NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	05000413	1 OF 8

TITLE (4)
Failure to Perform T/S Surveillances Due to Unanticipated Interaction of Systems

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Unit 2	05000414
07	27	95	95	-- 003 --	0	08	25	95	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
POWER LEVEL (10)	100	20.402(b)		20.405(c)		50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
D. P. Kimball, Safety Review Group Manager	(803) 831-3743

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		09	08	95

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

ABSTRACT

On July 27, 1995, with Units 1 and 2 in Mode 1, Power Operation, an accident scenario was discovered during a self assessment that had not been considered when containment integrity boundaries were established. Piping downstream of valves 1(2)KC310, 1(2)KC311, and 1(2)KC312 could fail during this scenario and adversely effect containment integrity. Not having these valves closed with power removed violates Technical Specification (T/S) 4.6.1.1a, Containment Integrity. This event is attributed to Design Analysis due to unanticipated interaction of systems. A Non-Licensed Operator (NLO) was dispatched to verify the valves closed and to remove control power from the valves. While verifying valve positions the NLO found 1KC311 open. The scenario would not change with 1KC311 open, because it took into account a spurious opening of the valve. The cause of the valve being open is being investigated. The periodic test procedures were revised. Planned corrective action is to review all penetrations to determine if similar situations exist where valves may have been omitted from the containment integrity boundary. Preliminary safety analysis indicates that the health and safety of the public would not be adversely affected by this scenario.

BACKGROUND

The Component Cooling System (KC) [EIIS:CC] acts as a closed loop treated water system to dissipate waste heat from motor [EIIS:MO] coolers [EIIS:CLR] and intersystem heat exchangers [EIIS: HX] serving various systems supporting plant startup, normal, and shutdown activities. This system serves as a boundary between the Reactor Coolant System (NC) [EIIS:AB] and the Nuclear Service Water System (RN) [EIIS:BI]; reducing the probability of radioactivity leakage into the environment.

Valves [EIIS: V] 1(2)KC310, Excess Letdown Heat Exchanger Vent, serves as a vent isolation for the shell side of the Excess Letdown Heat Exchanger;
1(2)KC311, Excess Letdown Heat Exchanger Vent to KC Drain Sump, serves as a diversion path to the KC drain sump for the shell side of the Excess Letdown Heat Exchanger vent; 1(2) KC312, Excess Letdown Heat Exchanger; Drain, serves as a drain isolation for the shell side of the Excess Letdown Heat Exchanger; 1(2)KC305B, Excess Letdown Heat Exchanger Supply Containment Isolation Valve, serves to isolate the inlet side of the Excess Letdown Heat Exchanger; and 1(2)KC-315B, Excess Letdown Heat Exchanger Return Containment Isolation Valve, serves to isolate the outlet side of the Excess Letdown Heat Exchanger.

KC System supply to the Excess Letdown Heat Exchanger is unique in that the outside containment isolation valves 1(2)KC305B and 1(2)KC315B are "B" train. With no "A" train valves, application of single failure criterion makes the scenario where an open flow path affecting Containment Integrity could exist. The outside containment isolation valves are motor operated and close upon receipt of an St signal to perform their containment isolation function during a design basis event. By design, manually operated valves are used for the inside containment isolation.

Technical Specification (T/S) 3.6.1.1 states the primary containment integrity shall be maintained during Modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). T/S states that without containment integrity, action is required to restore containment integrity within one hour or be in at least Hot Standby within the following six hours and in Cold Shutdown (Mode 5) within the following thirty hours.

Procedure PT/1(2)/A/4200/02B, Cold Shutdown Inside Containment Integrity Verification, is used to verify the position of containment integrity valves inside the Reactor Building[EIIS:NH].

EVENT DESCRIPTION

July 27, 1995

During the KC Self Initiated Technical Audit (SITA), it was discovered that an accident scenario existed which could affect containment integrity.

1120 hours A Technical Specification Operability Notification Sheet (TSONS) was issued declaring valves 1(2)KC310, 1(2)KC311, and 1(2)KC312 inoperable because 1(2)KC311, 312 were not included in the periodic test procedure for verifying containment integrity and 1(2)KC310 were not being verified secured; therefore, valve position and control power status was unknown. Operations approved the TSONS and dispatched a Non-Licensed Operator (NLO) to tag 1(2)KC305B, 315B, Excess Letdown HX containment Isolation Valves, closed with power removed to ensure containment integrity.

July 28, 1995

The Operations procedure group revised OP/1(2)/A/6100/01, Controlling Procedure For Unit Startup, to verify 1(2)KC310, 1(2)KC311, and 1(2)KC312 closed with power removed.

An NLO was dispatched to verify valves were closed and to isolate power from the valve operators. While verifying position for the unit 1 valves the NLO found 1KC311 open. The valve was immediately closed.

Power was restored and tags removed from valves 1(2)KC305B and 1(2)KC315B after containment integrity was verified per the operating procedure.

2315 hours KC system containment penetrations [EIIS:PGN] to the Excess Letdown Heat Exchanger lines for Unit 1 and 2 were declared operable.

CONCLUSION

The root cause of this event is Design Analysis due to unanticipated interaction of systems. During a KC SITA Audit a scenario was discovered for which the subject KC valves would be part of the containment integrity boundary. The scenario is the failure of the Class G piping downstream of 1(2)KC311, 312

during a seismic event coupled with a loss of offsite power, a B train Diesel Generator (D/G) failure, spurious actuation of 1(2)KC311, 312, and having KC aligned to the Excess Letdown HX. In this scenario an open path from the containment atmosphere to outside of containment could exist. The T/S Surveillance of 1(2)KC310, 311, and 312 has not been performed because it was not recognized that the subject valves were needed for containment integrity. This condition (failure to verify the valves closed and secured) has existed since the initial development of the containment integrity verification procedures. This scenario would only apply to those unique penetrations that have only one safety train of containment isolation.

As a result of the subject valves not being included in the test procedure there was no containment by-pass leakage path from inside containment to outside atmosphere. However, the potential existed under certain conditions for a by-pass leakage path to develop. The scenario included possible spurious opening of the valves. When the NLO went to verify the valves closed, 1KC311 was found open. The scenario does not change with 1KC311 being found open, but the cause of the valve being open is under investigation.

Planned corrective action is to review all penetrations to determine if similar situations exist where valves may have been omitted from the containment integrity boundary.
In addition, Operations revised PT/1(2)/A/4200/02B, Cold Shutdown Inside Containment Integrity Verification to include verifying that 1(2)KC310, 311, and 312 are closed with control power removed.

A review of Operating Experience Program database for the 24 months prior to this event indicates missed T/S surveillances is a recurring problem. Licensee Event Report (LER) 414/94-004 involved missed T/S surveillances where the surveillance existed in the test program but the time interval for the surveillance had been exceeded. Corrective actions were identified to address the recurring problem. This event occurred because the equipment had not been included in the test program. Due to this difference no additional corrective actions are needed.

CORRECTIVE ACTION:

Subsequent

1) Operations verified that 1(2)KC305B, 315B, inlet and outlet valves to the Excess Letdown Heat Exchanger, were closed with power removed to comply with T/S.

2) Operations revised OP/1(2)/A/6100/01 to include steps to verify the KC vent and drain valves closed and secured. This was a interim measure that will be used until the periodic test procedures are revised.

3) Operations revised procedures PT/1(2)/A/4200/02B, Cold Shutdown Inside Containment Integrity Verification, to include the KC vent and drain valves.

Planned

1) Operations and System Engineering will review all penetrations to determine if similar situations exist where valves may have been omitted from the containment integrity boundary.

SAFETY ANALYSIS:

Preliminary Safety Analysis

(See attachment A for simplified sketch)

The excess letdown heat exchanger process piping inside containment was designed to be protected from pipe break interaction effects and as such was considered to be a closed system inside containment. This piping system was therefore only provided with a single containment isolation valve located outside of containment on the supply and the return piping to the heat exchanger. This piping system is normally not in service and the containment isolation valves are closed. The recent Component Cooling Water System (KC) Self Initiated Technical Audit (SITA) identified a deficiency with respect to this piping system in that the drain piping located downstream of the heat exchanger vent and drain valves was Duke Class G piping. Duke Class G piping is non-safety related piping and has not been designed to be seismically qualified nor has it been evaluated for High Energy Line Break interactions. The KC SITA Team concluded that the valves which separate the safety related piping from the non-safety piping inside containment should have been included in PT/1(2)/A/4200/02B, Cold Shutdown Inside Containment Integrity Verification, which satisfies the surveillance requirements of Technical Specification 3.6.1.1. The excess letdown heat exchanger vent and drain valves (KC310, KC311, KC312) are fail as-is valves which have non-safety related controls. These controls are located at an elevation which may experience flooding following a postulated Loss of Coolant Accident. The position of these valves therefore cannot be assured and therefore for purposes of this analysis will be assumed to be open.

A review of the containment integrity implications of safety class of these valves has identified that a containment integrity concern does exist for these valves under a very limited set of postulated design basis accidents and single failures. This preliminary safety analysis has identified that if a Design Basis Earthquake coincident with a LOCA may be postulated to also result in a Loss of Offsite Power and a loss of Lake Wylie the non-safety related portion of the Ultimate Heat Sink. For purposes of this Preliminary Safety Analysis a failure of the B Train Diesel Generator on the LOCA unit is assumed. Additionally, it will be assumed that the non-LOCA unit B Train Diesel Generator is not available. The excess letdown heat exchanger, which is rarely in service will be assumed to be in service to ensure development of a limiting preliminary safety analysis. The non-safety related KC drain piping inside containment will be assumed to fail.

Under this postulated accident scenario the two excess letdown heat exchanger containment isolation valves (KC 305B and KC315B) will remain open, following the accident due to the postulated failure of the LOCA unit B Diesel Generator. These are gate valves which have been provided with a separate sealing system, Containment Valve Injection Water System (NW), which is designed to maintain the pressure between the wedges of the gate valves above the Containment Peak Accident Pressure thus preventing containment leakage through these valves. Due to the postulated failure of the LOCA unit B Diesel Generator, which causes the unavailability of the LOCA unit B Nuclear Service Water Pump (RN) Pump, and the assumed unavailability of the non-LOCA unit B RN pump, no B train RN pumps would be available for providing assured makeup water to the NW system rendering it unavailable.

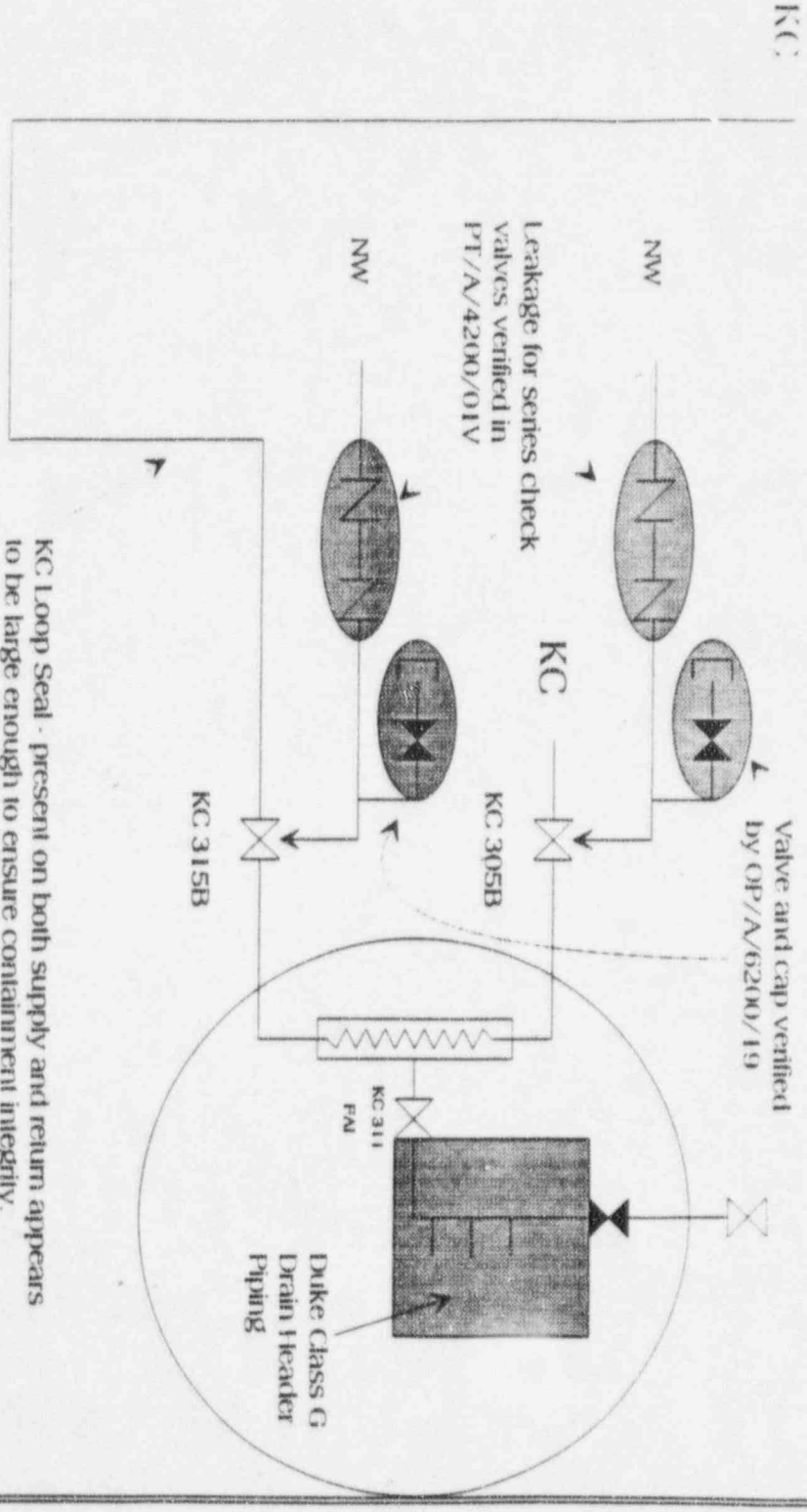
All containment isolation valves are verified to be in the closed position early in the Catawba Emergency Operating Procedures. If a containment isolation valve is not in the correct position steps will be taken to attempt to place it in the correct position. The excess letdown heat exchanger containment isolation valves are located inside the mechanical penetration rooms which are postulated, under the design basis dose analysis, to have significant post accident dose rates, therefore credit will not be taken for operator action to locally close these valves.

The KC Piping arrangement for the supply and return piping outside of containment has been reviewed. This piping is safety related and seismically supported and can therefore be assured to function following this postulated sequence of events. This review also indicates that each supply and return line has a "loop seal" arrangement present in the piping. Preliminary analysis indicates that this "loop seal" is of sufficient size to provide for containment isolation in a manner similar to the NRC reviewed and approved piping from the Refueling Water Storage Tank (FWST) to the Residual Heat Removal (RHR) Pump Suction which also ties in with the RHR line from the Containment Sump. Therefore, no adverse effects are

present resulting from the spurious operation of the Excess Letdown Heat Exchanger vent and drain valves which isolate the Safety Related Duke Class B piping from the non-safety related Duke Class G piping.

The Containment Valve Injection Water System lines to the Excess Letdown Heat Exchanger Isolation Valves (KC305B and KC315B) have two check valves in series which are tested each outage to ensure backflow isolation. The NW check valves for these isolation valves have an excellent leakage history and therefore do not create a credible significant leakage path. There is a test vent located between the NW Check Valves and the KC 305B and KC 315B containment isolation valves. Each test vent is provided with a isolation valve and pipe cap. This arrangement is considered to provide adequate containment isolation capability, and would normally be considered exempt form Type C testing under ANSI N56.8, 1994, if it were a vent or drain on a containment penetration. Therefore, no adverse affects result from the NW supplied containment isolation valves remaining open with the Excess Letdown Heat Exchanger piping inside containment.

In summary, this preliminary safety analysis, indicates that the health and safety of the public would not be adversely affected by the proposed spurious operation of the Excess Letdown Heat Exchanger vent and drain isolation valves during the limiting design basis event.


KC
NW
Leakage for series check valves verified in PT/A/4200/01V
NW
KC
KC 315B
KC 305B
Valve and cap verified by OP/A/6200/19
KC Loop Seal - present on both supply and return appears to be large enough to ensure containment integrity.
KC 311 FAN
Duke Class G Drain Header Piping