

# PRIORITY 1

ACCELERATED RIDS PROCESSING

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9503020147      DOC. DATE: 95/02/23      NOTARIZED: NO  
FACIL: 50-269 Oconee Nuclear Station, Unit 1, Duke Power Co.  
AUTH. NAME      AUTHOR AFFILIATION  
WILKIE, L.V.      Duke Power Co.  
HAMPTON, J.W.      Duke Power Co.  
RECIP. NAME      RECIPIENT AFFILIATION

DOCKET #  
05000269

SUBJECT: LER 95-002-00: on 950126, concluded that kw/ft limits in ECCS analysis not sufficient to ensure that PCT criterion of 2,200 F will not be exceeded in event of large break LOCA. New power imbalance limits implemented. W/950223 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6  
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

### NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD2-3 PD	1 1	WIENS, L	1 1
INTERNAL:	ACRS	1 1	AEOD/SPD/RAB	1 1
	AEOD/SPD/RRAB	1 1	FILE CENTER 02	1 1
	NRR/DE/ECGB	1 1	NRR/DE/EELB	1 1
	NRR/DE/EMEB	1 1	NRR/DISP/PIPB	1 1
	NRR/DOPS/OECB	1 1	NRR/DRCH/HHFB	1 1
	NRR/DRCH/HICB	1 1	NRR/DRCH/HOLB	1 1
	NRR/DRSS/PRPB	2 2	NRR/DSSA/SPLB	1 1
	NRR/DSSA/SRXB	1 1	RES/DSIR/EIB	1 1
	RGN2 FILE 01	1 1		
EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE, J H	2 2
	NOAC MURPHY, G.A	1 1	NOAC POORE, W.	1 1
	NRC PDR	1 1	NUDOCS FULL TXT	1 1

### NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL  
DESK, ROOM P1-37 (EXT. 504-2083) TO ELIMINATE YOUR NAME FROM  
DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED  
TOTAL NUMBER OF COPIES REQUIRED: LTTR 27 ENCL 27

A04

Duke Power Company  
Oconee Nuclear Site  
P.O. Box 1439  
Seneca, SC 29679

J. W. HAMPTON  
Vice President  
(803)885-3499 Office  
(803)885-3564 Fax



**DUKE POWER**

February 23, 1995

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

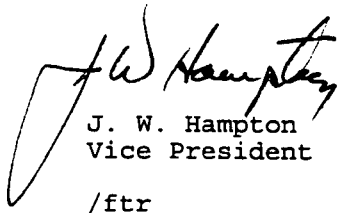
Subject: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287  
LER 269/95-02

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 269/95-02, concerning a vendor analysis deficiency which resulted in a condition outside the design basis of the plant.

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

Very truly yours,



J. W. Hampton  
Vice President  
/ftr

Attachment

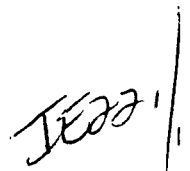
xc: Mr. S. D. Ebnetter  
Regional Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, Georgia 30323

INPO Records Center  
700 Galleria Parkway  
Atlanta, GA 30339-5957

Mr. L. A. Wiens  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Mr. P. E. Harmon  
NRC Resident Inspector  
Oconee Nuclear Site

9503020147 950223  
PDR ADOCK 05000269  
S PDR



# LICENSEE EVENT REPORT (LER)

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

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.

FACILITY NAME (1)

Oconee Nuclear Station, Unit 1

DOCKET NUMBER (2)

05000 269

PAGE (3)

1 OF 5

TITLE (4) Vendor Analysis Deficiency Results In A Condition Outside The Design Basis Of The Plant

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
01	26	95	95	02	00	02	23	95	Oconee, Unit 1	05000 270
									Oconee, Unit 2	05000 287

OPERATING MODE (9)	N	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)	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)	X 50.73(a)(2)(ii) (B)	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

L. V. Wilkie, Safety Review Manager

TELEPHONE NUMBER (Include Area Code)

(803) 885-3518

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)

YES  
(If yes, complete EXPECTED SUBMISSION DATE)

X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On January 26, 1995, Oconee Units 1, 2 and 3 were at 100% full power. B&W Nuclear Technologies (BWNT) notified Oconee Nuclear Station of a change in the application of the Emergency Core Cooling System (ECCS) Evaluation Model used to determine allowable Loss Of Coolant Accident (LOCA) kw/ft limits. Preliminary sensitivity studies were performed with a new model. It was concluded that the kw/ft limits, in the ECCS analysis, is not sufficient to ensure that the peak cladding temperature criterion of 2200 F will not be exceeded in the event of a large break LOCA. Oconee made a one hour notification to the NRC and promptly revised the present Power Imbalance Operational Setpoints based on a conservative projection of the impact of this change. The root cause of this deficiency is Vendor Design Analysis; Analysis deficiency. Corrective actions include revising the Core Operating Limits Report, alarm setpoints, and operational procedures.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Oconee Nuclear Station, Unit 1	05000 269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		95	- 02 -	00	

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

**BACKGROUND**

Reactor power imbalance is the power in the top half of the core minus the power in the bottom half of the core expressed as a percentage of rated power.

The Core Flood System [EIIS:BP] provides core protection for intermediate to large Reactor Coolant System (RCS) [EIIS:AB] pipe failures. It automatically floods the core when the RCS pressure drops below 600 psig.

As directed by 10 CFR 50.46, a significant change or error is one that results in a calculated peak cladding temperature different by more than 50 F from the temperature calculated using the last acceptable model. Any change or error correction that results in calculated Emergency Core Cooling System performance that does not conform to the criteria set forth in 10 CFR 50.46 is a reportable event as described in 10 CFR 50.72 and 50.73. One criterion in 10 CFR 50.46 is that the calculated maximum peak cladding temperature shall not exceed 2200 F.

**EVENT DESCRIPTION**

In September 1994 B&W Nuclear Technologies (BWNT) began studies based on Core Flood Tank sensitivity utilizing a new model. The studies resulted in new data that would require further evaluation. Existing fuel designs were analyzed and the results were applied to the current model. The overall impact indicated a difference of greater than 50 F, from the last calculated value of the peak cladding temperature (PCT).

On January 26, 1995, at 1700 hours, Oconee Nuclear Station received notification from BWNT identifying a change in the application of the Emergency Core Cooling System (ECCS) evaluation model. The change relates to the large break Loss Of Coolant Accident (LOCA) analyses for ECCS evaluation. The change results in a difference in the predicted PCT of greater than 50 F. Calculations performed by BWNT indicate that the kw/ft limits at the lowest core elevation must be reduced to ensure that the 2200 F PCT acceptance criterion is not exceeded.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Oconee Nuclear Station, Unit 1	05000 269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 5
		95	- 02 -	00	

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

There were two changes identified by BWNT. The first change deals with the initial Core Flood Tank (CFT) conditions of pressure and inventory and their potential effects on PCT predictions. In previous models, the CFT conditions assumed for calculations at the 2 foot core elevations have been based on the minimum CFT pressure and liquid inventory. These values, which represent the range of Technical Specification limits plus instrument uncertainty, were considered to be the most limiting initial conditions for the 2 foot large break LOCA PCT analysis. The new model concluded that the most limiting 2 foot PCT is calculated when the maximum CFT liquid inventory and minimum pressure were input as the initial conditions. The second change deals with the transfer of fluid enthalpy conditions between the evaluation model computer codes. When these changes were applied to the current approved evaluation model, the PCT change was found to be greater than 50 F.

As a result of this information from BWNT, Oconee made a formal notification to the NRC at 1752 hours, on January 26, 1995. Preliminary BWNT calculations determined that the changes, described in their January 27, 1995 letter to the NRC, would impact the 2 foot LOCA limit by 0.3 to 1.3 kw/ft. Oconee reduced the 2 foot LOCA linear heat rate limit for all three units by 1.3 kw/ft. Revised power imbalance operational setpoints were included on the operations turnover sheet until the Core Operating Limits Report (COLR), alarm setpoints, and operations surveillance procedures could be revised.

The revised COLR was approved on January 30, 1995. Operations surveillance procedures for each unit were revised and approved on January 31, 1995. On February 2, 1995, the computer alarm setpoint changes were completed to reflect the new limits.

BWNT is performing LOCA analyses to determine the new linear heat rate limits and Duke Power Engineering will determine their impact on operating limits. These analyses are scheduled to be completed in August 1995.

Duke Power has requested a plant specific analysis from BWNT for the Oconee units. This should reduce the impact of the kw/ft penalties that are currently imposed.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000 269	95	02	00	4 OF 5

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

CONCLUSIONS

The root cause of this event is Vendor Design Analysis; Analysis deficiency. Previous sensitivity studies performed by B&W Nuclear Technologies (BWNT) did not fully identify the impact of varying Core Flood Tank initial conditions on the predicted peak cladding temperature. More recent analyses performed by BWNT identified the change that was needed in the Emergency Core Cooling System (ECCS) calculation. When the change was analyzed with the approved model, the result was a difference in the peak cladding temperature of greater than 50 F. Generic analyses by BWNT have determined that operation of the Oconee units is justified with implementation of more restrictive operating limits (1.3 kw/ft reduction in the 2 foot LOCA limit). Currently, these bases support the expectation that the subject Preliminary Safety Concern and adjustment of enthalpies applied in the heatup analyses will not represent a substantial safety concern.

A search of the events of the last two years, indicated that this type problem had not been previously identified. Therefore, this event is not considered recurring.

There were no equipment failures associated with this event.

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

CORRECTIVE ACTIONS

Immediate

1. The new power imbalance limits were implemented via shift turnover sheets in the control rooms.

Subsequent

1. The Core Operating Limits Report, procedures, and Operator Aid Computer setpoints were revised for all three Oconee units, based on the preliminary limits.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

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 (MNSB 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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Oconee Nuclear Station, Unit 1	05000 269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 5
		95	02	00	

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

**Planned**

1. B&W Nuclear Technologies (BWNT) will complete the analyses required to determine the specific Linear Heat Rate limits and their impact on operating limits.
2. Duke Engineering will evaluate the BWNT analyses and make appropriate changes to operating limits, if necessary.

**SAFETY ANALYSIS**

B&W Nuclear Technologies (BWNT) provided information to Oconee Nuclear Station which indicated that BWNT had potential safety concerns with some of their assumptions made in their analyses for Emergency Core Cooling System evaluations in the large break Loss of Coolant Accident (LOCA).

In their January 27, 1995 letter to the NRC, BWNT stated an expected reduction in the LOCA kw/ft limit of 0.3 to 1.3 at the 2 foot elevation. Considering the available information, Duke Power used a bounding linear heat rate (LHR) reduction of 1.3 kw/ft at the 2 foot elevation to establish new operational limits on power imbalance. These new limits have been implemented on all three Oconee units and will prevent the core maximum LHR from reaching a power level that could violate the 10 CFR 50.46 criteria if a LOCA occurs.

Oconee engineering has also evaluated the impact of a 1.3 kw/ft reduction at the 2 foot elevation on the imbalance limits for previous cycles. The evaluation indicates that the revised imbalance limits may have been exceeded for brief periods of time. Thus, it was possible that the 2200 F acceptance criterion could have been exceeded if a LOCA had occurred. Although this criterion may have been exceeded during a LOCA, the dose consequences of the large break LOCA would still be bounded by the maximum hypothetical accident presented in Chapter 15 of the Oconee Final Safety Analysis Report.

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