-12**).

.3 Verification of Dose Estimates and Exposure Tracking Systems (02.03)

a. Inspection Scope

The inspectors reviewed the assumptions and basis (including dose rate and man-hour estimates) for the current annual collective exposure estimate for reasonable accuracy for select ALARA work packages. The inspectors reviewed applicable procedures to determine the methodology for estimating exposures from specific work activities and the intended dose outcome.

The inspectors evaluated whether the licensee had established measures to track, trend, and, if necessary, to reduce, occupational doses for ongoing work activities. The inspectors assessed whether trigger points or criteria were established to prompt additional reviews and/or additional ALARA planning and controls.

The inspectors evaluated the licensee's method of adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered. The inspectors assessed whether adjustments to exposure estimates (intended dose) were based on sound RP and ALARA principles or if they are just adjusted to account for failures to control the work. The inspectors evaluated whether the frequency of these adjustments called into question the adequacy of the original ALARA planning process.

b. Findings

No findings were identified.

.4 Problem Identification and Resolution (02.04)

a. Inspection Scope

The inspectors evaluated whether problems associated with ALARA planning and controls are being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved ALARA planning and controls. The inspectors assessed the licensee's process for applying operating experience to their plant.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

This inspection constituted one partial sample as defined in IP 71124.03-05.

.1 Engineering Controls (02.02)

a. Inspection Scope

The inspectors evaluated the licensee's use of ventilation systems and other engineering measures to control airborne radioactivity. The inspectors reviewed work packages and procedures to determine whether engineering controls were used as intended. The inspectors selectively reviewed airborne monitoring systems that warn of changing airborne conditions in the plant to determine whether alarm setpoints were sufficient to prompt actions to ensure worker dose was maintained within the limits prescribed by 10 CFR Part 20.

b. Findings

Refuel Floor Contamination Control Incident on February 24, 2009 (02.03)

Introduction: A finding of very low safety significance and an associated NCV of 10 CFR 20.1501 was self-revealed during an activity associated with the installation of a contamination control cover (i.e., the parachute) over the drywell head. The inspectors concluded that the licensee failed to perform an evaluation to determine the need for process or other engineering controls as required by 10 CFR 20.1701 and 20.1702. Given the method used to install the cover, coupled with the contamination levels present, an evaluation was necessary to determine the controls needed to limit the concentration of radioactive material in the air and to prevent the spread of contamination.

Description: On February 24, 2009, 15 individuals working on the refueling floor were contaminated and several received small intakes of radioactive material. The inspectors concluded that this issue was caused by the installation of a contamination control cover (i.e., parachute) over the drywell head without the necessary engineering controls. The licensee became aware of this issue as workers alarmed the personnel contamination monitors when exiting the area. The installation of the contamination control cover was successfully performed during the previous refueling outage without radiological incident

as the cover was lowered from above onto the head. However, during RFO-12, the cover was pulled over the highly contaminated drywell head (removable contamination levels up to approximately 1 rad/hour) without the use of engineering controls. Low levels of airborne radioactivity were created and contamination was spread over the work area, the walkway, and near the exit of the refuel floor at the personnel hatch. The front edge of the parachute cover was found to have contamination levels of 300,000 disintegrations per minute (dpm) following its installation demonstrating that the method used to install the cover without engineering controls created the problem.

The workers involved in the work activity were not provided with instructions for the installation of the cover and were unfamiliar with the task. Also, neither the ALARA Plan nor RWP specified if or how the drywell head was to be covered because the work package lacked sufficient detail. After the cover was installed, many of the workers involved with the cover installation continued with other tasks on the refuel floor unaware that a problem occurred. Area air samplers located on the refuel floor trended upwards but did not alarm. Over the course of the next 6-8 hours, some workers vacated the refuel floor and alarmed the contamination monitors and others entered the floor before the licensee recognized the problem and attributed it to the parachute installation. The skin contamination on most of the workers was small while one worker had skin contamination that ranged up to approximately 200,000 dpm. The maximum skin dose was determined to be small compared to regulatory limits and all workers were successfully decontaminated. Whole body count results showed worker intakes also to be small, less than the licensee's 10 mrem dose assignment threshold.

As corrective actions, the licensee removed the parachute cover and applied a fixative to the drywell head to minimize further spread of contamination. An experienced supervisor was assigned to the refuel floor to better oversee work activities.

Analysis: The inspectors determined that this issue of concern was a performance deficiency because the licensee failed to perform required regulatory evaluation(s) that were necessary to demonstrate compliance with the requirements of 10 CFR 20.1701/20.1702 for the use of engineering controls or other controls consistent with maintaining the total effective dose equivalent ALARA. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented. The finding was not subject to traditional enforcement since the incident did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, Examples of Minor Issues, but did not identify any examples similar to the performance deficiency. However, in accordance with IMC 0612, the inspectors determined that the finding was more than minor because it impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to evaluate the method used to install the parachute cover and implement engineering controls given the contamination levels present resulted in 15 personal contaminations and low dose intakes to several workers. The inspectors also concluded that the radiological hazards had the potential to result in higher exposures to the individuals had the circumstances been slightly altered. The finding was assessed using the Occupational Radiation Safety SDP and was determined to be of very low safety significance (Green) because it was not an ALARA planning

issue, there was no overexposure nor substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised.

The licensee's evaluation of the incident correctly concluded that the work package was incomplete and failed to prescribe if and how the cover was to be installed over the drywell head to ensure a radiologically successful outcome. The inspectors determined that the cause of the problem involved the cross-cutting component of resources in the human performance cross-cutting area (H.2.(c)), in that the licensee did not ensure that personnel, equipment, and procedures including the work package were available and adequate.

Enforcement: Title 10 CFR 20.1501 requires, in part, that the licensee make or cause to be made, surveys that are necessary to comply with the regulations in 10 CFR Part 20 and that are reasonable under the circumstances to evaluate the potential radiological hazards that could be present. Pursuant to 10 CFR 20.1003, survey is defined, in part, as an evaluation of the radiological conditions and potential hazards incident to the production, use, and presence of radioactive material or other sources of radiation.

Title 10 CFR 20.1701/20.1702 require the licensee to control the concentration of radioactive material in air and/or to maintain the total effective dose equivalent ALARA through the use of engineering controls or other means. Contrary to this requirement, the licensee failed to conduct an adequate radiological evaluation for work associated with installing a contamination control cover on the drywell head. Since the failure to adequately evaluate the work activity to determine the use of process or other engineering controls was of very low safety significance, corrective actions were established as described above, and the issue was entered into the licensee's CAP as CR 09-54099, the violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy (**NCV 05000440/2010003-04; Failure to Evaluate the Need for Radiological Engineering Measures to Control Contamination During Installation of a Cover Over the Drywell Head**).

.2 Refuel Floor Airborne Radioactivity/Contamination Control Incident on March 14, 2009

Introduction: A finding of very low safety significance and an associated NCV of TS 5.4.1 was self-revealed for the failure to effectively implement intended radiological engineering controls in accordance with the work plan (ALARA Plan) for reactor cavity drain-down in preparation for cavity decontamination.

Description: On March, 14, 2009, during the second reactor cavity drain down, airborne radioactivity conditions were generated on the refuel floor when the cavity water level was lowered to support decontamination activities. Due to a communication problem, cavity drain-down commenced before the decontamination crew already present on the refuel floor was prepared to support the activity. Moreover, the drain-down proceeded at a rate faster than expected by the work crew, which impacted the attempted recovery. Cavity water level dropped about 5 feet in a 5-minute period as the decontamination crew scrambled to respond. The work plan called for the cavity walls to be misted with water as the drain-down took place, a previously successful contamination control technique.

The operations log documented that the drain-down continued for over 20 minutes before the control room was made aware of the problem and the drain-down was aborted. Meanwhile, as the drain-down was occurring, an airborne radioactivity

condition was generated on the refuel floor as initially indicated by an alarming airborne radiation monitor. Following that, the refuel floor was evacuated. The air sample collected during the problem revealed a beta/gamma (predominantly cobalt-60) DAC of about 3.3 DAC. The decontamination crew returned to the refuel floor wearing respiratory protection equipment to mist the walls and recover from the condition. About 1 hour later, a general area air sample showed that the airborne concentration had reduced to just over 0.3 DAC. Five workers received unplanned intakes all less than the licensee's 10 mrem dose assignment threshold based on whole body count analyses.

Corrective actions focused on the communications problem and better controlling the rate of drain-down through a procedural modification.

Analysis: The inspectors determined that failure to effectively implement the radiological engineering controls that were intended by the work plan for draining the reactor cavity was a performance deficiency. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented. The finding was not subject to traditional enforcement since the incident did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, Examples of Minor Issues, but did not identify any examples similar to the performance issue. However, in accordance with IMC 0612, the inspectors determined that the finding was more than minor because it impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to timely and effectively implement intended engineering controls during cavity drain-down caused several unplanned worker intakes and placed those workers at increased risk. The inspectors also concluded that the radiological hazards had the potential to result in higher exposures to the individuals had the circumstances been slightly altered. The finding was assessed using the Occupational Radiation Safety SDP and was determined to be of very low safety significance because it was not an ALARA planning issue, there was no overexposure nor substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised.

The licensee's evaluation of the incident correctly concluded that communication problems and overall lack of coordination between the control room and refuel floor led to the airborne conditions. The inspectors determined that the cause of the problem involved the cross-cutting component of work control in the human performance cross-cutting area (H.3.(b)). Specifically, the licensee did not appropriately coordinate work activities by incorporating actions to address the need for work groups to communicate and coordinate with each other during activities in which interdepartmental coordination was necessary to assure human performance.

Enforcement: Technical Specification 5.4.1 requires that written procedures be established, implemented, and maintained covering the activities in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Procedures specified in Regulatory Guide 1.33 include RP procedures for a RWP system, which are provided by the licensee's Nuclear Operating Procedure (NOP)-OP-4107, "Radiation Work Permit," Revision 02. That procedure specifies that ALARA Plans are part of the RWP and be reviewed and understood prior to commencing work. ALARA Plan No. 09-6018-02,

Revision 2, Task 5, RFO-12 Reactor Disassembly/Reassembly Activities/Cavity Decontamination, requires that engineering controls be used to control contamination including the use of surfactants (i.e., ultra-gel).

Contrary to this requirement, on March 14, 2009, the licensee failed to effectively implement intended radiological engineering controls (wall surface misting) in accordance with the work package for draining the reactor cavity. Since the issue was of very low safety significance, corrective actions were established as described above, and the issue was entered into the licensee's CAP as CR 09-55435, the violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy (**NCV 05000440/2010003-05; Failure to Effectively Use the Intended Radiological Engineering Controls During Cavity Drain-Down in Preparation for its Decontamination**).

2RS4 Occupational Dose Assessment (71124.04)

This inspection constituted one partial sample as defined in IP 71124.04-5.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program (NVLAP) report for the licensee's dosimetry vendor to determine the status of the accreditation and whether the accredited categories aligned with the licensee's program and needs

The inspectors reviewed procedures associated with dosimetry operations, including use of external dosimetry such as multi-badging and extremity monitoring. Additionally, the inspectors reviewed procedures associated with assessment of internal dose including operation of the whole body counter. The inspectors determined whether the licensee established procedural guidance governing external and internal dosimetry requirements.

b. Findings

No findings were identified.

.2 External Dosimetry (02.02)

NVLAP Accreditation

a. Inspection Scope

The inspectors evaluated the adequacy of the licensee's NVLAP accreditation for dosimeters that require processing and that are used to determine the dose of record. The inspectors determined whether irradiation test categories for each type of personnel dosimeter used was consistent with the types and energies of the radiation present.

b. Findings

No findings were identified.

.3 Passive Dosimeters

a. Inspection Scope

The inspectors evaluated the onsite storage of dosimeters before issuance and during use to determine if adequate quality controls were implemented or other guidance was provided to workers with respect to care and storage of the devices. Non-NVLAP accredited dosimetry has not been used to determine the dose of record at the Perry Nuclear Power Plant during this inspection period.

b. Findings

No findings were identified.

.4 Active Dosimeters

a. Inspection Scope

The inspectors determined whether the licensee used adequate correction factors to address the differences in response between electronic dosimetry and dosimetry that is used to determine the dose of record should secondary dosimetry be used to assign dose. The inspectors determined if the correction factors were based on sound technical principles.

The inspectors selected several dosimetry-related occurrence reports and corrective action documents to determine if the licensee identified any trends and implemented appropriate corrective actions.

b. Findings

No findings were identified.

.5 Internal Dosimetry (02.03)

Routine Bioassay (In-Vivo)

a. Inspection Scope

The inspectors reviewed procedures used to assess the dose from internally deposited nuclides using whole body counting equipment. The inspectors determined whether the procedures addressed methods for differentiating between internal and external contamination, the release of contaminated individuals, the route of intake and for the assignment of dose.

The inspectors reviewed the whole body count process to determine if the frequency of measurements was consistent with the biological half-life of the nuclides available for intake. The inspectors reviewed the licensee's evaluation for use of its portal radiation monitors as a passive monitoring system to determine if instrument minimum detectable activities were adequate to determine the potential for internally deposited radionuclides sufficient to prompt investigation, as provided in 10 CFR 20.1502.

The inspectors selected 10 whole body counts completed during RFO-12 and evaluated whether the counting system was used appropriately and included the necessary

sensitivity for the potential radionuclides of interest. The inspectors reviewed the radionuclide library used for the count system to determine its appropriateness. The inspectors reviewed the licensee's 10 CFR Part 61 data analyses to determine that the nuclide libraries included appropriate gamma-emitting nuclides and appropriate "marker" nuclides for alpha emitters indicative of fuel degradation.

b. Findings

No findings were identified.

.6 Special Dosimetric Situations (02.04)

Declared Pregnant Workers

a. Inspection Scope

The inspectors reviewed the adequacy of the licensee's methods for informing workers of the risks of radiation exposure to the embryo/fetus. The inspectors reviewed the licensee's monitoring methods and procedures, radiation exposure controls, and the information provided to declared pregnant women to determine if an adequate program had been established to limit embryo/fetal dose. The inspectors reviewed dose records for women that declared between 2009 and March 2010 to verify that the exposure results and monitoring controls employed by the licensee complied with the requirements of 10 CFR 20.1208 and 20.2106.

b. Findings

No findings were identified.

.7 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors selectively reviewed corrective actions documents generated during the approximate 12-month period that preceded the inspection. The inspectors determined whether problems associated with occupational dose assessment were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator (PI) for the period from third quarter 2009 through the first

quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6, and NUREG-1022, “Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee’s operator narrative logs, operability assessments, maintenance rule records, maintenance WOs, issue reports, event reports and NRC Integrated Inspection Reports (IRs) for the period third quarter 2009 through the first quarter 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee’s issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample for safety system functional failures as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index - Emergency AC Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System PI for the period from the third quarter 2009 through the first quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6, was used. The inspectors reviewed the licensee’s operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated IRs for the period of the third quarter 2009 through the first quarter 2010 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee’s issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample for MSPI emergency AC power system PI as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems PI for the period from the third quarter 2009 through the first quarter 2010. To

determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6, was used. The inspectors reviewed the licensee’s operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated IRs for the period of the third quarter 2009 through the first quarter 2010 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee’s issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample for MSPI high pressure injection system PI as defined in IP 71151-05.

b. Findings

No findings were identified.

.4 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Radiological Occurrences PI for the period from the third quarter 2009 through the first quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6, was used. The inspectors reviewed the licensee’s assessment of the PI for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee’s PI data collection and analyses, the inspectors discussed with RP staff, the scope, and breadth of its data review, and the results of those reviews. The inspectors independently reviewed electronic dosimetry dose rate and accumulated dose alarm reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample for occupational radiological occurrences PI as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

.1 Routine Review of Items Entered Into the CAP

a. Inspection Scope

As part of the various baseline IPs discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: the 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 occurrence reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the attached List of Documents Reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program 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 through inspection of the station's daily CR packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Annual Follow-Up of Selected Issues Sample: In-Depth Plan for Correcting Procedural Changes

a. Inspection Scope

The inspectors performed an annual follow-up of selected issues sample of the licensee's process for improving procedures as identified in the site recovery plan. During a review of items entered in the licensee's CAP and through discussion with licensee personnel, the inspectors determined that the licensee continues to struggle with timely processing and implementation of procedural changes to correct potential error traps for workers in the field. Interviews were held with the licensee personnel responsible for changes to procedures in the maintenance department and with senior licensee management. The inspectors assessed the current significance of changes not yet implemented and determined that safety was not significantly impacted. Further review indicated that the backlog and plan going forward will continue to require significant licensee effort to improve station procedures in a timely manner.

This review constituted one sample of in-depth problem identification and resolution as defined in IP 71152-05.

b. Observations and Assessments

Although there have been no recent events to highlight the deficiencies that currently exist in station procedures, challenges to licensee personnel execution of procedures in the field continue to occur. The licensee is struggling to implement procedural changes in a timely manner to support site human performance tool usage.

c. Findings

No findings were identified.

.4 Selected Issue Follow-Up Inspection: In-Depth Review of Hydrostatic Testing of ESW Couplings

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized and selected for review a corrective action item documenting repair to underground piping in the ESW 'B' loop. Initial review of the repair process indicated that post-maintenance testing of the coupling used to repair a leaking joint was not hydrostatically tested in accordance with ASME Section III Code requirements for piping systems.

As a result of the ongoing interest in buried piping issues, the inspectors selected for an in-depth review, the repair activities associated with the 24-inch 'B' loop ESW buried piping. The inspectors reviewed the purchase order and WO for the fabrication, testing and installation of two ESW pipe couplings (Purchase Order 45200614 to Energy Steel for the purchase of pipe coupling, as part of WO 200321690 to replace Dresser part number 0038-0017-180).

Also included in the review were corrective action documents CR 08-39814, "ESW Coupling Leak – Division 2" and CR 09-54577, "Emergency Service Water 'B' Buried

Supply Pipe," used to address the issue which allowed non-Code tested couplings to be placed in service.

This review constitutes one sample for in-depth problem and identification resolution as defined in IP 71152-05.

b. Findings

Failure to Perform a Hydrostatic Test in Accordance with ASME Code

Introduction: The inspectors identified an unresolved item (URI) concerning licensee actions to test two 24" diameter Dresser style couplings installed to repair a leaking coupling in the ESW "B" piping.

Description: On March 5, 2009, the inspectors observed repair/replacement activities on the licensee's buried ESW system. A Dresser style coupling used to join sections of the system piping had failed and was leaking around the seals. The failure appeared to be due, at least in part, to cold spring of the piping since the ends of the piping joined by the coupling were offset and separated. The offset and separation of the piping prevented simple replacement of the old coupling with a new one. The licensee elected to remove and replace the offset section of the piping, and replace the one coupling with two couplings to join the approximately 6' long section of piping that had been removed.

Through a records review of the related work package, the inspectors identified that the licensee had specified an incorrect hydrostatic test hold time of 3 minutes to the vendor for the testing of the two pipe couplings. The required ASME Section III hydrostatic test pressure for the Dresser style couplings (piping components) used to join the 6' section of pipe to the rest of the piping in the repair of the 24'' ESW piping system should have been a minimum total time of 10 minutes. A 10 minute hold time was also indicated in the vendor's hydrostatic testing procedure for ASME Section III components. The actual hold times performed by the vendor ranged from 4 to 6 minutes as indicated on the shipping documents.

The licensee (procurement engineering) stated that they had treated the component/coupling as ASME III material rather than as an ASME III component. After further evaluation of the inspectors' concerns the licensee further stated that not only is the coupling not a component by Code definition, but that the Dresser Style 38 middle rings (the pressure retaining portion of the coupling) were the only parts of the couplings requiring any testing and that there was no minimum test time specified in the Code. The licensee also felt that the hold time specified was more conservative than the 5 second hydrostatic test of seam welded pipe which they stated is all that is required by the Code for a seam weld repair.

The 180 second minimum hydrostatic testing hold time requirement specified in the purchase order for the couplings was based on requirements found in ANSI B16.5 "Steel Pipe Flanges and Flanged Fittings", and Standard Practice (SP) 61, "Pressure Testing of Steel Valves." The basis for the use of these documents, through discussion with the licensee, appeared to stem from an earlier Engineering Report, "ANSI/ASME Code Reconciliation for Replacement Material, Parts and Components," which compared and evaluated pressure-temperature ratings in B16.5 and ASME Section III. The report, which had been performed for an alternative application, dealt with, among other things,

flanged fittings and valves, but not couplings. The licensee stated that Subsection ND does not directly address hydrostatic testing of the item so they elected to use these documents as "guidance" to establish the testing requirements. Specifically they stated that they used the hydrotest requirement for valves indicated in SP 61 in the procurement package for the hydrostatic test duration. However, the inspectors noted that Section III hydrostatic test requirements for valves also specifies a minimum hold time of 10 minutes, and the ASME Code requirements supersede those of the Manufacturers Standardization Society.

At the conclusion of the inspection period the inspectors and the licensee were continuing discussions regarding the appropriate test requirements. Pending the results of additional discussions and additional information, this issue will remain open as a URI. (**URI 05000440/2010003-06; Failure to Perform a Hydrostatic Test in Accordance with ASME Code**)

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153)

.1 LPCI/RCIC Logic Failure

a. Inspection Scope

The inspectors reviewed the licensee's response to a failed optical isolator card in the RCIC 'A' pump control circuitry on April 6, 2010. The failed isolator card allowed an indication that RHR was still available through the power monitoring circuit despite a blown 10-amp fuse which provides normal power to the control circuitry for RHR. A feedback path through a 1-amp fuse in a separate circuit containing the optical isolator card allowed continued indication of availability to the operators despite the blown 10-amp fuse. The inspectors monitored the licensee's evaluation and corrective actions for this event. The licensee has entered the event into their CAP as CR 10-75161 and is continuing to evaluate an appropriate engineering response with the manufacturer. Additional corrective actions include checks every 6 hours on fuse conditions until an engineering change can be determined and implemented. Documents reviewed associated with the event response and restoration activities are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.2 Scram Caused by Failed Trip Unit Circuit Card

a. Inspection Scope

The inspectors responded to a manually initiated reactor scram on May 11, 2010. The inspectors reviewed the licensee's personnel performance in response to the events which led up to the manual trip of the reactor. A steam line high differential pressure trip unit circuit card that was installed on May 10, 2010, suffered an infant mortality failure after approximately 30 hours of operational time, at 11:04 p.m. on May 11. The failure of the card resulted in a Division 2 RHR LOCA signal to the plant circuitry. The

sequence of events associated with the card failure caused a fuse to blow and during the power supply restoration the reactor low level trips were picked up because of the nature of the circuitry. The response was complicated by the electrical line-up for power to the CRD auxiliary oil pumps. The line-up (due to a failed electrical transfer switch) led to an inability to recover the CRD motors because the oil pumps could not be started. Subsequent low level alarms on CRD accumulators as the pressures began to drop led to the operators' decision to place the mode switch in shutdown (i.e. scram the plant) in accordance with plant procedures.

The inspectors reviewed the licensee's actions to investigate and repair the failed trip unit card. The event was entered into the CAP as CR 10-76727 with a significant corrective action to have all future replacement cards undergo a 100-hour bench test burn in prior to installation into a site system. The failed trip card was only burned in for 48 hours at the manufacturer's facility. Further inspection was conducted under inspection procedure 71111.20 for the forced outage.

This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.3 Loss of Recirculation Pump 'A' at Full Power

a. Inspection Scope

On June 4, 2010, at 7:07 a.m. the 'A' reactor recirculation pump unexpectedly tripped with the plant at full power. The plant automatically reduced power to 65 percent and then was manually reduced to approximately 58 percent power and was stabilized by the operators in single loop operation at that power level. The inspectors responded to the control room and observed the operator's response to the situation and followed the repair and recovery of the 'A' pump. The licensee determined the trip of the recirculation pump was due to a failed optical isolator card. The failure of the optical isolator card resulted in a loss of power to the pump logic and subsequently loss of power to the pump itself. On June 5, 2010, the licensee successfully executed an additional power reduction to 22 percent power, restart of the recirculation pump, and subsequent return to full power on June 9, 2010.

b. Findings

No findings were identified.

.4 (Closed) Licensee Event Report 05000440/2010-002-00: Piping Leak Results in Condition Prohibited by Technical Specifications

a. Inspection Scope

On February 15, 2010, at approximately 9:30 p.m., a leak was identified on a portion of Emergency Closed Cooling Water subsystem B (ECCW 'B'). The leak was known to be on ASME Class 3 piping but was not correctly identified as impacting operability until 1:10 p.m. on the following day, a time period of 15 hours and 40 minutes. The through

wall piping leak, initially identified as a cracked weld, was not a result of a known condition which had been previously identified and, as such, should have led to a more timely evaluation that the pipe was no longer operable and subsequent entry into TS Limiting Condition for Operation (LCO) 3.7.10 “ECCW System,” Condition B, an LCO which requires specific actions within 12 hours. The licensee’s delay in evaluation of the piping condition led to exceeding the LCO requirement as noted in their submitted report. The deficiency was determined to be of low safety significance by the licensee and is documented in this report. The licensee documented the deficiency in CR 10-1622 and conducted a limited apparent cause evaluation to determine the appropriate corrective actions, which will include improved training of operators on operability determination requirements in NRC Regulatory Information Summary 9900 guidance. The Licensee Event Report (LER) and apparent cause evaluation were reviewed by the inspectors and no additional findings or violations of NRC requirements were identified. Documents reviewed are listed in the Attachment. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153-05

b. Findings

The enforcement aspects of this finding are discussed in Section 4OA7 of this report.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to the Site Vice-President, Mr. Mark Bezilla, and other members of licensee management on July 14, 2010. 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

The results of the post-outage ALARA, Radiological Hazard Assessment/Exposure Controls and In-Plant Airborne Radioactivity Control Inspection were discussed with Mr. K. Krueger and other licensee staff on April 23, 2010. On May 19, 2010, a teleconference was held with Mr. McNulty and others to further discuss the inspection results after additional in-office review. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as an NCV.

- On February 15, 2010, the licensee failed to enter TS LCO 3.7.10 “ECCW System,” as required, when an unisolable leak was identified on piping associated with the ECCW ‘B’ subsystem. The cause was a failure to complete a timely evaluation of the leak’s impact on operability of ASME Class 3 system piping. This was identified in the licensee’s CAP as CR 10-71622. Corrective actions included taking appropriate TS actions as required when the operability

impact was identified at 15 hours and 40 minutes after the initial identification of the piping leak. Additional actions include plans to improve operator training in the area of timely and correct operability determinations. The violation was determined to be of low safety significance through a licensee-conducted probabilistic risk assessment evaluation.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Bezilla, Vice President Nuclear
D. Evans, Work and Outage Management Director
J. Grabnar, Site Engineering Director
H. Hanson, Performance Improvement Director
T. Jardine, Operations Manager
K. Krueger, Plant General Manager
P. McNulty, Radiation Protection Manager
M. Stevens, Maintenance Director
J. Tufts, Chemistry Manager

Others

R. Leidy, Ohio Department of Health

NRC

J. Cameron, Chief, Reactor Projects Branch 3
B. Dickson, Health Physics Program Manager

LIST OF ITEMS OPENED, CLOSED, DISCUSSED

Opened

05000440/2010003-06	URI	Failure to Perform a Hydrostatic Test in Accordance with ASME Code (Section 4OA2.4)

Opened and Closed

05000440/2010003-01	NCV	Failure to Adequately Establish the Radiological Conditions In A Locked High Radiation Area to Allow Workers to Be Properly Briefed Prior to Entry. (Section 2RS1.2)
05000440/2010003-02	NCV	Failure To Work In High Radiation Areas Within The Bounds Of The Radiological Briefing Resulting In Entry Into Areas Without Knowledge Of The Radiological Conditions. (Section 2RS1.3)
05000440/2010003-03	NCV	Inadequate ALARA Planning And Radiological Controls That Did Not Prevent Unplanned, Unintended Dose For Several Work Activities In Refuel Outage 12. (Section 2RS2.2)
05000440/2010003-04	NCV	Failure To Evaluate The Need For Radiological Engineering Measures To Control Contamination During Installation Of A Cover Over The Drywell Head. (Section 2RS3.1)

05000440/2010003-05	NCV	Failure To Effectively Use The Intended Radiological Engineering Controls During Cavity Drain-Down In Preparation For Its Decontamination. (Section 2RS3.2)

Closed

05000440/2010-002	LER	Piping Leak Results in Condition Prohibited by Technical Specifications (Section 4OA3.4)

LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector 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 report.

1R01 Adverse Weather

ONI-ZZZ-1; Tornado or High Winds; Revision 10
CR 10-76579; NRC Identified Issues for ONI-ZZZ-1 Walkdown, dated May 7, 2010
eSOMS Narrative Logs dated May 7-8, 2010
CR 10-76578; Radwaste Fire Watch; dated May 7, 2010
NOP-WM-2001; Work Management Scheduling/Assessment/Seasonal Readiness Processes; Revision 9
IOI-15; Seasonal Variations; Revision 17
PTI-M99-P0001; Ambient Temperature Monitoring; Revision 5
CR 10-72025; Potential for Degraded Voltage Relay Trip Due to Addition of Stub Bus Loads; February 24, 2010
IOI-15, Seasonal Variations, Revision 17
Listing of Planned Switchyard Work January 2010 to December 2010; dated June 1, 2010
NOP-OP-1003; Grid Reliability Protocol; Revision 2
NOP-WM-2001, Work Management Scheduling/Assessment/Seasonal Readiness Process, Revision 9
ONI-R10; Loss of AC Power; Revision 9
ONI-S11; Hi/Low Voltage; Revision 6
PAP-0102; Interface with the Transmission System Operator; Revision 5
Perry System Health Report; R11 – Station Transformers; 2009-4 (4th quarter)
Perry System Health Report; S42 – Transmission Station; 2009-4 (4th quarter)

1R04 Equipment Alignment

SOI-E51; Reactor Core Isolation Cooling System; Revision 26
VLI-E51; Reactor Core Isolation Cooling System; Revision 8
SOI-M25/26; Control Room HVAC and Emergency Recirculating System; Revision 18
VLI-M25/26; Control Room HVAC and Emergency Recirculation System; Revision 7
CR 10-77682; Emergency Recirculation Fan A Tripped; dated June 3, 2010
VLI-R44; Division 1 and 2 Diesel Generator Starting Air System; Revision 4
VLI-R45; Division 1 and 2 Diesel Generator Fuel Oil System; Revision 5
VLI-R46; Division 1 and 2 Diesel Generator Jacket Water Systems; Revision 4
VLI-R47; Division 1 and 2 Diesel Generator Lube Oil; Revision 7
VLI-R48; Division 1 and 2 Diesel Generator Exhaust, Intake, and Crankcase Systems; Revision 6

1R05 Fire Protection (Annual/Quarterly)

PAP-1910; Fire Protection Program; Revision 19
FPI-A-C01; Fire Protection Program Control Processes; Revision 12
FPI-0CC; Pre-Fire Plan Instruction – Control Complex; Revision 8
FPI-0IB; Pre-Fire Plan Instruction – Intermediate Building; Revision 5

FPI-0FH; Pre-Fire Plan Instruction – Fuel Handling Building; Revision 4
CR 10-75264; NRC ID: Question Regarding Fire Piping; dated April 12, 2010
Updated Safety Analysis Report for Unit 1, Appendix 9A, Fire Protection Evaluation Report, Revision 14
CR 10-79131; NRC Identified – Excessive Rust on Fire Valve 1P54-F775; dated June 30, 2010
CR 10-79133; NRC Identified – Combustible in Fuel Handling Building Exceeding Fire Hazard Analysis Req.; dated June 30, 2010
CR 10-79157; NRC Identified – Various Discrepancies During Plant Inspection; dated June 30, 2010
FPI-A-B02; Fire Drill Planning Guide; dated June 17, 2010

1R07 Heat Sink Review

TAI-0515; Heat Exchanger Performance Monitoring; Revision 1
NOP-ER-2006; Service Water Reliability Management Program; Revision 1
PTI-E12-P0003; RHR Heat Exchangers B and D Performance Testing; Revision 8
PY-CEI/NRR-1121; PNPP Response to Generic Letter 89-13; dated January 26, 1990
PY-NRR/CEI-0497L; NRC Generic Letter 89-13; dated February 21, 1990
PY-CEI/NRR-1328; Supplemental Response to Generic Letter 89-13; dated March 1, 1991
PY-CEI/NRR-1734L; Implementation of Generic Letter 89-13; dated April 8, 1994

1R11 Licensed Operator Requalification Program

PYBP-PTS-0005; Operator Continuing Training Program Administration; Revision 25
PYBP-POS-0027; Operator Actions from Memory; Revision 0, dated December 3, 2008
Simulator Exercise Guide OTLC-3058201008_PY_SGC1; Cycle 8 2010 Evaluated Scenario C1; Revision 0
CR 10-76775; Static Simulator Exam Failures for Two SROs LOR Cycle 2010-08; dated May 12, 2010

1R12 Maintenance Effectiveness

CR 07-26052; Starting Air Compressor Div 2 DG Final Regulator Adjust Failed; September 2, 2007
CR 08-47743; Div 2 Starting Air Compressor 1R44C0001B failed PMT; October 11, 2008
CR 09-63288; Low Starting Air Pressure Switch May Need Adjusting; August 16, 2010
CR 10-69528; Div 1 Starting Air Compressor failed PTI-R44-P0001A; January 3, 2010
CR 10-72948; #1 EDG Left Starting Air Bank Pressure Found Below Minimum Allowed; March 8, 2010
CR 10-76258; Div 1 Diesel Starting Air Compressor Start Pressure is Out of Band; May 3, 2010
CR 10-77554; Division 1 DG Starting Air System PTI Failures; May 31, 2010
CR 10-78036; Failure of Div2 Diesel Generator Right and Left Bank Starting Air Systems; June 6, 2010
CR 10-78916; Division 2 Diesel 2B Lifting Relief Valve; June 26, 2010
CR 10-78958; Problems with Div 2 DG Starting Air #1 Air Dryer; June 27, 2010
CR 10-79152; D/G Air Regulator Not Working Causing Dryer Not to Shift; June 30, 2010
D-302-351; Piping System Diagram, R-44, Standby Diesel Starting Air; Revision 15
Maintenance Rule Functions, Performance Criteria, and Classifications; Maintenance Rule System Basis Document for Standby Diesel Generators; Revision 0
Perry Div 1 and Div 2 Standby Diesel Generator System Health 2010-1; January 1 through April 30, 2010

Perry High Pressure Core Spray Diesel Components System Health 2010-1; January 1 through April 30, 2010
Perry Unavailability Spreadsheet for Div 1 and Div 2 Standby Diesel Generators and High Pressure Core Spray Diesel Components; 2007-1 thru 2010-1

1R13 Maintenance Risk Assessments and Emergent Work Control

CR 10-75181; Annunciator Grounds; dated April 10, 2010
WO 200412735; Troubleshoot and Rework Cause of Unexpected Multiple Alarms and Annunciator Ground Alarm; Revision 5
Restricted Area Postings List for RCIC Outage to Protect Other Trains as Published in Daily Notes of May 3, 2010
CR 10-77781; Reactor Recirc. Pump Trip to Off; dated June 4, 2010

1R15 Operability Evaluations

NOP-OP-1009; Operability Determinations and Functionality Assessments; Revision 1
CR 10-75454; Replacement of Isolator Card Caused Loss of All Safety-Related Annunciators; dated April 15, 2010
Operational Decision Making Issue for Digital Feedwater Power Supply; Revision 0
CR 10-76900; ODMI for F1C08 Single Source Disposition; dated May 11, 2010
Operational Decision Making Issue for Disposition of Bus F1C08 with Regard to a Failed Auto Bus Transfer Device Currently Being Supplied by Alternate Source XF1A (XH12)
CR 10-77551; Unplanned Tech Spec Entry for Inoperable Containment Isolation Valve 1P52F0160; dated May 31, 2010
PRI-TSR; Technical Specification Rounds; Revision 21
CR 07-29630; SVI-C61-T1104 Does Not Reference Tech Spec 3.6.1.3; dated November 4, 2007
Operational Decision Making Issue for single Recirculation Loop Operation/Recovery Following "A" Pump Trip, Rev. 0, dated June 4, 2010

1R18 Permanent/Temporary Modifications

OP-CC-2003; Engineering Changes; Revision 14
NOBP-ER-3003-01; Temporary Modification Review Checklist; Revision 00
ECP 07-0097-001; Install and Inject Leak Sealant Device on RFBP 'B' Discharge Check Valve; October 17, 2007
Temporary Modification Tracking Report for April, 2010; May 4, 2010
ECP 07-0097-002; Remove Leak Sealant Device on RFBP 'B' Discharge Check Valve; dated October 26, 2010
GMI-0095; Instructions for the Use and Control of On-Line Leak Sealing; Revision 4
EDG 97-005; Engineering Design Guide: Leak Sealants; Revision 6
ECP 07-0097-002; Remove Leak Sealant Device on RFBP 'B' Discharge Check Valve, Revision 2; April 9, 2009
Drawing 302-0081-00000; Feedwater; Revision BBB
Drawing 41-0153-00010; 18" and 24" 300# Tilting Disc Check Valve; Revision –
Drawing 304-0071-00108; Piping Isometric Feedwater System; Revision H
CR 10-77377; EER 600411728 Does Not Contain the Sealant Material Contrary to GMI-0095; dated May 26, 2010
CR 00-3587; RFA – Request Installation of Clamp on 1N27F0505B; dated November 20, 2000

CR 10-78063; LEGACY – 2001 Leak Sealant Device Did Not Have a Cycle 11 Approved Extension; dated June 10, 2010
WO 200282588; RFBP 'B' Discharge Check Valve; dated December 13, 2007

1R19 Post-Maintenance Testing

WO 200412735; Troubleshoot and Rework Cause of Unexpected Multiple Alarms and Annunciator Ground Alarm; Revision 5
WO 200393532; Replace Accumulator, Pencil Filters, and Accumulator Instrumentation; dated April 21, 2010
SVI-C11-T1006; Control Rod Maximum Scram Insertion Time; Revision 13
PTI-C11-P0010; Control Rod Speed Adjustments; Revision 4
SVI-E51T2001; RCIC Pump and Valve Operability Test; Revision 32
WO 200218563; Disassemble and Inspect Stem of RCIC Turbine Governor Valve
WO 200393865; Full Spectrum Vibration RCIC Pump/Turbine
WO 200290979; Lube Oil Cooler Inspection and Cleaning – RCIC
WO 200415273; RCIC Turbine Trip Throttle Valve Latch – Troubleshoot and Repair Circuitry;
CR 10-76619; ICS Computer Digital I/O Board Damage: dated May 10, 2010
WO 200390778; Bench Test RCIC Relief Valve GMI-008
WO 200324753; Troubleshoot and Rework RCIC Flow Controller Process Needle Sticking Downscale
WO 200313070; Calibrate and Tune RCIC Turbine Control Section
WO 200293273; Replace Agastat Relay for "A" Recirculation Pump; dated June 5, 2010
WO 200417759; Recirculation Pump 'A' Optical Isolation Card Replacement; dated June 5, 2010
WO 200293273; Recirculation Pump 'A' Optical Isolation Card Relay Verification; dated June 5, 2010
DWG 208-0015-00027; Recirculation Pump C001A – Breaker Control 3A; dated March 29, 2006
DWG 208-0015-00031; Breaker 5A Controls L1106; dated September 28, 2009
SVI-C71-T0042-D; Drywell High Pressure Channel D Functional for 1C71-N650D; Revision 6
WO 200327238; Replace Rosemount Trip Units - Master Trip Unit Drywell Pressure – H; dated June 14, 2010

1R20 Forced Outage

CR 10-76728; Reactor Recirc Pumps Lost NCC Cooling and Seal Purge During Scram; dated May 12, 2010
CR 10-76727; Reactor Scram; dated May 11, 2010
CR 10-76677; HWC Shutdown; dated May 11, 2010
CR 10-76945; Offgas Issues Not Promptly Documented in CAP; dated May 17, 2010
CR 10-76996; Reverse Flow in the Offgas System During Initial SJAE Startup; dated May 18, 2010
CR 10-76944; PY-PA-10-02: Repeat Issues with RWCU Impact Plant Startup; dated May 17, 2010
CR 10-76986; 1N36F0392A Valve Found Continuously Blowing Air Through Its Exhaust Port; dated May 18, 2010
CR 10-76988; 1N11F0032B Valve Found Blowing Air Through Its Exhaust Port; dated May 18, 2010
CR 10-76937; Water Found in Piping During the Removal of the 1N641686B Valve Bonnet; dated May 16, 2010

CR 10-76897; RWCU Delta Flow Issues Delay Reestablishing System to Operation; dated May 13, 2010
SOI-B33, Reactor Recirculation System, Section 5-7; Revision 28
SVI-B33-T1168; Idle Recirculation Loop Temperature and Flow; Revision 6
SOI-G33, Reactor Water Cleanup System, Section 7.1; Revision 28
Restart Readiness Review Meeting and Minutes dated May 14, 2020
Post Scram Restart Report, Scram No. 1-10-01, dated May 13, 2010
CR 10-76908; Foreign Material Entered Suppression Pool Make-up Line Bravo; dated May 15, 2010
CR 10-76929; SVI-T23-T1203 Does Not Appear to be Fully Tracked in SAP; dated May 15, 2020
Perry 50.72 Event Notification for Manual Reactor Scram Due to Loss of Control Rod Drive Charging Water Header Pumps; dated May 12, 2010
CR 10-76846; Single Point Plant Vulnerability for a Loss of K-1-N; dated May 14, 2010
CR 10-76845; Evaluate Changing Timer Running Alarm Windows to Amber; dated May 14, 2010
CR 10-76841; Unable to Adjust Drywell Airlock Interlocks; dated May 13, 2010
CR 10-76839; Recirculation Pump A Seal Leakage Observed During Ops Walkdown of the Drywell; dated May13, 2010
CR 10-76763; MCC F1C08 Trip During Plant Scram; dated May 11, 2010
CR 10-76769; Following May 11th Manual Scram 5 Rods Had Invalid Data and 85 Rods Were Slow; dated May 12, 2010
CR 10-76794; Delays in Restoring a RWCU Filter to Service; dated May 13, 2010
CR 10-76737; Dual Position Indication on SPMU Valve 1G43F0030B; dated May 12, 2010
CR 10-76785; Post Scram Evaluation; dated May 13, 2010

1R22 Surveillance Testing

SVI-E12-T0146; ECCS/LPCI Pump A Start Time Delay Relay Channel Functional/Calibration for 1E12A-K70A; Revision 6
SVI-N31-T1151; Main Turbine Valve Exercise Test; Revision 5
SVI-C85-T1314; Turbine Bypass Valve Operability Test; Revision 6
SVI-C61-T1200; Remote Shutdown Control Test – RCIC and RHR; Revision 5
CR 10-76587; Re-evaluate Methodology for Performing SVI-C61-T1200 for the Remote S/D Panel; dated May 8, 2010
SVI-E31-T5396A; RHR/RCIC Steam Line Flow High Channel Calibration for 1E31-N084A; Revision 5
Calculation No. C41-016, 1C41C0001A/B SLCS Injection Pump Performance Acceptance Criteria; Revision 1
SVI-C41-T2001-B; Standby Liquid Control B Pump and Valve Operability Test; Revision 15
SOI-E22B; Division 3 Diesel Generator; Revision 23
SVI-E22-T1319; Diesel Generator Start and Load Division 3; Revision 15

2RS1 Radiological Hazard Assessment And Exposure Controls

NOP-OP-4107; Radiation Work Permit; Revision 04
HPI-D0001; Radiation and Contamination Survey Techniques; Revision 21
Apparent Cause Evaluation; CR 09-59219; RFO-12 Resulted In 261 Personal Contamination Events; dated May 14, 2009
Apparent Cause Evaluation; CR 09-63080; PCE Goal Exceeded For 2009; dated August 11, 2009

CR 10-73255; Worker Received Dose Rate Alarm; dated March 12, 2010
Radiological Surveys for FPCC Heat Exchanger Room; Various Dates In March 2010
CR 09-56917; RFO-12 Worker Received Ed Dose Alarm; dated April 8, 2009
CR 09-56265 AND 09-56266; Unanticipated Dose Rate Alarm; both dated March 28, 2009
Radiological Survey for RHR 'A' Pump Room; dated March 28, 2009

2RS2 Occupational Alara Planning And Controls

CR 09-59216; RFO12 Electronic Dosimeter Dose of 588 Rem Exceeded 374 Rem Estimate By 157 Percent; dated May 13, 2009
NOP-OP-4005; ALARA Program; Revision 01
NOP-WM-7001; ALARA Program; Revision 00
NOP-WM-7002; Operational ALARA Program; Revision 00
NOP-WM-7003; Radiation Work Permit (RWP); Revision 01
Perry Nuclear Power Plant; RFO-12 Outage ALARA Report; undated

2RS3 In-Plant Radioactivity Control And Mitigation

NOP-OP-4703; Determination of Alpha Monitoring Levels; Revision 00
CR 09-54099; Numerous Personnel Contamination Events of Refuel Floor; dated February 24, 2009
Radiological Survey for Drywell Dome; dated February 24, 2009
ALARA Plan for RWP 09-6018; RFO-12 Reactor Disassembly/Reassembly Activities Including Decontamination Activities; Revision 0 – Revision 2
RWP 096018; RFO-12 Reactor Vessel Disassembly/Reassembly Activities; Revision 0 – Revision 2
CR 09-55435; Cavity Drain-Down Not Communicated to Radiation Protection Supervision; dated March 14, 2009
Air Sample Results for Refuel Floor; Various Periods in February and March 2009

2RS4 Occupational Dose Assessment

Radiological Engineering Assessment; Source Term Determination for Cycle 12; 2009
HPI-B0015; Operation of the ABACOS 2000 Whole Body Counting System; Revision 5
NOP-OP-4206; Bioassay Program; Revision 00
NOP-OP-4205; Dose Assessment; Revision 02
CR 09-53610; HPI-B0004 Places Individual in Knowledge Based Performance Mode; dated February 16, 2009
Acute Inhalation Whole Body Count Dose Assessments Summary; Individual Assessments for various Periods In 2009
NOP-OP-4201; Routine External Exposure Monitoring; Revision 01
NOP-OP-4202; Declared Pregnant Workers; Revision 00
NOP-OP-4204; Special External Exposure Monitoring; Revision 03
NOP-OP-2404-04; Effective Dose Equivalent Dose Determination; Individual Assessments for Various Personnel In 2009

4OA1 Performance Indicator Verification

NOBP-LP-4012-08; MSPI Data Sheets for Safety System Functional Failures from July 2009 to March 2010; Revision 2

NOBP-LP-4012-04; MSPI Data Sheets for Emergency AC Power Systems from July 2009 to March 2010; Revision 2
MSPI Derivation Reports for Emergency AC Power Systems; March 2010
NOBP-LP-4012-05; MSPI Data Sheets for High Pressure Injection System from July 2009 to March 2010; Revision 2
MSPI Derivation Reports for High Pressure Injection System; March 2010
Mitigating Systems Performance Index Basis Document; Revision 4
NOBP-LP-4012; NRC Performance Indicators; Revision 3
PYBP-DES-0011; Mitigating Systems Performance Index; Revision 1
CR 10-77766; Calculating MSPI System Unavailability; dated June 4, 2010
NOBP-LP-4012; NRC Performance Indicators; Revision 03
Submittals for Perry Performance Indicator Occurrences; Various Dates Between March 2009 and March 2010

4OA2 Problem Identification and Resolution

CR 08-39814, ESW Coupling Leak – Division 2, dated May 5, 2008
CR 10-77714, NRC Potential Non Cited Violation on Minimum Hydrostatic Test Time for Coupling, dated June 3, 2010
CR 09-54577, Emergency Service Water 'B' Buried Supply Pipe, dated March 3, 2009
CR 09-55079, ESW B Piping Backfilled Without Completion of Final Piping Coatings, dated March 10, 2009
CR 10-72109, Human Performance Error Traps Exist in Various C41 (SLC) Procedures, dated February 25, 2010
WO 200321690, Rework 24" ESW Coupling, dated April 28, 2009
ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1977 Edition originally issued in 1968
Standard Practice (SP-61) – 1992 Edition, Pressure Testing of Steel Valves, 1977 Edition originally issued in February, 1961
ASME B36.10M-2004, Welded and Seamless Wrought Steel Pipe, Issued October 25, 2004

4OA3 Follow-up of Events and Notices of Enforcement Discretion

Event Notification, Loss of Safety Function to Control the Release of Radioactive Material; dated April 6, 2010
CR 10-71622; Degraded or Cracked Weld on ECC B Flow Element Instrument Root Piping; dated February 15, 2010
CR 10-74928; Unexpected Annunciator and Status Light; dated April 6, 2010
CR 10-74953; Loss of Power to RCIC Optical Isolator 1E12A-AT10; dated April 6, 2010
CR 10-75101; Fuse Holder Issue; dated April 8, 2010
CR 10-75131; Potential Non-Conformance of RHR Loss of Power Monitoring; dated April 9, 2010
CR 10-75052; Control Power Fuse E12A-F49 in Panel 1H13P0629 Found Blown; dated April 8, 2010
CR 10-75333; Optical Isolator Failure WO 200412735; dated April 13, 2010
CR 10-75424; Plant Narrative Log Lacked Details – Optical Isolator Issue Impact; dated April 11, 2010
CR 10-75161; Potential Non-Conformance of RHR Loss of Power Monitoring; dated April 9, 2010
CR 10-76727; Reactor Scram; dated May 11, 2010
CR 10-77781; Reactor Recirc Pump 'A' Trip to Off; dated June 4, 2010
LER 2010002-00; Piping Leak Results in Condition Prohibited by Technical Specifications

LIST OF ACRONYMS USED

AC	alternating current
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CFR	*Code of Federal Regulations*
CR	condition report
CRD	control rod drive
CRER	control room emergency recirculation
DAC	derived air concentration
dpm	disintegrations per minute
ECCS	emergency core cooling system
ED	electronic dosimeter
EDG	emergency diesel generator
ESW	emergency service water
FENOC	FirstEnergy Nuclear Operating Company
FPCC	fuel pool cooling and cleanup
HCU	hydraulic control unit
HRA	high radiation area
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
LCO	limiting condition for operation
LER	Licensee Event Report
LOCA	loss-of-coolant accident
LPCI	low pressure core injection
mrem	millirem
MSPI	mitigating systems performance index
NCV	non-cited violation
NEI	Nuclear Energy Institute
NOP	Nuclear Operating Procedure
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PI	performance indicator
RCIC	reactor core isolation cooling
RFBP	reactor feed booster pump
RFO	refueling outage
RHR	residual heat removal
RP	radiation protection
RWP	radiation work permit
SDP	Significance Determination Process
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
USAR	Updated Safety Analysis Report
WO	work order

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), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Jamnes L. Cameron, Chief
Branch 6
Division of Reactor Projects

Docket No. 50-440
License No. NPF-58

Enclosure: Inspection Report 05000440/2010003
w/Attachment: Supplemental Information

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Letter to M. Bezilla from J. Cameron dated August 5, 2010.

SUBJECT: PERRY NUCLEAR POWER PLANT NRC INTEGRATED INSPECTION REPORT 05000440/2010003

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