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SLLI-746
October 21, 1982
Project No. 4536-02

Illinois Power Company
Clinton Power Station - Unit 1

Draft FSAR Changes Explaining the Use of ASME Codes on Structural Design

Mr. Herb Williams
Licensing Project Manager
Standardization and Special Projects Branch
Division of Licensing
Office of Nuclear Regulation
Room 340
7920 Norfolk Avenue
Bethesda, Maryland

Dear Mr. Williams:

As requested by Illinois Power Company, I am sending you a copy of the draft FSAR revisions for Section 3.8. These draft revisions will be discussed at the meeting scheduled for October 26, 1982 between NRC and Illinois Power Company.

Yours very truly,

C. Michael Launi

C. Michael Launi
Licensing Engineer

CML:aab
Attachment
Copies:
H. Livermore (1/1)
J. D. Geier (1/1)
J. S. Spencer (1/1)
G. E. Wuller (1/1)
B. Erler (1/1)
R. C. Heider (1/1)
R. A. Witt (1/1)
P. K. Agrawal (1/1)
NSLD File: 1C-10a
File: 2.4.1 - S&L

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a. pedestal cavity area: 6 feet 0 inch;

b. sump floor area: 9 feet 0 inch; and

c. suppression pool area: 3 feet 0 inch.

Leak test channels are provided at the liner seams in the suppression pool area and in the containment wall up to elevation 757 feet 0 inch. The containment liner in the wet areas of the suppression pool is of stainless steel to minimize corrosion problems.

3.8.1.1.5 Polar Crane Girder Brackets

The polar crane girder is located just below the spring line of the containment and is supported by brackets that are spaced 15° apart and embedded into the containment wall. Figure 3.8-16 shows the embedment details for the crane girder brackets.

3.8.1.2 Applicable Codes, Standards, and Specifications

This section lists codes, specifications, standards of practice, Regulatory Guides, and other accepted industry guidelines which are adopted to the extent applicable, in the design and construction of the containment. The codes, standards and specifications are listed and discussed in Table 3.8-4 and are given with a specification reference number. The reference numbers for the containment are:

a. 1, 2 through 5, 8; 7 through 9

b. 11 through ~~21~~ 14; ~~38 through 41;~~ 16, 17, 18, 20, 21

c. 23, 25, ~~26~~ 28, ~~34~~, 35, 36, 38 through 41; and

d. 43, 44, 46, ~~and~~ 47 48, and 50

All the provisions of Article CC 3000 of ASME B&PV Code, Sec. III, Div. 2, are followed in the design of the containment structure except for the tangential shear criteria.

The provisions of the 1971 ASME Boiler and Pressure Vessel Code, Section III, Division 1, with summer of 1973 addenda are adopted for penetration sleeves, the personnel air lock, and equipment hatch.

Add hand written Paragraph from Page 3.8-22a

3.8.1.3 Loads and Loading Combinations

The containment structure is designed using the loads, load combinations, and load factors listed in Table 3.8-1.1.

Loads and load combinations listed in Table 3.8-1.1 are used for the design of the steel liner and liner anchors, but the load factor for all load cases is 1.0.

The design and analysis procedures are in full compliance with the requirements of Article CC-3000 of the ASME B&VP Code, Section III, Division 2.

Throughout the analysis, special attention is given to the following:

a. the intersection between the base slab and the cylinder;

b. the intersection between the cylinder and the dome;

c. the area around the large penetrations;

d. loading on the base slab from the underlying foundation material;

e. stresses due to transient temperature;

f. penetrations and points of concentrated loads; and

g. embedment of polar crane brackets in the containment wall.

3.8.1.4.2 Shell and Base Slab Analysis

The method of analysis used is a thin-shell of revolution finite element procedure using the computer program DYNAX. The complete containment with its basemat is modeled with shell elements.

The loads applied to the shell model are centerline loads. Consideration is given to the shift of the load from the actual place of application to the centerline of the shell. Overall effects of non-axisymmetric loads such as a pipe break load are analyzed using a series of Fourier harmonics, the summation of which represents the distribution of the load on the structure.

Results of the analysis, except for pool dynamic loads, are presented in Figure 3.8-17. Analysis results and design assessment of critical cross sections are presented in Attachment B3.8.

The base slab of the containment building is analyzed by a plate finite-element program PLFEM-II. The stiffening contributed by the walls is also included in the finite-element model.

Foundation soil is represented by equivalent springs at the nodal points of the basemat elements. A range of soil properties is used to allow for the short-term and long-term characteristics of the soil.

The base slab is also analyzed using the computer program CSEF-III to confirm the results from the finite-element analysis.

Except for the allowable tangential shear stresses listed in Subsection 3.8.1.5.1.1, all reinforced concrete is in accordance with Article CC 3400 of ASME B&PV Code, Sec. III, Div. 2.

3.8.1.5.1.1 Tangential Shear

allowables are

The containment is designed for the peak tangential shear. The tangential shear stress capacity of concrete v_c is limited to 40 psi and 60 psi respectively for the service and factored load combinations defined in Table 3.8-1.1. The excess shear is designed to be carried by inclined reinforcement.

3.8.1.5.2 Steel Liner

The allowable stresses and strains for the liner plate are limited to values as specified in Article CC 3000 of ASME B&PV Code Sec. III, Div. 2. When subject to SRV discharge loads, the liner plates are designed in accordance with Subsection NE, Section III of the ASME B&PV Code.

3.8.1.5.3 Steel Pressure-Retaining Components

Portions of the containment boundary that are of steel and not backed by concrete, such as the equipment hatch, personnel locks, and Code Class MC penetration assemblies, are designed in accordance with Subsection NE, Section III of the ASME B&PV Code.

These components are designed for the load combinations shown in Tables A3.9-6 and A3.9-7. The allowable stresses for these load combinations are summarized in the following list of figures from Section III Div. 1 of ASME B&PV Code:

a. design conditions, Figure NE-3221-1;

b. normal and upset conditions, Figure NB-3222-1;

c. emergency conditions, Figure NB-3224-1;

d. faulted conditions, Table F-1322; and

e. test conditions, Paragraph NE-3226.

3.8.1.5.4 Head Fitting Design

All head fittings (cover plates of flued heads), which are classified as Seismic Category I components, meet all stress requirements associated with the applicable design, operating, and testing conditions, as stated in the following paragraphs.

The allowable (temperature-dependent) stress values, as applicable to items a, b, c, d, and e, are taken from Tables I-1.1 through I-2.2 of the ASME Code, Section III, Div. 1.

3.8.3.2 Applicable Codes, Standards, and Specifications

This subsection lists codes, standards of practice, regulatory guides, and other accepted industry guidelines that are adopted, to the extent applicable, in the design and construction of the structures internal to the containment. To eliminate repetitious listing of the codes and standards for each structure, the codes and standards are listed and discussed in Table 3.8-4 and given a reference number. For each structure internal to the containment, the reference numbers are listed in Subsections 3.8.3.2.1 through 3.8.3.2.4.

Add. here and at the end of para 3.8.1.2

Table 3.8-9 gives additional details regarding various codes used for design, material, fabrication, and erection of the major structural items within containment. Appendix B gives a detailed discussion on the construction material standards and quality control procedures required during construction.

3.8.3.2.1 Reactor Shield Wall and Pedestal

The reference numbers are as follows:

a. 25 ~~and 26~~ for reactor pedestal;

b. 21 and 23 for reactor shield wall; and

c. 28, ~~34~~, 41, 43, ~~45~~, and 47 for both reactor pedestal and reactor shield wall.

~~Items 25 and 26 are not applicable for reactor shield wall.~~ ← delete

3.8.3.2.2 Drywell Structure

The reference numbers are as follows:

a. 1 through ~~5~~ 5; 7 through 9;

b. 11 through ~~20~~ 14; 16, 17, 18, 20;

c. 21, 23, 25a, ~~26~~, 28; and

d. ~~34~~, 35, 38, 41, 43, 44, 46, 47, 48, and 49.

3.8.3.2.3 Miscellaneous Platforms and Galleries, Refueling Floor, Equipment Rooms, Suppression Pool Weir Wall, Process Pipe Tunnel, and Structural Support System for Recirculation Pumps

The reference numbers are as follows:

a. 1 through ~~8~~ 5; 7 through 9;

b. 11 through ~~20~~ 14; 16, 17, 18, 20;

c. 21, 23, 28, 31, ~~34~~, 35; and

d. 37, 38, 41, 43, 46, 47, and 48.

3.8.3.2.4 Containment Pool

The reference numbers are as follows:

a. 1 through ~~8~~ 5; 7, 8, 9;

b. 11 through ~~20~~ 14; 16, 17, 18, 20;

c. 21, 23, 25c, 25d, ~~26~~, 28, ~~34~~, 35; and

d. 37, 38, 41, 43, 44, 46, 47, and 48.

3.8.3.4.3 Reactor Pedestal and Suppression Pool Weir Wall

The reactor support pedestal and the suppression pool weir wall are designed as axisymmetric cylindrical shells fixed at their base. Loads from the reactor pressure vessel and the reactor shield wall are applied at the top of the pedestal. Two Sargent & Lundy shell-of-revolution programs, SOR-III and DYNAX, are used for analysis. The seismic and pipe rupture forces transmitted to the pedestal are included in the design as shears and overturning moments.

The effects of concentrated pipe break load on the weir wall are analyzed using a series of Fourier harmonics, the summation of which represents the distribution of the load on the structure. The capacity of the section under combined loads is checked using the program TEMCO. Thermal analysis is performed as discussed in Subsection 3.8.3.4.2.4. The weir wall thickness and reinforcement are sc proportioned that the pressure suppression efficiency is not impaired by the deflection of the weir wall under design loads.

3.8.3.4.4 Refueling Floor, Miscellaneous Platforms and Galleries, and Support System For Recirculation Pumps

The platforms, galleries, and structural supports for the recirculation pumps are designed using conventional elastic design methods.

3.8.3.5 Structural Acceptance Criteria

3.8.3.5.1 Reinforced Concrete

Deformations of the drywell structure, containment pools, and equipment rooms under factored load conditions are limited by specifying a maximum allowable concrete strain of 0.002 in./in. Yielding of the reinforcing steel in tension is allowed only when the effects of thermal gradients are considered.

For section analysis, the strain in the reinforcing steel and concrete is assumed to be directly proportional to the distance from the neutral axis. The concrete stress-strain relationship is defined by a half parabola whose apex is the point where the strain is 0.002 in./in. and the stress is 0.85 f'_c, where f'_c is the specified concrete compressive strength. The tensile strength of the concrete is neglected.

Except for the allowable tangential shear stresses listed in Subsection 3.8.3.5.1.1, all reinforced concrete is in accordance with ASME B&PV Code, Section III, Div. 2.

The stresses and strains in all other reinforced concrete internal structures are limited to those specified in ACI 318-1971. Servicability checks are made in accordance with ACI 318-1971 to assure crack control and to keep deflections below the limits prescribed in ACI 318-1971 or to the manufacturer's

for each unit are in their own missile-protected cubicles. Each cubicle has its own cooling unit which is electrically segregated from the others. Each cubicle is flood protected by bulkhead doors. No single failure of the equipment associated with one cubicle will have a detrimental effect on the rest of the system. The CWSH is constructed with two inlet channels for providing water to the shutdown service water pumps.

3.8.4.2 Applicable Codes, Standards and Specifications

The codes, standards and specifications applicable to the design, fabrication, construction, testing and in-service inspection of safety-related structures outside the containment are listed in Table 3.8-4 and include the following specification numbers:

a. 1 through ~~10~~ 5; 7, 8, 9; 11 through 14; 16, 17, 18;

b. 21, 23, 25, ~~26~~ 25A, and 28;

c. 31, ~~34,~~ 35, 37, 38; and

d. 41, 43, 44 and 46 through 48.

3.8.4.3 Loads and Loading Combinations

The list of loads and their definitions and the loading combinations applicable to the design of Seismic Category I structures outside the containment are given in Table 3.8-1.2 and 3.8-2. The list of load categories where the types of loads are defined is also given in these tables.

In addition to their own dead loads including the weight of equipment, piping, cable pans, etc., floors are designed for conservative live loads resulting from the movement of the largest piece of equipment. The roofs are designed for a uniform live load of 25 psf in addition to snow loads and loads from probable maximum precipitation. The roofs are also designed to withstand suction pressure induced by the design wind and tornadic wind as discussed in Section 3.3. Pattern live loads are applied to determine maximum moments and shears in each slab. All slabs are designed for the effects of internal missiles, thermal gradients, and pipe rupture loads, wherever applicable. Floors and roofs are checked for their ability to transfer shear through diaphragm action.

The walls, interacting with the floor slabs, are designed to withstand the effects of seismic induced shears and moments. All walls are designed for external and internal missiles, transient thermal gradients, tornado-induced pressure, lateral soil and hydrostatic pressure and pipe rupture loads, wherever applicable, in addition to their own weight and associated loads from slabs and beams framing into the walls. For the design of subgrade walls a surcharge load of 500 psf or AASHO H-20 wheel loading is considered.

TABLE 3.8-4

LIST OF SPECIFICATIONS, CODES AND STANDARDS

SPECIFICATION REFERENCE NUMBER	SPECIFICATION OR STANDARD DESIGNATION	TITLE	EDITION	REMARKS
1	ACI 318-71 ~~'77~~ Supplement 1974	Building Code Requirements for Reinforced Concrete	~~1971~~ 1971 & '77	Appendix "A" adopted for seismic design
2	ACI 301-72 Revision 1973	Specifications for Structural Concrete for Buildings	1973	
3	ACI 347-68 ANSI A145.1-1968	Recommended Practice for Concrete Formwork	~~Tentative~~ 1968	
4	ACI 305-~~72~~ 72 ANSI A170.1-1972	Recommended Practice for Hot Weather Concreting	~~1972~~ 1972	
5	ACI 211.1-~~77~~ 74 ~~ANSI A167.1-1971~~	Recommended Practice for Selecting Proportions for Normal Weight Concrete	~~1970~~ 1974	
6	~~ACI 614-73~~	~~Recommended Practice for Measuring, Mixing and P[illegible] Concrete~~	~~1973~~	
7	ACI 315-74	Manual of Standard Practice for Detailing Reinforced Concrete Structures	1974	
8	ACI 306-66	Recommended Practice for Cold Weather Concreting	1966	
9	ACI 309-72	Recommended Practice for Consolidation of Concrete	1972 [illegible]-56	
10	~~ACI 318-72 ANSI A169.1-1972~~	~~Building Code Requirements for Structural Plain Concrete~~	~~1972~~	
11	ACI 308-71	Recommended Practice for Curing Concrete	1971 Title 69-1	
12	ACI 212	Guide for Use of Admixtures in Concrete	ACI Journal Sept, 1971 Title 68-56	
13	ACI 214-65 ANSI A146.1-1968	Recommended Practice for Evaluation of Compression Test Results of Field Concrete	1965	
14	ACI 311-64	Recommended Practice for Concrete Inspection	1964	
15	~~ACI SP-2~~	~~Manual of Concrete Inspection~~	~~1968 (5th Edition)~~	
16	ACI 304-73	Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete	1973	
17	Report by ACI Committee 304	Placing Concrete by Pumping Methods	ACI Journal May, 1971 Title 68-33	
18	Report by ACI Committee 437 Subcommittee 1	Strength Evaluation of Existing Concrete Structures	ACI Journal Nov, 1967 Title 64-61	
19		Deleted		
20	ACI-ASME-359	ASME Boiler & Pressure Vessel Code, Section III, Division 2, Concrete Reactor Vessels and Containments	1973	Issued for trial use and comment
21	AISC-69 ~~'78~~	Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings	~~Feb 12~~, 1969 & 1978	

TABLE 3.8-4 (Cont'd)

SPECIFICATION REFERENCE NUMBER	SPECIFICATION OR STANDARD DESIGNATION	TITLE	EDITION	REMARKS
22	~~AISI~~	~~Specification for the Design of Light Gage Cold-Framed Steel Structural Members~~	~~1968 or 1980~~	
23	AWS D1.1 ~~Revision 1-76~~	Structural Welding Code	1976 or 1977	
24	~~AWS D12.1.61~~	~~Recommended Practice for Welding Reinforcing Steel, Metal Inserts and Connection in Reinforced Concrete Construction~~	~~1961~~	
25	~~ASME~~	~~1971 ASME Boiler and Pressure Vessel Code, Subsections NCA through NF of Section III~~	~~1971~~	~~1974 edition with Summer 1976 addenda accepted for drywell liner~~
26	~~ASME~~	~~1971 ASME Boiler and Pressure Vessel Code, Material Specifications, Section II~~	~~Summer of 1972 Addenda~~	
27	~~ASME~~	~~ASME Boiler and Pressure Vessel Code, Section XI, "In-Service Inspection of Nuclear Reactor Coolant Systems"~~	~~Summer of 1972 Addenda~~	
28	ASTM	Annual Books of ASTM Standards	~~1972~~	
29	~~ANSI B31.1.0~~	~~Standard Code for Pressure Piping, Power Piping~~	~~latest edition~~	
30	~~API Spec. No. 620~~	~~Specification for Welded Steel Storage Tanks~~	~~Feb. 1970~~	
31	UBC	Uniform Building Code	1970 or 1979	
32	~~NEC~~	~~National Electric Code~~	~~latest edition~~	
33		~~U.S. Army Corps of Engineers Regulations with respect to Dredging and Constructions~~	~~latest edition~~	
34		~~Steiger Occupations Safety and Health ACT~~	~~latest edition~~	
35	NRC Regulatory Guide 1.10	Mechanical Cadweld Splices in Reinforcing Bars of Concrete Containments	Feb. 1, 1971	Withdrawn by the NRC 7/8/81
36	~~NRC Regulatory Guide 1.12~~	~~Instrumentation for Earthquakes~~	~~Rev. 1, Apr. 1974~~	
37	NRC Regulatory Guide 1.13	Fuel Storage Facility Design Basis	Rev. 1, Dec. 1975	
38	NRC Regulatory Guide 1.15	Testing of Reinforcing Bars For Concrete Structures (revision 1)	Dec. 28, 1972	Withdrawn by the NRC 7/8/81
39	NRC Regulatory Guide 1.18	Structural Acceptance Test for Concrete Primary Reactor Containments (Revision 1)	Dec. 28, 1972	Withdrawn by the NRC 7/8/81
40	NRC Regulatory Guide 1.19	Nondestructive Examinations of Primary Containment Liner Welds (Revision 1)	Aug. 11, 1972	Withdrawn by the NRC 7/8/81
41	NRC Regulatory Guide 1.26	Quality Group Classifications and Standards	Rev. 3, Feb. 1976	
42	~~NRC Regulatory Guide 1.27~~	~~Ultimate Heat Sink~~	~~Rev. 2, Jan. 1976~~	
43	NRC Regulatory Guide 1.29	Seismic Design Classification	Rev. 3, Sept. 1978	

See Attached Page

Changes to FSAR

TABLE 3.8-4

No.	Standard	Title	Edition	Remarks
25	ASME	ASME Boiler and Pressure Vessel Code, Section III, Division 1, NE	1971 with Summer of 1973 Addenda	for Containment Locks and Hatches
25a	ASME	ASME Boiler and Pressure Vessel Code, Section III, Division 1, NE	1974 with Summer of 1976 Addenda	for Drywell Locks and Hatches
25b	ASME	ASME Boiler and Pressure Vessel Code, Section III, Division 1, NF	1974 with Winter of 1975 Addenda	for Reactor Pedestal
25c	ASME	ASME Boiler and Pressure Vessel Code, Section III, Div. 1, Subsection ND	1977	for Fuel Pool Gates
25d	ASME	ASME Boiler and Pressure Vessel Code, Section III, Div. 2	1977	for Fuel Pool Liners

TABLE 3.8-4 (Cont'd)

SPECIFICATION REFERENCE NUMBER	SPECIFICATION OR STANDARD DESIGNATION	TITLE	EDITION	REMARKS
44	NRC Regulatory Guide 1.31	Control of Stainless Steel Welding	Rev. 3, Apr. 1976	
45	NRC Regulatory Guide 1.34	Control of Electroslag Weld Properties	Dec. 28, 1972	
46	CRSI	Manual of Standard Practice	1973	
47	ANSI N45.2.5 1972	Proposed Supplementary QA Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel during Construction Phase of Nuclear Power Plants	1972	
48	NRC Regulatory Guide 1.55	Concrete Placement in Category I Structures	Rev. 0, June 1973	Withdrawn by the NRC 7/8/81
49	NRC Regulatory Guide 1.57	Design Limits and Loading Combinations for Metal Primary Reactor Containment Systems and Components	June 1973	
50	NRC Regulatory Guide 1.136	Materials for Concrete Containments (Article CC-2000 of the Code for Concrete Reactor Vessels and Containments)	Rev. 1, Oct. 1978	

Explanation of Abbreviations

ACI - American Concrete Institute

AISC - American Institute of Steel Construction

AISI - American Iron and Steel Institute

ANSI - American National Standards Institute

API - American Petroleum Institute

ASME - American Society of Mechanical Engineers

ASTM - American Society for Testing and Materials

AWS - American Welding Society

CRSI - Concrete Reinforcing Steel Institute

NEC - National Electric Code

NRC - Nuclear Regulatory Commission

UBC - Uniform Building Code

FSAR Table 3.8-9
(See Note 1)

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ITEM	DESIGN	MATERIAL		FABRICATION		ERECTION		ANI	STAMPING
		SPECIFICATION	CONTROL-Note 2	WELDING	EXAMINATION	WELDING	EXAMINATION		
1. CONTAINMENT									
a. Liner backed by concrete	ASME, (proposed) Section III, Division 2 (1973)	ASME, Section II (1971, Sum. '73)	CC-2500, ASME, Sec. III, Div. 2	CC-4500, ASME, Sec. III, Div. 2 and ASME, Section IX (1971, Summer '73)	NRC Regulatory Guide 1.19, Rev. 1 and CC-5500, ASME Sec. III, Div. 2 (Proposed - 1973) and NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section V (1971, Sum. '73)	CC-4500, ASME, Section III, Div. 2 (Proposed - 1973) and ASME, Section IX (1971, Summer '73)	NRC Regulatory Guide 1.19, Rev. 1 and CC-5500, ASME, Sec. III, Div. 2 (Proposed - 1973) and NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section V (1971, Sum. '73)	No	No
b. Pipe Penetration Sleeves	ASME, Section III Division 1 (1974 with Summer '74 Addenda)	ASME, Section II (1971, Sum. '73)	NE-2000 ASME, Sec. III, Div. 1 (1971, Sum. '73)	ASME, Section IX (1971, Summer '73)	NE-2000, ASME, Sec. III, Div. 1 (1971, Sum. '73)	NE-4000, ASME, Sec. III, Div. 1 (1971, Summer '73)	NE-5000, ASME, Sec. III, Div. 1 (1971, Summer '73)	Yes	No
c. Personnel Locks	ASME, Section III Division 1 (1971 with Summer '73 Addenda)	ASME, Section II (1971, Summer '73)	NA-4000 & NE-2000, ASME, Sec. III, Div. 1 (1971, Sum. '73)	NE-4000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section IX (1971, Sum. '73)	NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Sec. V (1971, Sum. '73)	NE-4000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section IX (1971, Sum. '73)	NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section V (1971, Sum. '73)	Yes	Yes
d. Equipment Hatch	ASME, Section III Division 1 (1971 with Summer '73 Addenda)	ASME, Section II (1971, Summer '73)	NA-4000 & NE-2000, ASME, Sec. III, Div. 1 (1971, Sum. '73)	NE-4000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section IX (1971, Sum. '73)	NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Sec. V (1971, Sum. '73)	NE-4000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section IX (1971, Sum. '73)	NE-5000, ASME, Sec. III, Div. 1 (1971, Sum. '73) and ASME, Section V (1971, Sum. '73)	Yes	No

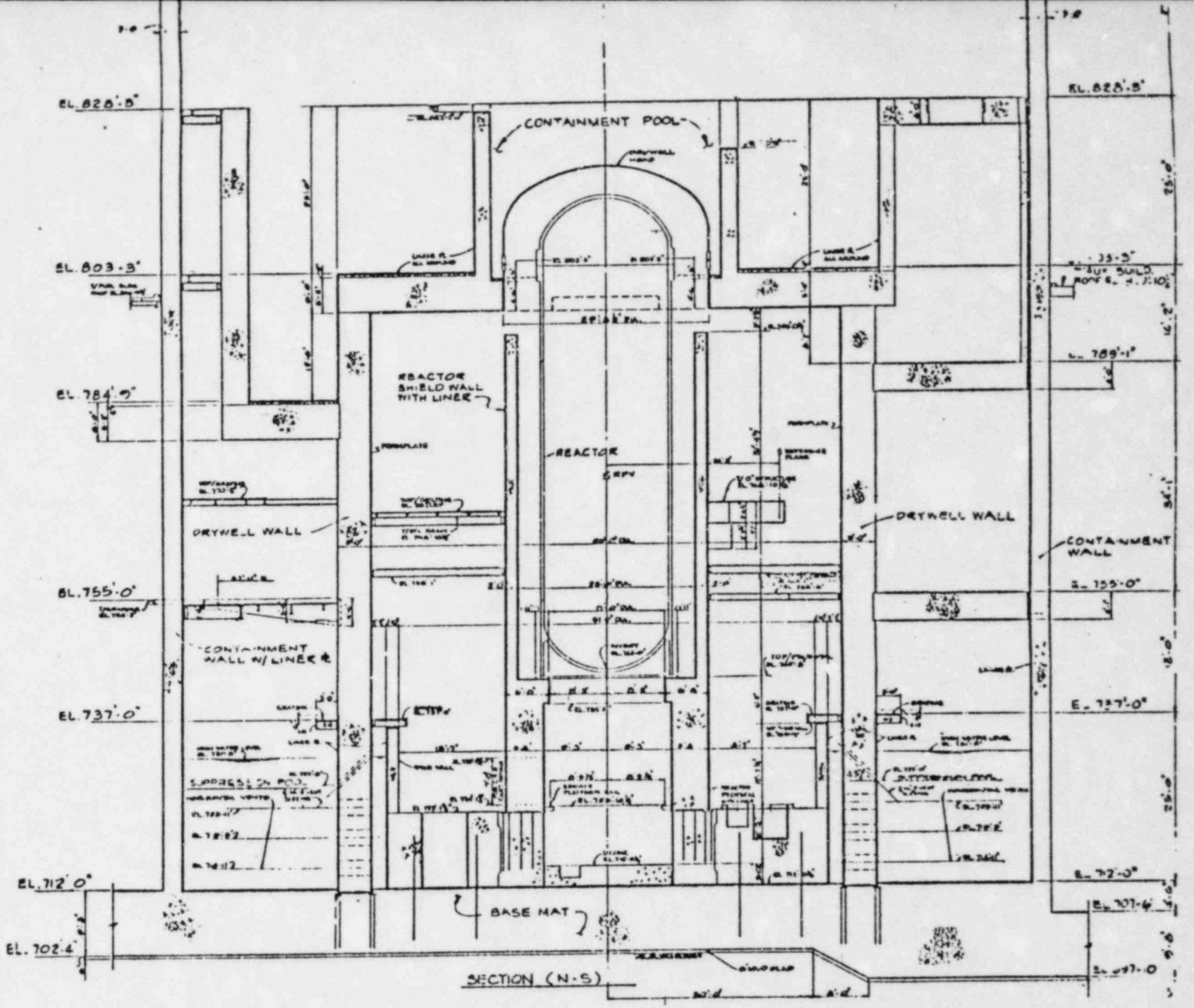
NOTES:

1. References to the ASME Code paragraphs made throughout this table are for technical requirements only; administrative requirements, such as preparation of Design Specification, Design Report, Code Data Report, ANI involvement or stamping, are not included unless noted in last two columns.
2. Material Control includes requirements for Certified Material Test Reports, impacts, identification & traceability, unless otherwise indicated.

ITEM	DESIGN	MATERIAL		FABRICATION		ERECTION		ASME	STAMPING
		SPECIFICATION	CRITERIA-Note 2	WELDING	EXAMINATION	WELDING	EXAMINATION		
2. DRYWELL a. Suppression Pool Liner	ASME, (Proposed) Section III, Division 2 (1973)	ASME, Section II (1974, Winter '75)	Equivalent to NB-2000 & NA-4000, ASME, Sec. III, Div. 1 (1974 Edition, Summer '74)	Equivalent to NB-4000, ASME, Sec. III, Div. 1 (1974, Summer '74) and ASME Section IX (1974 Edition, Winter 1975) or AWS D1.1, Rev. 1-76	NB-5000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section V (1974 Edition, Winter '75)	NB-4000, ASME, Sec. III, Div. 1 (1974, Summer '74) and ASME, Section IX (1974, Summer '74)	NB-5000, ASME, Sec. III, Div. 1 (1974, Summer '74) and ASME, Section V (1974, Summer '74)	No	No
b. Form Plate	AISC 1969 or 1978	ASTM-1978	Certified Material Test Reports Only	Not Applicable	Not Applicable	ASME, Section IX (1974 Edition, Summer '74) OR AWS D1.1-Rev. 1, 1976	NB-5000, ASME, Sec. III, Div. 1 (1974 Edition, Summer '74) and ASME, Section V (1974, Summer '74)	No	No
c. Pipe Penetration Sleeves	ASME, Section III, Div. 1 (1974, Summer 1974)	ASME, Section II (1974, Sum. 74)	NF-2000 & NA-4000, ASME, Section III, Div. 1 (1974, Sum. '74)	ASME, Section IX (1974, Sum. '74)	NF-2000, ASME, Section III, Division 1 (1974, Sum. '74)	ASME, Section IX (1974, Sum. '74) OR AWS D1.1, Rev. 1-'76	NB-5000, ASME, Sec. III, Div. 1 (1974, Sum. '74) and ASME, Section V (1974, Sum. '74)	No	No
d. Personnel Lock & Hatch, Drywell Head	ASME, Section III, Division 1, Subsection NE, (1974 Edition, Summer '76 Addenda)	ASME, Section II (1974, Summer '76)	NE-2000 & NA-4000, ASME, Sec. III, Div. 1 (1974, Sum. '76)	NE-4000, ASME, Sec. III, Div. 1 (1974, Sum. '76) and ASME, Section IX (1974, Sum. '76)	NE-5000, ASME, Sec. III, Div. 1 (1974, Sum. '76) and ASME, Sec. V (1974, Sum. '76)	NE-4000, ASME, Sec. III, Div (1974, Sum. '7 and ASME, Sec. IX (1974, Sum. '76)	NE-5000, ASME, Sec. III, D.v. 1 (1974, Sum. '76) and ASME, Section V (1974, Sum. '76)	Yes	No

ITEM	DESIGN	MATERIAL		FABRICATION		ERECTION		ASI	STAMPING
		SPECIFICATION	CODE (CLASS 2	WELDING	EXAMINATION	WELDING	EXAMINATION		
c. Refueling Bellows	ASME, Section III, Division 1, Subsection NE, (1977 Edition, Winter '77 Addenda)	ASME, Sec. II, (1977, Winter '77)	NE-2000 & NA-4000, ASME, Sec. III, Div.1 (1977, Winter '77)	NE-4000, ASME, Sec. III, Div. 1 (1977, Win. '77) and ASME, Section IX (1977, Win. '77)	NE-5000, ASME, Sec. III, Div. 1 (1977, Win. '77) and ASME, Section V (1977, Win. '77)	NE-4000, ASME, Sec. III, Div. 1 (1974, Sum. '74) and ASME, Section IX (1974, Sum. '74)	NE-5000, ASME, Sec. III, Div. 1 (1974, Sum. '74) and ASME, Section V (1974, Sum. '74)	No	No
3. REACTOR PEDESTAL	ASME, Section III, Division 1, Subsection NF (1974 Edition, Winter '75 Addenda)	ASME, Sec. II (1974, Winter '75)	NA-4000, NF-2000, ASME, Section III, Div. 1 (1975, Win. '75)	NF-4000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section IX (1974, Winter '75)	NF-5000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section V (1974, Win. '75)	NF-4000, ASME, Sec. III, Div. 1 (1974, Win. '75)	NF-5000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section V (1974, Win. '75)	No	No
4. WEIR WALL a. Liner	ASME, (Proposed) Section III, Division 2 (1973)	ASME, Sec. II, (1974, Win. '75) Table 3-2	Equivalent to NB-2000 & NA-4000, ASME, Sec. III, Div.1 (1974, Sum. '74	ASME, Section IX (1974, Win. '75) OR AWS D1.1, Rev. 1-1976	Equivalent to CC-5500, ASME, Sec. III, Div. 2 (Proposed, 1973) and NB-5000, ASME, Sec. III, Div. 1 (1974, Sum. '74)	ASME, Section IX (1974, Sum. '74) OR AWS D1.1, Rev. 1-1976	Equivalent to CC-5500, ASME, Sec. III, Div. 1 (Proposed, 1983) and NB-5000, ASME, Sec. III, Div. 1 (1974, Sum. '74)	No	No
5. REACTOR SHIELD WALL	AISC 1969 or 1978	ASTM-1976	Equivalent to NB-2000 & NA-4000, ASME, Sec. III, Div.1 (1974, Win. '75)	ASME, Section IX (1974, Winter '75) OR AWS D1.1, Rev. 1-1976	NB-5000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section V (1974, Win. '75)	ASME, Section IX (1974, Sum. '74) OR AWS D1.1, Rev. 1-1976,	NB-5000, ASME, Sec. III, Div. 1 (1974, Sum. '74) and ASME, Section V (1974, Sum. '74)	No	No
6. CONTAINMENT POOL a. Stainless Steel Liner	ASME, Section III Division 2 (1977)	ASME, Sec. II (1977 Edition)	Equivalent to NB-2000 & NA-4000, ASME, Sec. III, Div.1 (1977)	CC-4000, ASME, Sec. III, Div. 2 (1977) and ASME, Section IX (1977)	Equivalent to CC-5500, ASME, (1977 and ASME, Section V (1977)	CC-4000, ASME, Sec. III, Div. 2 and ASME, Section IX (1977)	Equivalent to CC-5500, ASME, (1977) and ASME, Section V (1977)	No	No

ITEM	DESIGN	MATERIAL		FABRICATION		ERECTION		ASME	STAMPING
		SPECIFICATION	CRITERIA-Note 2	WELDING	EXAMINATION	WELDING	EXAMINATION		
b. Pool Gates	ASME, Section III Division 1 (1977) Subsection ND	ASME, Sec. II (1977 Edition)	ND-2000 & NA-4000, ASME, Section III, Division 1 (1977)	ND-4000, ASME, Sec. III, Div. 1 (1977) and ASME, Section IX (1977)	Equivalent to CC-5500, ASME, Sec. III, Div. 2 (1977) and ASME, Section V (1977)	ND-4000, ASME, Sec. III, Div. 1 (1977)	Equivalent to CC-5500, ASME, Sec. III, Div. 2 (1977) and ASME, Section V (1977)	No	No
7. PIPE WHIP RESTRAINTS	AISC (1969 or 1978)	ASTM-1978	Equivalent to NB-2000 & NA-4000, ASME, Sec. III, Div. 1 (1977, Win. '78)	NF-4000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Section IX (1974, Win. '75)	Equivalent to NF-5000, ASME, Sec. III, Div. 1 (1974, Win. '75) and ASME, Sec. V	NF-4000, ASME, Sec. III, Div. 1 (1974, Winter '75) and ASME, Section IX (1974, Winter '75)	Equivalent to NF-5000, ASME, Sec. III, Div. 1 (1974, Winter '75) and ASME, Section V (1974, Win. '75)	No	No
8. a. Concrete (Includes containment wall, drywell wall, weir wall, containment pool walls & refueling floor slab)	ASME, (Propsed) Section III, Division 2 (1973)	ACI Codes and Standards (Refer to FSAR Table 3.8-4)	ANSI N45.2.5, Draft 3, Rev. 1 Jan. 1974	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No	No
b. Rebar (Includes same items as above)	ASME, (Proposed) Section III, Division 2 (1973)	ACI Codes and Standards (Refer to FSAR Table 3.8-4)	Certified Material Test Reports Only	Not Applicable	Not Applicable	NRC Regulatory Guide, 1.10, Rev. 1	NRC Regulatory Guide, 1.10, Rev. 1	No	No

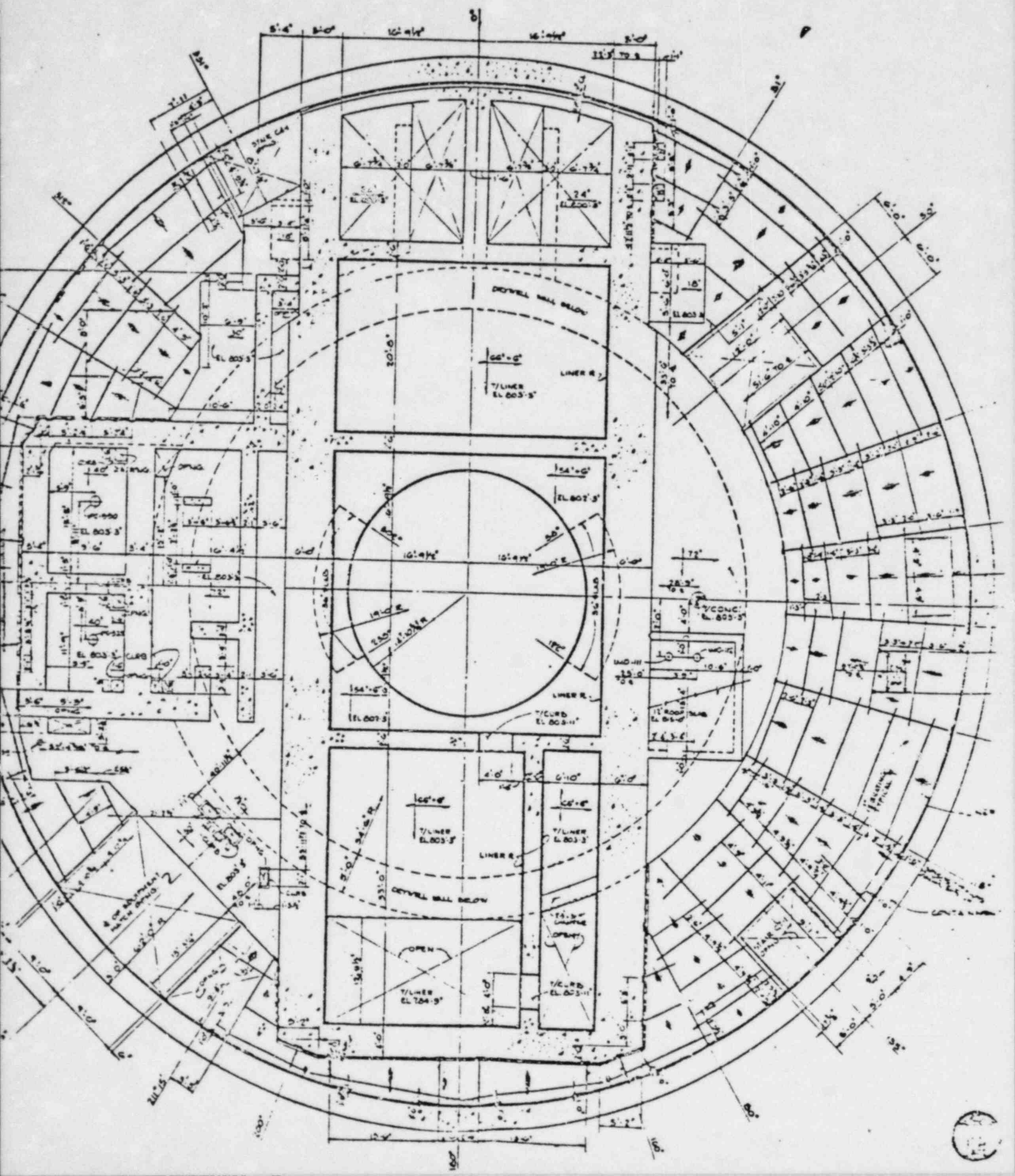


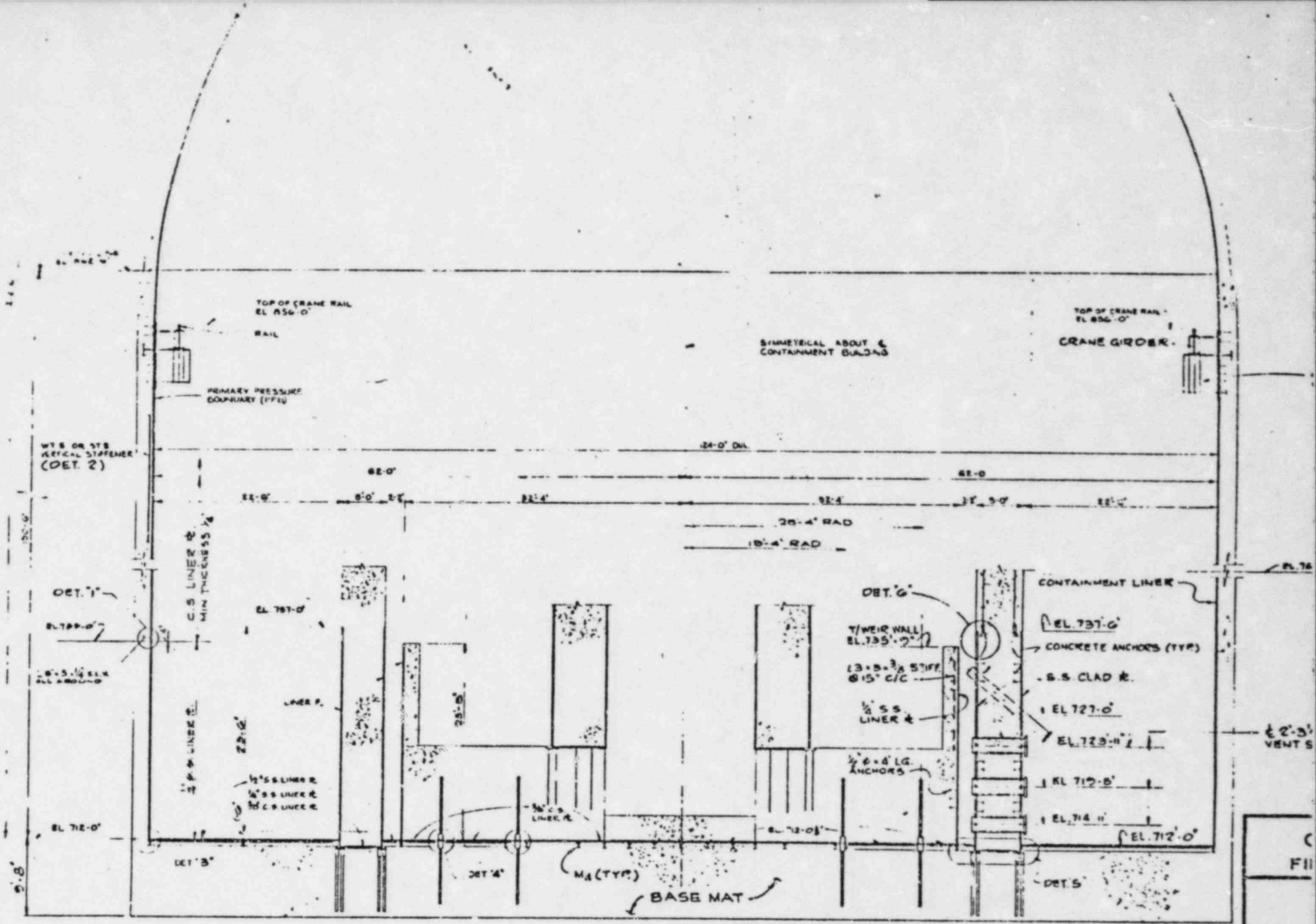
CLINTON POWER STATION
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-1

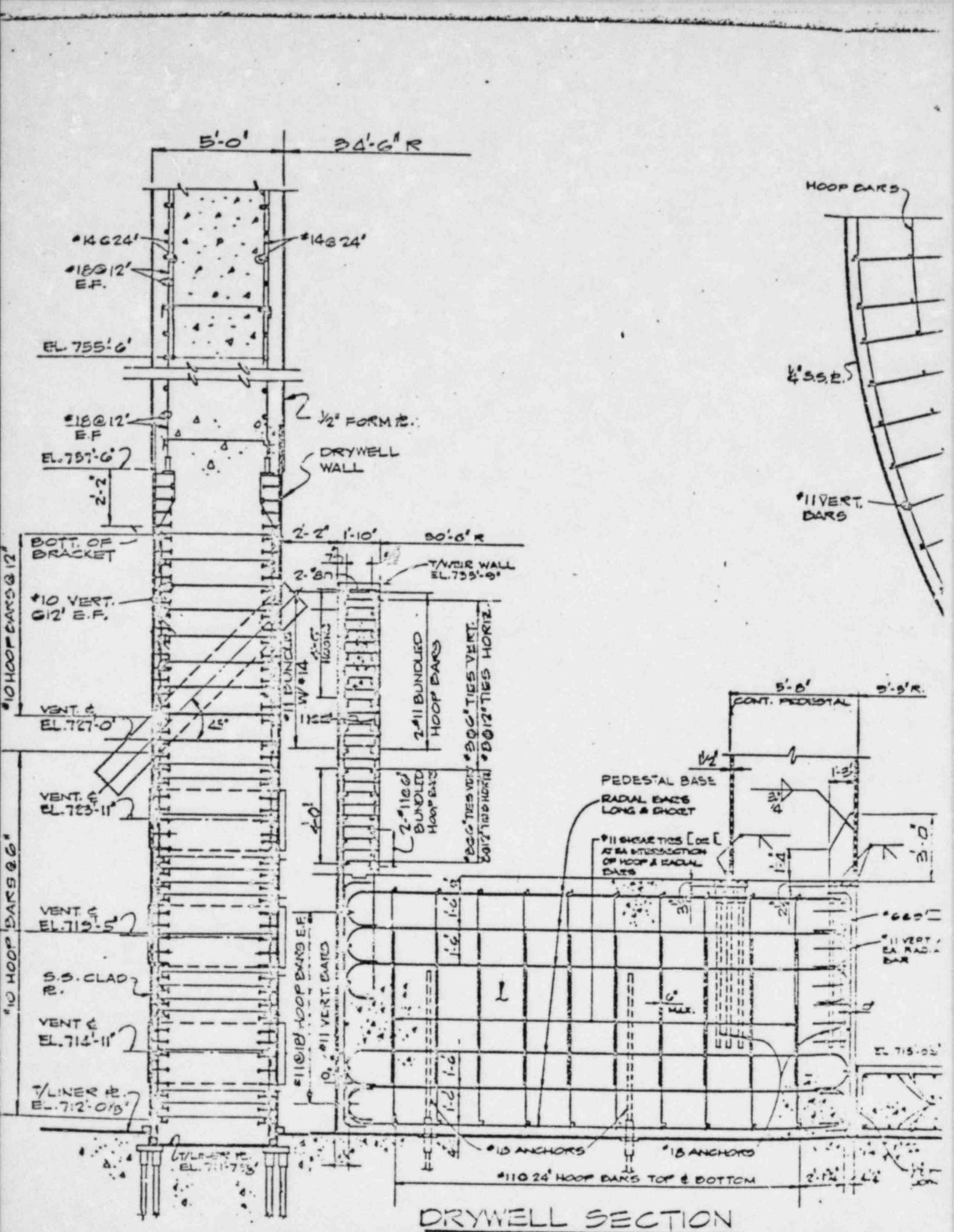
CONTAINMENT SYSTEM

(SHEET 2 OF [illegible])


CAVITY WALL BELOW
T/LINER EL 803'-3"
LINER R
T/CONC EL 803'-3"
T/CURB EL 803'-11"
OPEN
T/LINER EL 784'-9"



TYPICAL SECTION



DRYWELL SECTION

CONCRETE BUILDING STRUCTURE

CONCRETE PORTION

SPECIFY - ACI CODES AND STANDARDS

- ANSI N45.2.5

SUPPLEMENT WITH - ASME SECTION III, DIV. 2
(TRIAL USE AND COMMENT ISSUE)

LINER

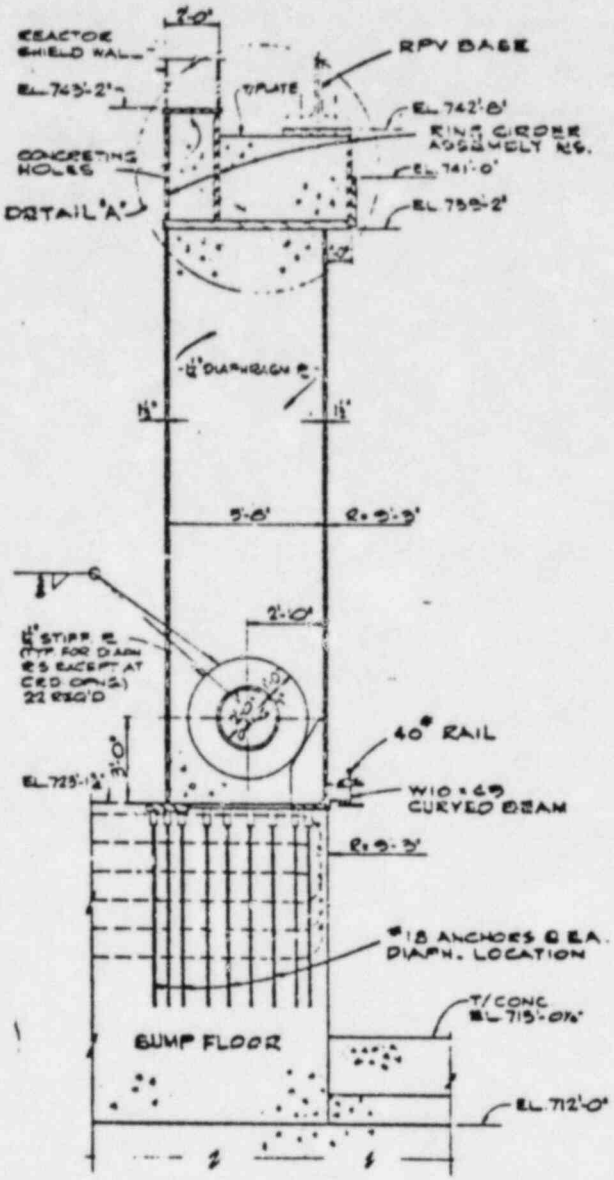
NON-LOAD CARRYING

REFERENCE - ASME SECTION II
ASME SECTION III, DIV. 1
ASME SECTION III, DIV. 2
ASME SECTION IX

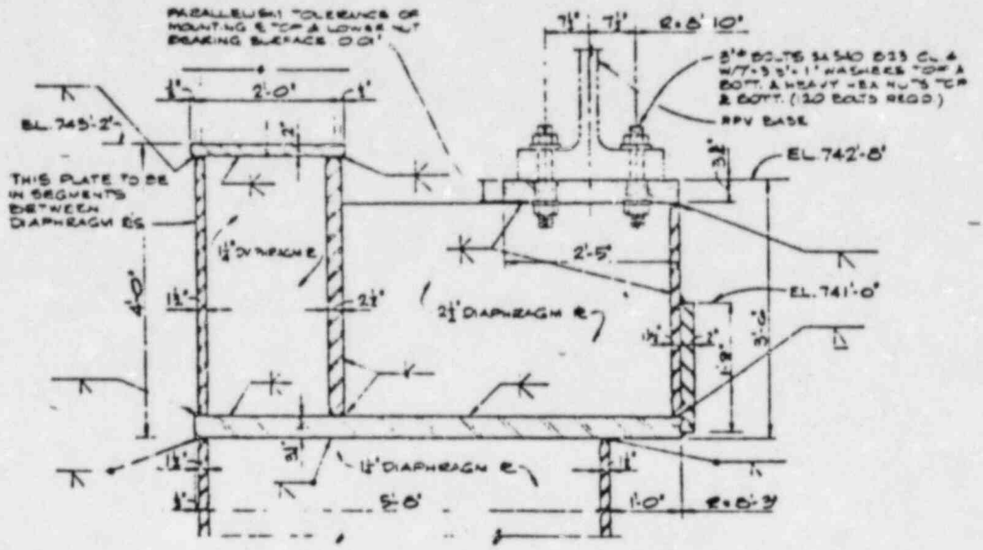
TECHNICALLY MOST APPROPRIATE STANDARDS

ASME NOT SET UP TO IMPLEMENT

COULD NOT REFERENCE ANY ASME CLASS IN ITS ENTIRETY


REACTOR SHIELD WALL
EL. 743'-2"
T/PLATE
RPV BASE
EL. 742'-8"
RING GIRDER ASSEMBLY KG.
CONCRETING HOLES
EL. 741'-0"
DETAIL 'A'
EL. 739'-2"
DIAPHRAGM
5'-8"
R. 2'-3"
2'-0"
STIFF
(TYP FOR DIAPHRAGMS EXCEPT AT CRD OPNGS)
22 REQ'D
40" RAIL
EL. 725'-1"
3'-0"
W10 x 49 CURVED BEAM
R. 2'-3"
#18 ANCHORS @ EA. DIAPH. LOCATION
T/CONC EL. 715'-0"
SUMP FLOOR
EL. 712'-0"

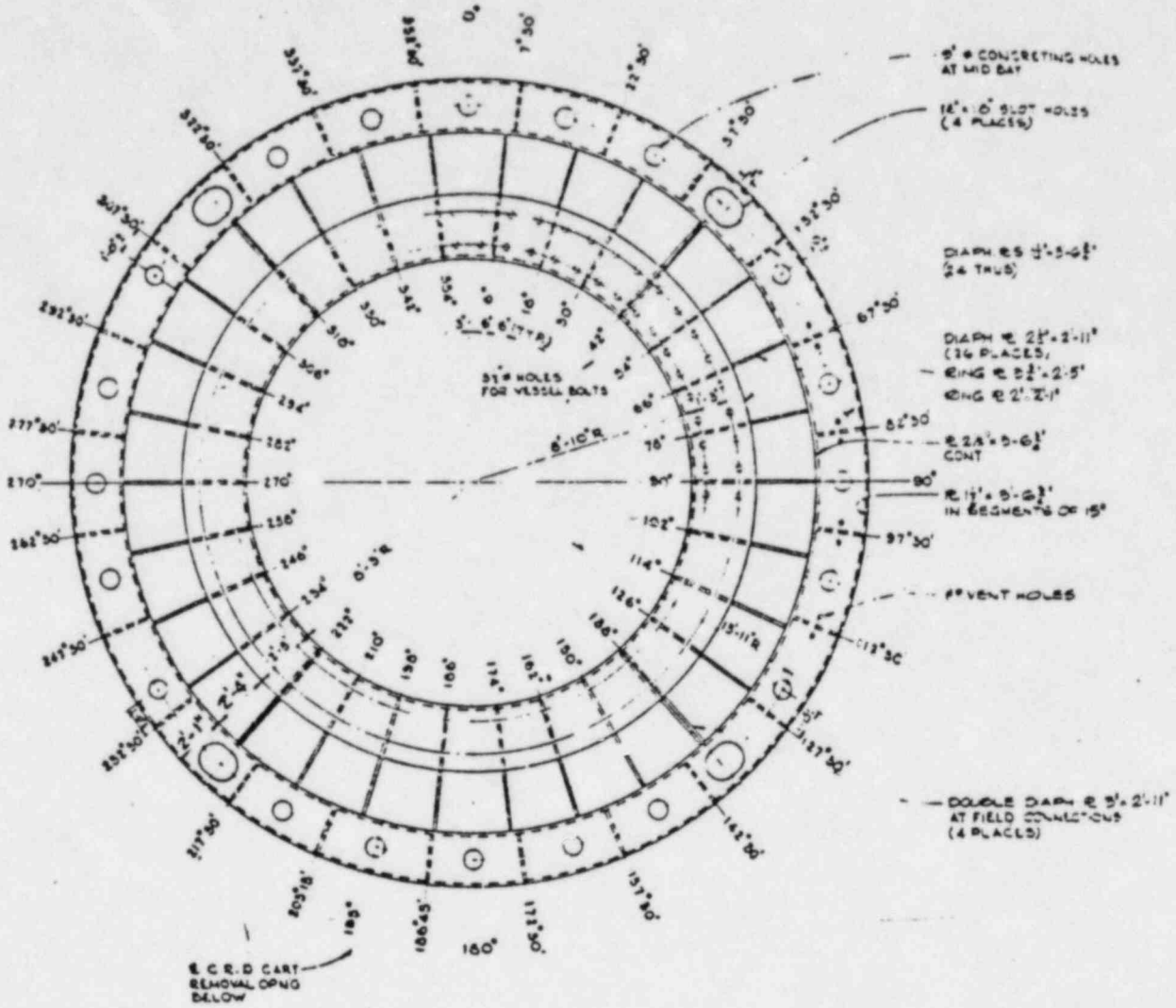
SECTION



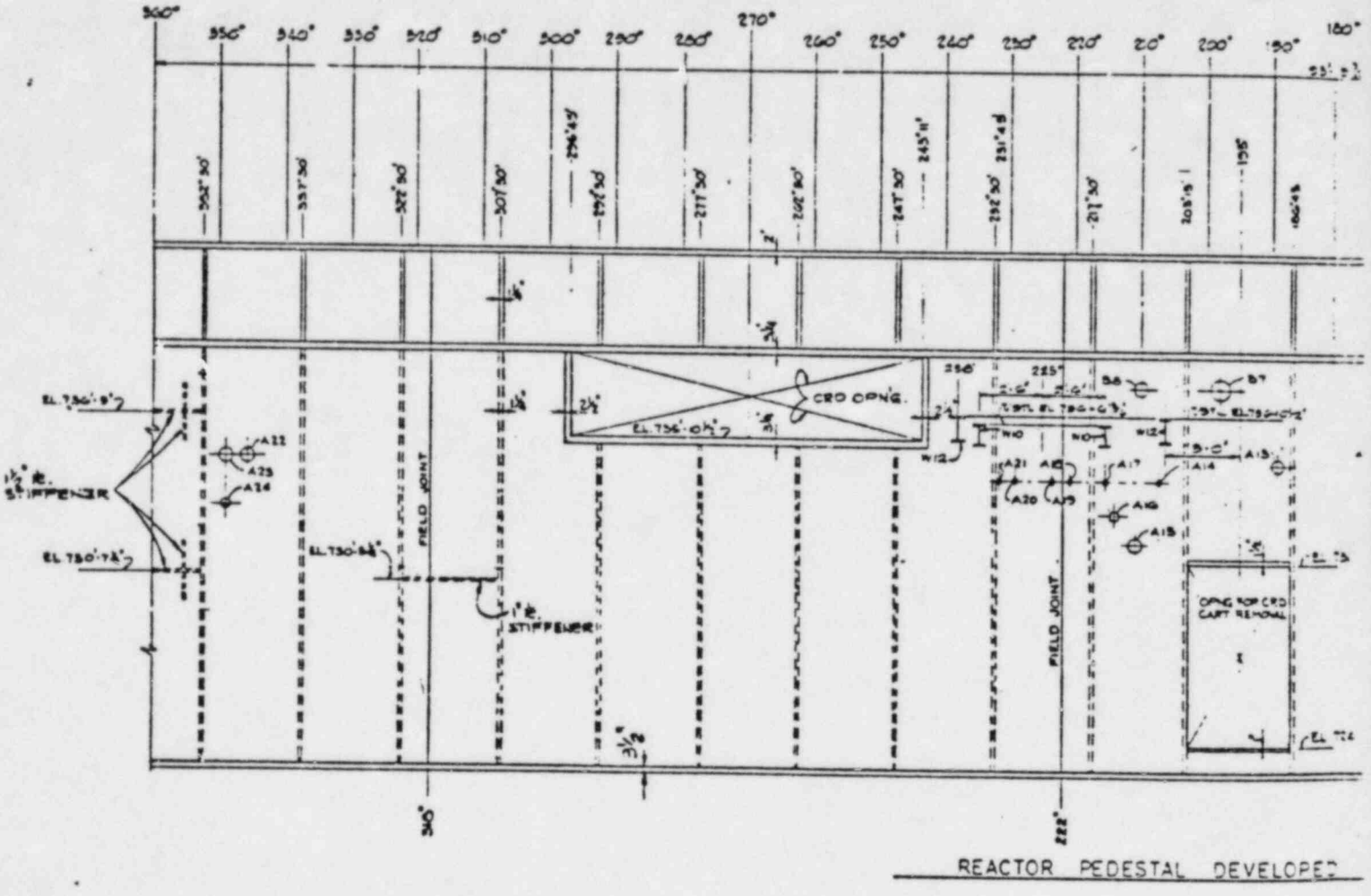
DETAIL "A"

R.P.V. CONNECTION DETAIL TO REACTOR PEDESTAL

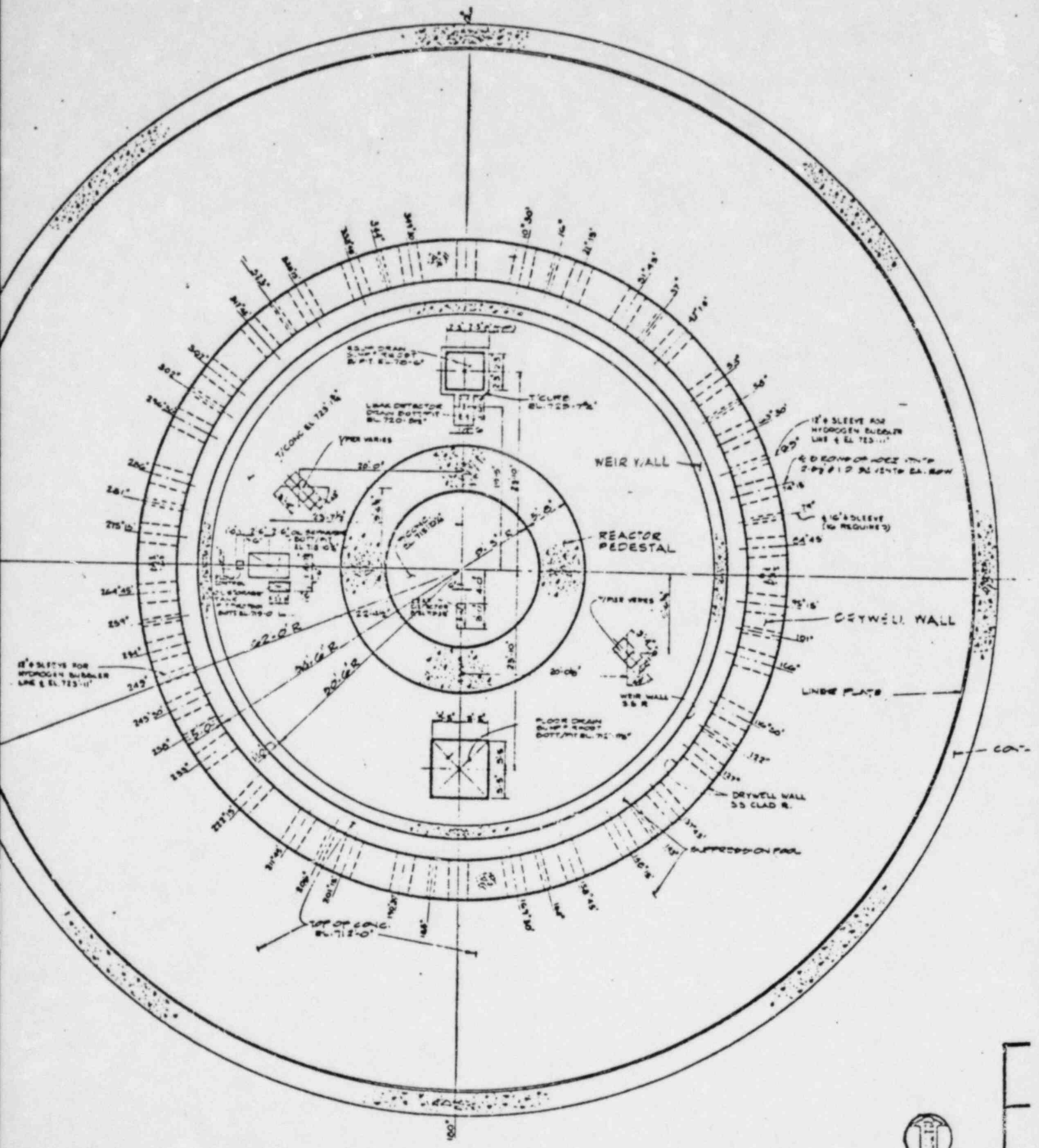
CLINTON POWER STATION FINAL SAFETY ANALYSIS REPORT
FIGURE 3.8-26 REACTOR PEDESTAL DETAILS (SHEET 2 of 2)



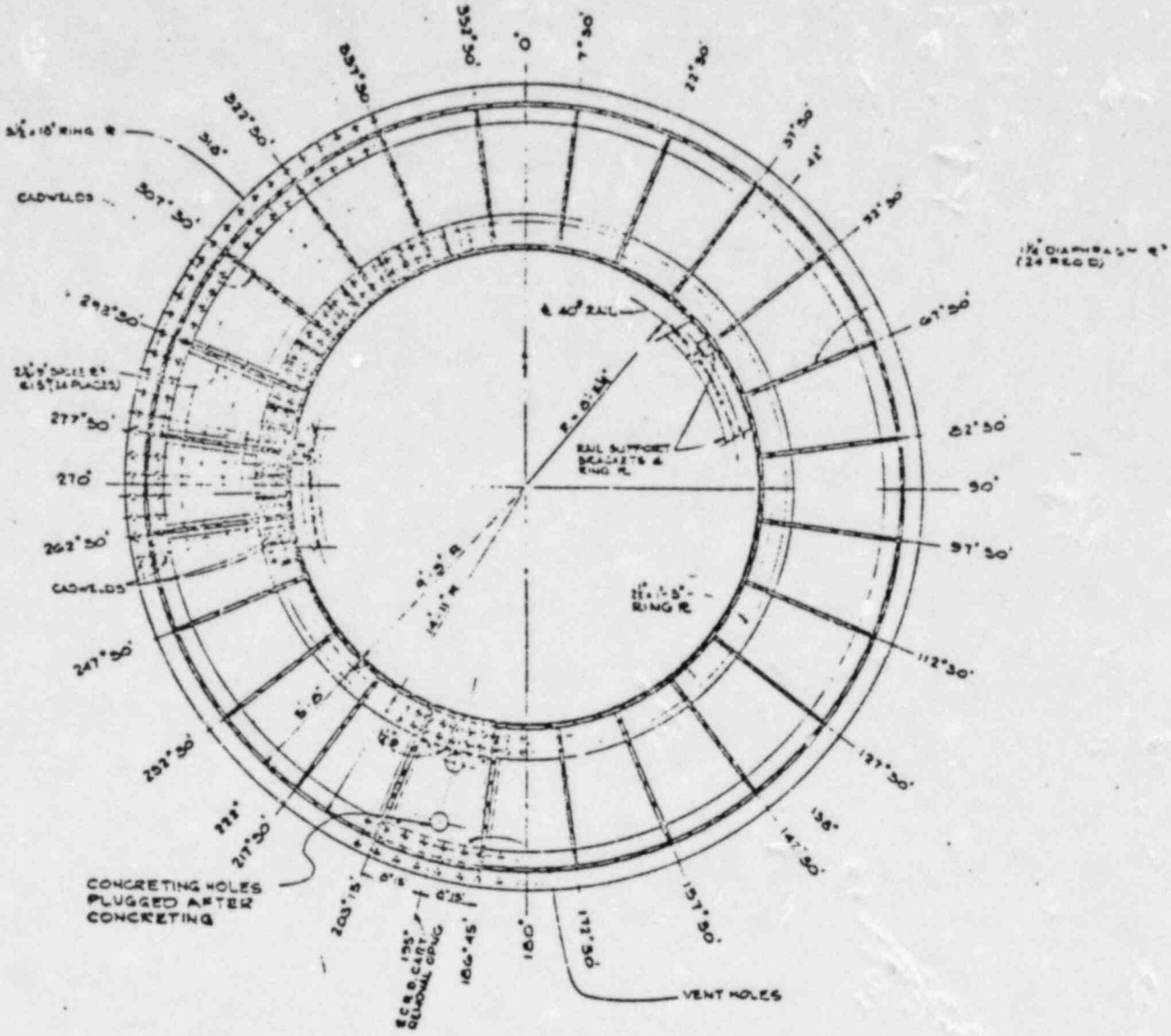
PLAN AT TOP OF PEDESTAL



REACTOR PEDESTAL DEVELOPED



BASEMENT EL. 712'-0"



PLAN AT BOTTOM OF PEDESTAL

CLINTON POWER STATION FINAL SAFETY ANALYSIS REPORT
FIGURE 3.8-26 REACTOR PEDESTAL DETAILS (SHEET 1 of 2)

STEEL BUILDING STRUCTURE

RPV PEDESTAL

ASME SECTION III - NF BOUNDARY AT RPV SKIRT - PEDESTAL INTERFACE

PEDESTAL A BUILDING STRUCTURE

SUPPORTS STRUCTURAL FRAMING

FILLED WITH CONCRETE

PIPE WHIP RESTRAINT SUPPORT

SUPPLEMENTED - AISC REQUIREMENT WITH ASME PLATE AND SHELL REQUIREMENTS

OTHER STRUCTURES

POOL GATES - NOT ASME COMPONENT

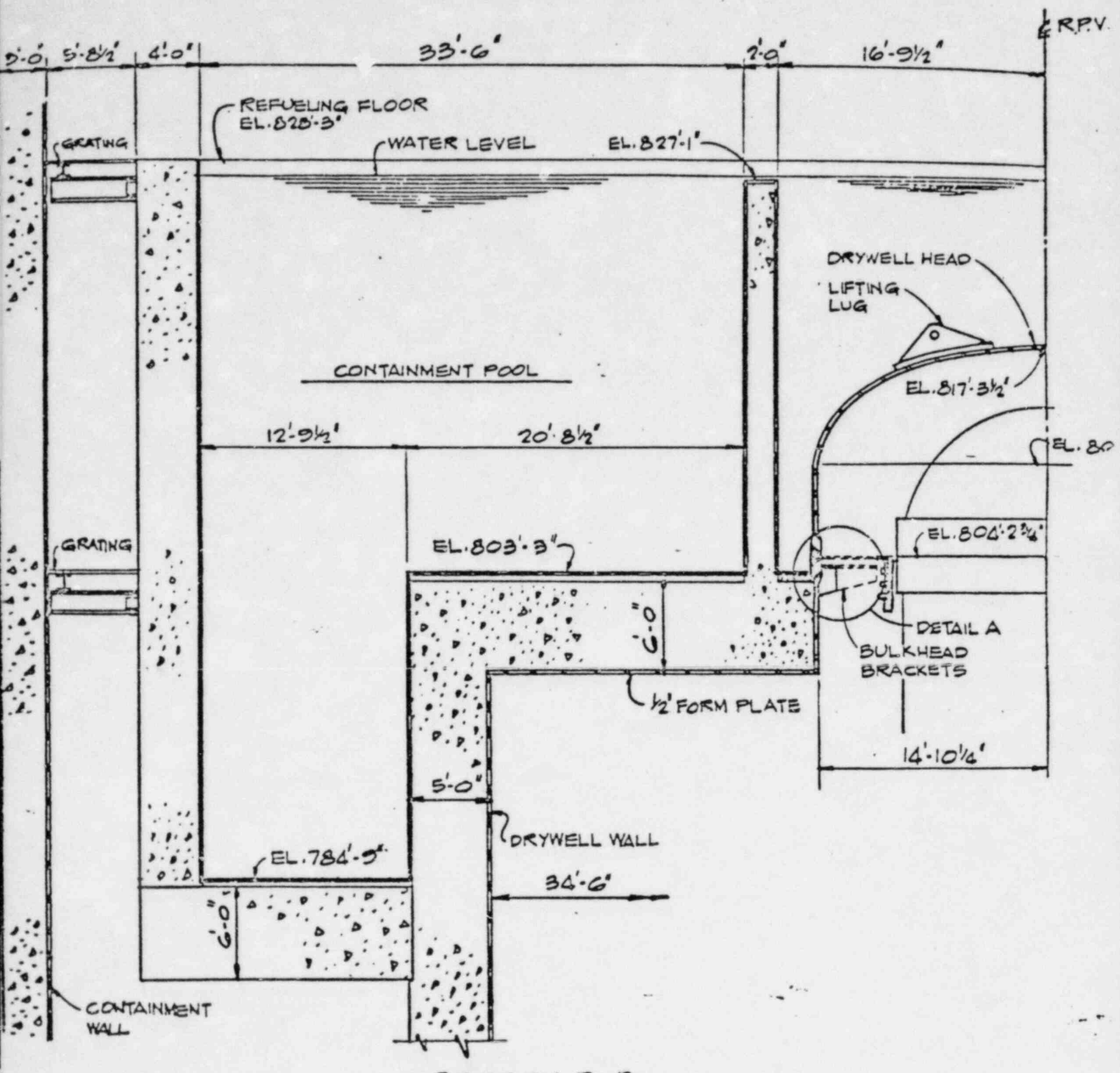
PART OF CONCRETE STRUCTURE

ASME TECHNICAL REQUIREMENTS ARE APPROPRIATE

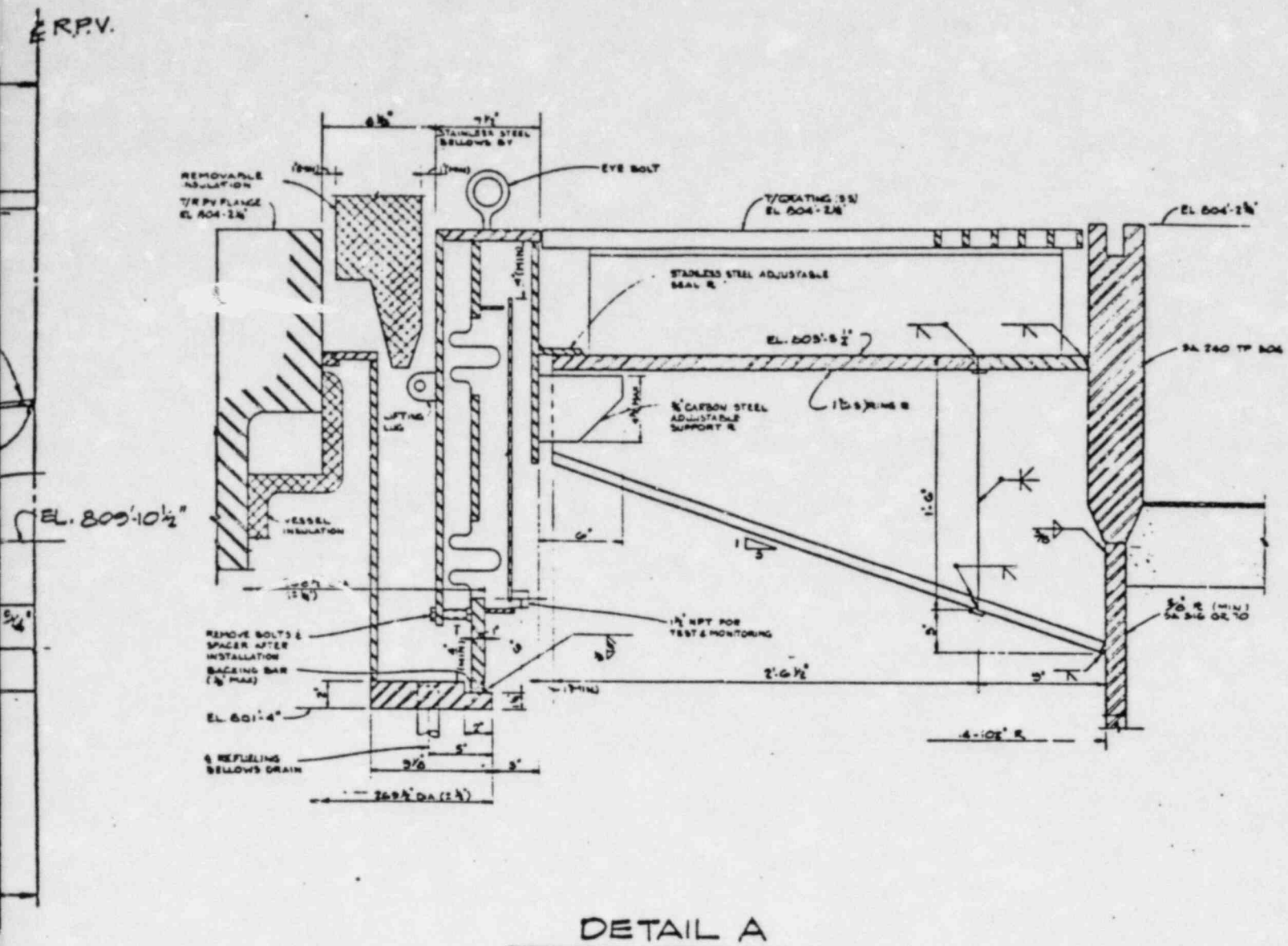
PIPE WHIP RESTRAINTS - NOT ASME COMPONENT (NF-1110)

SUMMARY CODE AND STANDARDS
CLINTON STRUCTURES

- WHEN APPROPRIATE EXISTING STRUCTURAL STANDARDS ENHANCE BY:
  - REFERENCING TECHNICAL REQUIREMENTS OF ASME
  - REFERENCING CODE AND STANDARDS UNDER DEVELOPMENT
  - ADDING OTHER SUPPLEMENTARY REQUIREMENTS
- EXCEEDED REQUIREMENTS OF STANDARD REVIEW PLAN
- CONSTRUCTED SOME AS ALL SAFETY RELATED STRUCTURES UNDER QC/QA PROGRAM MEETING
  - 10CFR50, APPENDIX B
  - ANSI N45.2


5'-0"
5'-8½"
4'-0"
33'-6"
2'-0"
16'-9½"
℄ R.P.V.
REFUELING FLOOR
EL. 828'-3"
GRATING
WATER LEVEL
EL. 827'-1"
DRYWELL HEAD
LIFTING LUG
CONTAINMENT POOL
EL. 817'-3½"
12'-9½"
20'-8½"
EL. 80
GRATING
EL. 803'-3"
EL. 804'-2⅝"
6'-0"
DETAIL A
BULKHEAD BRACKETS
½" FORM PLATE
14'-10¼"
5'-0"
DRYWELL WALL
EL. 784'-3"
34'-6"
6'-0"
CONTAINMENT WALL

SECTION B-B



DETAIL A

CLINTON POWER STATION FINAL SAFETY ANALYSIS REPORT
FIGURE 3.8-31 DETAILS OF THE DRYWELL HEAD AND CONTAINMENT POOL COMPLEX (SHEET 2 of 2)

Y-8604
L31-82(10-22)-6

October 22, 1982

TO: J. S. Spencer, T-29

FROM: J. D. Geier

SUBJECT: Specification Interpretation/ASME Boiler Code

The purpose of this letter is to record the results of a number of telephone calls that I made to A/Es and others. We discussed the matter of industry practice (if any) when engineering specifications require limited use of the Boiler Code.

All parties listed below indicated that their standard practice for specification writing includes limited use of the ASME Boiler Code when it is convenient or appropriate. They all agreed that when their specifications say "design and build in accordance with ASME Boiler Code but do not stamp," they do not expect the user of the specifications to have an ANI or equivalent third-party inspection and signoff of the work.

The parties whom I contacted on this matter include the following:

1. Commonwealth Edison Company
   LaSalle, Byron, and Braidwood applications
   Wayne Stiede, Assistant Vice President/Engineering
   312-294-3107

2. Stone & Webster Engineering Corporation
   Boston Office
   Charlie Miczek, Chief Engineer
   617-589-2002

   River Bend Station
   John Fletcher, Project Engineer
   Charlie Buckley, Project Engineer

3. Bechtel Corporation
   Gaithersburg, MD
   Robert Trickovic, Grand Gulf Project Manager
   301-258-3530

   J. N. Ward, Project Manager
   Adrian Zacharia, Project Manager

4. Tennessee Valley Authority
   Knoxville, TN
   Dwight Patterson, Chief Engineer
   615-632-2247

5. Cleveland Electric Illuminating Company
   Perry Station
   Larry Beck, Licensing Manager
   216-259-3737

6. Gilbert & Associates
   Perry Station Office
   Joe Schatzman, Project Engineer
   215-775-2600

All of the above indicated a deep interest in the outcome of this issue. Bechtel plans to have an observer at our Washington meeting on October 26. S&W (Fletcher) indicated that they may also have someone in attendance.

JDG:dl

cc: R. C. Heider, S&L
L. J. Koch, B-25
D. P. Hall, B-16
A. J. Budnick, T-32
G. E. Wuller
H. B. Perkins

Chicago Bridge & Iron Company
801 East Sixth Street
New Castle, Delaware 19720
302 328 1371

October 11, 1982

Mr. P. K. Agrawal
SARGENT & LUNDY ENGINEERS
55 East Monroe Street
Chicago, Illinois 60603

Clinton Power Station
Containment Liner & Drywell
Baldwin Associates for
Illinois Power Company
Clinton, Illinois
CBI Contracts 74-2563 & 73850
S&L Specs K-2816 & K-2896

Gentlemen:

In accordance with our telephone conversation on October 8, 1982, we are providing a revised general discussion of the ASME Code material, fabrication, erection, inspection, stamping, and certification for the Containment Liner and Drywell work. This letter supercedes and replaces my earlier letter of October 7, 1982.

Containment Liner

Material for the bottom, shell, and roof with embedments and attachments was designed, fabricated, erected, and examined generally in accordance with the April 1973 proposed ASME Section III, Division 2, Subsection CC. No ASME Code authorized inspection, data reports or stamping was provided.

The personnel locks excluding the sleeves were shop fabricated in accordance with ASME Section III, Division 1, Subsection NE. ASME Code Authorized Inspection and ASME Code Data Reports were provided. These locks were stamped as ASME Class MC vessels. The 1971 Edition with Summer 1973 Addenda was employed in this work.

All Shop and Field work for the equipment hatch, and Shop work for material and/or assemblies for penetration sleeves (including lock sleeves) was inspected by an ASME Code Authorized Inspector and certified using modified ASME Manufacturer's Data Reports. The certification included design to the extent of CBI's design responsibilities, material, fabrication, and examination for compliance with ASME Section III, Class MC rules as defined below. The 1971 Edition with Summer 1973 Addenda was employed in this work.

No ASME Code stamping was provided.

Included in the work certified was:

A) Penetration sleeves were certified as complying with ASME Section III, Class MC rules for material (pressure retaining), fabrication, and examination (if any).

B) The weld of liner insert plates to (A) above were certified as complying with ASME Section III, Class MC rules for fabrication and examination of Category D joints.

C) Permanent attachments to (A) above excluding attachments backed by concrete and test channels, were certified as complying with ASME Section III, Class MC rules for material.

D) The welds of attachments to (A) above, exclusive of stud attachment welds, were certified as complying with ASME Section III, Class MC rules for fabrication and examination.

Drywell Equipment

The personnel lock including sleeve, the equipment hatch, and the drywell manhole were shop fabricated in accordance with ASME Section III, Subsection NE. ASME Code Authorized Inspection and modified ASME Manufacturer's Data Reports were provided. No ASME Code stamping was provided.

The drywell refueling head was fabricated and partially assembled in the shop. Final assembly was performed in the field. Design, materials, fabrication, assembly and examination were in accordance with ASME Section III, Subsection NE. ASME Code Authorized Inspection was provided for shop and field work. Modified ASME Manufacturer's Data Reports were provided. No Code stamping was provided.

The 1974 Edition with Summer 1976 Addenda was used for all the drywell work.

We trust this summary provides the information needed. Please let us know if we can be of any further assistance.

Very truly yours,

RAY E. AKIN
ENGINEERING SUPERVISOR

id

cc: Mr. H. M. Sroka, Sargent & Lundy
Mr. W. J. Harrington, Project Manager, Baldwin Associates
Illinois Power Co., Clinton Project, Document Control Center

ILLINOIS POWER COMPANY

500 SOUTH 27TH STREET, DECATUR, ILLINOIS 62525

U-0572
L30-82(10-29)-6

October 29, 1982

ILPR

Mr. Cecil O. Thomas, Chief
Standardization & Special
Projects Branch
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

LLSS

Dear Mr. Thomas:

Clinton Power Station Unit 1
Containment Liner and Reactor
Vessel Pedestal Documentation Reviews

In accordance with agreements reached in NRC's Bethesda offices on Tuesday, October 26, IP agrees to the following:

1. An independent review will be performed for the Clinton containment liner and reactor vessel pedestal records.

2. The liner review will include documentation of exceptions taken to the ASME Boiler Code plus a review of documentation of the work stipulated by the S&L design specifications.

3. For the containment, we will review liner plate and appropriate appurtenances, but we will not include the air lock, penetrations, or other features for which Code stamps, ANI certification, or independent inspection by the ANI were previously obtained.

4. For the pedestal, the review will cover documentation of ASME Boiler Code requirements stipulated in the S&L design specifications.

IP will make suitable arrangements for the documentation review to be performed by an inspection organization qualified to perform ANI-level inspection for ASME Boiler Code work as described in the S&L design specifications.

8211060209

DUPE

You will be notified when a vendor has been selected to perform this work and when the work is completed so that proper coordination with NRC Licensing can be assured.

Sincerely,

G. E. Wuller
Supervisor-Licensing
Nuclear Station Engineering

JDG:dl

cc: J. H. Williams, NRC Clinton Project Manager
H. H. Livermore, NRC Resident Inspector
Illinois Department of Nuclear Safety