APPENDIX A
ENCLOSURE BUILDING WITHOUT MIXING

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APPENDIX A
ENCLOSURE BUILDING WITHOUT MIXING

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ENCLOSURE BUILDING WITHOUT MIXING

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A2.3.4 Short Term (Accident) Diffusion Estimates

18 The short term diffusion estimates are described in Section 2.3.4 with two modifications under Option A as discussed below.

The limiting exclusion area boundary short term (0-2 hr) atmospheric dispersion factor, CHI/Q, for the Option A design of
18 the Reference Plant is approximately 9.0×10^{-4} sec/m³ (B&W, CE, W). For sites with an exclusion boundary CHI/Q less than or equal to this value, the 0-2 hr doses at the exclusion area boundary will be less than the 150 Rem and 20 Rem thyroid and whole body doses, respectively, as discussed in Regulatory Guide 1.4 (Section 3A.1-1.4).

18 A set of limiting low population zones (LPZ) outer boundary CHI/Qs (B&W, CE, W) for the Option A design of the Reference Plant is given in Table A2.3.4-3. For sites with an LPZ CHI/Q for each time interval less than or equal to the corresponding CHI/Q given in Table A2.3.4-3, the 30 day doses at the LPZ will be less than the 150 Rem and 20 Rem thyroid and whole body doses, respectively, as discussed in Regulatory Guide 1.4 (Section 3A.1-1.4).

A lower power level for W-3S results in a slight increase in the
18 limiting CHI/Qs. The limiting CHI/Qs will be addressed in the Utility-Applicant's SAR.

A2.6 INTERFACE REQUIREMENTS

Interface requirements for Option A are given in Section 2.6 with substitution of the following information for atmospheric dispersion factor CHI/Q.

Atmospheric Dispersion Factor (CHI/Q)

The maximum value at the exclusion area boundary:

9.0×10^{-4} sec/m³

The maximum value at the low population zone outer boundary:

Refer to Table A2.3.4-3.

These values are flexible within the limits stated in Section A2.3.4.

The following relation must hold:

18

$$\frac{(X/Q)_1}{(X/Q)_2} \times A_1 \leq 1$$

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where

$(X/Q)_1$ = X/Q for the worst 5 percent meteorology

$(X/Q)_2$ = X/Q for any windspeed at which exfiltration occurs

A_1 = ratio of the iodine release with exfiltration to the iodine release without exfiltration as given in Fig.A15.1.13-8.

A3.8.4 Other Category I Structures

The following sections are added to the text for the Option A enclosure building. 18

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A6.2.3.1 Supplementary Leak Collection and Release System

The function of the SLCRS is as stated in Section 6.2.3.1. Under Option A the SLCRS collects leakage into the enclosure building in addition to the annulus building, fuel building, main steam and feedwater valve areas, and electrical tunnels in the annulus building as shown in Fig. A6.2.3.1-1. Principal component design parameters are given in Table A6.2.3.1-1.

A6.2.3.1.1 Design Bases

The design bases of the SLCRS are as listed in Section 6.2.3.1.1.

A6.2.3.1.2 System Design

The SLCRS under Option A is designed to collect leakage into the enclosure building in addition to the annulus building, main steam and feedwater valve areas, and electrical tunnels in the annulus building and fuel building. The system is designed to function with the enclosure building isolated, if necessary. The flow diagram (Fig. A6.2.3.1-1) indicates all spaces served by this system. The free volume, design leakage rate, and exhaust rate for each area are listed in Table A6.2.3.1-4. The remainder of the system design description is as discussed in Section 6.2.3.1.2.

A6.2.3.1.3 Design Evaluation

The design evaluation for the SLCRS is as described in Section 6.2.3.1.3 with the following modifications:

1. The SLCRS collects leakage to the enclosure building (Fig. A6.2.3.1-1).

2. The SLCRS pull-down time with enclosure building is shown in Fig. A6.2.3.1-2.

A6A.3 Analysis of SLCRS Performance

For a general discussion, see Section 6A.3.

23 A6A.3.2 Exfiltration Analysis

The exfiltration analysis is as discussed in Section 6A.3.1. The exfiltration rates as a function of wind velocity with an enclosure building are shown on Fig. A6A.3.2-1.

A15.1.13 Loss of Coolant Accident

The loss of coolant accident is as described in Section 15.1.13 except that Section A6A.3, Table A15.1.13-2, and Fig. A15.1.13-2,-3,-4,-5,-8, and -9 are used in place of Section 6A.3, Table 15.1.13-2, and Fig. 15.1.13-2,-3,-4,-5, 8, and -9 respectively.

A16.4.4 Containment Structure Leakage Rate Tests

The applicability, objectives, and specifications for this section are stated in Section 16.4.4 with the exception that Type C' tests are not required when an enclosure building is used. The description of Type A, B, and C tests for Option A are listed below. They are adapted from Section 16.4.4 with Type C' tests removed for Option A.

A. Type A Tests

Pretest requirements shall comply with paragraph III.A.1 of Appendix J except that type B and C tests shall be performed prior to the Type A test. Repairs or adjustments shall be made before testing to correct abnormalities found in the pretest inspection. 34

Periodic Type A leakage rate tests shall be scheduled in accordance with paragraph III.D.1 of Appendix J.

All Type A tests shall be conducted in accordance with ANSI N45.4-1972 "Leakage Rate Testing of Containment Structures for Nuclear Reactors" with the following exceptions:

1. Scheduling of leakage rate tests to account for the effects of weather conditions is not necessary for a concrete containment structure.

2. Leakage rate shall be calculated from a linear least squares fit to the calculated mass of containment air as a function of time (refer to Section 6.2.6). An instrument error analysis shall also be performed.

3. Leakage rate shall be based on the reference volume or absolute method. The makeup air method shall be used for supplemental verification (refer to Section 6.2.6).

4. Reference vessel system if used shall be at a pressure below 0.95 P_d at the start of a Type A test and shall remain below P_d throughout the test.

Preoperational and periodic Type A tests shall be performed in accordance with the peak pressure program defined in Appendix J, paragraphs III.A.4(a).(2) and III.A.5(a).(2). Test pressure shall be as specified in Table 6.1-1, the calculated peak containment internal pressure (P_a). The design basis accident leakage rate (L_a) shall be less than 0.2 weight percent per day of the containment structure air content at pressure P_a. The acceptance criteria for Type A tests shall satisfy the requirements of paragraph III.A.4(b) and III.A.5(b) of Appendix J. The measured leakage rate (L_{am}) shall be less than 0.75 L_a (L_{am} < 0.15 percent per day). Thus, the maximum allowable Type A test measured leakage rate L_{am} is 0.15 wt %/day.

The additional leakage testing requirements of paragraph III.A.6 of Appendix J shall be satisfied in the event of Type A test failure.

B. Type B Tests

Preoperational and periodic Type B tests shall be performed at a test pressure equal to P_a. Test methods are described in Section 6.2.6. Type B tests on air locks shall be conducted at intervals specified in "Reactor Containment Leakage Testing Requirements," Draft 1, by ANS Committee N274, Work Group 56.8, dated April 22, 1975, paragraph 5.3.3 (1) as follows:

"Personnel air locks shall be tested prior to initial criticality and at six month intervals thereafter at an internal pressure of P_a. Air locks opened during periods when containment integrity is not required need be tested only at the end of these periods. For air locks opened when containment integrity is required, the air locks shall be tested within three days after such opening. For air locks opened more frequently than once every three days, the air locks hall be tested at least once every three days.

a. For air lock doors having testable seals, testing the seals fulfills the three day test requirements. The test pressure shall be in accordance with door manufacturer's recommendations. Seal tests shall not be substituted for the six month air lock test.

b. For containments utilizing continuous leakage monitoring systems, only the six month testing requirements need apply to air locks."

Other Type B tests shall be conducted during each reactor shutdown for refueling at intervals not greater than two years.

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The acceptance criteria for Type B tests shall satisfy the requirements of paragraph III.B.3 of Appendix J. The total of Type B and C measured leakage shall be less than 0.6 L_a, which equals 0.12 percent per day.

C. Type C Tests

Preoperational and periodic Type C tests shall be performed at a test pressure equal to P . Test methods are described in Section 6.2.6. Type C tests shall be conducted during each reactor shutdown for refueling but in no case at intervals greater than two years. The acceptance criteria for Type C tests shall satisfy the requirements of paragraph III.C.3 of Appendix J. The total of Type B and C measured leakage shall be less than 0.6 L_a, which equals 0.12 percent per day.

D. Special Testing Requirements

Type A, B, and C tests, as applicable, shall be conducted following containment structure modifications in accordance with paragraph IV(A) of Appendix J.

E. Inspection and Reporting on Tests 18

A general pretest inspection of the containment structure shall be performed in accordance with paragraph V(A) of Appendix J. Technical reports for preoperational and periodic tests shall be submitted in accordance with the requirements of paragraph V(B) of Appendix J.

Bases

1. Appendix J to 10CFR50

2. The maximum allowable containment leak rate (L_a) of 0.2 percent per day is chosen to ensure that the radiological consequences of the design basis accident are below the limits suggested in 10CFR100.

3. The maximum allowable measured leakage rate (L_{am}) is 0.15 percent/day.

   The basis for these values is as follows:

   L_d = Primary containment design leak rate 0.2 wt %/day

   L_a = Maximum allowable primary containment leak rate = 0.2 wt %/day

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L_{am} = Maximum allowable measured primary containment leak rate = 0.75 L_a = 0.15 wt %/day

However, the radiological consequences of an accident are based on no uncollected leakage and 0.2 percent per day leakage that is collected and treated before release.

18 4. Type B and C tests ensure that leakage through containment isolation valves and penetrations is less than 0.6 L . This provides a high probability that the Type A measured leakage rate (L_{am}) will be below 0.75 L_a.

5. The peak containment internal pressure related to the design basis accident (P_a) is calculated by means of the LOCTIC computer code as described in Section 6.2.1.

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TABLE A2.3.4-3

A SET OF LIMITING LPZ OUTER BOUNDARY
ATMOSPHERIC DISPERSION FACTORS

Time Interval	CHI/Q (sec/m³)	
0-8 hr	2.7×10^{-4}	
8-24 hr	1.2×10^{-4}	22
1-4 days	4.1×10^{-5}	
4-30 days	9.0×10^{-6}	

TABLE A 6.2.3.1-1

SUPPLEMENTARY LEAK COLLECTION AND RELEASE SYSTEM
COMPONENT DESIGN AND PERFORMANCE CHARACTERISTICS

Component	Design and Performance Characteristics
1. Filter Bank	
Capacity	20,000 cfm
2. Exhaust Fan	
Capacity	20,000 cfm
Head	15 in. W.G.
Motor	70 hp
3. Charcoal Filter Decay Heat Removal Fan	
Capacity	120 cfm
Head	3 in. W.G.
Motor	1/2 hp

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TABLE A6.2.3.1-4

DESIGN PARAMETERS FOR AREAS
SERVED BY SLCRS

	Free Volume $x10^6$ ft^3	Estimated Leakage Rates* (cfm)	Fan Exhaust Rates (cfm)
Annulus Bldg	3.30	6,000	9,000
Fuel Bldg	0.93	2,000	3,000
Main Steam and Feedwater Valve Enclosure	0.16	1,000	1,500
Electrical Tunnels in The Annulus Bldg	0.27	1,000	1,500
Enclosure Bldg.	1.3	3,500	5,000
Totals	5.96	13,500	20,000

*At 0.25 in. H_2O differential pressure

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TABLE A8.3-1

LOADING CAPACITY IN HORSEPOWER (UNLESS OTHERWISE STATED)

NORMAL BUSES

13.8 KV Load	Bus No. 1N	Bus No. 2NB	Bus No. 2NA	Bus No. 3N
Reactor coolant pump	8,000	8,000	8,000	8,000
Circulating water pump	7,000	-	7,000	7,000
Cooling tower load centers	Later	-	Later	Later
480 V normal load centers	5,000	-	4,000	5,000
Condensate pump	4,000	-	4,000	4,000

4,160 V Load	Bus No. 1N	Bus No. 2N	Bus No. 3N
4th point heater drain pump	2,000	2,000	2,000
Turbine plant service water pump	1,000	1,000	1,000
Fire pump	400	-	-
Boron evaporator reboiler pump	-	-	250
Condenser air removal	250	-	250
Vacuum priming pump	500	-	500
Turbine plant component cooling pump	400	400	400
Thermal regeneration chiller compressor	-	-	250
Mechanical refrigeration units	650	650	650

EMERGENCY BUSES

4,160 V Load	Bus No. 1Q	Bus No. 2P	Bus No. 3G
High head safety injection pump	900	900	900
Low head safety injection pump	400	400	400
Charging pump	500	500	-
Containment spray pump	500	500	500

TABLE A8.3-1 (CONT)

	Bus No. 1O	Bus No. 2P	Bus No. 3G
Auxiliary feedwater pump	750	750	750
Reactor plant component cooling pump (Note 1)	800	800	800
Reactor plant service water pump (Notes 1 & 2)	600	600	600
Residual heat removal pump	275	275	275
Control building chiller	450	450	450
<u>480 V Load</u>			
Containment atmosphere recirculation fan (Note 1)	75	75	75
Reactor plant service water cooling tower fans (Note 2)	later	later	later
Fuel pool cooling pump	150	150	-
Control and diesel bldg HVAC	225	225	225
Boron injection pump	150	150	-
Boric acid transfer pump	21	21	-
Boron injection tank recirculation pump	5		-
Boron injection tank heaters	12 kW	12 kW	-
Boron injection surge tank heaters	3 kW	3 kW	-
Pressurizer heaters control group	-	480 kW	-
Pressurizer heaters backup group	810 kW	-	810 kW

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TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P	Bus No. 3G	
Battery chargers	100 kW	100 kW	200 kW	
Heat tracing	100 kW	-	100 kW	
Hydrogen recombiner	10 kW	10 kW	-	
Motor operated valves	Later	Later	Later	
Essential lighting	75 kW	75 kW	75 kW	
Supplementary leak collection and release system	172 kW	172 kW		
Control rod drive cooling fan	25	25	50	20
Positive displacement pump	-	-	100	
Diesel generator fuel pump	5	5	5	
Diesel generator lube oil pump	10	10	10	
Diesel starting air compressors (Note 1)	15	15	15	
Diesel generator circulating water pump	Later	Later	Later	
<u>Emergency Generator</u>				
Continuous rating	5,500 kW	5,500 kW	5,500 kW	

Note 1. Two motors of the given horsepower are provided per bus.
Note 2. Dependent on site.

TABLE A8.3-2

EMERGENCY DIESEL GENERATOR LOADING ON
LOSS OF OFFSITE POWER PLUS DBA

Load Description	Auto Sequence Start	Timing-Sec (1)	Loading Per Diesel HP (2)	KW (3)	
High head safety injection pump	Yes	10	900	750	
Low head safety injection pump	Yes	5	400	330	
Containment spray pump	Yes	30	500	415	20
Reactor plant component cooling pump	Yes	20	600	500	
Reactor plant service water pump	Yes	25	1,000 (4)	830	
Auxiliary feedwater pump	Yes	15	750	625	
Containment atmosphere recirculation fan	Yes	0	75	63	20
Reactor plant service water cooling tower fans (Note 4)	Yes	0	600	500	
Fuel pool cooling pump	No	-	150	125	
Boric acid transfer pump	No	60 min	20	17	
Boron injection pump	Yes	0	150	125	
Supplementary leak collection and release system	Yes	0		172	20
Battery chargers	Yes	0	-	60	
Essential lighting	Yes	0	-	75	
Valves (motor operated)	Yes	0	100	85	
Heat tracing	No	5 min	-	100	
Control and diesel building HVAC	Yes	0	675	565	20
Boron injection surge tank heaters	No	-	-	3	
Hydrogen recombiner	No	-	-	10	
Diesel generator auxiliaries	Yes	0	50	43	
Total Estimated Load				5,393	

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TABLE A8.3-2 (CONT)

NOTES:

(1) Maximum time to close the breaker with zero as the time when emergency diesel generator energizes the bus

(2) Horsepower required at driven equipment

(3) KW input to electric motor = $\frac{\text{Load in hp x 0.746}}{\text{0.9 average for motor efficiency}}$

(4) Dependent on site

TABLE A8.3-1

LOADING CAPACITY IN HORSEPOWER (UNLESS OTHERWISE STATED)

NORMAL BUSES

13.8 KV Load	Bus No. 1N	Bus No. 2NB	Bus No. 2NA	Bus No. 3N
Reactor coolant pump	7,000	7,000	7,000	7,000
Circulating water pump	7,000	-	7,000	7,000
Cooling tower load centers	Later	-	Later	Later
480 V normal load centers	5,000	-	4,000	5,000
Condensate pump	4,000	-	4,000	4,000

4,160 V Load	Bus No. 1N	Bus No. 2N	Bus No. 3N
4th point heater drain pump	1,250	1,250	1,250
Turbine plant service water pump	1,000	1,000	1,000
Fire pump	400	-	-
Boron evaporator reboiler pump	-	-	250
Condenser air removal	250	-	250
Vacuum priming pump	500	-	500
Turbine plant component cooling pump	400	400	400
Thermal regeneration chiller compressor	-	-	250
Mechanical refrigeration units	650	650	650

EMERGENCY BUSES

4,160 V Load	Bus No. 1Q	Bus No. 2P
Safety injection pump	400	400
Residual heat removal pump	450	450
Charging pump (Note 3)	600	600
Containment spray pump	650	650

20

TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P
Auxiliary feedwater pump	750	750
Reactor plant component cooling A pump	700	700
Reactor plant component cooling B pump	1,300	1,300
Reactor plant service water pump (Note 2)	600	600
Reactor plant service water B pump (Note 2)	800	800
Control building chiller (Note 3)	450	450
480 V Load		
Containment atmosphere recirculation fan (Note 4)	75	75
Reactor plant service water cooling tower fans (Note 2)	Later	Later
Fuel pool cooling pump	150	150
Control and diesel bldg HVAC	225	225
Boron injection pump	150	150
Boric acid transfer pump	15.5 kW	15.5 kW
Boron injection recirculation pump	2.5	2.5
Boron injection tank heaters	12 kW	12 kW
Boron injection surge tank heaters	3 kW	3 kW
Pressurizer heaters control group	-	400 kW
Pressurizer heaters backup group	700 kW	700 kW
Battery chargers	200 kW	200 kW
Heat tracing	100 kW	100 kW

20

TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P	
Hydrogen recombiner	10 kW	10 kW	
Motor operated valves	Later	Later	
Essential lighting	75 kW	75 kW	
Supplementary leak collection and release system	172 kW	172 kW	
Control rod drive cooling fan	70	70	
Diesel generator fuel pump	5	5	
Diesel generator lube oil pump	10	10	
Diesel starting air compressors (Note 1)	15	15	20
Diesel generator circulating water pump	Later	Later	
Emergency Generator			
Continuous rating	6,000 kW	6,000 kW	

Note 1. Two motors of the given horsepower are provided per bus.

Note 2. Dependent on site.

Note 3. One spare motor of the given horsepower is additionally provided which can be manually connected to either of the two emergency buses.

Note 4. Four motors of the given horsepower are provided per bus.

TABLE A8.3-2

EMERGENCY DIESEL GENERATOR LOADING ON
LOSS OF OFFSITE POWER PLUS DBA

Load Description	Auto Sequence Start	Timing-Sec (1)	Loading Per Diesel HP (2)	KW (3)
Charging pump	Yes	5	660	550
Safety injection pump	Yes	10	420	350
Containment spray pump	Yes	30	650	540
Reactor plant component cooling B pump	Yes	20	1,300	1,080
Reactor plant service water B pump	Yes	25	800 (4)	665
Auxiliary feedwater pump	Yes	15	750	625
Residual heat removal pump	Yes	10	450	375
Containment atmosphere recirculation fan	Yes	0	75	63
Reactor plant service water cooling tower fans (Note 4)	Yes	0	600	500
Fuel pool cooling pump	No	-	150	125
Supplementary leak collection and release system	Yes	0		172
Battery chargers	Yes	0	-	60
Essential lighting	Yes	0	-	75
Valves (motor operated)	Yes	0	100	85
Heat tracing	No	5 min	-	100
Control and diesel building HVAC	Yes	0	675	565
Boron injection surge tank heaters	No	10 min	-	6
Hydrogen recombiner	No	-	-	10
Diesel generator auxiliaries	Yes	0	50	43
Total Estimated Load			-	5,989

20

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TABLE A8.3-2 (CONT)

NOTES:

(1) Maximum time to close the breaker with zero as the time when emergency diesel generator energizes the bus. 20

(2) Horsepower required at driven equipment

(3) KW input to electric motor = $\frac{\text{Load in hp x 0.746}}{\text{0.9 average for motor efficiency}}$

(4) Dependent on site

TABLE A8.3-1

LOADING CAPACITY IN HORSEPOWER (UNLESS OTHERWISE STATED)

NORMAL BUSES

13.8 KV Load	Bus No. 1N	Bus No. 2NB	Bus No. 2NA	Bus No. 3N
Reactor coolant pump (Note 2)	12,500	12,500	12,500	12,500
Circulating water pump	7,000	-	7,000	7,000
Cooling tower load centers	Later	-	Later	Later
480 ' normal load centers	4,000	-	4,000	4,000
Condensate pump	4,000	-	4,000	4,000

4,160 V Load	Bus No. 1N	Bus No. 2N	Bus No. 3N
Condenser air removal	250	250	250
4th point heater drain pump	2,000	2,000	2,000
Turbine plant service water pump	1,000	1,000	1,000
Fire pump	-	400	-
Turbine plant component cooling pump	400	400	400
Mechanical refrigeration units	650	650	650

EMERGENCY BUSES

4,160 V Load	Bus No. 1Q	Bus No. 2P
1. High head safety injection pump/makeup pump (Note 4)	900	900
2. Low head safety injection pump/ DHR pump	700	700
3. Containment spray pump	1,000	1,000
4. Auxiliary feedwater pump	1,000	1,000
5. Reactor plant component cooling pump (Note 1)	1,500	1,500
6. Reactor plant service water pump (Note 1)	1,000	1,000

TABLE A8.3-1 (CONT)

		Bus No. 1Q	Bus No. 2P
7.	Control building chiller pump	450	450
480 V Load			
1.	Fuel pool cooling pump	150	150
2.	Control and diesel bldg HVAC	225	225
3.	Boric acid pump	3	3
4.	Reactor plant service water cooling tower fans	Later	Later
5.	Pressurizer heaters backup group	726 kW	726 kW
6.	Pressurizer heaters control group	-	290 kW
7.	Battery chargers	200 kW	200 kW
8.	Heat tracing	100 kW	100 kW
9.	Hydrogen recombiner	65 kW	65 kW
10.	Motor operated valves	Later	Later
11.	Essential lighting	75 kW	75 kW
12.	Supplementary leak collection and release system	172 kW	172 kW
13.	Control rod drive cooling fan	50	50
14.	Containment atmosphere recirculation fan (note 3)	75	75
15.	Diesel generator lube oil pump	10	10
16.	Diesel generator starting air compressors (Note 1)	15	15
17.	Diesel generator circulating water pump	Later	Later

20

TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P	
Emergency Generator			
Continuous rating	7,000 kW	7,000 kW	20

Note 1. Two motors of the given horsepower are provided per bus.
Note 2. Cold running capacity given.
Note 3. Four motors of the given horsepower are provided per bus.
Note 4. One spare motor of the given horsepower is provided which can be manually connected to either of the two emergency buses.

TABLE A8.3-2

EMERGENCY DIESEL GENERATOR LOADING ON
LOSS OF OFFSITE POWER PLUS DBA

Load Description	Auto Sequence Start	Timing-Sec (1)	Loading Per Diesel HP (Note 2)	KW (Note 3)
High head safety injection pump/makeup pump	Yes	5	900	747
Low head safety injection pump/DHR pump	Yes	10	700	581
Containment spray pump	Yes	30	1,000	830
Reactor plant component cooling pump	Yes	20	1,500	1,245
Reactor plant service water pump	Yes	25	1,000 (Note 4)	830
Auxiliary feedwater pump	Yes	35	1,000	830
Containment atmosphere recirculation fans	Yes	0	75	63
Reactor plant service water cooling tower fans (Note 4)	Yes	0	600(4)	500
Fuel pool cooling pump	No	-	150	125
Boric acid pump	No	60 min	3	3
Supplementary leak collection and release system	Yes	0	-	172kW
Battery chargers	Yes	0	-	60
Essential lighting	Yes	0	-	75
Valves (motor operated)	Yes	0	100	85
Heat tracing	No	5 min	-	100
Control and diesel building HVAC	Yes	0	675	565
Diesel generator auxiliaries	Yes	0	50	43
Hydrogen recombiner	No	-	-	65
Total Estimated Load				6,919

20

670 258

TABLE A8.3-2 (CONT)

NOTES:

(1) Maximum time to close the breaker with zero as the time when emergency diesel generator energizes the bus. 20

(2) Horsepower required at driven equipment

(3) KW input to electric motor = $\frac{\text{Load in hp x 0.746}}{\text{0.9 average for motor efficiency}}$

(4) Dependent on site

670 259

TABLE A8.3-1

LOADING CAPACITY IN HORSEPOWER (UNLESS OTHERWISE STATED)

NORMAL BUSES

13.8 KV Load	Bus No. 1N	Bus No. 2NB	Bus No. 2NA	Bus No. 3N	
Reactor coolant pump (Note 2)	12,250	12,250	12,250	12,250	
Circulating water pump	7,000	-	7,000	7,000	
Cooling tower load centers	Later	-	Later	Later	
480 V normal load centers	5,000	-	4,000	5,000	20
Condensate pump	4,000	-	4,000	4,000	

4,160 V Load	Bus No. 1N	Bus No. 2N	Bus No. 3N	
Condenser air removal	250	-	250	
4th point heater drain pump	2,000	2,000	2,000	
Turbine plant service water pump	1,000	1,000	1,000	
Fire pump	400	-	-	20
Boron evaporator reboiler pump	-	-	250	
Turbine plant component cooling pump	400	400	400	
Vacuum priming pump	500	-	500	
Mechanical refrigeration units	650	650	650	

EMERGENCY BUSES

4,160 V Load	Bus No. 1Q	Bus No. 2P	
High pressure safety injection pump	800	800	
Low pressure safety injection pump	500	500	
Shutdown cooling pump	550	550	20
Containment spray pump	1,000	1,000	
Auxiliary feedwater pump	700	700	
Reactor plant component cooling	600	600	

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TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P
A pump		
Reactor plant component cooling B pump	1,200	1,200
Reactor plant service water A pump (Note 4)	800	800
Reactor plant service water B pump (Note 4)	1,100	1,100
Control building chiller	450	450
480 V Load		
Fuel pool cooling pump	150	150
Control and diesel bldg HVAC	225	225
Boric acid makeup pump	30	30
Reactor plant service water cooling tower fans (Note 4)	Later	Later
Pressurizer heaters backup group	750 kW	750 kW
Pressurizer heaters control group	150 kW	150 kW
Battery chargers	200 kW	200 kW
Heat tracing	100 kW	100 kW
Hydrogen recombiner	20 kW	20 kW
Motor operated valves	Later	Later
Essential lighting	75 kW	75 kW
Supplementary leak collection and release system	172 kw	172 kw
Control rod drive cooling fan	50	50
Containment atmosphere recirculation fan (Note 3)	75	75

20

670 261

TABLE A8.3-1 (CONT)

	Bus No. 1Q	Bus No. 2P	
Charging pump	100	100 (Note 1)	
Diesel generator fuel pump	5	5	
Diesel generator lube oil pump	10	10	20
Diesel generator starting oil compressors (Note 1)	15	15	
Diesel generator circulating water pump	later	later	
Emergency Generator			
Continuous rating	6,500 kW	6,500 kW	

Note 1. Two motors of the given horsepower are provided per bus.
Note 2. Cold running capacity given.
Note 3. Four motors of the given horsepower are provided per bus.
Note 4. Dependent on site. 20

670 262

TABLE A8.3-2

EMERGENCY DIESEL GENERATOR LOADING ON
LOSS OF OFFSITE POWER PLUS DBA

Load Description	Auto Sequence Start	Timing Sec (1)	Loading Per Diesel HP (Note 2)	Loading Per Diesel KW (Note 3)	
High pressure safety injection pump	Yes	10	800	650	
Low pressure safety injection pump	Yes	5	500	405	
Containment spray pump	Yes	30	1,000	830	
Reactor plant component cooling B pump	Yes	20	1,200	[illegible]96	20
Reactor plant service water B pump	Yes	25	1,400 (Note 4)	1,162	
Auxiliary feedwater pump	Yes	15	700	580	
Containment atmosphere recirculation fans	Yes	0	75	63	
Reactor plant service water cooling tower fans	Yes	0	600 (Note 4)	500	
Fuel pool cooling pump	No	-	150	125	
Boric acid makeup pump	No	-	30	25	
Supplementary leak collection and release system	Yes	0		172	20
Battery chargers	Yes	0	-	60	
Essential lighting	Yes	0	-	75	
Valves (motor operated)	Yes	0	100	85	
Heat tracing	No	5 min	-	100	
Control and diesel building HVAC	Yes	0	675	565	20
Hydrogen recombiner	No	-	-	20	
Diesel generator auxiliaries	Yes	0	50	43	
Total Estimated Load				6,445	20

670 263

TABLE A8.3-2 (CONT)

NOTES:

(1) Maximum time to close the breaker with zero as the time when emergency diesel generator energizes the bus 7

(2) Horsepower required at driven equipment

(3) KW input to electric motor = $\frac{\text{Load in hp} \times 0.746}{\text{0.9 average for motor efficiency}}$

(4) Dependent on site

TABLE A15.1.13-2

PARAMETERS USED FOR THE LOSS OF COOLANT ACCIDENT ANALYSIS

The parameters listed in Table 15.1.13-2 are applicable to Option A except as noted below.

The following parameter (item 8, Table 15.1.13-2) is revised for Option A and is in addition to the parameters listed in Table 15.1.13-2. 18

8. One hundred percent of the containment leakage is collected in the supplementary leak collection release system (SLCRS) and filtered through the SLCRS HEPA filters/charcoal adsorbers with an overall efficiency for iodine of 95 percent before release to the environment.

670 265

Amendment 18
10/30/75

TABLE A15.1.23-3

FUEL HANDLING ACCIDENT IN CONTAINMENT THYROID DOSE

0-2 hr Thyroid Dose (Rem)

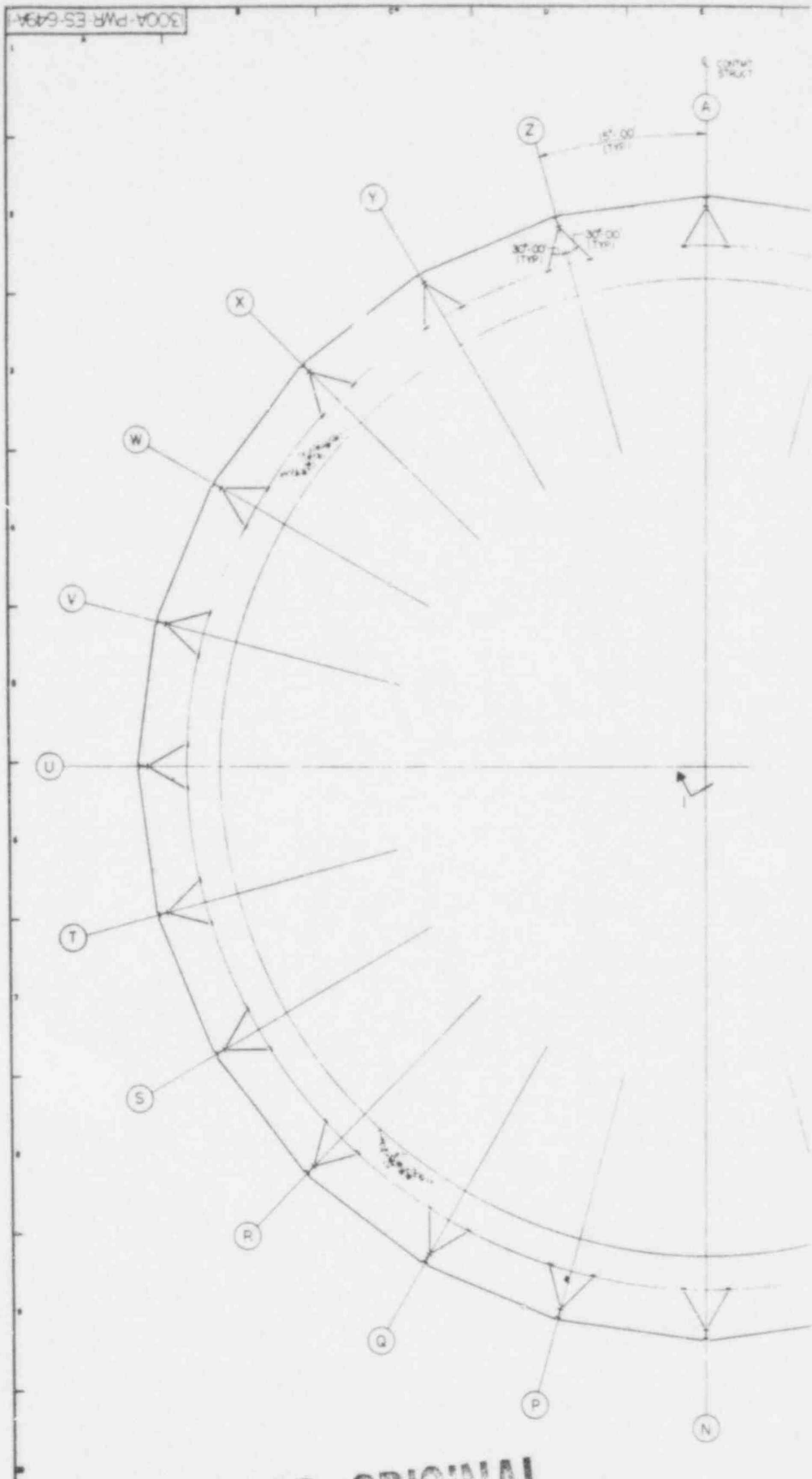
CHI/Q (sec/m³)	W-41	W-3S	B&W	C-E
9.0 -04[1]	8.0 + 01	4.1 + 01	1.1 + 01	4.3 + 01
1.3 -03[2]	1.2 + 02	-	-	6.2 + 01
1.4 -03[3]	-	6.4 + 01	-	-

33

(1) From Section A2.6

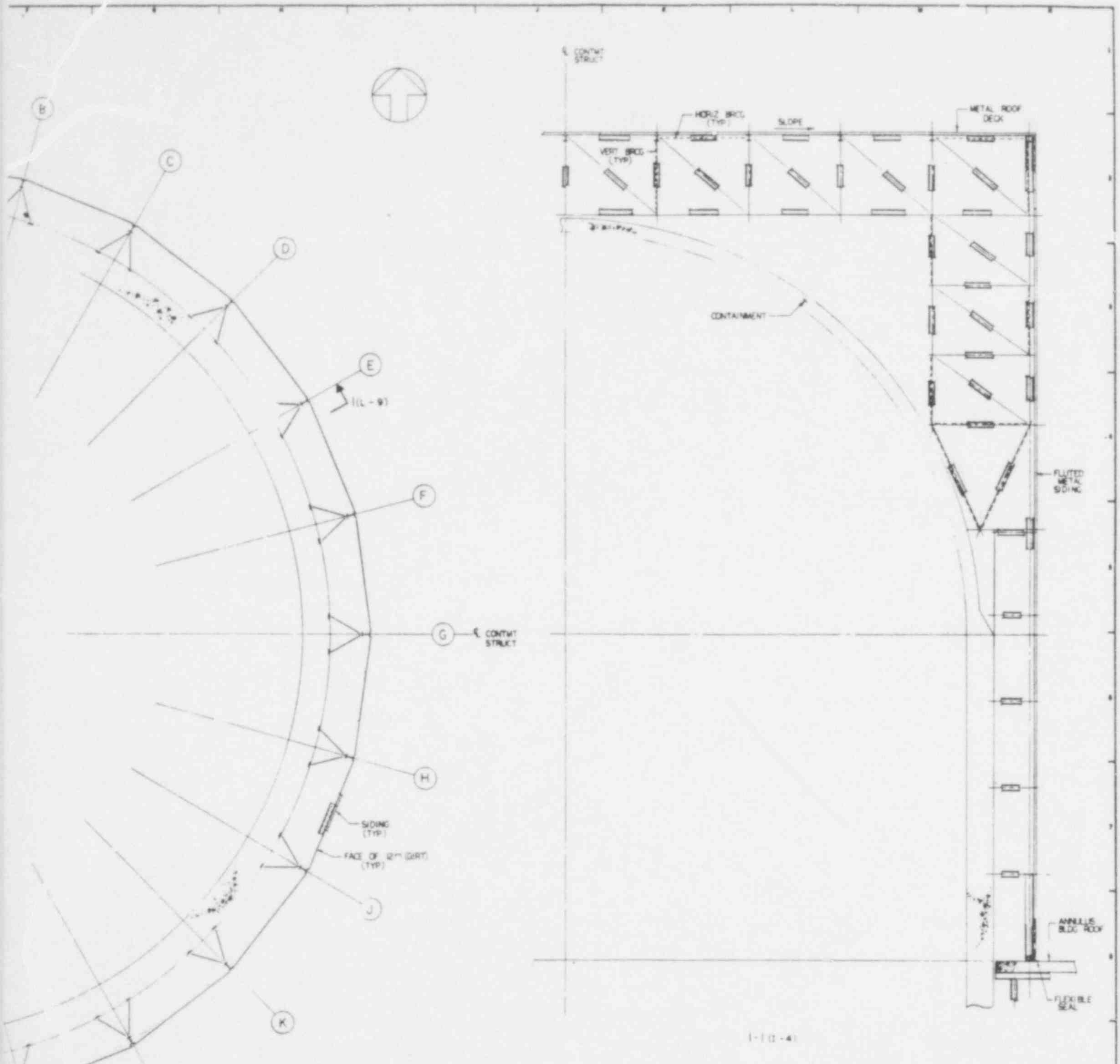
(2) From NUREG-0049, Safety Evaluation Report for SWESSAR-P1/ RESAR 41, May 1976 and NUREG-0096, Safety Evaluation Report for SWESSAR-P1/CESSAR, August 1976

(3) From NUREG-0096, Safety Evaluation Report for SWESSAR-P1/ RESAR 3S, August 1976



3OOA-PWR-ES-649A-1
℄ CONTAIN STRUCT
A
Z
15°-00' (TYP)
30°-00' (TYP)
30°-00' (TYP)
Y
X
W
V
U
T
S
R
Q
P
N

PLAN



1-1(L-4)

NOTES
1. SCALE: 1/8" = 1'-0"
2. COLUMN DESIGNATIONS FOR ENCLOSURE BUILDING ONLY

670 268

POOR ORIGINAL

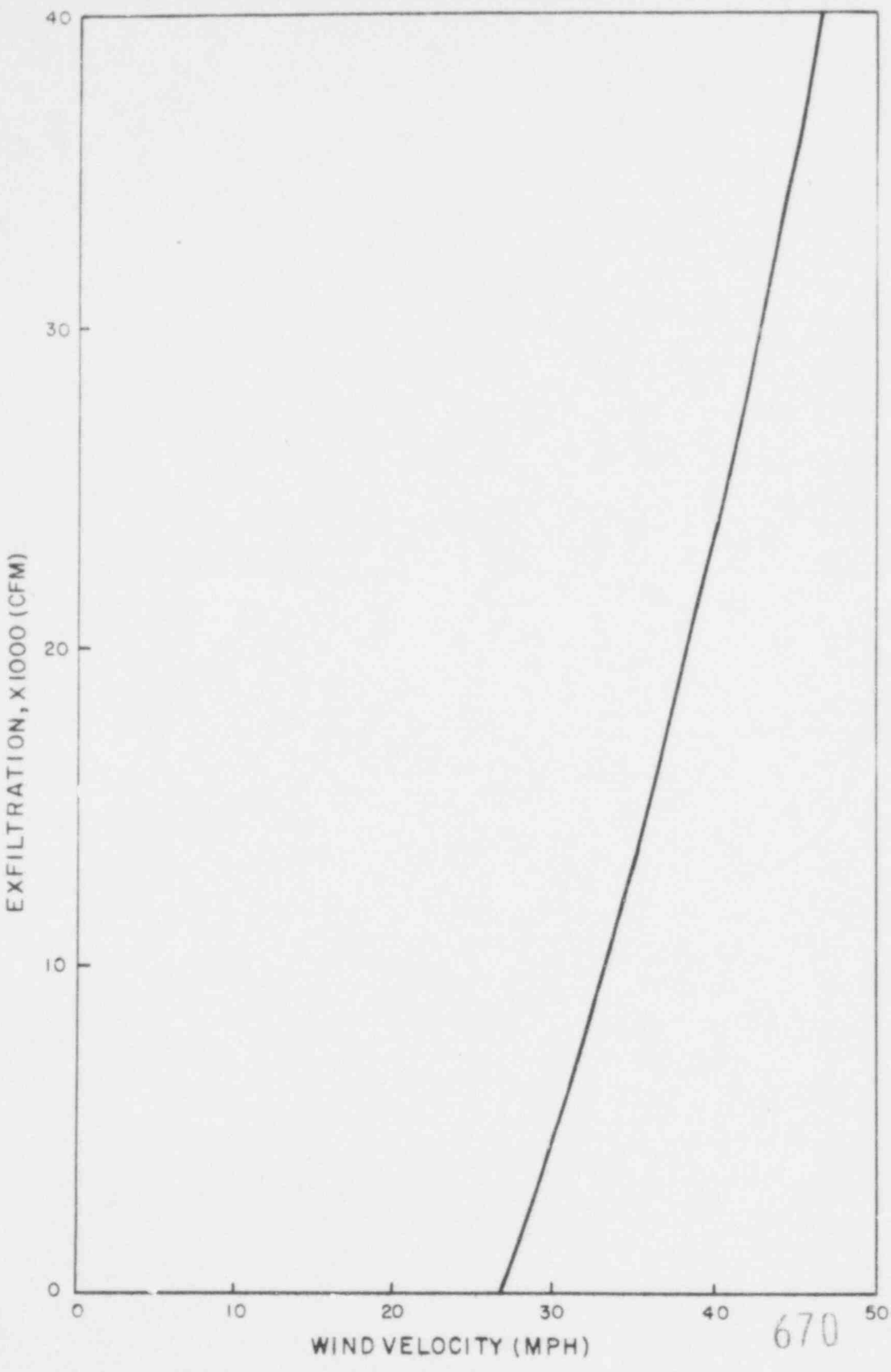
FIG. A3.8.4-1 SWESSAR-P1

ARRANGEMENT ENCLOSURE BUILDING
CONTAINMENT STRUCTURE
OPTION - A

CONCEPTUAL DESIGN

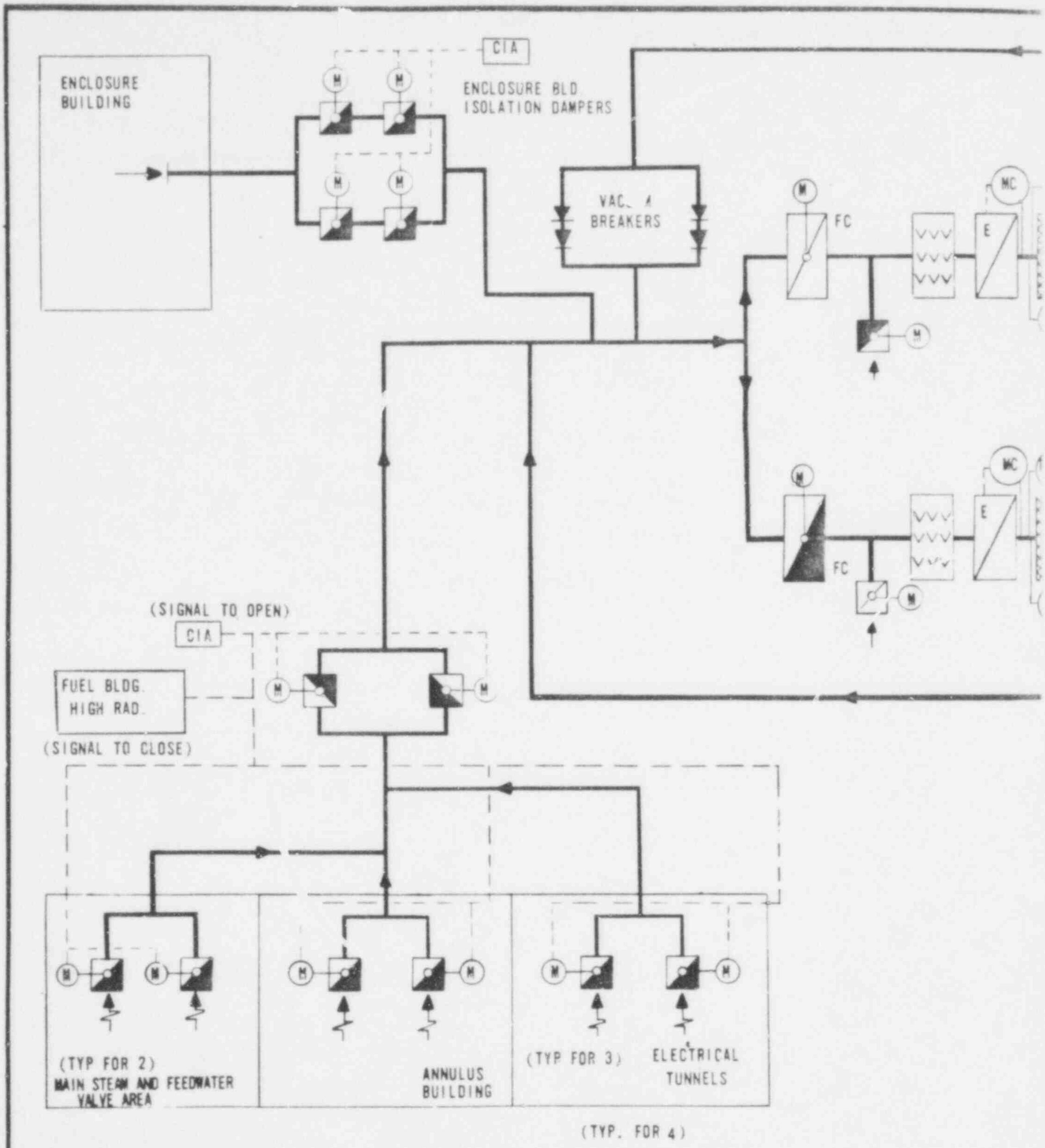
PWR STATION - 1300 MW UNIT - MODEL A
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

DRAWING NUMBER 1300A-PWR-ES-649A-1



670 269

FIG. A6 A.3.2-1
EXFILTRATION RATE AS A
FUNCTION OF WIND VELOCITY
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1



NOTES:

1) THIS SYSTEM IS DESIGNATED SAFETY CLASS 3 AND SEISMIC CATEGORY I AND IS LOCATED IN THE ANNULUS BUILDING EXCEPT WHERE OTHERWISE SHOWN.

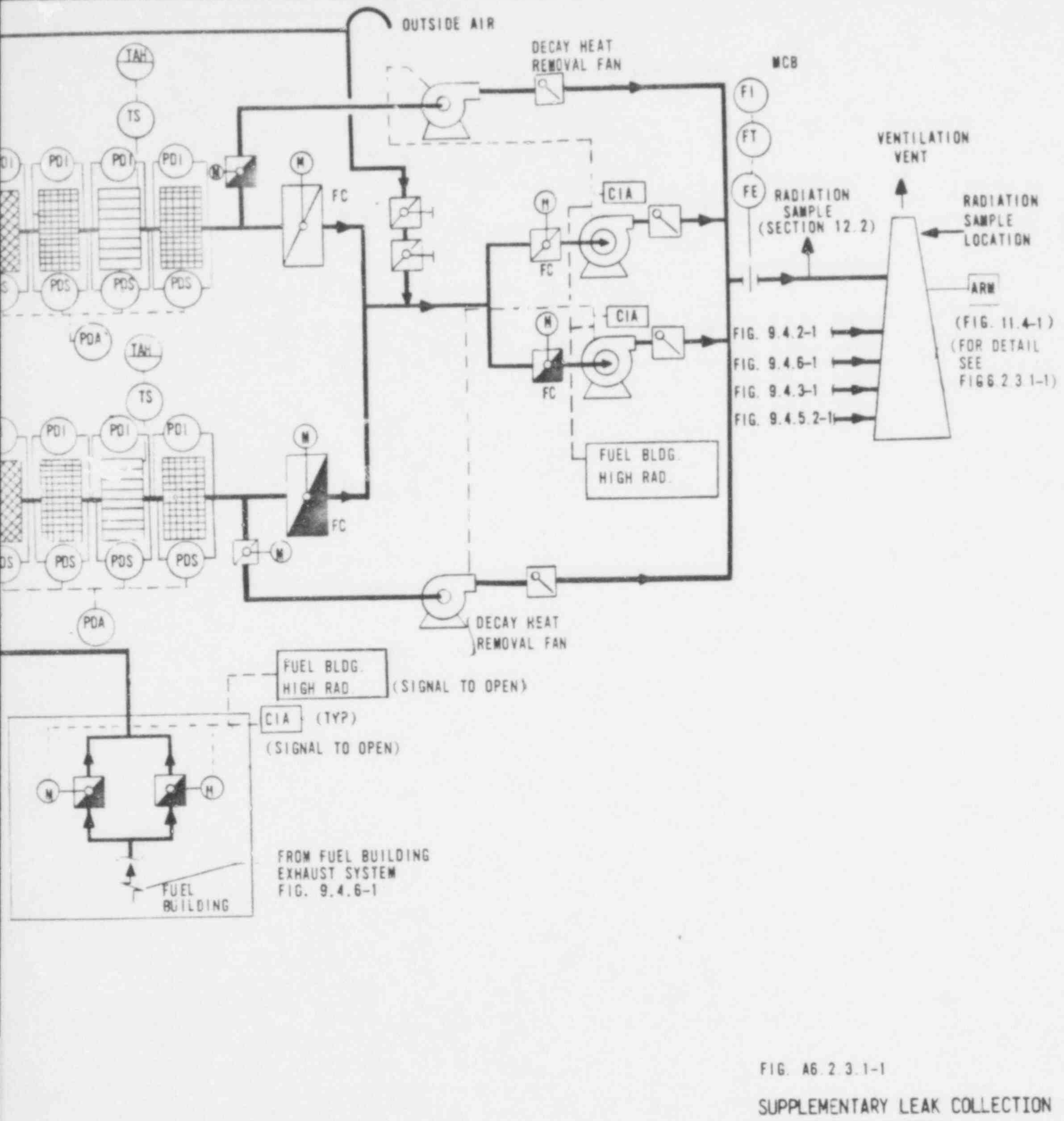


FIG. A6.2.3.1-1

SUPPLEMENTARY LEAK COLLECTION AND RELEASE SYSTEM

OPTION A
PWR STANDARD PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 271

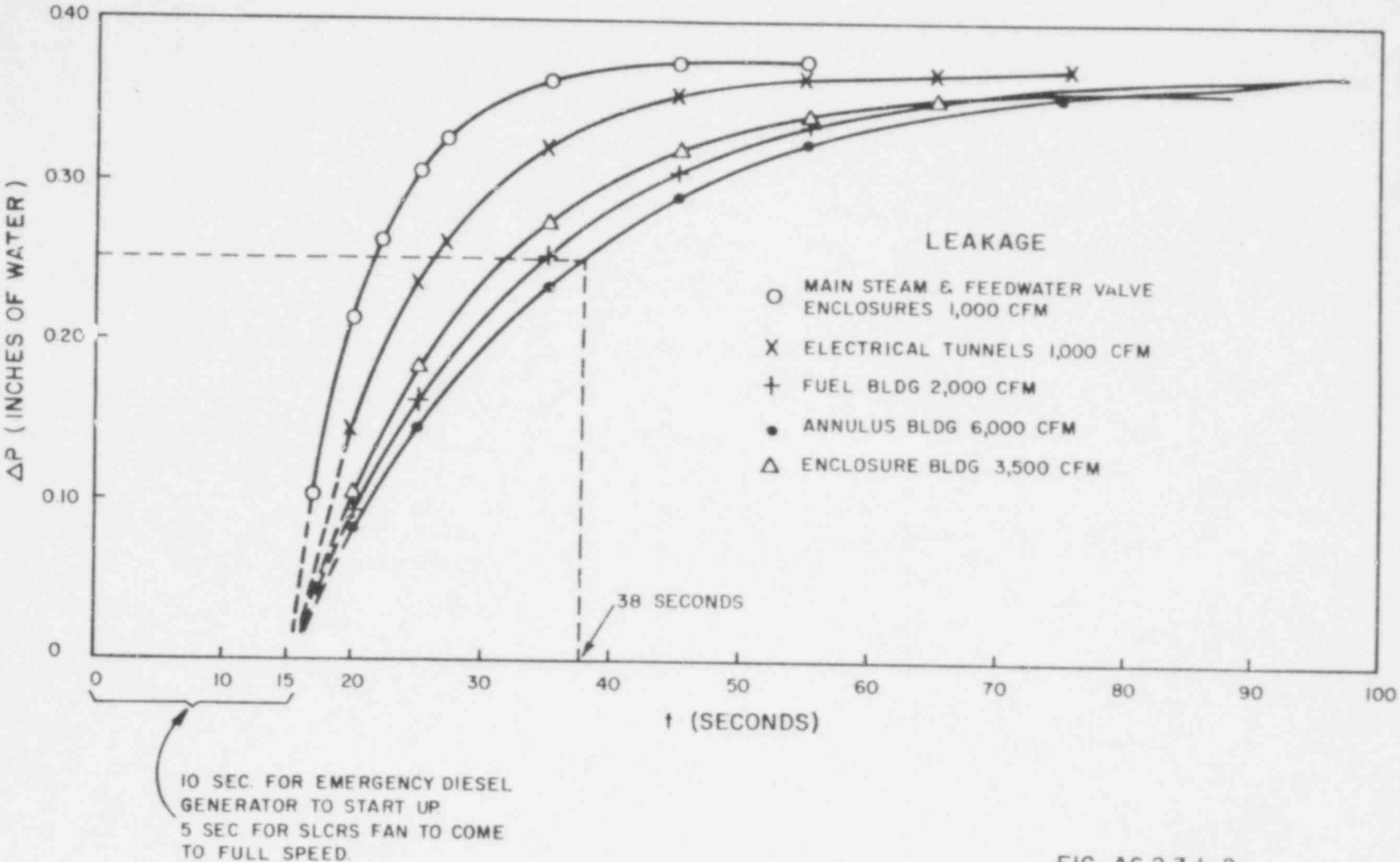
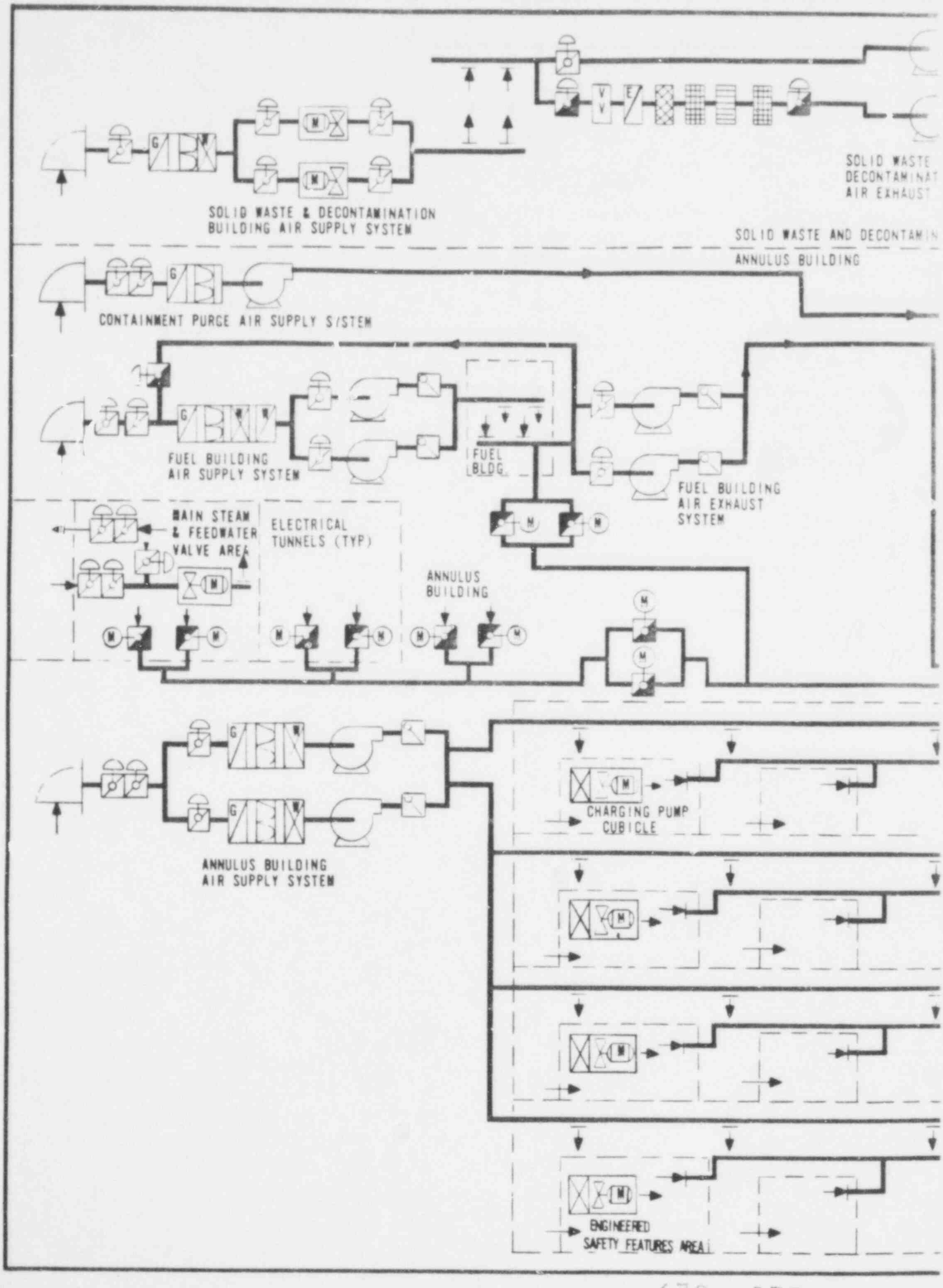


FIG. A6.2.3.1-2
SLCRS PULLDOWN TIME
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 272


SOLID WASTE & DECONTAMINATION BUILDING AIR SUPPLY SYSTEM
SOLID WASTE DECONTAMINAT AIR EXHAUST
SOLID WASTE AND DECONTAMIN
ANNULUS BUILDING
CONTAINMENT PURGE AIR SUPPLY SYSTEM
FUEL BUILDING AIR SUPPLY SYSTEM
FUEL BLDG
FUEL BUILDING AIR EXHAUST SYSTEM
MAIN STEAM & FEEDWATER VALVE AREA
ELECTRICAL TUNNELS (TYP)
ANNULUS BUILDING
CHARGING PUMP CUBICLE
ANNULUS BUILDING AIR SUPPLY SYSTEM
ENGINEERED SAFETY FEATURES AREA

670 273

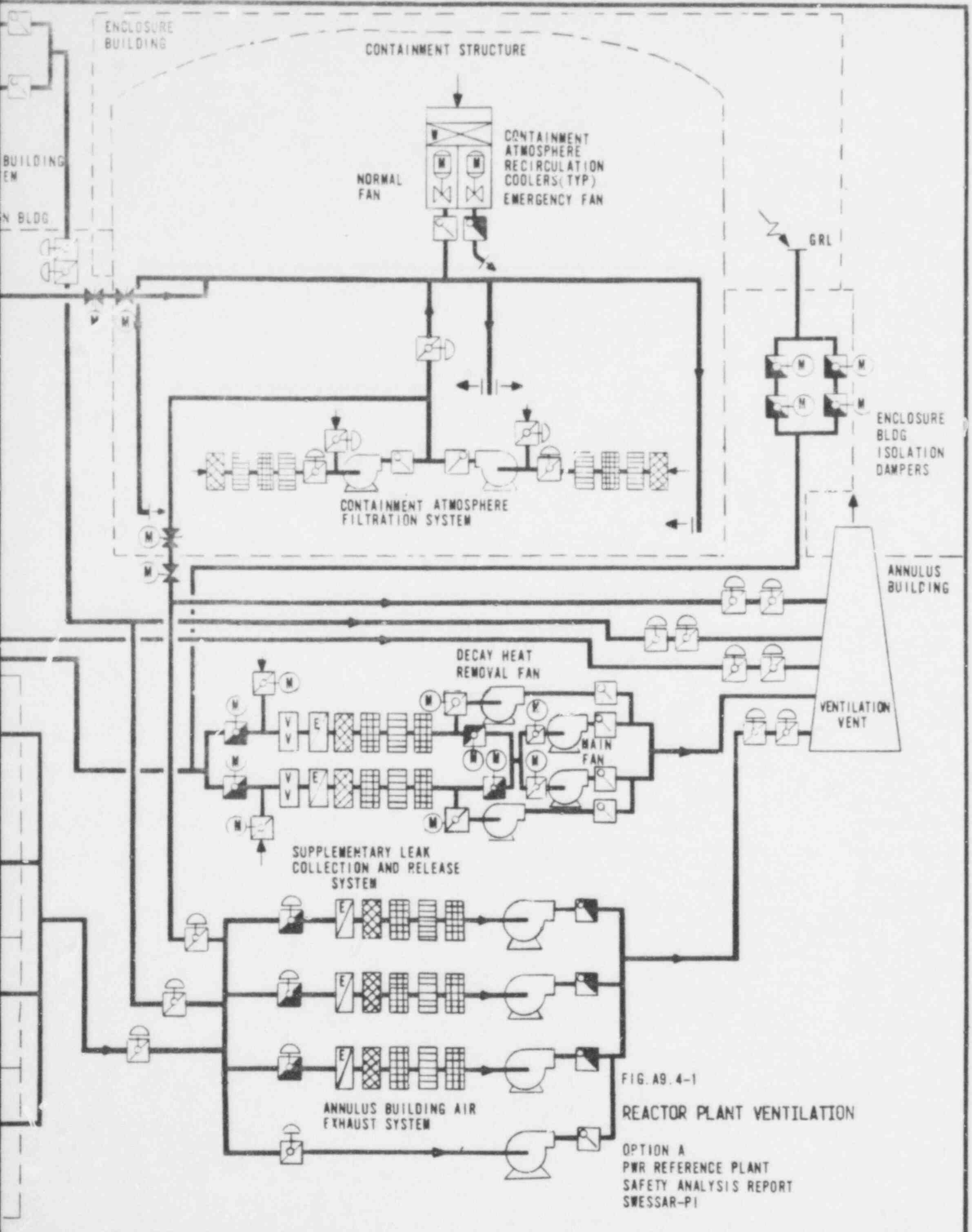


FIG. A9.4-1

REACTOR PLANT VENTILATION

OPTION A
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

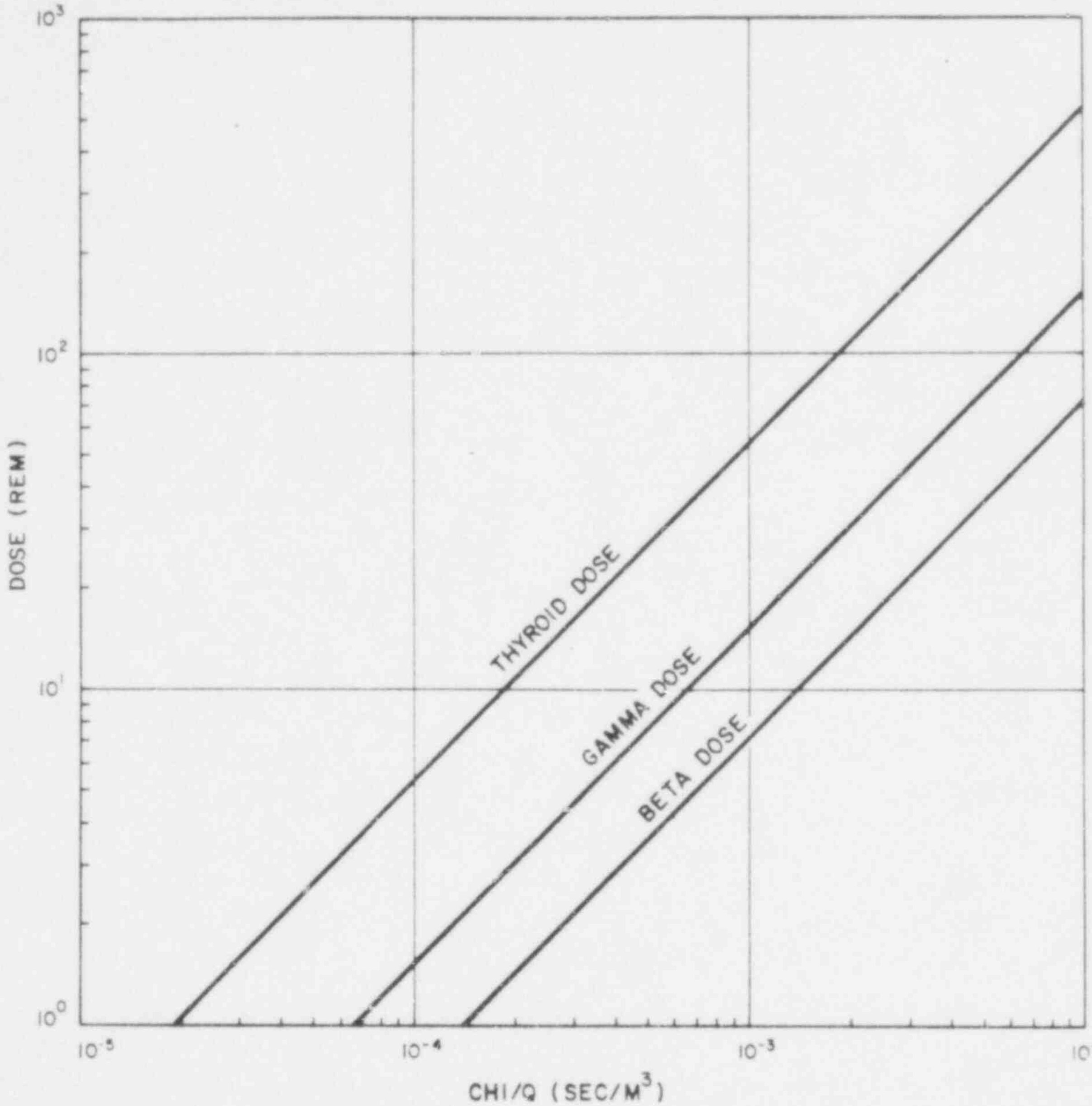


FIG. A15.1.13-2

LOSS OF COOLANT ACCIDENT
DOSE VS CHI/Q
2 HOUR DOSE AT EXCLUSION BOUNDARY

PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 275

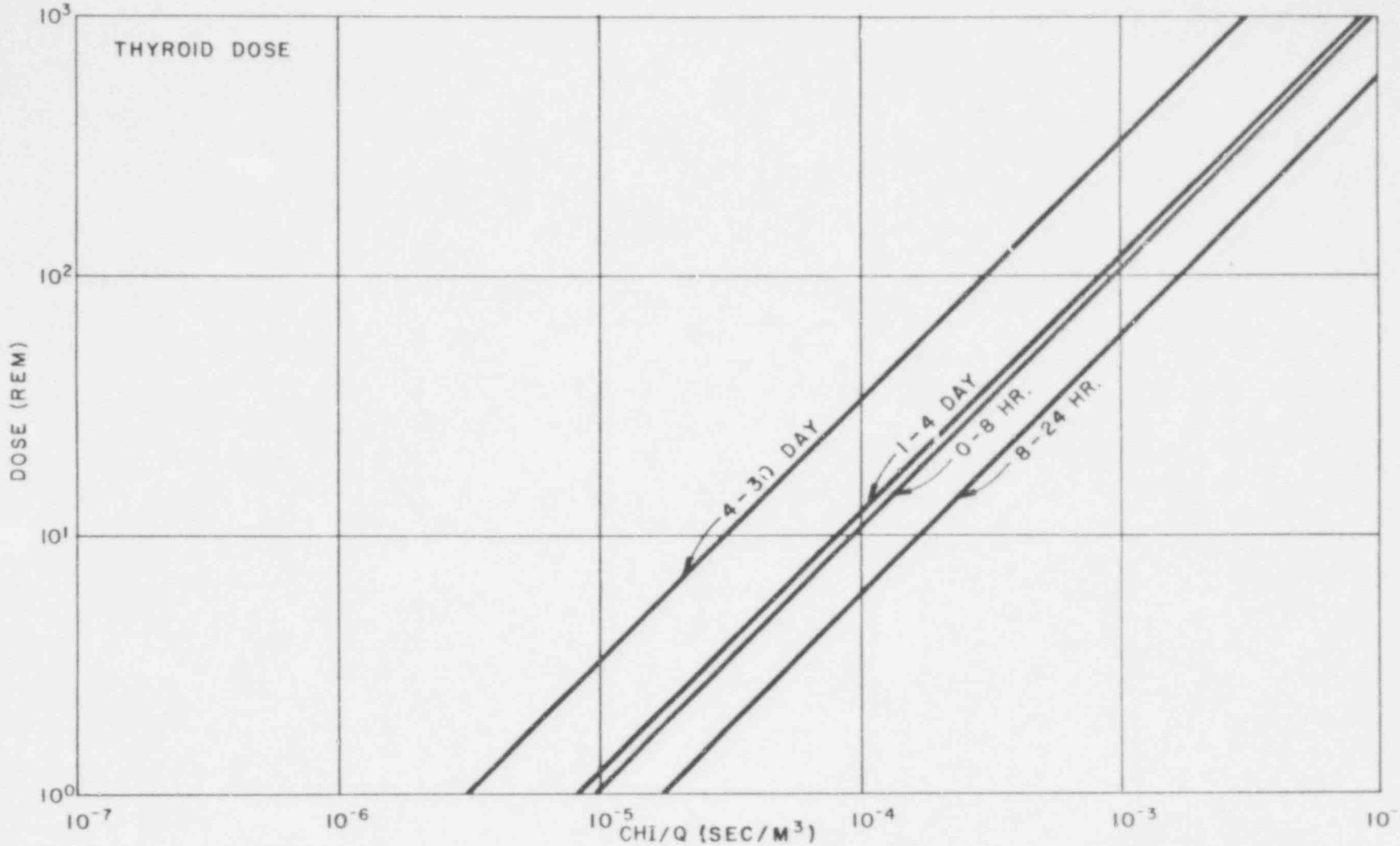


FIG. A15.1.13-3 (SH. 1 OF 3)
LOSS OF COOLANT ACCIDENT
DOSE VS CHI/Q
30 DAY DOSE AT LOW POPULATION ZONE
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 276

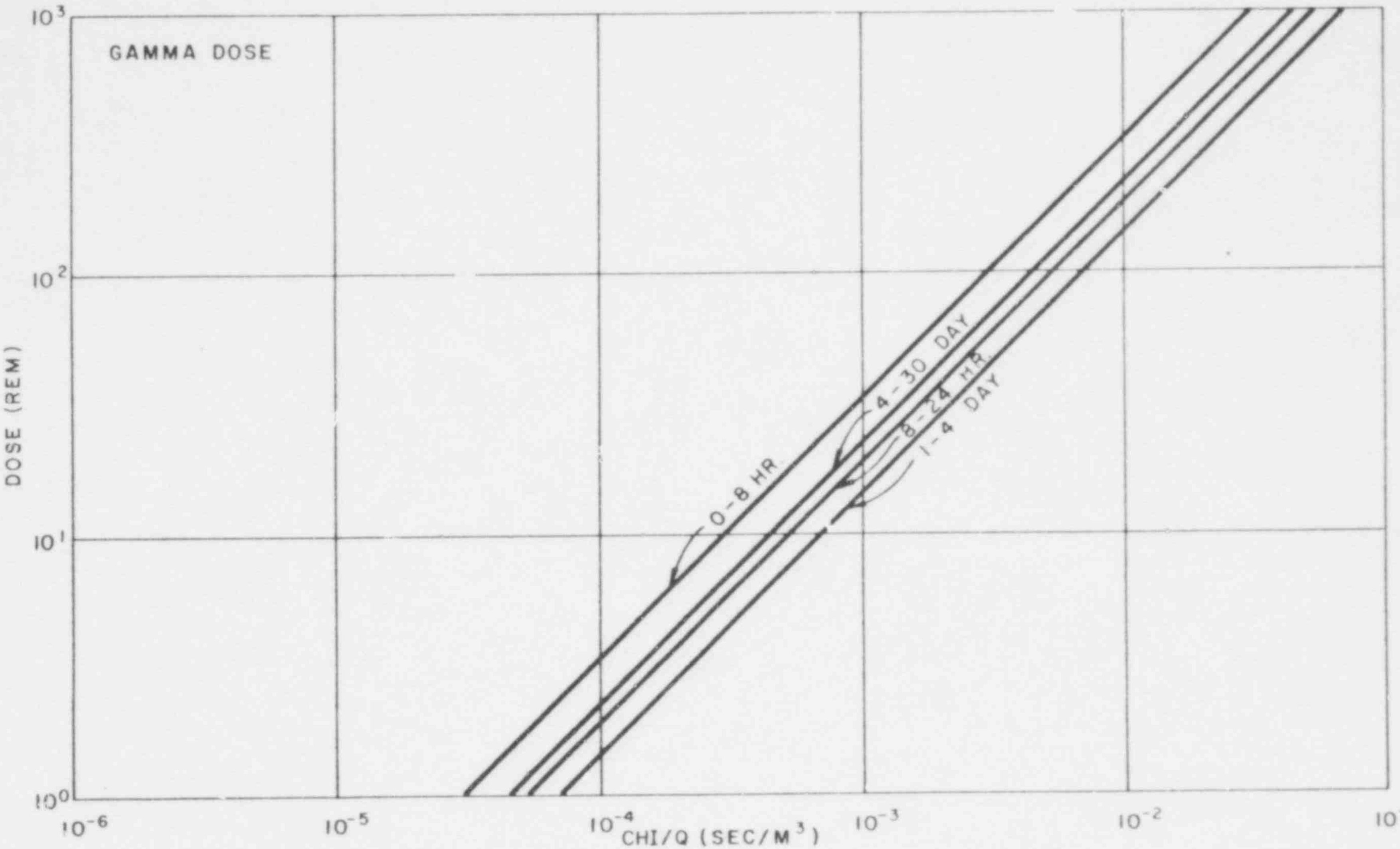


FIG. A15.1.13-3 (SH. 2 OF 3)
LOSS OF COOLANT ACCIDENT
DOSE VS CHI/Q
30 DAY DOSE AT LOW POPULATION ZONE

PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 277

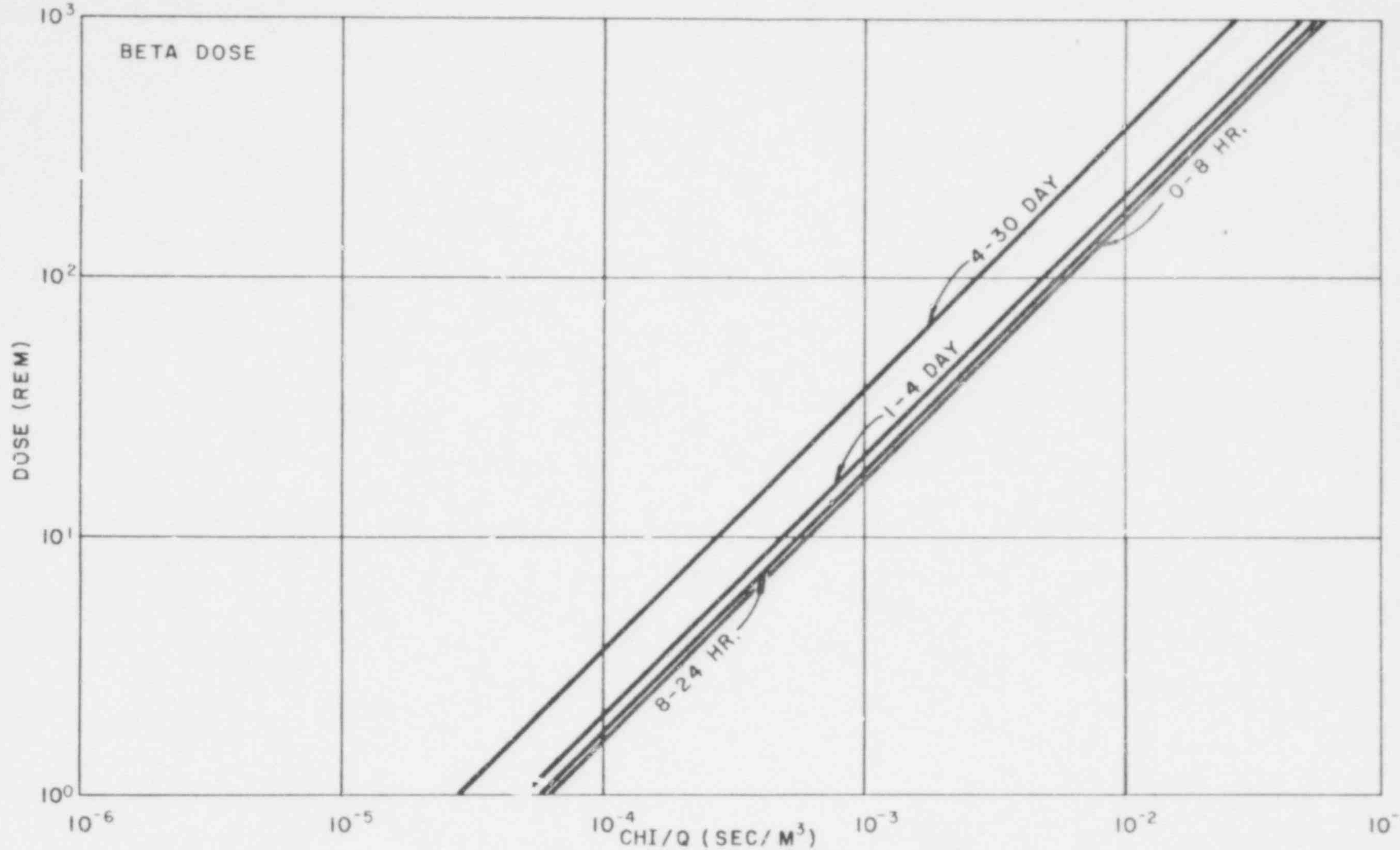


FIG. A15.1.13-3 (SH. 3 OF 3)
LOSS OF COOLANT ACCIDENT
DOSE VS CHI/Q
30 DAY DOSE AT LOW POPULATION ZONE
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 278

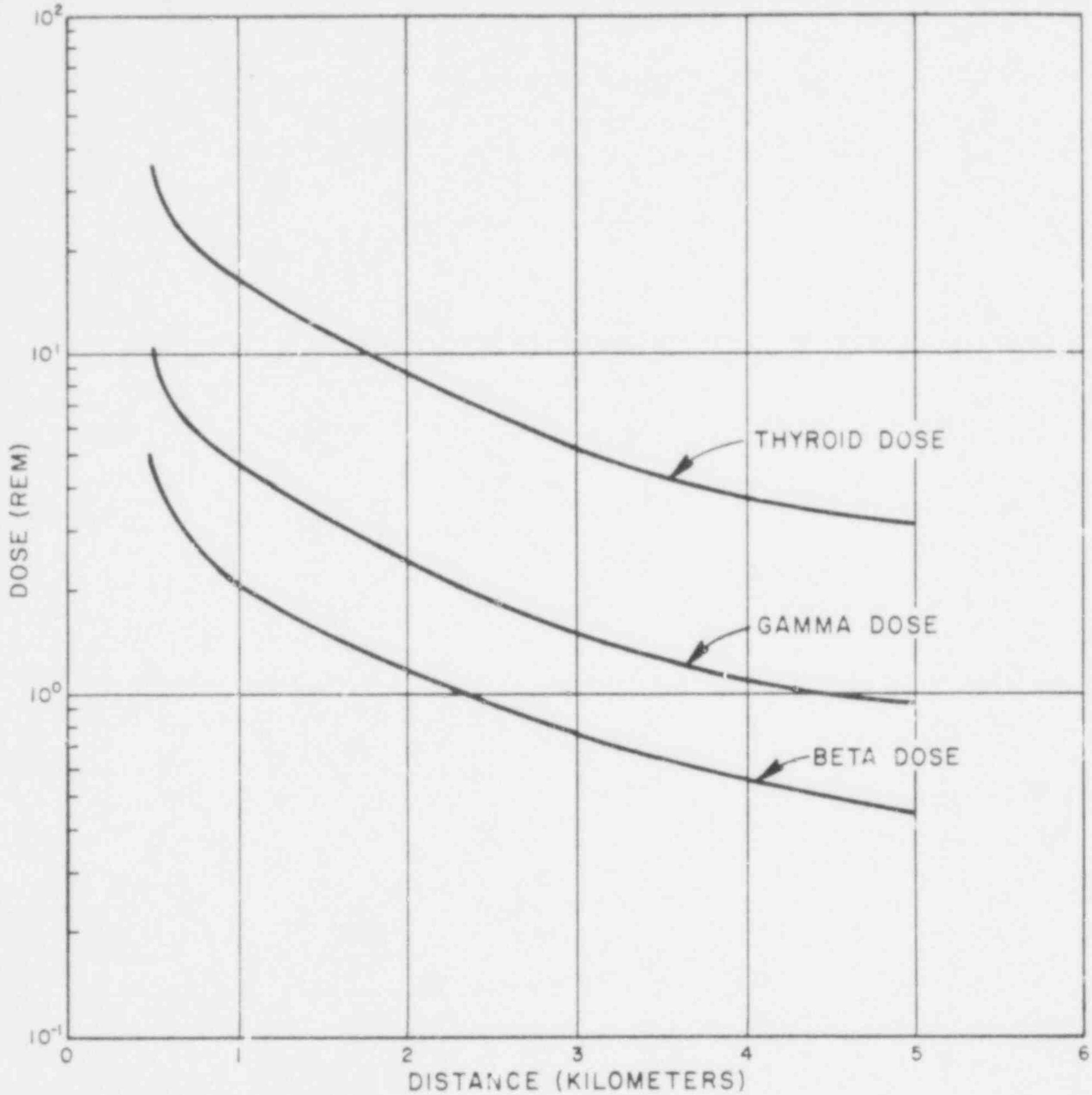


FIG. A15.1.13-4
LOSS OF COOLANT ACCIDENT
DOSE VS. DISTANCE
2 HOUR DOSE AT EXCLUSION BOUNDARY
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 279

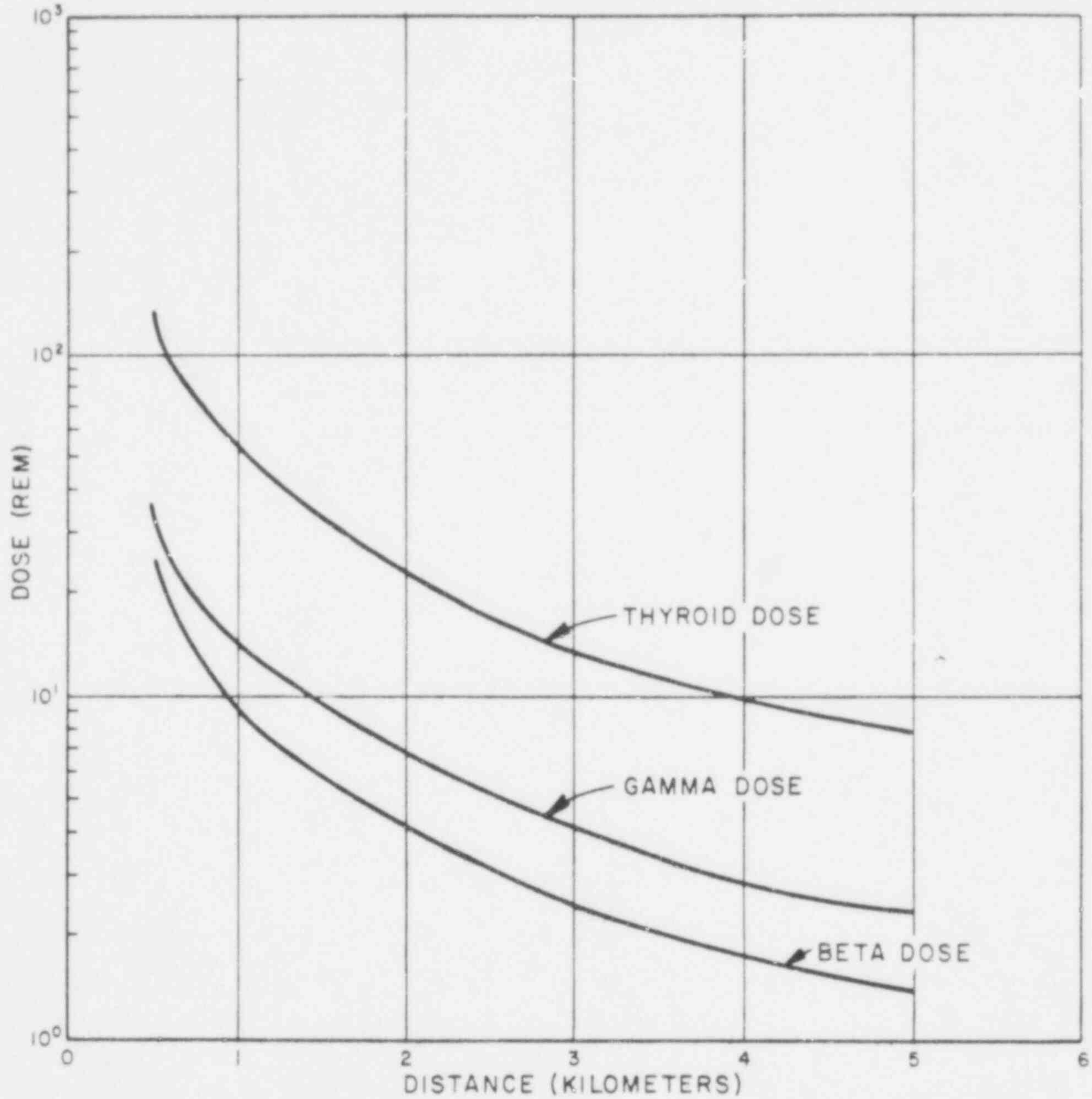


FIG. A15.1.13-5
LOSS OF COOLANT ACCIDENT
DOSE VS. DISTANCE
30 DAY DOSE AT LOW POPULATION ZONE
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 280

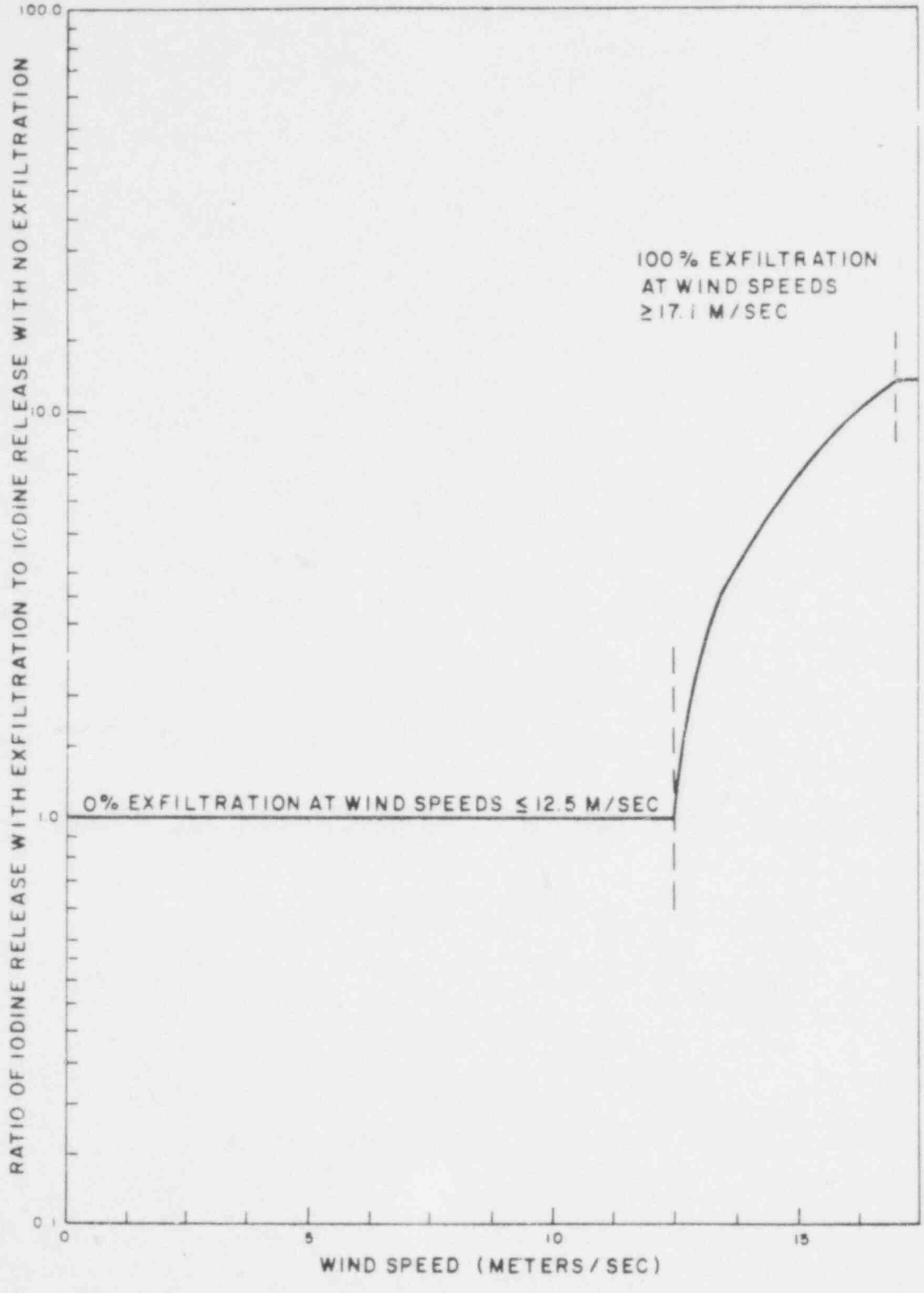


FIG. A15.1.13-8
INCREASE IN IODINE RELEASE DUE TO EXFILTRATION AFTER A LOCA

PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

670 281

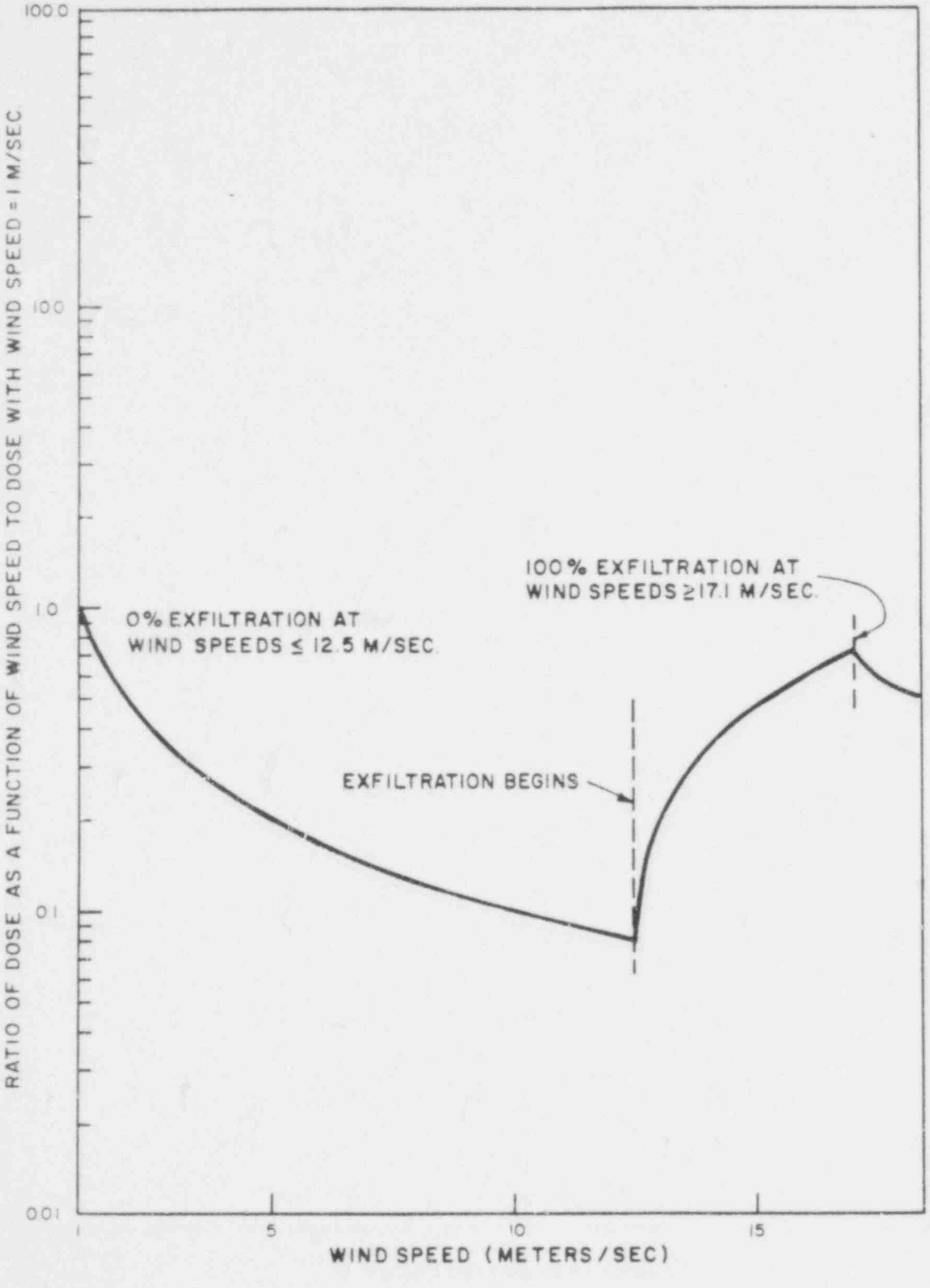


FIG. A15.1.13-9
EFFECT OF THE WIND SPEED ON
THE 0-2 HOUR THYROID DOSE
PWR REFERENCE PLANT
SAFETY ANALYSIS REPORT
SWESSAR-P1

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