**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
**REGION I**
**475 ALLENDALE ROAD**
**KING OF PRUSSIA, PA 19406-1415**

September 25, 2009

Mr. Joseph E. Pollock
Site Vice President
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT 2 – NRC COMPONENT DESIGN BASES INSPECTION REPORT NO. 05000247/2009007

Dear Mr. Pollock:

On August 13, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Indian Point Nuclear Generating Unit 2. The enclosed integrated inspection report documents the inspection results, which were discussed on August 13, 2009, with Mr. Donald Mayer 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. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design basis accidents. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents three NRC-identified findings which were of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of the violations and because they were entered into your corrective action program, the NRC is treating the violations 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 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, D.C. 20555-0001, with copies to the Regional Administrator, Region 1; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Senior Resident Inspector at Indian Point Nuclear Generating Unit 2. In addition, if you disagree with the characterization of 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 I and the NRC Senior Resident Inspector at Indian Point Nuclear Generating Unit 2.

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 the public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

***/RA/***

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-247
License No. DPR-26

Enclosure: Inspection Report No. 05000247/2009007
w/Attachment: Supplemental Information

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 the public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

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| Docket No.: | 50-247 |
| License No.: | DPR-26 |
| Report No.: | 05000247/2009007 |
| Licensee: | Entergy Nuclear Northeast (Entergy) |
| Facility: | Indian Point Nuclear Generating Unit 2 |
| Location: | 450 Broadway, GSB<br>Buchanan, NY 10511-0249 |
| Inspection Period: | July 20 – August 13, 2009 |
| Inspectors: | J. Schoppy, Senior Reactor Inspector, Division of Reactor Safety (DRS) Team Leader<br>M. Balazik, Reactor Inspector, DRS<br>J. Richmond, Senior Reactor Inspector, DRS<br>L. Scholl, Senior Reactor Inspector, DRS<br>S. Kobylarz, NRC Electrical Contractor<br>W. Sherbin, NRC Mechanical Contractor<br>E. Bonney, Reactor Inspector, DRS (Trainee)<br>S. Ibarrola, Project Engineer, Division of Reactor Projects (DRP) (Trainee)<br>J. Rady, Reactor Inspector, DRS (Trainee) |
| Approved By: | Lawrence T. Doerflein, Chief<br>Engineering Branch 2<br>Division of Reactor Safety |

Enclosure

## SUMMARY OF FINDINGS

IR 05000247/2009007; 07/20/2009 – 08/13/2009; Indian Point Unit 2; Component Design Bases Inspection.

The report covers the Component Design Bases Inspection (CDBI) conducted by a team of four NRC inspectors and two NRC contractors. Three findings of very low risk significance (Green) were identified. Two of these findings were also considered to be NCVs. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects were determined using IMC 0305, "Operating Reactor Assessment Program." 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-Revealing Findings

**Cornerstone: Mitigating Systems**

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Entergy did not verify the adequacy of design because they did not evaluate the impact of the installed Amptector discriminator instantaneous trip feature on breaker coordination. Following identification Entergy entered the issue into the corrective action program and performed an operability assessment and extent-of-condition review.

  The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the 480Vac bus to respond to initiating events to prevent undesirable consequences. Specifically, load center Bus 6A (and 2A, 3A and 5A) would be incapable of meeting the design basis function when required if the incoming line breaker to the load center bus were to trip due to lack of coordination for a fault on a non-Class 1E circuit during a design basis accident. The finding was determined to be of very low safety significance because the design deficiency was confirmed not to result in loss of operability or functionality.

  This finding was not assigned a cross-cutting aspect because the underlying cause was not indicative of current performance. (Section 1R21.2.1.1)

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Entergy did not to ensure that the component cooling water pump hydraulic performance test procedures had acceptance criteria which incorporated applicable design limits sufficient to ensure continued pump operability. Specifically, if the pump flow rate had degraded to the lower limit of the acceptance band, as listed in the test acceptance criteria, the pump would not have been able to meet the design basis flow requirements at the minimum acceptable differential pressure listed in the test procedure. In addition, the test acceptance criteria for design basis flow rate and differential pressure had no allowance for measurement uncertainty of the test instruments. In response to this deficiency, Entergy's short-term corrective actions included initiation of a corrective action condition report and completion of an operability determination for the affected equipment.

The finding was more than minor because it was associated with the design control attribute of the Mitigating Cornerstone and affected the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the test acceptance criteria did not ensure that the No. 23 component cooling water pump remained capable of performing its safety function under design basis conditions. The finding had very low safety significance because it was not a design or qualification deficiency, did not represent a loss of system safety function, did not represent an actual loss of safety function of a single train, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program Component, because Entergy's initial operability review, issue prioritization, and subsequent evaluation did not adequately assess actual pump performance. [P.1(c)] (Section 1R21.2.1.2)

- Green. The team identified a finding of very low safety significance because Entergy did not identify or evaluate material deficiencies of the city water system, as required by EN-LI-102, "Corrective Action Process." Specifically, Entergy did not identify or evaluate several degraded pipe supports on city water system piping in the utility tunnel, which represented reasonable doubt on system operability. The city water system provides a backup water supply for the condensate storage tank, fire fighting water supply, and provides alternate cooling to selected safety-related and risk significant pumps. The finding was not a violation because the city water piping, in the utility tunnel, is not safety-related, and the utility tunnel is not a safety-related or seismic structure. Entergy entered this issue into the corrective action program, assessed operability and extent-of-condition, and repaired one of the non-functioning pipe supports to restore additional margin.

  The finding was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. Specifically, the piping system could have potentially collapsed if additional pipe supports became degraded. The team determined the finding was of very low safety significance because it was not a design or qualification deficiency, did not represent of an actual loss of safety function of a single train, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program Component, because Entergy did not adequately implement the corrective action program with a low threshold for identifying issues. [P.1(a)] (Section 1R21.2.2.1)

B. Licensee-Identified Violations

None.

REPORT DETAILS

# 1. REACTOR SAFETY

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

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the Indian Point Unit 2 Probabilistic Safety Assessment (PSA) and the NRC's Standardized Plant Analysis Risk (SPAR) model for Indian Point Unit 2. Additionally, the team referenced the Risk-Informed Inspection Notebook for Indian Point Unit 2 (Revision 2.1a) in the selection of potential components and operator actions for review. In general, the selection process focused on components and operator actions that had a Risk Achievement Worth (RAW) factor greater than 1.3 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were located within both safety related and non-safety related systems, and included a variety of components such as pumps, breakers, ventilation fans, transformers, and valves.

The team initially compiled a list of components and operator actions based on the risk factors previously mentioned. Additionally, the team reviewed the previous CDBI report (05000247/2007007) and excluded the majority of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 16 components, 5 operator actions and 6 operating experience (OE) items. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment also included items such as failed performance test results, corrective action history, repeated maintenance, Maintenance Rule (MR) (a)(1) status, operability reviews for degraded conditions, NRC resident inspector insights, system health reports, and industry OE. Finally, consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins. The margin review of operator actions included complexity of the action, time to complete the action, and extent-of-training on the action.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns of selected components, interviews with operators, system engineers and design engineers, and reviews of associated design documents and calculations to assess the adequacy of the components to meet design basis, licensing basis, and risk-informed beyond design basis requirements. Summaries of the reviews performed for each component, operator action, OE sample, and the specific inspection findings identified are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

## .2 Results of Detailed Reviews

### .2.1 Detailed Component and System Reviews (16 samples)

#### .2.1.1 Diesel Building Ventilation Fans 318 and 323

a. Inspection Scope

Motor control center (MCC) 26B supplies power to diesel building ventilation fans 318 and 323. The team reviewed the MCC 26B one-line and fan motor schematic diagrams to ensure the ventilation fans functioned as designed. The team also reviewed the coordination/protection calculation for load center Bus 6A incoming line and MCC 26B feeder breaker Amptector trip settings for design basis load flow conditions and protective device coordination. The team walked down MCC 26B, the fan motor controllers, and 480Vac Bus 6A to assess the observable material condition. The team reviewed the fan motor feeder cable sizing and calculated voltage available during design basis conditions for adequacy. The load center breakers were field inspected for conformance with design basis requirements for the type of Amptector trip unit installed. In particular, LSG (long, short, & ground) type breakers potentially had Amptector discriminator trip units installed, whereas LSIG (long, short, instantaneous, & ground) type breakers did not. The team reviewed corrective action condition reports (CRs) and corrective maintenance history to identify potential recurring issues affecting reliability. The team also reviewed surveillance testing on Amptector trip units for adequacy of results in accordance with design basis setting requirements.

b. Findings

Introduction. The team identified a finding of very low safety significance (Green) involving a NCV of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” in that Entergy did not verify the adequacy of design because they did not evaluate the impact of the installed LSG trip unit discriminator feature on breaker coordination.

Description. During an inspection of 480Vac Bus 6A to independently assess Entergy design control (rating and use of LSG or LSIG type breakers), the team identified that Amptector discriminator instantaneous trips existed on the incoming line, emergency diesel generator (EDG) and bus cross-tie breaker. The team also determined that Entergy had not evaluated the discriminator circuit function in the breaker coordination study. Subsequently, during their extent-of-condition review, Entergy determined that type LSG trip units in load center Buses 5A, 2A and 3A were also affected. Entergy initiated CR-IP2-2009-3065 to evaluate the Amptector type LSG trip units without the discriminator defeated.

The Amptector discriminator circuit functions to provide an instantaneous breaker trip unless a minimum threshold current is exceeded prior to an overload condition (fault). The breaker coordination study, Calculation FEX-00141-01, “IP2 Amptector Setting Verification, Sensor and Tolerances,” specified that there are no instantaneous trips for the safety-related load center incoming line, EDG and bus-tie breakers, which would allow for their coordination with downstream non-Class 1E breakers during fault conditions. The breaker coordination analysis that demonstrates the adequacy of protection is required to satisfy Entergy Standard EEN-EE-S-010-IP2, “Electrical Separation Design Criteria,” Section 5.10.5, Electrical Isolation Criteria, which includes demonstration that operation of Class 1E circuits, are not degraded below an acceptable level due to shorts or faults on the non-Class 1E side.

The team noted that the Amptector discriminator circuit could potentially cause the instantaneous trip of the 480Vac load center bus incoming line breaker during a postulated design basis accident, due to a fault on a non-Class 1E circuit, and result in the loss of the load center. The team concluded that the electrical isolation provided for the postulated fault condition, with the subject load center breaker Amptector discriminator function not being disabled, did not satisfy the requirements of Engineering Standard EEN-EE-S-010-IP2, “Electrical Separation Design Criteria,” for electrical isolation of non-Class 1E circuits. Entergy performed an operability evaluation that determined that there was sufficient Class 1E load during all design basis operating conditions that served to disable the load center bus incoming line breaker Amptector discriminator circuit function (instantaneous trip) by exceeding the discriminator’s minimum threshold current. However, the team also found that the minimum threshold current setpoint calibration had not been verified by Entergy during surveillance testing. Nonetheless, the team concluded there was sufficient Class 1E load current available, well in excess of the manufacturer’s rated tolerance of the electrical defeat setpoint for the Amptector trip units, to provide reasonable assurance that the discriminator circuit would be electrically defeated.

Analysis. The team determined that Entergy’s failure to verify the adequacy of design of the installed LSG type breakers as required by Engineering Standard EEN-EE-S-010-IP2 was a performance deficiency that was reasonably within Entergy's ability to foresee and prevent prior to July 2009. The team noted that Entergy had a previous opportunity to identify this issue. Specifically, Entergy’s internal review of NRC Information Notice (IN) 92-29, “Potential Breaker Miscoordination Caused By Instantaneous Trip Circuitry,” represented a missed opportunity to evaluate this condition in 1992. On June 5, 1992, engineering had reviewed IN 92-29 and incorrectly concluded that only LSIG trip devices were installed at Unit 2.

The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the 480Vac bus to respond to initiating events to prevent undesirable consequences. Specifically, load center Bus 6A (and 2A, 3A and 5A) would be incapable of meeting the design basis function when required if the incoming line breaker to the load center bus were to trip due to lack of coordination for a fault on a non-Class 1E circuit during a design basis accident. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because the design deficiency was confirmed not to result in loss of operability or functionality.

This finding was not assigned a cross-cutting aspect because the underlying cause was not indicative of current performance. Specifically, the team did not identify any LSG breaker performance issues, Amptector calibrations, or associated engineering evaluations within the last several years that would have caused Entergy to re-revisit their response to NRC IN 92-29.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that 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 calculational methods, or by the performance of a suitable testing program. Contrary to the above, from June 5, 1992, until August 6, 2009, Entergy did not verify the adequacy of the design for protective device coordination regarding breakers configured with Amptector discriminator instantaneous trip circuits. Specifically, the load center Bus 6A incoming line breaker discriminator unit was neither defeated with an installed jumper nor were the conditions that were required to electrically defeat the circuit evaluated to ensure breaker coordination with non-Class 1E circuits. However, because this violation was of very low safety significance, and since it was entered in Entergy's corrective action program (CAP) as CR-IP2-2009-3065 this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000247/2009007-01, Failure to Evaluate the Impact on Breaker Coordination for the Westinghouse Amptector Type LSG Trip Unit Discriminator Feature)**

.2.1.2 No. 23 Component Cooling Water Pump

a. Inspection Scope

The team reviewed design documents, including drawings, calculations, procedures, and the design basis document (DBD) to determine the design requirements for No. 23 component cooling water (CCW) pump. The team reviewed hydraulic analyses to verify adequacy of net positive suction head (NPSH) and verify adequacy of surveillance test acceptance criteria for pump minimum discharge pressure at the required flow rate. The team reviewed in-service test (IST) results to verify acceptance criteria were met and any potential performance degradation was identified. In addition, the team reviewed Entergy's response and actions related to NRC Bulletin 88-04, "Potential Safety-Related Pump Loss," to assess implementation of OE related to pump minimum flow requirements, and pump-to-pump interaction. The team also reviewed electrical calculations, drawings, and pump brake horsepower requirements to determine if the motor capacity was adequate for the loading requirements. The team reviewed motor breaker Amptector settings, motor feeder cable ampacity and cable short circuit current capability to determine whether appropriate electrical protection coordination margins had been applied and whether the feeder cable had been properly sized for the maximum loading and short circuit current capability requirements.

The team performed a walkdown of the CCW pump area to assess the material condition of the pump and motor driver. The team reviewed preventive and corrective maintenance records to ensure that Entergy properly maintained the CCW pump. The team also reviewed corrective action documents to ensure that Entergy identified and corrected deficiencies associated with the CCW pump at an appropriate threshold.

b. Findings

Introduction. The team identified a finding of very low safety significance (Green) involving a NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Entergy did not ensure the CCW pump hydraulic performance test procedures had acceptance criteria which incorporated the applicable design limits sufficient to ensure continued pump operability.

Description. During a self-assessment in March 2009, Entergy identified an IST pump test acceptance criteria deficiency (CR 2009-0868). Specifically, Entergy identified that they had not appropriately incorporated instrument uncertainty into test acceptance criteria. For the CCW pumps, Entergy determined that they remained operable based on the available margin as indicated by their January 2009 IST for each of the respective CCW pumps. On April 1, Entergy expanded corrective actions to include detailed reviews to determine whether pump tests adequately incorporated design bases analytical limits. The team noted that Entergy's evaluation was still in-progress, with a due date of mid-September 2009.

At Indian Point 2, design basis hydraulic performance of the CCW pumps is verified by the American Society of Mechanical Engineers (ASME) Section XI in-service testing program. The team noted that the minimum CCW pump flow rate and differential pressure requirements were developed in Westinghouse Report No. WCAP-12312, "Safety Evaluation for an Ultimate Heat Sink Temperature of 95 ºF at Indian Point Unit 2," Revision 2, January 2004. The minimum performance criterion for the CCW pumps was determined to be 3500 gpm at 215.8 feet of total developed head (TDH). The team reviewed CCW pump IST procedure 2-PT-Q030C, "23 Component Cooling Water Pump," Revision 18, and noted that the acceptance criterion for pump flow rate was in the range of 3430 to 3500 gpm at a TDH of 215.8 ft. The team concluded that the lower limit for acceptance criterion of 3430 gpm for flow rate at 215.8 TDH was less than, and therefore, non-conservative when compared to the minimum analysis value for pump flow rate of 3500 gpm determined in Westinghouse WCAP No. 12312 at a TDH of 215.8 feet. The team also noted that procedure Step 4.5.1.2, which calculated pump discharge pressure, had a value of 1.5 psi added to the recorded discharge pressure. Entergy engineering personnel stated that this value was added to the discharge pressure to account for a check valve between the pump discharge and gauge pressure measuring tap, and that it was verified by field measurement. The team determined that this was not a valid number to be added to the discharge pressure because the field measurement did not account for the gauge elevation difference between the pump outlet gauge and the gauge used at the pressure tap. Using the formula for pressure drop through a check valve, the team independently determined that a more appropriate correction would be about 1.5 feet instead of 1.5 psi. Additionally, there was no allowance for instrument measurement uncertainty in the test acceptance criteria. As a result, the team concluded that the analytical value for the pump acceptance criteria was non-conservative by 70 gpm in flow rate, and about 2 feet TDH, without accounting for instrument uncertainty.

Based on these non-conservative values in the CCW pump IST acceptance criteria, the team questioned the operability of the No. 23 CCW pump because Entergy's April 16, 2009, IST recorded a CCW pump flow rate of 3460 gpm at 216.0 feet TDH (compared to the design limit of 3500 gpm at 215.8 feet TDH). Using the more appropriate correction factor on discharge pressure measurement, the recorded TDH should have been 214.0 feet. The inspectors plotted the data from the IST results on the design basis pump curve, and determined that the pump did not meet the minimum hydraulic performance requirements contained in WCAP No. 12312 during the April 2009 performance test. The team concluded that the No. 23 CCW pump actually had negative margin once appropriate and conservative values for design analytical limits and instrument uncertainty were factored in. Based on the team's assessment, the data indicated that the pump actually failed the test by about 6 feet of TDH at a corrected flow rate of 3500 gpm. The team noted that Entergy had noted the "low margin" during the April 2009 IST and entered the concern into their Margin Management Database; however, they did not assess the pump for continued operability, especially considering that they had lost all of the margin from the January 2009 IST that had formed the basis of their previous operability determination.

The team also noted that Entergy performed the No. 23 CCW pump IST again in July 2009 without updating the IST procedure and without performing an engineering evaluation to bound the condition to ensure that they adequately maintained the design bases. The team noted that the pump appeared to have more margin based on the July IST. Subsequently, Entergy provided an evaluation based on the July IST (considering instrument uncertainty and design bases analytical limits) that showed that the pump was operable as of July 09, 2009. The team agreed that there was more margin in the July test results which indicated that the pump met its design bases requirements for flow rate and TDH. In response to the team's concerns and identified deficiencies, Entergy initiated CR 2009-3807. Entergy's additional short-term planned corrective actions included performing an apparent cause evaluation and revising the CCW IST procedure to include appropriate analytical limits and instrument uncertainty values prior to the next scheduled IST.

The team noted that Entergy had missed several opportunities to identify and correct this IST shortcoming based on related issues within their CAP. Specifically, in 2006, CR IP2-2006-06511 identified concerns where instrument uncertainty was not considered in pump test acceptance criteria, and assigned an action to system and design engineering to "develop new acceptance criteria to account for instrument inaccuracy where needed." However, engineering did not complete the recommended actions from this 2006 CR. In 2007, the NRC identified a similar issue involving non-conservative analytical limits during the Indian Point Unit 3 CDBI (NCV 05000286/2007006-03, Non-Conservative Calculation for TDAFW Pump Discharge Pressure Used for Surveillance Testing). Entergy had performed an extent-of-condition review for Unit 2, but only reviewed the test acceptance criteria of the Unit 2 turbine driven auxiliary feedwater (TDAFW) pump.

Analysis. The team determined that Entergy's failure to ensure that the CCW pump hydraulic performance test procedures had acceptance criteria that incorporated the limits from applicable design documents was a performance deficiency that was reasonably within Entergy's ability to foresee and prevent prior to July 2009. The team noted that Entergy had missed several opportunities to identify and correct this deficiency dating back to 2006. In addition, following identification in March 2009, Entergy did not adequately prioritize and evaluate the condition to ensure continued CCW pump operability.

The team determined that the performance deficiency was similar to NRC IMC 0612, Appendix E, "Examples of Minor Issues," Example 3.j, in that the deficient hydraulic test acceptance criteria resulted in a condition where there was a reasonable doubt with respect to operability of the CCW pump. The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the CCW pump to respond to initiating events to prevent undesirable consequences. Specifically, the test acceptance criterion used did not ensure that the No. 23 CCW pump remained capable of performing its safety function under design bases conditions. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, did not represent an actual loss of safety function of a single train, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The team concluded that there was no loss of CCW safety function based on (1) Entergy's reasonable determination of continued operability based on the July IST results, (2) no significant corrective maintenance performed on No. 23 CCW pump between the January and July ISTs, and (3) review of the river water temperature trend for 2009 (a maximum river water temperature of 78 ºF was recorded in July).

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program Component, because Entergy's initial operability review, issue prioritization, and subsequent evaluation failed to adequately assess actual pump performance. Specifically, on March 5, 2009, Entergy identified pump testing deficiencies related to instrument uncertainty, and subsequently identified that No. 23 CCW pump had low margin, but did not adequately prioritize and evaluate the No. 23 CCW pump's performance with respect to its required design bases to ensure continued operability during 2009. (IMC 0305, aspect P.1(c))

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, from January 2004 until August 10, 2009, Entergy did not ensure that the CCW design basis for pump hydraulic performance was correctly translated into the CCW IST procedures. Specifically, Entergy did not include the appropriate analytical limits and instrument uncertainties in the development of the hydraulic performance test acceptance criteria of 3500 gpm at 215.8 feet TDH for the demonstration of operability of the CCW pumps. However, because this violation was of very low safety significance, and since it was entered in Entergy's CAP as CR-IP2-2009-3087 this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000247/2009007-02, Failure to Ensure That the CCW Pump Hydraulic Performance Test Procedures Had Acceptance Criteria That Incorporated the Limits from Applicable Design Documents)**

.2.1.3 Steam Admission Valve to the Turbine Driven Auxiliary Feedwater Pump (PCV-1139)

a. Inspection Scope

The team inspected air-operated valve (AOV) PCV-1139 to verify its ability to meet the design basis requirements in response to transient and accident events as described in the Updated Final Safety Analysis Report (UFSAR), DBD, and Technical Specifications (TSs). The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed diagnostic test results and stroke test documentation to verify acceptance criteria were met. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of valve PCV-1139 by sampling CRs, the system health report, and local maintenance procedures to verify that deficiencies were appropriately identified and resolved, and that the valve was properly maintained. The team reviewed the backup nitrogen supply system for PCV-1139 to determine if design assumptions were supported by procedural operation of the system. The team interviewed the AOV program and system engineers to gain an understanding of maintenance issues and overall reliability of the valve. The team also conducted several detailed walkdowns to assess the material condition of the valve and its support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.4 Engineered Safeguards Features Actuation System

a. Inspection Scope

The team inspected the engineered safeguards features actuation system (ESFAS) to verify its ability to meet design basis requirements during plant transients and accidents. The ESFAS processes inputs from plant instrumentation and control systems using a relay based logic network to actuate controlled components (pumps, valves, fans, etc.) when the design logic for a particular ESF is satisfied. The team reviewed design calculations, drawings, plant procedures and completed surveillance tests to ensure that the system was designed, operated, and tested in accordance with design and licensing bases documents that included the ESFAS DBD, the PSA, the UFSAR and TSs. The team performed walkdowns to assess the material condition of accessible portions of the system and Entergy's configuration control. The team reviewed a sample of maintenance work orders, CRs and system health reports to assess system performance and to ensure that Entergy identified and corrected deficiencies at an appropriate threshold. The team also discussed the design documentation and maintenance history of the ESFAS with the responsible design and system engineers.

b. Findings

No findings of significance were identified.

.2.1.5 Turbine Driven Auxiliary Feedwater Pump (No. 22 Auxiliary Boiler Feedwater Pump)

a. Inspection Scope

The team reviewed design documents, including drawings, calculations, procedures, and the DBD to determine the design requirements for the TDAFW pump. The team reviewed hydraulic analyses to verify adequacy of NPSH and to verify adequacy of surveillance test acceptance criteria for pump minimum discharge pressure at the required flow rate. The team reviewed IST results to verify acceptance criteria were met and any potential performance degradation identified. The team reviewed pump actuation logic test results to ensure the TDAFW pump would start in accidents and events as described in the UFSAR. In addition, the team reviewed Entergy's response and actions related to NRC IE Bulletin 88-04, "Potential Safety-Related Pump Loss," to assess implementation of OE related to pump minimum flow requirements, and pump-to-pump interaction. The team reviewed turbine protection features, including overspeed tests, and turbine casing relief valve sizing and testing, to ensure the equipment protection features were adequate. The team reviewed condensate storage tank (CST) design criteria, including seismic qualification and usable volume calculations to ensure the TDAFW pump, in conjunction with the motor driven AFW pump had an adequate safety-grade water supply. The team reviewed the use of city water as a backup supply for the suction source for the TDAFW pump to ensure sufficient flow would be provided and to verify that Entergy adequately tested the associated valves to perform their function.

The team performed several walkdowns of the TDAFW pump area and supporting equipment to determine whether the alignment was in accordance with design basis and procedural requirements, and to assess the material condition of the pump and turbine. The team reviewed preventive and corrective maintenance records to ensure that Entergy properly maintained the TDAFW pump. The team also reviewed corrective action documents to ensure that Entergy identified and corrected deficiencies associated with the TDAFW pump at an appropriate threshold.

b. Findings

No findings of significance were identified.

.2.1.6 Station Blackout/Appendix "R" Diesel Generator

a. Inspection Scope

The team reviewed the analysis for the station blackout (SBO)/Appendix "R" diesel generator (DG) system for load flow and short circuit current requirements to determine the design basis for maximum load, DG sizing, and protective device coordination. The team reviewed protective relay setting requirements, relay surveillance tests, and performed walkdowns of the protective relay settings to assess conformance with design bases IST. The team reviewed the vendor DG acceptance tests, and generator one-line and breaker control schematic diagrams to assess design basis requirements. The team reviewed Technical Requirements Manual (TRM) surveillance requirements and surveillance test results for adequacy. The team also reviewed CRs to identify potential recurring issues that could impact system reliability. The team performed several walkdowns of the DG and associated switchgear to assess the observable material condition and Entergy's configuration control.

b. Findings

No findings of significance were identified.

2.1.7 No. 22 Residual Heat Removal Pump

a. Inspection Scope

The team reviewed design documents, including drawings, calculations, procedures, and the DBD, to determine the design requirements for the No. 22 residual heat removal (RHR) pump. The team reviewed hydraulic analyses to verify NPSH adequacy during the injection and sump recirculation modes of operation. The team verified adequacy of surveillance test acceptance criteria for pump minimum discharge pressure at the required flow rate. The team reviewed IST results to verify acceptance criteria were met and any potential performance degradation identified. In addition, the team reviewed Entergy's response and actions related to NRC IE Bulletin 88-04, "Potential Safety-Related Pump Loss," and Generic Letter 87-12, "Loss of RHR while the RCS is Partially Filled," to assess Entergy's implementation of OE related to pump minimum flow requirements, pump-to-pump interaction, and mid-loop operation. The team also reviewed electrical calculations, drawings, and pump brake horsepower requirements to determine if the motor capacity was adequate for the loading requirements. The team reviewed motor breaker Amptector settings, motor feeder cable ampacity and cable short circuit current capability to determine whether appropriate electrical protection coordination margins had been applied and whether the feeder cable had been properly sized for the maximum loading and short circuit current capability requirements.

The team performed a walkdown of the RHR pump area and supporting equipment to assess the material condition of the pump and motor driver, and reviewed a recent modification performed for room flooding mitigation. The team reviewed preventive and corrective maintenance records to ensure that Entergy properly maintained the RHR pump. The team also reviewed corrective action documents to ensure that Entergy identified and corrected deficiencies associated with the RHR pump at an appropriate threshold.

b. Findings

No findings of significance were identified.

2.1.8 Motor Control Center 26A

a. Inspection Scope

The team inspected MCC-26A to verify its ability to meet design basis requirements during plant transients and accidents. The MCC provides 480 volts alternating current (Vac) power to operate safety-related components that include motor operated valves (MOVs), fans and transformers. The team reviewed design calculations, drawings and plant procedures to ensure that the MCC was designed and operated in accordance with design and licensing bases documents that included the 480Vac system DBD, the PSA, the UFSAR and TSs. The team performed walkdowns to assess the material condition of the MCC and Entergy's configuration control. The team reviewed a sample of maintenance work orders, CRs and system health reports to assess system performance and to ensure that Entergy identified and corrected deficiencies at an appropriate threshold. The team also discussed the design documentation and maintenance history of the MCC with the responsible design and system engineers to assess overall reliability.

b. Findings

No findings of significance were identified.

.2.1.9 Main Steam Atmospheric Steam Dump Valves (PCV-1134, 1135, 1136, & 1137)

a. Inspection Scope

The team inspected the air-operated atmospheric steam dump valves to verify their ability to meet the design basis requirements in response to transient and accident events. The team reviewed applicable portions of the UFSAR, main steam DBD, TSs, and drawings to identify design basis requirements for these valves. The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed diagnostic test results and stroke test documentation to verify acceptance criteria were met. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of the atmospheric steam dump valves by sampling CRs, the system health report, and local maintenance procedures to verify that deficiencies were appropriately identified and resolved, and that valves were properly maintained. The team reviewed the backup nitrogen supply system for the atmospheric steam dump valves to determine if design assumptions were supported by procedural operation of the system. The team interviewed the AOV program and system engineers to gain an understanding of maintenance issues and overall reliability of the valves. The team also conducted several detailed walkdowns to assess the material condition of the valves and their support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.10 DC Distribution Panel 22

a. Inspection Scope

The team inspected DC distribution panel No. 22 to verify its ability to meet the design basis requirements in response to transient and accident events. The team reviewed the No. 22 battery system calculation with respect to the DC distribution panel No. 22 loading to determine the design basis for maximum load and minimum required voltage at selected branch circuits for conformance with design basis requirements. The team also reviewed the distribution panel vendor ratings for conformance with the design basis. The team reviewed the coordination/protection calculation to assess the design basis load and short circuit current conditions. The team walked down the distribution panel to assess the observable material condition and conformance with design documentation. The team reviewed the procurement engineering technical evaluation for replacement breakers for conformance with design basis requirements. Also, the 0team reviewed CRs and corrective maintenance history to identify potential recurring issues that could impact DC distribution system reliability.

b. Findings

No findings of significance were identified.

.2.1.11 Electrical Bus 2 Fast Transfer (6.9 kV Circuit Breakers UT2/UT2-ST5)

a. Inspection Scope

The team inspected the electrical bus fast transfer feature to verify its ability to meet design basis requirements during plant transients and accidents. Following a turbine trip, the electrical bus 2 fast transfer circuitry controls 6.9kV feeder circuit breakers (UT2 and UT2-ST5) to disconnect the normal feed from the unit auxiliary transformer and connect the feed from bus 5 which is powered by the station auxiliary transformer. The team reviewed the design calculations, drawings and plant procedures to ensure the bus transfer was designed and operated in accordance with design and licensing bases documents that included the UFSAR and TSs. The team reviewed surveillance test procedures to ensure that Entergy had properly incorporated the associated design features and TS requirements. The team also reviewed completed surveillance tests to ensure the acceptance criteria were met. The team reviewed the results of the circuit breaker closure time testing to ensure that they were consistent with the design documentation. The team performed walkdowns to assess the material condition of the associated switchgear and Entergy's configuration control. The team reviewed a sample of maintenance work orders, CRs and system health reports to assess system performance and to ensure that Entergy identified and corrected deficiencies at an appropriate threshold. The team also discussed the design documentation and maintenance history of the bus fast transfer system with the responsible design and system engineers to identify potential recurring issues that could impact the reliability of the fast transfer control system.

b. Findings

No findings of significance were identified.

.2.1.12 Motor and Turbine Driven Auxiliary Feedwater Pump Flow Control Valves (FCV-406A,B,C,D & FCV-405A,B,C,D)

a. Inspection Scope

The team inspected the air-operated feedwater flow control valves for both the motor and turbine driven AFW pumps to verify their ability to meet the design basis requirements in response to transient and accident events. The team reviewed applicable portions of the UFSAR, the main steam and AFW DBDs, and the TSs, to identify design basis requirements for these valves. The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed diagnostic test results and stroke test documentation to verify acceptance criteria were met. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of the feedwater flow control valves by sampling CRs, the system health report, and local maintenance procedures to verify that deficiencies were appropriately identified and resolved, and that the valves were properly maintained. The team reviewed the backup nitrogen supply for the AFW system to determine if there was sufficient capacity to support design assumptions for system operation following a loss-of-instrument air. The team interviewed the AOV program and system engineers to gain an understanding of maintenance issues and overall reliability of the valves. The team also conducted several detailed walkdowns to assess the material condition of the valves and their support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.13 Station Service Transformer No. 5

a. Inspection Scope

The team reviewed station service transformer No. 5 to verify its capability to provide a reliable source of offsite power from 6.9 kV electrical Bus 5 to the safety-related electrical Bus 5A. The team reviewed one line diagrams and vendor test results for impedance data, to confirm that correct transformer impedances were utilized in design analyses. The team confirmed the adequacy of the overcurrent relay setting calculation for design basis loading and protective relay setting requirements. The team walked down the transformer overcurrent protective relays to observe settings and to determine conformance with relay setting sheets. The team reviewed the transformer modification history for potential impact on the design basis. The team also walked down the transformer and switchgear to assess the observable material condition and to observe transformer temperature monitoring indicators and controls. The team also reviewed the corrective maintenance history and CRs to identify potential recurring issues that could impact system reliability.

b. Findings

No findings of significance were identified.

.2.1.14 Common Cause Failure of the Emergency Diesel Generators

a. Inspection Scope

The team performed a focused review for potential common cause failure of the three EDGs. The team performed several detailed walkdowns of the EDG building to ascertain whether design or operational conditions existed that would compromise the performance of all three EDGs. In particular, the team reviewed seismic evaluations of control cabinets for EDG ventilation fans and EDG jacket water expansion tanks to ensure that the selected equipment could withstand seismic loads. The team walked down the areas external to the EDG building to look for seismic interaction potential (Seismic II/I), and assessed the seismic ruggedness of a transmission line tower located near the EDG building. The team reviewed internal flooding studies to ensure that there was no potential to flood the building and cause common cause failure of the EDGs. The team reviewed the EDG air start system configuration which included a connection between two of the EDG air start accumulators to ensure that any failure in the connecting air lines would not result in loss of air start capability for the two associated EDGs. The team reviewed EDG fuel oil sample results to ensure the quality of the fuel oil.

The EDG heat exchangers are cooled by service water (SW) delivered to the building through a common buried pipe. The team reviewed recent pressure integrity test results for the buried pipe to ensure that the pipe was not experiencing any leakage. The team also conducted several detailed walkdowns of the accessible portions of the SW piping, EDG ventilation system, and fuel oil system to assess the material condition of these essential support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.15 Power Operated Relief Valve Block Valves (MOV-535 and MOV-536)

a. Inspection Scope

The team inspected the electrical design and operation of the power operated relief valve (PORV) block valves. The review included the valve operation when the PORVs are used for plant pressure control at normal plant operating temperature and pressure as well as their use for plant low temperature overpressure protection (LTOP) when the plant is shut down. The team reviewed design calculations, drawings, plant procedures and completed surveillance tests to ensure that the valves were designed, operated and tested in accordance with design and licensing bases documents that included the UFSAR and TSs. The team reviewed thermal overload settings and system voltage loss calculations to verify the valves would operate under the most limiting plant conditions. The team also reviewed a sample of recent system health reports, maintenance work orders and CRs to assess the performance history and condition of the valves.

b. Findings

No findings of significance were identified.

2.1.16 Main Steam Isolation Valve (MS-1-24)

a. Inspection Scope

The team inspected air-operated valve MS-1-24 to verify its ability to meet the design basis requirements in response to transient and accident events, including the prevention of uncontrolled flow of steam following a steam line break. The team reviewed applicable portions of the UFSAR, the main steam DBD, and the TSs, to identify design basis requirements for the valve. The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed stroke test documentation to verify acceptance criteria were met. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of MS-1-24 by sampling CRs, the system health report, and local maintenance procedures to verify that deficiencies were appropriately identified and resolved, and that valves were properly maintained. The team interviewed the maintenance and system engineers to gain an understanding of maintenance issues and overall reliability of the valves. The team also conducted several detailed walkdowns to assess the material condition of the valve and its support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.2 Review of Low Margin Operator Actions (5 samples)

The team assessed manual operator actions and selected a sample of five operator actions for detailed review based upon risk significance, time urgency, and factors affecting the likelihood of human error. The operator actions were selected from a PSA ranking of operator action importance based on RAW and RRW values. The non-PSA considerations in the selection process included the following factors:

- Margin between the time needed to complete the actions and the time available prior to adverse reactor consequences;
- Complexity of the actions;
- Reliability and/or redundancy of components associated with the actions;
- Extent of actions to be performed outside of the control room;
- Procedural guidance to the operators; and
- Amount of relevant operator training conducted.

.2.2.1 Align City Water for Backup Cooling to Safety Injection/Residual Heat Removal Pumps following Loss of Component Cooling Water

a. Inspection Scope

The team evaluated manual operator actions to align city water backup cooling to the safety injection (SI) and RHR pumps, following a loss of CCW event, to verify operator actions were consistent with design and licensing bases. Specifically, operator critical tasks included:

- Install temporary hoses
- Align CCW, primary water, and city water valves

The team interviewed licensed and non-licensed operators, reviewed associated operating procedures and operator training, observed an in-field operator job performance measure (JPM) to install temporary hoses and align local CCW, primary water, and city water valves, and independently inventoried pre-staged equipment and tools, to evaluate the operators' ability to perform the required actions. In addition, the team walked down local piping and valves associated with the critical tasks to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions. The team also reviewed equipment deficiency reports, and performed infield observations, to assess the material condition of the associated piping, valves, and support systems.

In addition, the team walked down selected accessible portions of the city water system to independently assess Entergy's configuration control and the system's material condition. The walkdowns included the city water storage tank; an above ground inspection from the city water tank to the utility tunnel entrance to check for evidence of underground pipe leakage; the utility tunnel; and the AFW, RHR, SI, and charging pump rooms.

b. Findings

Introduction. The team identified a finding of very low safety significance (Green) because Entergy did not identify or evaluate material deficiencies of the city water system, as required by EN-LI-102, "Corrective Action Process." The finding was not a violation because the city water piping, in the utility tunnel, is not safety-related, and the utility tunnel is not a safety-related or seismic structure.

Description. City water piping is routed underground from the city water storage tank to the utility tunnel, at the air monitoring house. The utility tunnel runs underground from the air monitoring house to the screen well house. At various locations throughout the tunnel, city water branch lines come off of the city water header pipe, to provide a backup water supply for several safety-related or risk significant components. The city water system is credited to mitigate the consequences of a plant fire (fire safe shutdown analysis) and a station blackout (SBO) event. The city water system also provides a backup water supply for the CST and fire fighting water supply, and provides alternate cooling to selected safety-related and risk significant pumps. The city water system is required to be operable in accordance with TRM 3.7.E.

During a utility tunnel walkdown on July 23, 2009, the team identified a degraded pipe support on the city water header pipe. Entergy entered this issue into their CAP as CR 2009-2850, performed an extent-of-condition walkdown and a prompt operability assessment. Subsequently, Entergy identified several additional degraded supports on the city water pipe. Entergy determined that the city water system remained operable because the greatest unsupported span was not more than 22 feet. American Society of Mechanical Engineers (ASME) B31.1, "Power Piping," recommended that the maximum unsupported span not exceed 27 feet, for this size water service piping.

On August 4, 2009, the team performed an additional utility tunnel walkdown to independently assess Entergy's evaluation and extent-of-condition review. The team identified several additional degraded pipe supports on the city water header pipe, one of which caused the original unsupported span to increase from 22 feet to 38 feet in one section of the piping. Entergy entered this issue into their CAP as CR 2009-3046, performed an extent-of-condition walkdown and a prompt engineering analysis. Entergy concluded that although the available pipe stress margin was reduced, the city water system remained operable because the pipe stress was less than the ASME B31.1 allowable stress for the pipe. The team noted that Entergy used conservative assumptions in their analysis and concluded that the Entergy's assessment was reasonable. In addition, the team determined that the city water system was properly scoped in Entergy's MR program and the degraded supports would not have required a MR (a)(1) monitoring plan.

Subsequently, work order 00171798 repaired one of the degraded pipe supports to reduce the unsupported span to 22 feet, thereby increasing the margin of the pipe support system. CR 2009-2850, corrective action CA-2, required a follow-up engineering analysis with a formal calculation. Entergy planned additional long-term corrective actions under their existing and on-going utility tunnel refurbishment plan.

Analysis. The team determined that the failure to identify or evaluate material deficiencies of the city water system was a performance deficiency that was reasonably within Entergy's ability to foresee and prevent prior to July 2009. Specifically, Entergy did not identify or evaluate several degraded pipe supports on the city water header pipe in the utility tunnel, as required by EN-LI-102, "Corrective Action Process." As a result, the degraded supports represented reasonable doubt on the operability of the city water system.

The finding was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. Specifically, this risk significant piping system could have potentially collapsed if additional pipe supports became degraded. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, did not represent an actual loss of safety function of a single train, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program Component, because Entergy did not adequately implement the CAP with a low threshold for identifying issues. Specifically, Entergy personnel performed frequent activities in the utility tunnel within the last two years, but did not identify the degraded supports and did not initiate a corrective action CR, as required by EN-LI-102, "Corrective Action Process." (IMC 0305, aspect P.1(a))

Enforcement. Enforcement action does not apply because the performance deficiency did not involve a violation of a regulatory requirement. Entergy entered this issue into their CAP as CR IP2-2009-2850 and 3046. Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as FIN 05000247/2009007-03. **(FIN 050000247/2009007-03, Failure to Identify Several Degraded City Water System Pipe Supports in the Utility Tunnel)**

.2.2.2 Primary Feed and Bleed Cooling following Loss of Main and Auxiliary Feedwater

a. Inspection Scope

The team evaluated manual operator actions to establish primary feed and bleed, following a complete loss of main feedwater and AFW (e.g., loss of secondary heat sink), to verify operator actions were consistent with design and licensing bases. Specifically, operator critical tasks included:

- Trip reactor coolant pumps (RCPs)
- Initiate SI
- Open both pressurizer PORV block valves
- Open both pressurizer PORVs
- Verify SI flow
- Verify PORVs open

The team interviewed licensed operators, reviewed associated operating procedures and operator training, and observed a tabletop demonstration of a loss of secondary heat sink, to evaluate the operators' ability to perform the required actions. In addition, the team walked down main control room panels to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions. The team also walked down selected in-field components and reviewed equipment deficiency reports, engineering evaluations, and surveillance test results to assess the material condition of the associated pumps, valves, and support systems.

b. Findings

No findings of significance were identified.

.2.2.3 Align Condensate for Secondary Heat Removal following Loss of Main and Auxiliary Feedwater

a. Inspection Scope

The team evaluated manual operator actions to establish condensate flow to at least one steam generator (SG), following a complete loss of main feedwater and AFW (e.g., loss of secondary heat sink), to verify operator actions were consistent with design and licensing bases. Specifically, operator critical tasks included:

- Defeat feedwater isolation signal
- Block SI actuation signal
- Depressurize at least one SG to less than condensate pump discharge pressure
- Open feedwater flow control valves

The team interviewed licensed and non-licensed operators, reviewed associated operating procedures and operator training, observed a tabletop demonstration of a loss of secondary heat sink, observed an in-field operator JPM to install a temporary instrument air control line on a feedwater regulating bypass valve, and independently inventoried pre-staged equipment and tools, to evaluate the operators' ability to perform the required actions. The team walked down main control room panels and observed an in-field simulation of the local manual actions to disconnect and lift an electrical wire from a control relay to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions. The team also walked down selected in-field components and reviewed equipment deficiency reports to assess the material condition of the associated pumps, valves, and support systems.

b. Findings

No findings of significance were identified.

.2.2.4 Early Isolation of Ruptured Steam Generator

a. Inspection Scope

The team evaluated manual operator actions to prevent overfilling a ruptured SG, during a postulated design basis SG tube rupture (SGTR), to verify operator actions were consistent with design and licensing bases. Specifically, operator critical tasks included:

- Identify the ruptured SG
- Isolate main steam flow from the ruptured SG
- Stop main and auxiliary feedwater flow into the ruptured SG

The team interviewed licensed operators and operator simulator instructors, reviewed associated operating procedures and operator training, and observed operator response during a simulator scenario of a SGTR event, to evaluate the operators' ability to perform the required actions. The team walked down applicable control panels in the simulator and the main control room to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions. The team also walked down selected in-field components and reviewed equipment deficiency reports to assess the material condition of the associated pumps, valves, and support systems.

b. Findings

No findings of significance were identified.

.2.2.5 Align City Water for Backup Cooling to Charging Pumps following Loss of Component Cooling Water

a. Inspection Scope

The team evaluated manual operator actions to align city water backup cooling to the charging pumps, following a loss of CCW event, to verify operator actions were consistent with design and licensing bases. Specifically, operator critical tasks included:

- Align charging pump in manual at maximum speed
- Install a temporary hose
- Align CCW and city water valves

The team interviewed licensed and non-licensed operators, reviewed associated operating procedures and operator training, observed a tabletop demonstration of a loss of CCW, observed an in-field operator JPM to install a temporary hose and to align local CCW and city water valves, and independently inventoried pre-staged equipment and tools, to evaluate the operators' ability to perform the required actions. In addition, the team walked down local piping and valves associated with the critical tasks to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions. The team also reviewed equipment deficiency reports, as well as direct observation, to assess the material condition of the associated piping, valves, and support systems.

In addition, the team walked down selected accessible portions of the city water system to independently assess Entergy's configuration control and the system's material condition. The walkdowns included the city water storage tank; an above ground inspection from the city water tank to the utility tunnel entrance to check for evidence of underground pipe leakage; the utility tunnel; and the AFW, RHR, SI, and charging pump rooms.

b. Findings

No additional findings of significance were identified. (See Section 1R21.2.2.1 for a city water related finding.)

.2.3 Review of Industry Operating Experience and Generic Issues (6 samples)

The team reviewed selected OE issues for applicability at Indian Point Unit 2. The team performed a detailed review of the OE issues listed below to verify that Entergy had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.3.1 Operating Experience Smart Sample FY 2008-01 – Negative Trend and Recurring Events Involving Emergency Diesel Generators

a. Inspection Scope

NRC Operating Experience Smart Sample (OpESS) FY 2008-01 is directly related to NRC IN 2007-27, "Recurring Events Involving Emergency Diesel Generator Operability" and NRC IN 2007-36, "Emergency Diesel Generator Voltage Regulator Problems." The team reviewed Entergy's evaluation of IN 2007-27 and IN 2007-36 and their associated corrective actions. The team reviewed Entergy's EDG system health reports, EDG CRs and work orders, the leakage database, and surveillance test results to verify that Entergy appropriately dispositioned EDG concerns. Additionally, the team independently walked down the three EDGs and SBO/Appendix "R" DG on several occasions to inspect for indications of vibration-induced degradation on EDG piping and tubing and for any type of leakage (air, fuel oil, lube oil, jacket water). The team also directly observed the No. 21 EDG monthly surveillance run on July 21, 2009, and performed pre and post-run walkdowns to ensure Entergy maintained appropriate configuration control and identified deficiencies at a low threshold.

b. Findings

No findings of significance were identified.

.2.3.2 NRC Information Notice 2007-06: Potential Common Cause Vulnerabilities in Essential Service Water Systems

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC IN 2007-06. The IN informed licensees of a potential common cause failure mechanism of SW systems due to external corrosion of piping that could lead to catastrophic failure. The team reviewed Entergy's evaluation of this issue. Specifically, the team reviewed corrective action documents, interviewed plant engineers, and walked down selected portions of the SW system, including the below grade SW pump pit and Zurn strainer pit, to verify Entergy had appropriately evaluated the OE.

b. Findings

No findings of significance were identified.

.2.3.3 NRC Information Notice 2006-31: Inadequate Fault Interrupting Rating of Breakers

a. Inspection Scope

The team reviewed Entergy's disposition of IN 2006-31. The IN discussed industry events and concerns associated with inadequate fault interrupting rating of breakers. The team reviewed the disposition of the IN as documented by Entergy in CR-IP3-2007-01778 (the review was also applicable to IP2) and noted that engineering had concluded that design calculations and breaker ratings were adequate. The team reviewed the evaluation and the supporting short circuit analysis for IP2 and determined that Entergy had appropriately dispositioned this OE item.

b. Findings

No findings of significance were identified.

.2.3.4 NRC Information Notice 2005-30: Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design

a. Inspection Scope

The team reviewed Entergy's disposition of IN 2005-30. This IN discussed recent industry events where it was discovered that safe shutdown was potentially challenged by unanalyzed flooding events and inadequate design. The team reviewed the disposition of the IN as documented by Entergy in CR OEN-2005-00482, corrective action CA-9, for both units. In this CR, Entergy had discussed the evaluation of internal flooding for Units 2 and 3, and determined that the internal flooding issues discussed in IN 2005-30 had been previously evaluated, and concluded that there were no new or additional flooding scenarios associated with the IN. Entergy determined that the design was adequate and that no additional design modifications were required. The team reviewed corrective action documents, interviewed plant engineers, and walked down accessible portions of safety-related systems (e.g., RHR pump rooms, EDGs, electrical switchgear, AFW) looking for flood-related vulnerabilities to verify that Entergy had appropriately evaluated the OE.

b. Findings

No findings of significance were identified.

.2.3.5 NRC Information Notice 2008-09: Turbine-Driven Auxiliary Feedwater Pump Bearing Issues

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC IN 2008-09. The NRC issued the IN to alert licensees to issues with TDAFW pumps, as they relate to the importance of having accurate maintenance instructions and effective post-maintenance tests (PMTs). Entergy concluded that their maintenance procedures and PMT practices were adequate. In particular, engineering determined that, in addition to PMTs, they monitor the bearing temperature and vibration of the pump every time the TDAFW pump is run, as well as take oil samples for analysis. The team reviewed maintenance procedures, corrective action documents and interviewed plant personnel to assess the adequacy of Entergy's testing and maintenance procedures with respect to monitoring TDAFW pump bearing performance. The team also conducted several detailed walkdowns to assess the material condition of the TDAFW pump and its support systems, and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.3.6 NRC Information Notice 1995-10, Potential for Loss of Automatic Engineered Safety Features Actuation

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC IN 95-10. The NRC issued the IN to alert licensees to potential design issues that could result in a fault on a non-safety circuit adversely impacting the power supply to the engineered safeguards actuation system. The team reviewed Entergy's associated evaluation, the ESFAS DBD, and ESFAS drawings and determined that Entergy had appropriately dispositioned this OE item.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

The team reviewed a sample of problems that Entergy had previously identified and entered into the CAP. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, CRs written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the CAP. The specific corrective action documents that were sampled and reviewed by the team are listed in the Attachment.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

On August 13, 2009, the team presented the inspection results to Mr. Donald Mayer, Director, Unit 1 and Special Projects (Acting Site Vice President), Mr. Anthony Vitale, General Manager, Plant Operations, and other members of Entergy management. The team verified that no proprietary information is documented in the report.

## ATTACHMENT

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Entergy Personnel

B. Altadonna, Program and Components Engineer
N. Azevedo, Engineering Programs
J. Balletta, Supervisor, Operations Support
T. Beasley, System Engineer
J. Bencivenga, Design Engineer
P. Bowe, Engineer, Civil Design
C. Bristol, Maintenance Engineer
P. Conroy, Director of Nuclear Safety Assurance
J. Coulter, Predictive Maintenance Engineer
K. Curley, System Engineer
G. Dahl, Specialist, Licensing
M. Dries, System Engineer
T. Gander, Operations Procedure Group
D. Gayner, PRA Engineer
C. Ingrassia, System Engineer
E. Kenney, AOV Program Engineer
C. Kocsis, Operations Training
M. Koutsakos, System Engineer
C. Laverde, Component Engineer
L. Liberatori, Design Engineer
D. Mayer, Director, Unit 1 and Special Projects
T. McCaffrey, Manager, Design Engineer
B. McCarthy, Operations Assistant Manager
V. Myers, Design Engineering Supervisor
R. Parks, EOP Coordinator
M. Radvansky , Design Engineer
H. Robinson, Design Engineer
R. Schimpf, Design Engineer
R. Sergi, Design Engineer
B. Shepard, I&C Design Engineer
J. Timone, Component Engineer
A. Vitale, General Manager, Plant Operations
R. Walpole, Licensing Manager
C. Wilson, System Engineer
A. Zografos, Design Engineer

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

| | | |
|---|---|---|
| 05000247/2009007-01 | NCV | Failure to evaluate the impact on breaker coordination for the Westinghouse Amptector type LSG trip unit discriminator feature. (Section 1R21.2.1.1) |
| 05000247/2009007-02 | NCV | Failure to ensure that the CCW pump hydraulic performance test procedures had acceptance criteria that incorporated the limits from applicable design documents. (Section 1R21.2.1.2) |
| 05000247/2009007-03 | FIN | Failure to identify several degraded city water system pipe supports in the utility tunnel. (Section 1R21.2.2.1) |

## LIST OF DOCUMENTS REVIEWED

Audits and Self-Assessments

IP3LO-2009-00005, Component Design Bases Inspection for Indian Point 2 IPEC Focused Self-Assessment Report, dated 4/15/09

Calculations

18.03.F02.007, Air Operated Gate and Globe Valve Component Calculations, Rev. 0
41008.01, Control Room Panel Seismic Evaluation, Rev. 4
60817-2, 480V DB Circuit Breaker Setting for the 250HP Component Cooling Pump Motors, 12/17/86
60817-4, 480V DB Circuit Breaker Setting for the 400HP Residual Heat Removal Pump Motors, Rev. 1
CN-POE-01-05, SG Pressure EOP Setpoint Analysis, Rev. 3
ECX-00001, TOR Impedance Summary, Rev. 0
EGP-S36-002, EDG Building Ventilation System Upgrade Ampacity & Voltage Drop Calculations, Rev. 0
FEX-00141, IP2 Amptector Setting Verification, Sensor and Tolerances, Rev. 1
FEX-00143, IP2 Load Flow Analysis of the Electrical Distribution System, Rev. 1
FEX-00204, Station Battery 22 System Calculation, Rev. 1
FFX-00104, Check Minimum Line Size to Allow the City Water Header to Provide the Aux. Feed Water Pumps with 800 GPM, Rev. 0
FIX-00024, CST-Level Setpoints, Channel Accuracies and Corresponding Volumes, Rev. 3
FIX-00030, N2 Backup System Capacity to Support Critical AFW System Air Users in the Event of Loss of Instrument Air, Rev. 3
FIX-00035, RHR Indicated Flow and Flow Errors for EOP, Rev. 0
FIX-00145-00, Main Steam Pressure Loop Accuracy, Rev. 1
FMX-00085, RWST Minimum Submergence Level, Rev. 1

FMX-00086, CST Critical Submergence at Varied Flow Rates, Rev. 1
FMX-00130, Impact of Pipe Break Downstream of LCV-1158, Rev. 1
FMX-00162, Establish Stroke Time for Valve LCV-1158, Rev. 0
FMX-00237, Verification of Aux Feed Pump Full Flow Test Acceptance Criteria, Rev. 0
FMX-000245, RHR Pump Available NPSH from Sump and RWST, Rev. 2
FMX-00275, Pipe Flow Analysis for AFW System, Rev. 1
FMX-00287, Verification of AF Pump Recirculation Flow Test Acceptance Criteria, Rev. 1
FMX-00297, NPSH Calculation for RHR Pumps with One Pump/Heat Exchanger in Service, Rev. 2
IP-CALC-04-00650, IP2 Aux Feedwater System Safety Valve Sizing MS-52, Rev. 0
IP-CALC-04-01180, Attachment A, SQUG Panel Document, Rev. A
IP-CALC-05-01034, Appendix R Cooldown Benchmark and Sensitivity Analysis Using RETRAN-3D, Rev. 1
IP-CALC-06-00026, Indian Point Unit 2 (IP2) Hydraulic Analysis of Recirculation and Containment Sump Strainers, Rev. 3
IP-CALC-06-00281, Ventilation System for EDG Building, Rev. 0
IP-CALC-08-00022, Analysis of IP2 SBO/APPR DG Supplying IP2 SBO Loads, Rev. 0
IP-RPT-08-00044, Study for the Impact of Bus Transfer Transients With 10-Cycle Dead-Time on the 480V Safety-Related Motor Performance for Indian Point 2 & 3, Rev. 0
MEX-00131, Evaluation of Generic Letter 95-07 Power Operated Valves for Pressure Locking and Thermal Binding, Rev. 4
PGI-00473, Motor Operated Valve Terminal Voltage; Altran Calculation No. 99621-C-002, Rev. 3
PGI-00475, GL-89-10 MOV Protection – TOR Settings, Rev. 2
PGI-00496, AOV System Calculation for STM GEN 21 Atmospheric Dump Valves PCV-1134, 1135, 1136, and 1137, Rev. 0
PGI-00497, Auxiliary Feedwater System Air Operated Valve Functional and Maximum Expected Differential Pressure Calculation, Rev. 1
PGI-00518, AOV Component Level Calculations for FCV-405A, FCV-405B, FCV-405C, and FCV-405D, Rev. 1
SCN-00026, ESF-Safeguard Actuation Signal Response Time, Rev. 0
SGX-00005, Emergency Diesel Generator Building Ventilation Upgrade, Rev. 0
SGX-00007, 125V DC System Protection Device Coordination Study, Rev. 3
SGX-00051, 6900V Switchgear Coordination Calculation for Switchgear Buses 1, 2, 3, 4, 5 and 6, Rev. 1
SGX-00059, Safety Related 480V MCC Coordination Calculation for MCC-26A, Rev. 1
SGX-00073, Bus Transfer (Transient) Analysis of the IP2 Electrical Distribution System, Rev. 1
SQUG Evaluation Sheet for EQID No. 0023EDJET, EDG No. 23 Jacket Water Expansion Tank dated 3/4/93
SQUG Evaluation Sheet for EQID No. PNL EPA77, EDG Vent Distribution Panel 1, dated 10/30/96
SQUG Evaluation Sheet for EQID No. PNL EPA78, EDG Vent Distribution Panel 2, dated 10/30/96

Completed Surveillance Test Procedures

2-PT-2M4, Safety Injection System Train “A” Actuation Logic and Master Relay Test, performed 5/18/09
2-PT-3Y010, Flow Test for Underground Service Water Line 409, performed 9/10/05
2-PT-M021A, Emergency Diesel Generator 21 Load Test, performed 4/1/09 & 5/28/09
2-PT-M021B, Emergency Diesel Generator 22 Load Test, performed 4/2/09 & 5/29/09
2-PT-M021C, Emergency Diesel Generator 23 Load Test, performed 3/31/09 & 5/28/09
2-PT-M110, Appendix R DG Functional Test, performed 1/17/09, 4/11/09 & 7/1/09
2-PT-Q013, Inservice Valve Tests, performed 4/23/09, 5/6/2009, 5/21/09 & 7/1/09
2-PT-Q013, Inservice Valve Tests – MOV 535 & 536 Data Sheets, performed 1/18/09
2-PT-Q013-DS250, Valve PCV-1136 IST Data Sheet, performed 4/17/08
2-PT-Q030A, 21 Component Cooling Water Pump, performed 3/18/09
2-PT-Q030B, 22 Component Cooling Water Pump, performed 5/12/09
2-PT-Q030C, 23 Component Cooling Water Pump, performed 4/16/09 & 7/9/09
2-PT-Q034, 22 Auxiliary Feed Pump, performed 4/23/09
2-PT-Q034A, 22 Auxiliary Feed Pump Steam Supply Valves, performed 6/12/09
2-PT-Q055, Pressurizer Pressure, performed 2/25/09 & 5/20/09
2-PT-Q058, Steam Generator Level Bistables, performed 3/18/09 & 6/11/09
2-PT-Q059, Containment Pressure Bistables, performed 3/10/09 & 6/5/09
2-PT-Q061, Main Steam Line Pressure Bistables, performed 1/27/09 & 4/23/09
2-PT-Q062, High Steam Flow and Turbine First Stage Pressure Bistables, performed 2/11/09 & 5/6/09
2-PT-Q063, Steam Flow/Feedwater Flow Mismatch Bistables, performed 1/6/09 & 3/31/09
2-PT-Q280A, 21 Residual Heat Removal Pump, performed 3/9/09 & 6/1/09
2-PT-Q280B, 22 Residual Heat Removal Pump, performed 3/26/09
2-PT-R013, Safety Injection System, performed 3/28/08
2-PT-R013B, Auxiliary Feedwater Pumps Automatic Actuation Circuitry, performed 3/27/08
2-PT-R014, Automatic Safety Injection System Electrical Load and Blackout Test, performed 4/22/06 & 3/28/08
2-PT-R022A, Steam Driven Auxiliary Feed Pump Full Flow, performed 3/21/08
2-PT-R062, Pressurizer PORVs, performed 4/10/08
2-PT-R083, AMSAC End-to-End Functional, performed 4/18/08
2-PT-R139, RHR Pumps, Flow Settings, and Check Valves, performed 3/29/08
2-PT-SA069, City Water Backup Cooling Flow Test, performed 11/13/06, 5/3/07, & 4/2/09
2-PT-V008A, 22 ABFPT Mechanical Overspeed Alternate Trip Test, performed 4/4/08
2-PT-V014, Overpressurization Protection System Analog Channels, performed 3/24/08
2-PT-V015, Overpressurization Protection System Logic Check, performed 3/24/08
2-PT-V024E, Main Steam Isolation Valves, performed 10/6/05, 3/18/08, & 4/19/08
2-PT-V064, Auto Transfer Verification of Offsite Power for 6.9KV Buses 2 and 3, performed 4/18/06 & 3/23/08
2-PT-W010, Weekly Battery Surveillance Requirement, performed 1/21/09

Condition Reports (CR-IP2-)

| | | | | |
|---|---|---|---|---|
| 1998-10046 | 2007-0980 | 2008-3476 | 2009-2112 | 2009-3006* |
| 2003-0860 | 2007-1046 | 2008-3869 | 2009-2773* | 2009-3015* |
| 2003-2511 | 2007-1442 | 2008-3889 | 2009-2796* | 2009-3016* |
| 2004-1445 | 2007-1779 | 2008-3901 | 2009-2799* | 2009-3017* |
| 2005-0772 | 2007-2189 | 2008-4230 | 2009-2824* | 2009-3033* |
| 2005-1401 | 2007-3141 | 2008-5047 | 2009-2828* | 2009-3036* |
| 2005-0374 | 2007-3295 | 2008-5212 | 2009-2829* | 2009-3046* |
| 2005-3027 | 2007-3825 | 2008-5499 | 2009-2838* | 2009-3050* |
| 2005-3223 | 2007-4164 | 2009-0099 | 2009-2841 | 2009-3065* |
| 2005-3576 | 2007-4174 | 2009-0245 | 2009-2848* | 2009-3077* |
| 2005-3984 | 2008-0002 | 2009-0339 | 2009-2850* | 2009-3081* |
| 2006-1970 | 2008-0668 | 2009-0340 | 2009-2857 | 2009-3083* |
| 2006-2020 | 2008-1021 | 2009-0341 | 2009-2858* | 2009-3084* |
| 2006-2256 | 2008-1342 | 2009-0346 | 2009-2861* | 2009-3085* |
| 2006-3224 | 2008-1414 | 2009-0462 | 2009-2862* | 2009-3086* |
| 2006-3691 | 2008-1421 | 2009-0681 | 2009-2863* | 2009-3087* |
| 2006-4678 | 2008-1471 | 2009-0758 | 2009-2865* | 2009-3091* |
| 2006-5017 | 2008-1482 | 2009-0805 | 2009-2866* | 2009-3142* |
| 2006-5208 | 2008-2023 | 2009-0820 | 2009-2907 | 2009-3143* |
| 2006-5241 | 2008-2125 | 2009-0868 | 2009-2912* | 2009-3150* |
| 2006-5422 | 2008-2229 | 2009-0978 | 2009-2917* | 2009-3156* |
| 2006-6511 | 2008-2447 | 2009-1245 | 2009-2945* | 2009-3249* |
| 2006-6867 | 2008-2710 | 2009-1473 | 2009-2982 | 2009-3301* |
| 2007-0219 | 2008-3264 | 2009-2085 | 2009-2999* | |

* CR written as a result of this inspection

Design & Licensing Bases

ConEdison Letter No. NL-81-136, Response to GL 81-14 Regarding Seismic Qualification of AFW System, dated 8/7/81

ConEdison Letter No. NL-85-A21, Response to NRC on Seismic Qualification of AFW Components, dated 2/4/85

IP2-480V DBD, 480 Volt Electrical System Design Basis Document, Rev. 1

IP2-AFW DBD, Auxiliary Feedwater System Design Basis Document, Rev. 1

IP2-CCWS DBD, Component Cooling Water System Design Basis Document, Rev. 1

IP2-EDG DBD, Emergency Diesel Generator Design Basis Document, Rev.2

IP2-ESF-DBD, Engineered Safeguards Features System Design Basis Document, Rev. 1

IP2-MS DBD, Main Steam System Design Basis Document, Rev. 1

IP2-RCS/SG DBD, Reactor Coolant System/Steam Generator Design Basis Document, Rev. 1

Letter from Murray Seiman, Consolidated Edison, to USNRC, Loss of RHR while the RCS is Partially Filled, dated 9/29/87

Letter from Stephen B. Bram to USNRC, Supplemental Response to NRC Bulletin 88-04 Potential Safety Related Pump Loss, dated 7/19/88

NL-09-031, IPEC Letter to the NRC, Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 2, dated 3/6/09

NRC Letter to Entergy Nuclear Operations, Indian Point Nuclear Generating Unit No. 2 Issuance of Amendment RE: 3.26 Percent Power Uprate (TAC No. MC1865), dated 10/27/04
Safety Evaluation Report, Susceptibility of Safety-Related Systems to Flooding from Failure of Non-Category I Systems for IP2, November 1980

Drawings
179950, Copes-Vulcan Model D-100, 6 Inch, Class 6000 Valve Assembly Tandem Trim 3rd Generation, Rev. 4
193183, Unit 1 Piping Flow Diagram City Water System, Rev. 29
208485, 28 Inch OD Pipe Main Steam Stop Valve, Rev. 8
242688, Flow Diagram Instrument Air Containment Building & Auxiliary Boiler Feed Pump; Building, Rev. 27
251132, AFW Flow Control Loop, Rev. 6
251231, AFW Steam Supply to Auxiliary Feed Water Pump 22, Rev. 5
262422, CVCS Loop Diagram for RCP Instrumentation, Rev. 3
263935, 125VDC Power Panel #21 Circuit Assignment, Rev. 0
263936, 125VDC Power Panel #22 Circuit Assignments, Rev. 1
306641-01, W/D of Temperature Controller in Station Service Transformer #5, Rev. 1
311906, SOV 455C Pressurizer PORV PCV-455C, Rev. 1
311907, SOV 456 Pressurizer PORV PCV-456, Rev. 1
360858, Copes-Vulcan Series D-1000 Valve Assembly Class 900, Rev. 0
400882, Station Blackout and Appendix R Diesel Generator Set P&ID Diesel Cooling Water System Mechanical, Rev. 0
709091 Sh. 1, Auxiliary Feedwater Control Globe Valve, Rev. 1
9321-F-2017 Sh. 2, Flow Diagram Main Steam, Rev. 84
9321-F-2018, Flow Diagram Condensate and Boiler Feed Pump Suction, Rev. 143
9321-F-2019, Flow Diagram Boiler Feedwater, Rev. 114
9321-F-2028, Flow Diagram Jacket Water to Diesel Generator, Rev. 36
9321-F-2030, Flow Diagram Fuel Oil to Diesel Generator, Rev. 39
9321-F-2036, Flow Diagram Instrument Air Control Building Conventional Plant, Rev. 98
9321-F-2593, PAB Composite Piping at Charging Pumps, Rev. 40
9321-F-2696, PAB Service Air, City Water & Drains, Rev. 35
9321-F-2720, Flow Diagram Auxiliary Coolant System, Rev. 89
9321-F-2729, SG Blowdown & Blowdown Sample System Flow Diagram, Rev. 69
9321-F-2736, UFSAR Figure 9.2-1 SHT 1 - CVCS Flow Diagram, Rev. 128
9321-F-3006, Single Line Diagram 480V MCC26A and 26B, Rev. 94 & 95
9321-F-3204, 125 VDC Power Panels 21 & 22 Wiring Diagram, Rev. 76
9321-LL-3113 Sh. 1, Schematic Diagram - 6900V Switchgear 21, Rev. 14
9321-LL-3113 Sh. 3, Schematic Diagram - Breaker 52/UT1-ST5 Bus #1 Tie, Rev. 14
9321-LL-3113 Sh. 4, Schematic Diagram - Breaker 52/UT2 Bus 2, Rev. 10
9321-LL-3113 Sh. 5, Schematic Diagram - Breaker 52/UT2-ST5 Bus 2-5 Tie, Rev. 10
9321-LL-3113 Sh. 7, Schematic Diagram - Breaker 52/RCP21 Reactor Coolant Pump 21, Rev. 16
9321-LL-3113-10 Sh. 16, Schematic Diagram - 6900V Bus 1,2, & 5 Lockout Relays (86/UT1, 86/UT2, & 86/ST5), Rev. 10
9321-LL-3130 Sh. 5, Generator Primary Lockout Relay 86P, Rev. 31
9321-LL-3130 Sh. 6, Generator Backup Lockout Relay 86BU, Rev. 38

9321-LL-3131 Sh. 8, AFW Logic Schematic, Rev. 10
9321-LL-3132 Sh. 5, Schematic Diagram – Pilot Wire and Misc. Lock-Out Relays, Rev. 11
9321-LL-3601 Sh. 3, Feedwater Bypass Valves Schematic, Rev. 10
9321-LL-3601 Sh. 17, Feedwater Bypass Valves Schematic, Rev. 12
A207698, Lube Oil for Diesel Generators, Rev. 26
A208088, One Line Diagram 480VAC Swgrs. 21 & 22, Bus 2A, 3A, 5A & 6A, Rev. 43
A208168, UFSAR Figure 9.2-1 SHT 2 - CVCS Flow Diagram, Rev. 53
A208377, Main One Line Diagram, Rev. 12
A208500, One Line Diagram for 480VAC MCC-26AA and MCC26BB &120VAC Distribution Panels 1&2, Rev. 45
A225016, Safeguards Actuation Schemes – Train A, Rev. 12
A225018, Safeguards Actuation Schemes – Train B, Rev. 10
A225096, Turbine Trip Signals Logic Diagram, Rev. 19
A225097, 6900V Bus Auto Transfer Logic Diagram, Rev. 5
A225101, Safeguards Sequence Logic Diagram, Rev. 11
A225102, Pressurizer Trip Signals Logic Diagram, Rev. 5
A225105, Safeguards Actuation Signals Logic Diagram, Rev. 10
A225106, Feedwater Isolation Logic Diagram, Rev. 7
A227781, Flow Diagram - Auxiliary Coolant System, Rev. 81
A231592, 6900 Volt AC One Line Diagram, Rev. 19
A235296, Flow Diagram Safety Injection System, Rev. 69
A250907, Electrical Transmission and Distribution System, Rev. 21
A251783, Flow Diagram Auxiliary Coolant System Residual Heat Removal System, Rev. 29
AAA00738, 45 Actuator 2 Body, 657 HPT Diaphragm Actuated Control Valve for FCV-405A, 405B, 405C, and 405D, Rev. A
B192505 Sh. 1, Piping Flow Diagram City Water System, Rev. 19
B192506 Sh. 2, Piping Flow Diagram City Water System, Rev. 40
B243683, Diesel Generator Ventilation System Details, Rev. 3
D252276, SIS Recirculation Flow Loop #640, #946, Rev. 5
IP2-S-000209, Pressurizer Power Relief Line Block Valve 535, Rev. 8
IP2-S-000210, Pressurizer Power Relief Line Block Valve 536, Rev. 8
IP2-S-000231, One-Line Schematic for EDG Building Ventilation Dist. Panels #1 & #2, Rev. 4
IP2-S-000291, EDG Exhaust Fan #318, Rev. 3
IP2-S-000346, Install of 6$^{th}$ EDG Exh Fan - Swd, Rev. 2

Engineering Evaluations
04-001147, Procurement Engineering Technical Evaluation, Rev. 3
CR-IP2-2006-03691 CA-00002, Emergency Diesel Generator No. 21 Failed PT-M21A Apparent; Cause Evaluation, dated 7/19/06
CR-IP2-2009-0978, Operability Evaluation for PCV-1136, dated 3/12/09
CR-IP2-2008-1021, Apparent Cause Evaluation for MSIV MS-1-22, dated 3/24/08
EEN-04-0108, Item Equivalency Evaluation, Rev. 4
FMA07P0520, Failure Mode Analysis Report of Non-Safety Related Foxboro Power Supply for Entergy Nuclear Northeast – Indian Point 2, dated 3/13/07

IP-RPT-06-00022, Model 93 RCP Buffer Volume Related to Safe Shutdown Analysis, Rev. 0
Technical Report No. 00263-TR-001, Functionality and Risk Significance Evaluation of the Indian Point Unit 1 and 2 Mechanical and Electrical Systems Located in the Utility Tunnel, dated March 2001
Technical Report No. 92155-TR-01, Structural Assessment of 600,000 Gallon Condensate Storage Tank, September 1992

Maintenance Work Orders

| | | | |
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| 00126023 | 02-32013 | 51311792 | IP2-01-22271 |
| 00141067 | 02-33308 | 51319252 | IP2-03-20310 |
| 00141663 | 03-11725 | 51323098 | IP2-03-25125 |
| 00145034 | 03-31379 | 51557019 | IP2-03-25169 |
| 00148522 | 03-31474 | 51567240 | IP2-03-25176 |
| 00152728 | 03-31478 | 51679124 | IP2-04-17932 |
| 00171798 | 06-23642 | 51681055 | IP2-04-31352 |
| 01-22289 | 51251428 | 51686249 | IP2-04-32996 |
| 02-21968 | 51287272 | 51692345 | IP2-06-18008 |
| 02-31082 | 51295645 | 51697357 | |
| 02-32011 | 51296260 | 52037044 | |

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16" City Water Pipe – Flow Test, performed 5/26/09
1P-RPT-05-00138, IPEC Unit 2 and Unit 3 AOV Scoping and Categorization Report, Rev. 0
ANSI C50.41-2000, American National Standard for Polyphase Induction Motors for Power Generating Stations
Attachment to IPP-98-526, Draft Uncertainties for RHR and Containment Recirculation Flow Functions, February 1998
CCW Certified No. 22 Pump Curve, IR No. N-1402, dated 2/15/91
ConEdison Order No. 4900092, Performance & Thrust Test Report 8x20 W, Ingersoll-Dresser Pump Co., dated 1/20/95
CR-HQN-2007-00521
Cummins Metropower Inc. Letter, Quote No. 2004044b, IP2 SBO and Appendix R Diesel Generator Set, dated 05/14/04
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**LIST OF ACRONYMS**

| | |
|---|---|
| AC | Alternating Current |
| ADAMS | Agency-Wide Documents Access and Management System |
| AFW | Auxiliary Feedwater |
| AOP | Abnormal Operating Procedure |
| AOV | Air Operated Valve |
| ASME | American Society of Mechanical Engineers |
| CA | Corrective Action |
| CAP | Corrective Action Program |
| CCW | Component Cooling Water |
| CDBI | Component Design Bases Inspection |
| CFR | Code of Federal Regulations |
| CR | Condition Report |
| CST | Condensate Storage Tank |
| CVCS | Chemical and Volume Control System |
| DBD | Design Basis Document |
| DC | Direct Current |
| DG | Diesel Generator |
| DRS | Division of Reactor Safety |
| EDG | Emergency Diesel Generator |
| EOP | Emergency Operating Procedure |
| EPRI | Electric Power Research Institute |
| ERG | [WOG] Emergency Response Guideline |
| ESF | Engineered Safeguards Feature |
| ESFAS | Engineered Safeguards Features Actuation System |
| GL | Generic Letter |
| GPM | Gallons Per Minute |
| IMC | Inspection Manual Chapter |
| IN | Information Notice |
| IP | Inspection Procedure |
| IPEC | Indian Point Energy Center |
| IST | In-Service Test |
| JPM | Job Performance Measure |
| KV | Kilo Volts |
| LER | Licensee Event Report |
| LSG | Long, Short, & Ground |
| LSIG | Long, Short, Instantaneous, & Ground |
| LTOP | Low Temperature Overpressure Protection |
| MCC | Motor Control Center |
| MOV | Motor Operated Valve |
| MR | Maintenance Rule |
| NCV | Non-Cited Violation |
| NDE | Non-Destructive Examination |
| NPSH | Net Positive Suction Head |
| NRC | Nuclear Regulatory Commission |
| OE | Operating Experience |
| OpESS | Operating Experience Smart Sample |

| | |
|---|---|
| P&ID | Piping and Instrument Diagram |
| PAB | Primary Auxiliary Building |
| PARS | Publicly Available Records |
| PM | Preventive Maintenance |
| PMT | Post Maintenance Test |
| PORV | Power Operated Relief Valve |
| PSA | Probabilistic Safety Assessment |
| RAW | Risk Achievement Worth |
| RCP | Reactor Coolant Pump |
| RCS | Reactor Coolant System |
| RHR | Residual Heat Removal |
| RRW | Risk Reduction Worth |
| RT | Radiographic Test |
| RWST | Refueling Water Storage Tank |
| SBO | Station Blackout |
| SDP | Significance Determination Process |
| SG | Steam Generator |
| SGTR | Steam Generator Tube Rupture |
| SI | Safety Injection |
| SPAR | Standardized Plant Analysis Risk |
| SQUG | Seismic Qualification Utility Group |
| SW | Service Water |
| TDAFW | Turbine Driven Auxiliary Feedwater |
| TDH | Total Developed Head |
| TRM | Technical Requirements Manual |
| TS | Technical Specification |
| UFSAR | Updated Final Safety Analysis Report |
| UT | Ultrasonic Test |
| VAC | Volts Alternating Current |
| WOG | Westinghouse Owners Group |