

# Catawba 2

## 3Q/2007 Plant Inspection Findings

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### Initiating Events

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Perform Required Weld Inspections on the Fuel Handling Cask Cranes**

Inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion III, Design Control, for the licensee's failure to effectively implement the requirement to fully inspect fuel handling cask crane welds in accordance with Updated Final Safety Analysis Report (UFSAR) Section 9.1.4.2.3 following reinforcements made in response to a Part 21 notification. Following implementation of the modification to restore the fuel handling cask crane's capacity to 125 tons, the licensee had performed visual weld inspections rather than magnetic particle or liquid penetrant testing as required by the UFSAR. The licensee performed the required inspections prior to actual use of the cranes to lift loaded spent fuel casks. This issue has been entered into the licensee's corrective action program as PIP C-07-2028.

This finding was more than minor because if left uncorrected it could become a more significant safety concern in that improperly performed inspections on fuel handling equipment could impact the safe movement of nuclear fuel and increase the probability of a fuel handling accident. This finding is associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected the cornerstone objective of limiting the likelihood of an event that could challenge critical safety functions during spent fuel movement. The finding is not suitable for SDP evaluation, but has been reviewed by NRC management and was determined to be a finding of very low safety significance (Green) because the affected welds on the fuel handling cask cranes were properly inspected prior to lifting fully loaded fuel casks in the spent fuel pool building. This finding directly involved the cross-cutting area of Problem Identification and Resolution under the "Operating Experience Evaluation" aspect of the "Operating Experience" component, in that the licensee failed to properly evaluate the Part 21 notification received from Whiting Corporation to ensure all testing requirements were identified prior to implementing the required modification and declaring the cranes fully operable (P.2.a). (Section 1R17b.(3))

Inspection Report# : [2007003](#) (*pdf*)

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### Mitigating Systems

**Significance:**  Aug 03, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **ELU Replacement Batteries Not Tested After Installation**

Inspectors identified a non-cited violation (NCV) of Units 1 and 2 Operating License Condition 2.C.(5) for failure to follow the emergency battery lighting maintenance and testing procedure IP/0/B/3540/002, Emergency Battery Lighting Periodic Maintenance and Testing, Revision 33, during replacement of failed batteries. The licensee stated that the batteries were routinely tested prior to installation while in the maintenance shop; however, this bench test was neither required by the periodic maintenance and testing procedure nor documented in any test record. This NCV was entered into the licensee's corrective action program as Problem Investigation Process report C-07-2025.

This finding was more than minor because it was associated with the external factors attribute (i.e., fire) of the Mitigating Systems cornerstone and it affected the cornerstone objective. The finding involved systems or components (i.e., emergency lights) required for post-fire safe shutdown of the reactor. The inspectors completed a Phase 1 screening of the finding in accordance with Inspection Manual Chapter 0609, Appendix F, Fire Protection Significance Determination Process Phase 1 Qualitative Screening Approach, Step 1.3, and concluded that the finding, given its low degradation rating, had very low safety significance (Green) and no further analysis was required. The finding directly involved the cross-cutting area of Human Performance under the "procedural compliance" aspect of

the “Work Practices” component, in that the licensee failed to effectively communicate expectations regarding procedure compliance for testing of replacement emergency lighting batteries (H.4.b). (Section 1R05.09.b)

Inspection Report# : [2007007](#) (*pdf*)

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Implementation of Risk Management Actions Associated With Planned Maintenance on the Unit 2 B Train KC Heat Exchanger**

Inspectors identified a non-cited violation (NCV) of 10 CFR 50.65(a)(4) for the licensee’s failure to effectively implement the risk mitigation actions contained in the approved Critical Evolution Plan associated with work on the Unit 2 B Train Component Cooling Water (KC) heat exchanger to manage and minimize the resulting increased plant risk. Specifically, during the cleaning of the Unit 2 B Train KC heat exchanger tubes, the offsite power supply was not protected and in fact, work was conducted within the switchyard’s protective fence. This issue has been entered into the licensee’s corrective action program as Problem Investigation Process report (PIP) C-07-2025.

This finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences is maintained. The inspectors completed a Phase 1 screening of the finding using Appendix K of the Inspection Manual Chapter 0609, “Maintenance Risk Assessment and Risk Significance Determination Process,” and determined that the performance deficiency represented a finding of very low safety significance based on the resulting magnitude of the calculated Incremental Core Damage Probability associated with the work being performed in the switchyard in conjunction with the 2B KC heat exchanger tube cleaning being less than 1E-6. The finding directly involved the cross-cutting area of Human Performance under the “Work Activity Coordination” aspect of the “Work Control” component, in that the licensee failed to appropriately coordinate work activities to ensure the operational impact of the planned work was controlled and the increased risk minimized in accordance with the approved Critical Evolution Plan associated with the cleaning of the Unit 2 B train KC heat exchanger (H.3.b). (Section 1R13b.(1))

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Implementation of Risk Management Actions Associated With the Excavation of the RN Supply Headers**

Inspectors identified a NCV of 10 CFR 50.65(a)(4) for the licensee’s failure to develop and implement an effective Complex Evolution Plan associated with excavation and inspection of the nuclear service water (RN) supply headers in order to manage and minimize the risk associated with the activity. Specifically, during the excavation phase of the activity, the potential of damaging the RN headers was not adequately controlled to minimize the increased risk resulting from the excavation. This issue has been entered into the licensee’s corrective action program as PIP C-07-2079.

This finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences is maintained. The inspectors completed a Phase 1 screening of the finding using Appendix K of the Inspection Manual Chapter 0609, “Maintenance Risk Assessment and Risk Significance Determination Process,” and determined that the performance deficiency represented a finding of very low safety significance on the basis that in the event an RN supply header was damaged during the excavation, the licensee could complete repairs to the header within the TS allowable out-of-service time of 72 hours. The finding directly involved the cross-cutting area of Human Performance under the “Supervisory and Management Oversight” aspect of the “Work Practices” component, in that the licensee failed to ensure that the appropriate level of supervisory oversight was provided during the excavation phase to ensure the expectations pertaining to the use of mechanized equipment when digging in close proximity to the RN supply headers were properly implemented (H.4.c). (Section 1R13b.(2))

Inspection Report# : [2007003](#) (*pdf*)

**G****Significance:** Apr 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Corrective Action for CA System Air Entrainment Issue Identified in PIP C-97-01579**

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for failure to perform adequate corrective action associated with an air entrainment issue in the auxiliary feed water system (CA) pump suction line identified in PIP C-97-01579. The corrective actions in PIP 97-01579 were inadequate in that they did not address the potential impact of the air entrainment on the swap over instrumentation for the assured water supply located in the suction line upstream of the pumps. The licensee entered this deficiency into their corrective action program.

This finding is more than minor because the engineering calculation error which failed to include the potential impact of the air entrainment on the RN/CA swap over pressure switches resulted in a condition in which there was reasonable doubt on the operability of the CA pumps. The finding is of very low safety significance because the licensee's engineering evaluations performed during the inspection determined that there was no adverse impact on the pressure switches and therefore no loss of the CA pumps capability for short term heat removal. (Section 1R21.2.5)

Inspection Report# : [2007006](#) (*pdf*)**G****Significance:** Apr 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Perform Adequate and Timely Corrective Action to Identify and Resolve an Equipment Design Deficiency of the Alternate Power Supply for the 125 VDC Vital I&C Distribution Center 1EDF**

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for failure to perform adequate and timely corrective actions to resolve a potential equipment design deficiency of the 1DGBB battery and distribution which provided the alternate power supply to the 125 VDC Vital I&C distribution panel 1EDF. The licensee entered this deficiency into their corrective action program. This finding is more than minor because it affects the mitigating systems cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events in that 125 VDC distribution center 1EDF provides control power to critical equipment such as the 4.16kV vital bus which aligns power to ECCS pumps and valves. The finding is associated with the cornerstone attribute of design control. This finding is of very low safety significance because the team identified no occurrence, since this issue was identified on July 20, 2006, in which the station was aligned in the vulnerable condition relying on the alternate power supply to 1EDF. Additionally, the normal power supply, the vital battery, is a highly reliable power source and the alignment to the alternate power source requires manual action. Therefore there was no loss of the 1EDF safety function to provide adequate vital I&C control power for safe shutdown of the plant. This finding involved the crosscutting area of Problem Identification and Resolution because the evaluation, specifically the operability assessment, was inadequate and contributed the inadequacy of subsequent corrective actions. (P.1.c) (Section 1R21.2.12)

Inspection Report# : [2007006](#) (*pdf*)**G****Significance:** Apr 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Follow Procedure for Analyzing the Impact of Updated Vendor Technical Information on Reactor Trip Breaker Maintenance and Inspection Procedures**

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, for failure to follow procedure NSD 319, Vendor Technical Information Program, Rev. 2, which requires performance of technical impact reviews of maintenance and surveillance procedures due to vendor manual changes and technical updates. The licensee entered this deficiency into their corrective action program. This finding is more than minor because procedure inconsistencies were identified between the reactor trip breaker vendor manual and procedure SI/O/A/5100/002, Reactor Trip Breaker Surveillance Procedure, Rev. 18, which indicated that the licensee routinely failed to perform engineering evaluations on similar issues. The finding was determined to be of very low safety significance because there was no loss of the reactor trip breaker safety function to open on a scram signal. (Section 1R21.2.15)

Inspection Report# : [2007006](#) (*pdf*)

**G****Significance:** Dec 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Prevent Recurring Scaffolding Installation Deficiencies**

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the licensee's failure to identify and implement effective corrective actions to prevent recurring deficiencies associated with the erection of scaffolding around safety related equipment. For the examples identified by the inspectors, the licensee removed or adjusted the scaffolding to correct the condition.

The inspectors determined that the licensee's repeated failure to erect scaffolding in accordance with the Duke Scaffold Manual and implement effective corrective actions to prevent recurrence was a performance deficiency. The inspectors determined that the performance deficiency was more than minor in that multiple occurrences were identified of scaffolding being located in a manner where safety-related equipment could be adversely impacted without the appropriate engineering evaluation or approval. In accordance with Appendix B, "Issue Screening," of IMC 0612, the inspectors determined that the finding was of more than minor significance since the finding was associated with the equipment performance and human performance attributes of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of equipment that respond to initiating events to prevent undesirable consequences. This finding directly involved the cross-cutting area of Problem Identification and Resolution under the "Appropriate and Timely Corrective Actions" aspect of the "Corrective Action Program" component, in that ineffective corrective actions were established resulting in additional scaffolding deficiencies being identified over an 18 month period. The licensee has entered this issue into the corrective action program as PIP C-06-8183 and has identified scaffold construction and usage as an adverse trend requiring additional focus in 2007. [P.1.d]

Inspection Report# : [2006005](#) (*pdf*)**G****Significance:** Dec 01, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to establish a procedure for mitigating the consequences of an external flooding event.**

A non-cited violation of TS 5.4.1b was identified for failing to establish procedures required by Regulatory Guide 1.33, Appendix A, Section 6, Procedures for Combating Emergencies and Other Significant Events. Specifically, no procedure existed to combat or mitigate the consequences from an external flooding event.

The finding is greater than minor because the failure to establish appropriate procedures to cope with an external flood affects the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, Appendix A, Attachment 1, "Significance Determination Process," Phase 1 Worksheet, the finding is determined to have very low safety significance because it only affected the mitigating systems cornerstone and did not result in the total loss of any safety function that contributes to external event initiated core damage accident sequences. This violation was placed in the corrective action program as PIP C-06-08287,

Inspection Report# : [2006010](#) (*pdf*)**G****Significance:** Dec 01, 2006

Identified By: NRC

Item Type: FIN Finding

**Failure to conduct an adequate extent of condition review following multiple water intrusion events to ensure risk significant SSC's were protected from loss due to flooding.**

An NRC identified finding was identified for the licensee's failure to conduct adequate extent of condition reviews following multiple water intrusion events at the site by limiting the focus of the reviews to only safety-related structures, systems, and components (SSCs) and excluding those identified as being risk significant.

The finding is greater than minor as it was associated with the Protection Against External Factors and Equipment Performance attributes of the Mitigating Systems cornerstone in that by narrowly focusing extent of condition reviews to only encompass safety-related SSCs and excluding risk-significant SSCs, systems required to respond to and mitigate initiating events could be adversely affected. It was determined to be of very low safety significance because,

while limiting extent of condition reviews to safety-related SSCs has the potential to adversely affect the ability of the station to respond to initiating events, failing to include risk significant equipment in the reviews conducted for the water intrusion events in 2006 after the 1A DG conduit seals were repaired did not result in an overall increase in plant risk in excess of the green/white threshold. The vulnerabilities of other risk-significant SSCs to flooding have been addressed by the station. This finding has captured in PIPs C-06-8246 and C-06-8311. [P.1.a]  
Inspection Report# : [2006010](#) (*pdf*)

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## Barrier Integrity

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Design and Implementation of Modifications to the Hydrogen Igniter System on Catawba Units 1 and 2**

Inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion III, Design Control, for the licensee's failure to effectively design and implement a modification that replaced the containment hydrogen ignition system's glow plugs with upgraded glow coils to ensure the system's operability was maintained. Specifically, following the installation of the hydrogen igniter glow coils in both units, certain breakers and fuses in the individual igniter circuits were found to be undersized, resulting in breakers tripping and fuses failing when called upon to provide power to the igniters for extended periods. The licensee implemented corrective actions to restore the HIS on both units to full operability. This issue has been entered into the licensee's corrective action program as PIPs C-06-8562 and C-06-8742.

This finding was more than minor because it was associated with the Design Control attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that a physical design barrier (i.e., containment) would protect the public from radio nuclide releases caused by accidents or events. The inspectors determined the finding to be of very low safety significance using the Manual Chapter 0609, Appendix H, Containment Integrity Significance Determination Process, Phase 2, based on the under-rated breakers or fuses not resulting in the loss of coverage in two adjacent areas inside of containment. The finding directly involved the cross-cutting area of Human Performance under the "Procedural Compliance" aspect of the "Work Practices" component, in that the licensee failed to follow the guidance contained in their Nuclear System and Department-level procedures governing the modification process to ensure that a safety-related system remained operable under all postulated design requirements. (Section 1R17b.(1))

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Test Procedure Used to Verify the Operability of the Hydrogen Igniter System Glow Coils on Catawba Units 1 and 2**

Inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion XI, Test Control, for the licensee's failure to ensure that surveillance procedures were adequate to verify the operability of the newly-installed hydrogen igniter glow coils on Catawba Units 1 and 2. Specifically, following the installation of the hydrogen igniter glow coils, the voltage for several igniters was set below the required value to ensure the temperature specified in the TS was obtained due to an inadequate surveillance procedure. The licensee implemented corrective actions to restore the hydrogen ignition system on both units to full operability. This issue has been entered into the licensee's corrective action program as PIP C-06-8562.

The finding was more than minor because it was associated with the Procedure Quality attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that a physical design barrier (i.e., containment) would protect the public from radio nuclide releases caused by accidents or events. The inspectors determined the finding to be of very low safety significance using the Phase 1 Screening Worksheet of the Inspection Manual Chapter 0609, "Maintenance Risk Assessment and Risk Significance Determination Process" based on the actual temperatures of the affected hydrogen igniters being above the value that was subsequently shown to result in hydrogen ignition. The finding directly involved the cross-cutting area of Human Performance under the "Complete and Accurate Procedures" aspect of the "Resources" component, in that the licensee failed to develop an

adequate surveillance procedure to ensure voltages on hydrogen igniter glow coil circuits would produce temperatures that met the acceptance criteria specified in the TS (H.2.c). (Section 1R17b.(2))

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Dec 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Recognition, Assessment and Management of the Increased Shutdown Risk Associated With the Failure of the 1B KF Pump with the Core in the Spent Fuel Pool and the 1A DG Inoperable**

The inspectors identified a green NCV of 10 CFR 50.65(a)(4) for the licensee failing to adequately recognize, assess, and manage the increased risk resulting from the failure of the single operable spent fuel pool cooling pump with the opposite train's emergency diesel generator inoperable and the recently unloaded Unit 1 reactor core in the spent fuel pool.

The finding was more than minor because the deficiency is consistent with IMC 0612, Appendix B, Section 3, Minor Screening Question (5)(i). Specifically, the licensee failed to expeditiously develop and implement risk management actions to address the elevated risk the unit was in based on the 1B KF pump failure and other equipment out of service or in an outage alignment; i.e., core in the spent fuel pool and the 1A DG disassembled. The finding was associated with the Systems, Structures and Components (SSC) Performance attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of maintaining the functionality of the spent fuel pool cooling system. The inspectors completed a Phase 1 screening of the finding using Appendix K of Inspection Manual Chapter 0609, "Maintenance Risk Assessment and Risk Management Significance Determination Process," and determined that the performance deficiency represented a finding of very low risk significance (Green), based on the resulting magnitude of the calculated Incremental Core Damage Probability being below 1E-6. This was derived from discussions with the Region II Senior Reactor Analysts based on the time to boil in the Spent Fuel Pool being >24 hours which allows for operator actions to mitigate the effect of a postulated loss of cooling scenario. This finding has been entered into the licensee's Corrective Action Program as Problem Investigation Process reports (PIP) C-06-7829 and C-06-7840. The pump was returned to operable status approximately 48 hours after the failure occurred. This finding directly involved the cross-cutting aspect of Human Performance under the "Safety Significant / Risk Significant Decisions" aspect of the "Decision Making" component, in that the licensee failed to adequately recognize, assess and manage the increased risk resulting from the failure of the 1B Spent Fuel Pool Cooling (KF) pump during outage conditions on Unit 1. [H.1.a]

Inspection Report# : [2006005](#) (*pdf*)

**Significance:**  Dec 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to implement adequate design control for ice condenser lower inlet doors**

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion III, Design Control, and Criterion XI, Test Control, for the licensee's failure to have design documentation to support the ice condenser lower inlet door surveillance procedure test acceptance limits. The licensee subsequently received the supporting information from the vendor and incorporated it into the Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS) and surveillance procedures.

The inspectors determined that the licensee's failure to have design documentation that supported the acceptance criteria contained in the TS surveillance procedures used to test the ice condenser's lower inlet doors at the 40-degree open position was a performance deficiency. The requirement to maintain design bases documentation for tests performed on safety-related SSC's is contained in 10 CFR 50, Appendix B, Criterion III. The requirement to implement a test program that incorporates the design basis for these components is contained in 10 CFR 50, Appendix B, Criterion XI. It was determined to be more than minor using the guidance contained in IMC 0612, Appendix B, Issue Screening, in that an excessively high closing torque could adversely impact the ability of the lower inlet door to modulate properly in the event of a small-break Loss of Coolant Accident (LOCA); however, with no lower limit defined in the surveillance test's acceptance criteria, this condition might not have been identified and corrected prior to returning the unit to power operation. The finding is associated with the Barrier Integrity cornerstone and affected the integrity of the reactor containment structure; i.e., the ice condenser's ability to control internal pressure following a LOCA event, and protect the public from radio-nuclide releases. The licensee contracted

the vendor to reconstruct the design basis of the 40-degree torque test and has incorporated this analysis into the applicable surveillance procedure, Technical Specification and Design Basis Documents. This finding directly involved the cross-cutting area of Human Performance under the “Complete Documentation and Component Labeling” aspect of the “Resources” component, in that the licensee failed to maintain complete, accurate and up-to-date design documentation and procedures. [H.2.c]

Inspection Report# : [2006005](#) (*pdf*)

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## **Emergency Preparedness**

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## **Occupational Radiation Safety**

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## **Public Radiation Safety**

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## **Physical Protection**

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## **Miscellaneous**

Last modified : December 07, 2007