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

August 1, 2011

Mr. Jack M. Davis
Senior Vice President and
Chief Nuclear Officer
Detroit Edison Company
Fermi 2 - 210 NOC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI POWER PLANT, UNIT 2, INTEGRATED INSPECTION REPORTS 05000341/2011003; 07200071/2010001

Dear Mr. Davis:

On June 30, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Fermi Power Plant, Unit 2. The enclosed report documents the results of this inspection, which were discussed on July 12, 2011, with the Plant Manager, Mr. T. Conner, and other members of your staff.

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

Based on the results of this inspection, two Green findings were identified, one self-revealed and one NRC-identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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 Fermi 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 Fermi Power Plant.

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

Sincerely,

**/RA/**

John B. Giessner, Chief
Branch 4
Division of Reactor Projects

Docket Nos. 50-341; 072-071
License No. NPF-43

Enclosure: Inspection Reports 05000341/2011003; 07200071/2010001
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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|---|---|
| Docket Nos.: | 50-341; 072-071 |
| License No.: | NPF-43 |
| Report Nos.: | 05000341/2011003; 07200071/2010001 |
| Licensee: | Detroit Edison Company |
| Facility: | Fermi Power Plant, Unit 2 |
| Location: | Newport, MI |
| Dates: | April 1 through June 30, 2011 |
| Inspectors: | R. Morris, Senior Resident Inspector<br>R. Jones, Resident Inspector<br>J. Bozga, Reactor Inspector<br>R. Jickling, Senior Emergency Preparedness Inspector<br>M. Learn, Reactor Engineer<br>V. Meghani, Reactor Inspector<br>M. Mitchell, Health Physicist<br>J. Neurauter, Senior Reactor Inspector<br>J. O'Dwyer, Reactor Inspector<br>J. Tapp, Health Physicist<br>R. Temps, Senior Safety Inspector |
| Approved by: | J. Giessner, Chief<br>Branch 4<br>Division of Reactor Projects |

Enclosure

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## SUMMARY OF FINDINGS

Inspection Reports (IR) 05000341/2011003; 07200071/2010001; 04/01/2011 – 06/30/2011; Fermi Power Plant, Unit 2; Radiation Safety and Other Activities.

This report covers a 3-month period of inspection by resident inspectors, announced baseline inspections by regional inspectors, and an inspection of pre-operational testing activities of an Independent Spent Fuel Storage Installation (ISFSI) at the Fermi Power Plant, Unit 2. Two Green findings were identified, one NRC identified and one self-revealed. The findings were considered non-cited violations (NCVs) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). 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. NRC-Identified and Self-Revealed Findings

**Cornerstone: Mitigating Systems**

- Green. A finding of very low safety significance and associated NCV of Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," was identified by the inspectors for failure to provide adequate design control measures for the reactor building radial girders, reactor building concrete floor slab and beam structures, spent fuel pool structure, and spent fuel cask leveling plate which were used to support the spent fuel cask placement. Specifically, the inspectors identified four examples where the licensee failed to perform adequate evaluations of the reactor building radial girders, reactor building concrete floor slab and beam structures, spent fuel pool structure, seismic restrain for multiple purpose canister cask transfer configurations, and spent fuel cask leveling plate in accordance with Seismic Category I requirements as defined in the Updated Final Safety Analysis Report, Section 3.8.4.5.1. The licensee documented the violation examples in condition assessment resolution documents (CARDs) 10-21097, 10-21205, 10-21943, 10-22955, 10-25226, 11-22993, and 11-25507.

  The performance deficiency was determined to be more than minor because if left uncorrected the performance deficiency could lead to a more significant safety concern. The inspectors determined the finding could be evaluated using the SDP in accordance with Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 -- Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered "yes" to the question; is the finding a design qualification deficiency confirmed not to result in loss of operability or functionality in the Mitigating Systems column based on the licensee revising design calculations and initiating modifications where necessary to demonstrate compliance. The inspectors concluded the finding was of very low safety significance (Green). The inspectors identified a Human Performance, Work Practices, management and supervisory oversight (H.4.c) cross-cutting aspect associated with this finding. Specifically, the licensee failed to have adequate oversight of design calculations and documentation for establishing structural

adequacy of the reactor building concrete floor slab, spent fuel pool structure and the spent fuel cask leveling plate used to support spent fuel cask placement. (H.4(c)) (Section 4OA5.4)

**Cornerstone: Occupational Radiation Safety**

- Green. A finding of very low safety significance (Green) was self revealed when two radiation workers entered a high-radiation area without proper authorization. This issue was an NCV of licensee Technical Specification 5.4.1, Procedures. Specifically, radiation workers failed to adhere to a radiation work permit that limited access in the radiologically restricted area to radiation areas. This issue was placed in the licensee's corrective action program as CARD 10-29820.

  The finding was more than minor because the individuals entered into a high radiation area on the wrong RWP, which is similar to the example in IMC 0612, Appendix E, Example 6.H, that states entry to a high radiation area is, "not minor if: The individual was not authorized to enter a high radiation area." In addition it is associated with the human performance attribute of the Occupational Radiation Safety cornerstone and affected the cornerstone objective to ensure adequate protection from exposure to radiation. The finding was determined to be of very low safety significance (Green) because it did not involve the as-low-as-reasonably-achievable program, did not involve an over exposure, did not involve a substantial potential for an over exposure, and did not compromise the ability to assess dose. The finding was not associated with a cross-cutting aspect as no aspects listed in IMC 0310 were characteristic of the finding. (Section 2RS1.7)

## B. Licensee-Identified Violations

No findings were identified.

## REPORT DETAILS

### Summary of Plant Status

Fermi Unit 2 operated at 100 percent power until April 30, 2011, when power was reduced to 65 percent for a rod pattern adjustment. Power was returned to 100 percent on May 1, 2011, and remained there for the rest of the inspection period.

### 1. REACTOR SAFETY

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

1R01 Adverse Weather Protection (71111.01)

.1 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 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 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 corrective action program (CAP) items to verify 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 readiness of offsite and alternate AC power systems sample 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 Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified 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 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 seasonal adverse weather sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.

.3 External Flooding

a. Inspection Scope

As part of Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event," the inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the UFSAR for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors reviewed the last performance of Technical Requirements Manual surveillance SR 3.7.4.1 of the shore barrier. The inspectors walked down the shore barrier. Further, the inspectors conducted independent

walkdowns of selected external and internal flood mitigation equipment to contribute to the overall assessment of the licensee's flood mitigating capabilities. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also walked down underground bunkers/manholes subject to flooding that contained multiple train or multiple function risk-significant cables. The inspectors also reviewed the abnormal operating procedure for mitigating the design basis flood to ensure it could be implemented as written.

This inspection constituted one external flooding sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- control center heating, ventilation, and air conditioning (HVAC) division 1;
- residual heat removal (RHR) division 1;
- high pressure coolant injection (HPCI); and
- core spray system, division 1.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones 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, Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, 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 there were no obvious deficiencies. The inspectors also verified 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 to this report.

These activities constituted four partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. 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:

- auxiliary building, third floor, DC motor control center area and division 2 switchgear;
- reactor building, basement/sub-basement, northwest corner room, RHR;
- auxiliary building, fifth floor, ventilation area;
- auxiliary building, first floor, reactor building closed cooling water area; and
- auxiliary building, fourth floor, reactor building HVAC ventilation and testability panel area.

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

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On May 2, 2011, the inspectors observed a fire brigade activation in response to a fire in the radiation waste control room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified the fire

brigade, radiation protection, and security response was appropriate for the location, type, and size of the fire. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus;
- employment of appropriate firefighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- smoke removal operations; and
- utilization of pre-planned strategies.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant areas to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- turbine building basement;
- auxiliary building, T-room;
- torus room; and
- HPCI room.

This inspection constituted one internal flooding sample as defined in IP 71111.06-05.

b. Findings

No findings were identified.

1R07 Annual Heat Sink Performance (71111.07)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of the emergency diesel generators' (EDG) heat exchangers to verify 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 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. Inspectors also verified that test acceptance criteria considered differences between test conditions, design conditions, and testing 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.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On May 31, 2011, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify 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
- 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 licensed operator requalification program sample as defined in IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- N2100, reactor feedwater supply system;
- N3012, turbine control system;
- C4100, standby liquid control system; and
- E1100, RHR system.

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 Code of Federal Regulations (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.

This inspection constituted four quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

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 the appropriate risk assessments were performed prior to removing equipment for work:

- risk during division 2 ultimate heat sink, safety system outage (SSO), EDG 14 maintenance, and division 2 emergency equipment cooling water/emergency equipment service water maintenance;
- risk during EDG 12, 18-month outage;
- risk during division 1 RHR/RHR Service Water SSO, and work revisions due to weather;
- risk during EDG 11 heat exchanger work; and
- risk during core spray system SSO.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified 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 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 five samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Condition Assessment Resolution Document (CARD) 11-23153, Suction Strainer Debris Headloss for Reflective Metal Insulation;
- CARD 11-00394, Technical Support Center HVAC Air Filter Plugged;
- CARD 11-25029, RCIC Pump Suction Pressure High;

- CARD 11-25198, Multiple TS and Abnormal Operating Procedure Entries Due to Unacceptable Post-Trip Voltages; and
- CARD 11-25922, Drywell Sump Integrator.

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 UFSAR 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 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 (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modifications:

- final design calculation for reactor building, fifth floor (permanent); and
- Temporary Modification 11-0004, Furmanite leak repair of leak downstream of N2100F165B (temporary).

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, as applicable, to verify the modification did not affect the operability or availability of the affected systems. The inspectors, as applicable, observed ongoing and completed work activities to ensure the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and operation of the modifications did not impact the operability of any interfacing systems. As applicable, the inspectors verified relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure the individuals were aware of how the operation with the plant 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 temporary modification sample and one permanent plant modification sample as defined in IP 71111.18-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Post-Maintenance Testing, hydraulic control unit accumulator 14-31 replacement;
- WO 32561603, Perform 24.307.47, EDG 13 Fast Start Followed by Load Reject;
- WO 30498089, Perform 44.120.030, Post Accident Monitor Division 1, Drywell/Torus $H_2O_2$ Quarterly Calibration;
- WO 31305064, Replace Electrolytic Capacitors in Reactor Pressure Vessel Jet Pump No. 17 Square Root Convertor;
- WO 30582865, Perform Mini Motor Operated Valve Inspection for C1152-F003 (Control Rod Drive Pressure Control Valve);
- WO 31110598, Perform 24.206.01, RCIC System Pump Operability and Valve Test at 1000 PSIG; and
- HPCI run following SSO; and
- WO 3287923; Drywell Floor Drain Integrater Inoperable.

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 TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure the test results adequately ensured the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post maintenance 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 eight post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

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:

- Procedure 54.000.03, Control Rod Scram Insert Time Test (routine);
- Procedure 24.408.04, Section 5.1, Division 2 Monthly Stroke of T50-F412B (PCIV);
- Procedure 24.000.02, Attachment 1, Eight Hour Mode 1, 2, 3, Control Room (leakage);
- Procedure 24.202.01, Section 5.1, HPCI Pump Flow Test and Valve Stroke at 1025 PSIG (IST); and
- Procedure 24.307.15, EDG Start and Load Test (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, demonstrated 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; and the calibration frequency was in accordance with TSs, the UFSAR, 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 inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers (ASME) 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.

This inspection constituted two routine surveillance testing sample, one inservice testing sample, one reactor coolant system leak detection inspection sample, and one containment isolation valve samples as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

1EP2 Alert and Notification System Evaluation (71114.02)

.1 Alert and Notification System Evaluation

a. Inspection Scope

The inspectors reviewed documents and conducted discussions with Radiological Emergency Response Plan (RERP) staff and management regarding the operation, maintenance, and periodic testing of the alert and notification system in the Fermi Power Plant's plume pathway emergency planning zone. The inspectors reviewed monthly trend reports and the monthly operability records from March 2009 through March 2011. Information gathered during document reviews and interviews was used to determine whether the alert and notification equipment was maintained and tested in accordance with emergency plan commitments and procedures. Documents reviewed are listed in the Attachment to this report.

This alert and notification system inspection constituted one sample as defined in IP 71114.02-05.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03)

.1 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope

The inspectors reviewed and discussed with plant RERP management and staff the emergency plan commitments and procedures that addressed the primary and alternate methods of initiating an emergency response organization (ERO) activation to augment the on-shift staff as well as the provisions for maintaining the plant's ERO team and qualification lists. The inspectors reviewed reports and a sample of CAP records of unannounced off-hour augmentation tests and pager test, which were conducted between February 2009 and February 2010, to determine the adequacy of the drill critiques and associated corrective actions. The inspectors also reviewed a sample of the RERP training records of approximately 23 ERO personnel, who were assigned to key and support positions, to determine the status of their training as it related to their assigned ERO positions. Documents reviewed are listed in the Attachment to this report.

This emergency response organization augmentation testing inspection constituted one sample as defined in IP 71114.03-05.

b. Findings

No findings were identified.

1EP5 Correction of Emergency Preparedness Weaknesses (71114.05)

.1 Correction of Emergency Preparedness Weaknesses

a. Inspection Scope

The inspectors reviewed the Nuclear Quality Assurance staff's 2010 and 2011 audits of the Fermi Power Plant's emergency preparedness program to determine that the independent assessments met the requirements of 10 CFR 50.54(t). The inspectors also reviewed samples of CAP records associated with the various RERP drills conducted in 2009 and 2010, in order to determine whether the licensee fulfilled drill commitments and to evaluate the licensee's efforts to identify and resolve identified issues. The inspectors reviewed a sample of RERP items and corrective actions related to the station's RERP program and activities to determine whether corrective actions were completed in accordance with the site's CAP. The inspectors additionally reviewed the June 6, 2010, tornado alert event report and records to determine whether the licensee's response was timely and accurate and that any corrective actions had been appropriately identified and addressed. Documents reviewed are listed in the Attachment to this report.

This correction of emergency preparedness weaknesses and deficiencies inspection constituted one sample as defined in IP 71114.05-05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on May 24, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

This inspection constituted one complete sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed all licensee performance indicators for the occupational exposure cornerstone for follow-up. The inspectors reviewed the results of radiation protection program audits (e.g., licensee's quality assurance audits or other independent audits). The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the results of the audit and operational report reviews to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors determined if there have been changes to plant operations since the last inspection that may result in a significant new radiological hazard for onsite workers or members of the public. The inspectors evaluated whether the licensee assessed the potential impact of these changes and has implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

The inspectors conducted walkdowns of the facility, including radioactive waste processing, storage, and handling areas to evaluate material conditions and performed independent radiation measurements to verify conditions.

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

- Radiation Work Permit (RWP) 11-1031, Condensate Backwash Receiver Tank Instrument Repair, Revision 1;
- RWP 11-1011, Perform Corrective Maintenance, Torus Soft Seat Maintenance, Revision 0; and
- RWP 11-1-55, Radwaste Building HVAC Duct Work Cleaning, Revision 1

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

- identification of hot particles;
- the presence of alpha emitters;
- the potential for airborne radioactive materials, including the potential presence of transuranics and/or other hard-to-detect radioactive materials (This evaluation may include licensee planned entry into non-routinely entered areas subject to previous contamination from failed fuel);
- 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
- severe radiation field dose gradients that can result in non-uniform exposures of the body.

The inspectors observed work 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. The inspectors evaluated the licensee's program for monitoring levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne.

b. Findings

No findings were identified.

.3 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that may cause unplanned or inadvertent exposure of workers, and assessed whether the containers were labeled and controlled in accordance with 10 CFR 20.1904, "Labeling Containers," or met the requirements of 10 CFR 20.1905(g), "Exemptions To Labeling Requirements".

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

- RWP 11-1031, Condensate Backwash Receiver Tank Instrument Repair, Revision 1;
- RWP 11-1011, Perform Corrective Maintenance, Torus Soft Seat Maintenance, Revision 0; and
- RWP 11-1-55, Radwaste Building HVAC Duct Work Cleaning, Revision 1

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 electronic personal dosimeter alarm set-points were in conformance with survey indications and plant policy.

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter 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.

For work activities that could suddenly and severely increase radiological conditions, the inspectors assessed the licensee's means to inform workers of changes that could significantly impact their occupational dose.

b. Findings

No findings were identified.

.4 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitors potentially contaminated material leaving the radiological control area and inspected the methods used for control, survey, and release from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures and

whether the procedures were sufficient to control the spread of contamination and prevent unintended release of radioactive materials from the site. The inspectors assessed whether the radiation monitoring instrumentation had appropriate sensitivity for the type(s) of radiation present.

The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material. The inspectors evaluated whether there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material.

The inspectors reviewed the licensee's procedures and records to verify the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors assessed whether or not the licensee has established a de facto "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high-radiation background area.

The inspectors selected several sealed sources from the licensee's inventory records and assessed whether the sources were accounted for and verified to be intact.

The inspectors evaluated whether any transactions, since the last inspection, involving nationally tracked sources were reported in accordance with 10 CFR 20.2207.

b. Findings

No findings were identified.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions (e.g., radiation levels or potential radiation levels) during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, RWPs, and worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage (including audio and visual surveillance for remote job coverage), and contamination controls. The inspectors evaluated the licensee's use of electronic personal dosimeters in high noise areas as high radiation area 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.

The inspectors reviewed RWPs for work within airborne radioactivity areas with the potential for individual worker internal exposures. There was no scheduled work in airborne radioactivity areas.

For these RWPs, the inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels (e.g., grinding, grit blasting, system breaches, entry into tanks, cubicles, and reactor cavities). The inspectors assessed barrier (e.g., tent or glove box) integrity and temporary high-efficiency particulate air ventilation system operation.

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

The inspectors examined the posting and physical controls for selected high radiation areas and very high radiation areas to verify conformance with the occupational performance indicator.

b. Findings

No findings were identified.

.6 Risk Significant High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors discussed with the radiation protection manager the controls and procedures for high-risk high radiation areas and very high radiation areas. The inspectors discussed methods employed by the licensee to provide stricter control of very high radiation area access as specified in 10 CFR 20.1602, "Control of Access to Very High Radiation Areas," and Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Plants." The inspectors assessed whether any changes to licensee procedures substantially reduce the effectiveness and level of worker protection.

The inspectors discussed the controls in place for special areas that have the potential to become very high radiation areas during certain plant operations with first-line health physics supervisors (or equivalent positions having backshift health physics oversight authority). The inspectors assessed whether these plant operations require communication beforehand with the health physics group, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards including re-access authorization.

The inspectors evaluated licensee controls for very high radiation areas and areas with the potential to become a very high radiation area to ensure that an individual was not able to gain unauthorized access to the very high radiation area.

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors assessed whether workers were aware of the radiological conditions in their workplace and the RWP controls/limits in place, and whether their performance reflected the level of radiological hazards present.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. The inspectors discussed with the radiation protection manager any problems with the corrective actions planned or taken.

b. Findings

Introduction: A finding of very low safety significance (Green) was self-revealed when two radiation workers entered a high radiation area without proper authorization. This issue was an NCV of licensee TS 5.4.1, Procedures. Specifically, radiation workers failed to adhere to an RWP that limited access in the radiologically restricted area to radiation areas.

Description: On October 30, 2010, two contract pipefitters were tasked to locate a valve as part of planning a maintenance activity. The workers knew the valve was in the northeast or southwest quad (corner rooms). The workers were given a brief by a radiation protection technician. The workers electronically signed on to RWP 10-2011-Task 1. This RWP task authorized entry into the radiologically restricted area, but limited access to radiation areas only. By signing the RWP, each worker acknowledged that he/she read and understood the authorized activity under the RWP. During the entry to the radiologically restricted area, the workers could not locate the valve. Without contacting radiation protection, the workers entered the top of the torus through the RB-1 south floor plug. The workers dressed out in protective clothing prior to entering torus room. The portion of the torus room that the workers enter was posted as a high radiation area/contaminated area. The high radiation area signs, rope boundaries and swing gate were clearly visible when the workers entered. Each worker traversed the top of the torus, to a ladder. Each worker then climbed down the ladder to the basement level and entered the northwest corner room. One worker received an electronic dosimeter (ED) dose rate alarm on a dose of 107 millirem per hour. The ED dose rate alarm was set at 100 millirem per hour. The workers responded appropriately to the alarm by exiting the area and reporting the alarming ED to radiation protection.

In accordance with plant procedures, the licensee commenced an investigation. The licensee's investigation concluded the workers entered the high radiation. The licensee removed access authorization for the two individuals. The licensee also removed access authorization for that contract work group on the day shift in order to conduct a stand-down prior to continuing work. A stand-down was conducted for the on-coming night shift prior to allowing access to the radiologically restricted area.

After investigating the event, the licensee dismissed the two workers for failure to follow licensee procedures and the RWP limitations. The event and investigation were entered into the licensee's CAP as CARD 10-29820.

Analysis: The radiation workers' failure to adhere to the RWP instructions and limitations was a performance deficiency. The finding was more than minor because the individuals entered into a high radiation area on the wrong RWP, which is similar to the example in Inspection Manual Chapter (IMC) 0612, Appendix E, Example 6.H, that states entry to a high radiation area is, "not minor if: The individual was not authorized to enter a high radiation area." In addition it is associated with the human performance attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection from exposure to radiation. The finding is not subject to Traditional Enforcement because it did not affect the regulatory process or result in actual safety consequences. The inspectors evaluated the significance of this finding using IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because it did not involve the as-low-as-reasonably-achievable (ALARA) program, did not involve an overexposure, did not involve a substantial potential for an overexposure and did not compromise the ability to assess dose. The inspectors determined during the review of this issue, that the licensee ensured supervisory and management oversight of work activities. The finding was not associated with a cross-cutting aspect as no aspects listed in IMC 0310 were characteristic of the finding.

Enforcement: Technical Specification 5.4.1 requires that written procedures shall be established, implemented, and maintained covering the following activities applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A of Regulatory Guide 1.33, Section 7.e.1, references procedure for access control to radiation areas. Licensee Procedure MRP04, "Accessing and Working in the Radiologically Restricted Area," Section 4.2 requires all employees using an RWP, 1) be knowledgeable of radiological conditions in all areas entered; and 2) sign on to the RWP, sign the access sheet, and acknowledge understanding and compliance with the RWP and not deviate from the RWP, unless specifically authorized by radiation protection. Contrary to these requirements, on October 30, 2010, two contract radiation workers failed to properly implement RWP 10-2011, Task 1, by entering a high radiation area. Radiation Work Permit 10-2011, Task 1, authorized entry into the radiologically restricted area, but restricted individuals to work in radiation areas only. This was a violation. Because this violation was of very low safety significance and it was entered into the licensee's CAP, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2011003-01, Entry to a High Radiation Area on the Wrong Radiation Work Permit)

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors observed the performance of the radiation protection technicians with respect to all radiation protection work requirements. The inspectors evaluated whether technicians were aware of the radiological conditions in their workplace and the RWP

controls/limits, and whether their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be radiation protection technician error. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

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 involve radiation monitoring and exposure 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 complete sample as defined in IP 71124.03-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the plant UFSAR to identify areas of the plant designed as potential airborne radiation areas and any associated ventilation systems or airborne monitoring instrumentation. Instrumentation review included continuous air monitors (continuous air monitors and particulate-iodine-noble-gas-type instruments) used to identify changing airborne radiological conditions such that actions to prevent an overexposure may be taken. The review included an overview of the respiratory protection program and a description of the types of devices used. The inspectors reviewed UFSAR, TSs, and emergency planning documents to identify the location and quantity of respiratory protection devices stored for emergency use.

Inspectors reviewed the licensee's procedures for maintenance, inspection, and use of respiratory protection equipment including self-contained breathing apparatus as well as procedures for air quality maintenance.

The inspectors reviewed reported performance indicators to identify any related to unintended dose resulting from intakes of radioactive material.

b. Findings

No findings were identified.

.2 Engineering Controls (02.02)

a. Inspection Scope

The inspectors reviewed the licensee's use of permanent and temporary ventilation to determine whether the licensee uses ventilation systems as part of its engineering controls (in lieu of respiratory protection devices) to control airborne radioactivity. The inspectors reviewed procedural guidance for use of installed plant systems, such as containment purge, spent fuel pool (SFP), ventilation, and auxiliary building ventilation, and assessed whether the systems are used, to the extent practicable, during high-risk activities.

The inspectors selected installed ventilation systems used to mitigate the potential for airborne radioactivity, and evaluated whether the ventilation airflow capacity, flow path (including the alignment of the suction and discharges), and filter/charcoal unit efficiencies, as appropriate, were consistent with maintaining concentrations of airborne radioactivity in work areas below the concentrations of an airborne area to the extent practicable.

The inspectors selected temporary ventilation system setups (high-efficiency particulate air/charcoal negative pressure units, down draft tables, tents, metal "Kelly buildings," and other enclosures) used to support work in contaminated areas. The inspectors assessed whether the use of these systems is consistent with licensee procedural guidance and the ALARA concept.

The inspectors reviewed airborne monitoring protocols by selecting installed systems used to monitor and warn of changing airborne concentrations in the plant and evaluating whether the alarms and setpoints are sufficient to prompt licensee/worker action to ensure doses are maintained within the limits of 10 CFR Part 20 and the ALARA concept.

The inspectors assessed whether the licensee had established trigger points (e.g., the Electric Power Research Institute's "Alpha Monitoring Guidelines for Operating Nuclear Power Stations") for evaluating levels of airborne beta-emitting (e.g., plutonium-241) and alpha-emitting radionuclides.

b. Findings

No findings were identified.

.3 Use of Respiratory Protection Devices (02.03)

a. Inspection Scope

For those situations where it is impractical to employ engineering controls to minimize airborne radioactivity, the inspectors assessed whether the licensee provided respiratory protective devices such that occupational doses are ALARA. The inspectors selected work activities where respiratory protection devices were used to limit the intake of radioactive materials, and assessed whether the licensee performed an evaluation concluding that further engineering controls were not practical and the use of respirators is ALARA. The inspectors also evaluated whether the licensee had established means (such as routine bioassay) to determine if the level of protection (protection factor) provided by the respiratory protection devices during use was at least as good as that assumed in the licensee's work controls and dose assessment.

The inspectors assessed whether respiratory protection devices used to limit the intake of radioactive materials were certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration or have been approved by the NRC per 10 CFR 20.1703(b). The inspectors selected work activities where respiratory protection devices were used. The inspectors evaluated whether the devices were used consistent with their National Institute for Occupational Safety and Health/Mine Safety and Health Administration certification or any conditions of their NRC approval.

The inspectors reviewed records of air testing for supplied-air devices and self-contained breathing apparatus bottles to assess whether the air used in these devices meets or exceeds Grade D quality. The inspectors reviewed plant breathing air supply systems to determine whether they meet the minimum pressure and airflow requirements for the devices in use.

The inspectors selected several individuals qualified to use respiratory protection devices and assessed whether they have been deemed fit to use the devices by a physician.

The inspectors selected several individuals assigned to wear a respiratory protection device and observed them donning, doffing, and functionally checking the device as appropriate. Through interviews with these individuals, the inspectors evaluated whether they knew how to safely use the device and how to properly respond to any device malfunction or unusual occurrence (loss of power, loss of air, etc.).

The inspectors chose multiple respiratory protection devices staged and ready for use in the plant or stocked for issuance for use. The inspectors assessed the physical condition of the device components (mask or hood, harnesses, air lines, regulators, air bottles, etc.) and reviewed records of routine inspection for each. The inspectors selected several of the devices and reviewed records of maintenance on the vital components (e.g., pressure regulators, inhalation/exhalation valves, hose couplings).

b. Findings

No findings were identified.

.4 Self-Contained Breathing Apparatus for Emergency Use (02.04)

a. Inspection Scope

Based on the UFSAR, TSs, and emergency operating procedure requirements, the inspectors reviewed the status and surveillance records of self-contained breathing apparatuses staged in-plant for use during emergencies. The inspectors reviewed the licensee's capability for refilling and transporting self-contained breathing apparatus air bottles to and from the control room and operations support center during emergency conditions.

The inspectors selected several individuals on control room shift crews and from designated departments currently assigned emergency duties (e.g., onsite search and rescue duties) to assess whether control room operators and other emergency response and radiation protection personnel (assigned in-plant search and rescue duties or as required by emergency operating procedures or the emergency plan) were trained and qualified in the use of self-contained breathing apparatuses (including personal bottle change-out). The inspectors evaluated whether personnel assigned to refill bottles were trained and qualified for that task.

The inspectors determined whether appropriate mask sizes and types are available for use (i.e., in-field mask size and type match what was used in fit-testing). The inspectors determined whether on-shift operators had no facial hair that would interfere with the sealing of the mask to the face and whether vision correction (e.g., glasses inserts or corrected lenses) was available as appropriate.

The inspectors reviewed the past two years of maintenance records for select self-contained breathing apparatus units used to support operator activities during accident conditions and designated as "ready for service" to assess whether any maintenance or repairs on any self-contained breathing apparatus unit's vital components were performed by an individual, or individuals, certified by the manufacturer of the device to perform the work. The vital components typically are the pressure-demand air regulator and the low-pressure alarm. The inspectors reviewed the onsite maintenance procedures governing vital component work to determine any inconsistencies with the self-contained breathing apparatus manufacturer's recommended practices. For those self-contained breathing apparatuses designated as "ready for service," the inspectors determined whether the required periodic air cylinder hydrostatic testing was documented and up to date, and the retest air cylinder markings required by the U.S. Department of Transportation were in place.

b. Findings

No findings were identified.

.5 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee CAP. The inspectors assessed whether the corrective actions were appropriate for a selected

sample of problems involving airborne radioactivity and were appropriately documented by the licensee.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

This inspection constituted one complete sample as defined in IP 71124.04-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the results of radiation protection program audits related to internal and external dosimetry (e.g., licensee's quality assurance audits, self-assessments, or other independent audits) to gain insights into overall licensee performance in the area of dose assessment and focus the inspection activities consistent with the principle of "smart sampling."

The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program accreditation report on the vendor's most recent results to determine the status of the contractor's accreditation.

A review was conducted of the licensee procedures associated with dosimetry operations, including issuance/use of external dosimetry (routine, multi-badging, extremity, neutron, etc.), assessment of internal dose (operation of whole body counter, assignment of dose based on derived air concentration hours, urinalysis, etc.), and evaluation of and dose assessment for radiological incidents (distributed contamination, hot particles, loss of dosimetry, etc.).

The inspectors evaluated whether the licensee had established procedural requirements for determining when external and internal dosimetry is required.

b. Findings

No findings were identified.

.2 External Dosimetry (02.02)

a. Inspection Scope

The inspectors evaluated whether the licensee's dosimetry program is National Voluntary Laboratory Accreditation Program accredited and if the approved irradiation test categories for each type of personnel dosimeter used are consistent with the types and energies of the radiation present and the way the dosimeter is being used (e.g., to measure deep dose equivalent, shallow dose equivalent, or lens dose equivalent).

The inspectors evaluated the onsite storage of dosimeters before their issuance, during use, and before processing/reading. The inspectors also reviewed the guidance provided to radiation workers with respect to care and storage of dosimeters.

The inspectors assessed whether non-National Voluntary Laboratory Accreditation Program accredited passive dosimeters (e.g., direct ion storage sight read dosimeters) were used according to licensee procedures that provide for periodic calibration, application of calibration factors, usage, reading (dose assessment) and zeroing.

The inspectors assessed the use of active dosimeters (electronic personal dosimeters) to determine if the licensee uses a “correction factor” to address the response of the electronic personal dosimeter as compared to the passive dosimeter for situations when the electronic personal dosimeter must be used to assign dose and whether the correction factor is based on sound technical principles.

The inspectors reviewed dosimetry occurrence reports or CAP documents for adverse trends related to electronic personal dosimeters, such as interference from electromagnetic frequency, dropping or bumping, failure to hear alarms, etc. The inspectors assessed whether the licensee had identified any trends and implemented appropriate corrective actions.

b. Findings

No findings were identified.

.3 Internal Dosimetry (02.03)

a. Inspection Scope

(1) Routine Bioassay (In Vivo)

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

The inspectors selected several whole body counts and evaluated whether the counting system used had sufficient counting time/low background to ensure appropriate sensitivity for the potential radionuclides of interest. The inspectors reviewed the radionuclide library used for the count system to determine its appropriateness. The inspectors evaluated whether any anomalous count peaks/nuclides indicated in each output spectra received appropriate disposition. The inspector's reviewed the licensee's 10 CFR Part 61 data analyses to determine whether the nuclide libraries included appropriate gamma-emitting nuclides. The inspectors evaluated how the licensee accounts for hard-to-detect nuclides in the dose assessment.

(2) Special Bioassay (In Vitro)

There were no internal dose assessments obtained using in vitro monitoring for the inspectors to review. The inspectors reviewed and assessed the adequacy of the licensee's program for in vitro monitoring (i.e., urinalysis and fecal analysis) of radionuclides (tritium, fission products, and activation products), including collection and storage of samples.

The inspectors reviewed the vendor laboratory quality assurance program and assessed whether the laboratory participated in an industry recognized cross-check program including whether out-of-tolerance results were resolved appropriately.

(3) Internal Dose Assessment – Airborne Monitoring

The inspectors reviewed the licensee's program for airborne radioactivity assessment and dose assessment, as applicable, based on airborne monitoring and calculations of derived air concentration. The inspectors determined whether flow rates and collection times for air sampling equipment were adequate to allow lower limits of detection to be obtained. The inspectors also reviewed the adequacy of procedural guidance to assess internal dose if respiratory protection was used.

(4) Internal Dose Assessment – Whole Body Count Analyses

The inspectors reviewed several dose assessments performed by the licensee using the results of whole body count analyses. The inspectors determined whether affected personnel were properly monitored with calibrated equipment and that internal exposures were assessed consistent with the licensee's procedures.

b. Findings

No findings were identified.

.4 Special Dosimetric Situations (02.04)

a. Inspection Scope

(1) Declared Pregnant Workers

The inspectors assessed whether the licensee informs workers, as appropriate, of the risks of radiation exposure to the embryo/fetus, the regulatory aspects of declaring a pregnancy, and the specific process to be used for (voluntarily) declaring a pregnancy.

The inspectors selected individuals who had declared pregnancy during the current assessment period and evaluated whether the licensee's radiological monitoring program (internal and external) for declared pregnant workers is technically adequate to assess the dose to the embryo/fetus. The inspectors reviewed exposure results and monitoring controls employed by the licensee and with respect to the requirements of 10 CFR Part 20.

(2) Dosimeter Placement and Assessment of Effective Dose Equivalent for External Exposures

The inspectors reviewed the licensee's methodology for monitoring external dose in non-uniform radiation fields or where large dose gradients exist. The inspectors evaluated the licensee's criteria for determining when alternate monitoring, such as use of multi-badging, was to be implemented.

The inspectors reviewed dose assessments performed using multi-badging to evaluate whether the assessment was performed consistently with licensee procedures and dosimetric standards.

(3) Shallow Dose Equivalent

The inspectors reviewed shallow dose equivalent dose assessments for adequacy. The inspectors evaluated the licensee's method (e.g., VARSKIN or similar code) for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles.

(4) Neutron Dose Assessment

The inspectors evaluated the licensee's neutron dosimetry program, including dosimeter types and/or survey instrumentation.

The inspectors reviewed neutron exposure situations (e.g., independent spent fuel storage installation operations or at-power containment entries) and assessed whether: (a) dosimetry and/or instrumentation was appropriate for the expected neutron spectra, (b) there was sufficient sensitivity for low dose and/or dose rate measurement, and (c) neutron dosimetry was properly calibrated. The inspectors also assessed whether interference by gamma radiation had been accounted for in the calibration and whether time and motion evaluations were representative of actual neutron exposure events, as applicable.

(5) Assigning Dose of Record

For the special dosimetric situations reviewed in this section, the inspectors assessed how the licensee assigns dose of record for total effective dose equivalent, shallow dose equivalent, and lens dose equivalent. This included an assessment of external and internal monitoring results, supplementary information on individual exposures (e.g., radiation incident investigation reports and skin contamination reports), and radiation surveys and/or air monitoring results when dosimetry was based on these techniques.

b. Findings

No findings were identified.

.5 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors assessed whether problems associated with occupational dose assessment are being identified by the licensee at an appropriate threshold and are 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 involving occupational dose assessment.

b. Findings

No findings were identified.

## 4. OTHER ACTIVITIES

**Cornerstones: Mitigating Systems and Barrier Integrity**

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (MS05)

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for the period from the first quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator (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, dated October 2009, 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 work orders, issue reports, event reports and NRC integrated inspection reports for the period of January 2010 through March 2011 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 safety system functional failures sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index - High Pressure Injection Systems (MS07)

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - High Pressure Injection Systems PI for the period from the third quarter 2010 through the first quarter 2011. 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, dated October 2009, were used. The inspectors reviewed the licensee’s operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of July 2010, through March 2011, 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 MSPI - high pressure injection system sample as defined in IP 71151-05.

.3 Reactor Coolant System Leakage (BI02)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system leakage PI for the period from the first quarter 2010 through the first quarter 2011. 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, dated October 2009, were used. The inspectors reviewed the licensee's operator logs, reactor coolant system leakage tracking data, issue reports, event reports, and NRC integrated inspection reports for the period of January 2010 through March 2011 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 reactor coolant system leakage sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, adequate attention was being given to timely corrective actions, and adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and 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 Attachment to this report.

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 condition report 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 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six month period of January 2011 through June 2011, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or reworks maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

The inspectors reviewed a potential adverse trend with the licensee's repetitive equipment failures particularly the implementation of a program by the plant health

committee to track and prioritize issues. For example, the inspectors noted the following issues related to equipment failures:

- CARD 10-31830, Decline in Performance Indicators;
- CARD 10-28365, Equipment Reliability Report—Resolution of Repetitive Failures;
- multiple repeated issues with the process radiation monitor system; and
- issues obtaining replacement parts for aging equipment.

These issues are documented in the licensee's CAP. The licensee is tracking repetitive failures and PI declining trends through the plant health committee and will continue to implement corrective actions as needed.

This review constituted one semi-annual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings were identified.

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

.1 (Closed) Licensee Event Report 05000341/2010004-00: High Pressure Coolant Injection System Inoperable due to Inoperable Minimum Flow Valve

On December 28, 2010, during the HPCI turbine trip portion of a HPCI surveillance test, the HPCI minimum flow valve open and close indication lights in the control room began blinking simultaneously. After a short duration, the blinking faded and both indicators went out. The HPCI minimum flow valve did not fully close as expected. Operations declared the valve inoperable at 1220 Eastern Standard Time. Following trouble shooting and repair, the valve was tested successfully and returned to service. The HPCI system was declared operable at 1027 Eastern Standard Time on December 30, 2010. Safety consequences of the event were determined to be low. The issue was documented in the licensee's CAP as CARD 10-32191. Because this was discovered during the licensee's normal testing program, no findings were identified and no violation of NRC requirements occurred. Documents reviewed in this inspection are listed in the Attachment to this report. This Licensee Event Report (LER) is closed.

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

.2 (Closed) Unresolved Item 2010005-02 "Standby Liquid Control Test Tank Operability"

a. Inspection Scope

The inspectors identified an unresolved item (URI) for past operability of the standby liquid control (SLC) system and for the adequacy of the procedures utilized to perform the periodic SLC pump test. Specifically, the inspectors identified that the demineralized water in the SLC test tank had not been drained following each periodic test of the SLC pumps as a legacy condition. Further, they noted the SLC test tank could affect the SLC system operability following a seismic event, if there was still demineralized water remaining in the test tank. The operability evaluation provided by engineering concluded the mounting of the SLC test tank would remain in place and it would not impact the

adjacent safety-related equipment. The engineering analysis determined the SLC test tank was operable when water filled but was not within the design calculations. The plant procedure (24.139.02) used to periodically test the SLC pumps, as required by TS 3.1.7, did not require draining of the SLC test tank following testing. The procedure did not incorporate the General Electric maintenance instruction guidance to drain the test tank following pump testing. As an interim measure, the SLC test tank was drained of demineralized water, and the SLC pump testing procedure was revised to include guidance to drain the SLC test tank following testing. The inspectors did not identify any findings during their follow-up to this issue. This closes URI 2010005-02.

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) Temporary Instruction 2515/179, "Verification of Licensee Responses to NRC Requirement for Inventories of Materials Tracked in the National Source Tracking System Pursuant to Title 10, Code of Federal Regulations, Part 20.2207 (10 CFR 20.2207)"

a. Inspection Scope

The inspectors confirmed that the licensee has reported the initial inventories of sealed sources pursuant to 10 CFR 20.2207 and verified that the National Source Tracking System database correctly reflects the Category 1 and 2 sealed sources in custody of the licensee. Inspectors interviewed personnel and performed the following:

- reviewed the licensee's source inventory;
- verified the presence of any Category 1 or 2 sources;
- reviewed procedures for and evaluated the effectiveness of storage and handling of sources;
- reviewed documents involving transactions of sources; and
- reviewed adequacy of licensee maintenance, posting, and labeling of nationally tracked sources.

b. Findings

No findings were identified.

.2 (Closed) NRC Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

The inspectors assessed the activities and actions taken by the licensee to assess its readiness to respond to an event similar to the Fukushima Daiichi nuclear plant fuel damage event. This included (1) an assessment of the licensee's capability to mitigate conditions that may result from beyond design basis events, with a particular emphasis on strategies related to the SFP, as required by NRC Security Order Section B.5.b issued February 25, 2002, as committed to in severe accident management guidelines

(SAMGs), and as required by 10 CFR 50.54(hh); (2) an assessment of the licensee's capability to mitigate station blackout conditions, as required by 10 CFR 50.63 and station design bases; (3) an assessment of the licensee's capability to mitigate internal and external flooding events, as required by station design bases; and (4) an assessment of the thoroughness of the walkdowns and inspections of important equipment needed to mitigate fire and flood events, which were performed by the licensee to identify any potential loss of function of this equipment during seismic events possible for the site.

Inspection Report 05000341/2011011 (ML111320352) documented detailed results of this inspection activity. Following issuance of the report, the inspectors conducted detailed follow-up on selected issues.

.3 (Closed) NRC Temporary Instruction 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines"

On May 17, 2011, the inspectors completed a review of the licensee's SAMGs, implemented as a voluntary industry initiative in the 1990's, to determine (1) whether the SAMGs were available and updated, (2) whether the licensee had procedures and processes in place to control and update its SAMGs, (3) the nature and extent of the licensee's training of personnel on the use of SAMGs, and (4) licensee personnel's familiarity with SAMG implementation.

The results of this review were provided to the NRC task force chartered by the Executive Director for Operations to conduct a near-term evaluation of the need for agency actions following the Fukushima Daiichi fuel damage event in Japan. Plant-specific results for the Fermi station were provided as an enclosure to a memorandum to the Chief, Reactor Inspection Branch, Division of Inspection and Regional Support, dated June 1, 2011 (ML111520396).

.4 Preoperational Testing of an Independent Spent Fuel Storage Facility Installation at Operating Plants (60854.1)

a. Inspection Scope

(1) Control of Heavy Loads

The inspectors initiated a review of the licensee's crane and heavy loads program with regard to independent spent fuel storage facility installation (ISFSI) operations in 2010 as previously documented in NRC Inspection report No. 05000341/2010003.

The inspectors completed their review of documentation associated with the reactor building crane support structure modifications to restore conformance. The review also included structural evaluations associated with the seismic design of the trolley girder, crane bridge girders, crane earthquake restraints, modifications affecting the operating plant, floor loading in the SFP and other floor loading cask placement areas in the reactor building.

The inspectors also reviewed seismic restraints which were planned for use during placement of the transfer cask (HI-TRAC) on top of the storage cask (HI-STORM) during multi-purpose canister (MPC) transfer operations in the reactor building. The associated safety evaluations and screenings were also reviewed.

During the licensee's internal review of the reactor building first floor supporting structure loading analyses, it was identified that the existing reactor building first floor reinforced concrete floor beams which support the reactor building first floor rails, would exceed design code allowable values under a design basis seismic event when a HI-STORM storage cask loaded with spent nuclear fuel is placed on top of a low profile transporter at certain locations on the rails. The licensee concluded this was not a condition affecting the building's current ability to fulfill its design basis requirements as the HI-STORM had not been brought into the reactor building structure; however, this issue required further evaluation and was documented in CARD 11-25373. The licensee has delayed ISFSI operations pending resolution of this issue.

(2) Dry Run Activities

During this inspection period, the licensee performed several, but not all, preoperational dry run activities in order to fulfill the requirements of the Certificate of Compliance. The NRC inspectors were onsite to observe dry run activities January 27 through January 29, 2010 and March 8 through March 10, 2010. These activities included MPC processing and sealing operation dry runs.

The inspectors observed the licensee perform MPC processing activities. The licensee demonstrated MPC hydrostatic testing, blow-down, vacuum drying, and helium backfilling. The inspectors observed the licensee demonstrate MPC unloading dry run activities. The licensee demonstrated the ability to retrieve MPC gas samples and reflood a MPC prior to unloading. The inspectors observed the licensee perform MPC sealing operations using a contract welding vendor. The inspectors verified adequate communication and team work between departments and adherence to procedures.

The licensee has postponed the remaining required dry run operations in order to resolve design issues associated with the reactor building first floor support structure. Upon resolution of the open issues and prior to initial spent fuel loading, the licensee will complete the balance of dry runs associated with: movement of the MPC and HI-TRAC into the SFP, selection and verification of fuel assemblies, movement of dummy fuel assemblies into the MPC, remote installation of the MPC lid, removal of the MPC and HI-TRAC from the SFP, MPC transfer from the HI-TRAC to HI-STORM (Stackup), and placement of the HI-STORM at the ISFSI.

The inspectors reviewed cask inspection, loading, storage, and unloading procedures to ensure they contained requirements and commitments specified in the license, the TS, the Holtec Final Safety Analysis Report (FSAR), and 10 CFR Part 72. The inspectors will re-review major procedure changes, if any, prior to initial loading.

(3) Fuel Selection

The inspectors reviewed the licensee's program associated with fuel characterization and selection for storage. The inspectors reviewed licensee procedure 53.000.09; Dry Cask Storage Fuel Selection for Cask Loading, Revision 2, to ensure the procedure contained adequate instruction and criteria for reactor engineering personnel to select appropriate fuel in accordance with the TS approved loading contents. The inspectors reviewed cask fuel selection packages to verify the licensee was loading fuel in accordance with the TS. The licensee did not plan to load any damaged or high burn-up fuel assemblies during the initial campaign. The inspectors will re-review changes, if any, to the licensee's fuel selection program prior to initial loading.

(4) Radiation Protection

The inspectors evaluated the licensee's radiation protection program pertaining to the operation of the ISFSI. The inspectors reviewed the licensee's procedures describing the methods and techniques used when performing dose rate and surface contamination surveys. The inspectors verified the licensee's RP staff considered lessons learned from other utilities' spent fuel loading campaigns during development of the radiological controls for the loading, storage and unloading operations. The inspectors interviewed licensee personnel to verify their knowledge regarding the scope of the work and the radiological hazards associated with transfer and storage of spent fuel. The inspectors verified the licensee's procedures contained quantitative radiation dose rate limits to ensure dose rate limits and surveillance requirements of the TS and 10 CFR Part 72 requirements were met. The inspectors reviewed licensee dose rate calculations to verify the licensee's ISFSI was in compliance with 10 CFR 72.104, "Criteria for Radioactive Materials in Effluents and Direct Radiation from an ISFSI or MRS [Monitored Retrievable Storage Installation]."

(5) Training

The inspectors reviewed the licensee's ISFSI Training Program, which consisted of the job they were responsible to perform. The inspectors also reviewed training records and qualifications of individuals performing work activities associated with the ISFSI. The inspectors interviewed licensee personnel to verify they were knowledgeable in the scope of work that was being performed. The inspectors attended licensee dry run demonstrations used to train individuals and attended pre-job briefings associated with the dry runs.

(6) Quality Assurance

The inspectors reviewed the licensee's Quality Assurance Program as it applied to the ISFSI. The Fermi Power Plant, Unit 2, has incorporated the ISFSI Quality Assurance Program into their established 10 CFR Part 50 Quality Assurance Program as allowed by 10 CFR 72.140(d). The inspectors reviewed procedures pertaining to the receipt inspection of MPCs. The inspectors reviewed records for the use of 99.995 percent pure helium during backfilling.

(7) Emergency Preparedness and Fire Protection

The inspectors reviewed the licensee's Emergency Preparedness Plan required by 10 CFR 50.47 for conformance with 10 CFR 72.32(c). The inspectors verified the licensee incorporated emergency action levels into the emergency plan to address the possible emergency scenarios, their classification, and recovery actions associated with the ISFSI.

b. Findings

(1) Spent Fuel Cask Lay-down Areas Did Not Meet Seismic Category I Requirements

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified by the inspectors for failure to provide adequate design control measures for the reactor building radial girders, reactor building concrete floor slab and beam structures, SFP

structure, seismic restrain for MPC cask transfer configurations, and spent fuel cask leveling plate used to support the spent fuel cask placement. Specifically, the inspectors identified four examples where the licensee failed to perform adequate evaluations of the reactor building radial girders, reactor building concrete floor slab and beam structures, SFP structure, and spent fuel cask leveling plate in accordance with Seismic Category I requirements as defined in UFSAR Section 3.8.4.3.1 and 3.8.4.5.1.

Description: The process of safely moving spent nuclear fuel from the SFP into dry storage will place heavy loads on existing structures and components that need to be evaluated to ensure structural integrity.

The reactor building structure is required to be Seismic Category I per UFSAR, table 3.2-1, "Structures, Systems, and Components Classification." The SFP structure was designed to be Seismic Category I per NUREG-0798, "Safety Evaluation Report Related to the Operation of Enrico Fermi Atomic Power Plant, Unit No. 2," July 1981.

The reactor building structure provides secondary containment when the primary containment is closed and in service, and it provides primary containment during reactor refueling and maintenance operations when the primary containment is open as described in UFSAR 3.8.4.1.1.1.

The reactor building completely encloses the drywell and the suppression chamber is supported on the reactor building foundation mat. The reactor building structure also houses and supports safety-related systems and components such as the torus, RHR system and core spray. The spent-fuel storage pool, dryer-separator pool, and reactor refueling pool are reinforced concrete structures completely lined with seam-welded stainless steel plate. The stainless steel liners prevent leakage.

During a review of the calculations for spent fuel cask laydown areas, the inspectors identified four examples where the licensee failed to meet the requirements in 10 CFR Part 50, Appendix B, Criterion III, "Design Control."

1) Calculation SS-0003-2, Volume I, DCD 1, "Rx/Aux. Bldg-Final Load Verif. Phase 2 First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2)," Revision A.

   UFSAR, Section 3.8.4.5, "Structural Acceptance Criteria" and Section 3.8.4.5.1, "Reactor/Auxiliary Building" states, "Stresses and strains in the structural steel used for the reactor/auxiliary building are limited to those specified in the 1969 AISC Specifications…." The requirement in the American Institute of Steel Construction (AISC) was that the allowable shear stress was based on 0.4 times the specified minimum yield stress of the material. The licensee used an allowable shear stress based on minimum yield strength of the material for the evaluation of the reactor building torus area slab radial steel beams RBG-5, RBG-6, and RBG-14. The use of actual material yield strength did not meet AISC requirements. The licensee documented these deficiencies in CARDs 10-21097, 10-21205, and 10-21943.

2) Calculation SS-0003-2, Volume I, DCD 1, "Rx/Aux. Bldg-Final Load Verif. Phase 2, First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2)," Revision A; Calculation SS-0009-2, Vol. I, DCD 2, "Rx/Aux. Bldg – Final Load

Verification Phase 2 El. 684'-6" & 677'-6," Revision A; and Calculation NO-10, "SFP-Qualification of Loaded HI-TRAC, HI 2083941," Volume I, DCD 1, Revision A.

UFSAR Section 3.8.4.5.1 states, "The stresses and strains in the reinforced-concrete walls, floor slabs, beams, and equipment supports in the reactor/auxiliary building are limited to those specified in ACI 318-63 and/or ACI 318-71." American Concrete Institute (ACI) 318-63 Section 504 (b) and ACI 318-71 Section 4.1.4 requires that concrete compressive strength be based on a 28-day test. The 28-day compressive strength value for the reactor building was 4,000 pounds per square inch per drawing 6C721-2309, "Reactor Building Foundation Plan EL. 540'-0" S.W. Area," Revision R. The licensee used an age hardened concrete compressive strength of 5,900 pounds per square inch for evaluation of reactor building refuel floor slab and beams located at elevation 683'-6", the SFP floor slab elevation 645'-10" and reactor building truck bay floor slab located at elevation 583'-6". In addition, Calculation SL-2682, "Seismic Analysis of the Reactor-Auxiliary Building Complex Enrico Fermi Atomic Power Plant Unit 2," dated September 1, 1982, which is the reactor building response spectrum seismic analysis and is referenced in Section 3.7 of UFSAR specified a 4,000 pounds per square inch concrete compressive strength. The reactor building refuel floor slab and beams, SFP floor slab, and reactor building truck bay floor slab analysis did not meet the requirements of ACI 318. The licensee documented these discrepancies in CARD 10-22955.

3) Calculation HI-2104600, "Evaluation of Loads on Stack-Up Restraints at Fermi under Seismic Conditions," Revision 0.

   The inspectors identified the methodology used by the licensee to determine design loads for a seismic restraint was non-conservative. Specifically, Calculation HI-2104600 determined reaction forces for lateral restraint of the physical configurations of the HI-STORM, mating device, HI-TRAC, and MPC during transfer of the MPC from the HI-TRAC transfer cask into the HI-STORM storage cask during a postulated design basis seismic event. The stack-up restraint was designed to Seismic Category I requirements to protect safety-related structures, systems and components, due to the potential for seismic interaction with safety-related structures, systems and components. Although calculation HI-2104600 determined the stack-up configurations to be rigid with respect to the input seismic response spectrum, the calculation extended the response spectrum evaluation to include modal responses in the rigid frequency range. The calculation used a modal summation method that was confirmed by the licensee to be non-conservative that resulted in underestimation of the reaction forces used as input for design of the seismic restraint and evaluation of the restraint supporting structures. As a result, the calculations that evaluated adequacy of the seismic restraint and the restraint supporting structures required revision to demonstrate compliance with Seismic Category I design requirements. The licensee documented this concern in CARD 10-25226.

4) Calculation NO-10, Volume Number 1, DCD 1, "Spent Fuel Pool-Qualification of Loaded HI-TRAC, HI 2083941," Revision A.

UFSAR Table 3.8-18, "Loading Combinations for Steel Structures Elastic Design," and Table 3.8-19 require the linear elastic acceptance limits for structural steel members for the normal, severe and extreme environmental load combination which would ensure structural integrity during a Seismic Category I design basis event. The licensee used a leveling plate or shim plate assembly to structurally support the spent fuel cask on the SFP floor slab. Per drawing 7395; "Assembly, Adjustable Shim Plate," Revision 2, Sheet 1 of 1, the leveling plate was classified as safety related. The licensee's leveling plate calculation used the acceptance limits from ASME, Section III Subsection NF and Appendix F. The Appendix F acceptance limits go beyond the yield strength of the material which would allow for permanent deformation of the material. The use of acceptance limits of Subsection NF and Appendix F did not demonstrate structural integrity of the leveling plate during a severe environmental event (operating basis earthquake) and extreme environmental event (safe shutdown earthquake) as required by the design basis. The licensee documented these deficiencies in CARD 11-22993 and 11-25507.

As a result of the inspectors' concerns documented in these examples, the licensee performed a reanalysis of the reactor building radial girders, reactor building structure cask laydown areas, SFP structure, and leveling plate to address the various design calculation deficiencies, including those above, and initiated modifications where necessary to bring the structures into compliance.

Analysis: The inspectors determined the licensee's failure to perform adequate evaluations to demonstrate Seismic Category I compliance for the reactor building radial girders, reactor building concrete floor slab and beam structures, SFP structure, seismic restraint for MPC cask transfer configurations, and spent fuel cask leveling plate was contrary to the design control measures per 10 CFR Part 50, Appendix B, requirements and was a performance deficiency.

The inspectors determined the performance deficiency affected the Mitigating Systems and Barrier Integrity Cornerstone. The performance deficiency was determined to be more than minor because if left uncorrected the performance deficiency could lead to a more significant safety concern if ISFSI loading was conducted. Specifically, compliance with Seismic Category I requirements for the reactor building structure cask lay-down areas is required to ensure structural integrity of the reactor building itself as well as not adversely affect concrete floor slabs and beams which are located above and in close proximity to safety-related systems such as RHR, torus, and core spray.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 -- Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered "yes" to the question, is the finding a design qualification deficiency confirmed not to result in loss of operability or functionality in the Mitigating Systems column based on the fact that no actual loads exceeded the design basis, and the licensee revised design calculations and initiated modifications where necessary to demonstrate compliance. The inspectors concluded the finding was of very low safety-significance (Green).

The inspectors also determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04,

"Phase 1 - Initial Screening and Characterization of findings," Table 4a, for the Barrier Integrity Cornerstone. The finding screened as very low safety-significance (Green) because no actual loads exceeded the design basis and, and because the licensee revised design calculations and initiated modifications where necessary to demonstrate compliance. Therefore all questions were answered 'no' on the fuel and RCS barrier worksheet. The licensee was tracking corrective actions to ensure compliance prior to dry run operations in the reactor building. The inspectors identified a Human Performance, Work Practices (H.4.c) cross-cutting aspect associated with this finding. The licensee did not ensure effective supervisory and management oversight of work activities, including contractors, such that nuclear safety was supported. Specifically, the licensee failed to have adequate oversight of design calculations and documentation for establishing structural adequacy of the spent fuel cask lay-down areas. (H.4(c))

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that the design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods, or by the performance of a suitable testing program.

Contrary to the above:

1) On February 8, 2010, in Calculation SS-0003-2, Volume I, DCD 1, "Rx/Aux. Bldg-Final Load Verif. Phase 2 First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2)," Revision A, the inspectors determined the licensee's design control measures failed to verify adequacy of the reactor building torus area slab radial steel beams. Specifically, the allowable shear stress for the reactor building torus area slab radial steel beams RBG-5, RBG-6, and RBG-14 did not meet the AISC requirement to use 0.4 times the specified minimum yield stress of the material.

2) On April 6, 2010, in calculation SS-0003-2, Volume I, DCD 1, "Rx/Aux. Bldg-Final Load Verif. Phase 2, First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2)," Revision A, and Calculation NO-10, "Spent Fuel Pool-Qualification of Loaded HI-TRAC, HI 2083941," Volume I, DCD 1; Revision A, the inspectors determined the licensee's design control measures failed to verify adequacy of the reactor building concrete floor slab members used to support spent fuel cask placement. Specifically, the allowable stress did not meet the ACI requirement to use the concrete compressive strength for the 28-day test.

3) On June 22, 2010, in Calculation HI-2104600, "Evaluation of Loads on Stack-Up Restraints at Fermi under Seismic Conditions," Revision 0, the inspectors determined the licensee's design control measures failed to verify adequacy of the stack-up seismic restraint design. Specifically, licensee Calculation HI-2104600 used a non-conservative method to calculate the design loads for the stack-up restraint system. As a result, the design loads for the seismic restraint and the restraint support structure were underestimated. The use of correct seismic loads to determine structural adequacy of the restraint design and restraint supporting structure did not meet Seismic Category I design requirements.

4) On March 24, 2011, in Calculation NO-10, Volume Number 1, DCD 1; "Spent Fuel Pool-Qualification of Loaded HI-TRAC, HI 2083941," Revision A, the inspectors determined the licensee's design control measures failed to verify adequacy of the spent fuel cask leveling plate. Specifically, the licensee's leveling plate calculation used the acceptance limits from ASME Section III Subsection NF and Appendix F. The Appendix F acceptance limits go beyond the yield strength of the material which would allow for permanent deformation of the material. The use of acceptance limits of Subsection NF and Appendix F did not demonstrate structural integrity of the leveling plate during a severe environmental event (operating basis earthquake) and extreme environmental event (safe shutdown earthquake).

Because this violation was of very low safety significance (Green) and it was entered into the licensee's CAP as CARDs 10-21097, 10-21205, 10-21943, 10-22955, 10-25226, 11-22993, and 11-25507, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000341/2011003-02, 07200071/2010001-01, "Spent Fuel Cask Lay-down Areas Did Not Meet Seismic Category I Requirements")

(2) Unresolved Item

Seismic Analysis of Unrestrained Structures and Components

Introduction: A URI was identified by the inspectors regarding regulatory requirements and acceptable analytical methods to demonstrate seismic adequacy during vertical transfer of the MPC from the HI-TRAC to the HI-STORM during a postulated design basis earthquake event. Specifically, the inspectors identified a number of concerns pertaining to the licensee's calculation performed to demonstrate that a free-standing configuration during vertical transfer of the MPC will not tip-over or excessively slide during a postulated design basis seismic event.

Description: Calculation SS-0003-2, Volume I, DCD 1, "Rx/Aux. Bldg-Final Load Verif. Phase 2, First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2), Revision 0, evaluated the adequacy of a free-standing structural configuration during vertical transfer of the MPC from the HI-TRAC to the HI-STORM. The transfer includes the HI-TRAC placed on top of the HI-STORM with a mating device interposed between the two. All three components are placed on top of a trolley (low profile transporter) that can move along rails on the floor of the reactor building.

A seismic analysis of the configuration was performed by the licensee using time history seismic input into the Visual Nastran computer code. The analysis model evaluated multiple freestanding bodies responding to the input seismic motion with friction at various contact surfaces acting as resisting forces.

The inspectors identified a number of concerns regarding the calculation. The inspectors' concerns regarding regulatory requirements and acceptable analytical methods were discussed with the Division of Spent Fuel Storage and Transportation staff and the licensee. In response to inspector concerns, the licensee decided to abandon the plan to use a freestanding stack-up configuration and instead, at this time, provide physical restraint of the structural configuration during MPC transfer operations. The inspectors did not make a determination of a performance deficiency or significance

of these concerns by the end of the inspection. The licensee documented the inspectors' concerns in CARD 10-22717.

In addition, the inspectors identified the licensee is planning to deploy additional configurations of free-standing, non-stacked casks during ISFSI loading operations within the reactor building, using similar analytical methods.

This issue will be a URI pending further review of the calculation by the inspectors after the Division of Spent Fuel Storage and Transportation provides inspection and regulatory guidance pertaining to seismic analysis of unrestrained structures and components. In addition, the inspectors will assess the acceptability of other free-standing, non-stacked casks, as needed. (URI 05000341/2011003-03; 07200071/2010001-02, "Seismic Analysis of Unrestrained Components")

.5 Review of 10 CFR 72.212(b) Evaluations at Operating Plants

a. Inspection Scope

(1) Title 10 CFR 72.212 Report

The inspectors evaluated the licensee's compliance with the requirements of 10 CFR 72.212 and 10 CFR 72.48. The inspection consisted of interviews with cognizant personnel and review of documentation.

A written evaluation is required per 10 CFR 72.212(b)(2)(i), prior to use, to establish that the conditions of the Certificate of Compliance have been met. The inspectors reviewed the licensee's 10 CFR 72.212 Evaluation Report. The inspectors verified applicable reactor site parameters, such as fire and explosions, tornadoes, wind-generated missile impacts, seismic qualifications, lightning, flooding and temperature, had been evaluated for acceptability with bounding values specified in the Holtec HI-STORM 100 FSAR and associated analyses. The inspectors will re-review 10 CFR 72.212 Evaluation Report, if revised, prior to initial loading.

The inspectors reviewed the licensee's 10 CFR 72.48 Screenings.

(2) ISFSI Pad Design

The inspectors reviewed the licensee's ISFSI pad evaluations for compliance with the requirements in 10 CFR 72.212 (b)(2)(i)(B) during ISFSI inspections documented in NRC inspection reports 07200071/2009001 and 05000341/2009009. During this initial review, inspectors documented a non-compliance with the requirements of 10 CFR 72.212 (b)(2)(i)(B). Specifically the inspectors documented the licensee's calculation failed to adequately evaluate the cask storage pad's ability to support static and dynamics loads of the stored casks considering potential amplification of earthquakes.

The inspectors verified these non-compliances were documented in the licensee's CAP (CARD 10-24248). The licensee revised their evaluations and concluded the new evaluations demonstrated the ISFSI pad was designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, soil liquefaction potential, or other soil instability due to vibratory ground motion.

b. Findings

No findings were identified.

.6 Review Methodology for Off-Site Dose Calculation Manual Changes

a. Inspection Scope

The inspectors reviewed the licensee methodology used to make changes to the Off-Site Dose Calculation Manual (ODCM) as described in TSs Section 5.0, Administrative Controls, and as implemented through the Fermi 2 Licensing/Safety Engineering Conduct Manual (MLS08, Revision 23). The inspectors' review included the most recent Licensing Change Request for changes to the ODCM, initiated August 20, 2010, completed through management review on December 20, 2010, and issued January 4, 2011. The inspectors reviewed the Effectiveness Review documentation for that most recent change to assure changes were reviewed and approved in accordance with the Fermi 2 Licensing/Safety Engineering Conduct Manual. The inspectors interviewed the staff responsible for maintaining the ODCM and making technical changes to verify the current methodology used for making ODCM changes includes an Effectiveness Review directed by procedure and that no other methodology is used for making ODCM changes outside the Fermi 2 Licensing/Safety Engineering Conduct Manual.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On July 12, 2011, the inspectors presented the inspection results to T. Conner, Plant Manager, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- Radiological Hazard Assessment and Exposure Controls and Temporary Instruction and Verification of Licensee Responses to NRC Requirement for Inventories of Materials Tracked in the National Source Tracking System inspection with Mr. E. Kokosky, Radiation Protection Manager on April 1, 2011.

- The results of the Emergency Preparedness program inspection with Ms. C. Walker conducted at the site on April 14, 2011.

- In-Plant Airborne Radioactivity Control and Mitigation and Occupational Dose Assessment programs with Mr. T. Connor, Plant Manager, on June 17, 2011.

- The results of the ISFSI Dry Run Readiness Inspections were presented on June 24, 2011, to members of the licensee management and staff. The licensee acknowledged the information presented.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee

T. Conner, Plant Manager
W. Colonnetto, Nuclear Support Director
K. Scott, Senior Manager Engineering
C. Walker, Organizational Effectiveness Director
R. Johnson, Organizational Effectiveness Director
E. Kokosky, Radiation Protection Manager
R. LaBurn, Radiation Protection Manager

Nuclear Regulatory Commission

J. Giessner, Chief, Reactor Projects Branch 4

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000341/2011003-01 | NCV | Entry to a High Radiation Area on the Wrong Radiation Work Permit (2RS1) |
| 05000341/2011003-02<br>07200071/2010001-01 | NCV | Spent Fuel Cask Lay-down Areas Did Not Meet Seismic Category I Requirements (4OA5) |
| 05000341/2011003-03<br>07200071/2010001-02 | URI | Methodology Used in the HI-STORM/HI-TRAC Stack-up and Evaluation May Be Inadequate |

Closed

| | | |
|---|---|---|
| 05000341/2011003-01 | NCV | Entry to a High Radiation Area on the Wrong Radiation Work Permit (2RS1) |
| 05000341/2011003-02<br>07200071/2010001-01 | NCV | Spent Fuel Cask Lay-down Areas Did Not Meet Seismic Category I Requirements (4OA5) |
| 05000341/2010004-00 | LER | High Pressure Coolant Injection System Inoperable due to Inoperable Minimum Flow Valve |
| 05000341/2010005-02 | URI | Standby Liquid Control Test Tank Operability |

Discussed

None

## 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 Protection

- CARD 10-00654; South Supplemental Cooling Chiller Starter has Trip Light; 08/22/2010
- CARD 10-25192; Delta T of Condenser Water Abnormally High; 06/22/2010
- CARD 10-28313; Fan Detached from Motor; 09/20/2010
- CARD 10-29350; Unusual Noise Noted Coming from Duct Work of #4 CWP Fan; 10/20/2010
- CARD 11-00096; Center Absorber Chiller Cycling; 04/11/2011
- CARD 11-22083; High Levels of Algae Found on Center SCWW Condenser Tubes / Tube Sheet; 02/24/2011
- CARD 11-23276; Replacement Parts Incorrectly Identified; 03/31/2011
- CARD 11-24234; 120kV Offsite Source Declared Inoperable during Swan Creek Line Maintenance; 04/28/2011
- CARD 11-26228; Procedure Enhancements for Hot Weather Prep Procedure 27.000.06; 06/24/2011
- E-mail, W. Meath to R. Jones; 2011 Warm Weather Preps; 06/02/2011
- Fermi 2 Archived Operator Log; 04/26/2011
- ITC and Midwest ISO AQP-0002; Nuclear Plant Operating Agreement, Generator and Operations Interconnection Agreement (Exhibit C); Revision 1
- ODE-12; LCOs; 03/29/2011
- Procedure 20.300.GRID; Grid Disturbance; Revision 2
- Procedure 27.000.06; Hot Weather Operations; Revision 3
- Temporary System Operating Practice; Enrico Fermi-Swan Creek (EOR #11807) Shutdown; 04/25/2011 – 04/28/2011
- WO 29758421; Perform 27.000.06, Att. 3 Hot Weather System Readiness Review Checklists(s); 03/15/2011
- WO Coded M Warm 11 and M Warm 11A

1R04 – Equipment Alignment

- Drawing 6M721-5706-2; Residual Heat Removal, Division I; Revision X
- Drawing 6M721-5707; Core Spray System; Revision AD
- Drawing 6M721-5708-1; HPCI System; Revision AL
- Drawing 6M721-5736-2; Control Center A/C Water System; Revision R
- Drawing 6M721-5736-3; Control Center A/C Air System; Revision I
- Procedure 23.202, Attachment 1; Initial HPCI Valve Lineup
- Procedure 23.202, Attachment 2; HPCI Electrical Lineup
- Procedure 23.202, Attachment 3, HPCI Instrument Lineup
- Procedure 23.202, Attachment 5; HPCI Standby Verification Checklist
- Procedure 23.205, Attachment 1A; Division 1 RHR Initial Valve Lineup
- Procedure 23.205, Attachment 1C; Non-Divisional RHR Initial Valve Lineup
- Procedure 23.205, Attachment 2A; Division 1 RHR Electrical Lineup
- Procedure 23.205, Attachment 2C; Non-Divisional RHR Electrical Lineup
- Procedure 23.205, Attachment 3A; Division 1 RHR Instrument Lineup

- Procedure 23.205, Attachment 3C; Non-Divisional RHR Instrument Lineup
- Procedure 23.202, Enclosure D; HPCI and RCIC Controllers; 02/089/02
- SH-IC-331-0701-001; E41 High Pressure Coolant Injection; Revision 0

1R05 – Fire Protection

- CARD 11-24814; NRC Concern – Incorrect Priority Assigned to Work Order; 05/11/2011
- Drawing 6A721-2400; Fire Protection Evaluation Plot Plan; Revision P
- Drawing 6A721-2408; Fire Protection Evaluation Reactor and Auxiliary Buildings, Fourth Floor Plan; Revision U
- Drawing 6I721-2868-17; Installation Fire Detection System, Reactor Bldg – Fourth Floor; Revision E
- Drawing 6M721-2868-19; Installation Fire Detection System, Reactor Building, Fifth Floor; Revision H
- Fermi 2 UFSAR, Section 9A.4.2.13; Revision 17
- Procedure FP-AB-3-14c; Auxiliary Building, East RPS Division 1 MG Set Room, Zone 14, El. 643'6"; Revision 3
- Procedure FP-AB-3-14d; Auxiliary Building, West RPS Division II MG Set Room, Zone 14, El. 643'6"; Revision 4
- Procedure FP-AB-3-14e; Auxiliary Building, Division II Switchgear Room, Zone 14, El. 643'6"; Revision 3
- Procedure FP-RB-B-2b; Reactor Building Basement Northwest Corner Room, Zone 2, El. 562'0"; Revision 3
- Procedure FP-RB-SB-2a; Reactor Building Sub-Basement Northwest Corner Room, Zone 2, El. 540'0"; Revision 3
- UFSAR Figure 9A-2; Fire Protection Evaluation; Reactor Building Sub-basement Plan; Revision 12
- UFSAR Figure 9A-3; Fire Protection Evaluation, Reactor and Auxiliary Buildings, Basement Plan; Revision 12
- UFSAR Figure 9A-10; Fire Protection Evaluation, Reactor and Auxiliary Buildings, Fifth Floor Plan; Revision 14

1R06 – Flood Protection

- CARD 08-28540; Air Lock Door to T-Room; 12/22/2008
- CARD 11-24296; NRC Questions on Flood Response; 04/27/2011
- CARD 11-24359; NRC Concern: Flood Door Testing of RB-1/RBD-01; 04/29/2011
- CARD 11-24435; INPO IER 11-1 Door RB-1 Inspection – NRC Senior Resident Inspector Issues; 05/02/2011
- Deviation Event Report (DER) 88-0288; Recurring Problems with Water-Tight Doors; 02/22/1988
- DER 89-0177; Notice 87-49 Deficiencies in Outside Containment Flooding Protection; 01/31/1989
- FSAR Section 2.4.2.2.2.; Reactor/Auxiliary Building Flood Criteria; Revision 16
- NSSS White Paper, NRC's Concern on Door's A7000Y033 Seal and PM T510; Revision 1, 05/26/2011
- WO 26379885; Evaluate Installation of Additional Security / Delay Barriers; 03/19/2008
- Work Request T510050100; HPCI/Torus Water Management Pumps Room Watertight (RSB-1 Door); 12/07/2005
- Work Request T510060100; HPCI/Torus Water Management Pumps Room Watertight (RSB-1 Door; 12/21/2006

- Work Request 000Z053719; Security Personnel Air Lock Door (RB-1); 12/07/2006

1R07 – Heat Sink

- CARD 11-25898; Dent Indication Identified on a Tube on the Replacement Tube Assembly for R3001B025; 06/14/2011
- CARD 11-25918; Eddy Current Testing Indications of New EDG 11 HX Bundles – Trending; 06/14/2011
- CARD 11-25996; Eddy Current Test Results Summary – EDG 11 Heat Exchangers; 06/16/2011
- CARD 11-26092; Findings of EDG 11 SSO (June 2011); 06/20/2011
- Heat Exchanger Inspection Report; EDG 11 Air Coolant HX, RHR Complex; 06/14/2011

1R11 – Operator Requalification

- Fermi 2 Evaluation Scenario SS-OP-904-1125; Loss of FW/Steam Leak/ATWS; Revision 0

1R12 – Maintenance Effectiveness

- Fermi Control Room Log, Unit 2; Narrative Log; 04/26/2011
- CARD 11-23393; Ensure EOP Functions in MR Scope; 04/03/2011
- MRFF Evaluation 090113-01; System C4100; 01/13/2009
- MRFF Evaluation 091213-01; System C4100, 12/18/2009
- MRFF Evaluation 101109-01; System C4100; 11/22/2010
- MRFF Evaluation 101102-D2-01; System E1100; 11/10/2010
- MRFF Evaluation 101105-D2-01; System E1100; 11/13/2010
- MRFF Evaluation 101119-D2-01; System E1100; 11/13/2010
- MRFF Evaluation 100612-01; System N2100; 06/29/2010
- MRFF Evaluation 101119-01; System N2100; 11/30/2010
- MRFF Evaluation 101119-01; System N2100; 12/02/2010
- MRFF Evaluation 101125-01; System N2100; 12/03/2010
- MRFF Evaluation 101207-01; System N2100; 12/20/2010
- MRFF Evaluation 101210-01; System N2100; 12/28/2010
- MRFF Evaluation 110217-01; System N2100; 03/02/2011
- MRFF Evaluation 110205-01; System N3012; 02/23/2011
- MRFF Evaluation 110215-01; System N3012; 03/02/2011
- MRFF Evaluation 110215-02; System N3012; 03/03/2011

1R13 – Maintenance Risk Assessments and Emergent Work Control

- Fermi Control Room Log, Unit 2; Narrative Log; 04/26/2011
- Fermi 2 Plan of the Day; 04/01, 04/04-07, 04/21, and 04/25-29/2011
- Fermi 2 Plan of the Day; 06/10, 06/13-17, 06/20-24/2011
- Scheduled Risk Profile Summary; 04/15, 04/18, and 04/22, 2011
- T+1 Performance Analysis Review; Work Week 1117; 04/18/2011 – 04/24/2011

1R15 – Operability Evaluations

- CARD 11-00394; TSC HVAC Air Filter Plugged; 04/29/2011
- CARD 11-23153; Suction Strainer Debris Headloss for Reflective Metal Insulation; 03/29/2011
- CARD 11-23447; DWFD Sump Flow Recorder Oscillating with No Flow; 04/04/2011
- CARD 11-25029; RCIC Pump Suction Pressure High, ARP 1D73; 05/17/2011

- CARD 11-25198; Multiple TS and Abnormal Operating Procedure Entries due to Unacceptable Post-Trip Voltages; 05/22/2011
- CARD 11-25922; DWFD Integrator Inoperable; 06/15/2011
- CARD 11-25922; DWFD Integrator Inoperable; 06/16/2011
- Fermi 2 Archived LCO Log; DW Floor Drain Sump; 06/14/2011 to 06/27/2011
- Functional Failure Evaluation 110615-01; CARD 11-25922-01; 06/21/2011
- Procedure 24.000.02, Attachment 1; Eight Hour – Mode 1, 2, 3 – Control Room, Reactor Coolant System Operational Leakage; 06/23-26/2011
- Troubleshooting Data Sheet – CARD 11-25029; Equipment E5150 RCIC

1R18 – Plant Modifications

- CARD 11-24806; Steam Leak from South Reactor Feed Pump; 05/10/2011
- Technical Evaluation TE-J11-11-049; Fuel Injtegrity Evaluation for Furmanite Temporary Modification 11-0004; Revision A
- Temporary Modification 11-0004; On-line Furmanite Leak Repair of the Pipe Cap Threaded Joint Leak Downstream of N2100F165B; 05/23/2011

1R19 – Post-Maintenance Testing

- CARD 11-25922; DWFD Integrator Inoperable; 06/15/2011
- Procedure 35.106.009; Control Rod Drive Hydraulic Control Unit General Maintenance and Repair; Revision 48
- WO 29803664; 04-HCU 14-31 had 2 water alarms in 7 days, please replace the piston seal; 04/23/2011
- WO 30435038; Calibrate HPCI Turbine Governor Speed Loop; 10/03/2009
- WO 30498089; Perform 44.120.030, Post Accident Monitor Division 1, DW/Torus $H_2O_2$ Quarterly Calibration; 03/26/2011
- WO 30582865; Perform Mini Periodic MOV Inspection; 05/13/2011
- WO 30690694; Perform 44.210.001, Drywell Sump Level Functional; 06/24/2011
- WO 31110598; Perform 24.206.01, RCIC System Pump Operability and Valve Test at 1000 PSIG; 05/17/2011
- WO 31305064; Replace Electronic Capacitors in RPV Jet Pump 12 Square Root Convertor
- WO 32561603; Perform 24.306.47, EDG 13 Fast Start Followed by Load Reject; 05/02/2011
- WO 32878923; DWFD Integrator Inoperable; 06/16/2011

1R22 – Surveillance Testing

- Procedure 24.000.02, Attachment 1; Eight Hour Mode 1, 2, 3 Control Room
- Procedure 24.202.01, Section 5.1; HPCI Pump Flow Test and Valve Stroke at 1025 psig
- Procedure 24.307.15; EDG Start and Load Test; Revision
- Procedure 24.408.04, Section 5.1; Division 2 Monthly Stroke of T50-F412B
- Procedure 54.000.03; Control Rod Scram Insert Time Test; Revision 51
- WO 30552039; Perform 24.408.04 Section 5.1 (Division 2) Monthly Stroke of T50-F412B; 05/09/2011
- WO 30973701; Perform 24.307.16 Sec-5.1 EDG 13 Start and Load Test – Slow Start; 06/27/2011
- WO 31110562; Perform 24.202.01 Section 5.1 HPCI Pump/Flow Test and Valve Stroke at 1025 psig; 06/02/2011

1EP2 – Alert and Notification System Evaluation

- CARD 09-20406; Operating Experience on Potential Impact of Cold Weather on Siren Operation; 01/22/2009
- CARD 09-28190; Develop a Preventive Maintenance Schedule for Fermi 2 NOC Repeater for ANS Sirens; 10/20/2009
- CARD 10-24427; Alert Notification System Not Activated Per Procedure; 05/28/2010
- CARD 10-27891; Siren Test Data Not Captured Per Procedure; 09/26/2010
- CARD 11-20857; Alert Notification System Inadvertently Activated; 01/26/2011
- EP-560; Alert Notification System Siren Operation and Maintenance; Revision 3
- FEMA Approval Letter for Fermi 2 Nuclear Power Plant's Proposed Replacement of the Public Alert and Notification System; January 21, 2003
- NARP-11-0013; Alert Notification System Roles and Responsibilities, Revision 1; January 10, 2011
- RERP Plan, Section E; Notification Methods and Procedures; Revision 38
- Requests for Maintenance on Alert Notification System Sirens; January 5, 2009 – June 24, 2010
- Technical Reviews of the Fermi 2 Nuclear Power Plant Prompt Notification System Siren Addition and Relocation; May 6, 2002, and December 23, 2002
- Siren Preventive Maintenance Tracking Sheets; November 2009 – October 2010
- Siren Test Results; March 2009 – March 2011

1EP3 Emergency Response Organization Staffing and Augmentation System

- CARD 09-29571; ECOS Test Requirements Not Met; 12/15/2009
- CARD 10-28097; ECOS Test –Two Positions Filled by On-Shift Personnel; 09/14/2010
- EP-570; Emergency Call Out System – Testing and Maintenance; Revision 3
- Emergency Call-Out System (ECOS) Test Results; February 2009 – February 2011
- RERP Plan, Sections B, E, F, and J; Emergency Response Organization, Notification Methods, Emergency Communications, and Protective Response; Revision 38

1EP5 Correction of Emergency Preparedness Weaknesses

- Audit Report 11-0101; Quality Assurance Audit of Emergency Preparedness Program; 03/10/2011
- Audit Report 10-0102; Quality Assurance Audit of Emergency Preparedness Program; 03/02/2011
- CARD 10-21177; NQA-RERP Change Management Pre-Planning Inadequacies; 02/09/2010
- CARD 10-22012; RET Sampler Did Not Complete Requested Air Sample during Drill; 03/08/2010
- CARD 10-24626; Request Evaluation of ECOS Timeliness for June 6, 2010 Alert; 06/06/2010
- CARD 10-24665; Untimely Facility Activation for June 6, 2010, Alert Event; 06/07/2010
- CARD 10-24742; Duty ERO Team Members Did Not All Show at TSC for June 6, 2010 Alert; 06/09/2010
- CARD 11-21629; Hi-Com Degradation Compensatory Measures Incomplete; 02/11/2011
- CARD 11-21785; RERP Improvement Opportunities with Emergency Plan Off-Site Agencies; 02/16/2011
- CARD 11-22692; Hi-Com Override Not Heard in All Locations; 03/14/2011
- NARP-10-0133; June 6, 2010, Alert Critique; 07/02/2010
- ODE-15; Compensatory Monitoring Plan; 02/21/2011

1EP6 Drill Evaluation

- Scenario 50, Revision 1

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

- 2010 NVLAP On-Site Assessment of Fermi 2 Thermo-luminescent Dosimeter Laboratory; 04/22/2010
- 2RS3; In-Plant Airborne Radioactivity Control and Mitigation (71124.03)
- 2RS4; Occupational Dose Assessment (71124.04)
- Air Sample 00533-A11; Rad Waste 1, Mezzine 2; 03/24/2011
- Air Sample 00438-A11, Rad Waste 1, Mezzine 2; 03/25/2011
- Air Sample 00556-A11; Rad Waste 1, Motor Operated Valve Shop; 03/29/2011
- Audit Report 10-0111; Quality Assurance Audit of the Environmental Protection (Non-REMP) and Radiological Protection Programs; 10/01/2010
- CARD 10-27493; Two Operators Have Incomplete Self-Contained Breathing Apparatus/Emergency Breathing Air Training; 08/26/2010
- CARD 10-27509; Qualification Reporting Tool Does Not Reflect Actual Qualification Status; 08/27/2010
- CARD 10-27672; Unintended Exposure Greater Than Radiation Work Permit Limit; 08/31/2010
- CARD 10-28357; Improper Documentation of Radiation Protection Key Issue Log; 09/21/2010
- CARD 10-28558; Potential Release of Radioactive Material; 09/27/2010
- CARD 10-29820; Two Individuals Enter a High Radiation Area on the Wrong Radiation Work Permit Task; 10/30/2010
- CARD 10-29821; Radiation Work Permit Violation; 10/30/2010
- CARD 10-29914; Reactor Water Clean-up Valve Pit Broken Gate Lock; 11/01/2010
- CARD 10-31387; Worker Receives Electronic Dosimeter Dose Rate Alarm; 11/30/2010
- CARD 11-20362; Radiation Work Permit Requirements not Met; 01/13/2011
- CARD 11-20975; Common Cause Analysis – Unexpected Electronic Dosimeter Dose and Dose Rate Alarms Exceeded Goal in 2010; 01/28/2011
- CARD 11-23179; Contamination Identified in Non-Posted Area; 03/29/2011
- CARD 11-25813; Respiratory Protection Training Breathing Air System Configured Incorrectly, 06/10/2011
- CARD 11-25962; Observations during Routine NRC Inspection; 06/16/2011
- CARD 11-25975; Fit Test Observation during Routine NRC Inspection; 06/16/2011
- CARD Common Cause Analysis – Unexpected Electronic Dosimeter Dose and Dose Rate Alarms Exceeded Goal in 2010; January 2011
- LP-GN-509-0100; Nuclear Training Lesson Plan: Airborne Area Work Controls and Devices; Revision 8
- LP-GN-509-0200; Nuclear Training Lesson Plan: Self-Contained Breathing Apparatus, Revision 2
- LP-GN-509-0300, Nuclear Training Lesson Plan: Self-Contained Breathing Apparatus and Emergency Breathing Air; Revision 4
- MRP04; Accessing and Working in the Radiologically Restricted Area; Revision 29
- MRP09; Respiratory Protection; Revision 8
- NPRP 10-0158; Self-Assessment of the Fermi 2 Thermo-luminescent Dosimeter Laboratory; 11/16/2010
- NPRP 11-0070; Focused Self-Assessment: Radiological Hazard Assessment and Exposure Controls; Airborne Radioactivity Controls and Occupational dose Assessment-April 2011, 05/09/2011

- Procedure 63.000.100; Radiation Work Permits; Revision 35
- Procedure 65.000.201; Assembly, Issuance, and Return of Multiple Wholebody and Extremity Dosimetry; Revision 12
- Procedure 65.000.208; Cleaning and Operation of the Panasonic UD-710a Automatic TLD Reader; Revision 18
- Procedure 65.000.211; Bioassay Sample Collection and Processing, Revision 10
- Procedure 65.00.226; Thermo-luminescent Dosimeter Inspection and Receipt; Revision 7
- Procedure 65.00.243; Operation of the WE 2011-PC Automatic Thermo-luminescent Dosimeter Irradiator; Revision 7
- Procedure 65.000.255; Calibration of the Panasonic UD-710A Automatic Thermo-luminescent Dosimeter Reader; Revision 9
- Procedure 65.000.262; Operation of the Whole Body Counters with ABACOS 2000 Software; Revision 5
- Procedure 65.000.267; Whole Body Count Protocol and Evaluation of Bioassay Results; Revision 5
- Procedure 65.000.707; Inspection of MSA Respiratory Equipment; Revision 10
- Procedure 65.000.717; Inspection, Maintenance and Hydrostatic Testing of Breathing Air Cylinders; Revision 8
- Procedure 65.000.718; Maintenance and Repair of MSA Respiratory Protection Equipment; Revision 7
- Procedure 65.000.734; Performing Respirator Fit tests Using the TSI Port-A-Count; Revision 11
- Procedure 65.000.736; Operation of the Breathing Air Compressors; Revision 8
- Procedure 65.000.738; Filling of Breathing Air Cylinders; Revision 9
- Procedure 67.000.101; Performing Surveys and Monitoring Work; Revision 37
- Procedure 67.000.402; Dosimetry Evaluations; Revision 15
- RWP 11-1011; Perform Corrective Maintenance, Torus Soft Seat Maintenance; Revision 0
- RWP 11-1031; Condensate Backwash Receiver Tank Instrument Repair; Revision 1
- RWP 11-1055; Radwaste Building HVAC Duct Work Cleaning; Revision 1
- Survey No. 01518-R11; Turbine Building Basement North East Entry; 03/29/2011
- Survey No. 01549-R11; Onsite Storage Facility; 03/30/2011
- TS Section 5.4, “Procedures”; Amendment 134
- UFSAR Section 3; Criterion 19 – Main Control Room
- UFSAR Section 6.4.2.5 Personal Protective Equipment and First Aid and Emergency Supplies
- UFSAR Section 7.1.2.1.16, Standby Gas Treatment
- UFSAR Section 7.1.2.1.17; Control Center Atmospheric Control System
- WI-RH-011; Exchange/Collection and Processing of Personnel and Area Thermo-luminescent Dosimeters; Revision 11
- WI-RH-027; Determination of Dose from Multiple Whole Body Thermo-luminescent Dosimeters; Revision 0

2RS2 Occupational ALARA Planning Controls

- CARD 10-28007; Radiation Work Permit Does Not Meet UFSAR Requirement; 09/11/2011
- CARD 10-27497; Potential ALARA Planning Vulnerability; 08/26/2011

4OA1 – Performance Indicator Verification

- CARD 10-32190; HPCI Test Line Isolation Valve Would Not Close; 12/28/2010
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- CARD 11-22074; NRC Identified Issue, Error in ROP Submitted Generation Data; 02/24/2011
- E41 High Pressure Coolant Injection; SH-IC-331-0701-001; Revision 0
- Fermi 2 Equipment Logs; 12/01/2010 to 01/01/2011, 03/01/2011 to 04/01/2011
- Fermi 2 LCO Logs; 12/01/2010 to 01/01/2011, 03/01/2011f to 04/01/2011
- Fermi 2 Operator Logs; 09/01/2010 to 10/01/2010, 12/01/2010 to 01/01/2011, 03/01/2011 to 04/01/20111-0003;
- PI BI02; Reactor Coolant System Identified Leak Rate; 05/03/2011
- PI MS05; Safety System Functional Failures; 05/03/2011
- PI MS07; MSPI High Pressure Injection System; 05/03/2011
- MSPI Derivation Report; MSPI High Pressure Injection System, Unavailability Index; 05/03/2011
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- WO 30278609; Perform 24.202.08, Section 5.2, HPCI Pump LSFT and Operability Test at 1025 PSIG; 03/03/2011
- WO 31110537; Perform 24.202.01, Section 5.1, HPCI Pump/Flow Test and Valve Stroke at 1025 PSIG;09/06/2010
- WO 31110545; Perform 24.202.01, Section 5.1, HPCI Pump/Flow Test and Valve Stroke at 1025 PSIG; 12/28/2010
- WO 32436147; Perform Partial Surveillance 24.202.01 (Rev 97) FOR pmt Valve Stroke (E4150F042); 03/02/2011

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- CARD 10-27713 Common Cause for IP3 – Procedure Adherence; Revision 2
- CARD 10-28364; Equipment Reliability Report – Perform Assessment of Equipment System Performance; 09/21/2010
- CARD 10-28365; Equipment Reliability Report – Resolution of Repetitive Failures; 09/21/2010
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- CARD 10-31829; Equipment Reliability Indicator Decline; 12/14/2010
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- CARD 11-22000; Equipment Reliability Report – Resolution of Repetitive Failures; 02/22/2011
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- ERI Index; January 2010 – January 2011
- Engineering Human Performance Department Index; March 2011
- Equipment Reliability Index, Performance Indicators and Analysis; 06/08/2011
- Equipment Reliability Index, Equipment Reliability Metric 1
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- Fermi 2 Event Notification; 06/15/2011
- Fermi 2 Cycle 15, Conduct of Maintenance Excellence Plan – Tier 1; 06/09/2011

- Fermi 2 Cycle 15; Station Equipment Reliability Excellence Plan – Tier 1
- Nuclear Engineering Performance Indicators; January 2011 and April 2011
- Number of Deferred Preventive Maintenance Work Orders – Critical Equipment Reliability Metric 16a; May 2011
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- Number of PMs Deep in Grace, Equipment Reliability Metric 17; May 2011
- Periodic Equipment Reliability Trending Report – Second half 2010; 02/22/2011
- PHC Committee Meeting Minutes; 05/31/2011
- Plant Health Committee Meeting Minutes; 10/12/2010
- Program Health Report Fermi 2; Buried Pipe Inspection Program; 2009Q4
- Resolved Repeat Failures
- System D1100; Process Radiation Monitoring; 2010
- System and Performance Engineering Groups, 5-year plans
- System Engineering Health Report Summary; 04/27/2011
- System Equipment Obsolescence Report; 01/26/2011
- System Status; B3100, Reactor Recirculation System; 2009Q4
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- Apparent Cause Evaluation, CARD 10-32191; Abnormal Indication and Response of HPCI Minimum Flow Valve during Surveillance Testing; 03/23/2011
- CARD 10-32191; Abnormal Indication and Response of HPCI Minimum Flow Valve during Surveillance Testing; 12/28/2010
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- LER 2010-004-00; High Pressure Coolant Injection System Inoperable due to Inoperable Minimum Flow Valve; 2/28/2010

4OA5 - Other Activities

Calculations:
- Calculation No NO-10, Volume Number 1 DCD 1; "Spent Fuel Pool Qualification of Loaded HI-TRAC, HI 2083941"; Revision 0 and Revision A
- Calculation No. 3.07.00 Volume I, DCD 1; "Substructure Plate GRDRS/Rail Car Air Lock"; Revision 0
- Calculation No. DC-6438; MPC 68 and HI-TRAC Stability Check for Tornado Wind Load and Seismic Load; Revision B
- Calculation No. DC-6449; "ISFSI Stack-Up Restraints"; Revision B
- Calculation No. DC-6459; "Bridge and Trolley Structural Calculation for Reactor Building Crane"; Revision B

- Calculation No. DC-6465; “Reactor Building 5th Floor Steel Superstructure Structural Evaluation”; Revision 0
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- Calculation No. HI-2083940; HI-STORM CoC Radiation Protection Program Dose Limits; Revision 1
- Calculation No. HI-2083941; “Seismic Analysis of the Loaded HI-TRAC in the Cask Pit and SFP Slab Qualification”; Revisions 2, 3, 4
- Calculation No. HI-2083946; Cask Handling Weights and Cask Handling Dimension at DTE Fermi 2; Revision 1
- Calculation No. HI-2084156; Evaluation of Plant Hazards at DTE Fermi 2; Revision 2
- Calculation No. SL-2682; “Seismic Analysis of the Reactor-Auxiliary Building Complex Enrico Fermi Atomic Power Plant Unit 2”; dated September 1, 1982
- Calculation No. SS-0003-2, Vol. I, DCD 2; RX/Aux Building - Final Load Verif Phase 2 Equipment access building FL El. 583’-6”; Revision 0
- Calculation No. SS-0003-2, Volume I, DCD 1; Rx/Aux. Bldg-Final Load Verif. Phase 2, First Floor Truck Bay Area (HI 2084016, Slab S-1, Beams 1B12, 1B2); Revision A
- Calculation No. SS-0009-2, Vol. I, DCD 2; Reactor/Auxiliary Building – Final Load Verification Phase 2 El. 684’-6” & 677’-6”; Revisions 0, A
- Calculation No. SS-0009-2; “Reactor/ Auxiliary Building – Final Load Verification Phase 2 EL. 684’-6” & 677’-6”; Volume I, DCD 3, Revision A
- Calculation No. SS-0026, Volume Number I DCD 4; “Reactor/Auxiliary Building Final Load Verification for Concrete Walls and Columns”; Revision 0

<u>CARDs:</u>
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- 09-29718; Holtec User Group Meeting “Take Aways”; 12/12/2009
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- 11-22283; Review OE32882 – Failure of Hillman Roller on ISFSI Low Profile Transporter – LaSalle; 03/01/2011
- 11-22862; OE – LaSalle NCV on Failure to Perform Adequate Evaluations to Ensure Compliance with 10 CFR 72.212 (b)(3) and 10 CFR 72.122(b)(2)(i); 03/18/2011

- 11-23083; Evaluate ISFSI Technical Analysis Report from Perry Plant to Evaluate Potential Impacts on Fermi; 03/25/2011
- 11-23910; Revise Calculation HI 2083943- ISFSI related; 04/18/2011
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- 10-21097; ISFSI Concern – NRC Question on the stresses on Reactor Building girders 5, 6, and 14; 02/08/2010
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- 10-21943; NRC Issue: Use of CMTRs for Slab over Torus calculation; 03/04/2011
- 10-22717; NRC ISFSI Issue: Friction / Stack-up; 03/29/2010
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- 10-22955; NRC ISFSI Issue: Use of higher strength concrete; 04/06/2010
- 10-23795; NRC ISFSI issue: Revise calculation SS-0003-2 Volume 1 DCD1; 05/10/2010
- 10-24034; Tracking Procedure changes required for ISFSI implementation; 05/14/2010
- 10-24041; NRC ISFSI issue: Rail Stability Calculation; 05/14/2010
- 10-24236; NRC ISFSI issue: Conflict in UFSAR table 3.8-19; 05/21/2010
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- 10-25226; Error in Calc. HI-2104660; 06/22/2010
- 11-22993; NRC identified: Calculation NO-10 Vol. I DCD 1 Rev. A; 03/24/2011
- 11-23015; NRC identified: Details discrepancies in EDP-36637; 03/24/2011
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Drawings:
- 6C721-2309; Reactor Building Foundation Plan EL. 540'0" S.W. Area; Revision R
- 7395; Assembly, Adjustable Shim Plate; Revision 2

10 CFR 72.48 Screenings/Evaluations:
- 10-0001; Engineering Conduct Manual MES11 – Technical Service Request; Revision 0

- 10-0002; Engineering Conduct Manual MES42 – Equivalent Replacement Process; Revision 0
- 10-0003; Equivalent Replacement Process; Revision 0
- 10-0004; Installation of the HI-STORM Over pack Lid Outdoors; Revision 0
- 10-0005; Evaluation of Additional Tornado-induced Missile on Spent Fuel Storage Casks; Revision 0
- 10-0006; MPC Transport; Revision 0
- 10-0007; ISFSI Storage Pad Soil Modulus Analysis for DC-6433 Vol ; Revision 0
- 10-0008; Hoisting, Rigging and Load Handling; Revision 0
- 10-0009; Multi-Purpose Canister Loading; Revision 0
- 10-0010; Drying Backfill and Sealing the MPC; Revision 0
- 10-0011; Drying Backfilling and Sealing the MPC; Revision 0
- 10-0012; SSFS 10-0012, "72.48 Screen for 35.710.042, Multi-Purpose Canister Loading Revision 2"; Revision 0
- 10-0014; Closure Welding of Multi-Purpose Canisters at Fermi Station; Revision 0
- 11-0001; HI-STORM Lifting Bracket Inspection; Revision 0
- 11-0002; HI-TRAC Lift Yoke Inspection; Revision 0
- 11-0003; HI-TRAC Lift Yoke Inspection; Revision 0
- 11-0004; ISFSI Stack up Restraints; Revision 0
- 11-0006; Responding to ISFSI abnormal Conditions; Revision 0

Procedures:
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- Procedure 24.000.02; Shiftly, Daily, and Weekly Required Surveillances; Revision 134
- Procedure 24.000.03; Mode 5 Shiftly, Daily, and Weekly Surveillances; Revision 73
- Procedure 35.710.042; Multi-Purpose Canister (MPC) Loading; Revision 3
- Procedure 35.710.043; Drying, Backfilling and Sealing the MPC; Revision 3
- Procedure 35.710.044; MPC Transport; Revision 1
- Procedure 35.710.045; Dry Cask Storage Equipment Preparation and Lay Up; Revision 0
- Procedure 35.710.046; MPC Unloading; Revision 1
- Procedure 35.710.047; Responding to ISFSI Abnormal Conditions; Revision 1
- Procedure 35.710.048; MPC Preparation; Revision 0
- Procedure 35.717.003 Reactor Building Crane – Frequent and Periodic Inspection; Revision 6
- Procedure 53.000.09; Dry Cask Storage Fuel Selection for Cask Loading; Revision 2
- Procedure 67.000.105; HI-TRAC Radiation Survey; Revision 0
- Procedure 67.000.106; HI-STORM Radiation Survey; Revision 0
- Procedure 67.000.107; MPC/HI-TRAC Contamination Survey; Revision 0
- Procedure MMM12; Receipt and Source Inspection; Revision 22
- Procedure MOP 16; Conduct of Refuel Floor Activities (Non-Outage); Revision 6
- WO 29772436; RB Overhead Crane PM Inspections; 06/15/2010
- WO 30335704; Perform 'F' Frequent Inspection per MIOSHA R408.11872 Rule 1872 (2) (A); 04/12/2011

Other Documents:
- 11-1054, ISFSI Pre-Job ALARA Review Plan
- 11-1054, ISFSI Pre-Job ALARA Review Plan
- 11-1054, ISFSI Radiation Work Permit
- Composite Cask Load Report; Basket Layout – Campaign 1 Cask 4; March 12, 2010
- Dry Fuel Storage Organization Chart
- MES32010; Dry Cask Record Card; Revision 0
- NUREG-0798, Safety Evaluation Report Related to the Operation of Enrico Fermi Atomic Power Plant, Units No. 2; July 1981

- SNM/Component Transfer Form SNM-STG-15-04; Dry Cask Storage – Campaign 1, Cask 4 (MPC272); Revision 4

- TS Section 5.0; Amendment 134
- MLS08; Fermi 2 Licensing/Safety Engineering Conduct Manual; Revision 23
- LCR 10-016-ODM; Offsite Dose Calculation Manual; 01/04/2011

## LIST OF ACRONYMS USED

| | |
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| AC | Alternating Current |
| ACI | American Concrete Institute |
| ADAMS | Agencywide Document Access Management System |
| AISC | American Institute of Steel Construction |
| ALARA | As-Low-As-Is-Reasonably-Achievable |
| ANS | Alert and Notification System |
| ASME | American Society of Mechanical Engineers |
| CAP | Corrective Action Program |
| CARD | Condition Assessment Resolution Document |
| CFR | Code of Federal Regulations |
| DRP | Division of Reactor Projects |
| ED | Electronic Dosimeter |
| EDG | Emergency Diesel Generator |
| ERO | Emergency Response Organization |
| FSAR | Final Safety Analysis Report |
| HPCI | High Pressure Coolant Injection |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| IR | Inspection Report |
| ISFSI | Independent Spent Fuel Storage Installation |
| ISI | Inservice Inspection |
| MPC | Multi-Purpose Canister |
| MSPI | Mitigating Systems Performance Index |
| NCV | Non-Cited Violation |
| NEI | Nuclear Energy Institute |
| NRC | U.S. Nuclear Regulatory Commission |
| ODCM | Off-Site Dose Calculation Manual |
| PARS | Publicly Available Records System |
| PI | Performance Indicator |
| RERP | Radiological Emergency Response Plan |
| RHR | Residual Heat Removal |
| RP | Radiation Protection |
| RWP | Radiation Work Permit |
| SAMG | Severe Accident Management Guidelines |
| SDP | Significance Determination Process |
| SFP | Spent Fuel Pool |
| SLC | Standby Liquid Control |
| SSO | Safety System Outage |
| TS | Technical Specification |
| TSO | Transmission System Operator |
| UFSAR | Updated Final Safety Analysis Report |
| URI | Unresolved Item |
| WO | Work Order |

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**/RA/**

John B. Giessner, Chief
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