

May 11, 2007

Mr. Peter T. Dietrich  
Site Vice President  
Entergy Nuclear Northeast  
James A. FitzPatrick Nuclear Power Plant  
Post Office Box 110  
Lycoming, NY 13093

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - NRC INTEGRATED  
INSPECTION REPORT 05000333/2007002

Dear Mr. Dietrich:

On March 31, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your James A. FitzPatrick Nuclear Power Plant. The enclosed integrated inspection report documents the inspection results, which were discussed on March 27, 2007, with you and other members of your staff.

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

Based on the results of this inspection, two findings of very low safety significance (Green) were identified. These findings were also determined to be violations of NRC requirements. However, because of their very low safety significance, and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a written response within 30 days of the date of this inspection report with the basis or your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Senior Resident Inspector at the James A. FitzPatrick Nuclear 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

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Sincerely,

**/RA/**

Eugene W. Cobey, Chief  
Projects Branch 2  
Division of Reactor Projects

Docket No.: 50-333  
License No.: DPR-59

Enclosure: Inspection Report 05000333/2007002  
w/Attachment: Supplemental Information

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Sincerely,

**/RA/**

Eugene W. Cobey, Chief  
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-333

License No.: DPR-59

Report No.: 05000333/2007002

Licensee: Entergy Nuclear Northeast (Entergy)

Facility: James A. FitzPatrick Nuclear Power Plant

Location: 268 Lake Road  
Scriba, New York 13093

Dates: January 1, 2007 through March 31, 2007

Inspectors: G. Hunegs, Senior Resident Inspector  
D. Dempsey, Resident Inspector  
J. Noggle, Senior Health Physicist  
M. Snell, Reactor Inspector  
J. D'Antonio, Senior Operations Engineer

Approved by: Eugene W. Cobey, Chief  
Projects Branch 2  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000333/2007-002; 01/01/2007 - 03/31/2007; James A. FitzPatrick Nuclear Power Plant; Maintenance Risk Assessment and Emergent Work Control.

The report covered a three-month period of inspection by resident inspectors and region-based inspectors. Two Green findings were identified, both of which were determined to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- Green. A Green, self-revealing, non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified when Entergy failed to properly implement a torus exhaust valve maintenance procedure. As a result, on February 25, 2007, valve 27AOV-118 did not open on demand to vent the torus and maintain drywell to torus differential pressure. Entergy entered this issue into their corrective action program and performed an extent of condition review.

The inspectors determined that this finding more than minor because it was associated with the Barrier Performance attribute of the Barrier Integrity cornerstone; and it impacted the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Failure of the valve to operate remotely from the relay room would have required operators to open the valve locally using the manual operator in accordance with procedure Emergency Procedure 6, "Post-Accident Containment Venting and Gas Control." The inspectors evaluated this finding using Phase 1 of IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and determined it to be of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment, or involve an actual reduction in defense-in-depth for the atmospheric pressure control or hydrogen control functions of the reactor containment. (Section 1R13)

- Green. A Green, self-revealing, NCV of 10 CFR Part 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" was identified when Entergy did not perform a risk assessment for planned maintenance activities when a tagout was applied on the 'B' electro-hydraulic control (EHC) pump, in conjunction with a previous emergent failure of torus exhaust outer isolation valve 27AOV-118. Entergy performed a risk assessment and entered the deficiency into their corrective action program.

The inspectors determined that this finding affected the initiating events cornerstone; and it was more than minor because it was similar to Example 7(f) in Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that, the emergent failure of 27AOV-118, in combination with the subsequent removal of the 'B' electro hydraulic control pump availability resulted in the plant being in a higher risk category, which required risk management actions, under Entergy's on-line risk management procedure. The inspectors evaluated this finding using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management SDP," Flowchart 1, "Assessment of Risk Deficit," and determined the finding to be of very low safety significance (Green) because the finding resulted in an increase in the incremental core damage probability deficit of less than  $1 \times 10^{-6}$  (actual increase was in the high  $10^{-8}$  range).

The inspectors determined that this finding had a cross-cutting aspect in the area of human performance because Entergy did not incorporate appropriate risk insights into planned work activities. (Section 1R13)

B. Licensee-Identified Violations

None.

## REPORT DETAILS

### Summary of Plant Status

The James A. FitzPatrick Nuclear Power Plant began the inspection period operating at full power. On February 17, 2007, the 'B' feedwater pump inboard seal exhibited increased leakage; and, as a result, the licensee elected to downpower to approximately 50 percent power to remove the feedwater pump from service. Following repairs, the plant was returned to full power on February 21, 2007, and continued to operate at or near full power for the remainder of the inspection period.

### 1. **REACTOR SAFETY**

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

#### 1R01 Adverse Weather Protection (71111.01 - 1 sample)

##### a. Inspection Scope

In mid-February, Oswego county experienced significant lake effect snowfall exceeding totals in excess of eight feet in some areas with snowfall rates of several inches per hour. The inspectors reviewed Entergy's preparations and response to these conditions including actions specified in Supplemental Action Procedure 19, "Severe Weather," and Administrative Procedure (AP) 12.04, "Seasonal Weather Preparations." In addition, the inspectors verified that Entergy took action to ensure that adequate operator and onsite staff were available during the storm. The inspectors also verified the operability of offsite and onsite emergency power supplies and that control room operators communicated with the transmission system operators in accordance with AP 12.13, "345/115 kV [kilovolt] Transmission Line Operations and Interface." This inspection satisfied one inspection sample for the onset of adverse weather.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment (71111.04Q - 3 samples, 71111.04S - 1 sample)

##### .1 Partial System Walkdown (3 samples)

##### a. Inspection Scope

The inspectors performed three partial system walkdowns to verify the operability of redundant or diverse trains and components during periods of system train unavailability or following periods of maintenance. The inspectors referenced the system procedures, the Updated Final Safety Analysis Report (UFSAR), and system drawings in order to verify that the alignment of the available train was proper to support its required safety functions. The inspectors also reviewed applicable condition reports (CR) and work orders to ensure that Entergy had identified and properly addressed equipment discrepancies that could potentially impair the capability of the available train, as required by 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action." The

documents reviewed are listed in the Attachment. The inspectors performed a partial walkdown on the following systems which represented three inspection samples:

- Train 'A' low pressure coolant injection (LPCI) independent power supply system during testing of the LPCI battery and battery charger;
- Train 'B' emergency service water and emergency diesel generator systems during planned maintenance on the 'A' emergency service water train; and
- Train 'B' residual heat removal system when the 'A' residual heat removal system was out of service for testing.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown (1 sample)

a. Inspection Scope

The inspectors performed a complete system alignment inspection of the containment atmosphere control and dilution system to identify any discrepancies between the existing equipment lineup and the required lineup. During the inspection, system drawings and operating procedures were used to verify proper equipment alignment and operational status. The inspectors reviewed the open maintenance work orders associated with the system for any deficiencies that could affect the ability of the system to perform its function. Documentation associated with unresolved design issues such as temporary modifications, operator workarounds, and items tracked by plant engineering were also reviewed to assess their collective impact on system operation. In addition, the inspectors reviewed the CR database to verify that equipment problems were being identified and appropriately resolved. The documents reviewed during this inspection are listed in the Attachment. The inspection represented one inspection sample.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 9 samples)

a. Inspection Scope

The inspectors conducted a tour of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that: combustibles and ignition sources were controlled in accordance with Entergy's administrative procedures; fire detection and suppression equipment was available for use; passive fire barriers were maintained; and compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with Entergy's fire plan. The inspectors used procedure ENN-DC-161,

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“Transient Combustible Program,” in performing the inspection. The inspectors evaluated the fire protection program against the requirements of License Condition 2.C.3. The documents reviewed are listed in the Attachment. This inspection represented nine inspection samples for fire protection tours and were conducted in the following areas::

- Fire Area/Zone 1E/TB-1 North, elevation 252 foot;
- Fire Area/Zone 1E-TB-1 South, elevation 252 foot;
- Fire Area/Zone 1E/TB-1 North, elevation 272 foot;
- Fire Area/Zone IX/SG-1;
- Fire Area/Zone IX/RB-1A, elevation 272 foot;
- Fire Area/Zone II/SW-1, elevation 272 foot;
- Fire Area/Zone IC/SW-1, elevation 272 foot;
- Fire Area/Zone V/EG-1 South, elevation 272 foot; and
- Fire Area/Zone VII/CS-1, elevation 272 foot.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

Internal Flooding (71111.06 -1 sample)

a. Inspection Scope

The inspectors reviewed selected risk-important plant design features and Entergy’s procedures intended to protect the cable spreading and relay rooms and associated safety-related equipment from internal flooding events. The inspectors reviewed flood analysis and design documents, including the Individual Plant Examination and the UFSAR, engineering calculations, and abnormal operating procedures. The documents reviewed are listed in the Attachment. These activities represented one inspection sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A - 1 sample)

a. Inspection Scope

The inspectors reviewed the testing and evaluation of test results for the residual heat removal system heat exchanger 10E-2B performed in accordance with Entergy’s response to NRC Generic Letter 89-13, “Service Water System Problems Affecting Safety-Related Equipment.” Heat removal measurements and heat exchanger capacity calculations were reviewed to verify that cooler performance was consistent with design

calculations and the UFSAR. The documents reviewed are listed in the Attachment. These activities represented one inspection sample.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

.1 Resident Inspector Quarterly Review (71111.11Q - 1 sample)

a. Inspection Scope

On March 1, 2007, the inspectors observed licensed operator simulator training to assess operator performance during several scenarios to verify that operator performance was adequate and evaluators were identifying and documenting crew performance problems. The inspectors evaluated the performance of risk significant operator actions, including the use of emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, the implementation of appropriate actions in response to alarms, the performance of timely control board operation and manipulation, and the oversight and direction provided by the shift manager. The inspectors also reviewed simulator fidelity to evaluate the degree of similarity to the actual control room. Licensed operator training was evaluated against the requirements of 10 CFR Part 55, "Operators' Licenses." The documents reviewed are listed in the Attachment. This observation of operator simulator training represented one inspection sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 2 samples)

a. Inspection Scope

The inspectors reviewed performance-based problems involving selected in-scope structures, systems, or components (SSCs) to assess the effectiveness of the maintenance program. The reviews focused on:

- Proper Maintenance Rule scoping in accordance with 10 CFR Part 50.65;
- Characterization of reliability issues;
- Changing system and component unavailability;
- 10 CFR Part 50.65 (a)(1) and (a)(2) classifications;
- Identifying and addressing common cause failures;
- Trending of system flow and temperature values;
- Appropriateness of performance criteria for SSCs classified (a)(2); and
- Adequacy of goals and corrective actions for SSCs classified (a)(1).

The inspectors reviewed system health reports, maintenance backlogs, and Maintenance Rule basis documents. The inspectors evaluated the maintenance program against the requirements of 10 CFR Part 50.65. The documents reviewed are listed in the Attachment. The following Maintenance Rule samples were reviewed and represent two inspection samples:

- 125 volt station and 419 volt low pressure coolant injection batteries, chargers, and inverters; and
- Residual heat removal service water system.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 5 samples)

a. Inspection Scope

The inspectors reviewed maintenance activities to verify that the appropriate risk assessments were performed prior to removing equipment for work. The inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4), and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The documents reviewed are listed in the Attachment. The review of the following activities represented five inspection samples:

- Week of January 8, 2007, which included biennial maintenance on the 'A' train low pressure coolant injection inverter and full load surveillance testing of the 'A' train emergency diesel generator;
- Week of January 22, 2007, which included full load testing of 'B' train emergency diesel generators, quarterly inservice testing of the high pressure coolant injection system, and service testing of the 'B' train low pressure coolant injection battery and inverter;
- Week of February 19, 2007, which included emergent work on the 'B' feedwater pump due to a degraded inboard seal and 'C' condensate pump packing replacement;
- Week of February 26, 2007, which included emergent work on the torus exhaust outer isolation valve, 27-AOV-118, emergency diesel generator surveillance testing, and high pressure coolant injection system instrument surveillance testing; and
- Week of March 12, 2007, which included 'B' reactor water cleanup pump seal failure and system isolation with the 'A' steam packing exhauster and 'C' residual heat removal service water pump out of service.

b. Findings

- .1 Introduction: A Green, self-revealing, non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified when Entergy failed to properly implement a torus exhaust valve maintenance. As a result, on February 25, 2007, valve 27AOV-118 did not open on demand to vent the torus to maintain drywell-to-torus differential pressure.

Description: Valve 27AOV-118 is a normally closed 20-inch air-operated containment isolation valve in the containment atmosphere control system. During normal operation the valve is remotely operated from a relay room control panel to vent the torus via the standby gas treatment system to maintain drywell-to-torus differential pressure. During loss of normal decay heat removal events, the valve is used for containment pressure control and reactor decay heat removal. The system is manually initiated from the relay room in accordance with emergency operating procedures when drywell pressure reaches 44 psig. The valve can also be operated using a separately mounted manual operator.

On February 25, 2007, while attempting to vent the torus, Entergy identified that valve 27AOV-118 could not be opened from the relay room. Investigation revealed that the key connecting the air actuator coupling hub to the valve coupling hub had sheared and that the gap between the hubs appeared to be excessive. A similar key failure occurred in 1996 and had been attributed to an excessive coupling hub gap which overstressed the key. Based on the results of calculation JAF-CALC-CAD-02766, "Containment Purge Actuator to Valve Coupling Gap for Valves 27AOV-101A/B and 111 Through 118," an allowable range of 0.0625 to 0.125 inches was established and incorporated on December 19, 2002, into the valve actuator Maintenance Procedure (MP) 060.02, "GH Bettis Pneumatic Valve Actuator Maintenance," Revision 5. Following the February 25, 2007 key failure, Entergy found the coupling hub gap to be 0.625 inches.

Analysis: The inspectors determined that the performance deficiency was that Entergy failed to implement the actuator-to-valve coupling gap limit specified in the maintenance procedure. This was reasonably within Entergy's ability to foresee and prevent. Traditional enforcement does not apply because the issue did not have an actual safety consequence or a potential for impacting the NRC's regulatory function, and it was not the result of any willful violation of NRC requirements.

The inspectors determined that this finding was more than minor because it was associated with the Barrier Performance attribute of the Barrier Integrity cornerstone; and it impacted the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radio nuclide releases caused by accidents or events. Failure of the valve to operate remotely from the relay room would have required operators to open the valve locally using the manual operator in accordance with procedure Emergency Procedure 6, "Post-Accident Containment Venting and Gas Control." The inspectors evaluated this finding using Phase 1 of IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and determined it to be of very low safety significance (Green)

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because it did not represent an actual open pathway in the physical integrity of reactor containment, or involve an actual reduction in defense-in-depth for the atmospheric pressure control or hydrogen control functions of the reactor containment.

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality shall be accomplished in accordance with instructions, procedures, or drawings. Entergy Maintenance Procedure (MP) 060.02, "GH Bettis Pneumatic Valve Actuator Maintenance," Revision 5, requires adjustment of the valve stem coupling hub to hub gap be 0.0625 to 0.125 inches on both the manual and air operator side of valve 27AOV-118 as measured at the key interface locations. Contrary to the above, in October 2004, Entergy did not maintain the valve stem coupling hub to hub gap on valve 27AOV-118 in accordance with maintenance procedure MP-060.02 resulting in failure of the actuator-to-valve coupling hub key on February 25, 2007. Because the issue was of very low safety significance (Green) and was entered into Entergy's corrective action program as condition report CR-JAF-2007-00752, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: **(NCV 05000333/2007002-01, Inadequate Maintenance on Containment Atmosphere Control Valve.)**

- .2 Introduction: A Green, self-revealing NCV of 10 CFR Part 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" was identified when Entergy did not perform a risk assessment for planned maintenance activities when a tagout was applied on the 'B' electro-hydraulic control (EHC) pump, in conjunction with a previous emergent failure of torus exhaust outer isolation valve 27AOV-118.

Description: On February 25, 2007, at 11:10 p.m., 27AOV-118 would not open remotely to vent the torus. 27AOV-118 is a primary containment isolation valve, and, as required by TS 3.6.1.3, operators isolated the affected containment penetration flow path by closing and deactivating the inboard isolation valve. Subsequently, a tagout was applied on the 'B' EHC pump for scheduled maintenance. A risk assessment that considered the emergent failure of 27AOV-118 and the impact on containment venting prior to application of the tagout on the 'B' EHC pump was not performed. Specifically, Entergy's risk assessment failed to consider risk significant systems, structures, and components, as well as support systems that were unavailable during the maintenance. Administrative Procedure (AP) 10.10, "On-Line Risk Assessment," assigns a risk category color in risk significant order from Green, Yellow, Orange or Red based on core damage frequency. Risk management actions are implemented depending on the risk category color. With 27AOV-118 inoperable, combined with the impact of the tagout on the EHC system, the color increased from Yellow to Orange. On February 26, at approximately 6:46 a.m., the plant staff recognized the condition and the 'B' EHC pump was returned to standby.

Analysis: The inspectors determined that the finding was a performance deficiency because Entergy did not perform a risk assessment following the emergent failure of 27AOV-118, and subsequently continued scheduled work activities including tagout of

the 'B' EHC pump. The inspectors determined that this finding impacted the Initiating Events cornerstone due to the increased likelihood of a plant transient with the loss of the normal heat sink. It was reasonable that Entergy should have identified the condition and updated the risk assessment, because Entergy procedure AP 10.10, "On-Line Risk Assessment," specifies that plant risk must be reassessed when plant conditions change. Traditional enforcement does not apply since there were no actual safety consequences or potential for impacting the NRC's regulatory function, and the finding was not the result of any willful violation of NRC requirements or Entergy's procedures.

The inspectors determined that this finding was more than minor because it was similar to Example 7(f) in Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that, the emergent failure of 27AOV-118, in combination with the subsequent removal of the 'B' electro hydraulic control pump availability resulted in the plant being in a higher risk category, which required risk management actions, under Entergy's on-line risk management procedure. The ability to vent the containment from the torus is a risk important action to prevent containment failure and core damage for situations that involve the inability to remove core decay heat from the torus water. The tagout of the 'B' electro hydraulic control pump increased the chance of a plant transient with the loss of the normal heat sink.

Using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management SDP," Flowchart 1, "Assessment of Risk Deficit," the inspectors determined the incremental core damage probability deficit from Entergy's core damage frequency as a result of the actual duration of the 27AOV-118 maintenance combined with the time the 'B' EHC system was not available due to the tagout (two hours). The inspectors calculated the incremental core damage probability deficit to be in the high  $10^{-8}$  range. Because the calculated risk deficit was not greater than  $1 \times 10^{-6}$  incremental core damage probability deficit, the inspectors determined that this finding was of very low safety significance (Green).

The inspectors determined that this finding had a cross-cutting aspect in the area of human performance because Entergy did not incorporate appropriate risk insights into planned work activities.

Enforcement: 10 CFR 50.65 (a)(4), requires, in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on February 26, 2007, Entergy did not assess and manage the increase in risk for planned maintenance activities when a tagout was applied on the 'B' EHC pump, following an emergent failure of torus exhaust outer isolation valve 27AOV-118. Because this finding was of very low safety significance and was entered into Entergy's corrective action program as condition report CR-JAF-2007-00755, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000333/2007002-02, Failure to Perform a Risk Assessment When Required by 10 CFR 50.65(a)(4).

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1R15 Operability Evaluations (71111.15 - 6 samples)a. Inspection Scope

The inspectors reviewed operability determinations to assess the acceptability of the evaluations; when needed, the use and control of compensatory measures; and compliance with TS. The inspectors' review included a verification that the operability determinations were made as specified by ENN-OP-104, "Operability Determinations." The technical adequacy of the determinations was reviewed and compared to the TSs, UFSAR, and associated design basis documents. The documents reviewed are listed in the Attachment. The following evaluations were reviewed and represented six inspection samples:

- CR-2007-00151 concerning a commercial grade gate timing circuit card installed in safety-related low pressure coolant injection inverter 71INV-3A;
- CR-2007-00293 concerning installation of nonsafety-related contacts in safety-related circuit breaker 71MCC-163-OG-1 for containment isolation valve 10MOV-34B;
- CR-2007-00392 concerning an out of calibration condition of a local leak rate monitor panel that affected the test results of 12 containment penetrations;
- CR-2007-00647 concerning inaccurate valve position indication of vacuum breaker 27VB-2 while performing surveillance test ST-15J, "Torus to Drywell Vacuum Breakers Quarterly Test IST;"
- CR-2007-00281 concerning 'D' safety relief valve tailpipe temperature increase; and
- CR-2007-00752 concerning extent of condition reviews following failure of containment atmosphere control isolation valve 27AOV-118.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 6 samples)a. Inspection Scope

The inspectors reviewed six post-maintenance test procedures and associated testing activities for selected risk significant mitigating systems to assess whether the effect of maintenance on plant systems was adequately addressed by control room and engineering personnel. The inspectors verified: test acceptance criteria were clear, demonstrated operational readiness and were consistent with Design Basis Documents; test instrumentation had current calibrations and adequate range and accuracy for the application; and tests were performed, as written, with applicable prerequisites satisfied. Upon completion, the inspectors verified that equipment was returned to the proper alignment necessary to perform its safety function. Post-maintenance testing was evaluated against the requirements of 10 CFR 50, Appendix B, Criterion XI, "Test

Control.” The documents reviewed are listed in the Attachment. The following post-maintenance test activities were reviewed and represented six inspection samples:

- Work request JAF-03-07188-01, involving repair of a water leak in service water pump 46P-1B motor oil reservoir during the week of June 16, 2007;
- Work request JAF-05-17157, involving inspection and repair of a residual heat removal service water keep-full check valve;
- Work request JAF-05-22322, involving cleaning and replacement of two-inch emergency service water piping to the west electric bay and east cable tunnel coolers;
- Work request JAF-07-15650, involving repair of the air operator coupling of torus exhaust outboard containment isolation valve 27AOV-118;
- Work request 51104288, involving replacement of residual heat removal service water pump 10P-1C due to high vibration; and
- Work request 51178018, involving maintenance and repair of stator water cooling pump 94P-15B due to high vibration.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 7 samples)

a. Inspection Scope

The inspectors witnessed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether the SSCs satisfied TS, UFSAR, Technical Requirements Manual, and Entergy procedure requirements. The inspectors verified: test acceptance criteria were clear, demonstrated operational readiness, and were consistent with Design Basis Documents; test instrumentation had current calibrations and adequate range and accuracy for the application; and tests were performed, as written, with applicable prerequisites satisfied. Upon surveillance test (ST) completion, the inspectors verified that equipment was returned to the status specified to perform its safety function. The inspectors evaluated the tests against the requirements in TS. The following STs were reviewed and represented seven inspection program samples:

- ST-2AM, “Residual Heat Removal Loop B Quarterly Operability Test;”
- ST-4N, “High Pressure Coolant Injection Quick Start, Inservice, and Transient Monitoring Test;”
- MST-071.30, “Low Pressure Coolant Injection Charger-Inverter Performance and Low Pressure Coolant Injection Battery Service Surveillance Test;”
- ST-7F, “Standby Gas Treatment Fan B and Valve Exercising Test IST;”
- ST-8Q, “Testing of the Emergency Service Water System;”
- ST-9BB, “Emergency Diesel Generator 'B' and 'D' Full Load Test and Emergency Service Water Pump Operability Test;” and
- ST-5BB, “APRM System 'B' Channel Functional Test.”

Enclosure

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**1EP6 Drill Evaluation (71114.06 - 1 sample)a. Inspection Scope

The inspectors observed emergency response organization activities during the full participation drill that was conducted on January 11, 2007. The inspectors verified that emergency classification declarations, notifications, and protective action recommendations were properly completed. The inspectors evaluated the drill against the requirements of 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities." This observation constituted one inspection program sample.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY****Cornerstone: Occupational Radiation Safety**2OS2 ALARA Planning and Controls (71121.02 - 4 samples)a. Inspection Scope

The inspector conducted the following activities to verify that Entergy was properly maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). Implementation of the ALARA program was reviewed against the criteria contained in 10 CFR 20.1101(b) and Entergy's procedures.

(1) The following five highest exposure work activities from the Fall 2006 refueling outage were selected for review:

- Reactor disassembly/reassembly;
- In-Service inspection/ erosion-corrosion/intergranular stress corrosion cracking;
- Reactor vessel visual inspection and defueling activities;
- Control rod drive replacement; and
- Preventive maintenance on motor-operated valves.

- (2) With respect to the work activities listed above, the ALARA evaluations, exposure estimates, and applicable exposure mitigation requirements were reviewed. This included a review of exposure mitigation procedures and engineering and work controls to achieve exposures that are ALARA. These work activities were also reviewed to determine if they were reasonably grouped into work activities, based on historical precedence or industry standard groupings.
- (3) The actual results achieved were compared with the intended dose established in the ALARA planning for the work activities. ALARA post-job reviews were reviewed and interviews were conducted to evaluate the adequacy of ALARA controls as implemented, and to identify any significant performance deficiencies that may have resulted in unintended dose consequences.
- (4) The methodology for adjusting work activity exposure estimates were evaluated with respect to the work activities. The reasons for the exposure estimate adjustments were determined and evaluated with respect to sound radiation protection and ALARA principles and to ensure the revised exposure estimates provided an effective ALARA performance measure.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA2 Identification and Resolution of Problems

.1 Annual Sample: Operator Workaround Program (71152 - 1 sample)

a. Inspection Scope

The inspectors reviewed the cumulative effects of operator workarounds on the reliability, availability, and potential for mis-operation of a system and on the operator's ability to implement abnormal or emergency operating procedures. The inspectors reviewed the results of Entergy Surveillance Test ST-99H, "Operations Cumulative Impact Assessment," and the resolution of items identified in the assessment. The inspectors reviewed Entergy's program for identifying operator workarounds at an appropriate threshold and for entering them into the corrective action program. In addition, inspectors reviewed operation department records including standing orders for operational decision-making issues and operability evaluations.

b. Assessment and Observations

No findings of significance were identified. The corrective action program was effectively used to identify and resolve operator workarounds. The resolution of operator workaround items has been appropriately prioritized.

.2 Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of all items entered into Entergy's corrective action program. The review was accomplished by accessing Entergy's computerized database for CRs and attending CR screening meetings.

In accordance with the baseline inspection modules, the inspectors selected corrective action program items across the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for additional follow-up and review. Additionally, an NRC specialist inspector reviewed six CRs associated with the Occupational Radiation Safety Cornerstone that were initiated between October 2006 and January 2007. The inspectors assessed Entergy's threshold for problem identification, the adequacy of the cause analyses, extent of condition review, operability determinations, and the timeliness of the specified corrective actions. The CRs reviewed are listed in the Attachment.

b. Assessment and Observations

No findings of significance were identified.

4OA3 Event Followup (71153 - 1 sample)

.1 (Closed) LER 05000333/2006002-00, High Pressure Coolant Injection System Declared Inoperable Due to Turbine Speed Oscillations.

On November 4, 2006, with the plant operating in Mode 1, Entergy identified that the high pressure coolant injection system was inoperable due to turbine speed oscillations. The condition was discovered during post-maintenance testing following a refueling outage, and was caused by connecting two turbine hydraulic actuator oil lines to the incorrect oil ports. The enforcement aspects of this violation of maintenance procedures were documented in section 4OA7 of NRC Inspection Report 05000333/2006005. Entergy entered the event into its corrective action program as CR-2006-04754. This LER is closed.

4OA5 Other Activities

.1 Closed: URI 2006006-03, "Simulator Transient Testing"

This URI was opened because the inspectors determined that the facility process for reviewing simulator transient testing was not adequate to comply with 10 CFR Part 55.46(d)(1) and Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for use in Operator Training and License Examinations," Revision 1. The inspectors

considered this issue unresolved pending an appropriate review of test results to determine if significant discrepancies existed in simulator performance.

Entergy put together an "expert panel" of six individuals from operations, engineering, and training. This use of an expert panel satisfies regulatory requirements for test review. These individuals reviewed the most recent simulator transient tests and identified discrepancies.

Two discrepancies were identified by the expert panel review which resulted in simulator model changes. One instance involved solid plant pressure response at high pressure, the other involved indications of recirculation flow under certain conditions with all recirculation pumps tripped.

The inspectors evaluated the impact of these discrepancies against the criteria described in NRC Inspection Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance significance determination process," and determined that these discrepancies were minor. Accordingly, this URI is closed.

#### 40A6 Meetings, Including Exit

On March 27, 2007, the inspectors presented the inspection results to Mr. Peter T. Dietrich and other members of his staff. The inspectors asked Entergy whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Entergy Personnel

P. Dietrich, Site Vice President  
 C. Adner, Manager, Operations  
 N. Avrakotos, Manager, Emergency Preparedness  
 S. Bono, Director Engineering  
 J. Costedio, Manager, Regulatory Compliance  
 M. Durr, Manager, System Engineering  
 B. Finn, Director, Nuclear Safety Assurance  
 D. Johnson, Manager, Training  
 J. LaPlante, Manager, Security  
 K. Mulligan, General Manager, Plant Operations  
 J. Pechacek, Manager, Programs and Components Engineering  
 W. Rheume, Manager, CA&A  
 J. Solowski, Radiation Protection  
 John Pircsuk, Senior Operations Instructor  
 Darren Deritz, Regulatory Compliance  
 Greg Pitts, Training

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened and Closed

05000333/2006002-00	LER	High Pressure Coolant Injection System Declared Inoperable Due to Turbine Speed Oscillations (Section 4OA3)
05000333/2007002-01	NCV	Inadequate Maintenance on Containment Atmosphere Control Valve (Section 1R13)
05000333/2007002-02	NCV	Failure to Perform a Risk Assessment When Required by 10 CFR 50.65(a)(4) (Section 1R13)

Closed

05000333/2006003-03	URI	Simulator Transient Testing (Section 4OA5)
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**LIST OF DOCUMENTS REVIEWED****Section 1R04: Equipment Alignment**

OP-43C, "Low Pressure Coolant Injection Independent Power Supply System," Revision 17  
 MST-071.11, "Low Pressure Coolant Injection Battery Quarterly Surveillance Test," Revision 19

DBD-027, "Design Basis Document for The Air Treatment Systems," Revision 10  
OP-37, "Containment Atmosphere Dilution System," Revision 73  
FM-18A, "Flow Diagram - Drywell Inerting C.A.D. and Purge," Revision 57  
FM-18B, "Flow Diagram - Drywell Inerting C.A.D. Purge and Containment Differential Pressurization," Revision 37  
14620.9011-US(N)-001, "Torque Calculation for Suppression Chamber (20") and Drywell (24") Vent and Purge Butterfly Valves," Revision 2  
JAF-CALC-CAD-02782, "Nitrogen Flows and Volumes for Normal and Accident Conditions," Revision 0

### **Section 1R05: Fire Protection**

PFP-PWR42, Fire Area/Zone 1E/TB-1  
PFP-PWR43, Fire Area/Zone 1E/TB-1  
PFP-PWR45, Fire Area/Zone 1E/TB-1  
PFP-PWR22, Fire Area/Zone IX/SG-1  
PFP-PWR20, Fire Area/Zone IX/RB-1A  
PFP-PWR29, Fire Area/Zone II/SW-1  
PFP-PWR30, Fire Area/Zone IC/SW-1  
PFP-PWR31, Fire Area/Zone V/EG-1  
PFP-PWR11, Fire Area/Zone VII/CS-1  
ST-76J13, "Heat Detector Functional Test - SGT Filter B," Revision 16

### **Section 1R06: Flood Protection Measures**

AOP-43, "Plant Shutdown from Outside the Control Room," Revision 32  
AOP-51, "Unexpected Fire Pump Start," Revision 5  
AP-16.14, "Hazard Barrier Controls," Revision 3  
11825-FE-1AS, "120V AC One Line Diagram, Emergency Bus A2 & B2 Distribution Panels 71ACA2 & 71ACB2," Revision 18  
LO-OEN-2005-00193, "Response to NRC Information Notice 2005-011, 'Internal Flooding/Spray-Down of Safety-Related Equipment Due to Unsealed Equipment Hatch Floor Plugs and/or Blocked Floor Drains'"  
LO-OEN-2005-00555, "Response to NRC Information Notice 2005-030, 'Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design'"  
0090-0006-C-003, "JAF NPP Fire Suppression Effects Analysis," Revision 0  
DBD-071 Tab 1, "Design Basis Document for the Electrical Distribution Systems 4160V and 600V AC Power Systems," Revision 2  
JAF-RPT-MULTI-02107, "IPE Update, Appendix H, Internal Flooding Analysis," Revision 2

### **Section 1R07: Heat Sink Performance**

AOP-30, "Loss of Shutdown Cooling," Revision 19  
AP-19.14, "Eddy Current Testing of Heat Exchanger Tubes," Revision 8  
EOP-4, "Primary Containment Control," Revision 7  
OP-13, "Residual Heat Removal System," Revision 93

ST-2Y, "Residual Heat Removal Heat Exchanger Performance Test," Revision 7, dated January 24, 2007  
JAF-CALC-MISC-02634, "Torus Station Blackout Torus Heat-Up for Power Uprate Conditions," Revision 0  
JAF-CALC-Residual Heat Removal-01903, "Instrument Indication Uncertainty for Residual Heat Removal Heat Exchanger Performance Test," Revision 1  
JAF-CALC-Residual Heat Removal-02953, "Residual Heat Removal Heat Exchanger K-value with Reduced Tube Side Fouling Factor," Revision 0  
JAF-CALC-Residual Heat Removal-00392, "Calculation for Design Basis/Acceptance Criteria for ST-2Y," Revision 0  
GE-NE-T23-00373-01, "Higher Residual Heat Removal Service Water Temperature Analysis," Revision 1  
GE-NE-T23-00766-00-01, "Containment Analysis to Support ECCS Pump NPSH Evaluation," Revision 0  
JPN-91-015, "Updated Response to Generic Letter 89-13 Service Water System Problems Affecting Safety-Related Equipment," dated April 18, 1991  
JPN-93-015, "Updated Response to Generic Letter 89-13 Service Water System Problems Affecting Safety-Related Equipment," dated March 16, 1993  
"Eddy Current Inspection for Residual Heat Removal B Heat Exchanger," dated April 17, 2003  
Master Lee NDE Services, "Inspection Summary," dated April 2003

**Section 1R11: Licensed Operator Regualification Program**

71775-0, Loss of B Reactor Protection System Bus, failure to Automatically Scram, with a Scram Discharge Isolation Valve Rupture After the Manual Scram

**Section 1R12: Maintenance Effectiveness**

JAF-RPT-ELEC-02302, "MR Basis Document for System 071 DC Electrical Distribution, Revision 3  
JAF-RPT-MULTI-02294, "MR Basis Document for Service Water Systems Including System 010 - Residual Heat Removal Service Water - System 046 -- Emergency Service Water - System 046-000 - Normal Service Water," Revision 6

**Section 1R15: Operability Evaluations**

ST-39B, "Type B and C LLRT of Containment Penetrations," Revision 31

**Section 1R19: Post Maintenance Testing**

JAF-RPT-MULTI-02294, "MR Basis Document for Service Water Systems," Revision 6  
AP-05.07, "Maintenance Testing and Post-Work Testing (ISI)," Revision 36  
MP-059.45, "Piston Check Valves," Revision 10  
JAF-RPT-MULTI-00406, "Inservice Test Program Basis Document," Revision 0

**Section 1R22: Surveillance Testing**

IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications"  
 MP-057-.06, "Battery Maintenance," Revision 27  
 JAF-89-026, "Establish Acceptance Criteria for Low Pressure Coolant Injection Battery Intercell Connector Resistances," Revision 0  
 JAF-CALC-ELEC-00562, "Low Pressure Coolant Injection Battery Testing Duty Cycle," Revision 0  
 JAF-CALC-ELEC-01857, "419 V DC Low Pressure Coolant Injection Power System 3A & 3B Sizing," Revision 0  
 JAF-CALC-ELEC-02213, "Low Pressure Coolant Injection UPS System Testing Load Bank Characteristics and Low Pressure Coolant Injection Battery and Inverter on Line Testing Conditions and/or Limitation," Revision 0  
 JAF-CAL-ELEC-00523, "71/Low Pressure Coolant Injection UPS System Testing Duty Cycle," Revision 3 and Margin Revisions 3A and 0A  
 JAF Manual No. E356-0048, "Stationary Lead-Acid Batteries"  
 JAF-CALC-NMS-00758, "Setpoint Calculation for APRM A through F," Revision 11  
 JTS-93-0877, "Surveillance Test Adequacy Review of APRMs and Control Rod Blocks Findings," Revision 1

**Section 4OA2: Identification and Resolution of Problems**

Condition Reports

2003-02104	2007-01236	2007-00497
2003-02269	2007-01019	2007-00531
2000-06351	2007-01128	2007-00454
2003-01787	2007-00914	2007-00392
2006-04276	2007-00884	2007-01045
2006-05039	2007-00909	2007-01043
2006-04873	2007-00862	2007-00592
2006-05108	2007-00809	2007-00719
2006-05021	2007-00804	2007-00983
2006-04965	2007-00824	2007-00845
2006-04645	2007-00647	2007-00241
2006-05106	2007-00641	2007-00104
2007-00151	2007-00629	2007-00740
2007-00127	2007-00628	2007-00741
2007-00376	2007-00625	2007-01196

**Section 4OA5: Other Activities**

TP-7.03, "Simulator Test Program," Revision 1  
 CR-JAF-2006-02057  
 SDR-9494, ANSI Transient Questions  
 SDR-9297, ANSI06 Max Size Unisolable Steam Rupture

**LIST OF ACRONYMS**

ADAMS	Agency Documents Access Management System
ALARA	as low as is reasonably achievable
AP	administrative procedure
CDF	core damage frequency
CFR	Code of Federal Regulations
CR	condition report
DBD	design basis document
EHC	electro-hydraulic control
EOP	emergency operating procedure
ERO	emergency response organization
kV	kilovolt
IMC	inspection manual chapter
ISI	inservice inspection
IST	inservice testing
LPCI	low pressure coolant injection
MP	maintenance procedure
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
OP	operating procedure
PARS	publicly available records
psig	pounds per square inch gauge
SDP	significance determination process
SSC	structures, systems or components
ST	surveillance test
TS	technical specification
UFSAR	Updated Final Safety Evaluation Report
URI	unresolved item