



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
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ATLANTA, GEORGIA 30303-8931

October 29, 2007

Duke Power Company LLC  
d/b/a Duke Energy Carolinas, LLC  
ATTN: Mr. J. R. Morris  
Site Vice President  
Catawba Site  
4800 Concord Road  
York, SC 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000413/2007004 AND 05000414/2007004

Dear Mr. Morris:

On September 30, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Catawba Nuclear Station Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on October 10, 2007, with Mr. Jim Morris and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified.

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

Sincerely,

**/RA/**

James H. Moorman, III, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos.: 50-413, 50-414  
License Nos.: NPF-35, NPF-52

Enclosure: Integrated Inspection Report 05000413/2007004 and 05000414/2007004  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to J. R. Morris from James H. Moorman, III dated October 29, 2007

SUBJECT: CATAWBA NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000413/2007004 AND 05000414/2007004

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-413, 50-414

License Nos.: NPF-35, NPF-52

Report No.: 05000413/2007004 and 05000414/2007004

Licensee: Duke Power Company LLC

Facility: Catawba Nuclear Station, Units 1 and 2

Location: York, SC 29745

Dates: July 1, 2007 through September 30, 2007

Inspectors: A. Sabisch, Senior Resident Inspector  
G. Williams, Resident Inspector  
E. Rodriguez-Cruz, General Engineer  
E. Michel, Reactor Inspector (Section 1R07)  
J. Díaz Vélez, Health Physicist (Sections 2OS1  
and 4OA1.2)  
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and 2PS3)  
A. Nielsen, Health Physicist (Sections 2PS3 and  
4OA1.2)

Approved by: James H. Moorman, III, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000413/2007004, 05000414/2007004; 07/01/2007 - 09/30/2007; Catawba Nuclear Station, Units 1 and 2; Quarterly Integrated Inspection Report.

The report covered a three-month period of inspection by two resident inspectors, one general engineer, three health physicists, and a reactor inspector. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, Reactor Oversight Process, (ROP) Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

Enclosure

## Report Details

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP), where it remained through the end of the inspection period.

Unit 2 began the inspection period at 100 percent RTP and remained there until September 14, 2007, when the unit was removed from service for the end-of-cycle (EOC) 15 refueling outage.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather (Actual)

##### a. Inspection Scope

The inspectors reviewed the effectiveness of the licensee's hot weather protection program pertaining to the extreme hot weather conditions experienced during the period of August 1 - 28, 2007. This involved field walkdowns to assess risk-significant equipment associated with hot weather protection of the plant in areas including the standby shutdown facility, nuclear service water pump house, auxiliary building, and the containment mechanical equipment buildings. The inspectors reviewed specific procedures and alarm response actions associated with hot weather conditions and discussed these measures with operations and engineering personnel. The inspectors reviewed completed hot weather protection surveillance procedures to determine if required equipment was fully operable throughout the period of extreme hot weather. The documents reviewed during this inspection are listed in the Attachment to this report.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### a. Inspection Scope

The inspectors walked down the eight partial system alignments listed below and assessed whether critical portions of equipment alignments for selected trains remained operable while the redundant trains were inoperable. Plant documents were reviewed to find the correct system and power alignments, and the required positions of select valves and breakers. The inspectors determined if the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact mitigating system availability. Documents reviewed during this inspection are listed in the Attachment to this report.

Enclosure

- Protection of A and B train safety-related equipment identified as risk-significant in the Dual Unit Standby Shutdown Facility (SSF) Outage Complex Activity Plan
- Protection of B train safety-related equipment identified as risk significant in the Critical Activity Plan associated with the pre-outage work on the 2A Diesel Generator (DG)
- Protection of Unit 1 B train electrical equipment during the period the 1A DG was removed from service for planned maintenance
- Protection of 1A, 2A and 2B Nuclear Service Water (RN) pumps and associated electrical supplies during the period planned work was performed on 1B components
- Protection of the B Control Area Chilled Water (YC) chiller and associated power supplies following the trip of the A YC chiller during train swap activities
- Protection of the A train safety-related equipment identified as risk-significant during the 1B Component Cooling System (KC) Heat Exchanger Tube Cleaning Critical Activity Plan
- Protection of the 1A, 2A and 1B RN pumps and related support equipment when the 2B RN pump was tagged out for maintenance on discharge check valve 2RN18
- Protection of the A train equipment on Unit 1 and specific equipment on Unit 2 during the Critical Activity associated with the removal and relocation of three Unit 2 valves requiring isolation of the common RN return header to the Station Nuclear Service Water Pond (Unit 1 was in Mode 1 and Unit 2 was in No Mode)

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors walked down accessible portions of the plant to assess the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures. The inspectors observed the fire protection suppression and detection equipment to determine whether any conditions or deficiencies existed which could impair the operability of that equipment. The inspectors selected the areas based on a review of the licensee's safe shutdown analysis, probabilistic risk assessment based on sensitivity studies for fire related core damage accident sequences, and summary statements related to the licensee's 1992 Initial Plant Examination for External Events Submittal to the NRC. The inspectors toured the seven areas important to reactor safety listed below. The documents reviewed during this inspection are listed in the Attachment to this report.

- Service Building, 568 foot elevation
- RN Pump Structure, 594 foot elevation



- Unit 2, Electrical Penetration Room, Auxiliary Building 560 foot elevation
- Unit 1, Auxiliary Building 577 foot elevation, Room 400
- Unit 2, Mechanical Penetration Room Auxiliary Building 560 foot elevation
- Unit 1, Mechanical Penetration Room Auxiliary Building 543 foot elevation
- Unit 2, Exterior Doghouse

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (Biennial Inspection)

a. Inspection Scope

The inspectors reviewed inspection records, test results, and other documentation to ensure that heat exchanger (HX) deficiencies that could mask or degrade performance were identified and corrected. The test procedures and records were also reviewed to verify that these were consistent with Generic Letter (GL) 89-13 licensee commitments, and industry guidelines. Risk significant heat exchangers reviewed included the Containment Spray (NS) HXs, and the Component Cooling Water (KC) HXs.

The inspectors reviewed the corporate service water system program, basis documents for calculations performed to verify HX performance done in accordance with ASME Performance Test Code (PTC)-12.5, Problem Investigation Process reports (PIPs), and system health reports. For the Component Cooling HXs inspection and cleaning procedures, heat capacity test procedures and results, cooling water flow monitoring testing and trends, and visual inspection records were reviewed. The inspectors reviewed NS HX heat capacity testing procedures and results, the basis for acceptable testing performance criteria, NS HX flow capacity testing and trends, visual inspection records, and inspection and cleaning procedures. These documents were reviewed to verify inspection methods were consistent with industry standards, to verify HX design margins were being maintained, and to verify performance of the HXs under the current maintenance frequency was adequate. The inspectors also observed NS HX testing of the 2A HX in progress. In addition, the inspectors conducted a walkdown of selected HXs to assess general material condition and to identify any degraded conditions of selected components.

The inspectors also assessed the general health of RN through a review of design basis documents, engineering evaluations, system health reports, intake structure diver inspections, visual and ultrasonic testing of buried service water piping, corrosion monitoring procedures, procedures and results for flow balancing, and discussions with the service water system engineer. These documents were reviewed to verify the design basis was being maintained and to verify adequate RN system performance under current preventive maintenance, inspections, and frequencies.

The inspectors reviewed Federal Energy Regulatory Commission inspection reports for the standby nuclear service water pond earthen embankment, reviewed piezometer and settlement data, and reviewed local inspection results. The inspectors also performed a walkdown of those structures, and conducted interviews with civil engineers.

PIPs were reviewed for potential common cause problems and problems which could affect system performance. This was done to confirm that the licensee was entering issues into the corrective action program and initiating appropriate corrective actions. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed Active Simulator Exam Scenario 25 to assess the performance of licensed operators. The exercise included a pressurizer power operated relief valve (PORV) failing open, resulting in a drop in primary pressure, loss of main condenser vacuum, failure of the main turbine to trip automatically, and a loss of the secondary heat sink. The inspection focused on high-risk operator actions performed during implementation of the abnormal and emergency operating procedures, and the incorporation of lessons-learned from previous plant and industry events. Through observations of the critique conducted by training instructors following the exam session, the inspectors assessed whether appropriate feedback was provided to the licensed operators regarding identified weaknesses. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing the maintenance activity listed below. This review included an assessment of the licensee's practices pertaining to the identification, scope, and handling of degraded equipment conditions, as well as common cause failure evaluations and the resolution of historical equipment problems. For those structures, systems, and components scoped in the maintenance rule, the inspectors assessed whether reliability and unavailability were properly

monitored, and that 10 CFR 50.65 (a)(1) and (a)(2) classifications were justified in light of the reviewed degraded equipment condition. The documents reviewed during this inspection are listed in the Attachment to this report.

- Preventive maintenance activities associated with the 1B1 and 1B2 KC pumps during the period the 1B KC heat exchanger was removed from service for tube cleaning

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's assessments concerning the risk impact of removing from service those components associated with the nine work items listed below. This review primarily focused on activities determined to be risk-significant within the Maintenance Rule. The inspectors also assessed the adequacy of the licensee's identification and resolution of problems associated with maintenance risk assessments and emergent work activities. The inspectors reviewed Nuclear System Directive (NSD) 415, Operational Risk Management (Modes 1-3), and NSD 403, Shutdown Risk Management (Modes 4,5,6, and No Mode), for appropriate guidance to comply with 10 CFR 50.65 (a)(4). The documents reviewed during this inspection are listed in the Attachment to this report.

- Review of planned and emergent work for the period the SSF was removed from service for the annual outage and performance of the six-year preventive maintenance activities on July 11 and 12, 2007
- Review of planned and emergent work for the period the 2A DG was removed from service for the pre-outage maintenance activities on July 24 and 25, 2007
- Review of planned work on the 1A diesel generator and a steam generator PORV when an operability issue pertaining to the SSF DG was identified on July 31, 2007
- Review of planned and emergent work with the electrical grid status in an Orange economic risk condition on August 6, 2007
- Cessation of planned maintenance activities on the 2B DG and restoration of the equipment based on the Duke grid entering a Yellow reliability status following the loss of a unit at the Belews Creek Steam Station on August 7, 2007
- Evaluation of planned and emergent work following the failure of the A YC chiller to run during train swap activities
- Evaluation of planned and emergent work before and during the period when the 1B KC heat exchanger was removed from service for tube cleaning which placed Unit 1 in an Orange risk profile

- Review of planned and emergent work on both units in preparation for and during the multi-day period when RN discharge piping modification work was in-progress.
- Assessment of the elevated risk resulting from the inadvertent removal of the turbine driven auxiliary feedwater (CA) pump from service when one of the motor driven CA pumps was out of service for planned maintenance.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

For the seven operability evaluations listed below, the inspectors evaluated the technical adequacy of the evaluations to ensure that Technical Specification (TS) operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) to determine whether the system or component remained available to perform its intended function. In addition, the inspectors reviewed compensatory measures implemented to find that they worked as stated and that they were adequately controlled. The inspectors also reviewed a sampling of PIPs to determine if the licensee was identifying and correcting any deficiencies associated with operability evaluations. The documents reviewed during this inspection are listed in the Attachment to this report.

- PIP C-07-3340, Three vent ports were found removed and an adjacent access door was found open during the performance of an Auxiliary Building Ventilation (VA) performance test
- PIP C-07-3353, Two supports on the Ice Condenser Refrigeration system found to be loose around a section of piping
- PIP C-07-3635, Unexpected Technical Specification Action Item List (TSAIL) Entry due to the 1B DG failing to achieve 3950 volts to 4370 volts following a diesel start
- PIP C-07-3644, Areva notified Duke of the possibility of damaged mixing vanes on the grids of the Advanced Mark-Babcock and Wilcox assemblies at Catawba
- PIP C-07-3742, 2A2 Emergency Ventilation Fan failed to start when the 2A DG was started after maintenance activities
- PIP C-07-3810, SSF Diesel Generator routinely operated above 700kw continuous load limit as indicated on the name plate
- PIP C-07-4266, Unit 2 Auxiliary Building Fuel handling Radwaste Area Supply Header Isolation Valve, 2RN-839A, would not close fully when tagging out a portion of the system for maintenance

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the seven post-maintenance tests listed below to determine whether procedures and test activities ensured system operability and functional capability. The inspectors reviewed the licensee's test procedures to determine that the procedures adequately tested the safety function(s) that may have been affected by the maintenance activities, that the acceptance criteria in the procedures were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedures had been properly reviewed and approved. The inspectors also witnessed the tests and/or reviewed the test data to establish that test results adequately demonstrated restoration of the affected safety function(s). The documents reviewed during this inspection are listed in the Attachment to this report.

- SSF Diesel Test following the completion of the six-year preventative maintenance overhaul
- Operability testing of the 2A DG following the completion of pre-outage inspections and maintenance
- Operability test following scheduled maintenance on the 1A DG
- Performance test of the 1A Chemical and Volume Control (NV) pump following scheduled preventive maintenance activities
- Valve stroke test on valve 1RN38B, RN Pump 1B Discharge Isolation Valve, following preventive maintenance activities
- Operability test of the A Train YC chiller following repair
- Operability test of the 1B DG following maintenance and inspection activities

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors evaluated licensee outage activities to determine whether the licensee: considered risk in developing outage schedules; adhered to administrative risk reduction methodologies they developed to control plant configuration; adhered to operating license, TS and Selected Licensee Commitment requirements, and procedural guidance that maintained defense-in-depth. In addition, the inspectors assessed whether the licensee developed mitigation strategies for losses of the key safety functions identified below:

- Decay Heat Removal
- Inventory Control
- Reactivity Control
- Containment Control
- Spent Fuel Cooling
- Power Availability

Prior to the outage, the inspectors reviewed the licensee's outage risk control plan to determine if the licensee had performed adequate risk assessments and had implemented appropriate risk management strategies when required by 10CFR50.65(a)(4).

The inspectors observed the "Just-in-Time" training conducted for the shifts involved in the unit shutdown on September 12, 2007, which simulated bringing the unit down from an initial power level of 94 percent RTP to Mode 3.

On September 14, 2007, the inspectors observed: the power reduction process; operator and plant response to an automatic turbine trip due to low condenser vacuum; removing the reactor from service; and the subsequent plant cool down. During these observations, the inspectors assessed whether the requirements in the TSs and Selected Licensee Commitments were followed. The inspectors conducted a Mode 3 Containment Entry to observe the condition of major, normally-inaccessible equipment inside containment and determined whether indications of previously unidentified leakage from the reactor coolant system were present. The inspectors also participated in the ice condenser material condition inspection (performed once Mode 5 was entered) to observe the overall material condition in the upper and lower ice condensers, identify any foreign material that might be present, and observe the performance of lower inlet door as-found testing. Portions of the cooldown process on September 15, 2007, were observed to determine if the TS cooldown restrictions were followed.

The inspectors performed an inspection of the reactor vessel bottom head to determine if any leakage had occurred at the welds associated with the bottom head penetrations. This inspection was done in conjunction with the licensee's Engineering and Quality Control personnel.

The inspectors observed the items or activities described below, to determine whether the licensee maintained defense-in-depth commensurate with the outage risk control plan for the key safety functions identified above and compliance with applicable TS when taking equipment out of service.

- Clearance activities; hanging and removing safety tags
- Reactor coolant system instrumentation; from solid conditions to reduced inventory
- Realigning electrical power
- Establishing and maintaining decay heat removal
- Maintaining Spent Fuel Pool cooling

- Controlling reactivity during power reduction at the start of the outage
- Establishing and maintaining Containment Closure

The inspectors reviewed the licensee's responses to emergent work and unexpected conditions to assess whether resulting configuration changes were controlled in accordance with the outage risk control plan.

The inspectors also observed fuel handling operations during new fuel receipt and core offload to determine if those operations and activities were being performed in accordance with TSs and procedural guidance. In response to operational experience concerns regarding reactor vessel head lifts (Operating Experience Smart Sample OpESS FY2007-03), the inspectors also reviewed programs and procedures to determine whether current practices for lifting the reactor vessel head were bounded by the load drop analysis contained in the licensing basis. The revised lifting procedure and associated risk management plan were reviewed prior to the actual head lift, and their implementation was assessed during the head lift evolution.

Prior to mode changes and on a sampling basis, the inspectors reviewed system lineups and/or control board indications to determine if TSs, license conditions, and other requirements (i.e., commitments and administrative procedure prerequisites for mode changes) were met prior to changing modes or plant configurations. Also, the inspectors periodically reviewed the setting of containment integrity, to determine if the reactor coolant system (RCS) and containment boundaries were in place and had integrity when necessary.

Periodically, the inspectors reviewed the items entered into the licensee's corrective action program, to establish that the licensee had identified problems related to outage activities at an appropriate threshold and had entered them into the corrective action program.

Documents reviewed in support of the Unit 2 EOC15 refueling outage are listed in the Attachment to this report.

b. Findings and Observations

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed and/or reviewed the 12 surveillance tests listed below to determine that TS surveillance requirements and/or Selected Licensee Commitment requirements were properly complied with, and that test acceptance criteria were properly specified. The inspectors determined whether proper test conditions were

established as specified in the procedures, that no equipment pre-conditioning activities occurred, and that acceptance criteria had been met. Additionally, the inspectors also determined if equipment was properly returned to service and if proper testing was specified and conducted to ensure that the equipment could perform its intended safety function. The documents reviewed during this inspection are listed in the Attachment to this report.

#### Surveillance Tests

- PT/1/A/4200/007A; Centrifugal Charging Pump 1A Test, Rev. 050
- PT/0/A/4600/031; NAC-UMS Cask Surveillance, Rev 0
- PT/1/A/4350/015A; Diesel Generator 1A Periodic Test, Rev. 040
- OP/2/A/6200/032, Primary Sampling Using a Rheodyne Model 7010 Valve, Rev. 011 combined with CP/0/B/8200/006, Determination of Dose Equivalent Iodine-131, Rev. 014 and PT/0/B/4600/100, Periodic Surveillance for RCS Specific Activity, Rev. 001
- IP/1/A/3200/001A, Solid State Protection System (SSPS) Train A Periodic Testing, Rev. 7
- PT/2/A/4400/006A; Containment Spray Heat Exchanger 2A Heat Capacity Test, Rev. 36
- PT/1/A/4350/002B; Diesel Generator 1B Operability Test, Rev. 113
- MP/0/A/7150/072; Main Steam Safety Valve Setpoint Test, Rev. 018

#### In-Service Tests

- PT/2/A/4250/003C; Turbine Driven Auxiliary Feedwater Pump #2 Performance Test, Rev. 076
- PT/1/A/4200/013C, RN Valve Inservice test, Rev. 067; Enclosure 13.5, 1RN38B Valve Inservice test

#### Ice Condenser Tests

- MP/0/A/7150/006, Ice Condenser Lower Inlet Doors Inspection and Testing - As Found Values, Rev. 029
- MP/0/A/7150/005; Ice Basket Weight Determination, Rev. 25

#### b. Findings

No findings of significance were identified.



Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed and evaluated the licensee's simulated control room and emergency planning performance during a drill conducted on August 8, 2007. The inspectors observed licensee activities occurring in the simulator control room and Technical Support Center during a simulated event. The NRC's assessment focused on the timeliness and accuracy of the event classification, notification to offsite agencies and the overall response of the personnel involved in the drill from an operations and emergency planning perspective. The performance of the emergency response was evaluated against applicable licensee procedures and regulatory requirements. The inspectors attended the post-exercise critique for the drill to evaluate the licensee's self-assessment process for identifying potential deficiencies relating to failures in classification and notification. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety (OS)

2OS1 Access Controls To Radiologically Significant Areas

a. Inspection Scope

Access Controls - Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were inspected. The inspectors evaluated procedural guidance; directly observed implementation of administrative and established physical controls; assessed worker exposures to radiation and radioactive material; and appraised radiation worker and technician knowledge of, and proficiency in implementing radiation protection program activities.

During the inspection, radiological controls for selected operations and maintenance activities were observed and discussed. Briefings and/or radiation control field activities were observed for spent fuel pool loading of storage cask container, welding of storage cask container. Inspector evaluations included, as applicable, Radiation Work Permit (RWP) details; use and placement of dosimetry and air sampling equipment; electronic dosimeter set-points, and monitoring and assessment of worker dose from direct radiation and airborne radioactivity source terms. Effectiveness of established controls

were assessed against area radiation and contamination survey results, and occupational doses received. Physical and administrative controls and their implementation for locked high radiation areas (LHRA) and very high radiation areas (LHRA) locations and for storage of highly activated material within the spent fuel pool (SFP) areas were evaluated through discussions with licensee representatives, direct field observations, and record reviews.

Occupational worker adherence to selected RWPs and Health Physics Technician (HPT) proficiency in providing job coverage were evaluated through direct observations of staff performance during job coverage and routine surveillance activities, review of selected exposure records and investigations, and interviews with licensee staff. Radiological postings and physical controls for access to designated high radiation (HRA) and LHRA locations within Auxiliary Building (AB) and SFP areas were evaluated during facility tours. In addition, the inspectors independently measured radiation dose rates and evaluated established posting and access controls for selected AB locations and equipment including Unit 2 rooms 408, 403, 404/404B, 405, 417, 311, 315, 306, 308A, 222, and 215B/215D; Unit 1 and Unit 2 Lower Containment Entrance; and AB equipment/piping hot spots. Occupational exposures associated with direct radiation, potential radioactive material intakes, and from discrete radioactive particle or dispersed skin contamination events for calendar year (CY) 2005 and year-to-date 2007 were reviewed and discussed with licensee knowledgeable personnel.

Radiation protection program activities were evaluated against 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Updated Final Safety Analysis Report (UFSAR) details in Section 12, Radiation Protection; Technical Specification (TS) Sections 5.4, Procedures; and 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the Attachment to this report.

Problem Identification and Resolution - Licensee Corrective Action Program (CAP) documents associated with access controls to radiologically significant areas were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with Nuclear System Directive (NSD)-208, Problem Investigation Process, Revision (Rev.) 27. Licensee audits, self-assessments and PIPs related to access controls that were reviewed and evaluated in detail for this program area are listed in Section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

## 2OS3 Radiation Monitoring Instrumentation and Protective Equipment

### a. Inspection Scope

Radiation Monitoring Instrumentation and Post-Accident Sampling Systems - During tours of the AB, Radiologically Controlled Area (RCA) exit points, and administrative building areas, the inspectors observed installed radiation detection equipment including selected Area Radiation Monitors, Personnel Contamination Monitors (PCM), Portal Monitors (PM), Small Article Monitors (SAM), and Whole Body Counter (WBC) equipment. During the tours, the adequacy of the equipment's physical location and material condition were evaluated.

From a review of selected records and discussions with cognizant licensee representatives, the inspectors evaluated completion and adequacy of equipment calibrations, and assessed system operability and reliability. In addition, the inspectors reviewed and discussed changes to Post-Accident Sampling System capabilities and selectively evaluated material condition of current liquid and gaseous sampling equipment.

During equipment walk-downs, the inspectors observed functional checks of various fixed and portable radiation monitoring/detection instruments with a HPT. The observations included source checks of PCM, PM, SAM, and WBC equipment. The inspectors reviewed calibration records and discussed the functional testing and testing intervals for selected PCM and PM equipment located at the RCA and protected area exits. PCM equipment detection capabilities were demonstrated using a low-level mixed radionuclide source that was passed through the equipment. The operability and analysis capabilities of the WBC equipment were evaluated. WBC equipment operations and training of staff were reviewed and discussed with cognizant licensee representatives.

For selected portable survey instrumentation used in field tasks, the inspectors observed HPT selection of survey instruments, completion of required performance and/or functional checks, and use of instruments during selected task coverage. Availability of portable instruments for licensee use was evaluated through observation of instruments staged for issue and discussion with licensee personnel. For select frisker and portable survey instruments used in the field, the inspectors noted operability and verified calibration dates. Calibration data for selected portable instruments staged or recently used for coverage of radiation worker were also reviewed.

Operability and reliability of selected radiation detection instruments were reviewed against 10 CFR Part 20; TS Section 5.4, Procedures; Selected Licensee Commitments (SLC) Manual Section 16.7; UFSAR Chapters 11 and 12; and applicable licensee procedures. Documents reviewed during the inspection are listed in Sections 2OS3 and 2PS3 of the Attachment to this report.

Self-Contained Breathing Apparatus (SCBA) and Protective Equipment - Selected SCBA units staged for emergency use in the Control Room and other locations were inspected for material condition and adequate air pressure. The inspectors also reviewed the previous maintenance records for vital components for selected SCBA units. In addition, certification records associated with supplied-air quality were reviewed and discussed.

Qualifications for staff responsible for testing and repairing SCBA equipment were evaluated through a review of selected training records. Selected Control Room operators were interviewed to determine their knowledge of available SCBA equipment locations, including corrective lens inserts if needed. In addition, respirator qualification records were reviewed for selected licensee personnel.

Licensee activities associated with maintenance and use of respiratory protection equipment were reviewed against 10 CFR Part 20; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection; American National Standards Institute (ANSI)-Z88.2-1992, American National Standard for Respiratory Protection; and applicable licensee procedures. Documents reviewed during the inspection are listed in Section 2OS3 of the Attachment to this report.

Problem Identification and Resolution - Selected PIPs associated with instrumentation and protective equipment were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with NSD 208. Documents reviewed are listed in Section 2OS3 of the Attachment to this report.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety (PS)

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Effluent Monitoring and Radwaste Equipment - During inspector walk-downs, accessible sections of the Unit 1 and Unit 2 liquid radioactive waste (radwaste) system including waste monitor tanks A and B, system piping and valves, and Waste Liquid Discharge (1EMF-49), Turbine Building Sump (1EMF-31), and Boron Recycle Evaporator Condensate (1EMF-47) monitors were assessed for material condition. Inspected components of the gaseous effluent process and release system included waste gas decay tanks, hydrogen recombiners, the Unit 1/Unit 2 unit vent air particulate/noble gas/iodine monitor (1/2-EMF-35,36,37) skids, Waste Gas Discharge monitor (1EMF-50), Auxiliary Building Ventilation monitor (1EMF-41), Condenser Air Ejector Exhaust monitor (2EMF-33), and associated effluent sample lines. The inspectors interviewed chemistry

and radiation protection personnel regarding radwaste equipment configuration, effluent monitor operation, and system modifications.

The operability, availability, and reliability of selected effluent process sampling and detection equipment used for routine and accident monitoring activities were reviewed and evaluated. The inspectors reviewed results of calibrations for selected process monitors, flowmeters, and air filtration systems, including 1EMF-36, 2EMF-33, OEMF-43A and B, OEMF-41, OEMF-49, OEMF-50 and OEMF-57. The two most recent surveillances on the Containment Ventilation High Efficiency Particulate Air/charcoal air treatment systems, VQ1B and VQ2B, were also reviewed. The inspectors evaluated out-of-service effluent monitors and compensatory action data for the period of September 2005 through July 2007.

Installed configuration, material condition, operability, and reliability of selected effluent sampling and monitoring equipment were reviewed against details documented in 10 CFR Part 20; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants, June 1974; ANSI-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; TS Section 5; the Offsite Dose Calculation Manual (ODCM), Rev. 47; SLC Manual, Section 16.11; and the UFSAR, Chapter 11. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the Attachment to this report.

Effluent Release Processing and Quality Control Activities - Activities associated with gamma spectroscopy and alpha- and beta-emitter detection were discussed with count room technicians and radiation protection supervision. The inspectors observed performance of count room activities, assessing count room technician knowledge and proficiency. The inspectors reviewed the material condition of the gamma spectroscopy and liquid scintillation detectors in the count room. The inspectors discussed the reliability of the automated planchet counters with the count room technician. The processing of effluent releases was discussed with Radiation Protection and Chemistry personnel. In addition, results of the radiochemistry cross-check program were reviewed from the first quarter of CY 2005 through the fourth quarter of CY 2006.

Procedures for effluent sampling, processing, and release were evaluated for consistency with licensee actions. The inspectors reviewed 22 liquid and 11 gaseous release permits for June 2007 through August 8, 2007 against ODCM specifications for pre-release sampling and effluent monitor setpoints. The post-release report summaries were reviewed for the period of January 2007 through June 2007 to evaluate dose commitment calculations. The ODCM was reviewed and discussed with responsible licensee representatives to identify and evaluate any changes made since September 1, 2005. The inspectors also reviewed CY 2004, CY 2005, and CY 2006 Annual Effluent Reports for effluent release data trends and anomalous releases. The inspectors also reviewed CY 2006 Annual Environmental Operating Report.

Observed task evolutions, count room activities, and offsite dose results were evaluated against details and guidance documented in 10 CFR Part 20 and Appendix I to 10 CFR Part 50; ODCM; RG 1.21; RG 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I, October 1977; and TS Section 5. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the Attachment to this report.

Groundwater Monitoring - The inspectors discussed current and future programs for onsite groundwater monitoring with Health Physics supervisors, including number and placement of monitoring wells and identification of plant systems with the most potential for contaminated leakage. The inspectors also reviewed procedural guidance for identifying and assessing onsite spills and leaks of contaminated fluids. In addition, the inspectors reviewed records of historical contaminated spills retained for decommissioning purposes as required by 10 CFR Part 50.75(g).

The licensee currently has five groundwater monitoring wells located near conventional waste water (WC) system retention ponds outside the power block. Preliminary hydrological studies have been performed to determine the optimum location for additional groundwater sample points and 30 new wells are currently being constructed. Detectable levels of tritium have been identified in samples taken from the WC wells, the ground water drainage (WZ) system sumps (french drain system), composite samples from an onsite wetlands area (WC discharge point), and from the Retired Steam Generator Storage Facility sump. Monitoring for tritium contamination in groundwater is complicated by the fact that Lake Wylie has a relatively high tritium background due to routine effluent discharges from both Catawba Nuclear Station and McGuire Nuclear Station (40 miles upstream). As of January 2007, tritium concentrations at indicator locations in the lake range from 681 picoCuries per liter (pCi/L) (Wylie Dam) to 18,000 pCi/L (Discharge Canal) based on quarterly composite sample results and have been trending upward since plant startup. No levels exceeding the EPA drinking water limit of 20,000 pCi/L (corresponding to 4 millirem per year to a member of the public) have been identified in the offsite environs.

Problem Identification and Resolution - Selected PIPs associated with effluent release activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve selected issues in accordance with NSD 208. The inspectors noted the existence of RPMP 7.2, PIP-Threshold and Initiation, Rev. 9. Documents reviewed are listed in Section 2PS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

## 2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

### a. Inspection Scope

REMP Implementation - The inspectors observed routine sample collection and surveillance activities as required by the licensee's environmental monitoring program. The inspectors noted the material condition and operability of airborne particulate filter and iodine cartridge sample stations at monitoring locations 200, 201, 205, 212, and 258C. Environmental thermoluminescent dosimeters at sites 200, 201, 212SI, and 226 were checked for material condition. Collection of broadleaf vegetation, irrigated food crops, and a milk sample was observed at sample locations 200, 201, 222, 226, and 258C (broadleaf), 253 (garden), and 221C (milk). In addition, an automatic water sampler was inspected for material condition near discharge canal location 208. The inspectors determined the current location of selected sample points using NRC global positioning system instrumentation. Land use census results, changes to the ODCM, and sample collection/processing activities were discussed with environmental technicians and licensee staff.

The inspectors reviewed the last two calibration records for selected environmental air samplers and water samplers. The inspectors also reviewed the 2005 and 2006 Radiological Environmental Operating Reports, results of the 2005 and 2006 interlaboratory cross-check program, and procedural guidance for environmental sample collection and processing. Selected environmental measurements were reviewed for consistency with licensee effluent data, evaluated for radionuclide concentration trends, and compared with detection level sensitivity requirements.

Procedural guidance, program implementation, and environmental monitoring results were reviewed against: 10 CFR Part 20; Appendix I to 10 CFR Part 50; TS Section 5.0; ODCM; SLC Section 16.11; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment; and the Branch Technical Position, An Acceptable Radiological Environmental Monitoring Program - 1979. Documents reviewed are listed in Section 2PS3 of the report Attachment.

Meteorological Monitoring Program - During a weekly surveillance of the meteorological tower, the inspectors observed the physical condition of the tower and its instruments and discussed equipment operability and maintenance history with a technician. The inspectors compared locally generated meteorological data with information available to control room operators. For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed calibration records for applicable tower instrumentation and evaluated measurement data recovery for 2005 and 2006.

Licensee procedures and activities related to meteorological monitoring were evaluated against: ODCM; FSAR Section 2.3; SLC Section 16.7; ANSI/ANS-2.5-1984, Standard for Determining Meteorological Information at Nuclear Power Sites; and Safety Guide 23,

Onsite Meteorological Programs. Documents reviewed are listed in Section 2PS3 of the Attachment to this report.

Unrestricted Release of Materials from the RCA - The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors also observed source checks of these instruments and discussed equipment sensitivity and release program guidance with licensee staff. To evaluate the appropriateness and accuracy of release survey instrumentation, radionuclides identified within recent waste stream analyses were compared with radionuclides used in current calibration sources and performance check sources. The inspectors also reviewed the last two calibration records for selected release point survey instruments.

Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, Control of Radioactively Contaminated Material. Documents reviewed are listed in Section 2PS3 of the Attachment to this report.

Problem Identification and Resolution - The inspectors reviewed selected PIPs in the areas of environmental monitoring, meteorological monitoring, and release of materials. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with NSD 208. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Documents reviewed are listed in section 2PS3 in the Attachment to this report.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

.1 Initiating Events, Mitigating Systems, and Barrier Integrity

a. Inspection Scope

The inspectors sampled licensee data to establish the accuracy of reported performance indicator (PI) data listed below. To determine the accuracy of the reported PI elements, the reviewed data was assessed against PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Indicator Guideline.



### Initiating Events

Unplanned Scrams per 7,000 Critical Hours, Unit 2 - The inspectors reviewed the Unplanned Scrams per 7,000 Critical Hours PI results for the period of July 1, 2005, through June 30, 2007, for Unit 2. The inspectors reviewed operating logs, PIPs, and monthly operating reports associated with any manual and automatic scrams that occurred in that period and determined whether the data reported for the PI corresponded to the unit's power profile. The documents reviewed during this inspection are listed in the Attachment to this report.

Unplanned Scrams with Loss Normal Heat Removal, Units 1 and 2 - The inspectors reviewed the Unplanned Scrams with Loss Normal Heat Removal PI results for the period of July 1, 2005, through June 30, 2007, for Units 1 and 2. The inspectors reviewed operating logs, PIPs, and monthly operating reports associated with any manual and automatic scrams that occurred in that period and determined whether the data reported for the PI corresponded to the unit's post-trip performance. The documents reviewed during this inspection are listed in the Attachment to this report.

### Mitigating Systems

Safety System Functional Failures, Unit 1 - The inspectors reviewed the Safety System Functional Failures PI results for the period of July 1, 2005, through June 30, 2007, for Unit 1. The inspectors reviewed licensee event reports, maintenance rule reports and selected work orders to ensure that any failure that prevented or could have prevented the fulfillment of a safety function in that period was identified and reported for the PI. The documents reviewed during this inspection are listed in the Attachment to this report.

### Barrier Integrity

Reactor Coolant System Activity, Unit 1 - The inspectors reviewed the Reactor Coolant System Activity PI results for the period of July 1, 2005, through June 30, 2007, for Unit 1. The inspectors reviewed maximum monthly reactor coolant Dose Equivalent Iodine (DEI-131) activity compared to Technical Specification limiting values. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a Reactor Coolant System sample. The documents reviewed during this inspection are listed in the Attachment to this report.

#### b. Findings

No findings of significance were identified.

## .2 Public and Occupational Radiation Safety

### a. Inspection Scope

The inspectors sampled licensee data for the PIs listed below. To verify the accuracy of the PI data reported during the period reviewed, PI definitions and guidance contained in NEI 99-02 were used to verify the basis for each data element.

Public Radiation Safety - The inspectors reviewed the Radiological Effluent Technical Specification/ODCM Radiological Effluent Occurrences PI results from October 2005 through April 2007. The inspectors reviewed corrective action program documents, effluent dose data, and licensee procedural guidance for classifying and reporting PI events. The inspectors also discussed collection and analysis of PI data with licensee personnel. Reviewed documents are listed in Section 2PS1 and 4OA1 of the Attachment to this report.

Occupational Radiation Safety - The inspectors reviewed the Occupational Exposure Control Effectiveness PI results from October 2005 through April 2007. For the assessment period, the inspectors reviewed electronic dosimeter alarm logs and assessed corrective action program documents to determine whether HRA, VHRA, or unintended radiation exposures had occurred. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. In addition, the inspectors reviewed selected personnel contamination event data and internal dose assessment results. Report section 2OS1 contains additional details regarding the inspection of controls for exposure significant areas. Documents reviewed are listed in sections 2OS1 and 4OA1 of the Attachment to this report.

### b. Findings

No findings of significance were identified.

## 4OA2 Identification and Resolution of Problems

### .1 Daily Review

In accordance with Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed screening of items entered into the licensee's corrective action program. This was accomplished by reviewing copies of PIPs, attending some daily screening meetings, and accessing the licensee's computerized database.

## .2 Annual Sample Review

### a. Inspection Scope

The inspectors reviewed the cumulative effects of deficiencies that constituted operator workarounds to determine whether or not they could: affect the reliability, availability, and potential for mis-operation of a mitigating system; affect multiple mitigating systems; or affect the ability of operators to respond in a correct and timely manner to plant transients and accidents. The inspectors also assessed whether operator workarounds were being identified and entered into the licensee's corrective action program at an appropriate threshold.

The inspectors reviewed PIPs associated with licensee actions taken in response to defects found in steel plating used at Oconee in 2003. Additional plates from the same heat lot were subsequently used at Catawba in the fabrication of base plates for the Unit 2 vital inverters in the 2004 time frame. The issue of Catawba's use of these plates was identified during the NRC biennial Problem Identification and Resolution inspection conducted at Oconee in August 2007. Inspectors reviewed corrective action documents generated at Catawba in response to the issue that had been identified at Oconee to assess the potential impact on the station. The Inspectors interviewed Engineering and Operations personnel involved in the evaluation of the use of the plate material and performance of the Operability Assessment to justify continued operation with the plate installed in a safety-related system, structure and component. The documents reviewed during this inspection are listed in the Attachment to this report.

### b. Findings

No findings of significance were identified.

## 4OA3 Event Followup

### .1 Catawba's Response to Offsite Grid Disturbance

#### a. Inspection Scope

On August 25, 2007, a transformer fault occurred at a generating facility located within the Duke electrical grid, but operated by another utility. Protective relaying at the facility failed to isolate the fault from the grid as designed. The resulting degraded voltage condition on the grid was sensed at the Catawba switchyard and reached 75 percent of nominal voltage. Once the setpoint for degraded voltage on the 4.16kV vital busses was reached, all four diesel generators received an auto-start signal. The diesels started; however, since protective relaying on the Duke electrical grid functioned as designed and rapidly isolated the fault, the DG output breakers were not required to close and supply power to the 4.16kV vital buses. The licensee made the required 8-hour notification to the NRC based on the diesel generators receiving a valid auto start signal

due to low voltage conditions on the 4.16kV vital busses. Once grid conditions were verified to have stabilized and the fault at the remote location isolated from the Duke system, the diesel generators were secured and equipment restored to the standby alignment. Both units at Catawba remained at 100 percent RTP during the event.

b. Findings

No findings of significance were identified.

.2 Automatic Turbine Trip on Catawba Unit 2 During Power Reduction Activities

a. Inspection Scope

On September 15, 2007, Unit 2 was being removed from service for the start of the EOC15 refueling outage. At approximately 58 percent RTP, main condenser vacuum began to degrade. Actions were taken to identify the loss of condenser vacuum; however, the source of the air in-leakage was not identified by Operations personnel responding to the event. Just prior to manually tripping the turbine due to the degrading vacuum, an automatic trip signal was received and the reactor ran back to approximately 18 percent RTP as designed. All systems functioned as designed and heat removal was accomplished through the steam dump valves to the main condenser. Following the turbine trip, vacuum recovered and remained within the normal band throughout the remainder of the shutdown. Following stabilization of the plant, the shutdown continued without additional complications. The inspectors observed the response of the control room crew to the event.

b. Findings

No findings of significance were identified.

4OA5 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

ISFSI Radiological Controls - The inspectors reviewed gamma-ray surveys of new ISFSI facility, Docket No. 072-00045. Inspectors also compared the survey results with previous surveys for Cask No. 45 and TS limits. The inspectors evaluated implementation of radiological controls, including labeling and posting, and discussed controls with Radiation Protection staff. Environmental monitoring results for direct radiation from the ISFSI were reviewed [only environmental TLD baseline data (1<sup>st</sup> Quarter 2007) was reviewed since the facility was new], and inspectors observed the placement of thermoluminescent dosimeters around the facilities.

Radiological control activities for ISFSI areas were evaluated against 10 CFR Part 20,

10 CFR Part 72, and NAC-UMS Certificate of Compliance No. 721015 TS details. Documents reviewed are listed in section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting

On October 10, 2007, the inspectors presented the inspection results to Mr. J. Morris and other members of licensee management, who acknowledged the findings. The inspectors confirmed that all proprietary information provided or examined during the inspection period had been returned.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

E. Beadle, Emergency Planning Manager  
W. Byers, Security Manager  
J. Caldwell, Modification Engineering Manager  
B. Cauthen, RN System Engineer  
G. Cornwell, Project Manager  
J. Ferguson, Mechanical, Civil Engineering Manager  
J. Foster, Radiation Protection Manager  
P. Gillespie, Operations Manager  
E. Haack, Performance Testing Engineer  
T. Hamilton, Safety Assurance Manager  
G. Hamrick, Engineering Manager  
R. Hart, Regulatory Compliance Manager  
T. Jackson, Regulatory Compliance  
L. Keller; Supervisor, Reactor and Electrical Systems  
J. McConnell, Shift Operations Manager  
J. Morris, Catawba Site Vice President  
K. Nichols, Regulatory Compliance  
J. Pitesa, Station Manager  
C. Trezise, Reactor and Electrical Systems Manager  
A. Young, Licensing Engineer

#### NRC

J. Moorman, Chief, Reactor Projects Branch 1

### **LIST OF ITEMS OPENED, CLOSED, AND REVIEWED**

#### Opened and Closed

None

#### Reviewed

None

## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather

PT/0/B/4700/039, Rev. 12, Hot Weather Protection

Operator Aid Computer Alarm Actions for points

-C1P0118 (Ambient Dry Bulb Temperature)

-C1A0176, C1A0728 and C1A0734 (Unit 1 Condenser Absolute Backpressure)

-C1A0176, C1A0728 and C1A0734 (Unit 1 Condenser Absolute Backpressure)

Unit 1 Operator Aid Computer RC System mimic

Unit 2 Operator Aid Computer RC System mimic

Unit 1 Operator Aid Computer RN System mimic

Unit 2 Operator Aid Computer RN System mimic

### Section 1R04: Equipment Alignment

Complex Activity Plan for the Annual Dual Unit SSF Maintenance Outage on 7/11-12/07

OP/0/B/6350/011; Standby Shutdown Facility Diesel Operations, Rev. 040

PT/0/A/4200/017A; Standby Shutdown Facility Diesel Test; Rev. 001

Critical Activity Plan for the 2A DG Pre-Outage Maintenance Activities conducted on 7/24-25/07

Critical Activity Plan for the 1B KC heat exchanger tube cleaning, Rev. 3, conducted on 9/6/07

Critical Activity Plan for installation of modification CED200411; Auxiliary Building RN Piping

Replacement, conducted September 27 - 29, 2007

### Section 1R05: Fire Protection

Station Fire Impairment Log

Pre-Fire Plan for Fire Strategy Area B; Service Building 568 Elevation - East

Pre-Fire Plan for Fire Strategy Area C; Service Building 568 Elevation - West

Pre-Fire Plan for Fire Strategy Area 29 and Area 30, RN Pump Structure

Pre-Fire Plan for Fire Strategy Area 5; Unit 2 Electrical Penetration Room, Auxiliary Building 560 foot elevation

Pre-Fire Plan for Fire Strategy Area 18, Auxiliary Building 577 foot elevation

Pre-Fire Plan for Fire Strategy Area 11, Auxiliary Building 560 foot elevation

Pre-Fire Plan for Fire Strategy Area 4, Auxiliary Building 543 foot elevation, Rooms 200 - 248

Pre-Fire Plan for Fire Strategy Area 50, Unit 2 Exterior Doghouse

SLC Section 16.9-4; Fire Hose Stations

SLC Section 16.9-5; Fire rated Assemblies

NSD 313, Control of Combustible and Flammable Material, Rev. 6

NSD 314; Hot Work Authorization, Rev. 6

PIP C-07-3795; Open-ended instrument tubing in a committed fire stop G-R-U2-W-001

### Section 1R07 : Biennial Heat Sink Performance

#### Procedures

PT/2/A/4400/006 A, NS Heat Exchanger 2A Heat Capacity Test, Rev 36

PT/0/A/4400/008 A, RN Flow Balance Train A, Rev 52

PT/0/A/4400/004, Standby Nuclear Service Water Pond Dam Periodic Inspection, Rev 25

PT/1/A/4400/009, Cooling Water Flow Monitoring for Asiatic Clams and Mussels Test, Rev 65  
 PT/1/A/4400/006 C, KC Heat Exchanger 1A Heat Capacity Test, Rev 23  
 PT/1/A/4400/006 A, NS Heat Exchanger 1A Heat Capacity Test, Rev 41  
 MP/0/A/7650/056 C, KC Heat Exchanger Corrective Maintenance, Rev 22

#### PIPs

C-04-02668, Part 21 issued for Rotork Controls primary switch mechanism, 06/01/2004  
 C-06-0776, Observations of 1A KC HX condition prior to cleaning, 11/17/2006  
 C-01-00884, Documentation of visual, UT and video inspection of large diameter buried RN piping, 11/10/2000  
 C-06-04350, Review of surveillance results for rectifier #3 (U2 EDG piping), 06/06/2006

#### Miscellaneous

SDQA-00109-CNS, KC/ND Heat Exchanger Interaction Software Data Quality Assurance, Rev 2  
 SDQA-00081-CNS, Heat Exchanger Fouling Factor Software Data Quality Assurance, Rev 5  
 CNC-1232.00-00-0020, Buried Nuclear SW Piping - Calculations of Required Pipe Wall Thickness for Internal and External Pressure  
 CNC-1223.24-00-0018, Acceptable RN Flow and Fouling in the KC Heat Exchangers, Rev 4  
 Duke Energy Company Nuclear Generation Department Service Water System Program Manual, Rev 8  
 Operation Inspection Report for the NRC, Inspection by Federal Energy Regulatory Commission of the Standby Nuclear Service Water Pond, March 03, 2005  
 RN - Nuclear Service Water Health Report, 2007Q2  
 NS - Containment Spray Health Report, 2006T3  
 KC - Component Cooling Health Report, 2007Q2  
 CNS-1150.04-00-001, Design Basis Specification for the Nuclear Service Water Structures, Rev 7  
 CNS-1574.RN-00-0001, Design Basis Specification for the Nuclear Service Water (RN) System, Rev 44

#### **Section 1R11: Licensed Operator Requalification**

Active Simulator Exam 25 scenario guide, Rev. 19  
 AP/1/A/5500/011, Pressurizer Pressure Anomalies, Rev. 18  
 EP/1/A/5000/FR-H.1; Loss of Secondary Heat Sink, Rev. 30

#### **Section 1R12: Maintenance Effectiveness**

OP/1/A/6400/005; Component Cooling System, Enclosure 4.4, Operation of Additional KC pumps / Parallel Operation, Rev. 104  
 Work Order 01749708, Perform PM on 1KCPUB1 pump and motor  
 Work Order 01749863, Perform PM on 1KCPUB2 pump and motor  
 Work Order 01747863, Clean inboard pump shaft of 1KCPUB2



### **Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation**

Complex Activity Plan for the Annual Dual Unit SSF Maintenance Outage conducted on 7/11-12/07

Critical Activity Plan for the 2A DG Pre-Outage Maintenance Activities conducted on 7/24-25/07  
Nuclear System Directive 415; Operational Risk Management (Modes 1 – 3) per 10 CFR 50.65(a)(4), Rev. 04

Critical Activity Plan for the 1B KC heat exchanger tube cleaning, Rev. 3, activity conducted on 9/6/07

Critical Activity Plan for installation of modification CD200411; Auxiliary Building RN Piping Replacement, conducted September 27 - 29, 2007

Protected Equipment Posting Log associated with the Critical Activity conducted September 27- 29, 2007

PIP C-07-5387; NRC identified a temporary hoist attached to a valve on the Unit 2 KF system when the system was protected

ORAM / SENTINEL model results for two CA pumps being unavailable with Unit 2 in Mode 1

PIP C-07-4849; Insulation team removed ~140 feet of insulation from the steam supply piping to the Unit 2 CA pump turbine causing the temperature to drop below the TS limit rendering the pump inoperable

### **Section 1R15: Operability Evaluations**

PIP C-00-0271; Difficulty in maintaining the SSF output within the band of 700kw to 720kw during the 30-minute run

PIP C-06-5104; An unexpected entry into TSs occurred due to the 2B2 VD fan tripping during the 2B DG operability test

PIP C-07-0735; Evaluation of the impact a variation of +/-2% in DG frequency would have on MOV stroke times and operating margins for valves contained in the Generic Letter 89-10 program

UFSAR Section 3.1, Seismic Classification

Calculation CNC-1206.03-00-0037

### **Section 1R19: Post-Maintenance Testing**

Complex Activity Plan for the Annual Dual Unit SSF Maintenance Outage conducted on 7/11-12/07

OP/0/B/6350/011; Standby Shutdown Facility Diesel Operations, Rev. 040

PT/0/A/4200/017A; Standby Shutdown Facility Diesel Test; Rev. 001

PIP C-07-3524; Six of 13 fuel lines fabricated for the SSF diesel as part of the 6-year PM activities were not usable

PIP C-07-3547; Issues related to startup of the SSF diesel following completion of the 6-year preventative maintenance overhaul

PT/2/A/4350/002A; Diesel Generator 2A Operability Test, Rev. 88

Critical Activity Plan for work activities to be performed on the 2A DG prior to 2EOC15;  
Execution date: 7/24-07 – 7/25/07

PT/1/A/4350/002A; Diesel Generator 1A Operability Test, Rev. 115  
 PT/1/A/4200/007A; Centrifugal Charging Pump 1A Test, Rev. 050  
 OP/1/A/6200/001; Chemical and Volume Control System, Rev. 133, Enclosures 4.1 and 4.22  
 Prejob Briefing Sheet for the performance of PT/1/A/4200/007A; Centrifugal Charging Pump 1A  
 Test  
 PT/1/A/4200/013C; RN Valve In-service Test, Enclosure 13.5, 1RN38B Valve In-service Test,  
 Rev. 067  
 OP/0/A/6450/011, Control Room Area Ventilation / Chilled Water System, Enclosure 4.7,  
 Shifting the Operating VC/YC Train, Rev. 122  
 PIP C-07-4549; A YC chiller tripped following the swap to the A YC train  
 PIP C-07-4557; A YC chiller failed to start  
 WR 00932641; A Chiller failed to start  
 WO 01769683; I/R A YC chiller  
 Engineering Instructions for WO 01769683  
 PT/1/A/4350/002B; Diesel Generator 1B Operability Test, Rev. 113  
 PT/1/A/4350/002B; Diesel Generator 1B Operability Test, Rev. 114  
 PIP C-07-4799; Question related to acceptable range of DG output voltages based on the  
 degraded voltage MOV study

## **Section 1R20: Refueling and Outage Activities**

2EOC-15-IRT Unit 2 Outage Risk Assessment  
 Site Directive 3.1.30, Unit Shutdown Configuration Control (Modes 4, 5, 6 or No Mode), Rev. 34  
 Nuclear System Directive, NSD-403, Shutdown Risk Management (Modes 4, 5, 6 or No Mode),  
 per 10CFR50.65(a)(4); Rev. 16  
 NSD 500; Red Tags / Configuration Control Tags; Rev. 24  
 Plant Engineering Procedure 2.05, Attachment 5.1, Unit 2 EOC 15 Shutdown Operational  
 Guidance  
 OP-CN-EOC to MODE 5 JITT, Unit 1/2 EOC Shutdown to Mode 5 JITT (Load Reduction to Crud  
 Burst), Rev. 05  
 OP-CN-CP-OUT, Rev. 16; Pre-Outage Briefing Unit 2 EOC15  
 OP/2/A/6150/006, Draining the Reactor Coolant System, Rev. 69  
 PT/2/A/4350/003, Electrical Power Source Alignment Verification, Rev. 45  
 OP/2/A/6200/005, Spent Fuel Cooling System, Rev. 74  
 PT/0/A/4150/037, Fuel / Component Movement Accounting, Rev. 9  
 PT/2/A/4200/002C, Containment Closure Verification (Part I); Rev. 75  
 PT/2/A/4200/002I, Containment Closure Verification (Part II); Rev. 33  
 PT/2/A/4200/002J, Containment Closure Verification Penetration Status Change; Rev. 10  
 OP/0/A/6100/014, Penetration Control for Modes 5 and 6; Rev.31  
 OP/2/A/6150/006, Draining the Reactor Coolant System; Rev.68  
 Enclosure 4.2, Decreasing the NC System Level  
 Enclosure 4.3, Increasing the NC System Level  
 OP/0/A/6550/015; Receipt, Inspection and Storage of New Fuel, Rev. 31  
 SCD320; Receipt Inspection of Nuclear Fuel and Core Components, Rev. 1  
 PT/0/A/4150/29A; New Fuel and Component Inspection, Rev. 2

PT/2/A/4550/001F, Preparation for New Fuel Receipt, Rev. 3  
 OP/2/A/6550/006, Transferring Fuel with the Spent Fuel Manipulator Crane; Rev. 58  
 OP/2/A/6550/007, Reactor Building Manipulator Crane Operation; Rev. 32  
 OP/2/A/6550/008, Fuel Transfer System Operation; Rev. 9  
 MP/0/B/7150/012, Refueling Canal Cleanliness; Rev. 7  
 PT/2/A/4550/001C, Refueling Communications Test; Rev. 7  
 PT/2/A/4550/001D; Reactor Building Manipulator Crane Load test; Rev. 17  
 PT/2/A/4550/001E; Spent Fuel Building Manipulator Crane Load test; Rev. 11  
 OP/2/A/6100/003, Controlling Procedure for Unit Operations; Rev. 99  
 OP/2/A/6100/002; Controlling Procedure for Unit Shutdown; Rev. 144  
 MP/2/A/7150/042; RX Vessel Head Removal & Replacement, Rev. 48  
 PIP C-07-4838; Assessment of industry initiative of heavy load lifts  
 PIP C-07-4954; One train of containment sump recirculation was not available as required by Site Directive 3.1.30  
 PIP C-07-4990; Post transient assessment of the turbine trip on low condenser vacuum during the Unit 2 shutdown  
 PIP C-07-4991; Reactor Engineering's shutdown plan was low on the amount of boric acid estimated to be required for the shutdown  
 PIP C-06-2136; Bottom head inspections of the reactor vessel during the 2EOC14 outage in 2006  
 PIP C-07-4891; Document NCP Mode 3 walkdown on 9/15/07  
 PIP C-07-4898; PIP written to document performance of Mode 3 inside containment walkdown and PT/2/A/4150/01H Inside containment boric acid check 2EOC15  
 PIP C-07-4908; Discrepancies found during the initial engineering/maintenance ice condenser walkdown  
 PIP C-07-4904; Actual DID state for Containment KSF does not match predicted DID state  
 PIP C-07-4951; PIP to document the results from as-found surveillance testing (2EOC15) of the Lower Inlet Doors per MP/0/A/7150/006, revision 29  
 PIP C-07-5024; Documentation of the bare metal visual inspection of the Unit 2 Reactor Vessel Bottom Head during 2EOC15  
 PIP C-07-5044; Reactivity Balances performed failed to include Shutdown fission product correction factor  
 PIP C-07-5135; NCP 2B precursor evidence of main flange leak noted in Tech Support as found detailed inspection  
 PIP C-07-4089; Catawba 2EOC15 outage readiness evaluation performed 6/21/07-6/28/07 and action items taken from the Outage readiness executive review performed 7/25/07  
 UFSAR Chapter 9.1.4.2.2; Refueling procedure  
 2EOC-15 IRT, Self Assessment Report Form, July 30-August 1, 2007  
 Westinghouse Nuclear Fuel Product Certification shipping sheets for 2EOC15 core reload, Rev. 25  
 MP/2/A/7150/042; Reactor Vessel Head Removal and Replacement, Rev 037  
 Complex Activity Plan for Reactor Head Removal and Installation within the Bounds of the Catawba Specific Head Drop Analysis

## **Section 1R22: Surveillance Testing**

PIP C-07-3550; Assessment of the testing conducted on the Unit 2 CAPT following PM activities  
 PIP C-07-4799; Question related to acceptable range of DG output voltages based on the degraded voltage MOV study  
 OP/1/A/6350/002; DG Operation, Enclosure 4.8, Checklist for ES Actuation, Rev. 137  
 OP/1/A/6350/002; DG Operation, Enclosure 4.9, Separate Verification Checklist for ES Actuation, Rev. 137  
 PT/1/A/4350/002B; Diesel Generator 1B Operability Test, Rev. 114  
 MP/0/A/7150/139, Ice Condenser Walkdown and Inspection - As Found Conditions, Rev. 002  
 PIP C-07-4951; MP/0/A/7150/006 Ice Condenser Lower Inlet Doors Inspection and Testing Results from 2EOC15 As-Found testing

## **Section 1EP6: Drill Evaluation**

Simulated Nuclear Power Plant Emergency Notification Forms associated with the August 8, 2007 Emergency Response Organization drill  
 RP/0/A/5000/001; Classification of an Emergency, Rev. 18  
 PIP C-07-4069; Additional guidance needed to prevent potential steam generator overflow identified during ERO drill on 8/8/07  
 Catawba Nuclear Station Drill 07-4 on August 8, 2007  
 PIP C-07-4087, CNS ERO Drill 07/04 Critique

## **Section 2OS1: Access Control To Radiologically Significant Areas**

### Procedures, Guidance Documents, and Manuals

HP/0/B/1000/047, RP Number Issue and Reactivation of Terminated or Inactive Worker, Revision (Rev.) 4  
 HP/0/B/1000/048, TLD Issue, Rev. 3  
 HP/0/B/1000/049, Worker Termination, Rev. 3  
 HP/0/B/1000/050, TLD Process, Rev. 1  
 HP/0/B/1000/051, Quarterly TLD Change Out, Rev. 3  
 HP/0/B/1000/052, Monthly TLD Change Out, Rev. 1  
 MP/0/A/7650/181, Loading Spent Fuel Assemblies Into NAC-UMS Casks, Rev. 4  
 NSD502, Temporary Storage of Radioactive Material in the Spent Fuel Pool, Rev. 5  
 NDD507, Radiation Protection, Rev. 12  
 RPMP 2.4, LHRA and VHRA Documentation and Locking Hardware Control Guidelines, Rev. 11  
 RPMP 2.10, Monitoring The Graphical Electronic Dosimeter Display System (GEDDS), Rev. 1  
 RPMP 2.15, Remote Job Coverage, Rev. 1  
 RPMP 2.14, ALARA CONTROL AREA (ACA) DOCUMENTATION, Key Control and Locking Hardware Control Guidelines, Rev. 1  
 RPMP 10.3, Dose Rate Monitoring System Alarm Surveillance and Response, Rev. 3  
 RPMP 10.4, Use and Control Hoist Locks, Rev. 2  
 SH/0/B/2000/003, Preparation of a Radiation Work Permit, Rev. 7

SH/0/B/2000/004, Taking, Counting and Recording Surveys, Rev. 7  
 SH/0/B/2000/005, Posting of Radiation Control Zones, Rev. 5  
 SH/0/B/2000/006, Control of Radioactive Material and Use of Radioactive Material Tags, Rev. 5  
 SH/0/B/2000/007, Placement of Personnel Dosimetry for Non-Uniform Radiation Fields, Rev. 1  
 SH/0/B/2000/009, Neutron Dose Tracking, Rev. 2  
 SH/0/B/2000/012, Access Controls for High, Locked High, and Very High Radiation areas,  
 Rev. 8  
 SH/0/B/2000/013, Removal of Items from RCA/RCZs, Rev. 1  
 SH/0/B/2001/001, Internal Dose Assessment, Rev. 3  
 SH/0/B/2001/002, Investigation of Unusual Dosimetry Occurrence or Possible Overexposure,  
 Rev. 5  
 SH/0/B/2001/003, Investigation of Skin and Clothing Contaminations, Rev. 8  
 SH/0/B/2002/001, Multiple Dosimetry, Rev. 5  
 SH/0/B/2002/003, Declared Pregnant Worker, Rev. 3  
 SRPMP 2-1, ED Alarms, Rev. 0  
 SRPMP 4-1, Response to Medical Radiopharmaceutical Use, Rev. 2

#### Radiation Work Permits (RWP)

RWP 2, Entry for Routine Surveillance, Dated 03/07/07  
 RWP 6, General Decontamination Work, Dated 03/07/07  
 RWP 15, Routine Radiological Surveys, Dated 03/07/07  
 RWP 24, Removal and Replacement of Radioactive Filters/Strainers, Dated 03/07/07  
 RWP 34, Radiography Operations Inside of the Nuclear Station Owner Controlled Fence,  
 Dated 03/07/07  
 RWP 36, Declared Pregnant Worker, Dated 02/06/04  
 RWP 1025, Unit 1 NC Filter Change Out for Filters Reading >101R/HR to 200R/HR on Filter  
 Housing, Dated 03/07/07  
 RWP 1052, Unit 1 Dry Cask Storage, Dated 08/02/07  
 RWP 1907, Unit 1 RB U/C Entry Into Deep End to Recover Dropped Material, Dated 03/07/07  
 RWP 2053, Scope/Planning for ECCS Sump Mod in Unit 2 Lower Containment, Dated 03/07/07

#### Records and Data Reviewed

ALARA Package for RWP 1052, dated 05/14/07 [includes Planning Worksheet with dose  
 estimate revision, ALARA Briefing Checklist, Execution Team Post-Job ALARA Critique (for  
 Cask 45)]  
 CN00819, Multipack Report (1<sup>st</sup> Qtr. 2006), Dated 08/08/07  
 CN00818, Multipack Report (1<sup>st</sup> Qtr. 2006), Dated 08/08/07  
 NSD 501, Appendix B 501, Temporary Storage Request for Radioactive Material in SFP/RC,  
 Dated 06/15/05, 08/14/06, 12/12/06, 12/18/06, and 02/13/07  
 RA/1/1100/005, Controls for Unit 1 Flux Mapping, Rev. 1, Enclosure 5.2, Dated 07/20/06  
 SH/0/B/2000/012, Enclosure 5.14, EHRA/VHRA Key Issue Log, pages, Dated 12/31/06,  
 01/04/07, 01/08/07, 01/13/07, 01/19/07, 01/27/07, 04/28/07, 05/01/07, 05/03/07, 05/08/07,  
 05/11/07, 05/17/07, 05/18/07, 05/21/07, 05/24/07, 05/29/07, 05/31/07, 06/01/07, 06/10/07,  
 06/13/07, 06/16/07, 06/20/07, 06/22/07, 06/26/07, 06/28/07, 07/03/07, 07/07/07, 07/10/07,  
 07/11/07, 07/15/07, 07/17/07, 07/19/07, 07/24/07, and 07/27/07

O-081006-5, One Liner Survey Report, Dated 08/10/06  
 M-021707-4, Unit 2 RX Bldg\Unit 2 Lower Cont. Survey, Dated 2/17/07  
 M-021707-3, Unit 2 RX Bldg\Unit 2 Lower Cont. Survey, Dated 2/17/07  
 M-073107-6, ISFSI\Enclosure 505 Tech Spec Survey, Dated 07/30/07  
 M-080707-2, ISFSI\TSC Lid Pre-Weld Survey (Cask 28), Dated 08/07/07  
 M-080707-1, ISFSI\TSC Lid Pre-Weld Survey (Cask 28), Dated 08/07/07  
 M-080707-6, ISFSI\Weld TSC Shield Lid Survey (Cask 28), Dated 08/07/07  
 M-073007-13, ISFSI Rope Survey (Cask 45), Dated 07/30/07  
 ISFSI TLD Map, Map to pre-existing and new ISFSI Boundary TLD locations, Not Dated  
 (including CNS RCA/RCZ Boundary TLD Study – 1<sup>st</sup> Quarter 2007 Report)  
 Dose Records, Selected internal dose assessment records for Calendar Years 2005 and 2006

#### Corrective Action Program (CAP) Documents

Problem Investigation Process (PIP) C-06-00979, Entering and Exit RCA w/Wrong ED  
 PIP C-07-04065, NRC Identified RCZ swing gate stuck open  
 PIP C-07-04078, NRC identified welding safety issue related to ISFSI activities  
 PIP C-06-06097, Evaluation of OE23133 less rigorous control of Locked High Radiation Areas  
 PIP C-06-06573, EHRA key issued to security personnel  
 PIP C-07-00620, U-1 Lower Annulus door key broke off inside core  
 PIP C-07-02786, RP yellow flashing light to LHRA not working properly  
 PIP C-07-03590, Incomplete entries to source use log  
 PIP C-07-01681, Inadvertent sharing of RP and Ops key series  
 RP-13-07, Group Self-Assessment  
 RPS-07-07, Human Performance Trends  
 RPS-08-07, Group Self-Assessment  
 RPS-17-07, Self-Assessment

### **Section 2OS3: Radiation Monitoring Instrumentation and Protective Equipment**

#### Procedures, Guidance Documents, and Manuals

HP/0/B/1001/031, Operation and Calibration of Canberra Autoscan Whole Body Counter,  
 Rev. 2  
 HP/0/B/1003/006, Calibration of Portable Geiger-Mueller Survey Meters, Rev. 13  
 HP/0/B/1003/010, Operation of Irradiators, Rev. 4  
 HP/0/B/1003/016, Calibration of Portable Ion Chambers, Rev. 16  
 HP/0/B/1003/057, Set-up and Calibration of Eberline Model ESP-2, Rev. 6  
 Nuclear System Directive (NSD) 208, Problem Investigation Process (PIP), Rev. 27  
 RA/0/1400/002, Calibration of AMS-4, Rev. 0  
 RA/0/1400/006, In-Service Radiation Protection Instrument Source Check, Rev. 9  
 RA/0/1400/009, Calibration of RADOS RTM 110 Hand and Foot Monitor, Rev. 2  
 RA/0/1600/001, Controls for Respiratory Protection Equipment, Rev. 4  
 RA/0/1600/003, Set-Up and Use of Air Supplied Respiratory Protection Equipment, Rev. 12  
 RA/0/1600/006, Respiratory Protection Equipment Issue, Rev. 1

#### Records and Data Reviewed

Certificates of Calibrations for: Eberline Model (Mod.) Number (No.) E-520, Serial No. (S/N) 3292, Dated 10/05/05 and 11/21/06, and S/N 00866, Dated 10/05/05; Eberline Mod. No. E-530 (MR), S/N 1501, Dated 02/17/07 and 05/22/07; Eberline Mod. No. RM-14, S/N 2808, Dated 08/11/06 and 06/11/07; Eberline Mod. No. RO-20, S/N 1355, Dated 08/09/06 and 03/14/07; Radeco Mod. No. Lo-Vol Air Sampler, S/N 5745, Dated 11/09/06 and 04/12/07; Rotem, Mod. No. Telepole, S/N 6605-004, Dated 08/15/06 and 03/26/07  
 CNS Grade D Data 1<sup>st</sup> Quarter 2004 - 3<sup>rd</sup> Quarter 2007  
 Fastscan Daily Source Check, Dated 08/09/07  
 Instrument Source Check and/or Background Determination Checklist, Week of 08/06/07  
 LIMS Instrument Daily High Range Check QC, Dated 08/07/07  
 Hydrostatic Test Results for MSA Cylinders No. 218, 219, 221, 225 and 226  
 MSA ProCheck 3 Test Results for Mod. No. Custom 4500 II, S/Ns: 01605, Dated 03/01/06 and 02/14/07; 01633, Dated 03/10/06 and 01/10/07; 01634, Dated 05/04/06 and 05/03/07; 02045, Dated 03/10/06 and 01/11/07; 02054, Dated 06/28/06 and 02/07/07  
 Non-Radiological Program SCBA Monthly QA Report, and Non-Radiological and Radiological Program Respirator Monthly QA Reports, Dated 08/08/07  
 Non-Radiological Program Bottle Hydro Test Due Report, Dated 08/09/07  
 Work Orders for Channel Calibrations on: 1EMF53A, Dated 05/27/05 and 11/15/06; 1EMF53B, Dated 05/27/05 and 11/15/06; 2EMF53A, Dated 10/05/04 and 03/21/06; 2EMF53B, Dated 10/05/04 and 03/21/06; OEMF-23, Dated 09/21/06

#### CAP Documents

2005 and 2006 Respirator User Assessments, Nos. RPS-01-06 and RPS-03-07, Respectively  
 Annual Assessment of Control Room Operators' Respiratory Needs/Inventory, No. RPS-21-06  
 PIP C-05-05994, The Shephard calibrator would not function when daily instrument source check was to be performed  
 PIP C-07-02344, Out of calibration air sampler located in the hot machine shop  
 PIP C-07-03320, Training Self Assessment of the RP Training Program  
 PIP C-07-04128, Two SCBA bottles, Nos. 218 and 226, were found to have expired hydrostatic tests dates

### **Section 2PS1: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems**

#### Procedures, Guidance Documents, and Manuals

Catawba Nuclear Station Offsite Dose Calculation Manual - 2007  
 HP/0/B/1001/018, RP Compliance Sampling, Rev. 28  
 HP/0/B/1001/027, Operation and Calibration of the Beckman 6000 Series Liquid Scintillation Counters, Rev. 4  
 HP/0/B/1001/029, Genie/CAS Gamma Spectroscopy System Operation and Calibration, Rev. 6  
 IP/0/B/3314/086H, Process High Range Monitor Channel Calibration, Rev. 18, Performed 02/13/07  
 IP/2/B/3314/033R, 2EMF33 Gas Monitor Channel Calibration, Rev.13, Performed 09/13/06  
 OP/0/A/6500/018, Release of Waste Gas Decay Tank C, Rev. 40  
 OP/0/B/6500/060, Discharge of an AMT to the Environment, Rev. 42

OP/0/B/6500/015, Discharging a Monitor Tank to the Environment, Rev. 101  
 OP/1/A/6450/015, Containment Purge System, Rev. 42  
 OP/1/A/6450/017, Containment Air Release and Addition System, Rev. 62  
 OP/1/A/6500/014, Operations Controlled Liquid Waste Systems, Rev. 71  
 RPMP 5.1, Count Room Intrastation and Interstation Cross Check Process, Rev. 1  
 RPPM Policy V-01, Interlaboratory Cross Check Program, Rev. 2  
 RPPM Policy V-02, Quality Control of Count Room Instrumentation, Rev. 1  
 SRPMP 8-2, Investigation of Unusual Radiological Occurrences, Rev. 1

#### Records and Data Reviewed

10 CFR Part 50.75(g) Records of Historical Contaminated Spills  
 Catawba Nuclear Station (CNS) Annual Radioactive Effluent Release Report for 2004, 2005, and 2006  
 CNS 2006 Annual Radiological Environmental Operating Report  
 Gaseous Waste Release Permits: 2007046, Unit 1 Containment Air Release and Addition, 05/31/07 to 06/4/07; 2007048, Unit 1 Containment Air Release and Addition, 06/05/07 to 07/04/07; 2007052, Unit 1 vent, 05/01/07 to 06/01/07; 2007062, Unit 1 Containment Air Release and Addition, 07/05/07 to 08/04/07; 2007055, Unit 2 Containment Air Release and Addition, 06/25/07 to 06/25/07; 2007056, Unit 2 Containment Air Release and Addition, 06/26/07 to 06/28/07; 2007057, Unit 2 Containment Air Release and Addition, 06/28/07 to 07/04/07; 2007061, Unit 2 Containment Air Release and Addition, 07/04/07 to 07/10/07; 2007065, Unit 2 Containment Air Release and Addition, 07/10/07 to 07/12/07; 2007065, Unit 2 Containment Air Release and Addition, 07/12/07 to 08/03/07; and 2007066, Unit 2 Containment Air Release and Addition, 08/03/07 to 08/04/07  
 Inter-laboratory Cross Check Results for: Alpha smear, Dated 01/24/06; Tritium, Dated 03/31/06, 05/18/06 and 09/28/06; Tritium blank, Dated 03/31/06, 05/18/06 and 09/28/06; 1 liter liquid Marinelli, gamma spectroscopy, dated 03/31/06 and 10/30/06; 3.5 liter liquid Marinelli, gamma spectroscopy, Dated 03/31/06 and 10/30/06; Gamma in Water 50ml Bottle @ 3cm, Dated 05/18/06; Gamma in Water 50ml Bottle @ 7cm, Dated 05/18/06; Gamma in Water 50ml Bottle @ 13cm, Dated 05/18/06; Gamma in Water Rheodyne Bottle @ 3cm, Dated 05/18/06; Gamma in Water Rheodyne Bottle @ 7cm, Dated 05/18/06; Gamma in Water Rheodyne Bottle @ 13cm, Dated 05/18/06; WBC –Co-57 & 60, Dated 09/29/06; and WBC - Thyroid I-131, Dated 10/15/06  
 Liquid Waste Release Permits: 2007012, Waste monitor tank “B”, 02/12/07; 2007040, Waste monitor tank “A”, 06/05/07; 2007042, Auxiliary monitor tank “A”, 06/12/07; 2007043, Conventional waste water treatment, 05/01/07 - 06/01/07; 2007044, Auxiliary monitor tank “C”, 06/14/07; 2007047, Auxiliary monitor tank “A”, 06/21/07; 2007048, Auxiliary monitor tank “C”, 06/27/07; 2007049, Auxiliary monitor tank “B”, 06/28/07; 2007052, Conventional waste water treatment, 06/01/07 - 07/01/07; 2007053, Auxiliary monitor tank “C”, 07/09/07; 2007054, Recycle monitor tank “A”, 07/10/07; 2007055, Auxiliary monitor tank “B”, 07/10/07; 2007056, Auxiliary monitor tank “A”, 07/11/07; 2007057, Auxiliary monitor tank “C”, 07/18/07; 2007058, Auxiliary monitor tank “A”, 07/21/07; 2007060, Auxiliary monitor tank “A”, 07/24/07; 2007061, Auxiliary monitor tank “C”, 07/27/07; 2007062, Auxiliary monitor tank “A”, 07/31/07; 2007063, Auxiliary monitor tank “B”, 08/01/07; 2007064, Auxiliary monitor tank “C”, 08/02/07; 2007065, Auxiliary monitor tank “A”, 08/06/07; and 2007066, Auxiliary monitor tank “B”,



08/08/07

RETDAS Effluent Dose Calculations For: January 2007, Dated 02/20/07; February 2007, Dated 03/20/07; March 2007, Dated 04/20/07; April 2007, Dated 05/20/07; May 2007, Dated 06/20/07; and June 2007, Dated 07/20/07

Spreadsheet: CNS System Mods Since 9-05.xls

Work Order (WO) 0EMF - Channel CAL EMF-41, Dated 03/17/05 and 08/05/06

WO 0EMF - Channel Calibrate 0EMF-43A, Dated 10/02/06

WO 0EMF - Channel Calibrate 0EMF-43B, Dated 06/19/06

WO 0EMF - Flow Calibration on EMF-41, Dated 01/17/07

WO 0EMF - Perform CC on EMF50L & EMF50H, Dated 09/01/05

WO 0EMF - Perform Channel CAL EMF-57, Dated 08/27/04

WO 0EMF - PFM CAL OWLFS7380 then CC EMF-49, Dated 12/13/05

WO 1EMF 36; CC-EMF 36, Dated 02/14/07

WO 2EMF - Perform Flow Instr Cal & Then Chnl Cal (2EMF-33), dated 9/12/06

#### CAP Documents

PIP C-06-00844, Gap found in Unit 1 spent fuel pool expansion joint

PIP C-06-01142, Certain relief request submitted to NRC in 2005 contained statements crediting certain monitors as being able to detect reactor coolant system leakage. Both monitors are presently inoperable and should not be credited.

PIP C-06-01811, While performing radioactive liquid waste release paperwork for auxiliary monitor tank "A" the RP compliance technician incorrectly interpreted the EMF-57 background of 1.35E4 cpm as 1350 cpm instead of 13500 cpm.

PIP C-06-01833, WC pond groundwater monitoring wells show positive tritium results

PIP C-06-04267, Boron Recycle Evaporator gas stripper design requirements are not defined.

PIP C-06-05599, Need to install composite sampler in the WZ sumps to monitor groundwater contamination

PIP C-06-05871, 10 CFR 50.75(g) file needs to be redesigned and updated

PIP C-06-06909, FWST sump drain line broken when bumped by forklift

PIP C-06-08706, 70,000 pCi/L tritium found in S/G mausoleum sump

PIP C-07-00649, Bantam Computer Console became inoperable affecting six radiation monitors.

### **Section 2PS3: Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program**

#### Procedures and Guidance Documents

ENRAD Laboratories Procedure 721, Airborne Radioiodine and Particulate Sampling at Catawba Nuclear Station, Rev. 3

HP/0/B/1001/027, Operation and Calibration of the Beckman 6000 Series Liquid Scintillation Counters, Rev. 004

HP/0/B/1001/029, Genie/CAS Gamma Spectroscopy System Operation and Calibration, Rev. 006

HP/0/B/1003/068, Set-up and Calibration of Eberline PCM-1C Personnel Monitor, Rev. 2

HP/0/B/1003/071, Calibration of NNC SYS20 Gamma-60 Portal Monitor, Rev. 1

IP/0/B/3343/013, Meteorological Monitoring System (EEB) Calibration and Maintenance Procedure, Rev. 41  
 NSD 208, Problem Investigation Process (PIP), Rev. 27  
 RA/0/1300/002, Rev. 0, Setup, Calibration and Quality Control of Canberra Series 5 Automatic Planchet Counting System (APC)  
 RA/0/1400/005, Calibration of the SAM-9 and SAM-11 Small Articles Monitor (SAM), Rev. 0  
 SH/0/B/2008/001, Calibration and Quality Assurance of Canberra Argos-4AB Contamination Monitors, Rev. 001

#### Records and Data Reviewed

10 CFR Part 61 Analysis, Dry Active Waste Stream, 09/28/04  
 2005 and 2006 Annual Radiological Environmental Operating Reports  
 2006 Annual Effluent Report  
 ENRAD Laboratories Interlab Crosscheck Results, 2005 and 2006  
 Environmental Air Sampler Calibration Records, No. 00293 (12/20/05 and 07/26/06), No. 00297 (12/20/05 and 12/18/06), No. 00306 (02/27/06 and 04/03/07)  
 HP/0/B/1003/068, Set-up and Calibration of Eberline PCM-1C Personnel Monitor, Rev. 2, CHP No. 3003, Dated 10/05/05 and 07/28/07; CHP No. 3053, Dated 06/14/06 and 03/14/07; CHP No. 4203, Dated 10/17/06 and 07/23/07; CHP No. 4204, Dated 03/14/06 and 03/12/07; and CHP No. 4230, Dated 02/27/06 and 07/16/07  
 HP/0/B/1003/071, Calibration of NNC SYS20 Gamma-60 Portal Monitor, Rev. 1, CHP No. 3271, Dated 01/10/06 and 01/08/07; CHP No. 3272, Dated 11/10/05 and 11/10/06; CHP No. 3273, Dated 11/10/05 and 11/10/06; CHP No. 4135, Dated 01/19/06 and 01/17/07; CHP No. 4227, Dated 06/13/06 and 06/13/07; CHP No. 4233, Dated 01/10/06 and 01/10/07; and Enrad No. 01979, Dated 04/23/07  
 Meteorological Data Recovery, composite data (wind speed, wind direction, delta temperature), 2005 and 2006  
 Meteorological Tower 10m and 60m Instrument Calibration Records, 10/30/06 and 04/23/07  
 RA/0/1400/005, Calibration of the SAM-9 and SAM-11 Small Articles Monitor (SAM), Rev. 0, CHP No. 3236, Dated 06/29/05 and 07/19/06; CHP No. 4175, Dated 07/09/04 and 07/10/06; CHP No. 4176, Dated 03/07/06 and 03/14/07; CHP No. 4177, Dated 06/28/04 and 06/29/06; CHP No. 4198, Dated 04/05/06 and 03/14/07; CHP No. 4222, Dated 03/07/06 and 03/12/07; CHP No. 4293, Dated 03/07/06; CHP No. 4294, Dated 02/15/06 and 02/13/07; CHP No. 4295, Dated 03/07/06 and 03/05/07; CHP No. 4298, Dated 06/27/05 and 06/27/06; CHP No. 4299, Dated 08/17/05 and 08/17/06; CHP No. 4300, Dated 08/17/05 and 08/16/06; and CHP No. 4301, Dated 08/17/05 and 07/10/06  
 SH/0/B/2008/001, Calibration and Quality Assurance of Canberra Argos-4AB Contamination Monitors, Rev. 001, Monitor ID 4276, Dated 11/08/06 and 05/25/07; Monitor ID 4277, Dated 05/31/06, 11/19/06, and 05/23/07; Monitor ID 4278, Dated 06/03/06 and 05/30/07; Monitor ID 4279, Dated 03/18/06, 06/02/06 and 05/30/07; Monitor ID 4280, Dated 06/02/06, 04/28/07, and 05/29/07  
 Water Sampler Calibration Records, No. 02443 (04/16/07), No. 00272 (05/27/04 and 07/03/06), No. 00273 (08/23/06 and 09/28/06), No. 01680 (06/07/06 and 09/28/06), No. 00305 (11/22/05 and 11/21/06), No. 01042 (08/23/06 and 12/18/06), No. 00274 (04/11/06 and

02/13/07), No. 00275 (04/11/06 and 04/10/07), No. 00271 (04/11/06 and 04/10/07)

Corrective Action Program Documents

GO-07-57(RP)(REMP)(CNS), Duke Power Company Assessment Report, REMP at CNS  
PIP C-07-00047, Meteorological tower checks are being performed monthly rather than weekly as described in the FSAR

PIP C-07-00635, Unplanned entry into SLC 16.7-3 due to malfunction of strip chart recorder for meteorological tower measurements

PIP C-07-01721, Surface water sampler at site 208 is inoperable

PIP C-07-04201, Section of the 2006 Annual Land Use Census Report was not clear as to the application of D/Q comparisons

**Section 40A1: Performance Indicator Verification**

OP/2/A/6200/032, Primary sampling using a Rheodyne Model 7010 valve, Rev. 011

CP/0/B/8200/002; Determination of Gross Specific Activity and XE-133 Equivalent Activity in Reactor Coolant, Rev. 019

CP/0/B/8200/006, Determination of Dose Equivalent Iodine-131, Rev. 014

NSD 225, NRC Performance Indicators, Rev. 3

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 4 and Rev. 5

LER 05000413/2006-002; Safe Shutdown Potentially Challenged by an External Flooding Event and Inadequate Design & Configuration Control

**Section 40A1: Performance Indicator Verification**

Procedures and Guidance Documents

SRPMP 10-1, NRC Performance Indicator Data Collection, Validation, Review and Approval, Rev. 2

Records and Data Reviewed

Catawba Nuclear Station Annual Radioactive Effluent Release Reports for 2005 and 2006

Monthly Performance Indicator Packages for October 2005 through April 2007

Summary of Electronic Dosimeter Dose Rate Alarms from 09/01/05 to 5/31/07

Summary of Electronic Dosimeter Dose Alarms from 09/01/05 to 05/31/07

**Section 40A2: Identification and Resolution of Problems**

PIP O-03-4686; Defect found in  $\frac{3}{4}$ " plate during prefabrication of supports for LPI crossties

PIP C-06-6706; Defective steel plate was not quarantined or segregated after issues were identified at Oconee. The defect was also not reported per 10CFR21

PIP C-06-6749; PIP is to facilitate a review at Catawba of the root cause and Corrective Actions to Prevent Recurrence associated with the Oconee event related to the use of a defective piece of steel plate

Duke Energy Metallurgy File #3676; Lamination Found in Steel Plate at Oconee Nuclear

Station, dated October 9, 2006  
 Catawba drawing CN-1214-08.09; Auxiliary Building Electrical Equipment Seismic Mounting  
 Plans, Sections and Details, Rev. 03

### Section 40A3: Event Follow-up

Event Notification Report #43597 for Valid System Actuation under 10CFR50.72(b)(2) on  
 8/25/07

PIP C-07-4990; This PIP is the operating crew's post assessment of the crew's response to the  
 loss of main turbine condenser vacuum and subsequent main turbine trip

PIP C-07-5054; WO 01774284-01 written to remove and inspect orifice to support root cause  
 investigation for main turbine trip on low condenser vacuum

PIP C-07-4479; Catawba does not have a "grid disturbance" abnormal operating procedure

PIP C-07-4488; Following the grid disturbance on 8/25/07, the unit 1 containment chilled water  
 system chillers would not restart

### LIST OF ACRONYMS

AB	-	Auxiliary Building
ANSI	-	American National Standards Institute
ARM	-	Area Radiation Monitor
CA	-	Auxiliary Feedwater
CAP	-	Corrective Action Program
CFR	-	Code of Federal Regulations
CNS	-	Catawba Nuclear Station
CY	-	Calendar Year
DG	-	Diesel Generator
EMF	-	Effluent Monitoring Function
EOC	-	End-of-Cycle
EPA	-	Environmental Protection Agency
HP	-	Health Physics Procedure
HPT	-	Health Physics Technician
HRA	-	High Radiation Area
HX	-	Heat Exchanger
ISFSI	-	Independent Spent Fuel Storage Installation
KC	-	Component Cooling
LER	-	Licensee Event Report
LHRA	-	Locked High Radiation Area
NCV	-	Non-Cited Violation
No.	-	Number
NRC	-	Nuclear Regulatory Commission
NSD	-	Nuclear System Directive
NUREG	-	Nuclear Regulations
NV	-	Chemical Volume Control

OA	-	Other Activities
ODCM	-	Offsite Dose Calculation Manual
OP	-	Operating Procedure
OS	-	Occupational Radiation Safety
PCM	-	Personnel Contamination Monitor
pCi/L	-	picoCuries per Liter
PIP	-	Problem Investigation Process report
PI	-	Performance Indicator
PM	-	Portal Monitor
PORV	-	Power Operated Relief Valve
PS	-	Public Radiation Safety
PT	-	Performance Test
RA	-	Radiation Protection Section Procedure
radwaste	-	radioactive waste
RCA	-	Radiologically Controlled Area
RCS	-	Reactor Coolant System
REMP	-	Radiological Environmental Monitoring Program
Rev.	-	Revision
RG	-	Regulatory Guide
RN	-	Nuclear Service Water
RPMP	-	Radiation Protection Management Procedure
RTP	-	Rated Thermal Power
RWP	-	Radiation Work Permit
SAM	-	Small Article Monitor
SCBA	-	Self-Contained Breathing Apparatus
SDP	-	Significance Determination Process
SFP	-	Spent Fuel Pool
SH	-	Shared Health Physics Procedure
SLC	-	Selected Licensee Commitment
S/N	-	Serial Number
SSF	-	Standby Shutdown Facility
SSPS	-	Solid State Protection System
TS	-	Technical Specifications
TSAIL	-	Technical Specification Action Item Log
UFSAR	-	Updated Final Safety Analysis Report
WO	-	Work Order
YC	-	Control Area Chilled Water
VA	-	Auxiliary Building Ventilation
VHRA	-	Very High Radiation Area
WBC	-	Whole-Body Count
WC	-	Conventional Waste Water
WZ	-	Groundwater Drainage