

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): CRYSTAL RIVER UNIT 3
DOCKET NUMBER (2): 05000302
PAGE 1 OF 5

TITLE (4): Personnel Error During Original Plant Design Specification Development Leads to Ultimate Heat Sink Temperature Exceeding Limit and to Operation Outside Design Basis

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 NAMES		
09	03	87	87	020	01	01	22	88	N/A		
									DOCKET NUMBER(S)		
									05000302		
									N/A		
									05000302		

OPERATING MODE (9): 1
POWER LEVEL (10): 0.63

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.408(a)	<input type="checkbox"/> 90.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.408(a)(1)(ii)	<input type="checkbox"/> 90.38(a)(1)	<input type="checkbox"/> 90.73(a)(2)(v)	<input type="checkbox"/> 73.71(a)
<input type="checkbox"/> 20.408(a)(1)(iii)	<input type="checkbox"/> 90.38(a)(2)	<input type="checkbox"/> 90.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)
<input type="checkbox"/> 20.408(a)(1)(iv)	<input type="checkbox"/> 90.73(a)(2)(i)	<input type="checkbox"/> 90.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.408(a)(1)(v)	<input checked="" type="checkbox"/> 90.73(a)(2)(ii)	<input type="checkbox"/> 90.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.408(a)(1)(vi)	<input type="checkbox"/> 90.73(a)(2)(iii)	<input type="checkbox"/> 90.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12):

NAME: L. W. Moffatt, Nuclear Safety Supervisor
TELEPHONE NUMBER: 904795-6486

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14): YES (If yes, complete EXPECTED SUBMISSION DATE:) NO

EXPECTED SUBMISSION DATE (15): MONTH 06, DAY 30, YEAR 88

ABSTRACT (Limit to 1400 spaces; i.e. approximately fifteen single-space typewritten lines) (16):

On September 3, 1987, Crystal River Unit 3 (CR3) was operating at approximately 63% Rated Thermal Power. An NRC audit of plant cooling water systems revealed that the Ultimate Heat Sink (UHS) temperature exceeded the maximum value assumed in the plant design basis. Also, the plant Technical Specification limit for UHS temperature was higher than the design basis. This event was the result of an inadequate plant design specification. The maximum seawater temperature specified for plant design was 85 degrees F., while actual temperatures exceed this value during the summer months. The Technical Specification error appears to have been caused by inadvertently selecting a temperature limit from a closed cycle cooling loop rather than the UHS design specification. Analyses indicate that the Nuclear Services Closed Cycle Cooling System 105 degree F. temperature limit can be met with seawater temperatures as high as 92.3 degrees F if only two Reactor Building (RB) fan coolers are used. CR3 operation continued based on this analysis until September 19, 1987 when it was shut down for a refueling outage. CR3 restarted based on a revised Technical Specifications limit of 85 F. All three RB fan coolers can be used. FPC continues to evaluate the maximum temperatures permitted in the closed cycle cooling systems and the ultimate heat sink.

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TEXT (if more space is required, use additional NRC Form 388A 2/17)

EVENT DESCRIPTION

On August 27, 1987, Crystal River Unit 3 (CR3) was in cold shutdown (Mode 5) to replace a degraded Reactor Coolant Pump seal [AB,SEAL]. A Nuclear Regulatory Commission team was on site conducting an audit of plant cooling water systems. During the audit, a member of the NRC team noted some discrepancies in the Ultimate Heat Sink (UHS)[BS] temperature limits. The maximum seawater (Ultimate Heat Sink) temperature referenced in the Crystal River Unit 3 Final Safety Analysis Report (FSAR) and Design Basis Document is 85 degrees F. However, the Crystal River Unit 3 Technical Specifications contained a seawater temperature limit of 105 degrees F. The seawater intake temperature at that time was near 90 degrees F. At the time of discovery, it was suspected that the 85 degrees F. seawater temperature referenced in the FSAR and Design Basis Document was incorrect and the temperature used for plant design was actually significantly higher.

On September 3, 1987, the plant was operating (Mode 1) at 63% Rated Thermal Power, generating 537 MWe. Power was limited because one Reactor Coolant Pump [AB,P] was out of service. At 10:00 am, it was concluded that 85 degrees F. was the seawater temperature assumed for plant design and that the plant was operating in a condition outside the design basis. Revision 00 of this report was submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

CAUSE

This event was the result of an inadequate plant design specification. An inappropriate maximum seawater temperature was chosen when specifications for plant design were originally established in 1967. The maximum temperature was specified as 85 degrees F., while actual temperatures (measured at the plant main condenser intake [NN]) exceed this during the summer months.

It could not be established where the Technical Specification value of 105 degrees F. originated. However, the value corresponds with the Nuclear Services and Decay Heat Closed Cycle Cooling Water Systems' heat exchanger [CC,HX] design outlet temperatures (see Figure 1). This value could have been inadvertently applied to the Ultimate Heat Sink Technical Specification temperature limit.

EVENT ANALYSIS

The Nuclear Services and Decay Heat Seawater System [BI] removes heat from closed cycle cooling systems serving critical plant components and rejects it to the environment. Elevated seawater temperatures will reduce the heat removal capability of this system and could affect the ability to adequately cool the closed cycle systems and their associated components (see Figure 1).

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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 365A 2 (17)

The elevated seawater temperature was analyzed by the Crystal River Unit 3 Architect/Engineer to assess its impact upon the Nuclear Services Closed Cycle Cooling System which serves various plant components including the Reactor Building fan cooler units [BK,HX]. The results of the analysis indicated that the design temperature of this cooling system could not be maintained, under accident conditions, with seawater temperatures in excess of 86 degrees F.

This analysis was performed using the assumption that all three Reactor Building fan cooler units were operating following an accident. Further analysis showed that the Nuclear Services Closed Cycle Cooling System design temperature of 105 degrees F. could be maintained by seawater temperatures as high as 92.3 degree F. if only two of the Reactor Building fan cooler units were operating following an accident.

Continuous plant operating with only two fan cooler units operable is allowed by the Crystal River Unit 3 Technical Specifications. Additionally, an evaluation of the Reactor Building [NH] response to reduced cooling capacity (performed for unrelated reasons) during an accident was consulted. This evaluation concluded that the peak Reactor Building pressures and temperatures experienced during a high energy line break accident (LOCA) are virtually unaffected by the presence or absence of all three fan cooler units. Therefore, removal of one fan cooler unit from service during an accident would be an acceptable operating condition.

CR3 continued to operate based on this analysis until entering a Refueling Outage on September 19, 1987. Florida Power Corporation is working with Babcock & Wilcox and Gilbert Associates Inc. to establish new, higher temperature limits for the closed cycle cooling systems and the ultimate heat sink. This evaluation requires analyzing every cooling load and, in many cases, requires going back to the individual equipment vendors to determine the minimum cooling requirements. This evaluation could not be completed in time for startup so CR3 is operating under the original design basis limitations of seawater temperature not to exceed 85 degrees F.

Florida Power Corporation is keeping the NRC informed of all work and findings related to this subject. A supplement to this LER will be issued when the new operating limits are determined.

CORRECTIVE ACTION

An analysis was performed when this event was discovered to determine the effect of the elevated seawater temperature on plant cooling requirements. The results of the analysis indicated that adequate cooling could be maintained with the higher seawater temperature (up to 92.3 degrees F.). The Plant Review Committee (PRC) met at 8:00 am on September 3, 1987 to evaluate this event. The PRC directed the plant operations staff to develop appropriate

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guidance for reducing Nuclear Services Closed Cycle Cooling System heat loads if plant components were not being adequately cooled. Existing procedures were determined to include adequate guidance and no further compensatory actions were considered necessary. CR3 operated under this evaluation until shutting down on September 19, 1987 for a refueling outage.

Prior to plant restart, FPC sought and obtained permission to operate the plant under a revised STS limiting the seawater temperature to less than or equal to 85 degrees F. FPC is continuing to evaluate the closed cycle systems performance at UHS temperatures in excess of the maximum expected during summer months, based on historical data. Appropriate system and documentation changes will be implemented prior to the UHS temperature exceeding the current 85 degree F limit.

FPC is currently in the process of implementing a Configuration Management Program for Crystal River Unit 3. Among the goals for this program is the validation of design bases associated with plant systems and components and to assure these bases are appropriately reflected in operational documents.

PREVIOUS SIMILAR EVENTS

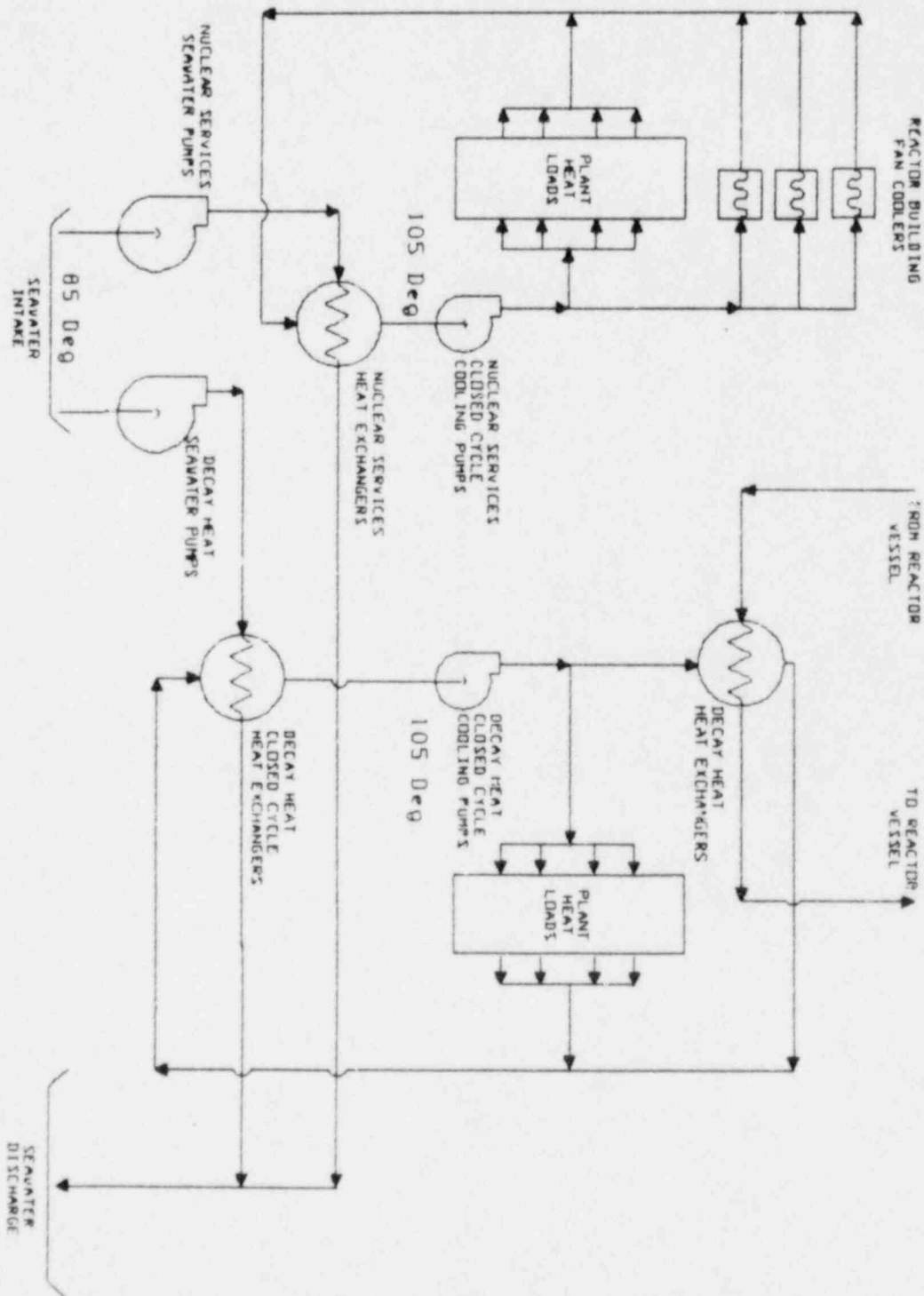
This is the first LER submitted regarding the Ultimate Heat Sink temperature exceeding the plant design basis.

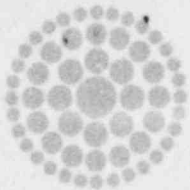
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FIGURE 1





**Florida
Power**
CORPORATION

January 20, 1988
3F8801-20

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

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
Licensee Event Report No. 87-020-01

Dear Sir:

Enclosed is Licensee Event Report (LER) 87-020-01 which is submitted in accordance with 10 CFR 50.73.

Should there be any questions, please contact this office.

Sincerely,

W. S. Wilgus
Vice President
Nuclear Operations

WLR:maj

Enclosure

xc: Dr. J. Nelson Grace
Regional Administrator, Region II

Mr. T. F. Stetka
Senior Resident Inspector

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