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U.S. Nuclear Regulatory Commission
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Subject: Oconee Nuclear Station
Docket Nos. 50-269,-270, -287
Licensee Event Report 50-269/2000-03, Revision 00
Problem Investigation Process No.: O-00-2141

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 269/2000-03, concerning operation with two trains of the Chilled Water System out of service. In this condition, the plant's Technical Specifications require entry into Technical Specification 3.0.3.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

W. R. McCollum, Jr.

Attachment

IE22

cc: Mr. Luis A. Reyes
Administrator, Region II
U.S. Nuclear Regulatory Commission
61 Forsyth Street, S. W., Suite 23T85
Atlanta, GA 30303

Mr. D. E. LaBarge
U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555

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700 Galleria Parkway, NW
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Mr. M. C. Shannon
NRC Senior Resident Inspector
Oconee Nuclear Station

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control nurmber, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)
TS 3.0.3 Entry due to Control Room Cooling Chillers

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
06	06	00	2000	- 03 -	00	07	06	00	Unit 2	05000 - 270
									Unit 3	05000 - 287

OPERATING MODE (9)	1
POWER LEVEL (10)	100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(I)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
L.E. Nicholson, Regulatory Compliance Manager	(864) 885-3292

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	KM	CHU	Y018	YES						

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

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

On June 6, 2000, while Oconee Units 1, 2, and 3 were operating at 100% power, Control Room Zone (CRZ) HVAC Chiller "B" tripped at 14:13 while Chiller "A" was removed from service for maintenance. Technical Specification (TS) 3.0.3 was entered for all three units due to a loss of required chilled water per TS 3.16.7, Condition E. Chiller "A" was restored to operation per the maintenance contingency plan at 14:33. TS 3.0.3 was exited before the shutdown power reduction was initiated.

Chiller "B" tripped due to a failure of one of two solenoids that control chiller load. The apparent cause of the solenoid failure was the failure of a time delay relay installed in Chiller "B" in 1995. The failed time delay relay was removed, the failed solenoid replaced, and other potentially damaged circuit components replaced. Chiller "B" was tested and determined Operable at 13:45 on June 9, 2000.

During the 20-minute period both chillers were out of service, CRZ temperatures increased slightly, but remained well within TS 3.6.17 limits. This event is considered of no significance with respect to the health and safety of the public.

EVALUATION:

BACKGROUND

This event is reportable per 10CFR 50.73(a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications." This event placed Units 1, 2, and 3 in Technical Specification (TS) 3.7.16, Condition E, which requires entry into LCO 3.0.3.

Oconee Units 1 and 2 share a common Control Room, while Unit 3 has a separate Control Room.

The Oconee Control Room Area Cooling System (CRACS) [EIIS:VI] is composed of two sub-systems: The Control Room Ventilation System (CRVS) and the Chilled Water (WC) [EIIS:KM] system. The CRVS includes Air Handling Units (AHUs) [EIIS:AHU] (i.e. fans, cooling coils, and dampers), ductwork, etc. to maintain a suitable environment for equipment and operating personnel in the Control Rooms and the associated Cable Rooms, Electrical Equipment Rooms, and areas called the Control Room Zone. During normal operation, the CRACS must maintain the Control Room Zone temperatures within the limits assumed as initial conditions within the post-accident analyses. Provided that the temperatures within these areas are within the assumed limits at the start of an event, the CRACS cooling function is not required during the first 18 hours of an event.

WC supports the CRACS for both Control Rooms. The major components of the WC System are chillers [EIIS:CHU], pumps, valves, piping, and controls. The main piping header is shared between units and is common to both trains. The two chillers and water circulation pumps are divided into two trains located in the Turbine Building basement. The WC piping divides into two trains at each pair of AHUs.

The "A" and "B" chillers are YORK model YS DC DB S3 CNA0 rotary screw chillers. They were installed by minor modification ONOE-4326 in March 1992 as replacements for previous models.

On March 27, 1999, Oconee implemented Improved Technical Specifications (ITS). One change from the previous Customized Technical Specifications was that ITS 3.7.16 incorporated a

limiting condition for operation for CRACS. If one train of either the CRVS (air side) or the WC (water side) of the system is inoperable, a 30 day action statement applies. However, if both trains of either CRVS or WC are inoperable on the same Control Room, ITS 3.0.3 applies. ITS also includes a surveillance requirement to verify the Control Room temperature is less than or equal to 80F once every 12 hours. If the Control Room temperature exceeds 80F, a 7-day action statement applies.

Prior to this event, all three units were operating at 100% power. No other safety systems or components were out of service that would have contributed to this event.

EVENT DESCRIPTION

On the morning of June 6, 2000, all three Oconee units were operating in Mode 1 at 100% with Chiller "A" inservice.

At 09:17, Chiller "B" was removed from stand-by and taken out of service for planned maintenance: The TS 3.7.16, Action B, 30-day action statement was entered. The maintenance plan for this complex maintenance included contingencies for the possibility an operating chiller trip. As part of that maintenance, a control circuit board was replaced with a newer model, which would accommodate Chiller data monitoring for improved preventative and predictive maintenance. Following completion of maintenance, Chiller "B" was started at approximately 10:20 for its post maintenance test (PMT).

During the PMT, Chiller "B" tripped twice due to an additional option on the new control board to verify condenser water flow. The problem was resolved by installing a jumper in the "B" Chiller control cabinet to satisfy the new condenser water flow trip option. Chiller "B" was restarted at 11:15 and operated normally.

The PMT was declared successfully completed and Chiller "B" was declared operable at 12:55.

At 13:09 Operations declared Chiller "A" out of service and began tagging it to replace the new control circuit board and to perform other maintenance.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

After Chiller "A" had been tagged out and work had been initiated, Non-Licensed Operators (NLOs) in the vicinity smelled a burning odor coming from the area of Chiller "B". The NLOs immediately contacted the Work Control Center (WCC) and Maintenance personnel involved with the chiller work. The Maintenance personnel began investigating the status of Chiller "B".

Operations personnel began restoring Chiller "A" to operation per the contingency plan that was included in the work plan for this maintenance evolution.

At 14:13, Chiller "B" tripped: TS 3.0.3 was entered per TS 3.7.16, Condition E. No attempt was made to restart Chiller "B" because smoke was observed coming from a solenoid on the slide control valve which controls chiller load.

As part of the contingency plan, Maintenance personnel reinstalled the original control circuit board in Chiller "A" and initiated action to clear the safety tags to return Chiller "A" to service.

Chiller "A" was returned to service at 14:33: TS 3.0.3 and TS 3.7.16, Condition E were exited prior to initiating a power reduction for shutdown of the three units required by TS 3.0.3.

The Control Room Zone temperatures for all three units increased slightly as a result of the chillers being out of service for this 20 minute period. The Control Room remained less than the 80F TS limit.

Maintenance found two solenoid valves simultaneously energized that control hydraulic fluid that positions the slide control valve of Chiller "B". Only one of the solenoid valves should have been energized. Both solenoid valves remained energized until one of them overheated and failed.

The solenoid which had failed and a digital relay card which may have failed were replaced on June 7, 2000. Subsequent diagnostic testing revealed that both solenoid valves remained energized.

A low oil level trip time delay relay was installed in 1995 due to spurious low oil level trips on startup of Chiller "B". A similar time delay relay was unneeded for Chiller "A" and therefore not installed. The problem that prompted installation of this time

delay relay had been consequently eliminated by service water system modifications in 1998 and the relay was no longer needed.

The time delay relay was removed from the "B" Chiller circuit on June 7, 2000, and the diagnostic testing repeated. System response was now observed to be normal with the solenoid valves being energized individually per the design. The time delay relay was determined to have failed.

Because the solenoid and digital relay card that were replaced on June 7, 2000, may have been degraded by the failed time delay relay prior to its removal, these components were replaced as a conservative measure. Diagnostic testing found these replaced components to function within normal parameters. Chiller "B" was placed in service at 13:45 on June 8, 2000, and declared OPERABLE at 13:45 on June 9, 2000, after successfully operating for 24 hours.

CAUSAL FACTORS

The Chiller "B" failure appears to have occurred as the result of failure of the low oil level trip time delay relay. As described above, diagnostic testing with the relay removed found normal system response. The time delay relay is a Mars model 32392 with a time delay on restart.

When the time delay relay failed, it is postulated its power supply voltage was reduced or biased such that other control circuitry energized both control slide valve solenoids leading to the failure of one of the two solenoid coils.

Evidence suggests the time delay relay failed approximately two hours after replacement of the control circuit board because the chiller ran acceptably after its return to service at 11:15 on June 6, 2000. The cause of the time delay relay failure cannot be determined.

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CORRECTIVE ACTIONS

Immediate:

1. Chiller "A" restored to service within 20 minutes: TS 3.0.3 was exited prior to initiation of Unit shutdown.

2. The low oil level time delay relay was removed from Chiller "B".

There are no other corrective actions. There are no NRC Commitment items contained in this LER.

SAFETY ANALYSIS

An additional function related to CRACS is the function of the Control Room Ventilation System Booster Fans to provide filtered air to pressurize the control room for control of radioactive and chemical contaminants. This event had no impact on the booster fans, Control Room pressurization, or post-accident Control Room doses.

As stated in the Background section of this report, the CRACS sub-systems CRVS and WC function during normal operation to maintain the Control Room, Cable Room, and Equipment Room temperatures within the limits assumed within the post-accident analyses as initial conditions.

The control, cable, and equipment room temperatures did not exceed TS limits or assumed limits on initial conditions during this event.

The most limiting scenario for CRACS with respect to temperature control is the LOCA-LOOP (LOCA with loss of off-site power) scenario because the CRACS AHU fans, the WC chillers, and WC pumps are assumed to trip off. System restoration requires manual operator action.

The temperature at which limiting components are assumed to become inoperable is 120F in the cable and equipment rooms and 100F in the control room. The calculated time to reach these limits following a LOCA-LOOP, assuming no cooling, is greater than 18 hours.

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The Loss of Power Abnormal Procedure is referenced by the Emergency Operating Procedure and contains steps to restore power to the CRACS AHUs and the WC system and to restart the CRACS system within 18 hours after the initial event. Actual restart would be expected to occur much sooner.

If the problems encountered during this event were to occur associated with a design basis event, such as a LOCA-LOOP, site personnel would be required to diagnose the problem and restore the system to proper operation prior to reaching the operating limits of any essential components.

In an accident scenario, the Emergency Response Organization would be in place soon after the initial event and possibly prior to restart of the CRACS system. The Technical Support Center and Operational Support Center are located within the Control Room areas and would be able to direct and co-ordinate troubleshooting and repair activities such as those required to restore the "A" and "B" Chillers in this event. During this event, the actual time from the initial chiller trip until Chiller "B" was restored was less than three hours. Therefore, given the staffing available in an accident scenario, the diagnosis and correction of this type of problem can reasonably be expected to occur within the 18 hours supported by heat up calculations. Restoring the system within that time would prevent the operating limits of any components from being exceeded.

Therefore, engineering judgement indicates that this event did not prevent the fulfillment of any safety function and did not result in a Safety System Functional Failure.

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

ADDITIONAL INFORMATION

Licensee Event Report 50-269/2000-02, dated April 6, 2000, also addressed entry into TS 3.0.3 due to inoperable chillers. However, in that case, the chillers tripped on low refrigerant due to maintenance work practices. Thus, the causes of these events are different and they are not considered recurring.

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There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event is considered reportable under the Equipment Performance and Information Exchange (EPIX) program.