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DENTON,H.R. Office of Nuclear Reactor Regulation

SUBJECT: Forwards addl info requested by NRC 790109 ltr,re analyses of containment temp response to postulated main steam line breaks.

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# INDIANA & MICHIGAN ELECTRIC COMPANY

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NEW YORK, N. Y. 10004


April 1, 1980
AEP:NRC:00131

Donald C. Cook Nuclear Plant Unit No. 2
Docket No. 50-316
License No. DPR-74
Subject: Request for Additional Information 022.17

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

The response to Request for Additional Information 022.17 which was enclosed in Mr. A. Schwencer's letter of January 9, 1979 is contained in the attachment to this letter.

Very truly yours,

G. P. Maloney
Vice President

GPM/emc
Attachment

cc: R. C. Callen - w/o att.
G. Charnoff - w/o att.
R. S. Hunter - w/o att.
R. W. Jurgensen - w/o att.
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ATTACHMENT TO
AEP:NRC:00131

ENCLOSURE

Request for Additional Information

Donald C. Cook Nuclear Plant, Unit 2
Docket No. 50-316

022.17 We require additional information regarding your analyses of the containment temperature response to postulated main steam line break(s) which you provided in your response to NRC request 022.9. Specifically, we will require the following to complete our review of the containment response to postulated ruptures of the main steam line inside containment.

For the worst split break (i.e., 30% power level with assumed failure of the auxiliary feedwater runout protection system), provide the results of containment response analyses using the LOTIC-3 code for a spectrum of break sizes ranging in size up to the 0.942 $ft^2$ break previously analyzed. The spectrum of breaks analyzed should include the largest split break which would not result in automatic initiation of the containment spray system and the largest split break which would not result in automatic initiation of the containment return air fan(s).

For each break analyzed provide: 1) a figure similar to figure 022.9-2 (Appendix Q) showing upper and lower compartment temperature as a function of time; 2) a figure showing containment pressure as a function of time; 3) a table similar to Table 022.9-2 (Appendix Q) identifying the mass and energy release rate data used in the containment analyses; and 4) identification of any actions assumed to be performed by a control room operator during the course of the accident and the time at which operator actions are assumed to occur including justification for the assumed operator actions.

Response to 022.17

Rather than performing a plant specific analysis for D. C. Cook Unit 2, a generic ice condenser plant small steamline break analysis was performed. It is shown herein that the differences between the generic containment parameters and blowdown releases and the Cook 2 values are either conservative or unimportant. The following evaluation justifies that referencing the generic work for Donald C. Cook is conservative.

The LOTIC-3 computer code was employed in the generic analysis. The LOTIC-3 computer code has been developed to analyze steamline breaks in an ice condenser plant. During the development of this computer code, discussion and justification of the heat transfer coefficients and of the thermodynamic equations have been presented to the NRC. Details of the LOTIC-3 computer code are given in References 1 to 3. The LOTIC-3 computer code has been found to be acceptable for the analysis of steamline breaks (Reference 4) with the following restrictions:

a. Mass and energy release rates are calculated with an approved model.

b. Complete break spectrums are analyzed.

c. Convective heat flux calculations as described in Reference 2, Q7, are performed for all break sizes.

NRC question, 022.9 (Reference 6) pertains to the steamline break analysis and its subsequent response in identifying the limiting small break. The following evaluation will illustrate the conservatism in those results and the relative insensitive nature of the containment response to break size.

The net containment free volume assumed in the generic analysis was 1,193,971 $ft^3$ while the Cook 2 free volume is 1,241,384 $ft^3$. Further, the generic plant lower compartment was assumed to have a volume of 235,481 $ft^3$ while the free volume of the Cook 2 lower compartment is 254,000 $ft^3$. Since containment volume is an important parameter in determining the containment environmental response to a steamline break, this comparison illustrates the conservatism of referencing the generic work.

The heat sinks in the lower compartment are of primary importance since this compartment is where the break occurs and consequently experiences the most severe environment. The heat sinks in the upper and ice condenser compartments are of secondary importance.

The areas and volumes for the concrete of the generic plant add up to 25670 $ft^2$ and 47808 $ft^3$ respectively, compared to 35459 $ft^2$ and 47358 $ft^3$ for D. C. Cook Unit 2. Even though the concrete volume of the generic plant is slightly greater, (less than 1%), this is more than offset by the surface area comparison which, due to the low thermal conductivity of concrete, is of more importance to heat transfer. This comparison therefore reveals a greater concrete heat transfer area and heat removal capability of D. C. Cook, which would result in a lower calculated peak temperature. Likewise, the steel heat sink comparison displays a greater heat transfer area, volume and heat removal capability. The generic plant's parameters are 3955 $ft^2$ and 167 $ft^3$ compared to 40010 $ft^2$ and 580 $ft^3$ for D. C. Cook 2. The heat sinks in the ice condenser are identical for both plant cases. The preceding comparison illustrates the conservatism of the generic plant's lower compartment heat sinks.

The last comparison of compartment heat sinks is in the upper compartment. The generic plant's upper compartment concrete area and volume are 26123 $ft^2$ and 41722 $ft^3$ respectively, compared to 60440 $ft^2$ and 105970 $ft^3$ for D. C. Cook 2. The steel heat transfer areas and volumes are 41302 $ft^2$ and 2034 $ft^3$ for the generic plant and 32500 $ft^2$ and 1524 $ft^3$ for D. C. Cook 2. Although the generic plant does have a greater upper compartment structural heat removal capability due to steel, this is of secondary importance in the analysis since the ice condenser allows very little steam into the upper compartment, and the spray system has the capability to cool the upper compartment. Consequently, the upper compartment's environment is not a severe one and has little impact on the analysis. Tables Q22.17-5 and Q22.17-6 are attached listing the volumes, areas, materials and a description of compartments for both the generic and D. C. Cook Unit 2 Plants.

Two spray systems exist for comparison. The upper compartment system has little impact on the lower compartment temperature so emphasis will be on the lower compartment spray system. The generic plant does not employ a lower compartment spray system , whereas D. C. Cook Unit 2 does contain a lower compartment spray system (900 gpm). Since the spray system of D. C. Cook Unit 2 is much more efficient because of location than that of the generic plant, the reference to generic parameters is conservative with respect to Cook.

In conjunction with the above comparisons a further justification and bases for referencing a generic plant analysis for the D. C. Cook Unit 2 analysis is illustrated in Figure Q22.17-5. This figure contains a comparison of the limiting small break cases, 0.942 $ft^2$, from the Cook 2 and generic plant's previous small break submittals. Figure Q22.17-5 illustrates that the small steamline break temperature transients result in very similar peaks with any differences being incidental to the results. In addition, elevated containment temperatures for Cook last for a shorter duration in the transient.

Further, the containment pressure Hi-2 setpoint which provides the actuation signal for the containment spray and fan systems was assumed to be 3.5 psig in the generic analysis. The Cook 2 Hi-2 setpoint is 2.9 psig. Therefore, the actuation setpoint would have been reached sooner in D.C. Cook 2 and therefore the containment transient would have been mitigated more rapidly.

The evaluation presented above, illustrates the conservative comparison between D. C. Cook 2 and the generic plant's heat sinks and plant parameters. Therefore, a generic LOTIC-III spectrum of small breaks analysis is provided for D. C. Cook 2 instead of a plant specific analysis. The generic analysis provides the containment responses for a spectrum of small breaks at the 30% power level with assumed failure of the auxiliary feedwater runout protection system. The analyses studied a spectrum of breaks ranging in size from 0.1 $ft^2$ up to the break identified as the most severe small split break, 0.942 $ft^2$. The lower bound break size was established in discussions held between the NRC staff and Westinghouse Electric Corporation. It was also referenced in the Sequoyah Nuclear Plant's response to Q5.56A.

This spectrum included breaks of 0.6, 0.35 and 0.10 $ft^2$. Attached Figures Q22.17-1 and Q22.17-2 provide the upper compartment temperature and lower compartment pressure transients. As Figure Q22.17-3 shows, similar lower compartment temperature transients were calculated for the spectrum of breaks analyzed. However, the 0.6 $ft^2$ break resulted in a slightly higher maximum lower compartment temperature. (See attached Table Q22.17-1). When this transient was compared to the transient identified as the most severe small break at 30% power in the previous analysis, it was found to result in very similar peaks, with the difference being incidental to the results. (See Figure Q22-17.4).

In the analysis, spray and fan initiation are automatic after reaching the containment Hi-2 setpoint. Associated times are included in Table Q22.17-1. As described above, these times are conservative in regard to Cook 2. Tables Q22.17-2, Q22.17-3, and Q22.17-4 provide the mass and energy release rates for the transients analyzed. These results demonstrate the conservatism of the results previously submitted in response to Q022.9 and also the somewhat insensitive nature of the ice condenser plant containment response to break size.

The comparison illustrated in Figure Q.22.17-5, between a generic plant's temperature transient and the same transient for Cook 2 illustrates the kind of conservatism introduced by referencing the generic analysis. Table Q22.17-7 further demonstrates this conservatism. The actual plant specific analysis results for the smaller breaks would be similar to the Cook 2 results in Figure Q.22.17-5. The temperature would peak, then sharply fall off when the sprays come on, and finally settle to a much lower temperature level for the remainder of the transient.

References:

1. C. Eicheldinger, Letter of 10/22/76, #NS-CE-1250

2. C. Eicheldinger, Letter of 6/14/77, #NS-CE-1453

3. C. Eicheldinger, Letter of 12/7/77, #NS-CE-1626

4. John F. Stolz, Letter of 5/3/78, "Evaluation of Proposed Supplement to WCAP-8354 (LOTIC-3)".

5. D. C. Cook, FSAR, Section 14.3.4, Page 30

6. T. M. Anderson, Letter of 9/20/78, #NS-TMA-1946

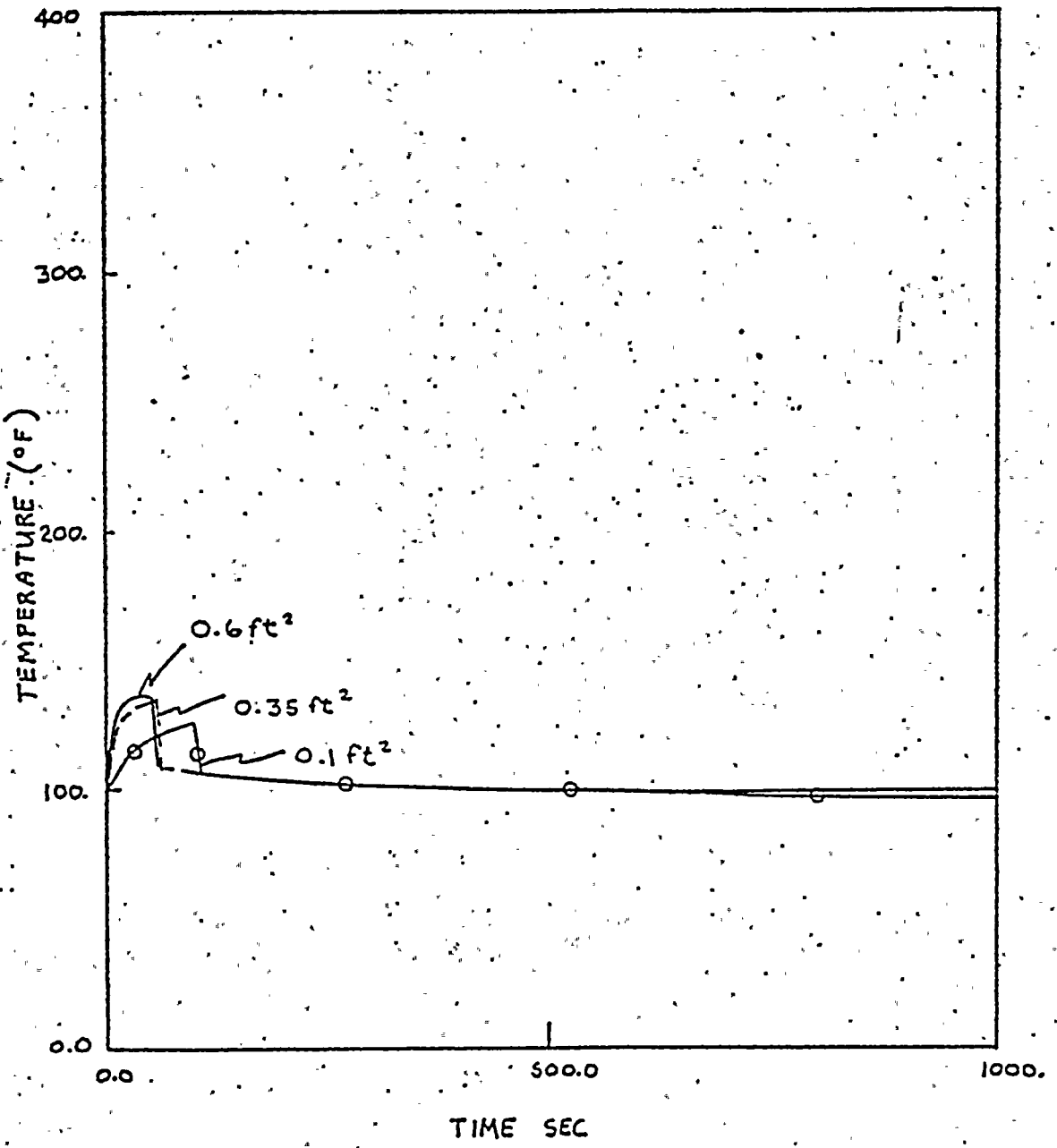


Figure Q22.17-1: Upper Compartment Temperature (30% Bower Level)

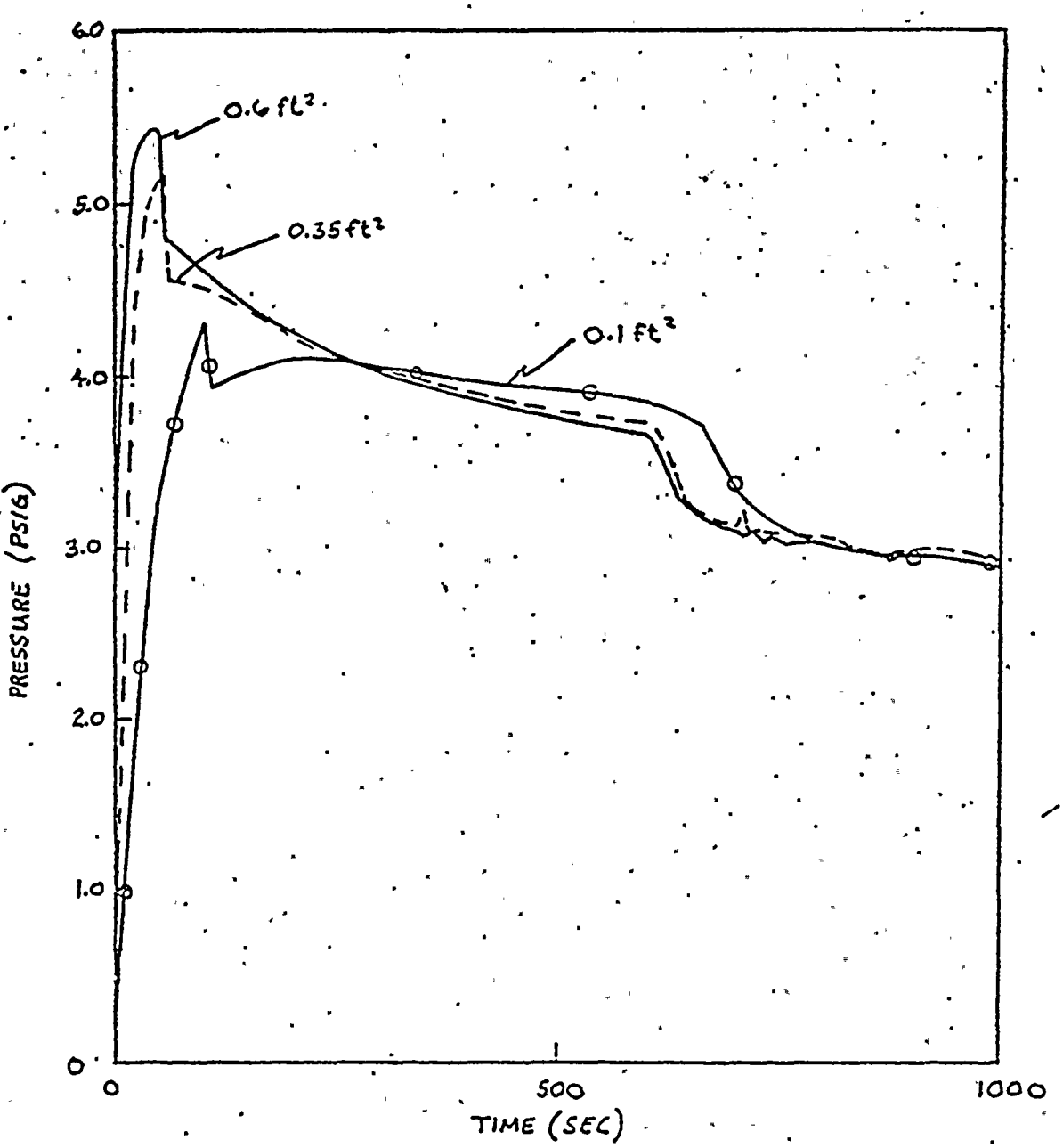


Figure Q22.17-2: Lower Compartment Pressure
(30% Power Level)

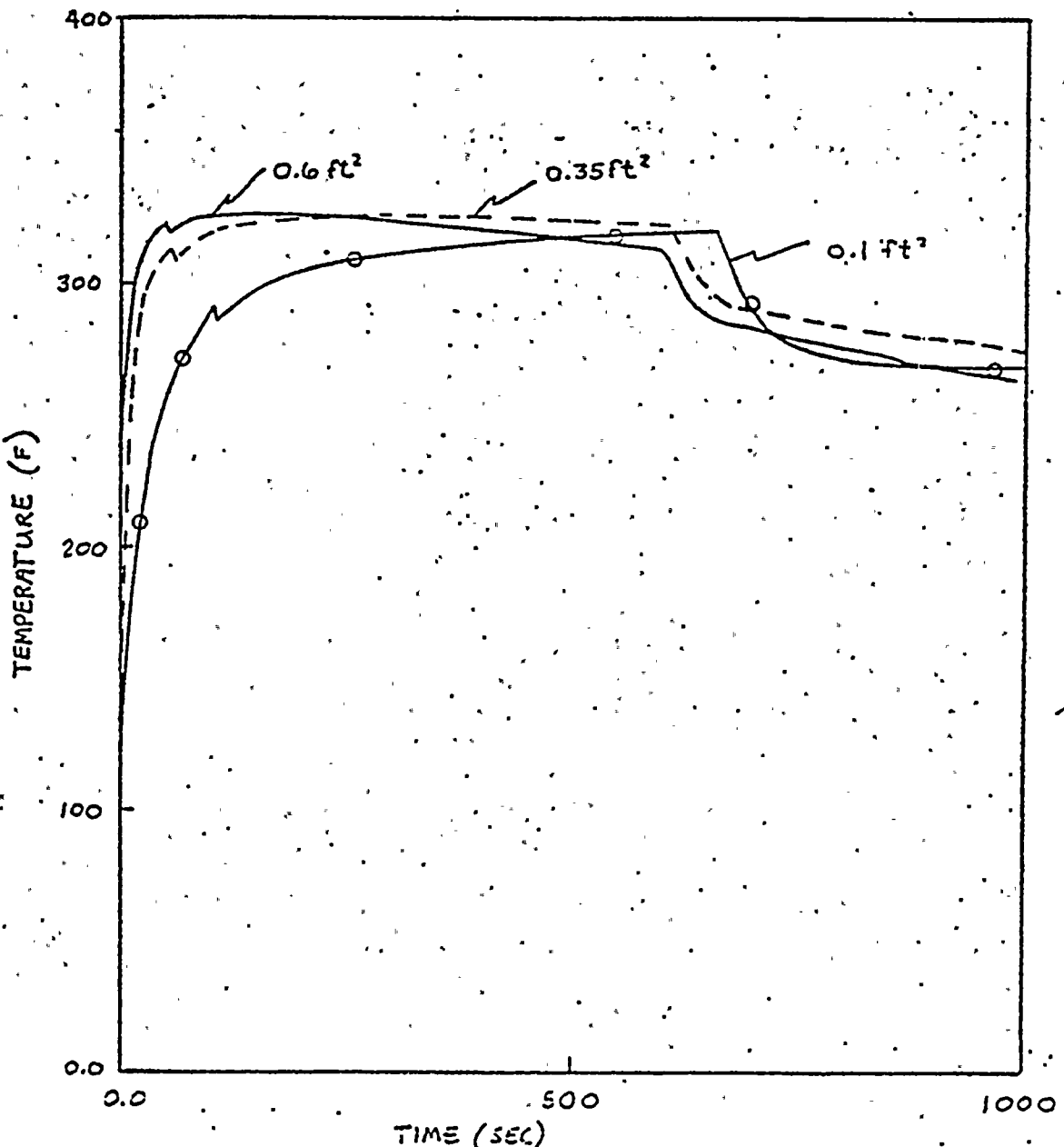


Figure Q22.17-3: Lower Compartment Temperature (30% Power Level)

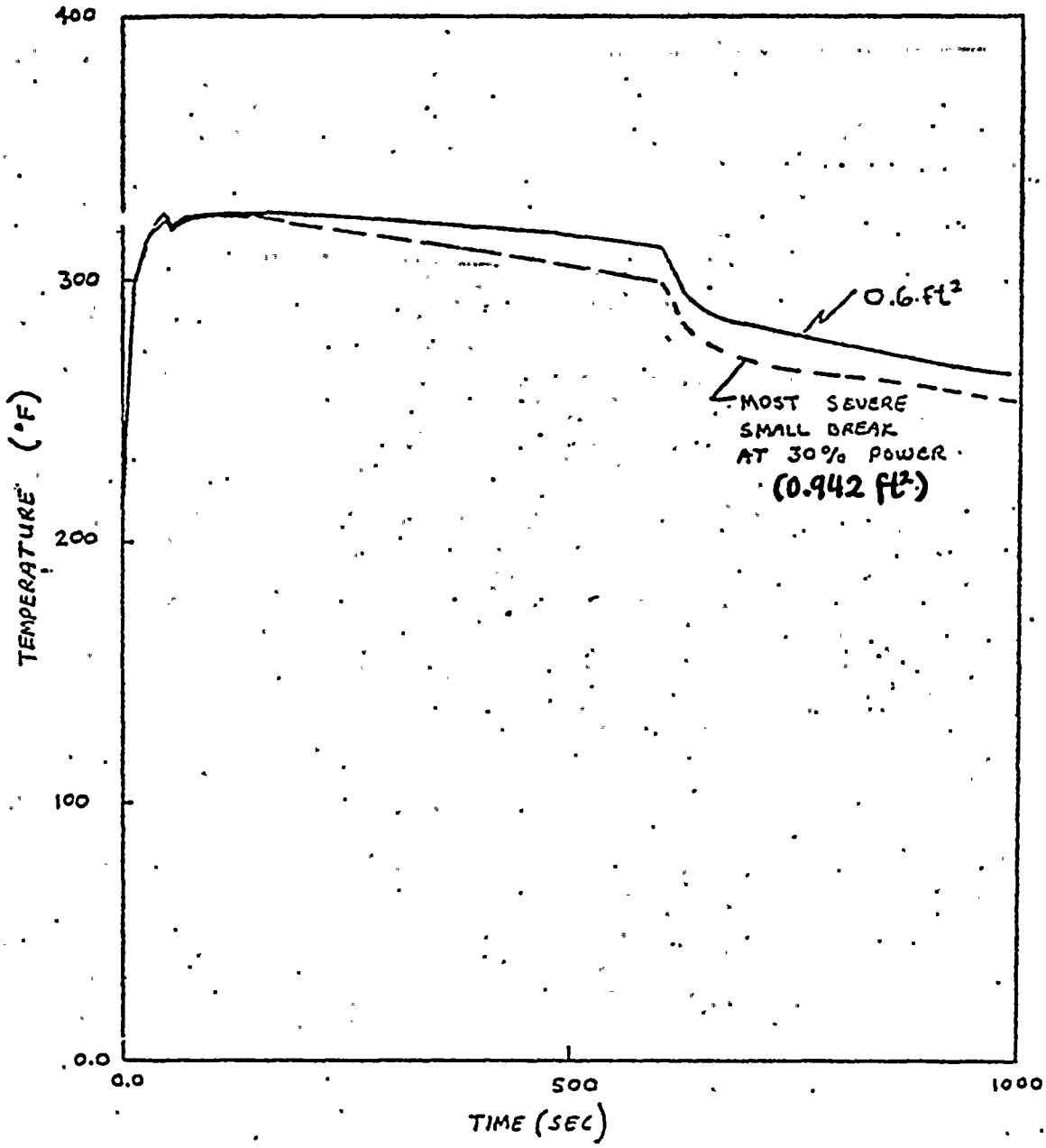


Figure Q22.17-4: Worst Break Lower Compartment Temperature Comparison (Generic Analysis)

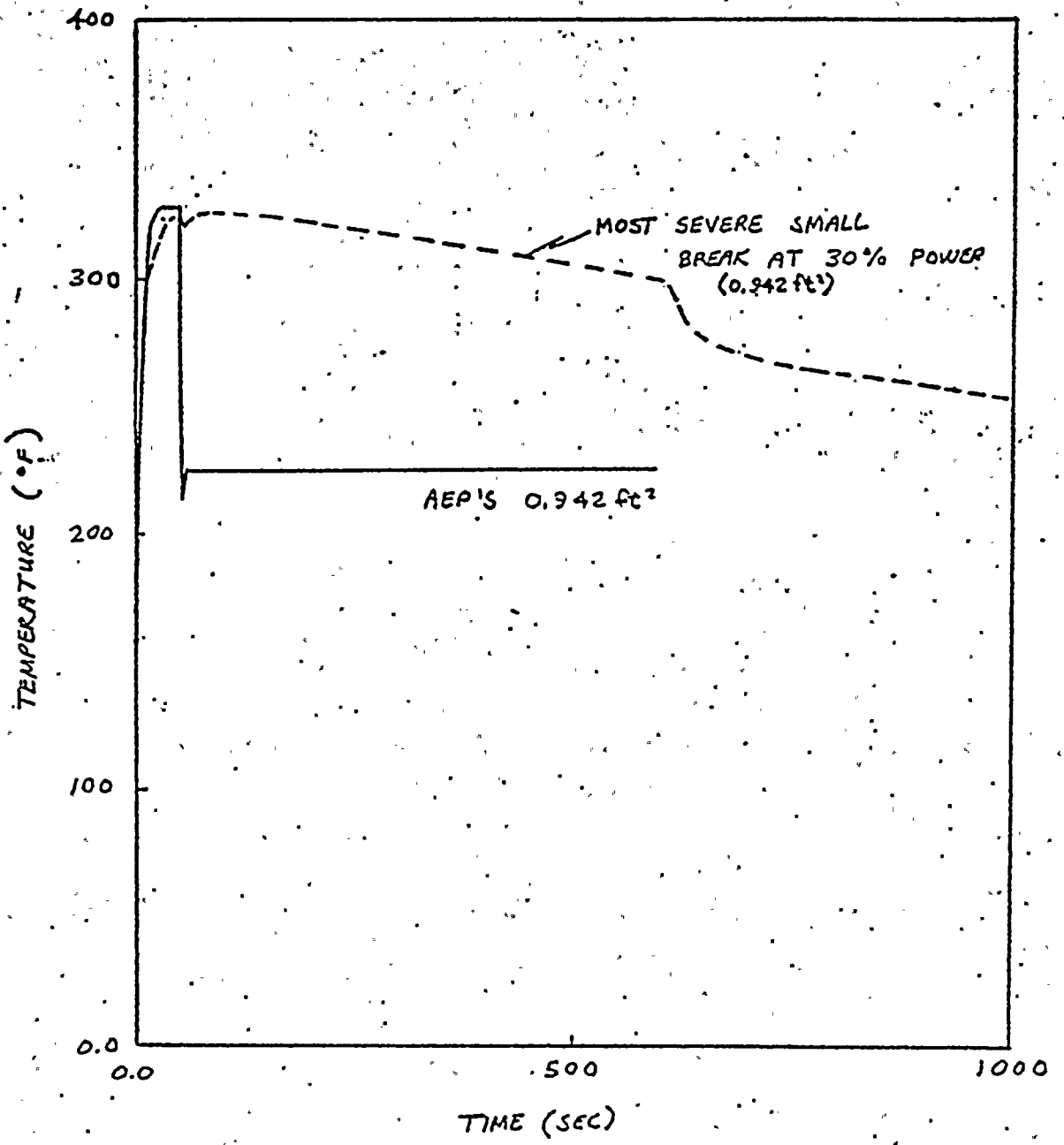


Figure Q22.17-5: Worst Break Lower Compartment Temperature Comparison

Table Q22.17-1

| CASE | MAXIMUM LC TEMP °F | TIME $t_{max}$ SEC. | TIME OF CONTAINMENT* SPRAY | FAN |
|---|---|---|---|---|
| 0.6 ft2 | 326.1 | 151.39 | 53. | 605. |
| 0.35 ft2 | 325.8 | 322.8 | 59. | 617 |
| 0.1 ft2 | 320.7 | 651. | 106. | 663. |

*Hi-2 Pressure Setpoint used was 3.5 psig,
Relay time used for spray actuation after Hi-2 signal was 45 sec
Relay time used for fan actuation after Hi-2 signal was 600 sec.

Table Q22.17-2

0.1 $FT^2$ SPLIT 30 PERCENT POWER

| TIME | m (lb/sec) | e (BTU/SEC) |
|---|---|---|
| .1000E-01 | .2280E+03 | .2712E+06 |
| .1000E+01 | .2280E+03 | .2712E+06 |
| .3000E+01 | .2260E+03 | .2688E+06 |
| .7000E+01 | .2260E+03 | .2688E+06 |
| .1400E+02 | .2240E+03 | .2665E+06 |
| .2400E+02 | .2220E+03 | .2642E+06 |
| .2600E+02 | .2250E+03 | .2677E+06 |
| .2800E+02 | .2280E+03 | .2711E+06 |
| .3000E+02 | .2290E+03 | .2722E+06 |
| .3300E+02 | .2300E+03 | .2734E+06 |
| .3600E+02 | .2300E+03 | .2734E+06 |
| .4600E+02 | .2290E+03 | .2723E+06 |
| .5250E+02 | .2280E+03 | .2711E+06 |
| .5500E+02 | .2270E+03 | .2700E+06 |
| .5750E+02 | .2250E+03 | .2677E+06 |
| .6000E+02 | .2220E+03 | .2643E+06 |
| .6750E+02 | .2150E+03 | .2562E+06 |
| .7000E+02 | .2130E+03 | .2539E+06 |
| .7500E+02 | .2100E+03 | .2504E+06 |
| .8500E+02 | .2040E+03 | .2435E+06 |
| .9500E+02 | .2000E+03 | .2388E+06 |
| .1000E+03 | .1980E+03 | .2365E+06 |
| .1200E+03 | .1920E+03 | .2295E+06 |
| .1400E+03 | .1870E+03 | .2237E+06 |
| .1800E+03 | .1790E+03 | .2143E+06 |
| .2200E+03 | .1730E+03 | .2073E+06 |
| .2600E+03 | .1670E+03 | .2002E+06 |
| .3000E+03 | .1620E+03 | .1944E+06 |
| .3600E+03 | .1550E+03 | .1861E+06 |
| .4000E+03 | .1500E+03 | .1802E+06 |
| .4600E+03 | .1440E+03 | .1731E+06 |
| .5000E+03 | .1400E+03 | .1683E+06 |
| .5600E+03 | .1340E+03 | .1612E+06 |
| .6400E+03 | .1270E+03 | .1528E+06 |
| .7000E+03 | .1220E+03 | .1469E+06 |
| .7400E+03 | .1190E+03 | .1433E+06 |
| .8200E+03 | .1130E+03 | .1361E+06 |
| .8800E+03 | .1090E+03 | .1313E+06 |
| .9600E+03 | .1040E+03 | .1253E+06 |
| .1000E+04 | .1020E+03 | .1229E+06 |

Table Q22.17-3

0.35 FT2 SPLIT 30 PERCENT POWER

| TIME | m (lb/sec) | e (BTU/SEC) |
|---|---|---|
| .1000E-01 | .7970E+03 | .9480E+06 |
| .1000E+01 | .7970E+03 | .9480E+06 |
| .3000E+01 | .7890E+03 | .9388E+06 |
| .5000E+01 | .7820E+03 | .9308E+06 |
| .7000E+01 | .7760E+03 | .7239E+06 |
| .9000E+01 | .7700E+03 | .9169E+06 |
| .1000E+02 | .7680E+03 | .9145E+06 |
| .1300E+02 | .7760E+03 | .9237E+06 |
| .1500E+02 | .7800E+03 | .9284E+06 |
| .1600E+02 | .8960E+03 | .1066E+07 |
| .1900E+02 | .1240E+04 | .1476E+07 |
| .2000E+02 | .7720E+03 | .9195E+06 |
| .2500E+02 | .7090E+03 | .8466E+06 |
| .3000E+02 | .6630E+03 | .7930E+06 |
| .3500E+02 | .6280E+03 | .7520E+06 |
| .4000E+02 | .6010E+03 | .7203E+06 |
| .5000E+02 | .5630E+03 | .6756E+06 |
| .6000E+02 | .5350E+03 | .6425E+06 |
| .7000E+02 | .5140E+03 | .6176E+06 |
| .8000E+02 | .4970E+03 | .5974E+06 |
| .9000E+02 | .4830E+03 | .5808E+06 |
| .1000E+03 | .4700E+03 | .5653E+06 |
| .1200E+03 | .4500E+03 | .5415E+06 |
| .1400E+03 | .4320E+03 | .5200E+06 |
| .1600E+03 | .4160E+03 | .5008E+06 |
| .1800E+03 | .4020E+03 | .4841E+06 |
| .2000E+03 | .3890E+03 | .4685E+06 |
| .2400E+03 | .3650E+03 | .4397E+06 |
| .2800E+03 | .3440E+03 | .4144E+06 |
| .3200E+03 | .3240E+03 | .3904E+06 |
| .3600E+03 | .3060E+03 | .3687E+06 |
| .4000E+03 | .2890E+03 | .3481E+06 |
| .5000E+03 | .2530E+03 | .3046E+06 |
| .6000E+03 | .2230E+03 | .2683E+06 |
| .7000E+03 | .1990E+03 | .2392E+06 |
| .8000E+03 | .1790E+03 | .2150E+06 |
| .9000E+03 | .1620E+03 | .1944E+06 |
| .1000E+04 | .1480E+03 | .1774E+06 |

Table Q22.17-4

0.6 FT2 SPLIT 30 PERCENT POWER

| TIME | m (lb/sec) | e (BTU/SEC) |
|---|---|---|
| .1000E-01 | .1365E+04 | .1624E+07 |
| .1000E+01 | .1365E+04 | .1624E+07 |
| .3000E+01 | .1341E+04 | .1596E+07 |
| .5000E+01 | .1320E+04 | .1572E+07 |
| .7000E+01 | .1302E+04 | .1551E+07 |
| .8000E+01 | .1293E+04 | .1541E+07 |
| .1000E+02 | .1297E+04 | .1545E+07 |
| .1200E+02 | .1298E+04 | .1546E+07 |
| .1300E+02 | .1297E+04 | .1545E+07 |
| .1400E+02 | .1268E+04 | .1513E+07 |
| .1600E+02 | .1196E+04 | .1429E+07 |
| .1800E+02 | .1133E+04 | .1355E+07 |
| .2000E+02 | .1079E+04 | .1292E+07 |
| .2200E+02 | .1033E+04 | .1238E+07 |
| .2400E+02 | .9940E+03 | .1192E+07 |
| .2700E+02 | .9440E+03 | .1133E+07 |
| .3200E+02 | .8800E+03 | .1057E+07 |
| .3600E+02 | .8420E+03 | .1012E+07 |
| .4000E+02 | .8110E+03 | .9754E+06 |
| .4600E+02 | .7740E+03 | .9313E+06 |
| .5000E+02 | .7540E+03 | .9074E+06 |
| .6000E+02 | .7130E+03 | .8584E+06 |
| .7500E+02 | .6680E+03 | .8045E+06 |
| .9500E+02 | .6250E+03 | .7529E+06 |
| .1200E+03 | .5840E+03 | .7036E+06 |
| .1400E+03 | .5570E+03 | .6711E+06 |
| .1800E+03 | .5110E+03 | .6156E+06 |
| .2200E+03 | .4720E+03 | .5685E+06 |
| .2400E+03 | .4530E+03 | .5455E+06 |
| .2600E+03 | .4350E+03 | .5238E+06 |
| .3000E+03 | .4020E+03 | .4838E+06 |
| .3600E+03 | .3600E+03 | .4330E+06 |
| .4200E+03 | .3250E+03 | .3905E+06 |
| .5000E+03 | .2870E+03 | .3445E+06 |
| .5600E+03 | .2680E+03 | .3154E+06 |
| .6000E+03 | .2480E+03 | .2972E+06 |
| .8600E+03 | .1790E+03 | .2136E+06 |
| .9600E+03 | .1610E+03 | .1918E+06 |
| .9800E+03 | .1580E+03 | .1882E+06 |
| .1000E+04 | .1550E+03 | .1846E+06 |

Table Q22.17-5

## GENERIC PLANT ICE CONDENSER DESIGN PARAMETERS

### 1. VOLUME

| | |
|---|---|
| Reactor Containment Volume (Net free volume, ft3) | |
| Upper Compartment | 670,101 |
| Upper Plenum | 47,000 |
| Ice Condenser | 86,300 |
| Lower Plenum | 24,200 |
| Lower Compartment (Active) | 235,481 |
| Lower Compartment (Dead Ended) | 130,899 |
| Total Containment Volume | 1,193,971 |
| Tech Spec Weight of Ice in Condenser, lbs | $2.45 \times 10^6$ |

TABLE-5(cont)

2. STRUCTURAL HEAT SINKS

| | Area $ft^2$ | Material and Thickness (ft) | |
|---|---|---|---|
| A. Upper Compartment | | | |
| 1. Polar Crane Wall, Containment Shell, and Miscellaneous Steel | | | |
| Slab 1 | 8915 | 0.000583<br>0.01017 | Paint<br>Carbon Steel |
| Slab 2 | 31667 | 0.000583<br>0.05758 | Paint<br>Carbon Steel |
| Slab 3 | 720 | 0.00167<br>0.1670 | Paint<br>Carbon Steel |
| 2. Refueling Canal and Miscellaneous Concrete | | | |
| Slab 4 | 25443 | 0.00167<br>1.511 | Paint<br>Concrete |
| Slab 5 | 680 | 0.00167<br>4.82 | Paint<br>Concrete |
| B. Lower Compartment | | | |
| 1. Platforms | | | |
| Slab 1 | 1,375 | 0.000583<br>0.007813 | Paint<br>Carbon Steel |
| 2. Steam Generator Supports and Reactor Coolant Pump Supports | | | |
| Slab 2 | 2,580 | 0.00583<br>0.0605 | Paint<br>Steel |
| 3. Miscellaneous Concrete | | | |
| Slab 3 | 23,300 | 0.00167<br>1.645 | Paint<br>Concrete |

TABLE 5 (cont)

STRUCTURAL HEAT SINKS

| | Area ($ft^2$) | Material and Thickness (ft) | |
|---|---|---|---|
| 4. Reactor Cavity | | | |
| Slab 4 | 2,370 | 0.00167<br>4.0 | Paint<br>Concrete |
| 5. Base Floor* | | | |
| Slab 5 | 4,228 | 0.00167<br>2.0 | Paint<br>Concrete |
| C. Ice Condenser | | | |
| 1. Ice Baskets | | | |
| Slab 1 | 180,628 | 0.00663 | Steel |
| 2. Lattice Frames | | | |
| Slab 2 | 76,650 | 0.0217 | Steel |
| 3. Lower Support Fracture | | | |
| Slab 3 | 28,670 | 0.0267 | Steel |
| 4. Ice Condenser Floor | | | |
| Slab 4 | 3,336 | 0.000833<br>0.333 | Paint<br>Concrete |
| 5. Containment Wall panels and Containment Shell | | | |
| Slab 5 | 19,100 | 1.0<br>0.0625 | Steel & Insulation<br>Steel Shell |
| 6. Crane Wall Panels and Crane Wall | | | |
| Slab 6 | 13,055 | 1.0<br>1.0 | Steel & Insulation<br>Concrete |

*In contact with sump.

Table Q22.17-6

D. C. COOK UNIT 2 ICE CONDENSER DESIGN PARAMETERS

| | |
|---|---|
| Reactor Containment Volume | |
| Upper Compartment | 798742 ft3 |
| Lower Compartment | 254000 ft3 |
| Ice Condenser | 126940 ft3 |
| Dead Ended | 61702 ft3 |
| Total Volume | 1,241,384 ft3 |

Tech Spec Weight of Ice in Condenser, lbs. $2.37 \times 10^6$

TABLE 6 (cont)

STRUCTURAL HEAT SINKS

| Wall# | Compartment | Area | Material | Thickness (ft) |
|---|---|---|---|---|
| 1 | UC | 32500 | Paint/Steel/Concrete | 0.001/0.0469/2.0 |
| 2 | UC | 10090 | Paint/Concrete | 0.001/2.0 |
| 3 | UC | 5880 | Paint/Concrete | 0.001/1.5 |
| 4 | UC | 11970 | Paint/Concrete | 0.001/1.0 |
| 5 | LC | 5069 | Paint/Concrete | 0.001/2.0 |
| 6 | LC | 13660 | Paint/Concrete | 0.001/1.5 |
| 7 | LC | 16730 | Paint/Concrete | 0.001/1.0 |
| 8 | LC | 8665 | Paint/Concrete | 0.001/2.0 |
| 9 | LC | 6995 | Paint/Steel | 0.001/0.008 |
| 10 | LC | 23650 | Paint/Steel | 0.001/0.0096 |
| 11 | LC | 3340 | Paint/Steel | 0.001/0.0419 |
| 12 | LC | 1170 | S. Steel | 0.0334 |
| 13 | LC | 276 | Lead | 0.25 |
| 14 | LC | 4580 | Paint/Steel | 0.001/0.0149 |
| 15 | IB | 180600 | Steel | 0.0066 |
| 16 | IB | 76650 | Steel | 0.022 |
| 17 | IB | 28670 | Steel | 0.0267 |
| 18 | IB | 3336 | Paint/Concrete | 0.0008/1.5 |
| 19 | IB | 19100 | Insulation and Steel/ Concrete | 1.0/0.0625 |
| 20 | IB | 13060 | Insulation and Steel/ Concrete | 1.0/1.0 |

Table Q22.17-7

KEY PARAMETERS AFFECTING SPLIT STEAM LINE BREAKS

| Variable | Values Used in LOTIC-3 Report | Values for D. C. Cook |
|---|---|---|
| Full Load Steam Pressure (psia) | 1000 | 820 |
| Plant Power (Mwt) | 3425 | 3403 |
| Time Delay to Feedline Isolation (sec) | 15 | $\leq$ 9.0 |
| Time Delay to Steam Line Isolation (sec) | 15 | $\leq$ 9.0 |