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Region 2, Atlanta, Office of the Director

SUBJECT: LER 79-021/01T-1:on 790704 leak in LPI cooler released approx 456 UCI of corrosion & fission products into Lake Keowee.Caused by overpressurization of cooler due to leakag past cooler inlet valves & improper relief valve setpoint.

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	09 I&E	2	2	11 MPA	3	3
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DUKE POWER COMPANY
Oconee Unit 1

Report Number: RO-269/79-21

Report Date: September 24, 1979

Occurrence Date: July 4, 1979

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Low Pressure Injection Cooler Leak

Conditions Prior to Occurrence: Cold Shutdown

Description of Occurrence:

During startup of Oconee 1 on July 4, 1979, low pressure injection (LPI) cooler 1A was determined to be leaking to the condenser cooling water system. The leak allowed approximately 456 microcuries of corrosion and fission products to be released to Lake Keowee. The decay heat removal system was in a switchover mode in anticipation of heatup of the primary system when an increase in the activity recorded by the low pressure service water (LPSW) discharge monitors was noted, indicating a possible primary-to-secondary leak from one of the two LPI coolers, In the switchover mode, reactor coolant is circulated by both the reactor coolant pumps and LPI pump 1A. Reactor coolant passes through LPI cooler B, where heat is rejected, and is returned to the primary loop by LPI pump 1A. LPI cooler 1A is isolated during this mode of operation. By alternately isolating each cooler and sampling the LPSW discharge, it was determined that LPI cooler 1A was leaking slightly. The cooler was isolated and the tube side was drained to permit eddy-current testing to be performed. When an attempt was made to vent the shell side, valve LPSW-238, the cooler discharge activity monitor line isolation valve, was inadvertently opened rather than the drain valve. The activity monitors again alarmed, but the alarms cleared when valve LPSW-238 was reclosed approximately ten minutes later. Eddy-current testing revealed five tubes with through-wall indications of greater than 40%. Upon further investigation with a fiberscope, a gouge-like cut was indicated on the inside of one of the tubes. Each of the five tubes was plugged. One additional tube was plugged by mistake. From July 12 to July 15, 1979, LPSW outlet samples were taken every three hours, and it was determined that activity levels had returned to within permissible limits. The cooler was then declared operable and returned to service.

Apparent Cause of Occurrence:

Although there was no flow through LPI cooler 1A, it was apparently over-pressurized as a result of leakage through the inlet isolation valves. Over-pressure protection is provided by a relief valve at the cooler inlet, but the relief valve setpoint was discovered to be 555 psig, which is the hydrostatic test pressure for the cooler, rather than the cooler design pressure of 370 psig. During operation in the switchover mode, the pressure at the inlet to LPI cooler 1A was approximately 475 psig. Although under normal conditions such a pressure would not cause tubes to leak, it could result in slight leakage from tubes weakened by manufacturing defects or erosion.

Analysis of Occurrence:

Since the tube leaks were very slight, a total of only approximately 456 microcuries of corrosion and fission products was released to Lake Keowee. In addition, if decay heat removal capability had been required, LPI cooler B was available and in proper condition. The six tubes removed from service represent a very small decrease in the heat transfer area of the cooler, well within the safety factor allowed by the cooler design. However, the leakage constitutes abnormal degradation of a reactor coolant pressure boundary, and must therefore be reported pursuant to Oconee Nuclear Station Technical Specification 6.6.2.1.a(3), although it is considered to be of no significance with respect to safe operation of the unit, and the health and safety of the public were not affected.

Corrective Action:

The immediate corrective action was to isolate and drain the leaking cooler. The five tubes which exhibited through-wall indications greater than 40% were plugged. The LPSW discharge monitor isolation valve has been clearly marked to preclude inadvertantly opening it subsequent to isolating the cooler. In order to preclude overpressurization of the cooler in the future, operating procedures will be revised to assure that the cooler inlet valves are closed tightly. In addition, the relief valve at the cooler inlet was reset to the cooler design pressure of 370 psig. The need for better isolation of the secondary side of the cooler will be evaluated, and consideration will be given to adding an intermediate closed loop cooling system for the LPI coolers.

NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

EXHIBIT A

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

Line	Field	Value
01	Licensee Code (2)	S C N E E 1
01	License Number (3)	0 0 - 0 0 0 0 0 - 0 0
01	License Type (4)	4 1 1 1 1
01	CAT (5)	
CON'T 01	Report Source (6)	L
01	Docket Number (7)	0 5 0 0 0 2 6 9
01	Event Date (8)	0 7 0 4 7 9
01	Report Date (9)	0 9 2 4 7 9

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 On July 4, 1979, a slight leak in LPI cooler A allowed approximately 456
03 microcuries of corrosion and fission products to be released to Lake Keowee.
04 Since the release was very small and since the other LPI cooler was available
05 to remove decay heat if required, the leakage is considered to be of no
06 significance with respsect to safe operation and the health and safety of the
07 public were not affected.
08

Line 09	System Code (11)	Cause Code (12)	Cause Subcode (13)	Component Code (14)	Comp. Subcode (15)	Valve Subcode (16)
	S F	E	C	H T E X C H	C	Z

(17) LER/RO Report Number	Event Year		Sequential Report No.		Occurrence Code	Report Type		Revision No.
	7 9	—	0 2 1	/	0 1	T	—	1

Action Taken (18)	Future Action (19)	Effect on Plant (20)	Shutdown Method (21)	Hours (22)	Attachment Submitted (23)	NPRD-4 Form Sub. (24)	Prime Comp. Supplier (25)	Component Manufacturer (26)
B	G	C	Z	0 3 0 0	Y	Y	L	B 0 1 5

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 The LPI cooler leak is the result of overpressurization of the cooler due to
11 leakage past the cooler inlet valves and an improper relief valve setpoint.
12 Five tubes which showed through-wall degradation greater than 40% were
13 plugged. Administrative actions will be taken to preclude overpressurization
14 in the future.

Line	Field	Value
15	Facility Status (28)	G
15	% Power (29)	0 0 0
15	Other Status (30)	NA
15	Method of Discovery (31)	A
15	Discovery Description (32)	Operator observation
16	Activity Released (33)	M
16	Content of Release (34)	M
16	Amount of Activity (35)	456 microcuries
16	Location of Release (36)	LPSW discharge to Lake Keowee
17	Personnel Exposures Number (37)	0 0 0
17	Type (38)	Z
17	Description (39)	NA
18	Personnel Injuries Number (40)	0 0 0
18	Description (41)	NA
19	Loss of or Damage to Facility Type (42)	Z
19	Description (43)	NA
20	Publicity Issued (44)	Y
20	Description (45)	Press release on July 5, 1979

NRC USE ONLY

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