ENVIRONMENTAL QUALIFICATION

OF

ELECTRICAL EQUIPMENT

FOR

DRESDEN NUCLEAR POWER STATION UNIT 2

COMMONWEALTH EDISON COMPANY

DOCKET NUMBER 50-237

PREPARED BY: BECHTEL POWER CORPORATION

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1.0 STUDY OBJECTIVES

This study has been prepared in response to NRC letters dated March 6, 1980, and March 28, 1980, on the subject of environmental qualification of electrical equipment. It has been prepared by Bechtel Power Corporation, Ann Arbor, Michigan, for Commonwealth Edison Company's Dresden Nuclear Power Station Unit 2.

The scope of the study includes:

a. Preparing a master list of all ESF systems

b. Identifying all components required to function under postulated accident conditions

c. Defining environmental service conditions for the components identified above

d. Establishing maximum flood elevation inside containment

e. Evaluating qualification data for components and documenting bases of equipment qualification

f. Recommending action to be taken where qualification data for components does not exist or is inadequate for station service conditions

g. Identifying for Commonwealth Edison Company, those Class 1E electrical equipment items for which a licensee event report (LER) should be prepared

h. Preparing a report documenting the results of the study

2.0 STUDY RESULTS

The systems required to function following the postulated accidents have been identified and the essential components listed. Environmental service conditions have been established. Evaluation of environmental qualification test reports have been completed. Data sheets (Appendixes D, E, and F) are provided for all essential components. Appendix D contains data sheets for components with nonharsh service conditions. Appendix E contains data sheets for components with harsh service conditions and for which qualification data is complete and adequate. Appendix E contains data sheets for components with harsh service conditions and for which qualification data is incomplete

or inadequate. Table 2-1 provides a tabulation of components included in the study, percent of components with outstanding items, and percent of outstanding qualification data items; all by system.

3.0 STUDY CONCLUSIONS AND RECOMMENDATIONS

Investigations in response to NRC letters dated March 6, 1980 and March 28, 1980, on the subject of environmental qualification of electrical equipment, indicates that a significant number of components are either not subjected to harsh environmental service conditions or have qualification data documented. Resolution of qualification status for the remaining components is being pursued in one or any combination of the following methods.

a. Vendors have been contacted and confirming letters have been written to the equipment manufacturers requesting qualification data, if available, or component materials data for analysis. Table 3-1 provides a list of letters written.

b. Where long-term temperature conditions are based on criteria established prior to station operation and referenced in the FSAR, actual worst case plant conditions (including measurements of area temperatures, where required) will be utilized to reanalyze station environments and establish actual environmental service conditions. Where conservatism in design results in reduced actual temperatures, qualification will be based on actual conditions. Qualification will not be required where actual conditions reduce low temperature harsh environments to nonharsh environments.

c. Where vendor qualification data is not available, but materials lists and other data required to analyze components for qualification is available, analyses will be performed to verify the capability of the component to function under the environmental service conditions.

d. Components designed to operate in low temperature harsh environments, but for which no qualification data exists, will be analyzed or performance tested onsite to obtain data used to determine the ability of the equipment to function under the actual in-plant service conditions.

e. Components which cannot be qualified by any of the above methods, or for which inadequate test data exists, will be tested, relocated to a nonharsh area, or replaced.

All testing programs will be established and all analyses and vendor contacts will be completed by October 31, 1980. Where it is determined that components require replacement, preparation of engineering documents for procurement of new components will be initiated within 30 days of identifying the need for replacement. Replacement components will be installed during the first refueling outage after the new component is received onsite. When the outstanding items identified in Appendix F are closed out, all Class 1E electrical components will be qualified and the basis of the qualification documented.

It is recommended that work continue as outlined above to close out the outstanding items in Appendix F.

4.0 DETAILED EVALUATION

4.1 DEFINITION OF POSTULATED ACCIDENTS

Reference 2 of NRC letter dated March 28, 1980, defines the postulated accident conditions to be addressed as the loss-of-coolant-accident/mainsteam line break (LOCA/MSLB) inside the containment and the MSLB and main feedwater line break (FWLB) outside the containment.

For the Dresden Nuclear Power Station Unit 2, the LOCA/MSLB inside the containment is discussed in FSAR Sections 5.2.3 and 6.2.7. The MSLB/FWLB outside the containment are discussed in Special Report No. 37, Revision 1, submitted to the NRC in February 1975. In evaluating the effects of MSLB/FWLB, concurrent multiple breaks are not evaluated.

For the LOCA/MSLB inside the containment, worst case environmental conditions are established by the LOCA, resulting from a double-ended recirculation line break. The environmental conditions which result from this accident are provided in Section 4.3 and Appendix C. The NRC letter dated March 28, 1980, requires qualification be demonstrated inside the drywell for 6 hours at 340F. For an MSLB/FWLB outside the containment, Special Report No. 37 identifies the locations of postulated breaks.

In support of this response, studies were performed to establish equipment integrated radiation doses as a result of the postulated accidents. These environmental conditions are discussed in Section 4.3.

The following postulated accidents established the environmental conditions:

a. LOCA inside drywell

b. NRC guidelines for time/temperature

c. Main steam line break in the steam tunnel

d. Main feedwater line break

Where components, because of their location, could be subjected to differing environments for the various accidents, the most severe environmental conditions were utilized for qualification. Components located within compartments with postulated MSLB/FWLB would be subject to pressure, temperature, and humidity conditions resulting from that postulated accident, but would not be subjected to radiation doses in excess of 5×10^4 rads simultaneously. These same components could be subjected to radiation doses in excess of 5×10^4 rads following a LOCA, but these doses would not be simultaneous with pressure, temperature, and humidity. To simplify this analysis, qualification data will be sought which demonstrates operability of these components for the combination of all environmental conditions. Where qualification cannot be demonstrated for the entire spectrum of conditions simultaneously, components will be evaluated for the conditions associated with each individual accident.

4.2 IDENTIFICATION OF CLASS 1E COMPONENTS REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

The Dresden Nuclear Power Station FSAR and emergency procedures were reviewed to identify the engineered safety features systems which are required to mitigate the consequences of the postulated accidents discussed in Section 1.0. These systems are those needed to achieve reactor shutdown, containment isolation, reactor core cooling, containment and reactor heat removal, and to prevent the release of radioactive material to the environment in excess of the guidelines of 10 CFR 100.

In addition, the emergency procedures were reviewed to identify systems that are non-Class 1E, and not considered in the station safety evaluation for accident mitigation, but which would be utilized if available. These systems are identified as alternative use systems. No data is provided for components in alternative use systems.

Appendix A provides the master list of Unit 2 and common systems required to function following all of the postulated accidents discussed in Section 4.1.

The station piping and instrument diagrams and electrical schematics were reviewed to determine the specific components which must function following the postulated accidents. Based on this review, a master components list has been developed for each system identified in Appendix A. The master components list identifies each Class 1E and/or essential electrical component that is required to function following the postulated accidents discussed in Section 4.1. Appendix B provides the master components list for Unit 2 and common systems. Throughout this report Class 1E is used in reference to components designed to Class 1E as well as components not designed to Class 1E, but which are essential following the postulated accidents.

4.3 DEFINITION OF ENVIRONMENTAL SERVICE CONDITIONS

4.3.1 Inside the Drywell

The drywell pressure and temperature response following the postulated LOCA are provided in FSAR Figures 5.2.11 and 5.2.12, respectively. These figures are included in Appendix C. The maximum humidity inside the drywell is defined in FSAR Table 5.2.2 as 100%. Chemical sprays are not used in the Dresden design. Demineralized water containment spray is utilized and considered in the evaluation. The Dresden FSAR does not provide integrated radiation doses inside the drywell. Studies were performed to establish the integrated doses inside the drywell for a postulated LOCA. The integrated doses for 1 day, 30 days, and 1 year are provided in Appendix C. The study methodology is described in Section 4.3.5. Radiation doses are evaluated for actual equipment operating times. Appendix C also defines the containment spray fluid and provides the maximum drywell pressure, temperature, humidity, and flood elevation. The NRC requirement to qualify components for 6 hours at 340F is also considered in this study.

4.3.2 Outside the Drywell, Subject to MSLB/FWLB

MSLB/FWLB is discussed in detail in Special Report No. 37, Revision 1, submitted to the NRC in February 1975. The environmental conditions (pressure, temperature, and humidity), due to a pipe break in the steam tunnel and turbine building are listed in Appendix C. Radiation doses following a MSLB/FWLB are less severe than the doses associated with a LOCA and are therefore not provided. Flooding does not occur outside the drywell as a result of the postulated line breaks. Chemical and demineralized water spray do not exist outside the drywell. For this study, the environmental effects of a pipe break are considered only in the compartment in which the break occurs as well as areas open to the break area.

4.3.3 Outside the Drywell, Post-LOCA Radiation Exposures

Integrated doses have been calculated for areas outside the drywell. Doses were established for 1 day, 30 days, and 1 year exposure. Integrated doses of less than 5×10^4 rads during a component's service life are evaluated as nonharsh environmental conditions. Integrated doses of 5×10^4 rads and greater are evaluated as harsh environmental conditions. Appendix C provides integrated doses as a function of exposure time for areas containing components identified in Appendix B. The radiation study methodology is described in Section 4.3.5.

4.3.4 Nonharsh Areas

Plant areas which are not covered in the above referenced Appendix C tables are considered nonharsh environmental areas with respect to MSLB/FWLB and post-LOCA radiation. These areas are either maintained in a suitable environmental condition by safety-related heating, ventilating, and air conditioning (HVAC) equipment, or are considered nonharsh because they are controlled to less than 104F prior to the postulated accidents and are relatively large open areas with no large motors or other equivalent heat sources.

Where environmental conditions are maintained by HVAC equipment, the HVAC system is provided with redundant components and/or a backup power supply for reliable operation. Safety-related HVAC systems are provided for the following areas:

a. Control room, cable spreading room, battery rooms, computer room, and electrical equipment room

b. Standby diesel generator room

c. HPCI room

d. Low-pressure coolant injection corner rooms

4.3.5 Radiation Study Methodology

A radiation study was performed to establish integrated doses to equipment following a postulated LOCA. The core fission product inventory was based on General Electric document "Radiation Source Information for NUREG 0578 Implementation, Computer Run Identified as SNUMB 7007S" dated November 1979.

The fission products were diluted into the appropriate fluid media as follows:

Fluid	Noble Gases(%)	Halogens(%)	Other(%)
Suppression pool liquid	50	-	1
Reactor coolant liquid	100	50	1
Containment atmosphere	100	25	-
Reactor steam	100	25	-

Dilution of the fission products was considered using the fluid volume as the dilution media.

For components located inside the drywell, gamma doses were only considered if the component was enclosed in a nonorganic material (e.g., valve motor actuators in metal enclosures). The gamma dose was established based on immersion of the component in the gaseous drywell atmosphere for the time which the component must remain functional. For components enclosed in organic material (e.g., cable), beta radiation doses were also calculated. Where components enclosed in organic materials are installed in metal enclosures (e.g., cable in conduit or flex-conduit), beta radiation will be neglected. Where cable or other organic enclosed materials are exposed, they will be protected with either metal enclosures or sufficient insulation covering material will exist (>70 mils) to reduce beta radiation doses to less than 10% of the gamma radiation dose. Beta doses will therefore not be considered.

For components located outside the drywell, source terms were established for piping systems containing reactor steam, reactor coolant liquid, suppression pool liquid, and containment atmosphere. Since the piping wall thickness is

sufficient to shield against beta radiation, only gamma radiation need be considered. Each Class 1E component was located with respect to the piping systems containing post-LOCA radioactive fluids. The integrated dose was established based on the piping source term, distance from pipe to component, and component operating time. Where a component could receive dose from more than one piping system, the doses were added to derive a total dose. Appendix C, Table C-3, provides integrated doses as a function of time calculated 1 foot from the greatest single source in each plant major area.

4.3.6 Aging

In this study, the need to consider aging is based on the evaluation of component design and application. The effects of aging have also been considered based on Enclosure 4 to NRC Bulletin 79-01B, "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" and NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

a. Components Located Inside the Drywell

The environmental conditions inside the drywell are defined as harsh (Sections 4.3.1 and 4.3.4) and hence the effects of thermal and radiation aging are evaluated for all Class 1E electrical components.

b. Components Located Outside the Drywell

1. Radiation aging

The components which are located outside the drywell and steam tunnel are exposed to insignificant amounts of radiation during normal operating conditions. The effects of radiation aging are therefore not considered in the qualification evaluation of these components.

Under postulated accident conditions some components may be exposed to greater than 5×10^4 rads (integrated radiation dose). The effects of this short-term radiation exposure are considered in the qualification evaluation.

2. Thermal aging

Most areas outside the drywell are maintained in a suitable environmental condition by safety-related HVAC equipment. The normal maximum environmental design temperature is 103F, which in this study is defined as a nonharsh environment (Section 4.3.4). Thermal aging for these components is not required since the normal and post-accident environments are nonharsh. In addition, infrequent temperature extremes (up to 120F) may occur in some plant areas. However, these conditions would result only during periods of extreme outdoor temperatures. Equipment designed and installed per industry standards would be capable of satisfactory operation without exhibiting age-related degradation due to these infrequent temperature extremes up to 120F. Therefore, the effects of thermal aging are not considered for components located in areas where the maximum ambient temperature can be maintained at 120F or below.

The effects of thermal aging will be considered for components located in the steam tunnel.

4.4 EVALUATION OF ENVIRONMENTAL QUALIFICATION DATA

Appendix B identifies all specific components necessary following the postulated accidents. In addition, this study covers general use electrical items such as motor lubricating oil, sealants, tape, terminal blocks, gaskets, etc. These general use items are discussed in Section 4.5.

For each specific component identified in Appendix B, a component evaluation worksheet was prepared. These worksheets identified the most harsh environment each component would be subjected to following the postulated accidents. Environments were considered nonharsh when the temperature was controlled to 104F or less and the maximum integrated radiation dose was less than 5×10^4 rads. Where worst case temperatures of 120F exist in conjunction with operating times of 10 minutes or less, qualification will not be required. Since the 120F condition would be an infrequent temperature extreme, it is considered to have an undetectable effect on system performance over a short time interval (i.e., 10 minutes). For nonharsh environments, qualification data is not required.

Since industry standards did not exist for environmental qualification of Class 1E electrical equipment during the time frame the Dresden station was designed and constructed, qualification testing was not required for these components when originally purchased. However, many of these same components were used in later designs and qualification testing data is available. Also some testing has been performed by the Nuclear Steam System Supplier in response to NRC IE Bulletin 79-01. These qualification reports are being evaluated to determine their applicability to the components identified in Appendix B. Where applicable qualification data exists, this data is entered on the component evaluation worksheets to document the suitability of the component.

It is anticipated that some components may be qualified by analysis or a combination of analysis and testing. In those cases, the component evaluation worksheets will reference the subject analysis and document the suitability of the component.

Finally for those components which are exposed to harsh environments and for which data is not available and qualification by analysis is not appropriate, the qualification status will be resolved by testing, replacement, or relocation of the component to a nonharsh environment.

The component evaluation worksheets are provided in Appendixes D, E, and F (Volumes 2 and 3) for Unit 2 and common components.

The qualification plan, which will be followed to complete the response to the referenced NRC letters, is discussed in Section 4.5.

4.5 CLASS 1E EQUIPMENT QUALIFICATION PLAN

4.5.1 Specific Components

Where existing data is not available to demonstrate qualification of a component, one of the following methods will be utilized to resolve the status of the component:

a. Tests on similar components will be evaluated. Where the component is sufficiently similar to the qualified component, the test data and component design data will be analyzed. Providing sufficient similarity exists to utilize the report for the similar component, the evaluation will be documented and the analysis and test report referenced as demonstrating the suitability of the component.

b. Analysis of actual in-plant environmental conditions and component performance will be performed to establish the suitability of the component for actual in-plant environmental conditions.

c. An identical component from the spare parts inventory or one of the installed components will be tested.

d. The component will be relocated in a nonharsh environment.

e. The component will be replaced.

4.5.2 General Use Components

A walkdown inspection of accessible electrical boxes and cable connections was performed in the Dresden Unit 2 drywell. The inspection was performed during a 4-day outage in May 1980.

The purpose of the inspection was to identify miscellaneous general use electrical items (i.e., gaskets, seals, grommets, terminal blocks, splices, and termination tapes) used inside the drywell. In addition, the condition of cable at the electrical boxes and component terminations was inspected. Boxes which did not have preassigned numbers were numbered by the inspection team. These field-assigned numbers were prefixed with 79-01B. The condition of cables entering boxes was satisfactory with no damage noted. During the inspection, any damage noted was reported to station electrical personnel for correction. Splices and termination tapes were not found in the electrical boxes inspected. The results of the electrical box inspection are provided in Table 4-1.

Where qualification data is not available for existing installed materials, procedures will be written to replace these items with qualified materials. Gasket material suitable for the accident environment will be maintained onsite and procedures implemented so that when boxes are opened, gasket material damaged (due to aging or the opening of the box) can be replaced. The station inventory of lubricating oils and greases will include qualified materials and steps implemented so that only these materials are utilized on Class 1E components.

4.6 SUBMITTAL OF LICENSEE EVENT REPORTS

In the event any Class 1E electrical equipment item is determined not capable of meeting its required function under the established service conditions, Bechtel will advise Commonwealth Edison Company so that an LER can be submitted. LERs, when submitted, will identify the component conditions which it must function under and basis of determination that it is incapable of functioning. Where justification for continued station operation exists, this will be included in the LER.

LERs will not be submitted for items previously documented as not being capable of meeting their required function in the response to previous requests for information by the NRC.

5.0 REFERENCES

a. USNRC Letters to Mr. D. Louis Peoples, Director of Nuclear Licensing, Commonwealth Edison Company, dated March 6, 1980, and March 28, 1980, Concerning Environmental Qualification of Electrical Equipment.

b. Dresden Nuclear Power Station Final Safety Analysis Report, Docket Number 50-237 and 50-249

c. Analysis of Effects of Pipe Break Outside Primary Containment, Dresden Station, Units 2 and 3, Special Report No. 37, Revision 1, February 1975

d. Dresden Station Emergency Procedures, DGA-1, Loss-of-Coolant (Break Inside Drywell), Revision 4, January 1980; DGA-2, Loss-of-Coolant (Slow Leak), Revision 2, January 1980; DCA-3, Loss-of-Coolant (Break Outside Drywell), Revision 4, January 1980

e. Report on Results on Qualification Data Search for Dresden Units 2 and 3, NEDO-24218, General Electric Company, November 1979

f. NUREG 0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment

TABLE 2-1

COMPONENT QUALIFICATION STATUS

System	Number of Components	Components With Outstanding Items (%)	Outstanding Qualification Data Items (%)
Reactor protection	16	25	4
Core spray	22	55	49
High-pressure coolant injection	47	72	18
Auto depressurization/ main steam	59	91	48
Low-pressure coolant injection	54	56	29
Pressure suppression	61	23	9
Standby gas treatment	23	87	50
Service water	5	100	17
Diesel oil piping	6	50	17
Containment isolation	35	6	2
Control rod drive hydraulic	542	0	0
Reactor recirculation	61	38	23
Process radiation monitoring	2	0	0
Reactor building ventilation	4	0	0
Control room HVAC	13	0	0
Standby ac power	30	73	25
Standby dc power	20	85	36
Isolation condenser	8	50	32
General use electrical	44	100	88
Totals	1,052	25	15

TABLE 3-1

LISTING OF LETTERS TO MANUFACTURERS
REQUESTING QUALIFICATION DATA

Manufacturer	Letter Chron Number	Date Sent
Automatic Switch	772	May 6, 1980
Barkdale	804	May 9, 1980
Barton	820	May 9, 1980
Buffalo Forge	883	May 3, 1980
Chromalox (Dave Ray & Associates)	876	May 22, 1980
Cutler Hammer	836	May 15, 1980
Dresser Industries	784	May 8, 1980
Edwin L. Wiegland (Dave Ray & Associates)	876	May 22, 1980
Fenwal	785	May 8, 1980
Electromotive Division G.M.	834	May 13, 1980
General Electric (cable)	911	May 29, 1980
General Electric (motors)	912	May 29, 1980
GE (neutron monitoring preamplifiers)	913	May 29, 1980
Foxboro	904	May 22, 1980
Gould	835	May 13, 1980
Harlo	877	May 22, 1980
Leeds & Northrup	893	May 22, 1980
Limitorque	914	May 29, 1980
Magnetrol	813	May 13, 1980
Mercoid	815	May 13, 1980
Namco Snap-Lock	845	May 15, 1980
Raychem Corporation	915	May 29, 1980
Simplex Wire & Cable Company	892	May 22, 1980
Static-O-Ring	846	May 15, 1980
United Electric Control	848	May 16, 1980
Versa	847	May 15, 1980
Yarway	833	May 13, 1980
Temptron	842	May 13, 1980
Static-O-Ring (2)	916	May 29, 1980
Essex	917	May 29, 1980
H.K. Portor Company (Limitorque peerless)	918	May 29, 1980

TABLE 4-1

TABULATION OF FIELD INSPECTION
DATA FOR ELECTRICAL BOXES INSIDE THE DRYWELL

Component	Box Number	Type	Location Elev	Location Azim	Terminal Blocks Type	Remarks
MO-2-1301-4	79-01B-11	Pull	538	190	NA	
MO-2-1301-4	79-01B-25	Pull	536	85	NA	18" x 18" Box
AO-2-203-1A	79-01B-16	Term	524	15	Could not be identified, similar to Allen Bradley	
AO-2-203-1A	79-01B-17	Term	522	15	GE 264B965	
AO-2-203-1B	79-01B-14	Term	524	5	Could not be identified, similar to Allen Bradley	Cable insulation cracking in the box
AO-2-203-1B	79-01B-15	Term	522	5	GE 264B965	
AO-2-203-1C	79-01B-20	Term	524	355	Could not be identified, similar to Allen Bradley	One conduit loose
AO-2-203-1C	79-01B-21	Term	522	355	GE 264B965	Silicon rubber and cables hanging loose
AO-2-203-1D	79-01B-18	Term	524	5	Could not be identified, similar to Allen Bradley	Flex burnt and broken
AO-2-203-1D	79-01B-19	Term	522	5	GE 264B965	
MO-2-220-1	None	NA	NA	NA	NA	Component located at 517 elev and 355 Az
SO-2-220-44	79-01B-3	Pull	539	280	NA	

TABLE 4-1 (Continued)

Component	Box Number	Type	Location Elev	Location Azim	Terminal Blocks Type	Remarks
MO-2-1201-1	79-01B-1	Pull	540	45	NA	Box support loose
MO-2-1001-1A	79-01B-33	Pull	525	0	NA	
MO-2-1001-1B	79-01B-28	Pull	538	120	NA	
POS SW for AO-2-1501-25A	None	NA	NA	NA	NA	Valve in basement, inaccessible
POS SW for AO-2-1501-25B	None	NA	NA	NA	NA	Equipment could be located
POS SW for AO-2-1501-26A	None	NA	NA	NA	NA	Inaccessible
POS SW for AO-2-1501-26B	79-01B-13	Pull	527	210	NA	
AO-2-220-51	79-01B-4	Pull	575	185	NA	
AO-2-220-52	79-01B-5	Pull	575	185	NA	Two screws missing
SRM/IRM	NA	NA	NA	NA	NA	About 1 foot cable without flex conduit

APPENDIX A

DRESDEN UNIT 2 AND COMMON

SYSTEMS LIST

Facility: Dresden
Unit: 2
Docket: 50-237

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DRESDEN 2 AND COMMON

Systems Required Following a LOCA, MSLB, HELB

1. Reactor Protection/Neutron Monitoring System
2. Core Spray System
3. High-Pressure Coolant Injection System
4. Auto Depressurization System/Main Steam System
5. Low-Pressure Coolant Injection System
6. Pressure Suppression System
7. Standby Gas Treatment System
8. Deleted (Included With 1)
9. Service Water System
10. Diesel Oil Piping System
11. Containment Isolation System*
12. Control Rod Drive Hydraulic System
13. Reactor (Nuclear Boiler) Recirculation System
14. Process Radiation Monitoring System
15A. Reactor Building Ventilation System
15B. Control Room, Office, and Drywell Air Conditioning
16. Standby Alternating Current Power
17. Standby Direct Current Power
18. Isolation Condenser System
19. General Use Electrical Equipment
20. Main Steam (Alternate Use Only)
21. Main Feedwater/Condensate (Alternate Use Only)

* Containment isolation includes all components in various systems performing the containment isolation function.

APPENDIX B

DRESDEN UNIT 2 AND COMMON SPECIFIC

AND GENERAL USE COMPONENTS LIST SORTED

BY SYSTEM

Facility: Dresden
Unit: 2
Docket: 50-237

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MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT
REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor Protection/Neutron Monitoring(1)

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name (**)	Inside Primary Containment	Outside Primary Containment
*LS-2-302-82A,B,C,D	Level Switch (M-34)		X
PS-2-503A,B,C,D	Press. Switch Low (M-13)		X
*AO-2-203-1A,B,C,D	Globe Valve Air Operated (M-12)	X	
*AO-2-203-2A,B,C,D	Globe Valve Air Operated (M-12)		X
*PS-2-1621-A,B,C,D	Press. Switch - High (M-25)		X
*PS-2-263-55A,B,C,D	Press. Switch (M-26)		X
*LIS-2-263-57A,B	Level Indication Switch (M-26)		X
*LIS-2-263-58A,B	Level Indication Switch (M-26)		X
RAM-2-0762-A,B,C,D, E,F,G,H	IRM Preamplifier		X
RAM-2-0752-A,B,C,D	SRM-Reamplifier		X

* These components are listed for information only. Their qualification evaluation is covered with their respective systems.

** Shows P&ID number of respective system

(1) This listing includes additional miscellaneous components required to detect or mitigate the specified accidents. Some of these components are not part of the reactor protection system.

Facility: Dresden
Unit: 2
Docket: 50-237

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MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT
REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Core Spray

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
MO-2-1402-25A,B	Gate Valve, Motor Operated		X
MO-2-1402-24A,B	Gate Valve, Motor Operated		X
MO-2-1402-4A,B	Globe Valve, Motor Operated		X
FT-2-1461A,B	Flow Transmitter		X
PT-2-1460A,B	Pressure Transmitter		X
2-1401A,B	Core Spray Pump		X
MO-2-1402-3A,B	Gate Valve, Motor Operated		X
FS-2-1464A,B	Flow Switch		X
MO-2-1402-38A,B	Gate Valve, Motor Operated		X
PS-2-1466A,B,C,D	Pressure Switch		X

Facility: Dresden
Unit: 2
Docket: 50-237

Rev 3
June 2, 1980

MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: High-Pressure Coolant Injection

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
MO-2-2301-5	Gate Valve, Motor Operated		X
MO-2-2301-3	Gate Valve, Motor Operated		X
SV 12	Turbine Stop Valve		X
PT-2-2359	Pressure Transmitter		X
FT-2-2358	Flow Transmitter		X
MO-2-2301-9	Gate Valve, Motor Operated (dc)		X
MO-2-2301-8	Gate Valve, Motor Operated (dc)		X
None	Turbine Gland Seal Condenser Hotwell Drain Pump (dc)		X
PT-2-2382	Pressure Transmitter		X
MO-2-2301-35	Gate Valve, Motor Operated		X
MO-2-2301-6	Gate Valve, Motor Operated		X
AO-2-2301-30	Air Operated Valve, Solenoid		X
POS-2-2301-30	Air Operated Valve, Position Switch		X
AO-2-2301-29	Air Operated Valve, Solenoid		X

SYSTEM: High-Pressure Coolant Injection

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
POS-2-2301-29	Air Operated Valve, Position Switch		X
MO-2-2301-4	Steam Supply Isolation Valve	X	
NONE	Motor Speed Changer		X
NONE	Motor Gear Unit		X
NONE	Emergency Oil Pump		X
NONE	Auxiliary Oil Pump		X
NONE	Gland Steam Exhauster Fan		X
PS-2-2389A,B,C,D	Pressure Switch		X
MO-2-2301-14	Gate Valve, Motor Operated		X
MO-2-2301-15	Gate Valve, Motor Operated		X
MO-2-2301-48	Gate Valve, Motor Operated		X
MO-2-2301-49	Gate Valve, Motor Operated		X
AO-2-2301-64	Air Operated Valve, Solenoid		X
POS-2-2301-64	Air Operated Valve Position Switch		X
AO-2-2301-65	Air Operated Valve, Solenoid		X
POS-2-2301-65	Air Operated Valve, Position Switch		X
MO-2-2301-36	Gate Valve, Motor Operated		X
MO-2-2301-10	Motor-Operated Valve		X

SYSTEM: High-Pressure Coolant Injection

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
2-2386	HPCI Motor Control Signal Convertor		X
PS-2-2360	Pressure Switch		X
LS-2-2351A,B	Level Switch		X
LS-2/3-2350A,B,C,D	Level Switch		X
FS-2-2354	Flow Switch		X
PS-2-2368A,B	Pressure Switch		X
LS-LCS-1	Level Switch		X

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SYSTEM: Auto Depressurization/Main Steam

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location: Inside Primary Containment	Location: Outside Primary Containment
2-203-3A	Target Rock Valve and Associated Solenoid	X	
2-203-3B,C,D,E	Electromatic Relief Valve and Associated Solenoid Valve	X	
AO-2-203-1A,B,C,D	Main Steam Isolation Valve with Associated Solenoid Valves	X	
POS-2-203-1A,B,C,D	Main Steam Isolation Valve, Position Switch	X	
MO-2-220-1	Globe Valve, Motor Operated	X	
TS-2-261-15A,B,C,D 16A,B,C,D 17A,B,C,D 18A,B,C,D	Temperature Switch		X
MO-2-220-2	Globe Valve, Motor Operated		X
AO-2-203-2A,B,C,D	Main Steam Isolation Valve with Associated Solenoid Valve		X
POS-2-203-2A,B,C,D	Main Steam Isolation Valve, Position Switch		X
DPIS-2-261-2A,B,C,D,E,F,G,H,J,K,L,M,N,P,R,S	Differential Pressure Indication Switch		X
PS-2-0261-30A,B,C,D	Pressure Switch		X

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CLASS 1E ELECTRICAL EQUIPMENT
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SYSTEM: Low-Pressure Coolant Injection

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
MO-2-1501-5A,B,C,D	Gate Valve, Motor Operated		X
PS-2-1554A,B,C,D,E, F,H,J	Pressure Switch		X
2-A,B,C,D-1502	LP Coolant Injection Pump		X
MO-2-1501-3A,B	Globe Valve, Motor Operated (and Position Transmitter)		X
DPT-2-1543A,B	Differential Pressure Transmitter		X
MO-2-1501-11A,B	Gate Valve, Motor Operated		X
MO-2-1501-32A,B	Gate Valve, Motor Operated		X
MO-2-1501-13A,B	Gate Valve, Motor Operated		X
FT-2-1549A,B	Flow Transmitter		X
MO-2-1501-18A,B	Globe Valve, Motor Operated		X
MO-2-1501-19A,B	Gate Valve, Motor Operated		X
FT-2-1551A,B	Flow Transmitter		X
FS-2-1501-58A,B	Flow Switch		X

SYSTEM: Low-Pressure Coolant Injection

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
MO-2-1501-21A,B	Angle Valve, Motor Operated		X
MO-2-1501-22A,B	Gate Valve, Motor Operated		X
MO-2-1501-27A,B	Gate Valve, Motor Operated		X
MO-2-1501-28A,B	Gate Valve, Motor Operated		X
2-A,B,C,D-1501-44	Containment Cooling Service Water Pumps		X
FT-2-1542A,B	Flow Transmitter		X
MO-2-1501-38A,B	Globe Valve, Motor Operated		X
MO-2-1501-20A,B	Gate Valve, Motor Operated		X

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SYSTEM: Pressure Suppression

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
LT-2-1641-1	Level Transmitter		X
SO-2-1601-68	Solenoid Valve		X
SO-2-1601-69	Solenoid Valve		X
POS-2-1601-61	Gate Valve, Air Operated (Position Switch)		X
POS-2-1601-60	Butterfly Valve, Air Operated (Position Switch)		X
SO-2-8501-2A,B	Solenoid Valve		X
SO-2-8501-4A,B	Solenoid Valve		X
SO-2-9203A,B	Solenoid Valve		X
SO-2-9204A,B	Solenoid Valve		X
SO-2-8501-6A,B	Solenoid Valve		X
PS-2-1632A,B,C,D	Pressure Switch		X
PS-2-1501-62A,B,C,D	Pressure Switch		X
PS-2-1629A,B	Pressure Switch		X
PS-2-1621A,B,C,D	Pressure Switch		X
PS-2-1628A,B	Pressure Switch		X
PT-2-1625	Pressure Transmitter		X

SYSTEM: Pressure Suppression

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
POS-2-1601-23	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-24	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-62	Globe Valve, Air Operated (Position Switch)		X
SO-2-1601-70	Solenoid Valve		X
POS-2-1601-63	Butterfly Valve, Air Operated (Position Switch)		X
AO-2-1601-55	Air Operated Valve, Solenoid		X
POS-2-1601-55	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-21	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-22	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-56	Butterfly Valve, Air Operated (Position Switch)		X
POS-2-1601-58	Butterfly Valve, Air Operated (Position Switch)		X
SO-2-1601-66	Solenoid Valve		X
MO-2-1601-57	Globe Valve, Motor Operated		X

SYSTEM: Pressure Suppression

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
POS-2-1601-59	Globe Valve, Air Operated (Position Switch)		X
SO-2-1601-67	Solenoid Valve		X
POS-2-1601-20A	Butterfly Valve. Air Operated (Position Switch)		X
POS-2-1601-20B	Butterfly Valve, Air Operated (Position Switch)		X
DPT-2-1602-12	Differential Pressure Transmitter		X
DPIS-2-1622A,B	Differential Pressure Indication Switch		X
LT-2-1626	Level Transmitter		X
SO-2-1601-65	Solenoid Valve		X
SO-2-1601-71	Solenoid Valve		X
SO-2-1601-50A,B	Solenoid Valve		X
SO-2-1601-51A,B	Solenoid Valve		X
SO-2-1601-52A,B	Solenoid Valve		X
PS-2-1620	Pressure Switch		X

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CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Standby Gas Treatment

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location (elevation) Inside Primary Containment	Location (elevation) Outside Primary Containment
2/3-A,B-7506	Fan		X
FT-2/3-7541-40A,B	Flow Transmitter		X
FS-2/3-7541-45A,B	Flow Switch		X
MO-2/3-7507A,B	Butterfly Valves - Motor Operated		X
MO-2-7503	Butterfly Valve - Motor Operated		X
MO-2/3-7504-A,B	Butterfly Valves - Motor Operated		X
MO-2/3-7505-A,B	Butterfly Valves, Motor Operated		X
TSH-2/3-7541-11A,B	Temperature Switch		X
SCR-2/3-7541-36A,B	SCR		X
2/3-A,B-7503	Electric Air Heater		X
FS-2/3-7541-41A,B	Flow Switch		X
2223-28A,B	Local Control Panel		X

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CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Service Water

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
2 & 2/3-3903	Diesel Generator Cooling Water Pumps		X
2-5746A,B	Emergency Air Cooler Reactor Building		X
2-5747	HPCI Building Cooler		X

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CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Diesel Oil Piping

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
2-5203	Diesel Oil Transfer Pump		X
2/3-5203	Diesel Oil Transfer Pump		X
LS-2-5241-3	Level Switch (High/Low)		X
LS-2/3-5241-3	Level Switch (High/Low)		X
SO-2-5202	Solenoid Valve		X
SO-2/3-5202	Solenoid Valve		X

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SYSTEM: Containment Isolation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name (**)	Location	
		Inside Primary Containment	Outside Primary Containment
*AO-2-203-1A,B,C,D	Globe Valve, Air Operated (M-12)	X	
*AO-2-203-2A,B,C,D	Globe Valve, Air Operated (M-12)		X
*MO-2-220-1	Globe Valve, Motor Operated (M-12)	X	
*MO-2-220-2	Globe Valve, Motor Operated (M-12)		X
*SO-2-220-44	Solenoid Valve (M-26)	X	
*SO-2-220-45	Solenoid Valve (M-26)		X
MO-2-1201-1	Gate Valve, Motor Operated	X	
MO-2-1201-2	Gate Valve, Motor Operated		X
MO-2-1201-3	Gate Valve, Motor Operated		X
MO-2-1001-1A,B	Gate Valve, Motor Operated	X	
MO-2-1001-2A,B,C	Gate Valve, Motor Operated		X
MO-2-1001-5A,B	Gate Valve, Motor Operated		X
*MO-2-1501-5A,B,C,D	Gate Valve, Motor Operated (M-29)		X
*SO-2-305-120	Solenoid Valve		X
*SO-2-305-121	Solenoid Valve		X
*SO-2-305-122	Solenoid Valve		X

SYSTEM: Containment Isolation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM		Location	
Plant Identification Number	Generic Name (**)	Inside Primary Containment	Outside Primary Containment
*SO-2-305-123	Solenoid Valve		X
*MO-2-1501-22A,B	Gate Valve, Motor Operated (M-29)		X
*MO-2-1501-18A,B	Globe Valve, Motor Operated (M-29)		X
*MO-2-1501-19A,B	Gate Valve, Motor Operated (M-29)		X
*MO-2-1501-38A,B	Globe Valve, Motor Operated (M-29)		X
*MO-2-1501-20A,B	Gate Valve, Motor Operated (M-29)		X
*MO-2-1501-13A,B	Gate Valve, Motor Operated (M-29)		X
*MO-2-1501-28A,B	Gate Valve, Motor Operated (M-29)		X
*MO-_-205-2-4	Gate Valve, Motor Operated (M-26)		X
*MO-2-1301-1	Gate Valve, Motor Operated (M-28)		X
*MO-2-1301-2	Gate Valve, Motor Operated (M-28)		X
*MO-2-1301-3	Gate Valve, Motor Operated (M-28)		X
*MO-2-1301-4	Gate Valve, Motor Operated (M-28)	X	
*MO-2-1402-3A,B	Gate Valve, Motor Operated (M-27)		X
*MO-2-1402-25A,B	Gate Valve, Motor Operated (M-27)		X
*MO-2-1402-4A,B	Globe Valve, Motor Operated (M-27)		X

SYSTEM: Containment Isolation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name (**)	Location	
		Inside Primary Containment	Outside Primary Containment
*MO-2-2301-36	Gate Valve, Motor Operated (M-51)		X
*MO-2-2301-9	Gate Valve, Motor Operated (M-51)	X	
*MO-2-2301-5	Gate Valve, Motor Operated (M-51)		X
AO-2-2001-105	Gate Valve, Air Operated (Solenoid)		X
AO-2-2001-106	Gate Valve, Air Operated (Solenoid)		X
AO-2-2001-5	Gate Valve, Air Operated (Solenoid)		X
AO-2-2001-6	Gate Valve, Air Operated (Solenoid)		X
POS-2-2001-105	Gate Valve, Air Operated (Position Switch)		X
POS-2-2001-106	Gate Valve, Air Operated (Position Switch)		X
POS-2-2001-5	Gate Valve, Air Operated (Position Switch)		X
POS-2-2001-6	Gate Valve, Air Operated (Position Switch)		X
MO-2-3702	Gate Valve, Motor Operated		X
MO-2-3703	Gate Valve, Motor Operated		X
MO-2-3706	Gate Valve, Motor Operated	X	
*AO-2-1601-60	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-61	Gate Valve, Air Operated (M-25)		X

SYSTEM: Containment Isolation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name (**)	Location	
		Inside Primary Containment	Outside Primary Containment
*AO-2-1601-20A,B	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-23	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-24	Butterfly Valve, Air Operated (M-25)		X
*MO-2-1601-57	Globe Valve, Motor Operated (M-25)		X
*AO-2-1601-62	Globe Valve, Air Operated (M-25)		X
*AO-2-1601-21	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-59	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-58	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-56	Butterfly Valve, Air Operated (M-25)		X
*MO-2-1601-57	Globe Valve, Motor Operated (M-25)		X
*AO-2-1601-22	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-63	Butterfly Valve, Air Operated (M-25)		X
*AO-2-1601-55	Butterfly Valve, Air Operated (M-25)		X
AO-2-4720	Air Operated Valve (Solenoid)		X
AO-2-4721	Air Operated Valve (Solenoid)		X

SYSTEM: Containment Isolation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name (**)	Location	
		Inside Primary Containment	Outside Primary Containment
POS-2-4720	Air Operated Valve (Position Switch)		X
POS-2-4721	Air Operated Valve (Position Switch)		X
3-700-733A,B,C,D,E	Solenoid Ball Valve		X
3-700-736A,B,C,D,E	Squib Shear Valve		X

* These components are listed here for information only. Their qualification evaluation is covered with their respective systems.

** Shows P&ID Number of respective system

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SYSTEM: Control Rod Drive Hydraulic

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
*SO-2-305-117	Scram Solenoid Valve		X
*SO-2-305-118	Scram Solenoid Valve		X
SO-2-0302-20A,B	Scram Solenoid Valve		X
SO-2-0302-19A,B	Scram Solenoid Valve		X
LS-2-0302-82A,B,C,D	Level Switch		X
POS-2-302-21A,B	Air Operated Valve (Position Switch)		X
POS-2-302-22	Air Operated Valve (Position Switch)		X
*SO-2-305-120	Solenoid Valve		X
*SO-2-305-121	Solenoid Valve		X
*SO-2-305-122	Solenoid Valve		X
*SO-2-305-123	Solenoid Valve		X

*Typical of 177 valves.

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CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Reactor (Nuclear Boiler) Recirculation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
LITS-2-263-73A,B	Level Indicating Transmitter Switch		X
PS-2-263-111A,B,C,D	Pressure Switch		X
PT-2-647A,B	Pressure Transmitter		X
LT-2-646-A,B	Level Transmitter		X
PT-2-662	Pressure Transmitter		X
PS-2-263-52A,B	Pressure Switch		X
PS-2-263-55A,B,C,D	Pressure Switch		X
LT-2-263-61	Level Transmitter		X
MO-2-20[illegible]-2-4	Gate Valve, Motor Operated		X
POS-2-220-51	Globe Valve, Air Operated (Position Switch)	X	
AO-2-220-51	Globe Valve, Air Operated (Solenoid)	X	
POS-2-220-52	Globe Valve, Air Operated (Position Switch)	X	
AO-2-220-52	Globe Valve, Air Operated (Solenoid)	X	

SYSTEM: Reactor (Nuclear Boiler) Recirculation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location: Inside Primary Containment	Location: Outside Primary Containment
LITS-2-263-59A,B	Level Indicator Transmitter Switch		X
LIS-2-263-57A,B	Level Indicator Switch		X
LIS-2-263-72A,B,C,D	Level Indicator Switch		X
LIS-2-263-58A,B	Level Indicator Switch		X
POS-2-220-44	Globe Valve, Air Operated (Position Switch)	X	
AO-2-220-44	Globe Valve, Air Operated (Solenoid)	X	
POS-2-220-45	Globe Valve, Air Operated (Position Switch)		X
AO-2-220-45	Globe Valve, Air Operated (Solenoid)		X
DPIS-2-261-35A,B,C,D E,F,G,H	Differential Pressure Indicating Switch		X
DPIS-2-261-34A,B,C,D	Differential Pressure Indicating Switch		X
MO-2-202-5A,B	Gate Valve, Motor Operated	X	
MO-2-202-4A,B	Motor Operated Valve	X	
MO-2-202-7A,B	Motor Operated Valve	X	
MO-2-202-6A,B	Motor Operated Valve	X	
MO-2-202-9A,B	Motor Operated Valve	X	

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SYSTEM: Process Radiation Monitoring

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
RE-2-1735A,B	Rx Building Ventilation Exhaust Radiation Element		X

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CLASS 1E ELECTRICAL EQUIPMENT
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SYSTEM: Reactor Building Ventilation

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
AO-2-5742A,B	Butterfly Valve, Air Operated (Solenoid)		X
AO-2-5741A,B	Butterfly Valve, Air Operated (Solenoid)		X

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CLASS 1E ELECTRICAL EQUIPMENT
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SYSTEM: Control Room, Office, and Drywell Air Conditioning

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
2/3-5772-100	Isolation Damper and Solenoid Valves		X
2/3-5772-99	Damper		X
2/3-5772-101	Isolation Damper		X
2/3-5731	Supply Air Fan		X
2/3-9472-024	Damper		X
2/3-9472-023	Damper		X
2/3-5772-62	Damper		X
2/3-5728	Return Air Fan		X
2/3-5790	Diesel Generator Room Fan		X
2/3-5732A,B	Control Room Air Conditioning Compressors		X
SE-2/3-8941-013	Smoke Detector		X
SE-2/3-9441-003	Solenoid Valve		X
SO-2/3-9441-004	Solenoid Valve		X

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CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Standby Alternating Current Power

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
D/G 2-5209	Standby Diesel Generator		X
D/G 2/3-5209	Standby Diesel Generator		X
SWGR 23-1	4.16 kV Switchgear		X
SWGR 24-1	4.16 kV Switchgear		X
SWGR 28	480 V Switchgear		X
SWGR 29	480 V Switchgear		X
MCC 28-1	480 V Rx Building MCC		X
MCC 28-2	480 V Turbine Building MCC		X
MCC 28-3	480 V Turbine Building MCC		X
MCC 28-7	480 V Rx Building MCC		X
MCC 29-1	480 V Rx Building MCC		X
MCC 29-2	480 V Turbine Building MCC		X
MCC 29-3	480 V Rx Building MCC		X
MCC 29-4	480 V Rx Building MCC		X
MCC 29-7	480 V Rx Building MCC		X
RPS Bus 1	120 V ac Reactor Protection System Bus 1		X
RPS Bus 2	120 V ac Reactor Protection System Bus 2		X

SYSTEM: Standby Alternating Current Power

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
Essential Service Bus	120/240 V ac Essential Service Bus		X
Instrument Bus	120/240 V ac Instrument Bus		X
Essential Bus MMG Set	120/240 V ac Essentail Bus Supply MMG Set		X
2252-21	D/G 2 Excitation Cabinet		X
2223-41	D/G 2/3 Excitation Cabinet		X
None	D/G 2-2/3 Engine Control Panel		X
None	D/G 2-2/3 Speed Sensing Panel at Engine		X
None	D/G 2 Relay and Meter Panel		X
2223-33	D/G 2/3 Relay and Meter Panel		X
None	4 kV Nonsegregated Bus		X

Facility: Dresden
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MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Standby Direct Current Power

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location: Inside Primary Containment	Location: Outside Primary Containment
250 V Batt Chgr 2	250 V Battery Charger		X
250 V Batt Chgr 2/3	250 V Battery Charger		X
MCC 2 (Turbine Building)	250 V dc Turbine Building MCC		X
MCC 2 (Rx Building Bus 2A & 2B	250 V dc Reactor Building MCC		X
250 V Battery	250 V dc Battery		X
125 V Batt Chgr 2	125 V Battery Charger		X
125 V Batt Chgr 2A	125 V Battery Charger		X
125 V Battery	125 V dc Battery		X
125 V DCDP Main Bus 2	125 V dc Turbine Building Distribition Panel (Main Bus)		X
125 V DCDP Res Bus 2	125 V dc Turbine Building Distribution Panel (Reserve Bus)		X
125 V DCDP Main Bus 3	125 V dc Reactor Building Distribution Panel (Main Bus)		X
48/24 Batt 2A & 2B	48/24 V Battery		X
24V Batt Chgr 2A & 2B (+)	24 V Battery Charger		X
24 V Batt Chgr 2A & 2B (-)	24 V Battery Charger		X
48/24 DCDB 2A & 2B	48/24 V dc Distribution Panel		X

Facility: Dresden
Unit: 2
Docket: 50-237

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MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: Isolation Condenser

SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM

Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
POS-2-1301-17	Globe Valve, Air Operated (Position Switch)		X
AO-2-1301-17	Globe Valve, Air Operated (Solenoid)		X
POS-2-1301-20	Globe Valve, Air Operated (Position Switch)		X
AO-2-1301-20	Globe Valve, Air Operated (Solenoid)		X
MO-2-1301-3	Gate Valve, Motor Operated (dc)		X
MO-2-1301-4	Gate Valve, Motor Operated	X	
MO-2-1301-1	Gate Valve, Motor Operated	X	
MO-2-1301-2	Gate Valve, Motor Operated (dc)		X

Facility: Dresden
Unit: 2
Docket: 50-237

Rev 3
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MASTER LIST

CLASS 1E ELECTRICAL EQUIPMENT REQUIRED TO FUNCTION UNDER POSTULATED ACCIDENT CONDITIONS

SYSTEM: General Use Electrical Equipment

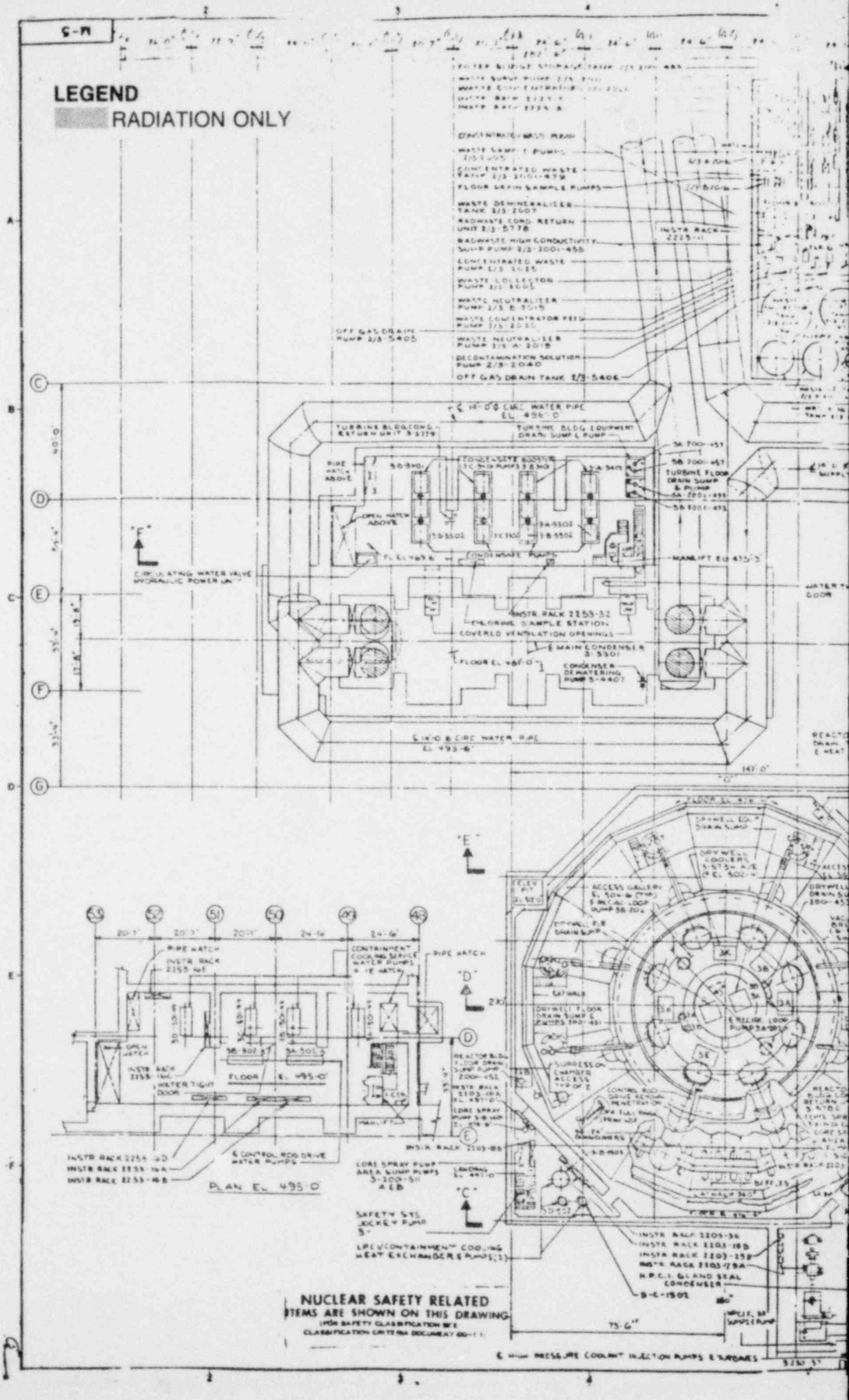
SPECIFIC COMPONENTS ASSOCIATED WITH ABOVE SYSTEM			
		Location	
Plant Identification Number	Generic Name	Inside Primary Containment	Outside Primary Containment
Cable	5 kV Power		X
Cable	600 V Power and Control	X	X
Cable	Instruments	X	X
Cable	Thermocouples	X	X
Electrical Penetration	High-Voltage Power	X	X
Electrical Penetration	Low-Voltage Power & Control	X	X
Electrical Penetration	Instruments	X	X
Electrical Penetration	Thermocouples	X	X

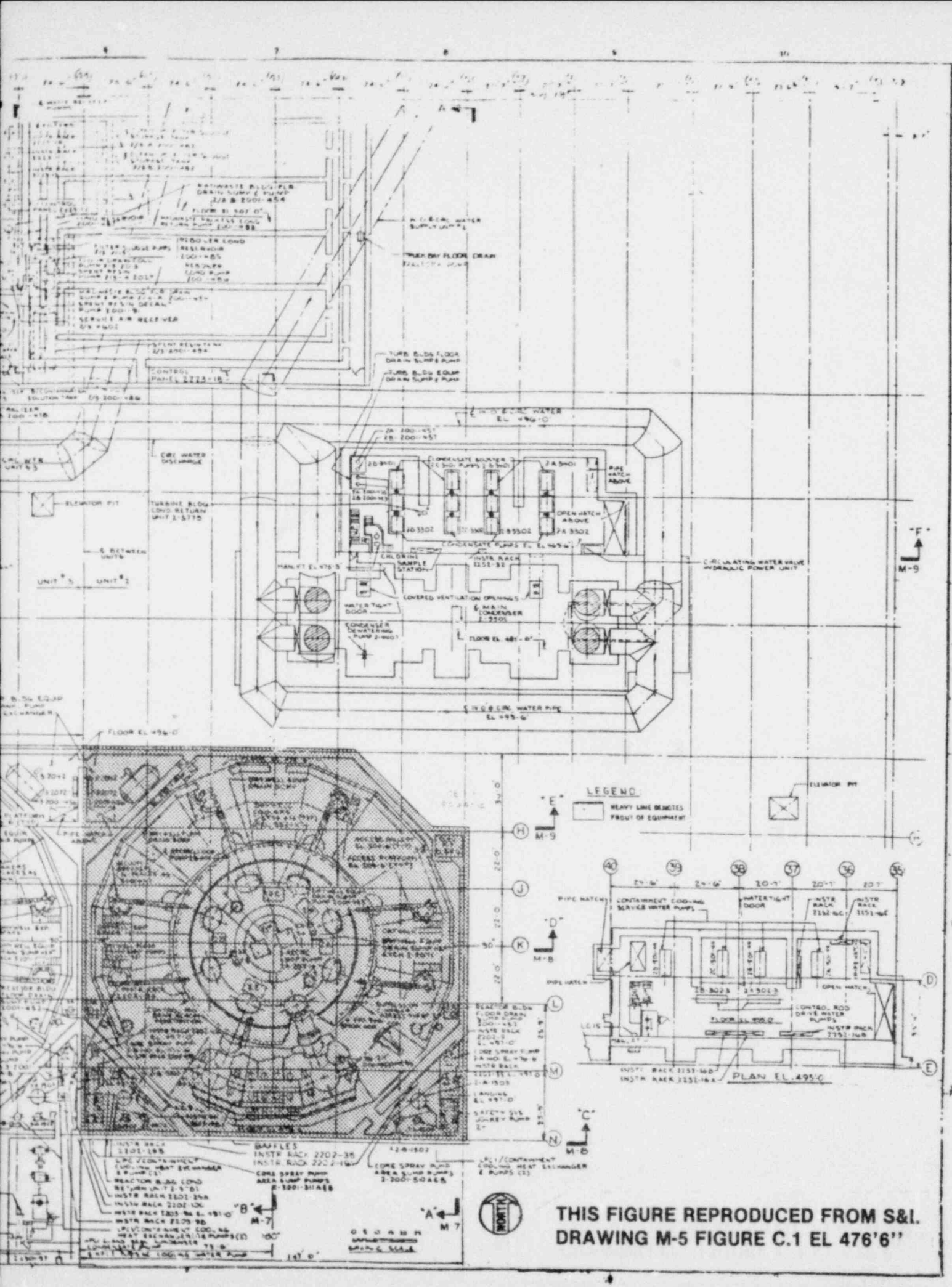
APPENDIX C

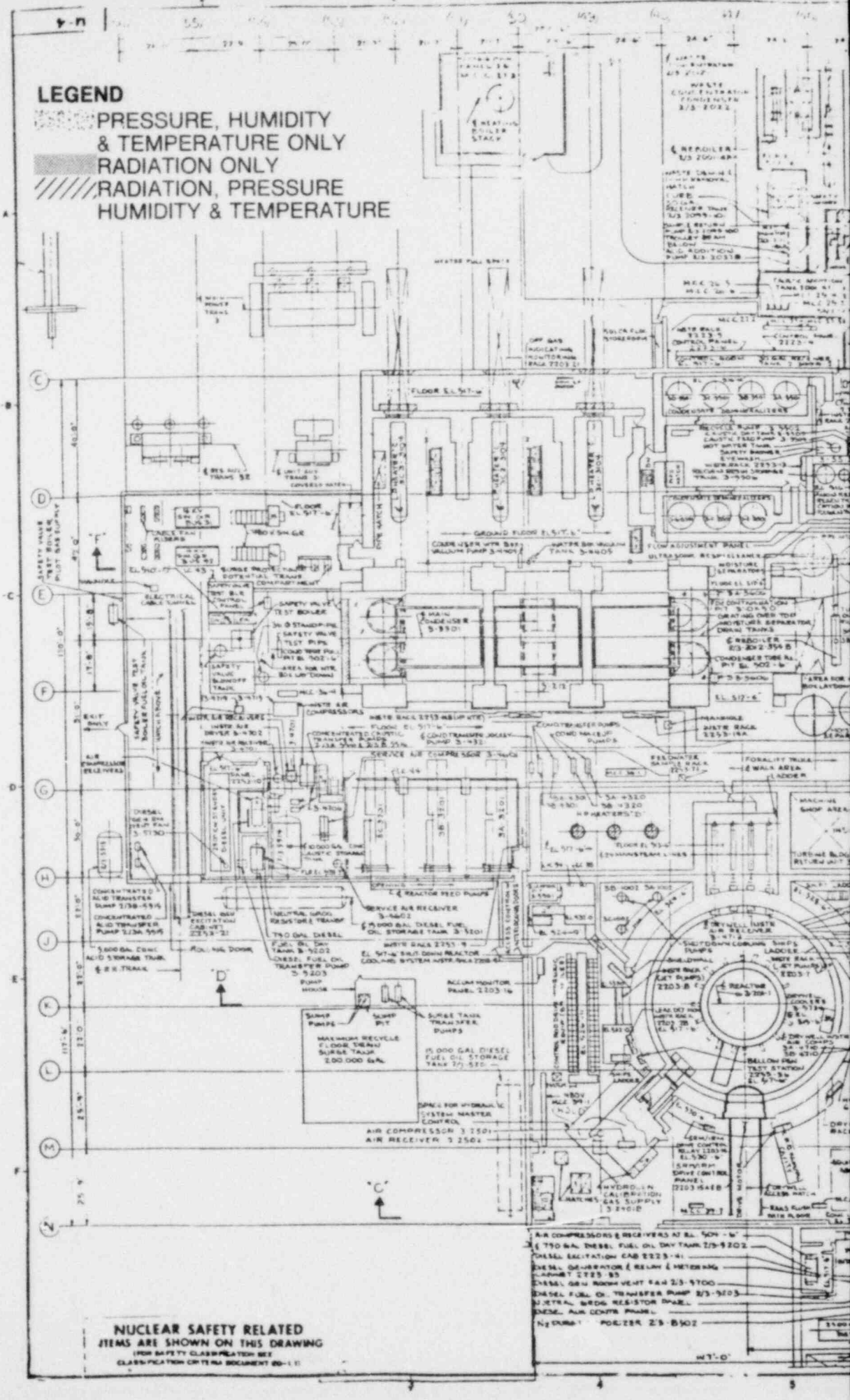
LIST OF FIGURES AND TABLES

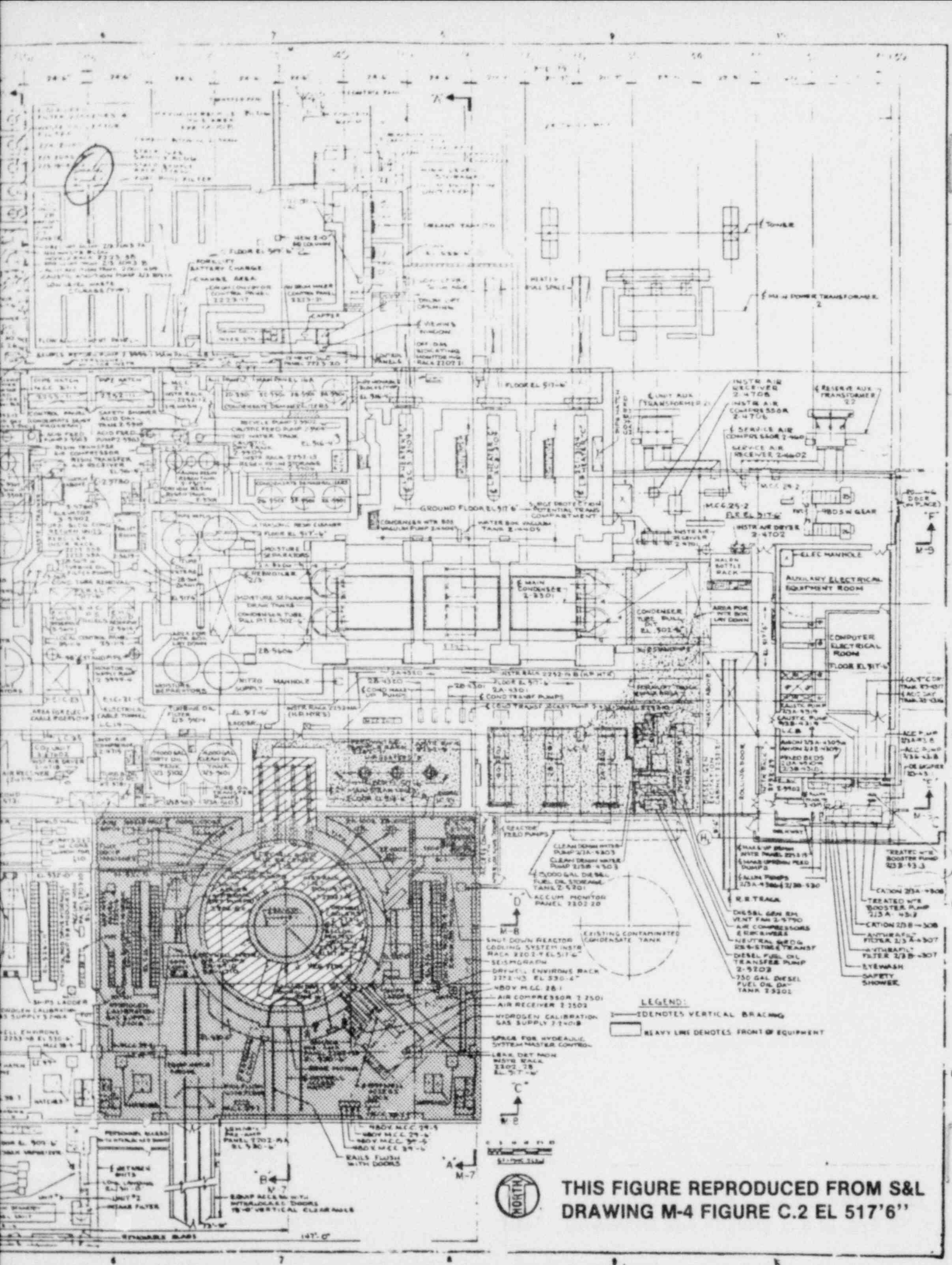
DRESDEN UNIT 2 KEY PLAN IDENTIFYING HARSH ENVIRONMENTAL AREAS AND TABULATION OF SERVICE CONDITIONS

Figure C.1	Plan view general arrangement drawing identifying harsh environmental areas for Dresden Unit 2 el 476'-6"
Figure C.2	Plan view general arrangement drawing identifying harsh environmental areas for Dresden Unit 2 el 517'-6"
Figure C.3	Plan view general arrangement drawing identifying harsh environmental areas for Dresden Unit 2 el 545'-6"
Figure C.4	Plan view general arrangement drawing identifying harsh environmental areas for Dresden Unit 2 el 570'-0"
Figure C.5	Plan view general arrangement drawing identifying harsh environmental areas for Dresden Unit 2 el 589'-0" and 613'-0"
Figure C.6	FSAR Figure 5.2.11 providing the drywell pressure response following the postulated LOCA
Figure C.7	FSAR Figure 5.2.12 providing drywell temperature response following the postulated LOCA
Table C-1	Maximum environmental conditions inside drywell for the postulated LOCA/MSLB
Table C-2	Maximum environmental conditions outside drywell following the postulated MSLB/FWLB accidents discussed in Section 4.1
Table C-3	Post-LOCA maximum radiation doses for areas outside the drywell for 1 day, 30 days, and 1-year exposure. (Where times other than 1 day, 30 days, and 1 year apply calculated values for the appropriate time are utilized.)

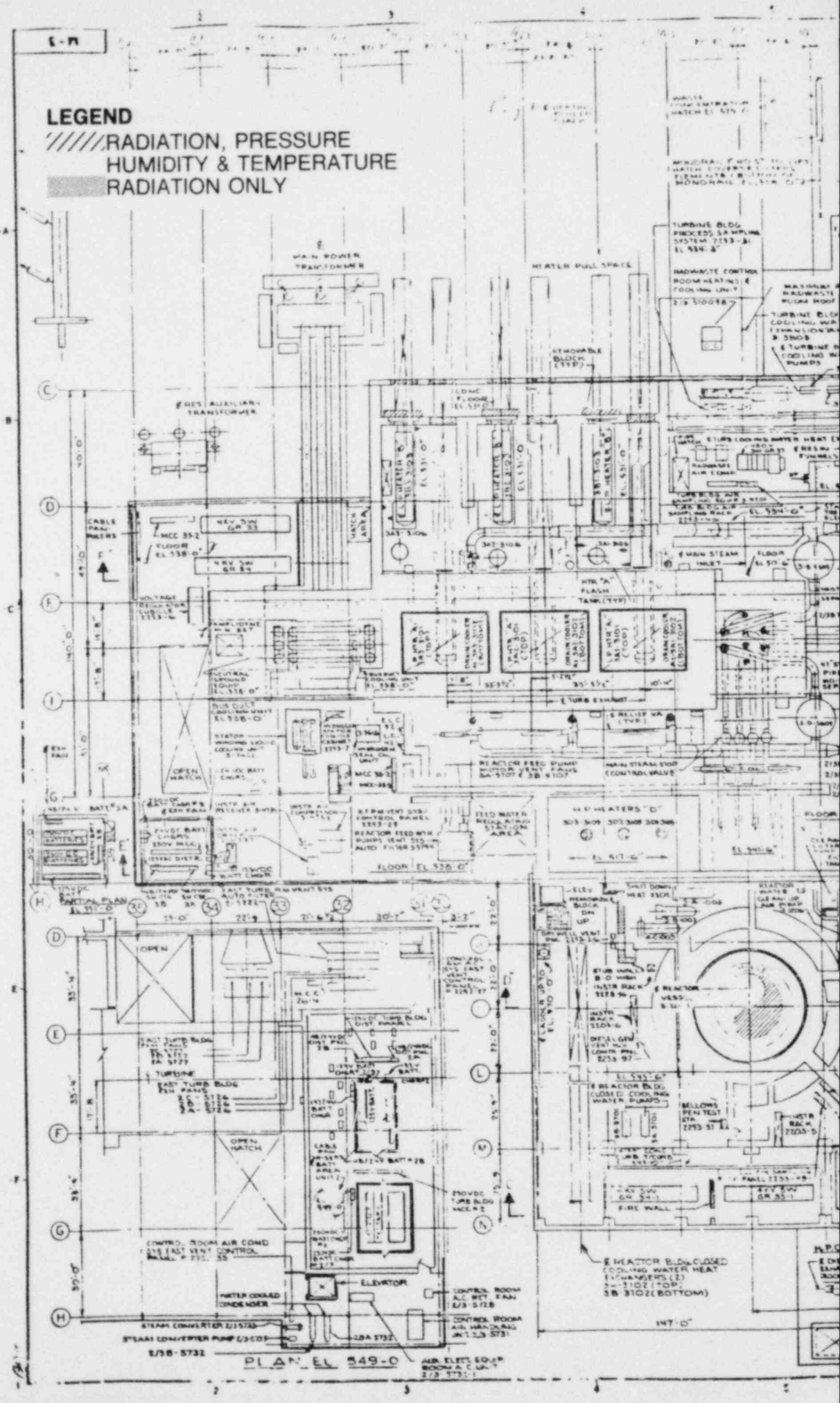

LEGEND
RADIATION ONLY
PLAN EL 495'0"
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
(FOR SAFETY CLASSIFICATION SEE
CLASSIFICATION CRITERIA DOCUMENT 22A-1)

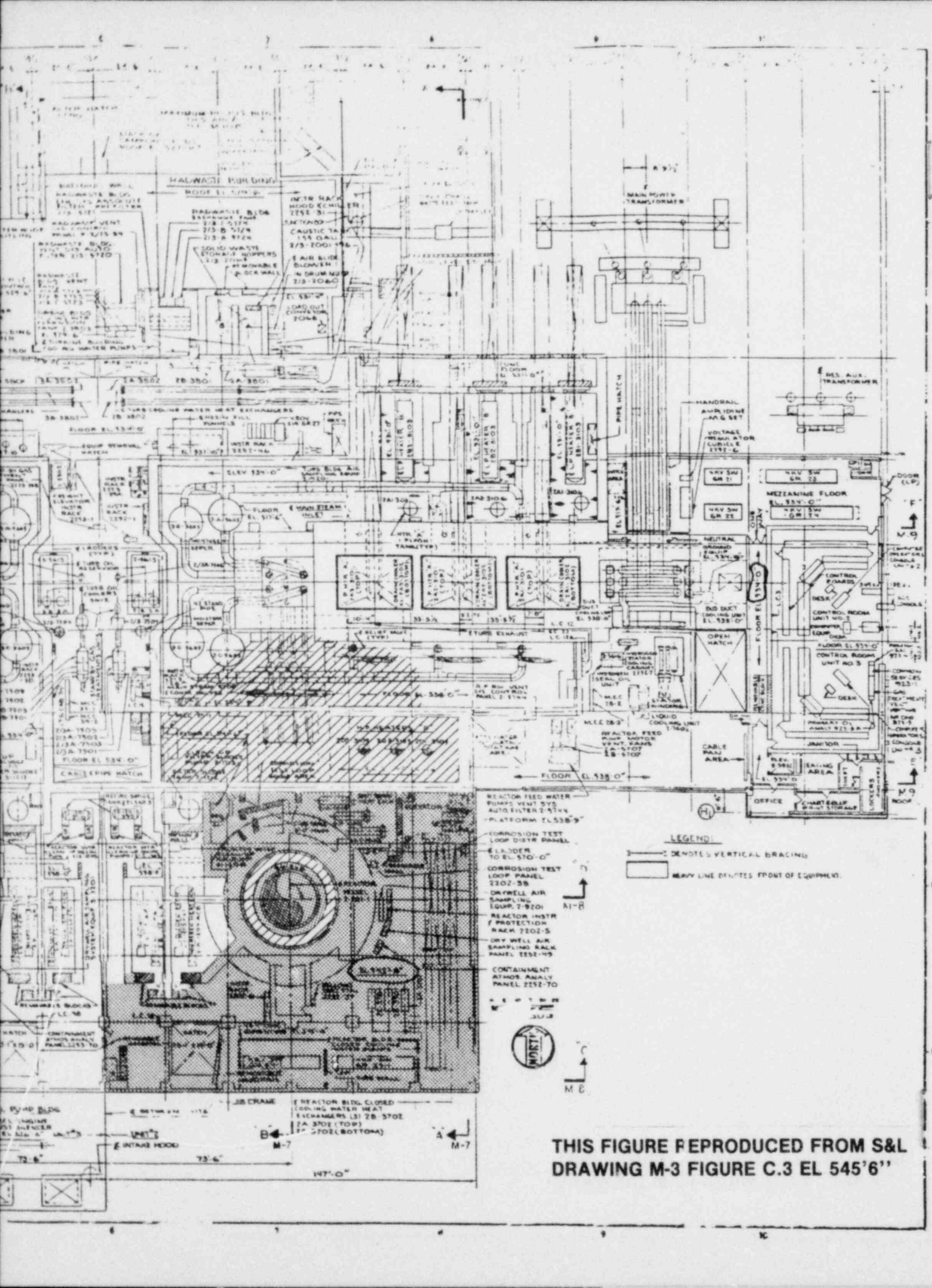

LEGEND
HEAVY LINE INDICTES FRONT OF EQUIPMENT
PLAN EL. 495'0"
THIS FIGURE REPRODUCED FROM S&I. DRAWING M-5 FIGURE C.1 EL 476'6"


LEGEND
PRESSURE, HUMIDITY & TEMPERATURE ONLY
RADIATION ONLY
RADIATION, PRESSURE HUMIDITY & TEMPERATURE
NUCLEAR SAFETY RELATED ITEMS ARE SHOWN ON THIS DRAWING

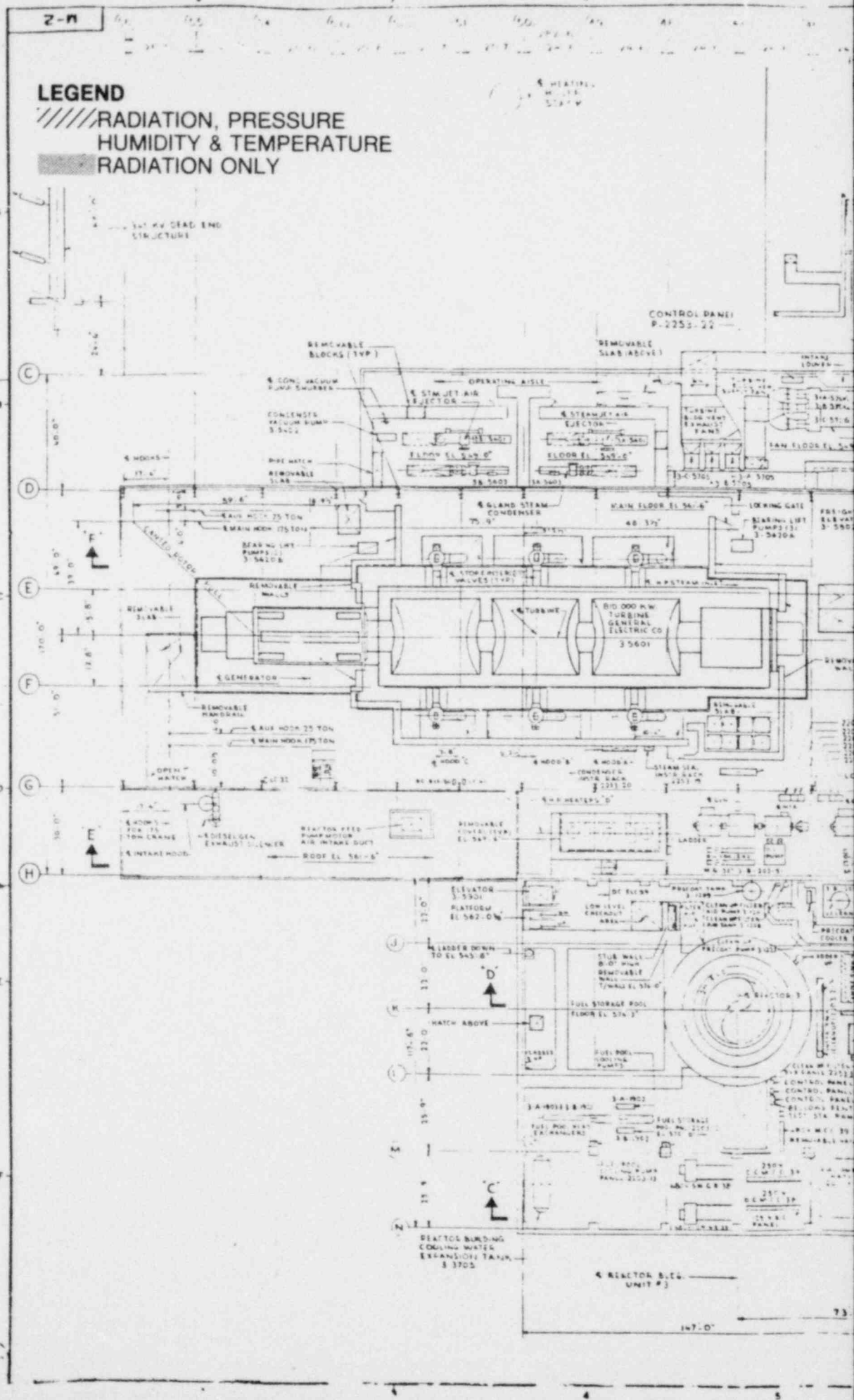


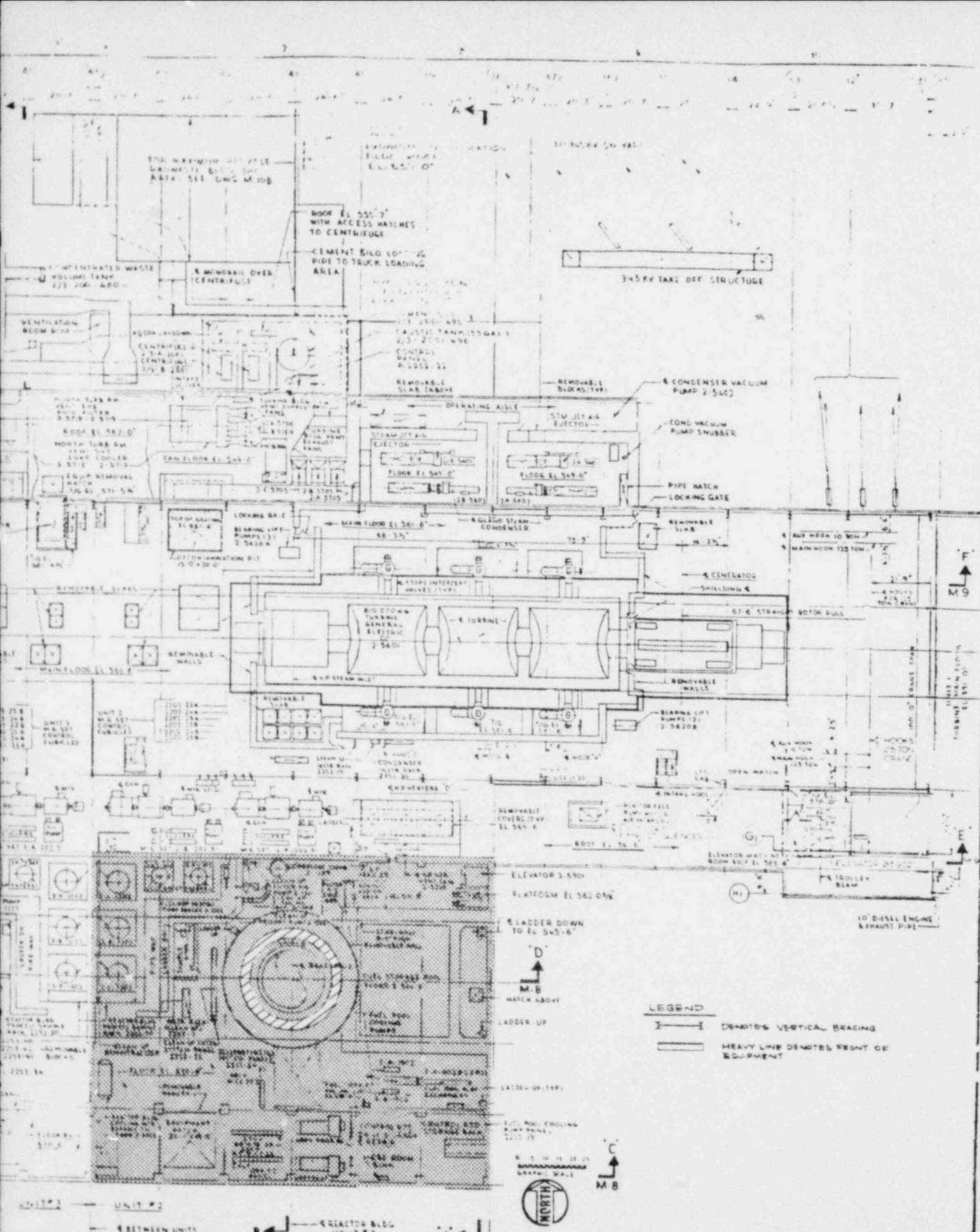
THIS FIGURE REPRODUCED FROM S&L DRAWING M-4 FIGURE C.2 EL 517'6"


LEGEND
RADIATION, PRESSURE HUMIDITY & TEMPERATURE
RADIATION ONLY
PLAN EL 549-0



THIS FIGURE REPRODUCED FROM S&L DRAWING M-3 FIGURE C.3 EL 545'6"


LEGEND
RADIATION, PRESSURE HUMIDITY & TEMPERATURE
RADIATION ONLY
CONTROL PANEL P-2253-22
REMOVABLE BLOCKS (TYP)
REMOVABLE SLAB (ABOVE)
OPERATING AISLE
STM JET AIR EJECTOR
CONDENSER VACUUM PUMP 3-5402
PIPE HATCH REMOVABLE SLAB
GLAND STEAM CONDENSER
MAIN FLOOR EL 561'-6"
LOCKING GATE
BEARING LIFT PUMPS (3) 3-5420A
BEARING LIFT PUMPS (2) 3-5420B
REMOVABLE WALLS
REMOVABLE SLAB
REMOVABLE HANDRAIL
TURBINE
810 000 KW TURBINE GENERAL ELECTRIC CO. 3-5601
GENERATOR
AUX HOOK 25 TON
MAIN HOOK 175 TON
OPEN WATER
DIESEL GEN EXHAUST SILENCER
REACTOR FEED PUMP MOTOR AIR INTAKE DUCT
REMOVABLE COVER (TYP) EL 547'-6"
ROOF EL 581'-6"
INTAKE HOOD
ELEVATOR 3-5901
PLATFORM EL 562'-0"
LADDER DOWN TO EL 545'-8"
STUB WALL 8'-0" HIGH REMOVABLE WALL
FUEL STORAGE POOL FLOOR EL 574'-3"
HATCH ABOVE
REACTOR BUILDING COOLING WATER EXPANSION TANK 3-3705
REACTOR BLDG. UNIT #3
147'-0"



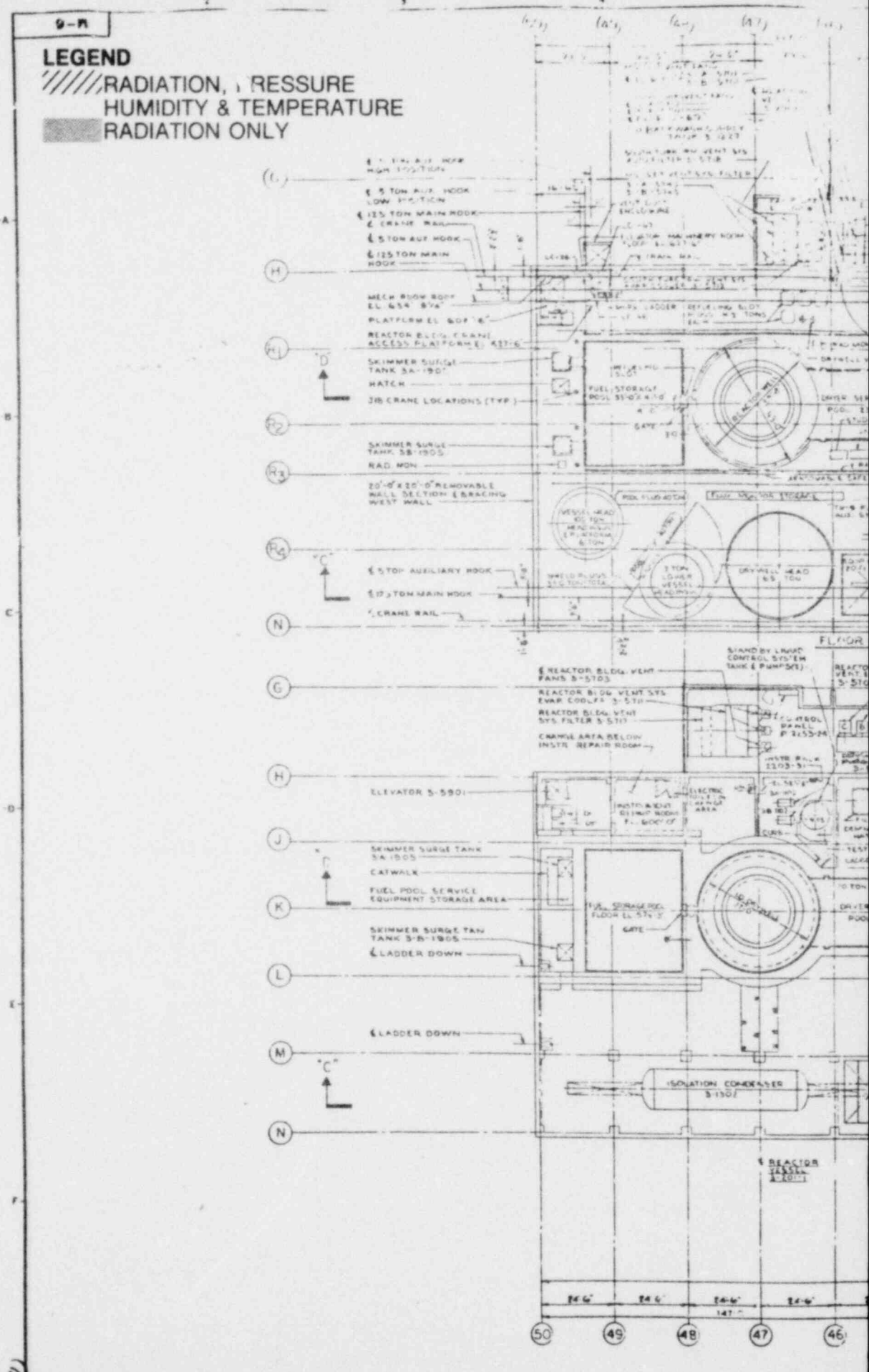
THIS FIGURE REPRODUCED FROM S&L DRAWING M-2 FIGURE C.4 EL 570'0"

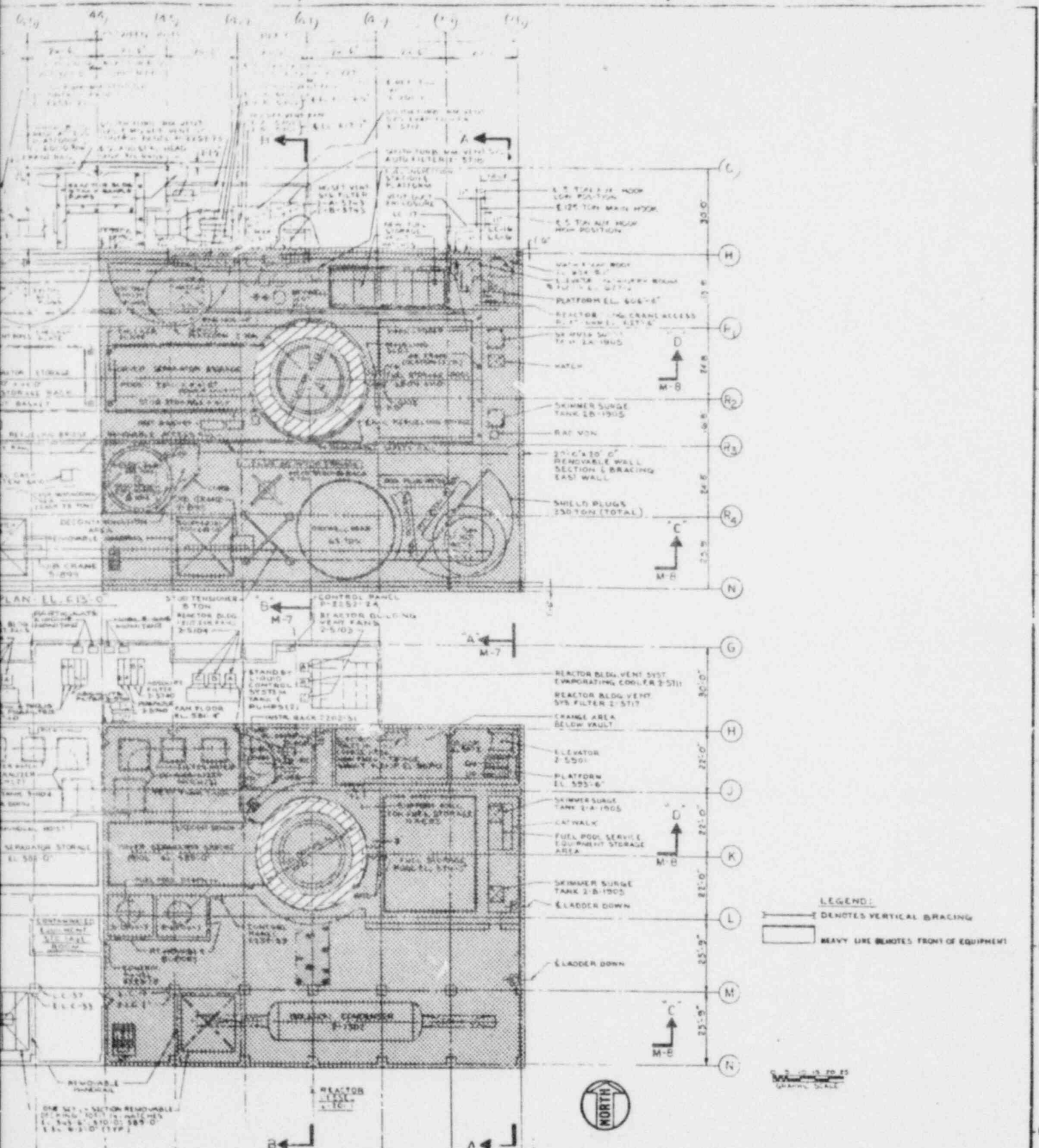
9-M

LEGEND

////// RADIATION, PRESSURE
HUMIDITY & TEMPERATURE

RADIATION ONLY





THIS FIGURE REPRODUCED FROM S&L DRAWING M-6 FIGURE C.5 EL 589'0'' & 613'0''

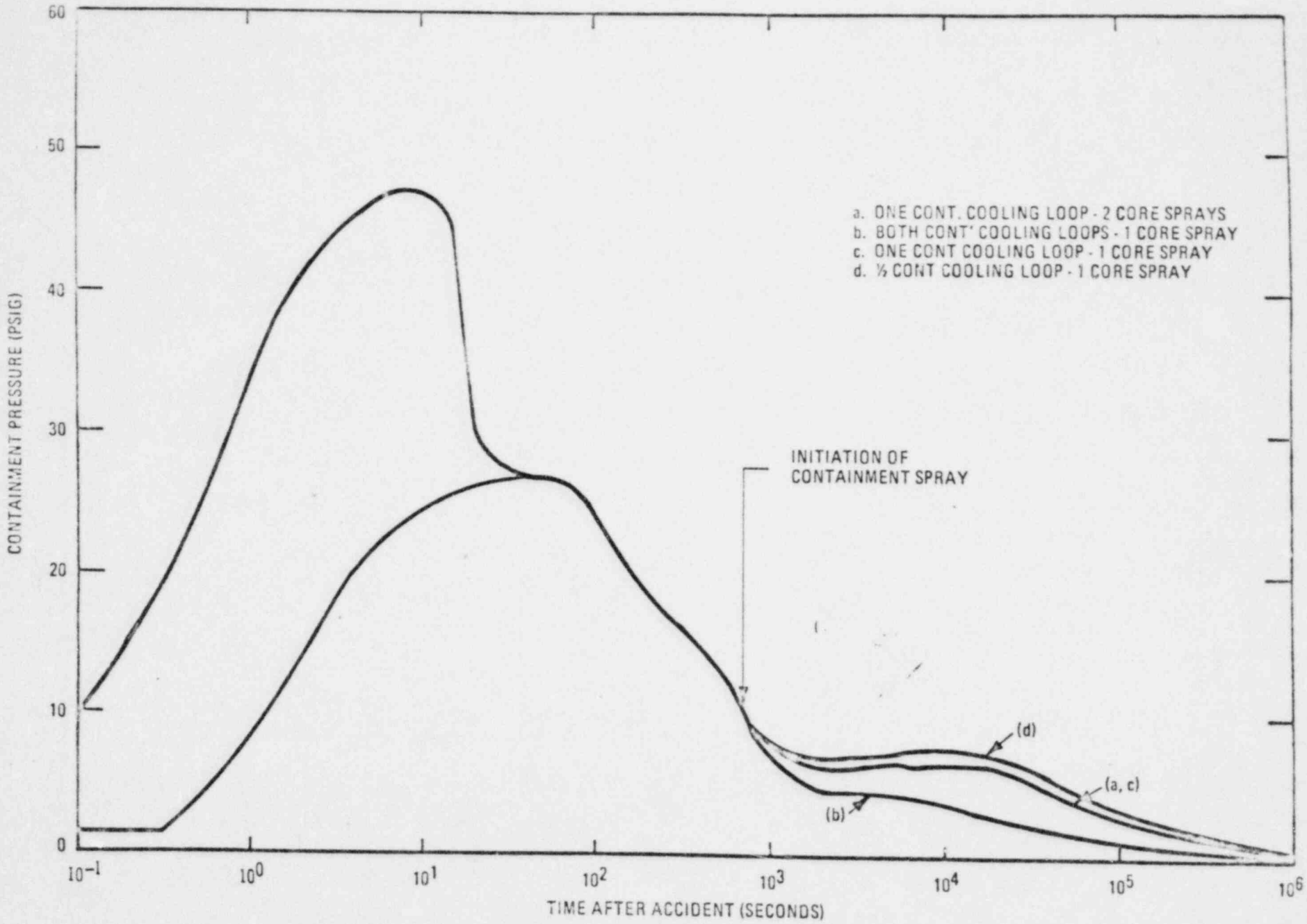


Figure 5.2.11 Pressure Response to Loss-of-Coolant Accident

FIGURE C.6

Rev. 3-22-65

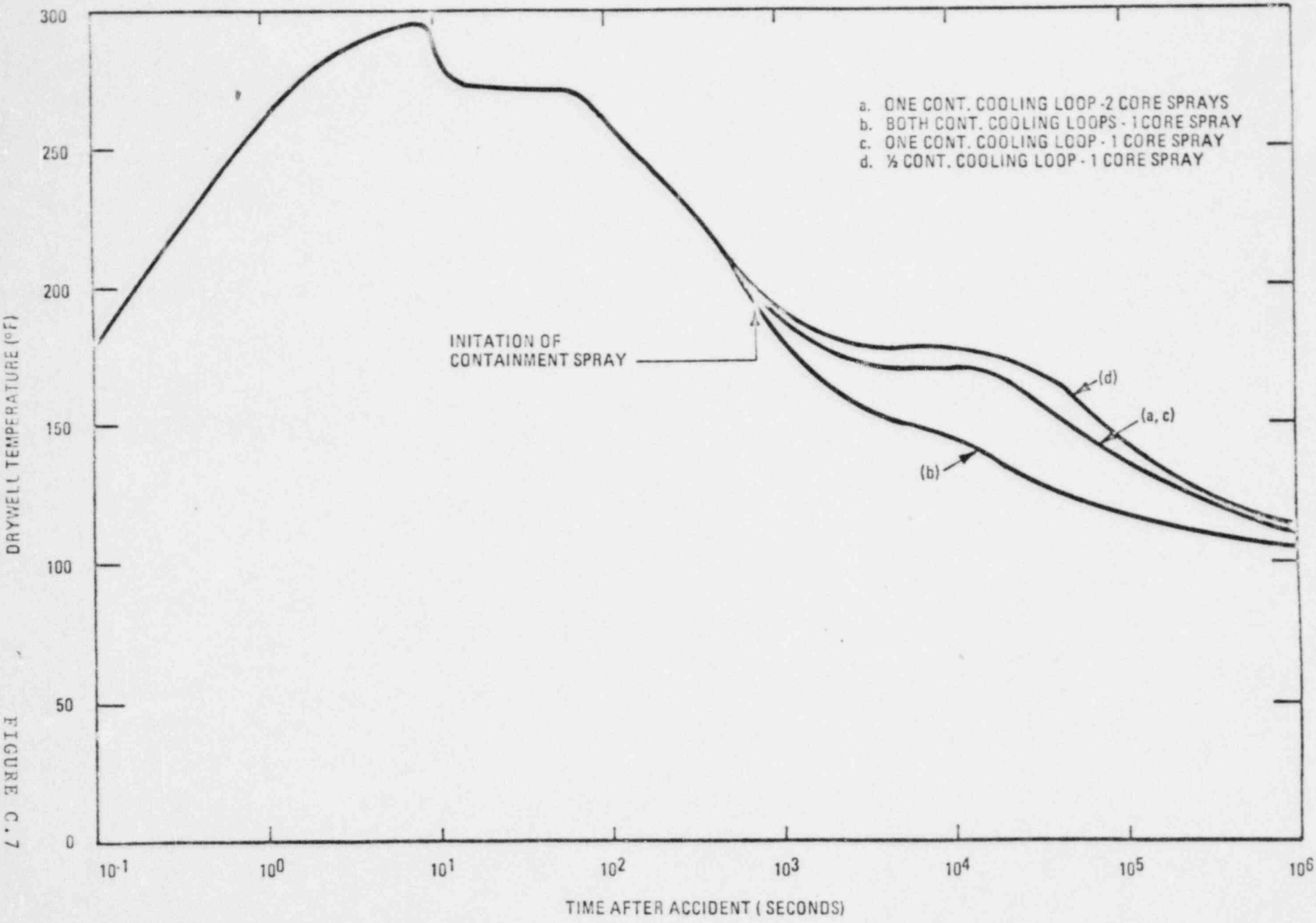


FIGURE C.7

Figure 5.2.12 Temperature Response to Loss-of-Coolant Accident

TABLE C-1

MAXIMUM ENVIRONMENTAL CONDITIONS INSIDE THE DRYWELL
FOLLOWING THE POSTULATED LOCA/HELB

Temperature	Pressure	Relative Humidity	Containment Spray	Gamma Radiation	Submergence Elevation
281F (340F)	63 psia	100%	Demineralized water	1 day-4.3×10^7 rads 30 day-1×10^8 rads 1 year-1.1×10^8 rads	505'-6"

TABLE C-2

MSLB/FWLB ENVIRONMENTAL CONDITIONS
OUTSIDE THE DRYWELL

Area	Pipe Break	Maximum Pressure (psia)	Maximum Temperature (°F)	Relative Humidity (%)
Steam tunnel	Main steam/ feedwater	27.0	242	100
High-pressure heater bay	Main steam/ feedwater	27.0	242	100
Turbine Building el 538'-0", north of Column G, between Columns 40 and 42 and 46 and 48	Main steam	21.9	230	100
Reactor feed pump room	Feedwater	Not evaluated - No equipment required to function located in this room		

TABLE C-3

RADIATION ENVIRONMENTAL CONDITIONS OUTSIDE
DRYWELL FOLLOWING THE POSTULATED LOCA
MAXIMUM RADIATION SOURCES

Area	Source*	Integrated Dose Levels (rads) 1 Day	30 Days	1 Year
Torus	SP	1.5×10^7	3.2×10^7	3.9×10^7
Low-pressure coolant injection corner rooms	SP	2.4×10^5	9.4×10^5	1.7×10^6
High-pressure coolant injection room	MS	6.6×10^6	1.6×10^7	1.7×10^7
Steam tunnel	SP	1.9×10^5	7.0×10^5	1.3×10^6
Reactor building el 517'-6"	RW	2.5×10^6	7.8×10^6	1.4×10^7
Reactor building el 545'-6"	CA/SP	2.2×10^5	6.2×10^5	1.1×10^6
Reactor building el 570'-0"	CA	2.2×10^5	5.4×10^5	6.1×10^5
Reactor building el 589'-0"	RW	3.2×10^6	1.1×10^7	1.8×10^7

* SP = Suppression pool liquid
RW = Reactor water
MS = Reactor steam
CA = Containment airborne