# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9210200061 DOC.DATE: 92/10/13 NOTARIZED: NO DOCKET #
FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270
50-287 Oconee Nuclear Station, Unit 3, Duke Power Co. 05000287
AUTH.NAME AUTHOR AFFILIATION
HAMPTON,J.W. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards response to NRC request for addl info to clarify questions re "Room Heatup Calculation for Station Blackout" (OSC-4747),consisting of detailed explanation of development of equation for calculation.

DISTRIBUTION CODE: A050D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 2
TITLE: OR Submittal: Station Blackout (USI A-44) 10CFR50.63, MPA A-22

NOTES:

| | RECIPIENT ID CODE/NAME | COPIES LTTR | COPIES ENCL | RECIPIENT ID CODE/NAME | COPIES LTTR | COPIES ENCL |
|---|---|---|---|---|---|---|
| | PD2-3 PD | 1 | 1 | WIENS,L | 1 | 1 |
| INTERNAL: | ACRS | 1 | 1 | AEOD/DSP/TPAB | 1 | 1 |
| | NRR PD2-4PM TAM | 1 | 1 | NRR/DET/ESGB 8D | 2 | 2 |
| | NRR/DST/SELB | 3 | 3 | NRR/DST/SPLB8D1 | 3 | 3 |
| | NRR/DST/SRXB8E | 1 | 1 | REG FILE 01 | 1 | 1 |
| EXTERNAL: | NRC PDR | 1 | 1 | NSIC | 1 | 1 |

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 504-2065) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 17 ENCL 17

RIDS/ADDS

RIDS/ADDS

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

J.W. HAMPTON
Vice President
(803)885-3499 Office
(704)373-5222 FAX

DUKE POWER

October 13, 1992

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

Subject: Oconee Nuclear Site, Units 1, 2, and 3
Docket Nos. 50-269, 270, and 287
Requirements for Station Blackout
Request for Additional Information

Attached is the additional information requested for clarification of questions related to the "Room Heat-up Calculation for Station Blackout," OSC-4747. Included is a more detailed explanation of the development of the equation found at the bottom of page 5 of the subject calculations. If there are any further questions or concerns regarding this or any other information related to Oconee's response to Station Blackout, please contact Mark E. Patrick, Oconee Regulatory Compliance Manager at (803) 885-3292.

Very truly yours,

J. W. Hampton

xc: Mr. S. D. Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW., Suite 2900
Atlanta, GA 30323

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

Mr. P. E. Harmon
Senior NRC Resident Inspector
Oconee Nuclear Station





A050
1/1

The equation in step 1 of the design method is:

$$Q_{air}=Q_{gen}-Q_{out}-Q_{conc}$$

Assume for now that $Q_{conc}$ = 0. This term will be dealt with later.

$$\frac{dQ_{air}}{dt}=\frac{dQ_{gen}}{dt}-\frac{dQ_{out}}{dt}$$

At steady state conditions,

$$\frac{dQ_{air}}{dt}=0$$

and therefore

$$\frac{dQ_{gen}}{dt}=\frac{dQ_{out}}{dt}=UA(T_{air,ss}-T_{surr})$$

Prior to steady state conditions

$$\frac{dQ_{air}}{dt}=UA(T_{air,ss}-T_{surr})-UA(T_{air}-T_{surr})$$

$$\frac{dQ_{air}}{dt}=UA(T_{air,ss}-T_{air})$$

Set $c_a$ = UA with units Btu/°F·hr

From the equation in step 6 of the design method the following equation can be formed.

$$\frac{dQ_{air}}{dt}=\rho Vc_p\frac{dT_{air}}{dt}$$

Set $c_b$ = $\rho Vc_p$ with units Btu/°F.

$$c_1=\frac{c_b}{c_a}=\textit{time constant }(\tau)\textit{ with units of hrs}$$

The equation at the bottom of page 5 of 43 is the standard form of a Thermal first order system.

Taking into account $Q_{conc}$ will decrease the rate at which the air temperature rises. This is taken care of by adjusting the value of the time constant $c_1$ until the assumed value of $T_{air,avg}$ equals the calculated value of $T_{air,avg}$.