8005160422

DOCKET NO. 50-219

ATTACHMENT 1

OYSTER CREEK NUCLEAR GENERATING STATION
ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT
SUMMARY OF ANALYSIS

MAY,1980

The Nuclear Regulatory Commission (NRC) has recently mandated in letters to utilities that the environmental qualification of electrical equipment required to function subsequent to certain postulated accidents be reviewed. The postulated accidents include a LOCA inside containment or a High Energy Line Break (HELB) inside or outside of containment.

The qualification conditions to be considered include the following:

1. Post accident pressure, temperature, and humidity conditions
2. Post accident radiation exposure
3. Exposure to post accident chemical spray
4. Submergence

At a March 17, 1980 meeting, the Jersey Central Power and Light Company (JCP&L) requested EDS to execute the analyses necessary to adequately define the post accident service condition profiles for electrical equipment whose designation and plant location were specified by JCP&L. The EDS scope of work included the following tasks:

1. Develop pressure and temperature time histories for plant areas outside of containment based upon postulated line breaks in the following systems specified by JCP&L:
   - Main Steam System
   - Main Feedwater System
   - Reactor Cleanup System

- Emergency Condenser System

2. Calculate radiation levels at component locations selected by JCP&L in plant areas outside of containment.

3. Calculate radiation levels inside containment.

The thermal-hydraulic analysis to develop the pressure and temperature service condition profiles was performed utilizing the EDS proprietary computer code EDS FLOW.

The thermal-hydraulic results are summarized on Table 1 and supporting Figures 1 through 18, which indicate the various temperature time history profiles. A temperature profile was generated in cases where compartment temperature exceeded 100°F.

Radiological analysis was conducted utilizing source terms furnished by JCP&L, the computer code QAD-5PA, and in some cases hand calculations. Table 1 indicates the total integrated radiation exposure one year subsequent to a LOCA at a number of component "targets" specified by JCP&L.

Table 2 summarizes analysis executed to define the total one year integrated radiation exposure to equipment located inside containment subsequent to a LOCA. The exposure is divided into the following contributory components:

1. Reactor Vessel Streaming
2. Containment Airborne Activity
3. Torus Streaming
4. Drywell Sump Activity

The above components are algebraically summed in total or partially dependent upon the equipment specific location within containment.

The results of the above discussed analyses, as summarized on Tables 1 and 2 and Figures 1 through 18, provide JCP&L with an accurate prediction of environmental conditions existing in plant areas subsequent to certain postulated accidents. This information can be used to assess the capability of existing equipment in terms of qualification, and/or as the source document for preparing an equipment qualification specification.

DOCKET NO. 50-219

ATTACHMENT 2

OYSTER CREEK NUCLEAR GENERATING STATION
ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

MAY 1980

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

*Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

	Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Break	Peak Temperature (°F)	Temperature Profile	Peak Pressure (PSIA)	Total Integrated Radiation Exposure (1 Yr.) NUREG 0578 Assumptions (PAMs)
1.	IA-83-A	ADS-Pressure Switch	R_4 x East Drywell Wall	55'	Cleanup System	205°	Fig. 10	16 PSIA	3.7×10^{4} R
	IA-83-B	ADS-Pressure Switch	R_3 x East Drywell Wall	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^{4}$ R
	IA-83-C	ADS-Pressure Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^{4}$ R
	IA-83-D	ADS-Pressure Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^{4} R
	IA-83-E	ADS-Pressure Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^{5} R
2.	V-26-16*	Drywell Vent & Purge Valve	R_2 x R_F	25'	-	77°*	-	15 PSIA*	2.0×10^{5} R
	V-26-18*	Drywell Vent & Purge Valve	R_2 x R_F	25'	-	77°*	-	15 PSIA*	2.0×10^{5} R
3.	V-21-5*	Containment Spray Valve	R_3 x R_C	33'	Cleanup System	195°*	Fig. 13*	15 PSIA*	5.1×10^{5} R
	V-21-11*	Containment Spray Valve	R_5 x Drywell Wall	62'	Cleanup System	205°*	Fig. 10*	16 PSIA*	5.1×10^{5} R
4.	V-5-167*	Reactor Bldg. Closed Lp. Cooling System Valve	R_4 x Drywell Wall	49'	Cleanup System	130°*	Fig. 12*	16 PSIA*	2.5×10^{4} R
	V-5-147*	Reactor Bldg. Closed Lp. Cooling System Valve	R_4 x Drywell Wall	49'	Cleanup System	130°*	Fig. 12*	16 PSIA*	2.5×10^{4} R
5.	V-21-13	Containment Spray Valve	R_1-R_2 x R_C-R_D	27'	Cleanup System	195°	Fig. 13	15 PSIA	6.7×10^{5} R
	V-21-17	Containment Spray Valve	R_6-R_7 x R_D R_C	27'	-	77°	-	15 PSIA	3.7×10^{5} R
	V-21-3	Containment Spray Valve	Southeast Corner Rm.	-19'	Cleanup System	130°	Fig. 14	15 PSIA	6.0×10^{5} R
	V-21-9	Containment Spray Valve	Northeast Corner Rm.	-19'	Main Steam	165°	Fig. 18	15 PSIA	6.1×10^{5} R
	V-21-1	Containment Spray Valve	Southeast Corner Rm.	-19'	Cleanup System	130°	Fig. 14	15 PSIA	1.0×10^{6} R
	V-21-7	Containment Spray Valve	Northeast Corner Rm.	-19'	Main Steam	165°	Fig. 18	15 PSIA	6.3×10^{5} R
6.	RE-01-A*	Drywell Pressure Scram Switch	℄ Reactor Vessel x R_6-R_7	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	1.5×10^{6} R
	RE-01-B*	Drywell Pressure Scram Switch	℄ Reactor Vessel x R_6-R_7	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	1.5×10^{6} R
	RE-01-C*	Drywell Pressure Scram Switch	R_E x North Drywell Wall	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	2.8×10^{5} R
	RE-01-D*	Drywell Pressure Scram Switch	R_E x North Drywell Wall	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	2.8×10^{5} R

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Break	Peak Temperature (°F)	Temperature Profile	Peak Pressure (PSIA)	Total Integrated Radiation Exposure (1 Yr.) NUREG 0588 Assumptions (RADS)
7. ID-15-A	Reactor Vessel Pressure Trans	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4 R
ID-15-B	Reactor Vessel Pressure Trans	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^1$ R
ID-16-A	Reactor Vessel Pressure Trans	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4 R
ID-16-B	Reactor Vessel Pressure Trans	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^1$ R
8. IG-06-A-1	Isolation Condenser Level Trans	R_4 x ℄ of "A" Iso. Cond.	98'	Emer. Cond.	270°	Fig. 5	16 PSIA	5.3×10^5 R
IG-06-A-2	Isolation Condenser Level Trans	R_4 x ℄ of "A" Iso. Cond.	98'	Emer. Cond.	270°	Fig. 5	16 PSIA	5.3×10^5 R
IG-06-B-1	Isolation Condenser Level Trans	R_4 x ℄ of "B" Iso. Cond.	98'	Emer. Cond.	270°	Fig. 5	16 PSIA	5.3×10^5 R
IG-06-B-2	Isolation Condenser Level Trans	R_4 x ℄ of "B" Iso. Cond.	98'	Emer. Cond.	270°	Fig. 5	16 PSIA	5.3×10^5 R
9. IB-(16 switches) (See Item No. 21)	Reactor Isolation Temp. Switch	Location to be specified by JCP&L.					——	
10. ID-13A	Reactor Water Level Trans	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4 R
ID-13B	Reactor Water Level Trans	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^1$ R
IA-12A	Reactor Water Level Trans	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4 R
IA-12B	Reactor Water Level Trans	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^1$ R
11. RV-29-A	Core Spray Pressure Switch	NW Corner Room	-19'	-	77°	-	15 PSIA	4.1×10^3 R
RV-29-B	Core Spray Pressure Switch	SW Corner Room	-19'	-	77°	-	15 PSIA	2.6×10^3 R
RV-29-C	Core Spray Pressure Switch	NW Corner Room	-19'	-	77°	-	15 PSIA	4.4×10^3 R
RV-29-D	Core Spray Pressure Switch	SW Corner Room	-19'	-	77°	-	15 PSIA	2.6×10^3 R
12. RV-40-A	Core Spray Pressure Switch	R_D x North Drywell Wall	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.7×10^5 R
RV-40-B	Core Spray Pressure Switch	R_2-R_3 x R_E - R_F	27'	-	77°	-	15 PSIA	2.3×10^3 R
RV-40-C	Core Spray Pressure Switch	R_D x North Drywell Wall	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.7×10^5 R
RV-40-D	Core Spray Pressure Switch	R_2-R_3 x R_E - R_F	27'	-	77°	-	15 PSIA	2.3×10^3 R
RV-26-A	Core Spray Flow Trans.	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5 R
RV-26-B	Core Spray Flow Trans.	R_2-R_3 x R_E	91'	Emer. Cond.	225°	Fig. 8	16 PSIA	8.0×10^5 R
12. IB-06-E	Isolation Cond. Area Temp Det.	C.g. Condr. NE-01A	115'	Emer. Cond.	270°	Fig. 5	16 PSIA	$<6.1 \times 10^1$ R
IB-06-F	Isolation Cond. Area Temp Det.	C.g. Condr. NE-01B	115'	Emer. Cond.	270°	Fig. 5	16 PSIA	$<6.1 \times 10^1$ R
IB-06-G	Isolation Cond. Area Temp Det.	10'S of R_4 x Rc-RB	90'	Emer. Cond.	280°	Fig. 6	16 PSIA	1.0×10^6 R
IB-06-H	Isolation Cond. Area Temp Det.	10'N of R_4 x Rc-RB	90'	Emer. Cond.	280°	Fig. 6	16 PSIA	9.4×10^5 R
14. IP-03-A	Containment Spray Flow Mtr.	R_C-R_B x North RB Wall	25'	-	77°	-	15 PSIA	3.4×10^5 R
IP-03-B	Containment Spray Flow Mtr.	R_C-R_B x South RB Wall	25'	Cleanup System	195°	Fig. 13	15 PSIA	1.7×10^6 R

*Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Break	Peak Temperature (°F)	Temperature Profile	Peak Pressure (PSIA)	Total Integrated Radiation Exposures (1 Yr.) NUREG 0578 Assumptions (RAD)
15. IP-15-A*	Containment Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
IP-15-B*	Containment Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
IP-15-C*	Containment Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
IP-15-D*	Containment Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
16. IP-07*	Drywell Press. Trans.	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
18. RV-16-A*	Drywell Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
RV-16-B*	Drywell Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
RV-16-C*	Drywell Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
RV-16-D*	Drywell Press. Switch	RKO-3	55'	Emer. Cond.	230°*	Fig. 4*	16 PSIA*	3.9×10^5R
19. RE-23-A*	MSL Low Press. Switch	Reactor Fd. Pump Room x North Wall	5'	Reactor Feed	218°*	Fig. 2*	23 PSIA*	$<6.1 \times 10^4$R
RF-23-B*	MSL Low Press. Switch	Reactor Fd. Pump Room x South Wall	5'	Reactor Feed	218°*	Fig. 2*	23 PSIA*	$<6.1 \times 10^4$R
RE-23-C*	MSL Low Press. Switch	Reactor Fd. Pump Room x North Wall	5'	Reactor Feed	218°*	Fig. 2*	23 PSIA*	$<6.1 \times 10^4$R
RE-23-D*	MSL Low Press. Switch	Reactor Fd. Pump Room x South Wall	5'	Reactor Feed	215°*	Fig. 2*	23 PSIA*	$<6.1 \times 10^4$R
20. RE-22-A*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-B*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-C*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RF-22-D*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-E*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-F*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-G*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
RE-22-H*	Reactor Isolation Switch	R_E-R_F x Drywell Wall	27'	-	77°*	-	15 PSIA*	$<6.1 \times 10^4$R
21. IB-95-A1	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-95-A2	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-95-B1	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-95-B2	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-11-A1	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-11-A2	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-11-B1	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R
IB-11-B2	Isolation Condenser △P Switch	RKO-3	55'	Emer. Cond.	230°	Fig. 4	16 PSIA	3.9×10^5R

*Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Break	Peak Temperature (°F)	Temperature Profile	Peak Pressure (PSIA)	Total Integrated Radiation Exposure (1 Yr.) NUREG 0578 Assumptions (RAD)
22. RE-17-A	Core Spray Press. Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-17-B	Core Spray Press. Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
RE-17-C	Core Spray Press. Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-17-D	Core Spray Press. Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
23. RE-15-A	Reactor Vessel Press. Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-15-B	Reactor Vessel Press. Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
RE-15-C	Reactor Vessel Press. Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-15-D	Reactor Vessel Press. Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	15 PSIA	$<6.1 \times 10^4$R
24. RE-03-A	Reactor Pressure Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-03-B	Reactor Pressure Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
RE-03-C	Reactor Pressure Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-03-D	Reactor Pressure Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
25. RE-05-A	Reactor Water Level Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-05-B	Reactor Water Level Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
26. RE-02-A	Reactor Water Level Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-02-B	Reactor Water Level Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
RE-02-C	Reactor Water Level Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16 PSIA	1.4×10^4R
RE-02-D	Reactor Water Level Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16 PSIA	$<6.1 \times 10^4$R
27. V-27-1*	Purge Valves	Top of Torus x NE of Reactor Vessel	19'	Main Steam	150°*	Fig. 15*	16 PSIA*	$<6.1 \times 10^4$R
V-27-2*	Purge Valves	Top of Torus x NE of Reactor Vessel	19'	Main Steam	150°*	Fig. 15*	16 PSIA*	$<6.1 \times 10^4$R
V-27-3*	Purge Valves	℄ Reactor Vessel West x $R_E - R_F$	83'	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R
V-27-4*	Purge Valves	℄ Reactor Vessel West x $R_E - R_F$	83'	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R
V-23-13*	Nitrogen Valves	℄ Reactor Vessel West x $R_E - R_F$	83	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R
V-23-14*	Nitrogen Valves	℄ Reactor Vessel West x $R_E - R_F$	83'	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R
V-23-17*	Nitrogen Valves	℄ Reactor Vessel West x $R_E - R_F$	83'	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R
V-23-18*	Nitrogen Valves	℄ Reactor Vessel West x $R_E - R_F$	83'	Emer. Cond.	250°*	Fig. 9*	16 PSIA*	1.3×10^5R

* Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Breaks	Peak Temperature (°F)	Temperature Profile	Peak Pressure PSIA	Total Integrated Radiation Exposure (1 Yr) NUREG-0578 Assumptions (RAD)
28.								
V-23-15*	Nitrogen System Valves	R_2-R_3 x R_E-R_F (by Wall)	33'	-	77°*	--	15PSIA*	$2.9x10^5$ R
V-23-16*	Nitrogen System Valves	R_2-R_3 x R_E-R_F (by Wall)	33'	-	77°*	--	15PSIA*	$2.9x10^5$ R
V-23-19*	Nitrogen System Valves	R_2-R_3 x R_E-R_F (by Wall)	33'	-	77°*	--	15PSIA*	$2.9x10^5$ R
V-23-20*	Nitrogen System Valves	R_2-R_3 x R_E-R_F (by Wall)	33'	-	77°*	--	15PSIA*	$2.9x10^5$ R
29. V-38-16*	Particulate Monitoring System	R_C x NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
V-38-17*	Particulate Monitoring System	R_Cx NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
V-38-9*	Oxygen Analyzer System	R_C x NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
V-38-10*	Oxygen Analyzer System	R_C x NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
V-38-22*	Torus Sample System	R_C x NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
V-38-23*	Torus Sample System	R_C x NW Drywell Wall	27'	-	77°*	--	15PSIA*	$7.6x10^4$ R
30. V-23-21*	Ventilation Valve	Top of Torus x NE Reactor Vessel Wall	19'	Main Steam	150°*	Fig. 15*	16PSIA*	$<6.1x10^4$ R
V-23-22*	Ventilation Valve	Top of Torus x NE Reactor Vessel Wall	19'	Main Steam	150°*	Fig. 15*	16PSIA*	$<6.1x10^4$ R
V-28-17*	Ventilation Valve	Top of Torus x Reactor Vessel East Wall	19'	Main Steam	150°*	Fig. 15*	16PSIA*	$<6.1x10^4$ R
V-28-18*	Ventilation Valve	Top of Torus x Reactor Vessel East Wall	19'	Main Steam	150°*	Fig. 15*	16PSIA*	$<6.1x10^4$ R
V-28-17*	Ventilation Valve	Top of Torus x Reactor Vessel East Wall	19'	Main Steam	150°*	Fig. 15*	16PSIA*	$<6.1x10^4$ R
31.								
IB-10 (4 switches)	Temperature Switch for Reactor Isolation	℄ Steam Tunnel xR_G-R_F	32'3" (6' above steam line)	Main Steam	290°	Fig. 3	21PSIA	$<6.1x10^4$ R
IB-10 (3 switches)	Temperature Switch for Reactor Isolation	℄ Steam Tunnel xR_H-R_J	32'3" (6' above steam line)	Main Steam	290°	Fig. 1	28 PSIA	$<6.1x10^4$ R
IB-10 (1 switch)	Temperature Switch for Reactor Isolation	℄ Steam Tunnel x RH	32'3" (6' above steam line)	Main Steam	290°	Fig. 1	28 PSIA	$<6.1x10^4$ R
IB-10 (4 switches)	Temperature Switch for Reactor Isolation	℄ Steam Tunnel x R_I-R_H	32'3" (6' above steam line)	Main Steam	290°	Fig. 1	28 PSIA	$<6.1x10^4$ R
IB-10 (4 switches)	Temperature Switch for Reactor Isolation	℄ Steam Tunnel x R_F	32'3" (6' above steam line)	Main Steam	290°	Fig. 1	28 PSIA	$<6.1x10^4$ R

*Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

TABLE 1
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevation	Worst Case Line Break	Peak Temperature (°F)	Temperature Profile	Peak Pressure PSIA	Total Integrated Radiation Exposure (1 Yr) NUREG-0578 Assumptions (RMR
32. NZ-01-A	Core Spray Pump	Northwest Cor. Rm.	(-) 16'-3"	-	77°	-	15 PSIA	5.6 x 10^5R
NZ-01-B	Core Spray Pump	Southwest Cor. Rm.	(-) 16'-3"	-	77°	-	15 PSIA	5.6 x 10^5R
NZ-01-C	Core Spray Pump	Northwest Cor. Rm.	(-) 16'-3"	-	77°	-	15 PSIA	5.6 x 10^5R
NZ-01-D	Core Spray Pump	Southwest Cor. Rm.	(-) 16'-3"	-	77°	-	15 PSIA	5.6 x 10^5R
33. PM-51-1-1	Contmt. Spray Pump	Northeast Cor. Rm.	(-) 13'-0"	Main Steam	165°	Fig. 18	15 PSIA	6.1 x 10^5R
PM-51-1-2	Contmt. Spray Pump	Northeast Cor. Rm.	(-) 13'-0"	Main Steam	165°	Fig. 18	15 PSIA	6.3 x 10^5R
PM-51-1-3	Contmt. Spray Pump	Southeast Cor. Rm.	(-) 13'-0"	Cleanup System	130°	Fig. 14	15 PSIA	1.0 x 10^6R
PM-51-1-4	Contmt. Spray Pump	Southeast Cor. Rm.	(-) 13'-0	Cleanup System	130°	Fig. 14	15 PSIA	1.0 x 10^6R
34. IP-05A*	Contmt. Spray Diff. Press. Trans.	R_6-R_7 x R_A-R_B	29'-0"	Cleanup System	195°*	Fig. 13*	15 PSIA*	(Later)
IP-05B*	Contmt. Spray Diff. Press. Trans.	R_6-R_7 x R_A-R_B	29'-0"	Cleanup System	195°*	Fig. 13*	15 PSIA*	(Later)
IP-05C*	Contmt. Spray Diff. Press. Trans.	R_1-R_2 x R_B-R_C	29'-0"	-	77°*	-	15 PSIA*	(Later)
IP-05D*	Contmt. Spray Diff. Press. Trans.	R_1-R_2 x R_B-R_C	29'-0"	-	77°*	-	15 PSIA*	(Later)
35. NS-01A-L1	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01A-L2	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01A-L3	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01B-L1	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01B-L2	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01B-L3	MSIV Solenoid Valves	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01A-1	MSIV Position Indicators	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01A-2	MSIV Position Indicators	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01B-1	MSIV Position Indicators	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
NS-01B-2	MSIV Position Indicators	Steam Tunnel	30'-6"	Main Steam	280°	Fig. 3	21 PSIA	<6.1 x 10^4R
36. V-16-2	Clean-Up Valve	R_1-R_2 x R_D-R_E	69'-3"	Cleanup System	145°	Fig. 16	15 PSIA	(Later)
V-16-14	Clean-Up Valve	R_1-R_2 x R_D-R_E	69'-3"	Cleanup System	145°	Fig. 16	15 PSIA	(Later)
V-16-61	Clean-Up Valve	R_1-R_2 x R_D-R_E	64'-10"	Cleanup System	145°	Fig. 16	15 PSIA	(Later)
37. V-21-27*	Reactor Water Sample Valve	R_2-R_3 x R_D-R_E	55'-0"	Cleanup System	215°*	Fig. 17*	15 PSIA*	(Later)
V-21-30*	Reactor Water Sample Valve	R_2-R_3 x R_D-R_E	55'-0"	Cleanup System	215°*	Fig. 17*	15 PSIA*	(Later)
38. V-17-1*	Shutdown Cooling Valve	R_5-R_6 x R_B-R_C	46'-2"	-	77°*	-	15 PSIA*	(Later)
V-17-2*	Shutdown Cooling Valve	R_3-R_7 x R_B-R_C	46'-2"	-	77°*	-	15 PSIA*	(Later)
V-17-3*	Shutdown Cooling Valve	R_6-R_7 x R_B-R_C	46'-2"	-	77°*	-	15 PSIA*	(Later)
V-17-55*	Shutdown Cooling Valve	R_5-R_6 x R_C-R_D	57'-9"	-	77°*	-	15 PSIA*	(Later)
V-17-56*	Shutdown Cooling Valve	R_5-R_6 x R_C-R_D	57'-9"	-	77°*	-	15 PSIA*	(Later)
V-17-57*	Shutdown Cooling Valve	R_5-R_6 x R_C-R_D	57'-9"	-	77°*	-	15 PSIA*	(Later)

*Indicates that equipment is not required to mitigate the consequences of the accident outside of containment or to achieve a safe shutdown for that accident. For a break inside containment, asterisked items are needed to mitigate the accident, however, the environmental conditions for these asterisked items would be normal ambient conditions.

TABLE I
OYSTER CREEK NUCLEAR GENERATING STATION
ELECTRICAL EQUIPMENT ENVIRONMENTAL CONDITIONS

Target Designation	Description	Location Coordinates	Approximate Elevations	Worst Case Line Break	Peak Temperature (°F)	Temperature Profiles	Peak Pressure (PSIA)	Total Integrated Radiation Exposure (1 Yr) NUREG-0578 Assumptions (RADS)
39.								
V-22-1*	Drywell Sump Disch. Valve	R_5-R_6 x R_B-R_C	39'-9"	-	77°*	-	15PSIA*	(Later)
V-22-2*	Drywell Sump Disch. Valve	R_5-R_6 x R_B-R_C	39'-9"	-	77°*	-	15PSIA*	(Later)
V-22-28*	Drywell Sump Disch. Valve	R_5-R_6 x R_B-R_C	39'-9"	-	77°*	-	15PSIA*	(Later)
V-22-29*	Drywell Sump Disch. Valve	R_5-R_6 x R_B-R_C	39'-9"	-	77°*	-	15PSIA*	(Later)
40. V-20-15	Core Spray Valve	R_5-R_C x R_D-R_E	65'-6"	Emer. Cond.	230°	Fig. 4	16PSIA	3.9×10^5R
V-20-10	Core Spray Valve	R_5-R_6 x R_D-R_E	58'-10"	Emer. Cond.	230°	Fig. 4	16PSIA	3.9×10^5R
41. IS-153*	Contmt. Iso. Valve Switch	R_6-R_7 x R_D-R_E	55'-0"	Emer. Cond.	230°*	Fig. 4*	16PSIA*	1.5×10^6R
42. NZ-03-A	Core Spray Boost Pump	R_6-R_7 x R_D-R_E	54'-1"	Emer. Cond.	230°	Fig. 4	16PSIA	1.2×10^6R
NZ-03-B	Core Spray Boost Pump	R_2-R_3 x R_E	26'-4"	-	77°	-	15PSIA	2.9×10^5R
NZ-03-C	Core Spray Boost Pump	R_6-R_7 x R_D-R_E	54'-1"	Emer. Cond.	230°	Fig. 4	16PSIA	1.2×10^6R
NZ-03-D	Core Spray Boost Pump	R_1-R_2 x R_E	26'-4"	-	77°	-	15PSIA	2.9×10^5R
43. V-20-21	Core Spray Valve	R_2-R_3 x R_D-R_E	83'-4"	Emer. Cond.	225°	Fig. 8	16PSIA	8.0×10^5R
V-20-11	Core Spray Valve	R_2-R_3 x R_D-R_E	83'-4"	Emer. Cond.	225°	Fig. 8	16PSIA	8.0×10^5R
44. V-14-30	Emerg. Cond. Valve	R_3-R_4 x R_B-R_C	90'-0"	Emer. Cond.	280°	Fig. 6	16PSIA	1.0×10^6R
V-14-31	Emerg. Cond. Valve	R_3-R_4 x R_B-R_C	90'-0"	Emer. Cond.	280°	Fig. 6	16PSIA	1.0×10^6R
V-14-32	Emerg. Cond. Valve	R_4-R_5 x R_B-R_C	90'-0"	Emer. Cond.	280°	Fig. 6	16PSIA	9.1×10^5R
V-14-33	Emerg. Cond. Valve	R_4-R_5 x R_B-R_C	90'-0"	Emer. Cond.	280°	Fig. 6	16PSIA	9.4×10^5R
V-14-34	Emerg. Cond. Valve	R_4-R_5 x R_B-R_C	86'-10"	Emer. Cond.	280°	Fig. 6	16PSIA	9.4×10^5R
V-14-35	Emerg. Cond. Valve	R_3-R_4 x R_B-R_C	87'-5"	Emer. Cond.	280°	Fig. 6	16PSIA	1.0×10^6R
45. V-14-31	Emerg. Cond. Valve	R_4-R_5 x R_A-R_B	99'-9"	Emer. Cond.	270°	Fig. 5	16PSIA	5.3×10^5R
V-14-36	Emerg. Cond. Valve	R_4-R_5 x R_B-R_C	99'-9"	Emer. Cond.	270°	Fig. 5	16PSIA	5.3×10^5R
46. RE-18-A	Reactor Vessel Level Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16PSIA	1.4×10^4R
RE-18-B	Reactor Vessel Level Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16PSIA	$<6.1 \times 10^4$R
RE-18-C	Reactor Vessel Level Switch	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16PSIA	1.4×10^4R
RE-18-D	Reactor Vessel Level Switch	RKO-2	72'	Cleanup System	215°	Fig. 11	16PSIA	$<6.1 \times 10^4$R
RE-05-19-A	Reactor Vessel Level Switch/Trans.	RKO-1	72'	Emer. Cond.	230°	Fig. 4	16PSIA	1.4×10^4R
RE-05-19-B	Reactor Vessel Level Switch/Trans.	RKO-2	72'	Cleanup System	215°	Fig. 11	16PSIA	$<6.1 \times 10^4$R

ATTACHMENT 3

OYSTER CREEK NUCLEAR GENERATING STATION
ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT
TEMPERATURE PROFILE

(TEMPERATURE PROFILE IS ALSO REFERENCED IN TABLE 1, ATTACHMENT 2)

MAY, 1980

FIGURE 1

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 24

MAIN STEAM
LINE BREAK

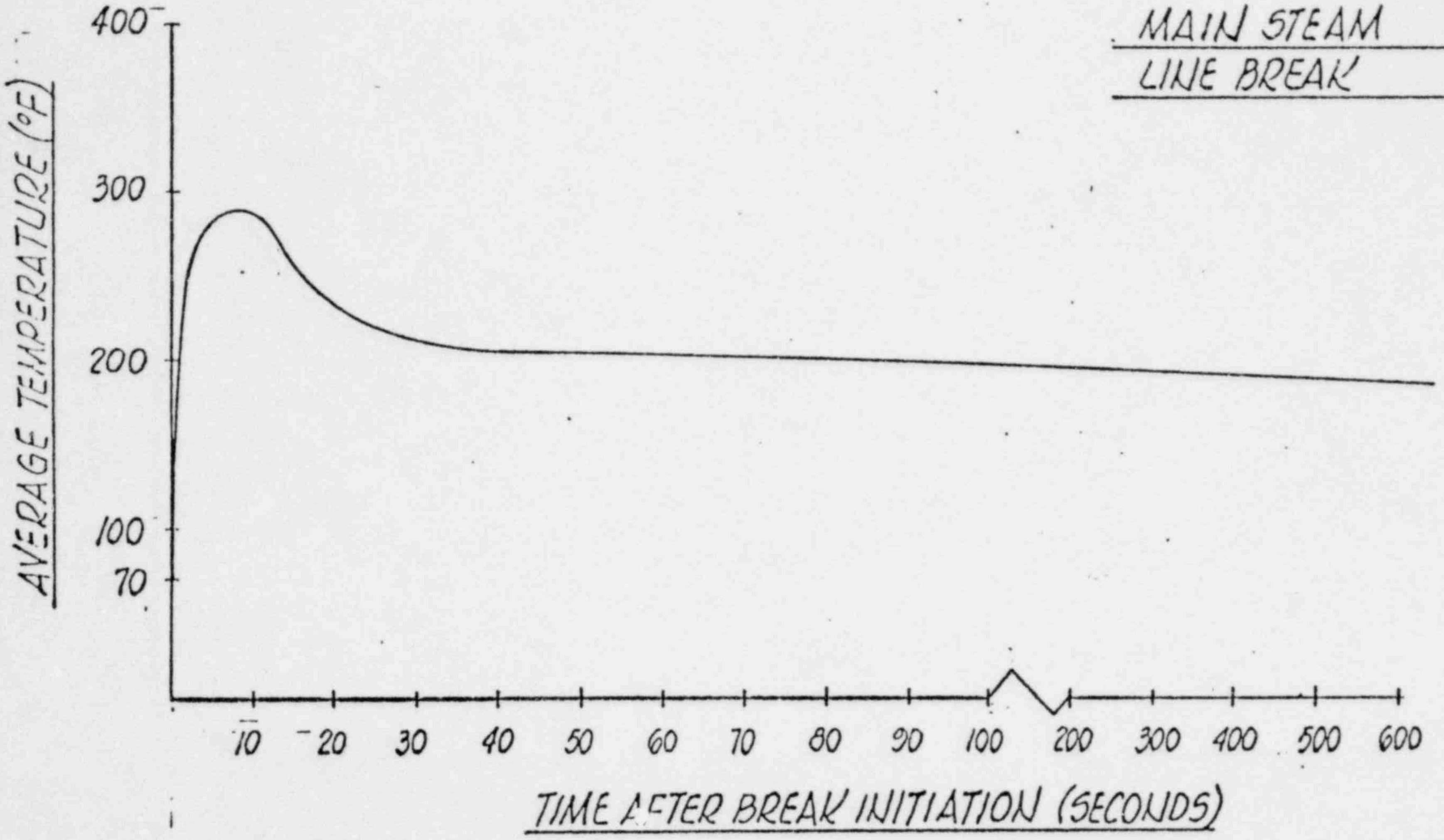


FIGURE 2

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 8

MAIN FEED
LINE BREAK

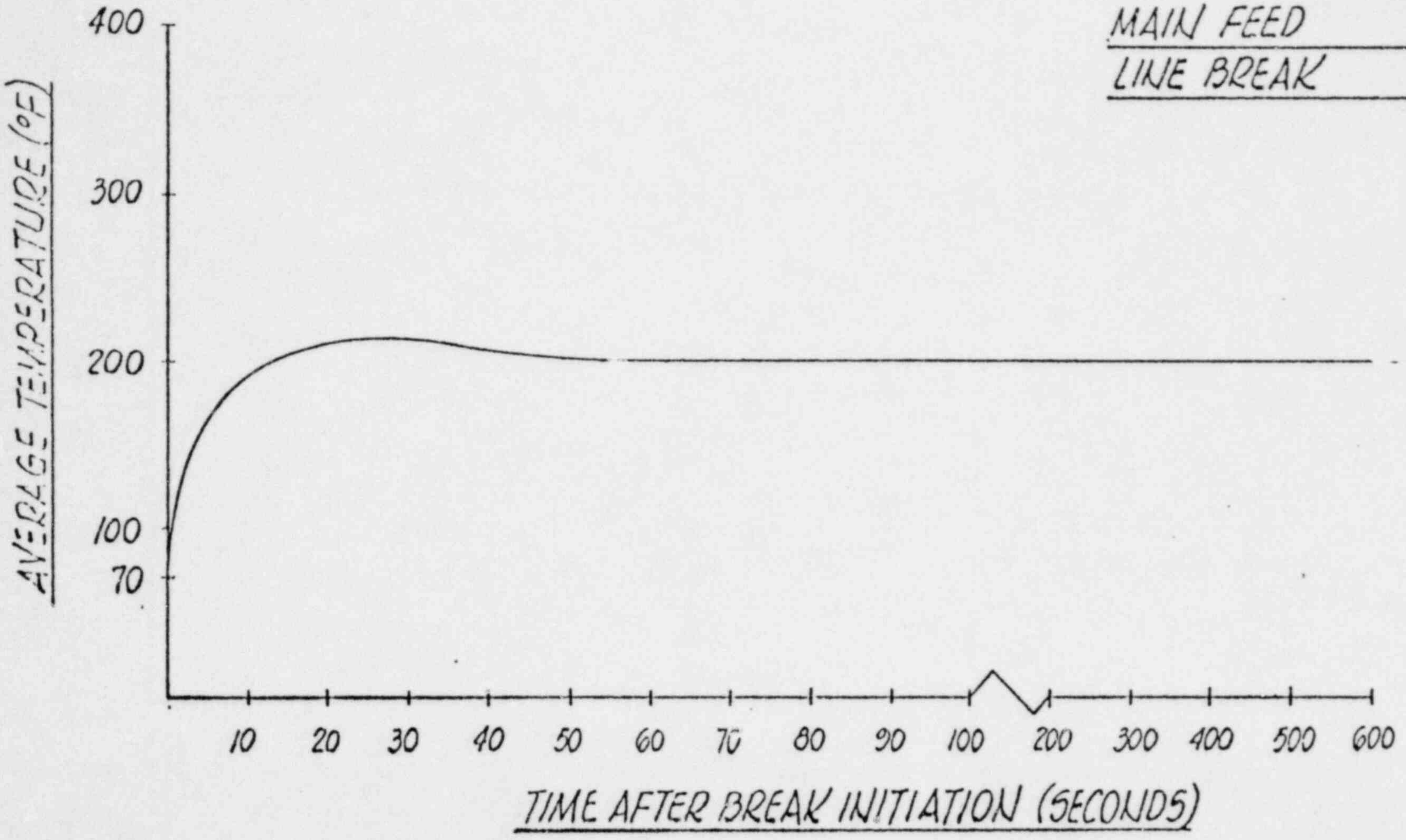


FIGURE 3

OYSTER CREEK NUCLEAR GENERATING STATION

TIME HISTORY FOR NODE 35

MAIN STEAM LINE BREAK

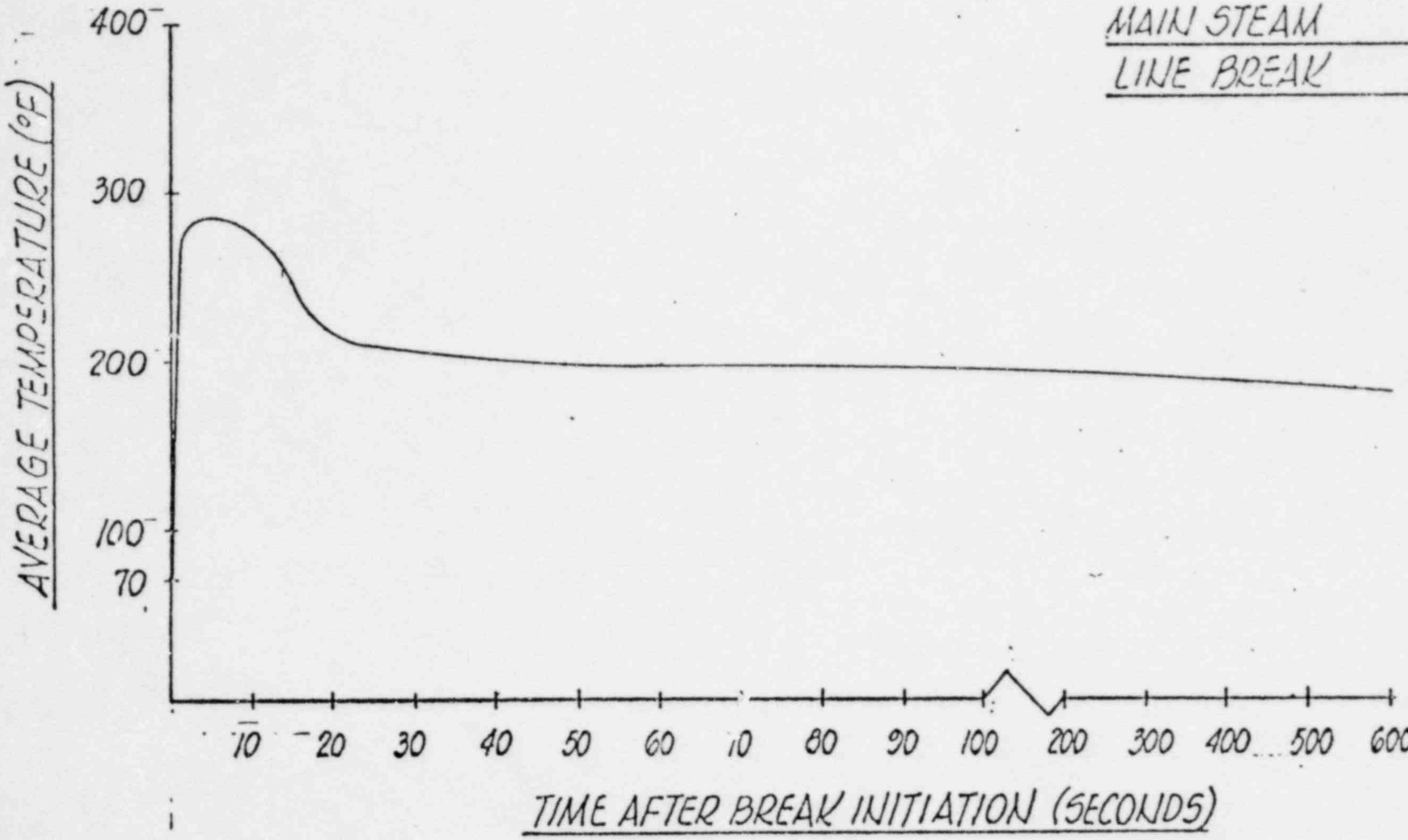


FIGURE 4

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 19

EMERGENCY CONDENSER
LINE BREAK

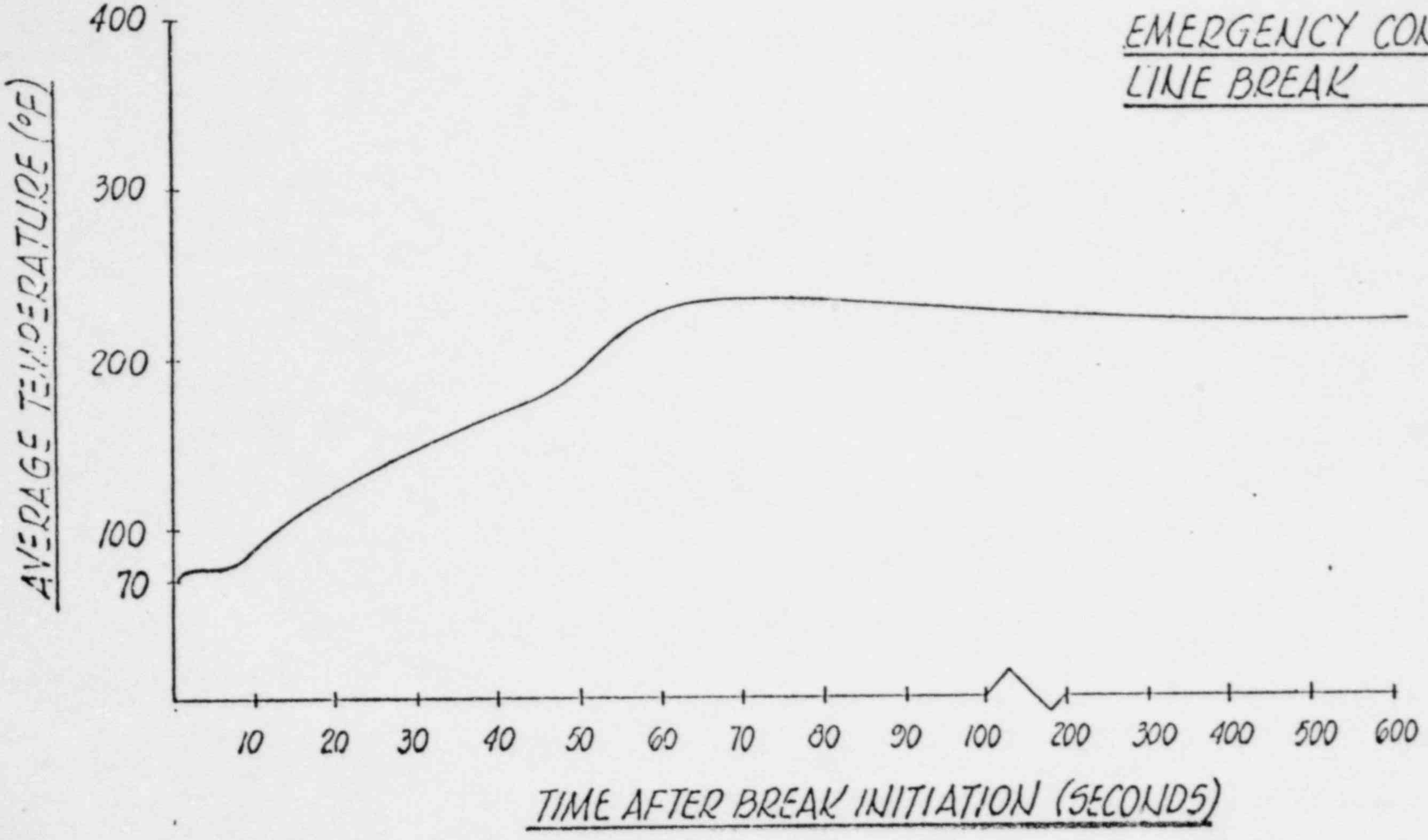


FIGURE 5

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 7

EMERGENCY CONDENSER
LINE BREAK

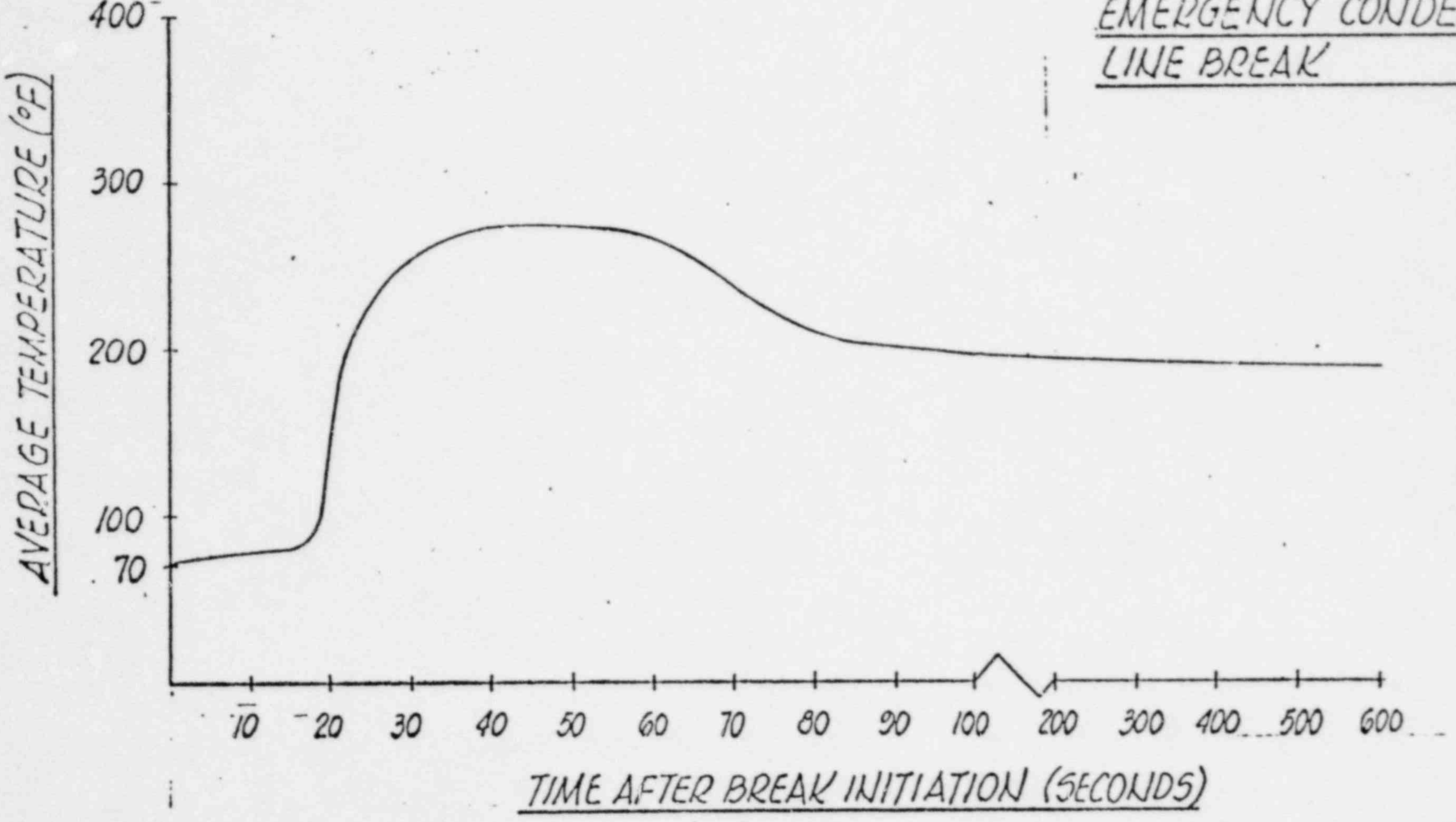
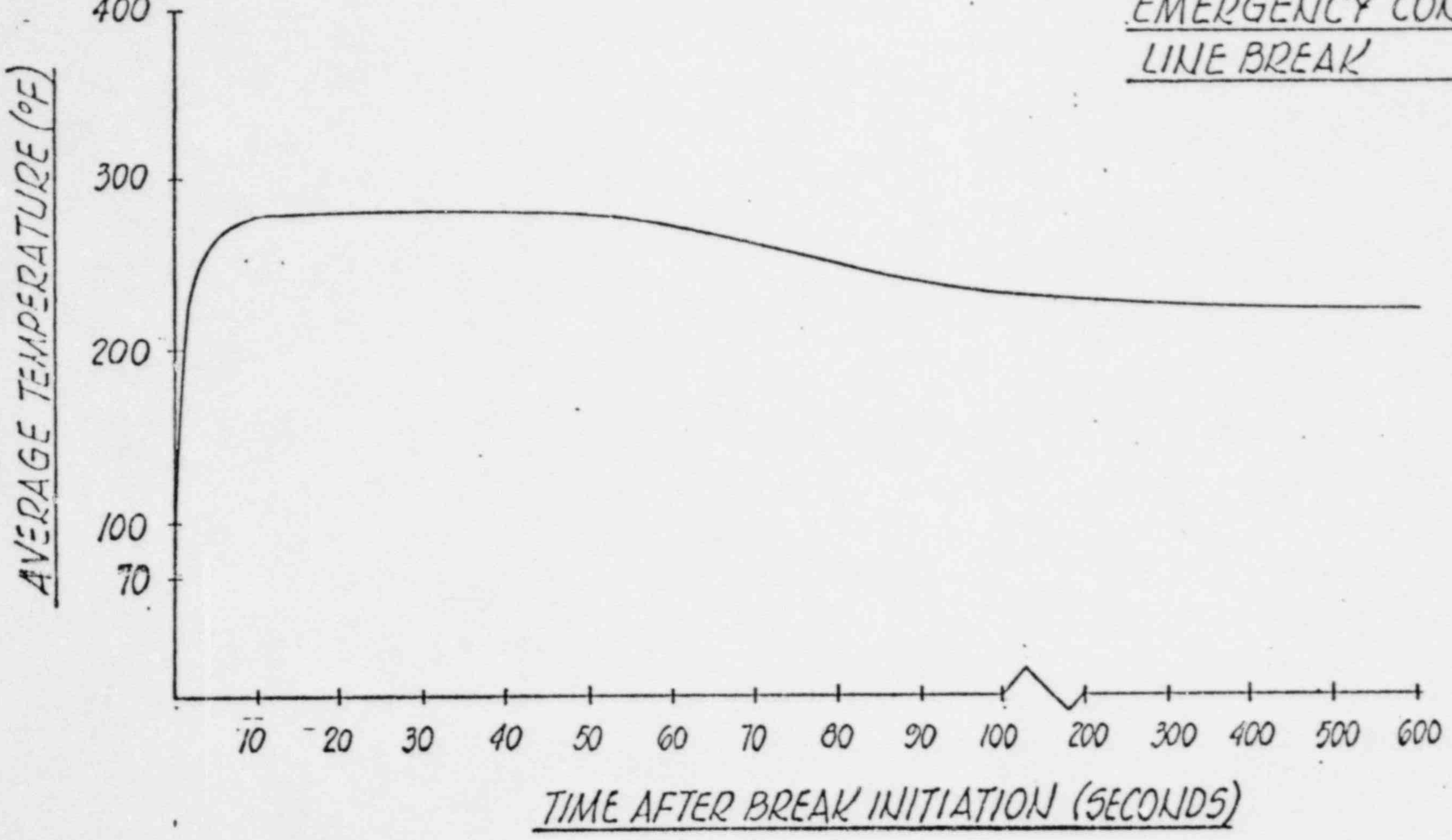


FIGURE 6

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 15

EMERGENCY CONDENSER
LINE BREAK



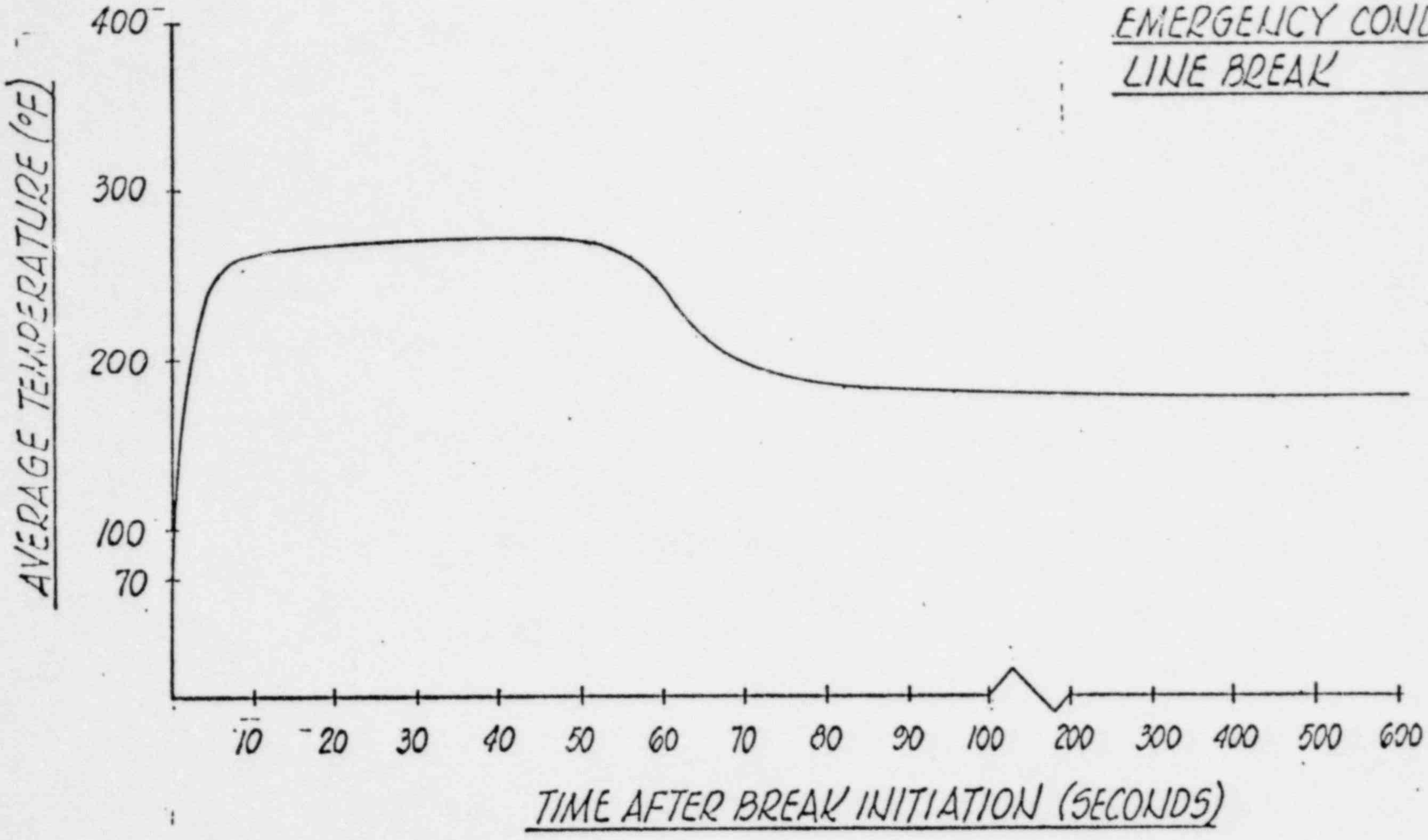


FIGURE 7

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 16

EMERGENCY CONDENSER
LINE BREAK

FIGURE 8

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 17

EMERGENCY CONDENSER
LINE BREAK

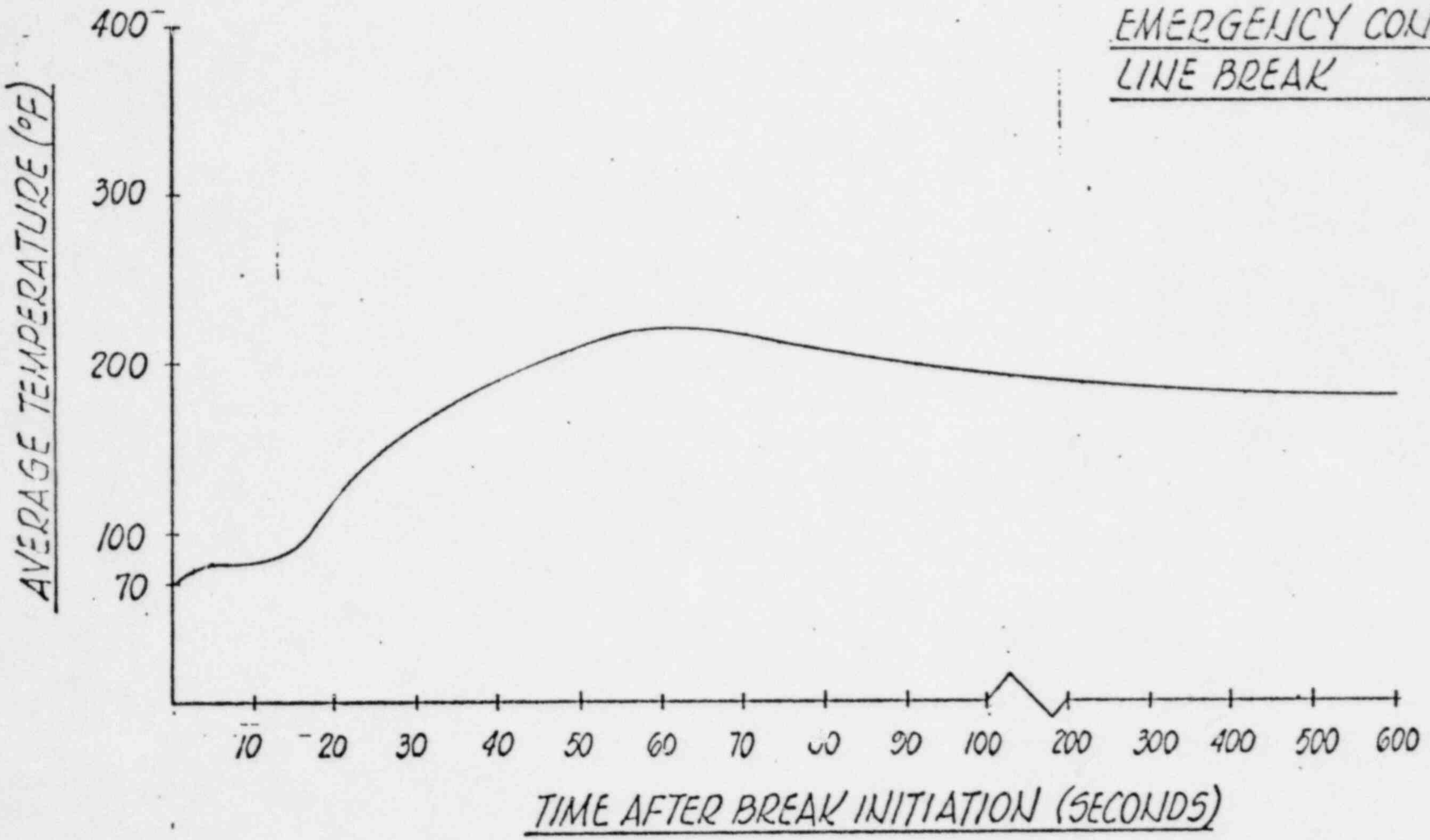


FIGURE 9

OYSTER CREEK NUCLEAR GENERATING STATION

TIME HISTORY FOR NODE 18

EMERGENCY CONDENSER LINE BREAK

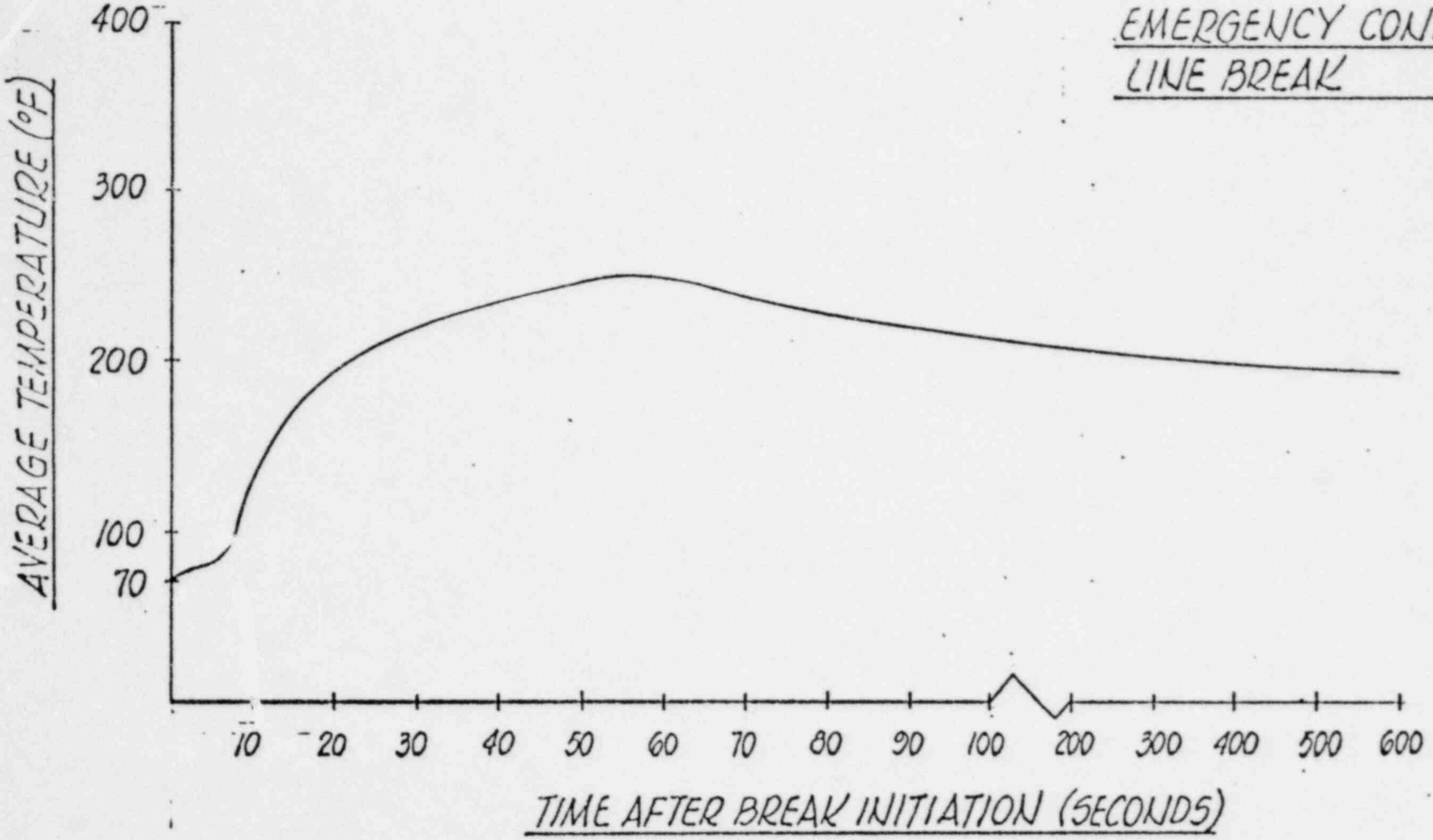


FIGURE 10

OYSTER CREEK NUCLEAR GENERATING STATION

TIME HISTORY FOR NODE 24

CLEANUP LINE BREAK

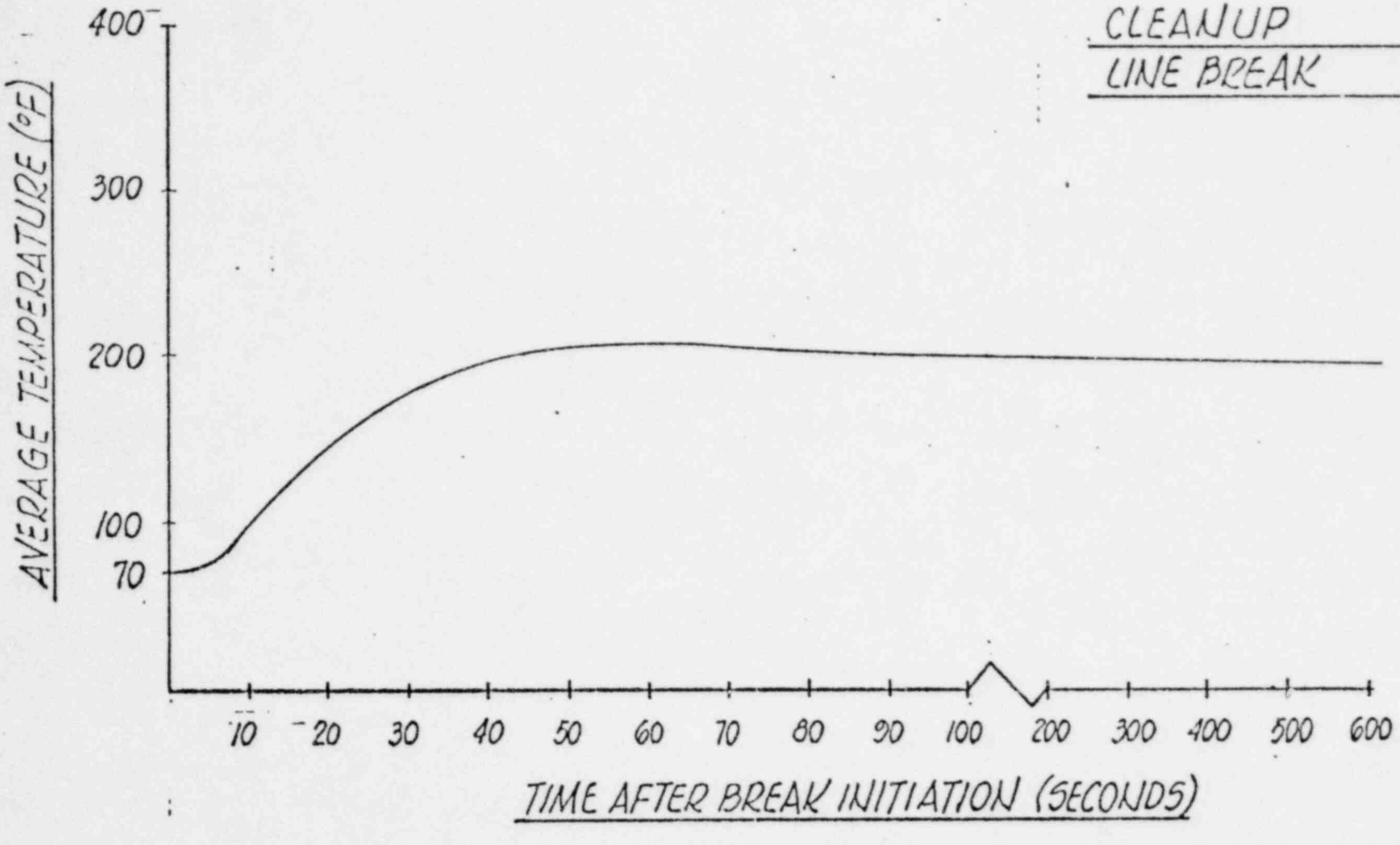


FIGURE 11

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 25

CLEANUP
LINE BREAK

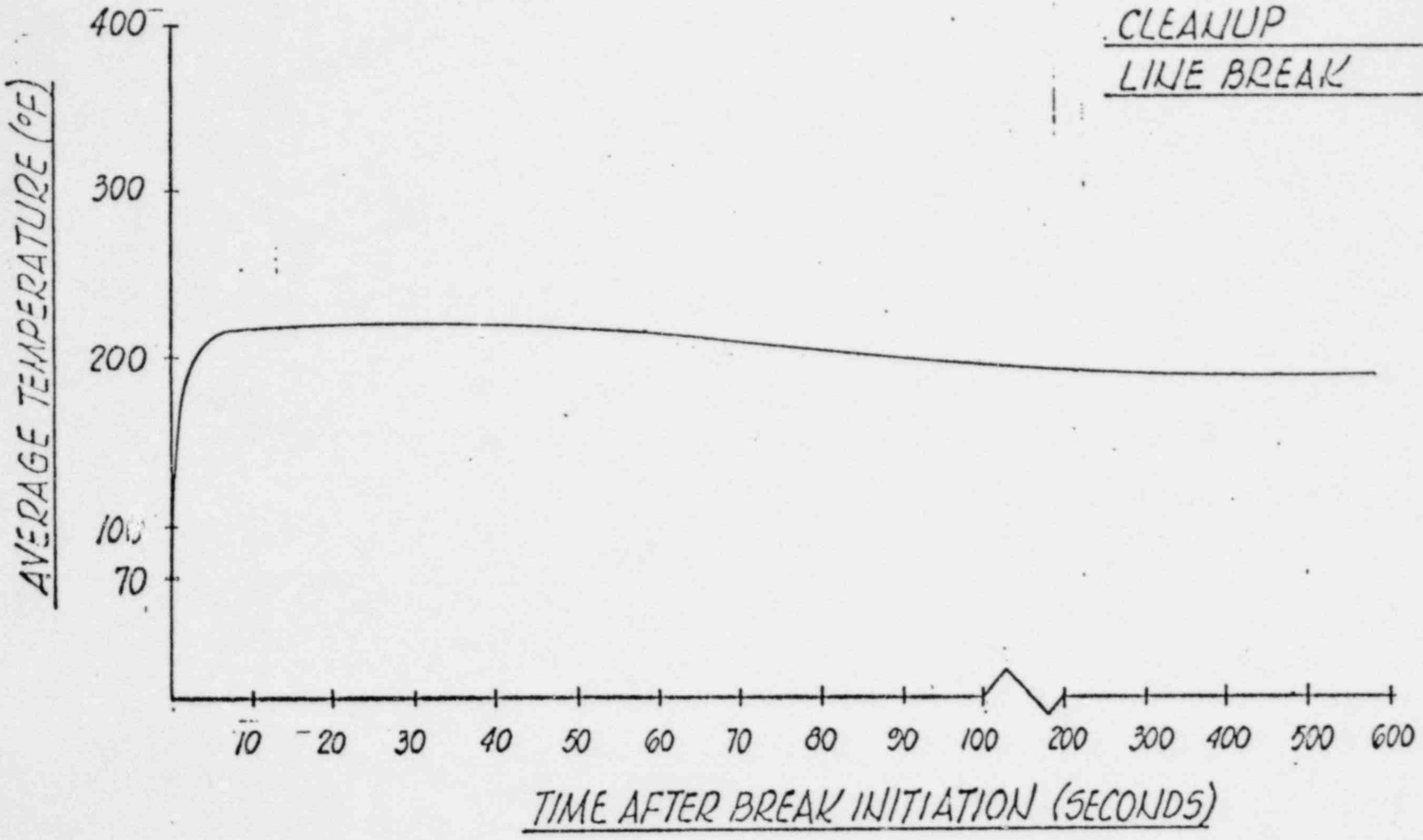


FIGURE 12

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 29

CLEANUP
LINE BREAK

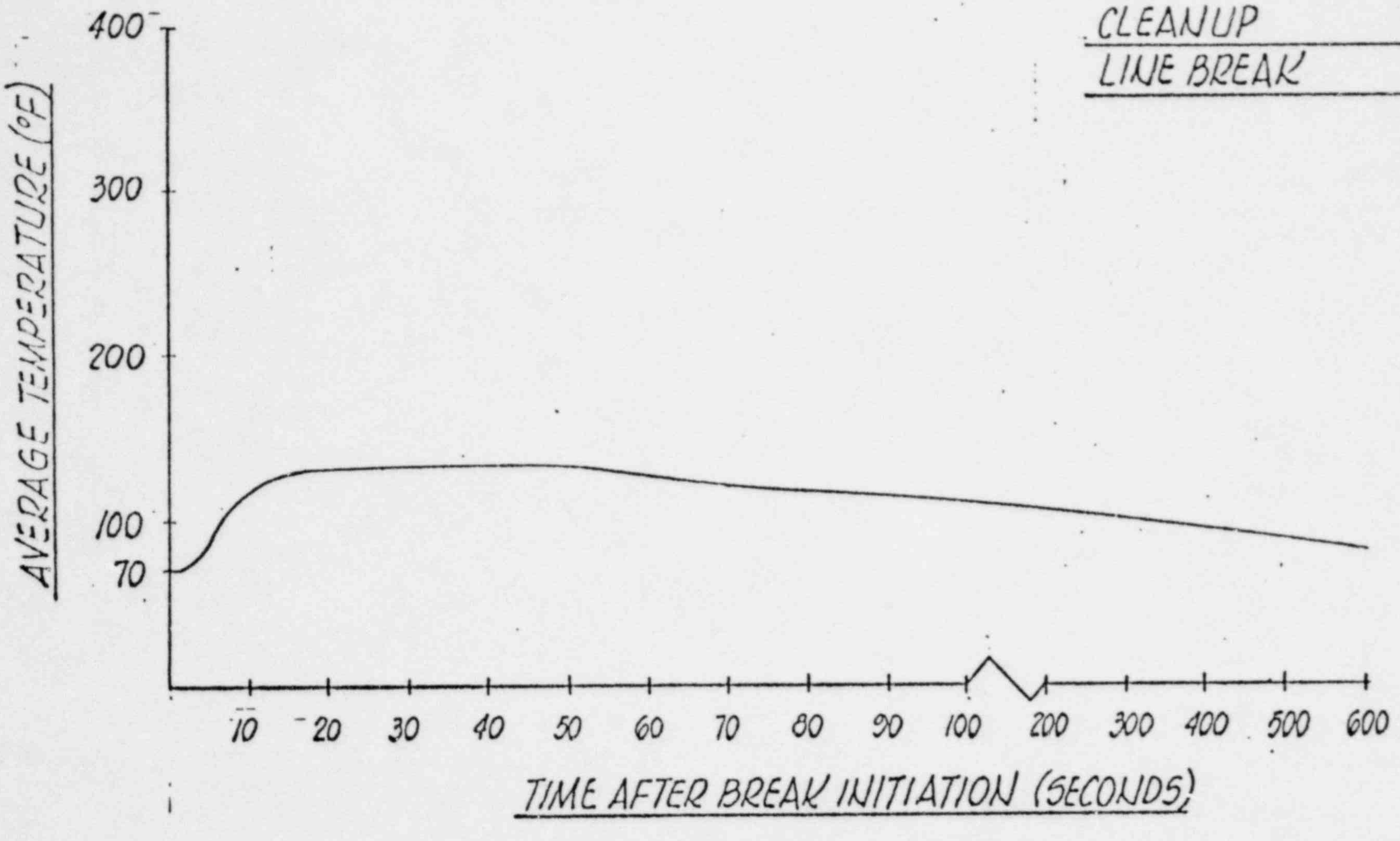


FIGURE 13

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 30

CLEANUP
LINE BREAK

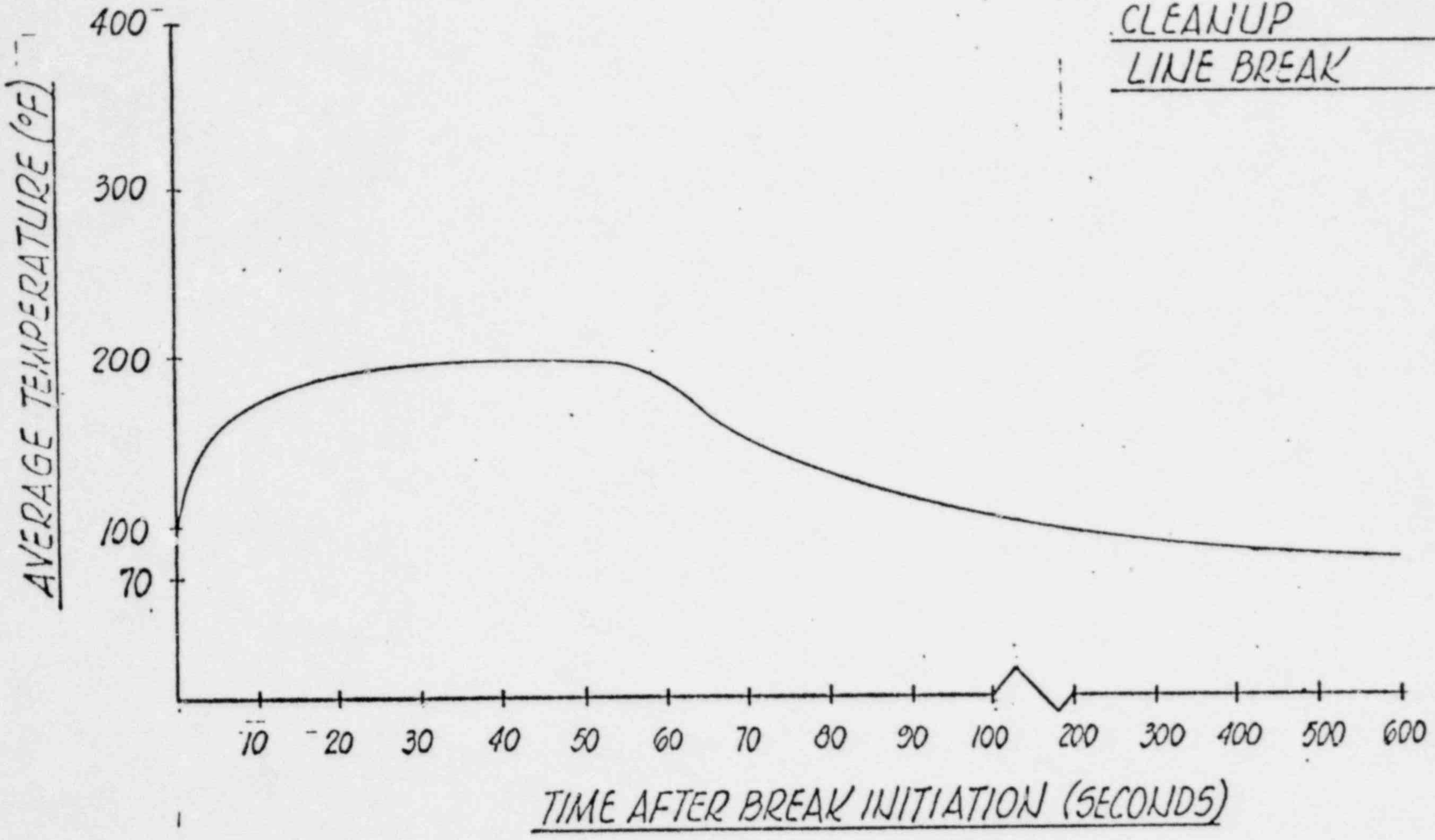


FIGURE 14

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 33

CLEANUP
LINE BREAK

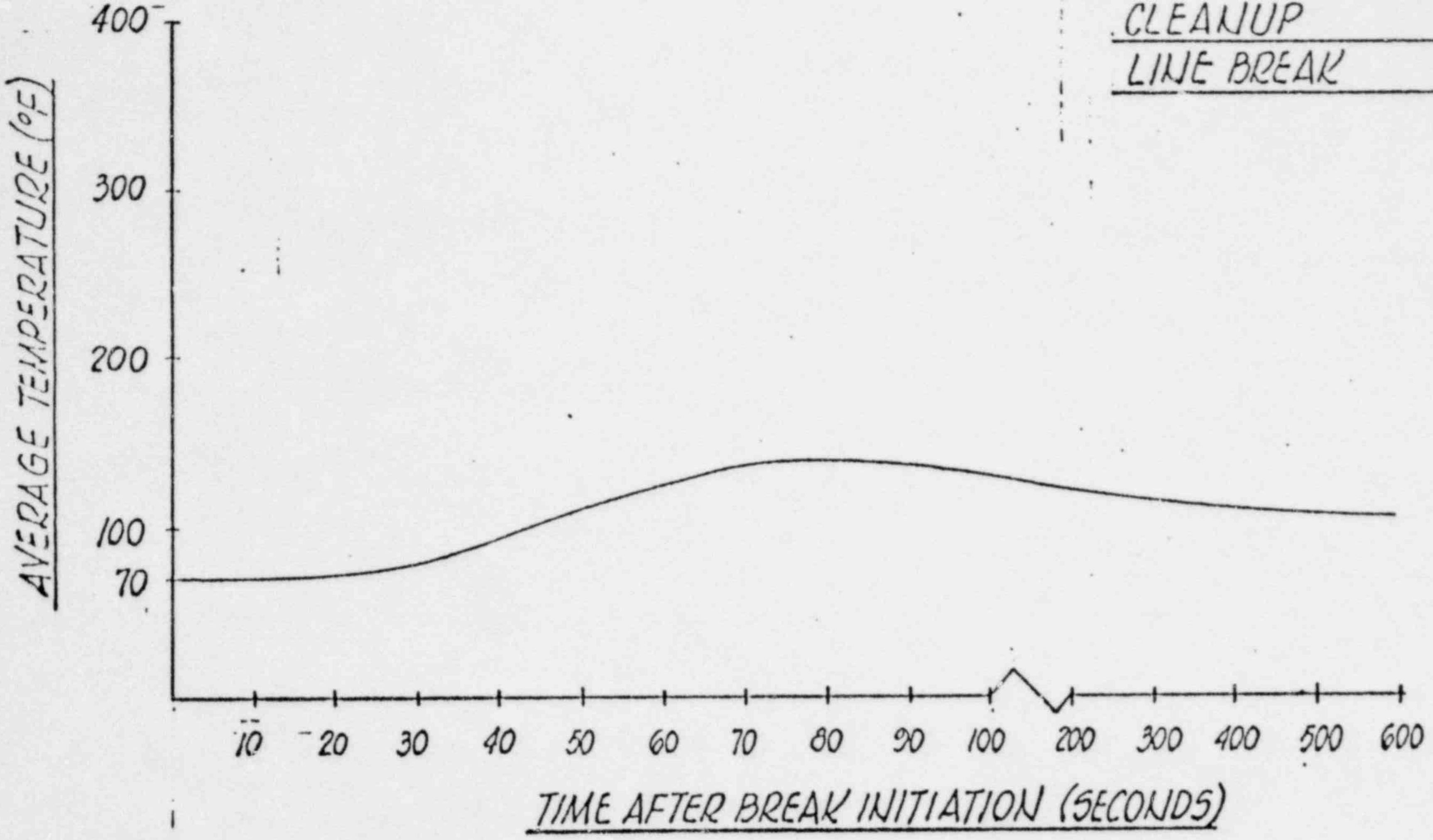


FIGURE 15

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 31

MAIN STEAM
LINE BREAK

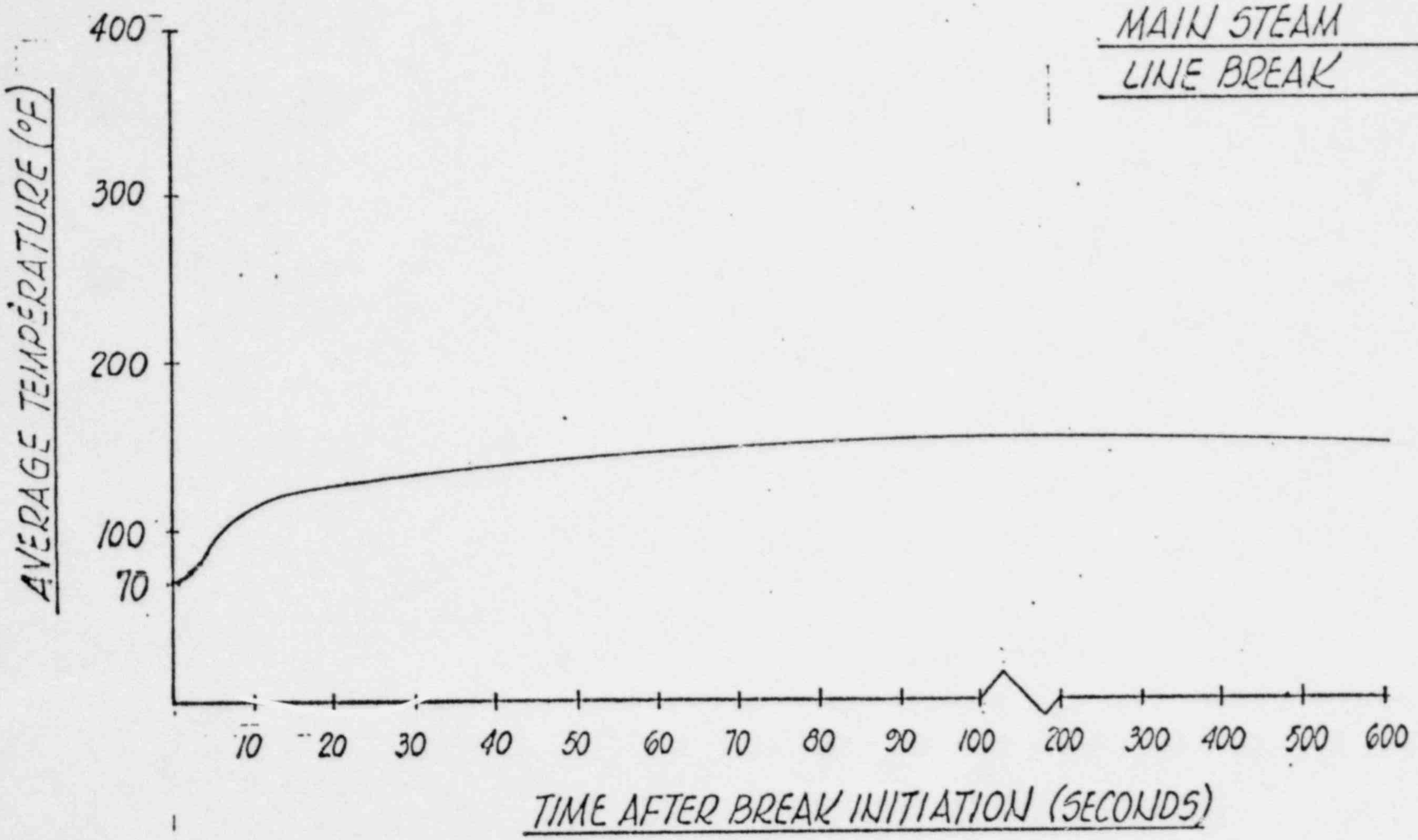


FIGURE 16

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 26

CLEANUP
LINE BREAK

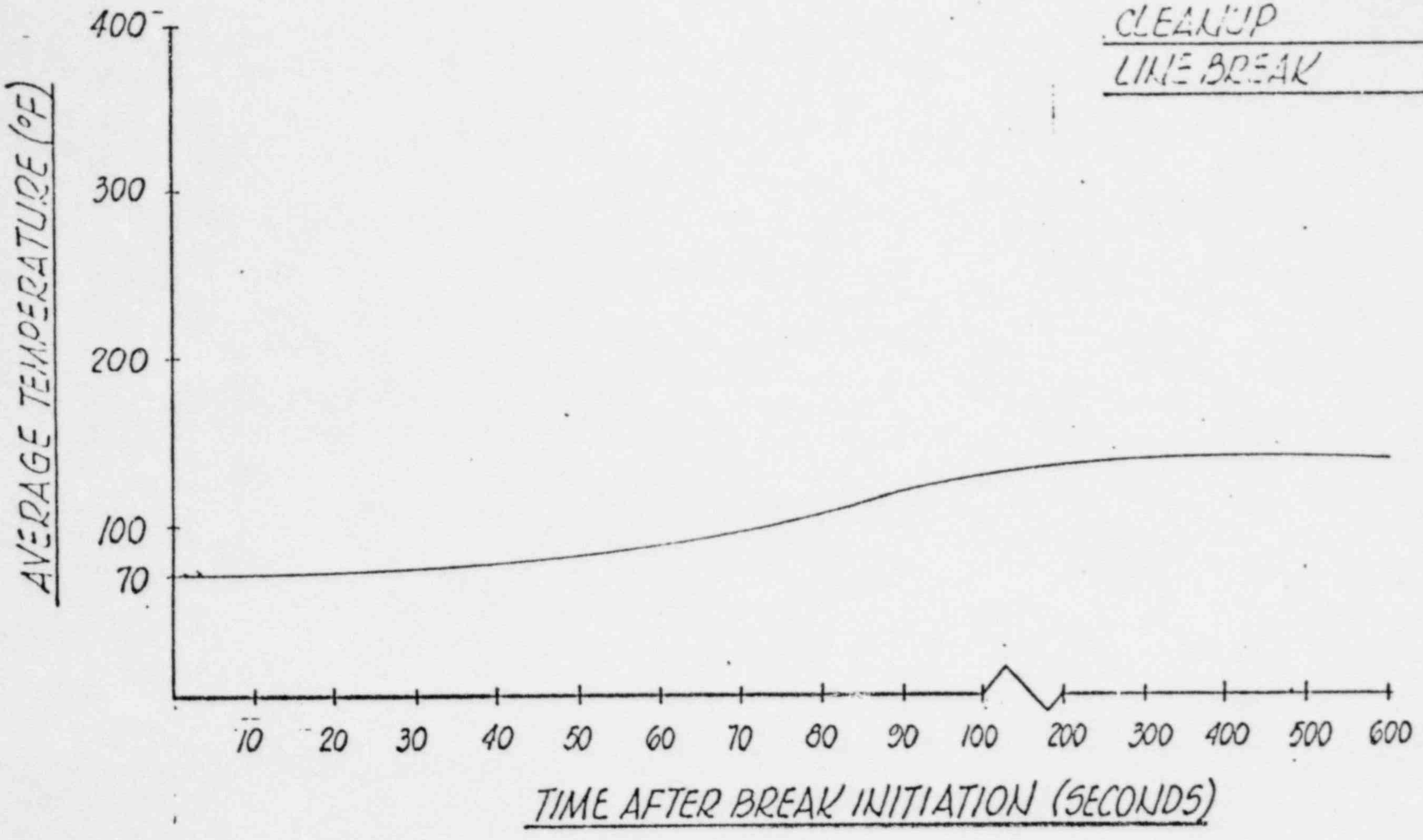


FIGURE 17

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 43

CLEANUP
LINE BREAK

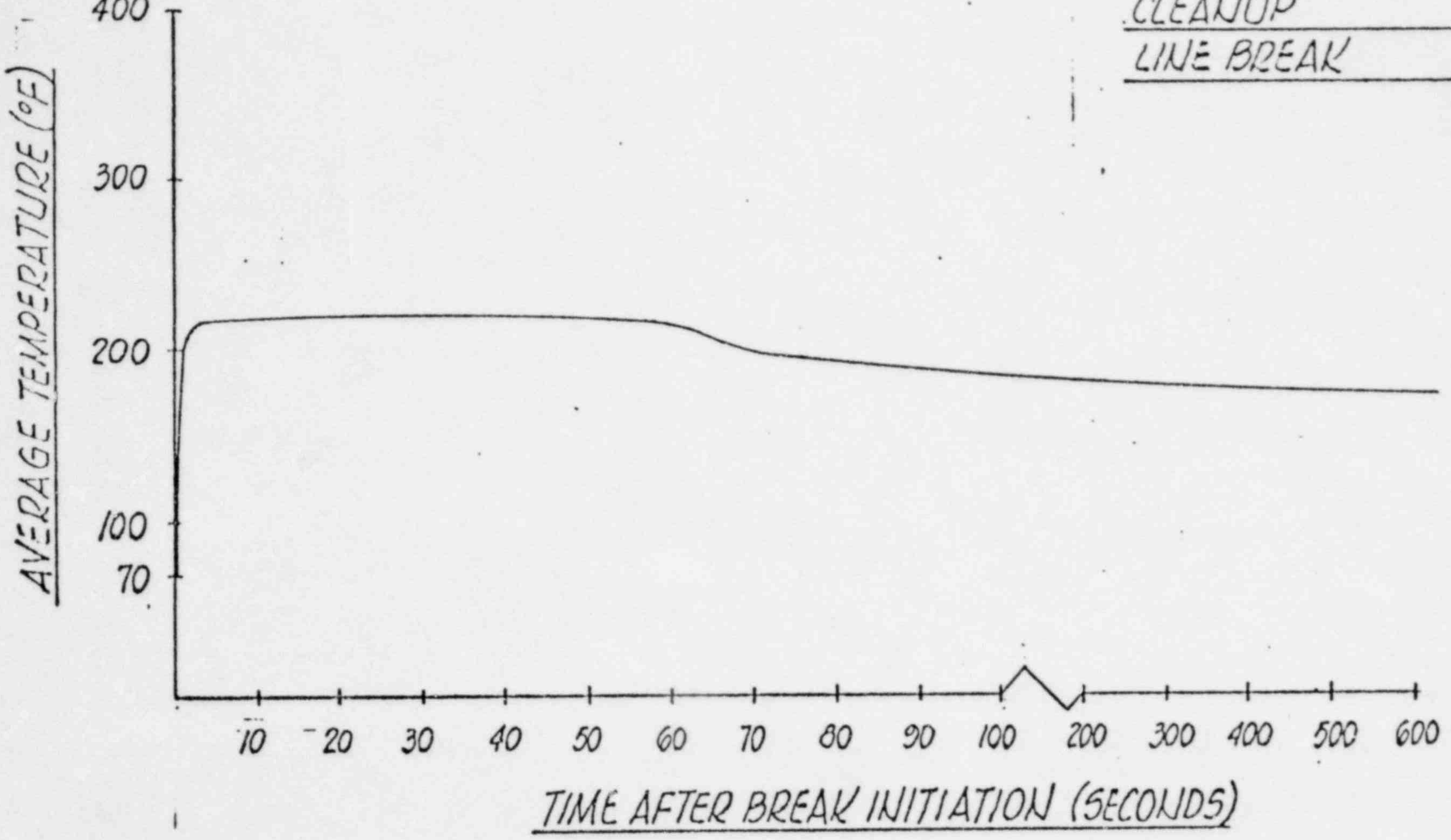
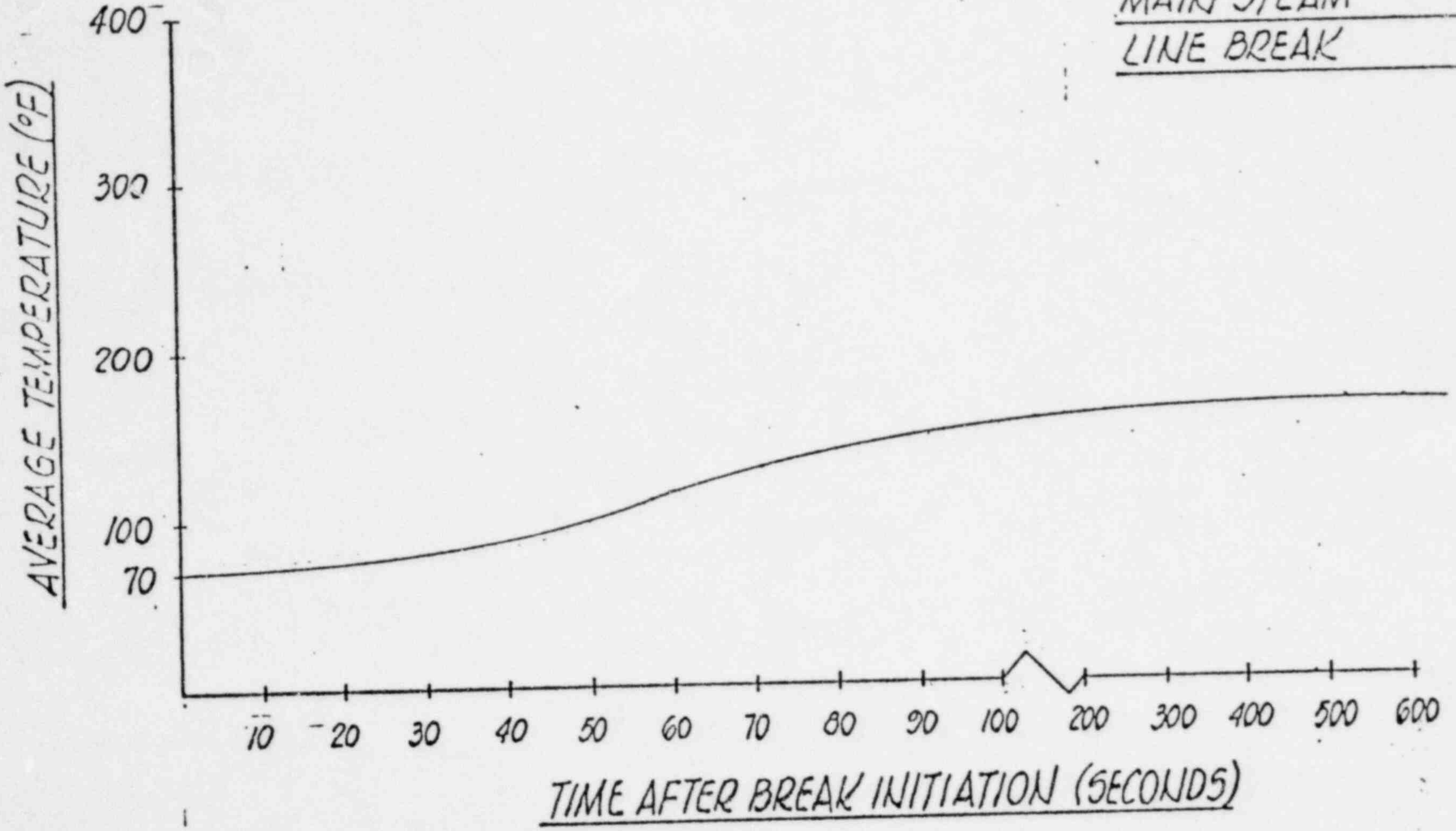


FIGURE 18

OYSTER CREEK NUCLEAR
GENERATING STATION

TIME HISTORY FOR NODE 32

MAIN STEAM
LINE BREAK



DOCKET NO. 50-219

ATTACHMENT 4

OYSTER CREEK NUCLEAR GENERATING STATION
ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT
EFFECT OF CHROMATE SOLUTIONS

MAY, 1980

EFFECT OF CHROMATE SOLUTIONS ON SOME ELASTOMERS AND METALS AT OYSTER CREEK

Cable Insulating Materials

Regarding the effect of the chromate ions in the torus water at Oyster Creek on cable insulating materials such as polyethylene, polyvinyl chloride and ethylene propylene, it is reported in the literature that these materials will be unaffected in neutral or alkaline chromate solutions up to 150 F for typical short term test exposure periods (6 months). All these materials, however, will suffer some form of mild degradation such as loss of strength or hardening with long term continuous exposures. This generally does not affect performance in the early stages and therefore many years of exposure can be tolerated.

Metals

In general, chromates are primarily used to inhibit the corrosion of metals and alloys which demonstrate active passive transitions. Metals undergoing these transitions are nikel, silicon, chromium, titanium and alloys containing these metals. Therefore, these metals should become more corrosion resistant when exposed to a chromate solution.

A corrosion data survey revealed the following metals to experience very low corrosion rates (2 mpy) when imersed in a 10% sodium chromate solution at temperatures up to 180 F:

(1) Cast Iron (gray, nickel, silicon)

(2) Mild steel

(3) Austenitic stainless steels (302, 304, 316, 317, 321, 347)

(4) Martensitic stainless steels (405, 410)

(5) Copper base alloys (copper 85-99.9, brass 70-80 Cu + Zn, Sn or Pb, brass 59-93 Cu + Al, Zn or As, Cupro-nickel 66-88 Cu, 11-33 Ni)

(6) Nickel base alloys (nickel 99, Ni-Cu 66-32, Ni-Cr-Fe 76-16-7, Ni-Fe-Cr 32-47-20, Ni-Mo 62-28 + Fe, V; Ni-Cr-Mo 54-15-16 + Fe, W)

(7) Aluminum

(8) Lead

(9) Titanium

(10) Zinc

(11) Cadmium

Therefore, one would expect the corrosion rates of these metals to be no greater than 2 mpy when sprayed with 150 F torus water containing 900 ppm sodium chromate. Thus the short term exposure of containment metal to chromates will produce negligible corrosion.

DOCKET NO. 50-219

ATTACHMENT 5

OYSTER CREEK NUCLEAR GENERATING STATION
ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT
DATA NECESSARY FOR THE STAFF CALCULATION OF CONTAINMENT TEMPERATURE AND PRESSURE DELAY TIME

MAY, 1980

DATA NECESSARY FOR THE STAFF CALCULATION OF CONTAINMENT TEMPERATURE AND PRESSURE DECAY TIME

DATA REQUIREMENT	RESPONSE
I. 1. Reference the most current LOCA analysis on the docket that defines the service conditions to be used in equipment qualifications.	1. The containment design basis LOCA for Oyster Creek is discussed in the FDSAR, Section XIII-2. This was reanalyzed in Amendments No. 32 and 68, response to question 3. Mass and energy data for this DBA LOCA are not available on the docket, but are being provided herein.
2. With respect to that analysis, provide the following:	
A. Containment Net Free Volume	A. Drywell: 180,000 FT3 Wetwell: 213,300 FT3
B. Passive Heat Sinks	B. Passive heat sinks were not utilized in the DBA LOCA containment analysis. However, heat sink information for the containment wall surfaces is provided in Table 1 which is attached to this document.
C. Initial Containment Atmosphere Conditions for: 1. Temperature 2. Pressure 3. Relative Humidity	C. Drywell Wetwell Temp. (^{o}F) 135 120 Press. (PSIA) 15.5 15.5 Humidity 100% 100%
D. Containment Spray System	
1. Parameters and their setpoints to activate spray.	1. Vessel Level: double low Drywell Pressure: 2 psig

DATA REQUIREMENT	RESPONSE
1. D. Containment Spray System (Continued)	
2. Spray System Activation Time:	
a. time elapsed until signal to activate spray is reached.	2a. Double low level: 2 psig drywell pressure: .85 sec.
b. instrumentation lag	2b. 500 msec.
c. time required for diesel generator to attain full operating speed	2c. 18 sec.
d. time required for loading of containment spray pump	2d. 40 sec. ± 15% time delay.
e. time required to open isolation valve	2e. Valve normally open
f. time required for containment spray pump to achieve full speed	2f. To be supplied later
g. time required to fill spray system and deliver water to spray header	2g. To be supplied later
3. Identify the spray heat exchanger type.	3. Shell and tube heat exchanger with four pass flow on the tube side and two pass flow on the shell side. Water from the wetwell flows on shell side and raw service water is on the tube side. See attached Figure 1.

DATA REQUIREMENT	RESPONSE
E. Fan Cooler System	E. Not applicable
F. Other containment heat removal system	F. Not applicable
G. Provide a discussion of the single failure assumed in the analysis	G. The analysis assumes a loss of offsite power and a failure of a diesel generator.
H. Provide the mass and energy release data for the postulated pipe break considered	H. This data has been obtained recently from General Electric Company and is provided in Table 2 attached to this document.
II. Provide a figure which represents the ECCS and spray systems relied on to mitigate the consequences of a pipe break. Provide pertinent information for these systems. Indicate whether the values given assume a single failure and specify the single failure assumption.	II. A figure (Figure 2) describing the Oyster Creek core spray and containment spray systems and the pertinent data associated with these systems is attached to this document. The containment spray flow represents the flow from a single pump which would experience a runout flow condition since the loop is designed for two pump flow. This represents one half of one loop only. The remaining loop is assumed to be inoperable. The core spray flow shown represents the flow from one of the two loops available as well.

TABLE 1

OYSTER CREEK PASSIVE HEAT SINK DATA

	Material	Thickness Inch	Area ft^2	Geom. Type
1. Biological Shield - Lower	Concrete	48	443.	Cyl.
2. Biological Shield - Middle	Concrete	60.	185.	Cyl.
3. Biological Shield - Upper	Steel Concrete Steel	0.25 29.4 0.31	1044.	Cyl.
4. Drywell - Floor	Concrete	11.25	1374.	Slab
5. Drywell Sphere - Lower	Steel Insulation Concrete	1.154 2.5 78.	2542.	Spher.
6. Drywell Sphere - Middle	Steel Insulation Concrete	0.770 2.75 78.	4210.	Spher.
7. Drywell Sphere - Upper	Steel Insulation Concrete	0.722 2.75 78.	3085.	Spher.
8. Drywell Transition	Steel Insulation Concrete	2.56 2.5 78.	1433.	Spher.
9. Drywell Cylinder	Steel Insulation Concrete	0.640 2.5 78.	1287.	Cyl.
10. Drywell Head	Steel	1.188	428.	Spher.
11. Torus	Steel	0.385	7476.	Cyl.

MATERIAL PROPERTIES

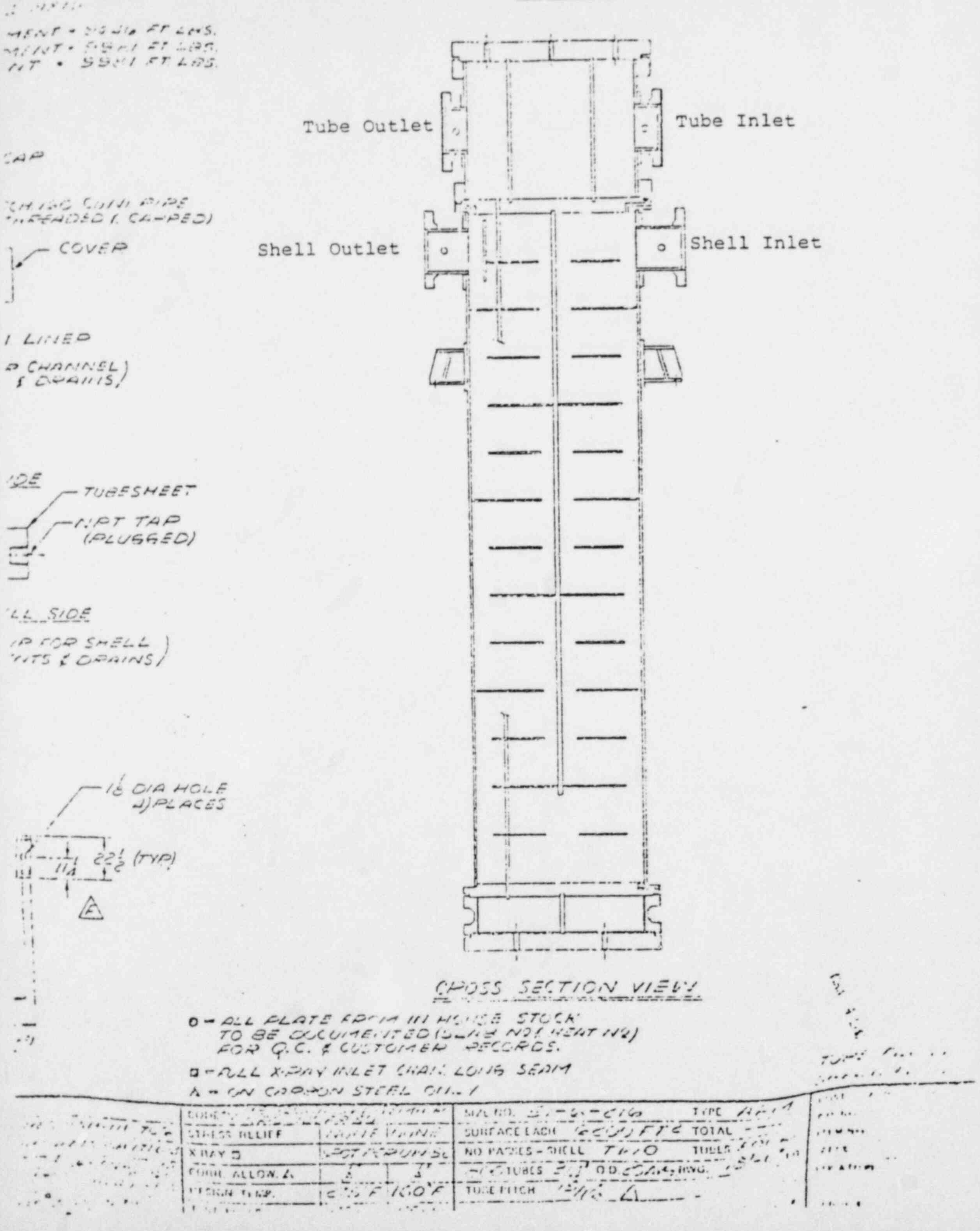
Material	Thermal Conductivity (BTU/hr-ft^2 ^oF)	Volumetric Heat Capacity (BTU/FT^3-^oF)
Concrete	0.92	22.62
Steel	27	58.8
FIRE-BAR (Asbestos fiber - magnesite cement)	0.02	3.74

TABLE 2

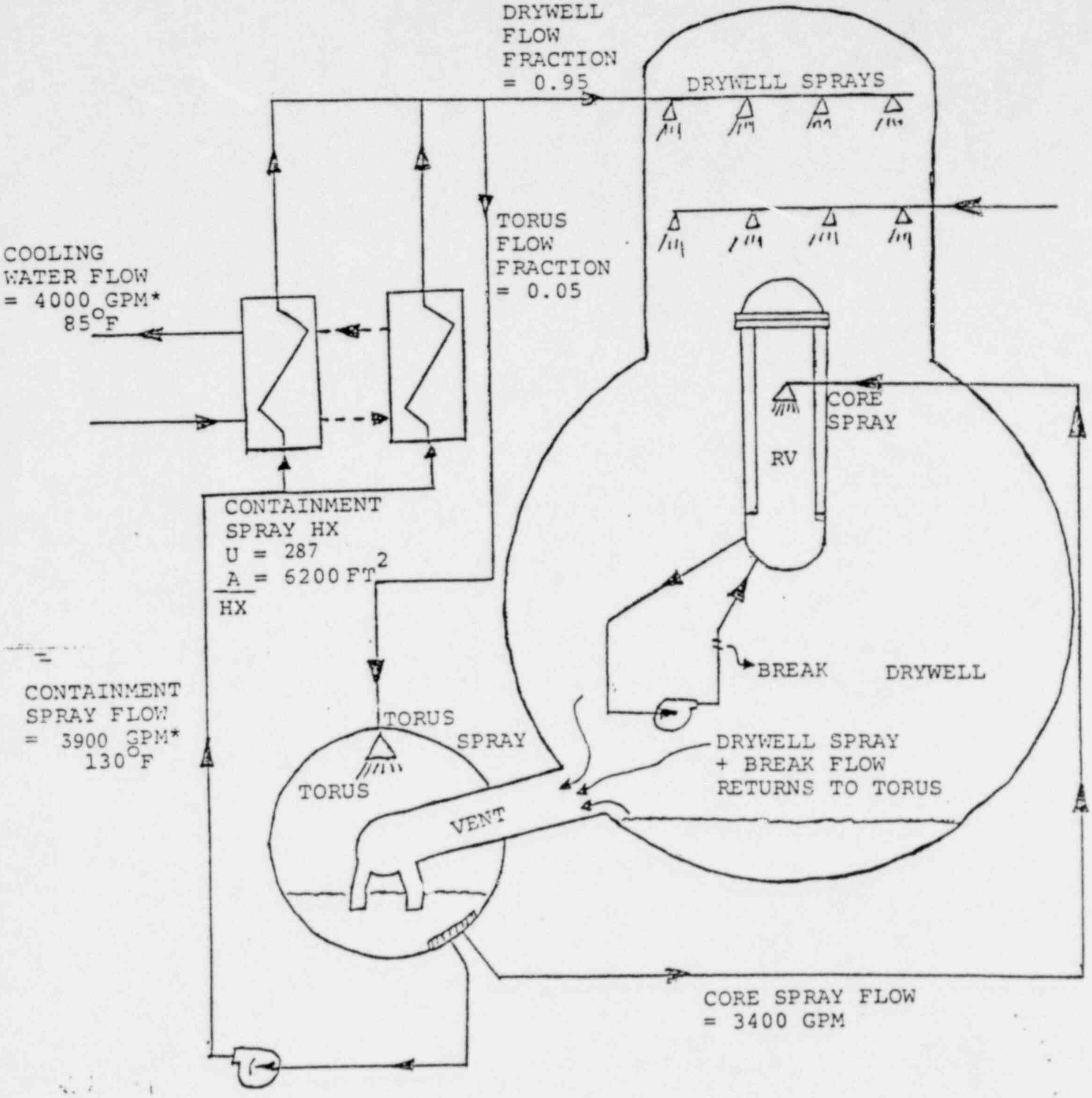
OYSTER CREEK DBA LOCA (GE)
MASS/ENERGY RELEASE DATA

Time (Sec)	Vessel Liq. Temp, °F	Liquid Blowdown, $\frac{LBM}{Sec}$	Liquid Blowdown, $\frac{LBM}{Sec}$	Vessel Pressure, PSIA
0	548.8	3.72 E + 4	0	1035
0.5	548.2	3.713 E + 4	0	1030
1.0	547.5	3.705 E + 4	0	1024
1.5	546.7	3.697 E + 4	0	1018
2.0	546.0	3.688 E + 4	0	1011
2.5	545.3	3.680 E + 4	0	1006
3.0	544.8	3.675 E + 4	0	1002
3.5	544.5	3.671 E + 4	0	999.4
4.0	544.3	3.669 E + 4	0	997.4
4.5	544.1	3.666 E + 4	0	996.3
5.0	543.9	3.664 E + 4	0	994.7
5.5				
6.0	543.5	3.658 E + 4	0	991.2
6.5				
7.0	543.0	3.651 E + 4	0	986.7
7.5				
8.0	542.2	3.641 E + 4	0	980.5
8.5				
9.0	541.2	3.628 E + 4	0	972.2
9.5	540.2	1.882 E + 4	4.995 E + 3	964.1
10.0	534.7	1.752 E + 4	4.94 E + 3	920.8
10.5	528.9	1.627 E + 4	4.863 E + 3	877.3
11.0	523.0	1.507 E + 4	4.768 E + 3	833.8
11.5	516.9	1.391 E + 4	4.653 E + 3	790.6
12.0	510.5	1.287 E + 4	4.547 E + 3	747.7
12.5	503.9	1.188 E + 4	4.429 E + 3	705.1
13.0	497.1	1.09 E + 4	4.282 E + 3	663.1
13.5	490.1	9.947 E + 3	4.115 E + 3	621.9
14.0	482.9	9.063 E + 3	3.945 E + 3	581.8
14.5	475.5	8.276 E + 3	3.786 E + 3	542.6
15.0	467.9	7.534 E + 3	3.621 E + 3	504.6
15.5	460.2	6.784 E + 3	3.423 E + 3	467.8
16.0	452.4	6.078 E + 3	3.217 E + 3	432.7
16.5	444.5	5.442 E + 3	3.020 E + 3	399.4
17.0	436.5	4.851 E + 3	2.819 E + 3	367.9
17.5	428.5	4.31 E + 3	2.623 E + 3	338.1
18.0	420.4	3.819 E + 3	2.431 E + 3	310.3
18.5	412.4	3.387 E + 3	2.254 E + 3	284.2
19.0	404.3	3.026 E + 3	2.104 E + 3	259.7
19.5	396.1	2.702 E + 3	1.962 E + 3	236.6
20.0	387.8	2.4111 E + 3	1.827 E + 3	214.7

FIGURE 1


MENT • ... FT LBS.
MENT • ... FT LBS.
NT • 5591 FT LBS.
Tube Outlet
Tube Inlet
Shell Outlet
Shell Inlet
CAP
...CH 160 CONT PIPE THREADED (CAPPED)
COVER
LINED
(CHANNEL) & DRAINS)
...IDE
TUBESHEET
NPT TAP (PLUGGED)
...LL SIDE
(... FOR SHELL ...NTS & DRAINS)
1⅛ DIA HOLE 4) PLACES
11¼
22½ (TYP)
CROSS SECTION VIEW
○ – ALL PLATE FROM IN HOUSE STOCK TO BE DOCUMENTED (SLAB NO & HEAT NO) FOR Q.C. & CUSTOMER RECORDS.
□ – FULL X-RAY INLET CHAN. LONG SEAM
Δ – ON CARBON STEEL ONLY
CODE
STRESS RELIEF
X RAY □
CORR. ALLOW. Δ
DESIGN TEMP.
160°F
SIZE NO.
TYPE
SURFACE EACH
TOTAL
NO PASSES – SHELL TWO
TUBES
TUBES
O.D.
TUBE PITCH

OYSTER CREEK
CORE SPRAY AND CONTAINMENT SPRAY FLOW



* ACTUAL PERFORMANCE OF 3000 GPM PUMP UNDER RUNOUT CONDITIONS CONSISTENT WITH SINGLE PUMP OPERATION.
FLOW = 6000 GPM FOR TWO PUMP OPERATION.

FIGURE 2