UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 26, 2005

Duke Energy Corporation
ATTN: Mr. D. M. Jamil
Site Vice President
Catawba Nuclear Station
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA NUCLEAR STATION - NRC SAFETY SYSTEMS DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT 05000413/2005009 AND 05000414/2005009

Dear Mr. Jamil:

On October 7, 2005, the U. S. Nuclear Regulatory Commission (NRC) completed a safety system design and performance capability team inspection at your Catawba Nuclear Station. The enclosed report documents the inspection findings which were discussed on October 6, 2005, with you 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 inspection team reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of the 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/

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure: NRC Inspection Report 05000413/2005009 and 05000414/2005009
w/Attachment: Supplemental Information

cc w/encl: (See page 2)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-413, 50-414
License Nos.:	NPF-35, NPF-52
Report Nos.:	05000413/2005009 and 05000414/2005009
Licensee:	Duke Energy Corporation
Facility:	Catawba Nuclear Station, Units 1 & 2
Location:	4800 Concord Road York, SC 29745
Dates:	September 19 - 23, 2005 October 3 - 7, 2005
Inspectors:	R. Moore, Senior Reactor Inspector (Lead Inspector) R. Baldwin, Senior Operations Engineer D. Mas-Penaranda, Reactor Inspector N. Staples, Reactor Inspector A. Sabisch, Resident Inspector
Accompanied by:	K. Harper, Reactor Inspector (Trainee) R. Lewis, Reactor Inspector (Trainee) W. Fowler, Reactor Inspector (Trainee)
Approved by:	Charles R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000413/2005009, 05000414/2005009; 9/19-23/2005 and 10/3-7/2005; Catawba Nuclear Station, Units 1 and 2; Safety System Design and Performance Capability Inspection.

This inspection was conducted by a team of inspectors from the NRC's Region II office and a resident inspector from the site. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

The team evaluated the capability of installed plant equipment to detect and respond to a small break loss of coolant accident (SBLOCA). Procedures which direct the mitigating actions for this event were also evaluated.

A specific list of equipment and documents reviewed for each section is included in the Attachment to this report.

.1 System Needs

.11 Process Medium

a. Inspection Scope

The team reviewed the availability and reliability of water sources required for the SBLOCA events. These water sources included the refueling water storage tank (FWST) and the containment emergency recirculation sump. The review included design documentation, drawings, Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS), corrective actions history, volumetric and water depth calculations for the FWST and the containment recirculation sump, calculations of system capacity, and calculations of net positive suction head (NPSH) available and required for the safety injection (NI) pumps, residual heat removal (ND) pumps, and the charging (NV) pumps.

The reviews were performed in order to determine the adequacy of the water supplies for the systems required to respond to a SBLOCA. The reviews were also performed to verify that design bases requirements delineated in the design basis documents for the water supplies were consistent with the plant's current licensing bases requirements.

b. Findings

No findings of significance were identified.

.12 Energy Sources

a. Inspection Scope

The team reviewed test and design documents to verify that the 4160 volt alternating current (VAC) and 600VAC power sources were adequate to meet minimum voltage specifications for electrical equipment during and following a SBLOCA event. The team performed an independent voltage drop calculation from the 2ELXB Motor Control Center to motor operated valve (MOV) 2NI-184B to assess the adequacy of the licensee's

voltage drop calculation. A review of design torque values for selected critical MOVs was performed to verify that the safety functions (open/closed) were adequately tested assuming minimum voltage.

b. Findings

No findings of significance were identified.

.13 Instrumentation and Controls

a. Inspection Scope

The team reviewed the instrumentation that is used by operators for detection and mitigation of a SBLOCA event. The team reviewed appropriate design basis documents, TS, system flow diagrams, instrument uncertainty calculations, calibration procedures, and calibration test records to verify that selected level, flow, and pressure process instrumentation had the proper range and accuracy needed to perform their safety function. The setpoints for the FWST level alarms and equipment actuation relays were reviewed to verify that they were established in accordance with setpoint guideline procedures and design output documents. The team reviewed vendor data demonstrating the operating characteristics for containment sump level transmitters and containment pressure transmitters and compared it to the minimum expected calculated inaccuracies in the applicable loop accuracy calculations to verify that sufficient margin was available for satisfactory operation under SBLOCA conditions. The team conducted field inspections of accessible instrument installations to verify that the instrument tubing, sensors, and supports were in good material condition.

b. Findings

No findings of significance were identified.

.14 Operator Actions

b. Inspection Scope

The team reviewed plant operating instructions, including emergency procedures (EPs), abnormal procedures (APs), and alarm response procedures (ARs) that would be used during the identification and mitigation of a SBLOCA event. The team focused on installed equipment and operator actions that could be used to mitigate the event. The review was done to verify that the instructions were consistent with the UFSAR description of SBLOCA events and within the Westinghouse Owners' Group Emergency Procedure Guidelines (EPGs), any step deviations were justified and reasonable, and the instructions were written clearly and followed the emergency operating procedure (EOP) writer's guide. The team held discussions with licensed operators and training instructors, reviewed job performance measures and training lesson plans pertaining to procedures and equipment used during a SBLOCA event to confirm that training was consistent with the applicable operating instructions. The manual operator action times

for performance of SBLOCA mitigation activities were reviewed for consistency with accident analyses and operator training. The team observed an operator perform the manual alignment for high pressure recirculation (piggy back mode) on the simulator to verify time requirements were consistent with the time stated in the UFSAR.

c. Findings

No findings of significance were identified.

.15 Heat Removal

a. Inspection Scope

The team reviewed design documentation, drawings, vendor manuals, pump bearing temperature trend data, and completed surveillance tests to verify that the pump and motor cooling for the ND, NI, and NV pumps were adequate to ensure that the pumps would remain operable under maximum expected temperatures during design basis operating conditions. A review of the procedures used to provide an alternate source of cooling water to these pumps was performed. A walkdown of the components required to be manipulated to accomplish this action was conducted to ensure the components were well-labeled and accessible. In addition, the ability of the ND system heat exchangers to remove sufficient heat during postulated accident conditions was verified through the review of design documents and heat capacity surveillance tests.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

.21 Installed Configuration

a. Inspection Scope

The team performed field walkdowns of accessible SBLOCA mitigation equipment to observe the existing conditions and configurations. Equipment examined included NI, ND, and NV pumps, system valves, piping, and related components. Also, the team walked down portions of the 4160 VAC and 600 VAC systems to verify that the installed configuration was consistent with design basis information, assess the observable material condition, and to verify that installed equipment tap settings were consistent with design calculation values. The walkdowns included review of potential impact on equipment operation or accessability from security modifications.

b. Findings

No findings of significance were identified.

.22 Operation

a. Inspection Scope

The team walked down selected portions of NI, ND, and NV operating procedures and emergency procedures to check for human factors in the procedures and in the plant; including clarity, accuracy, labeling, lighting, noise, communications, and accessibility. The team compared valve positions with those specified in the system operating procedure line-ups and drawings, and observed the material condition of the plant to verify that it would be adequate to support operator actions and system operation. The team also checked NI, ND, and NV system alignments to verify consistency with design and licensing basis assumptions and TS.

b. Findings

No findings of significance were identified.

.23 Design

a. Inspection Scope

Mechanical Design Review

The team reviewed design calculations, TS, the UFSAR, testing, maintenance, and modification documentation to verify that system and equipment design functions have been appropriately evaluated and maintained. Periodic test procedures and equipment monitoring activities were reviewed to verify that design criteria were appropriately translated into the acceptance criteria in the tests for the ND, NI, and NV pumps, selected motor operated valves, and selected check valves.

The team reviewed calculations and system configurations to assess the adequacy of the NPSH available for the NI, ND, and NV pumps from the containment sump including a reactor coolant system break inside the crane wall where some inventory could fail to reach the containment sump due to leakage through the incore sump room hatch covers; i.e., “smart-break loss of coolant accident (LOCA).” In addition, the team reviewed the most restrictive flow passage opening conditions in the systems to assess the adequacy of the sizing of the flow passage openings in the containment sump strainers. System design, testing, and as-maintained configuration were reviewed to assure pump minimum flow requirements and run out protection were provided for the ND, NI, and NV pumps. A review of test data for ND pumps replaced over the past two years was conducted to ensure that the new pump assembly functioned within the design parameters required by the system and that the head curves were verified and updated following the replacement. The team reviewed a sample of replacement parts to verify the parts were appropriately evaluated and qualified for use in safety related applications to assure the design function of the equipment was maintained.

Electrical, Instrumentation, and Controls Design Review

The team reviewed system flow diagrams, instrumentation and control (I&C) drawings, electrical elementary and schematic diagrams, instrument setpoint calculations, as well as calibration procedures and calibration test records to verify that the instrumentation and controls for the NI, ND, NV systems, and FWST were in accordance with design basis documents. The team reviewed control schematics and electrical drawings to verify design features are incorporated in control circuits for selected pumps and MOVs. The team also reviewed setpoint calculations for selected process instruments including containment pressure, containment sump level, letdown flow measurement, and FWST level to verify that the calculations included appropriate instrument uncertainties. The last two completed calibration test records were reviewed to confirm that instrument setpoints were consistent with setpoint calculations. For the instruments selected, the team reviewed documentation of completed surveillance tests and calibrations to verify that equipment performance was appropriately monitored and maintained consistent with the design and licensing basis.

The team reviewed voltage drop calculations and performed an independent voltage drop calculation for a portion of the vital AC distribution to verify that adequate power would be available to meet design basis scenarios. Additionally, it was verified that calculated minimum voltage values were appropriately used as inputs to MOV torque and thrust calculations. Valve operation test evaluation system (VOTES) test results were reviewed to check that motor inrush currents were consistent with those used in the calculations. In addition, the team reviewed overcurrent protective relays data set point calculations and curves to verify the margin between the motor start current and the time the instantaneous relay would allow the motor to start without an inadvertent trip.

b. Findings

No findings of significance were identified.

.24 Testing and Inspection

a. Inspection Scope

The team reviewed performance and post-maintenance testing of NI, ND, and NV systems' pumps and valves to verify that the tests and inspections were appropriately verifying that the assumptions of the licensing and design bases were being maintained and that performance degradation would be identified. The team reviewed service and performance testing and electrical preventive maintenance procedures for the 4160VAC and 600VAC power system to verify that specified acceptance criteria were met and that the equipment operation was consistent with the plant's licensing and design bases.

The emergency core cooling system performance test documentation was reviewed to verify the system control functions were appropriately tested.

The team reviewed calibrations for the overcurrent protective relays to support proper operation of 4160VAC safety buses. Additionally, the team reviewed inservice test performance for the NV pump motors to verify that the motor's load current and vibrations under full load conditions were consistent with the manufacturer's guidelines.

The team reviewed valve operability stroke time testing, thrust and torque testing, and corrective maintenance records for selected NI, ND and NV system risk-significant MOVs. This review was conducted to verify the availability of the selected valves, adequacy of surveillance testing acceptance criteria, and monitoring of these valves for degradation. The team also reviewed selective risk-significant check valve periodic tests to verify the check valves were periodically demonstrated to function to the appropriate open / check positions to support system operation. The team reviewed completed periodic test results and calibration data related to NI, ND, and NV systems instrumentation to verify that testing was being performed in accordance with applicable TS requirements.

Test records were reviewed to verify that permissives and interlocks not normally tested during pump testing were verified during periodic surveillance testing. The team reviewed surveillance procedures of containment sump level and containment pressure process instrument channels to verify that tests were consistent with the instrument design including uncertainty calculations, setpoint documents, and TS. The last two completed instrument calibration records were reviewed for the selected instruments to verify that they had been calibrated in accordance with the setpoint documents and calibration procedures. The calibration records were also reviewed to verify test deficiencies such as "out of tolerance conditions," were being entered into the corrective action program for evaluation and disposition. A sample of measuring and test equipment used for calibrations and performance tests was reviewed to verify the equipment was calibrated and appropriate for the application.

b. Findings

No findings of significance were identified.

.3 Selected Components

.31 Component Degradation

a. Inspection Scope

The team reviewed maintenance and testing documentation, modifications, performance trending, and equipment history as identified by work orders, problem investigation process reports (PIPs), and system health reports to assess the licensee's actions to verify and maintain the safety function, reliability and availability of selected components. Equipment reviewed included safety-related pumps (NI, NV, and ND), selected critical

valves, 4160 VAC and 600 VAC breakers, FWST level and letdown flow instrumentation. The team reviewed the potential for common cause failure mechanisms in maintenance. Additionally, the team reviewed in-service trending data for selected components, including the NI, ND, and NV pumps to verify that the components were continuing to perform within the limits specified by the test and design basis.

b. Findings

No findings of significance were identified.

.32 Equipment/Environmental Qualification (EQ)

a. Inspection Scope

The team conducted in-plant walkdowns to verify that the observable portions of selected mechanical and electrical components were suitable for the environment expected under all conditions, including high energy line breaks (HELBs) and flooding. The test data was reviewed to confirm that the components were qualified for the worst case postulated accident environments where they are installed. The team also reviewed documents that implemented EQ requirements to verify that the components' EQ conditions are maintained.

b. Findings

No findings of significance were identified.

.33 Equipment Protection

a. Inspection Scope

The FWST cold weather protection was not included in this inspection as the licensee was in the process of installing a modification to provide this protection. A walkdown of the Unit 2 FWST level transmitters, located adjacent to the exterior of the FWST, was performed to assess the condition of the instrumentation. The team also walked down the enclosure around the FWST to verify it provided adequate missile protection for the tank and instrumentation.

b. Findings

No findings of significance were identified.

.34 Component Inputs/Outputs

d. Inspection Scope

The team reviewed selected MOVs and evaluated the capability of the valve operators to perform their design function under degraded voltage conditions. For equipment control functions used for a SBLOCA, the team reviewed functional, and elementary drawings for a sample of pump control circuits in the NI, ND, and NV start circuits. The team also reviewed control circuits for MOV actuation on the FWST-containment sump MOV interlock. The objective of the review was to confirm that the circuits implemented the functional requirements stated in the design and licensing basis. The team reviewed samples of surveillance test procedures for LOCA and logic functional testing to confirm that the logic paths were being tested in a manner to adequately demonstrate that the equipment would perform in accordance with design basis documents. The team also reviewed test records to verify periodic surveillance testing of permissives and interlocks for selected MOVs.

b. Findings

No findings of significance were identified.

.35 Operating Experience

a. Inspection Scope

The team reviewed the licensee's applicability evaluations, extent of condition reviews, and corrective actions for industry and station operating experience issues related to NI, ND, and NV equipment problems, use of non-conservative acceptance criteria in safety related pump surveillance tests, plugging of safety injection pump oil coolers, gas voids in NV and ND pump suction lines, charging pump impeller pitting, and check valve problems to verify that plant specific issues were appropriately identified and addressed. Work orders, procedures, field observations and discussions with engineering staff were used to verify that operating experience related corrective actions were accomplished. The team reviewed a report summarizing the results of the licensee's evaluation of safety related logic system testing in response to NRC Generic Letter 96-01. Specifically, the section of the report dealing with NI, ND, and NV logic system testing was reviewed to verify that logic test deficiencies were properly evaluated.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed selected system health reports, maintenance records, surveillance test records, and PIPs to verify that design and performance problems were identified and entered into the corrective action program.

The team assessed the scope of the licensee's extent-of-condition reviews and the adequacy of the corrective actions. The team reviewed calibration test records to verify that "out of tolerance" conditions were properly entered into the corrective action program for evaluation and disposition. The team reviewed a sample of corrective maintenance work orders on the NI, ND, and NV pumps and selected valves.

Additionally, the team reviewed documentation of individual PIPs which were originated as a result of the team's inspection activities, including documentation of the status of each initial PIP evaluation as it existed at the conclusion of the onsite inspection activities.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Meetings, Including Exit

The lead inspector presented the inspection results on October 6, 2005, with Mr. Jamil and other members of the licensee's staff. All proprietary information reviewed during the inspection was returned to the plant staff prior to the exit and is not included in this inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

S. Beagles, Manager, Chemistry Manager
A. Dickard, Engineering, Senior Electrical Engineer
R. Herring, Senior Engineer, Primary Systems
D. Jamil, Site Vice President
L. Keller, Regulatory Compliance Manager
K. Phillips, Manager, Operations Support
B. Pitesa, Station Manager
R. Repko, Manager, Engineering
T. Simril, Supervisor, Balance of Plant
S. Snyder, Supervisor, Primary Systems
G. Strickland, Regulatory Compliance Specialist

NRC (attended exit meeting)

G. Guthrie, Senior Resident Inspector
H. Christensen, Deputy Director, Division of Reactor Safety, RII

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

None

Attachment

LIST OF EQUIPMENT REVIEWED

Report sections

1R21.11a Process Medium

Unit 2 FWST
2A & 2B Residual Heat Removal (ND) pumps
2A & 2B Safety Injection (NI) pumps
2A & 2B charging (NV) pumps
Suction piping and valves in the suction piping associated with the ND, NI and NV pumps

MOVs

2NI-185A	2NI-103A	2NV-252A	2FW-27A

1R21.12a Energy Sources

MOVs:

2FW-27A	2FW-55B	2NI-185A	2NI-184B

Degraded Voltage Relays:
Class 1E 4160 VAC Bus 2ETB 27ZX, YX, ZY
Class 1E 4160 VAC Bus 2ETA 27ZX, YX, ZY

Loss of Voltage Relays:
Class 1E 4160 VAC Bus 2ETA Relay 27XA
Class 1E 4160 VAC Bus 2ETB Relay 27XB

1R21.13a Instrumentation & Controls

Containment Sump Level Instrument 2NILT5260
Containment Pressure Ch. 3 NSLP5040
FWST Level Instruments (2FWLT5000, 2FWP5000)
NV Flow Instruments (2NVFE5530, 2NVFT5530, 2NVP5530)
NV Mini-flow Orifice (2NVFE5980)

1R21.15.a: Heat Removal

Valves required to align Station Drinking Water (YD) to the 2A NV pump in the event normal cooling water is lost (per AP/2/A/5500/021, Loss of Component Cooling Water, Enclosure 4)
Vents in the pump room doors
NV Pumps 2A and 2B
NV Pump Coolers

1R21.21a Installed Configuration

2A & 2B Residual Heat Removal (ND) pump
2A & 2B Safety Injection (NI) pumps
2A & 2B charging (NV) pumps

MOVs

2FW-27A	2FW-55B	2NI-185A	2NI-184B
2ND-25	2ND-59		

Pump Motors:

2ANV	2BNV	2ANI	2BNI
2AND	2BND		

Breakers:
2ETA-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETA
2ETB-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETB
2ETA-06 Component Cooling Water Pump Motor 2A1
2ETA-07 Component Cooling Water Pump Motor 2A2
2ETB-06 Component Cooling Water Pump Motor 2B1
2ETB-07 Component Cooling Water Pump Motor 2B2
2ETA-09 Residual Heat Removal Pump Motor 2A
2ETB-09 Residual Heat Removal Pump Motor 2B
2ETA-11 Safety Injection Pump Motor 2A
2ETB-11 Safety Injection Pump Motor 2B
2ETA-12 Centrifugal Charging Pump Motor 2A
2ETB-12 Centrifugal Charging Pump Motor 2B
2EMXA-F02B 2FW27A
2EMXA-R08D 2NI185A
2EMXB-F01B 2FW55B
2EMXB-F01C 2NI184B

230kV Switchyard
Transformer Yard
2ETA/ETB Switchgear
Unit 2 Diesel Generators
Unit 2 NV System Instrumentation
Unit 2 ND System Instrumentation
Unit 2 DC Switchgear/Battery Rooms

1R21.23a Design

2A & 2B Residual Heat Removal (ND) pump
2A & 2B Safety Injection (NI) pumps
2A & 2B charging (NV) pumps

MOVs

2FW-27A	2FW-55B	2NI-185A	2NI-184B
2ND-1B	2ND-2A	2NI-184B	

Breakers:
2ETA-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETA
2ETB-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETB
2ETA-06 Component Cooling Water Pump Motor 2A1
2ETA-07 Component Cooling Water Pump Motor 2A2
2ETB-06 Component Cooling Water Pump Motor 2B1
2ETB-07 Component Cooling Water Pump Motor 2B2
2ETA-09 Residual Heat Removal Pump Motor 2A
2ETB-09 Residual Heat Removal Pump Motor 2B
2ETA-11 Safety Injection Pump Motor 2A
2ETB-11 Safety Injection Pump Motor 2B
2ETA-12 Centrifugal Charging Pump Motor 2A
2ETB-12 Centrifugal Charging Pump Motor 2B
FWST Level Instrument (2FWLT5000, 2FWP5000)
2NV Flow Instruments (2NVFE5530, 2NVFT5530, 2NVP5530
Switchgear 2ETA(B)-6,7,9,11,12

1R21.24a Testing and Inspection

MOVs

2FW-27A	2FW-55B	2NI-185A	2NI-184B

Pump Motors:

2ANV	2BNV	2ANI	2BNI	2AND	2BND

Breakers:
2ETA-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETA
2ETB-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETB
2ETA-06 Component Cooling Water Pump Motor 2A1
2ETA-07 Component Cooling Water Pump Motor 2A2
2ETB-06 Component Cooling Water Pump Motor 2B1
2ETB-07 Component Cooling Water Pump Motor 2B2
2ETA-09 Residual Heat Removal Pump Motor 2A
2ETB-09 Residual Heat Removal Pump Motor 2B
2ETA-11 Safety Injection Pump Motor 2A
2ETB-11 Safety Injection Pump Motor 2B
2ETA-12 Centrifugal Charging Pump Motor 2A
2ETB-12 Centrifugal Charging Pump Motor 2B

FWST Level Instruments (2FWLT5000, 2FWP5000)
NV Flow Instruments (2NVFE5530, 2NVFT5530, 2NVP5530)
2ETA(B)-6,7,9,11,12
CN-IAC-27917

CN-IAC-21278
CN-IAC-18900
CN-PRF-20851
CN-PRF-20870

1R21.31a Component Degradation

2NI-185A
2NI-103A
2NV-252A
2FW-27A
2NV-270
2NV-813
2NV-482
2NV-205

MOVs

2FW-27A	2FW-55B	2NI-185A	2NI-184B
2ND-25	2ND-59	2NI-1B	2NI-2A

Pumps and Motors:

2ANV	2BNV	2ANI	2BNI	2AND	2BND

Breakers:
2ETA-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETA
2ETB-03 feeder Breaker for Class 1E 4160 VAC Bus 2ETB
2ETA-06 Component Cooling Water Pump Motor 2A1
2ETA-07 Component Cooling Water Pump Motor 2A2
2ETB-06 Component Cooling Water Pump Motor 2B1
2ETB-07 Component Cooling Water Pump Motor 2B2
2ETA-09 Residual Heat Removal Pump Motor 2A
2ETB-09 Residual Heat Removal Pump Motor 2B
2ETA-11 Safety Injection Pump Motor 2A
2ETB-11 Safety Injection Pump Motor 2B
2ETA-12 Centrifugal Charging Pump Motor 2A
2ETB-12 Centrifugal Charging Pump Motor 2B
2EMXA-F02B 2FW27A
2EMXA-R08D 2NI185A
2EMXB-F01B 2FW55B
2EMXB-F01C 2NI184B

Auxiliary Relays:
ESG Auxiliary Relays K649A, K648A
FWST Level Instruments (2FWLT5000, 2FWP5000)
2NV Flow Instruments (2NVFE5530, 2NVFT5530, 2NVP5530)
2KCFT5531

1R21.32a Equipment/Environmental Qualification

MOVs:

2FW-27A	2FW-55B	2NI-185A	2NI-184B
2ND-1B	2ND-2A		

Pump Motors:

2ANV	2BNV	2ANI	2BNI	2AND
2BND				

FWST Level Instruments (2FWLT5000, 2FWP5000)
2NV Flow Instruments (2NVFE5530, 2NVFT5530, 2NVP5530

1R21.33a Equipment Protection

Unit 2 FWST instrumentation within the missile wall

1R21.34a Component Inputs/Outputs

MOVs:

2FW-27A	2FW-55B	2NI-185A	2NI-184B

1R21.4a Identification and Resolution of Problems

1ETA-12 Centrifugal Charging Pump Motor 1A
1NI183B
2NI183B

LIST OF DOCUMENTS REVIEWED

Procedures:

OP/2/A/6200/001; Chemical & Volume Control System, Rev. 107
OP/2/A/6200/006; Safety Injection System. Rev. 55
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AP/2/A/5500/010; Reactor Coolant Leak, Rev. 41
OP/2/B/6100/010N; Annunciator Resp. for Panel 2AD-13; Windows A/7, A/8, A/4, C/6 and D/5, Rev. 47
AP/2/A/5500/021, Loss of Component Cooling, Rev. 27
PT/2/A/4400/001, Centrifugal Charging Pump Performance and Cold Leg Injection Flow Balance, Enclosure 13.3
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PT/2/A/4200/006B, ECCS Valve Lineup Verification, Rev. 40
PT/2/A/4200/010A, Residual Heat Removal Pump 2A Performance Test, Rev. 44 and Rev. 45
PT/1/A/4200/010B, Residual Heat Removal Pump 1B Performance Test, Rev. 81 and Rev. 83
PT/1/A/4200/010A, Residual Heat Removal Pump 1A Performance Test, Rev. 66 and Rev. 67
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OP/2/A/6200/001, Chemical and Volume Control System, Rev. 107
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PT/2/A/4200/006A, Boron Injection Valve Lineup Verification, Rev. 25
IP/0/A/3820/004D, MOV Actuator EGS Bayonet Connectors, Rev. 14
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IP/0/A/3020/004A, MOV Diagnostic Testing, Rev. 13
SI/0/A/5200/006, MOV Actuator Lubrication and Inspection, Rev. 5
IP/0/A/3820/007, Maintenance of Rotork Actuators, Rev. 14
IP-2-A-3146-003, (NI) Containment Sump Level Calibration, Rev. 009
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PT-2-A-4200-005A, SI Pump 2A Performance Test, Rev. 33
PT-2-A-4200-005B, SI Pump 2B Performance Test, Rev. 35
PT-2-A-4200-006B, ECCS Valve Lineup Verification, Rev. 40
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EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation, Rev. 19
EP/1/A/5000/ECA-1.1, Loss of Emergency Recirculation, Rev. 27
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PT/2/A/4200/007B; Centrifugal Charging Pump 2B Test (4/20/05 & 7/12/05)
PT/2/A/4200/006A; Boron Injection Valve Lineup Verification (8/17/05 & 9/12/05)
PT/2/A/4200/006B; ECCS Valve Lineup Verification (7/19/05 & 8/17/05)
PT/2/A/4200/005A; Safety Injection Pump 2A Performance Test (10/2/04 & 7/1/05)
PT/2/A/4200/005B; Safety Injection Pump 2B Performance Test (9/7/05)
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OP-CN-CP-RSS-05, Break Condenser Vacuum Locally, Rev. 0
OP-CN-EP-EP4, Locally Isolate the Steam to the CAPT # During a SGTR, Rev. 2
OP-CN-EP-EP–008, Locally Operate Steam Generator PORVs during a SGTR, Rev. 4
OP-CN-EP-EP–009, Locally Operate Steam Generator PORVs during a SGTR, Rev. 2
OP-CN-EP-EP–010, Locally Operate Steam Generator PORVs during a SGTR, Rev. 0
OP-CN-PSS-KC-005, Alternate Cooling to the 2A NV Pump, Rev. 0
OP-CN-EP-EP5-008, Transfer 1EMXS to Alternate Power Supply, Rev. 3
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OP-CN-PSS-KC-004, Alternate Cooling to the 1A NV Pump, Rev. 4
OP-CN-CP-AD-001, Transfer Control to the Standby Shutdown Facility, Revision 20
OP-CN-CP-AD-002, Establish NCP Seal Injection from the SSF, Rev. 26
OP-CN-CP-AD-003, Place SSF Diesel in Operation, Rev. 21
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OP-CN-ECCS-NI, Safety Injection System (NI), Lesson Plan, Rev. 8
Operator Training Package for ECA-1.1, and ECA1.2 Changes
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CNC-1223.12-00-0055; Operability Evaluation for PIP C-97-2425, Rev. 0
CNC-1205.19-00-0172; Operability Support of PIP C-05-2259 for 1(2)NI-184B and 1(2)NI-185A, Rev. 0
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CNC-1381.05-00-0012, 4160 Volts Essential Auxiliary Power System Switchgear Relay Setting, Rev. 11
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CNC-1210.04-00-0001, Containment Building Level Instrument Loop Accuracy Calculation,-CN-1/2-NI5260/5270, Rev.1
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98640805, 2NI-185A Perform Limited Rotork PM, 9/28/04
98372517, 2NI-184B Perform Comprehensive Rotork PM, 9/28/4
98521274, 2NI-184B Perform Limited Rotork PM, 3/9/03
98640849, 2NI-184B Perform Limited Rotork PM, 9/21/04
98361522, 2NI-184B Perform 89-10 Test, 928/01
98497702, 2FW-027A Perform Comprehensive Rotork PM, 6/13/02
98590568, 2FW-027A Perform Limited Rotork PM, 5/12/03
98470796, 2FW-027A Perform Limited Rotork PM, 3/18/02
97066975, 2FW-027A Perform 89-10 Test, 10/8/97
98676151, 2FW-055B Perform Comprehensive Rotork PM,11/8/04
98731542, 2FW-055B Perform Limited Rotork PM, 7/20/05
98185128, 2FW-055B, Perform 89-10 MOV Votes Test, 1/13/00
98704076, 2NI Motor A, Perform Motor On-Line Testing, 1/13/05
98640753, 2NI Motor A, Perform Motor On-Line Testing, 5/7/04
98671473, 2NI Motor B, Perform Motor On-Line Testing, 7/15/04
98607846, 2NI Motor B, Perform Motor On-Line Testing, 11/2/03
98740178, PM Protect Relays on 2ETA “ Except” 3,5,10,16, 8/30/05
98596119, PM Protect Relays on 2ETA “ Except” 3,5,10,16, 8/4/03
98526468, 2EPC Routine Test 2ETB SWGR Relays Except 3,5,10,16, 11/04/02
98691012, 2EPC Routine Test 2ETB SWGR Relays Except 3,5,10,16, 11/25/04
98730292, Perform Routine Test 27 Relays on 2B D/G, 6/22/05
98739751, Perform Routine Test 27 Relay on 2B D/G, 8/15/05
98730291, Perform Routine Test 27 Relays on 1B D/G, 6/22/05
98739750, Perform Routine Test 27 Relay on 1B D/G, 8/15/05
98730909, Perform Routine Test 27 Relays on 2A D/G, 7/9/05
98738152, Perform Routine Test 27 Relays on 2A D/G, 7/25/05
98730908, Perform Routine Test 27 Relays on 1A D/G, 7/9/05
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98695770, ND 2 Replace Motor with Spare, 10/08/04
98728209-01, 2EIA: PFM Channel Operational Test for Channel 3, 07/02/05
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98478919-05, MOV Diagnostic Testing, 03/11/05
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98519814-01 2NILP5270 NI Containment Sump Level Calibration, 03/21/03
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CGD-2004.02-1-0006, Solon Switches, Rev. 1
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OEDB 03–33912, NRC IN 2003-06, Failure of SR Linestarter Relays at San Onofre Nuclear Generating Station, 6/23/03
OEDB 03-033590, Closed Plant Service Water Valve Makes Required ECCS Valve Inoperable, 5/23/03
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OEDB 02-030209, Head Loss Characteristic of Containment Sump Check Valves Greater than Previously Assumed, 5/23/02
OEDB 05-038968, Charging Pump Runout on SI Issue, 5/24/05
List of post 9/11 Security Modifications Installed in the Plant (combined with discussions with the Security Manager)
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NUREG-0611; Generic Evaluation of Feedwater Transients and Small Break Loss of Coolant Accidents in Westinghouse Designed Operating Plants
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CNM-1318.15-0008.001, WC2 Install, Operations, and Maintenance of RHR Pump Motors, Rev. D4
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EQMM-1391.01-A01-01, Electric Motor Actuator, Rev. 4
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ES-1.3, WOG Emergency Response Guideline Configuration Control and Approval Sheet, HP Rev. 2.0, 4/30/05
Catawba Specific Differences HP Rev. 2.0, ES-1.3, Transfer to Cold Leg Recirculation, Rev. 7
E-1, WOG Emergency Response Guideline Configuration Control and Approval Sheet, HP Rev. 1c, Loss of Reactor or Secondary Coolant, 9/30/97
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ES-1.2, WOG Emergency Response Guideline Configuration Control and Approval Sheet, HP Rev. 2, Post LOCA Cooldown and Depressurization, 4/30/05
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CN-2562-1.2, Flow Diagram of Safety Injection System, Rev. 28
CN-2562-1.3, Flow Diagram of Safety Injection System, Rev. 16
CN-2554-1.1, Flow Diagram of Chemical and Volume Control System, Rev. 8
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CN-2554-1.7, Flow Diagram of Chemical and Volume Control System, Rev. 16
CN-2573-1.0, Flow Diagram of Component Cooling System, Rev. 22
CN-2573-2.0, Flow Diagram of Component Cooling System, Rev. 7
CN-2573-2.2, Flow Diagram of Component Cooling System, Rev. 4
CN-2561-1.0, Flow Diagram of Residual Heat Removal System, Rev. 25
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CNEE-0242-01.45, Elementary Diagram Component Cooling System (KC) Aux. Relay Controls, Rev. 5
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CNEE-0242-01.03, Elementary Diagram Component Cooling System (KC) Reactor. BLDG. Non-ESS. Return HDR. Isolation Valve 2KC003A, Rev. 5
CNEE-0242-01.05, Elementary Diagram Component Cooling System (KC) Train 2A Supply to Aux. Bldg. Non-ESS. HDR. Isolation Valve 2KC050A, Rev. 7
CNEE-0242-01.09, Elementary Diagram Component Cooling System (KC) ND HX 2A Cooling Water Supply Isolation Valve 2KC056A, Rev. 6
CNEE-0242-01.12, Elementary Diagram Component Cooling System (KC) Train 2A Supply to RX BLDG. Non-ESS. Return HDR. Isolation Valve 2KC230A, Rev. 7
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CNEE-0241-01.02-01, Elementary Diagram (ND) RHR System NC Loop 2 Supply to ND Train 2A Isolation Valve 2ND002A, Rev. 7
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CNEE-0274-01.32 Elementary Diagram Solid State Protection System (IPE) Auxiliary Safeguards Cabinet Relay Development, Rev. 2
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Updated Final Safety Analysis Report (UFSAR)

Section 15.6.5, Loss-of-Coolant Accidents, dated 10/24/04
Table 15-32, Input Parameters Used in the SBLOCA LOCA Analysis (Unit 2), dated 10/22/01
Table 15-57, Minimum ECCS Flow Assumed in SBLOCA Analysis One Train Operational, Break Backpressure Equal to RCS Pressure, dated 10/22/01
Table 15-59, Input Parameters Used in the SBLOCA LOCA Analysis (Unit 1), dated 10/22/01

Technical Specifications / Selected Licensee Commitments

Tech Spec Section 3.5.1; ECCS Operating, Amendment Nos 203/196
Tech Spec Section 3.5.2; ECCS Shutdown, Amendment Nos 213/207
Tech Spec Section 3.3.2; Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Amendment Nos 173/165
Tech Spec Section 5.5.8; Inservice Testing Program, Amendment Nos 218/212
SLC 16.9-7, Boration Systems Flow Paths - Shutdown
SLC 16.9-8, Boration Systems Flow Paths - Operating
SLC 16.9-9, Boration Systems Pumps - Shutdown
SLC 16.9-10, Boration Systems Pumps - Operating

Modifications:

NSM CN-21407/00, Install Continuous Vents on Unit 2 NI/ND Discharge Headers, 7/29/04
CD-500288, Minor Design Change, Incore Instrument Room Hatch Seal, 11/05

PIPs

C-04-05651	Flow Transmitter with Incorrect Range Used in NV Cold Leg Balance Section of ECCS Flow Balance
C-04-00436	Amendment to Compensatory Actions for Unit 1 ECCS Operations
C-04-01534	MOVs Mis-classified in EDB with respect to Harsh vs Mild Environment
C-05-00180	TDK Components Obsolete
C-04-00270	NV Piping Voids
C-04-02668	10 CFR Part 21 on ROTORK Actuators
C-03-01482	Engineering Evaluation of Small Sump Pump to be Placed in U-2 L/C Pipechase
C-03-01646	2NI185A Leak Test Procedure and Its Impact on Containment Sump Availability
C-04-05408	Leakage Past 2NV813 was Measured at 0.78gpm
C-04-06136	Perform UT on Piping Near 2NI VA 185A
C-05-02259	ND Pressure Trapped in ND Pump Suction
C-05-02380	Input to CFE Sump 2A of >0.5gpm Associated with Comp. Action for 2NI-184B and 2NI-185A
C-05-03441	1A NV Pump failed to start, 06/03/2005
C-04-01534	Valves are located in a Harsh (H) Environment and the field in EDB indicates a Mild (M) Environment, 03/30/2004
C-04-05191	Actuator Replacement causes 2ND-2A Stroke Time to be Greater than Required Stroke
C-04-05268	Actuator Replacement causes 2ND-1B Stroke Time to be Greater than Required Stroke
C-04-02939	Audit of Catawba M&TE Program Against NSD 406 and MD 2.19
C-04-05651	Flow Transmitter with Incorrect Range Used in NV Cold Leg Balance Section of ECCS Flow Balance
C-03-02221	Unit 2 NC Unidentified Leakage in excess of Technical Specifications 3.4.13 limits
C-03-00854	OE Review of Impeller Pitting on Charging Pumps
C-04-02668	Rotork Controls, Inc. Part 21 Notification
C-04-00344	Gas in Unit 1 1A ECCS Piping

PIPs Written due to this Inspection:

05-05755	Solon Switches (aluminum) not in containment accountability calculation
05-05776	Inconsistencies in 4160 VAC Relay setting calculation
05-05826	Guidance for operator action on TOL indication
05-05849	2 NV-A pump boron leak at seal
05-05763	Boron leak on valve 2-NI-VA-0184B
05-05785	Inconsistent designation of critical action in similar JPMs
05-05984	M&TE out of tolerance reviews not documented
05-05999	Walkdown housekeeping - rag on 2A ND pump
05-05958	Operability evaluation of 1NI-184B,-185A, not revised following installation of new actuators.
05-06111	Inconsistent procedure sequence for returning dp cell to service
05-06033	Work order documentation deficiency regarding replacement motor for 2 ND pump 2A

05-06065	Fire walls around main and auxiliary transformers do not appear consistent with applicable code
05-06046	4160 VAC relay calibration procedure not updated from minor modification
05-06054	EOP step deviation documents not updated consistent with EOP changes
05-06056	Unit 2 motor operated disconnect position indication do not provide clear view of disconnect position