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**DUKE POWER**

July 2, 1997

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Catawba Nuclear Station  
Docket No. 50-413  
LER 413/97-004

Gentlemen:

Attached is Licensee Event Report: **Inadequate Surveillance Resulting From a Conflicting Technical Specification Limiting Condition for Operation and Surveillance Requirement.**

This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

G. R. Peterson  
Site Vice-President

Attachment

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### LICENSEE EVENT REPORT (LER)

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TITLE (4)  
Inadequate Surveillance Resulting From a Conflicting Technical Specification Limiting Condition of Operation and Surveillance Requirement

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
5	14	97	97	004	00	7	2	97	Unit 2	05000414
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)									
POWER LEVEL (10) 100	<input type="checkbox"/>	20.402(b)	<input type="checkbox"/>	20.405(c)	<input type="checkbox"/>	50.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)		
	<input type="checkbox"/>	20.405(a)(1)(i)	<input checked="" type="checkbox"/>	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	<input type="checkbox"/>	73.71(c)		
	<input type="checkbox"/>	20.405(a)(1)(ii)	<input type="checkbox"/>	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	<input type="checkbox"/>	OTHER (Specify in		
	<input type="checkbox"/>	20.405(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	<input type="checkbox"/>	Abstract below and		
	<input type="checkbox"/>	20.405(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)	<input type="checkbox"/>	in Text, NRC Form		
	<input type="checkbox"/>	20.405(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(x)	<input type="checkbox"/>	366A)		

LICENSEE CONTACT FOR THIS LER (12)

NAME D. P. Kimball, Safety Review Group Manager	TELEPHONE NUMBER AREA CODE (803) 831-3743
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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**ABSTRACT** (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

**Unit Status:** Units 1 and 2 were in Mode 1, Power Operation, at 100% power.

**Event Description:** On June 6, 1997, Engineering determined that existing station procedures were not adequate to ensure the requirements of Technical Specification (T/S) surveillance 4.5.3.2 for Reactor Coolant (NC) system overpressure protection in Mode 4, Hot Shutdown, are satisfied. Follow-up analysis has determined that adequate pressure relief capacity was available to ensure the NC and Residual Heat Removal (ND) systems were protected from overpressure concerns.

**Root Cause:** This event is attributed to the interpretation of conflicting T/S requirements. Conflict exists between surveillance requirement 4.5.3.2 and T/S 3.5.3 in that the Limiting Condition for Operation (LCO) specifies a maximum of one Chemical and Volume Control (NV) system pump and one Safety Injection (NI) system pump operable in Mode 4, whereas the surveillance verifies all charging and safety injection pumps are inoperable except for one NV pump. This specification was interpreted in 1988 to be met when the requirements of the LCO are satisfied.

**Corrective Action:** Station procedures have been revised to ensure T/S surveillance 4.5.3.2 is met. Planned corrective actions include a T/S amendment crediting the use of the ND suction relief valves for overpressure protection which will allow the operability of a second charging pump when less than 285 degrees Fahrenheit in Mode 4 and causal analysis to evaluate events involving the T/S surveillance program.

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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

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BACKGROUND

The Chemical and Volume Control (NV) system [EIIS:CB], the Safety Injection (NI) system [EIIS:BQ], the Residual Heat Removal (ND) system [EIIS:BP], and the Refueling Water (FW) system [EIIS:DA] are part of the Emergency Core Cooling System (ECCS).

The NV system functions during normal unit operation and in support of the ECCS during mitigation of small-break and large-break loss of cooling accidents (LOCAs). During unit operation NV provides letdown, charging, chemical control, purification, and makeup for the Reactor Coolant (NC) system [EIIS:AB]. The NV system supports operation of the ECCS to cool the reactor [EIIS:RCT] core and control reactivity following any safety injection actuation. The NV system for each unit contains two train related centrifugal charging pumps [EIIS:P].

The NI system is normally aligned to inject borated water from the Refueling Water Storage Tank to the NC cold legs upon receipt of a safety injection signal. Two NI pumps are provided per unit in parallel trains.

The ND system is normally aligned to function as part of the ECCS to remove residual heat from the NC system. Each unit contains two parallel ND trains. ND, when operated as an extension of NC during decay heat removal, provides the NC system with overpressure protection via ND pump suction side relief valves (ND3 for train A and ND38 for train B).

Technical Specification (T/S) 3.5.3 requires that in Mode 4, Hot Shutdown, as a minimum, one ECCS subsystem comprised of the following shall be operable:

- a) One operable centrifugal charging pump, #
- b) One operable residual heat removal heat exchanger,
- c) One operable residual heat removal pump, and
- d) An operable flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

The T/S footnote describing the conditions noted by the "#" for statement "a" states that a maximum of one centrifugal charging pump and one safety injection pump shall be operable whenever the temperature of one or more of the reactor coolant system cold legs is less than or equal to 285 degrees Fahrenheit (F).

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Surveillance requirement 4.5.3.2 states that all charging and safety injection pumps, except the above required operable centrifugal charging pump, shall be demonstrated inoperable by verifying that the motor circuit breakers are secured in the open position or the discharge of each pump has been isolated from the reactor coolant system by at least two isolation valves with power removed from the valve motor operator at least once per 12 hours whenever the temperature of one or more of the reactor coolant system cold legs is less than or equal to 285 degrees F.

Low-temperature overpressure protection (LTOP) is required in pressurized water reactors to provide protection against brittle failure of the reactor pressure vessel following an anticipated event. Appendix G to 10CFR50 provides the fracture toughness requirements for the reactor pressure vessel under certain conditions.

LTOP is required in the shutdown modes of operation, Mode 4 - Hot Shutdown (with the temperature of one or more NC cold legs less than or equal to 285 degrees F), Mode 5 - Cold Shutdown, and Mode 6 - Refueling, when the head is on the reactor vessel. T/S 3.4.9.3 sets the requirements for LTOP in these modes.

Procedure PT/1(2)/A/4600/02D, Mode 4 Periodic Surveillance, is used to verify compliance with T/S surveillance requirement 4.5.3.2.

### EVENT DESCRIPTION

May 14, 1997 Engineering identified contradictions within the requirements of T/S 3.5.3 and surveillance requirement 4.5.3.2. An investigation was initiated per Nuclear System Directive 208, Problem Investigation Process.

May 14-  
June 6, 1997 Engineering evaluated the licensing bases for T/S 3.5.3, technical bases for LTOP, and identified station procedures impacted by the apparent conflict with T/S 3.5.3 and its associated surveillance 4.5.3.2. Engineering reanalyzed existing calculations to ensure adequate relief capacity has existed using the current procedures.

June 6, 1997 This issue was determined to be reportable due to station procedures not satisfying the requirements of surveillance 4.5.3.2.

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CONCLUSION

This event is attributed to the interpretation of conflicting T/S requirements. T/S 3.5.3 and surveillance requirement 4.5.3.2 are contradictory in that the Limiting Condition for Operation (LCO) details the operability of a maximum of one NV and one NI pump during Mode 4 when the temperature of one or more of the NC system cold legs is less than or equal to 285 degrees F, whereas the surveillance requirement verifies the inoperability of all NV and NI pumps except for the "required operable NV pump." The bases contains the same conflict.

The periodic test program acceptance criteria for this T/S was initially designed to verify compliance with the surveillance requirement. However, in 1988, compliance with this T/S was interpreted to be satisfied by verification of the requirements set forth in the LCO rather than the surveillance requirement.

A review of station procedures revealed that surveillance requirement 4.5.3.2 was correctly performed prior to February, 1988. At this point, procedure PT/1(2)/A/4600/02D, Mode 4 Periodic Surveillance, was revised from verification of surveillance requirement 4.5.3.2 to verification of the LCO requirements.

Though the surveillance requirement was not being properly performed following the change to PT/1(2)/A/4600/02D, NI and NV system alignment were correctly maintained with respect to pump operability/inoperability in Mode 4 per station operating procedures through March 1991.

OP/1(2)/A/6200/06, NI System, enclosure 4.2, Removing the Safety Injection System from Standby Readiness, was revised in March 1991 to maintain two high head safety injection pumps (rather than one) which could reduce the probability of safety injection system failure. This was in response to Westinghouse Owners Group (WOG) study "Shutdown LOCA Analysis Concerns That Relate to the Interim Guidance (June 1990)." This study is being reviewed by the NRC.

Corrective actions have been implemented to ensure station operating procedures are in compliance with surveillance requirement 4.5.3.2. Additionally, Mode 5 and 6 procedures will be evaluated and revised as necessary to ensure that the requirements of T/S surveillance 4.5.3.2 are carried forward into these modes as implied in the bases to LTOP T/S 3.4.9.3. Station Directive 3.1.30, Unit Shutdown Configuration Control, and Work Process Manual 607 will also be evaluated and revised if necessary

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to ensure guidance contained within these documents is consistent with surveillance requirement 4.5.3.2. Additionally, to support Catawba's use of an NI pump during Mode 4 to provide improved outage risk management, a change to the ECCS and LTOP T/S will be developed crediting use of the ND suction relief valves.

There are no NPRDS reportable equipment failures associated with this event.

A review of the Operating Experience Database for the thirty six months prior to this event revealed nine reportable events which involve the T/S surveillance program. The specifics and cause of the current event are dissimilar to the previous events and the corrective actions prescribed for those events would not have identified or corrected the current event. However, the general event code of "surveillance testing" is noted as being recurring and warrants additional causal analysis.

### CORRECTIVE ACTION

#### SUBSEQUENT

- 1) PT/1(2)/A/4600/02D, Mode 4 Periodic Surveillance, has been revised to verify the inoperability of one NV and both NI pumps in Mode 4 when average NC temperature is less than 350 degrees F and prior to any NC cold leg temperature being less than 285 degrees F.
- 2) PT/1(2)/A/4600/19D, Pre-Mode 4 Surveillance, has been revised to ensure compliance with T/S surveillance requirement 4.5.3.2.
- 3) OP/1(2)/A/6200/06, Safety Injection System, Enclosure 4.2, has been revised to require that both NI pump motor breakers be racked out and safety tagged with power removed when average NC temperature is less than 350 degrees F and prior to any NC cold leg temperature being less than 285 degrees F.
- 4) Emergency procedures have been evaluated and revised to ensure that the requirements of T/S surveillance 4.5.3.2 are met.
- 5) OP/1(2)/A/6100/02, Controlling Procedure for Unit Shutdown, will be revised to ensure T/S surveillance 4.5.3.2 is met.

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### PLANNED

- 1) Catawba Site Directive 3.1.30, Unit Shutdown Configuration Control, will be evaluated and revised as necessary to ensure T/S surveillance 4.5.3.2 is met.
- 2) Work Process Manual 607 will be evaluated and revised if necessary to ensure T/S surveillance 4.5.3.2 is met.
- 3) Mode 5 and 6 (when the head is on the reactor vessel) procedures will be evaluated and revised as necessary to ensure the requirements of T/S surveillance 4.5.3.2 are met in these modes.
- 4) A common cause analysis will be performed to analyze the noted trend in missed T/S surveillances.
- 5) A T/S amendment will be developed, crediting the use of the ND suction relief valves to provide LTOP protection, to allow the operability of a NI pump during Mode 4 below 285 degrees F.

### SAFETY ANALYSIS

Engineering calculation CNC-1223.03-90-0005, Pressurizer [EIIS:PZR] Power Operated Relief Valve [EIIS:RV] (PORV) Setpoint Verification for LTOP, Revision 6, demonstrates that when one train of the ND System is in service, taking suction from the NC hot legs, the ND suction safety relief valve, provides sufficient relief capacity for the inadvertent start of a safety injection pump. Single failure criteria remains valid in that any two of the three available relief valves will be adequate for LTOP.

At least one train of the ND system has been open to the NC system before an NC cold leg temperature has reached less than or equal to 285 degrees F for reactor trips, forced outage shutdowns, and planned refueling outage shutdowns. Review of four recent shutdown evolutions has confirmed that for Mode 4 below 285 degrees F, and for Modes 5 and 6 with the head on the reactor pressure vessel, the suction isolation valves for one train of ND have always been aligned below 350 degrees F, but above 285 degrees F.

Additionally, it has been confirmed that OP/1(2)/A/6100/02, Controlling Procedure for Unit Shutdown, from the 1991 time frame forward has contained steps to open at least one train of ND to the NC system and remove power to the isolation valves to prevent their spurious closure.

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Therefore, though procedures to ensure that T/S surveillance 4.5.3.2 has been satisfied were determined to be inadequate, an ND suction relief valve has been available to provide overpressure protection for the NC and ND systems providing assurance that 10CFR50 Appendix G limits would not have been exceeded.

The health and safety of the public were not affected by this event.