



Department of Energy
Washington, D.C. 20545

Docket No. 50-537
HQ:S:82:128

NOV 23 1982

50-537

Mr. Paul S. Check, Director
CRBR Program Office
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Check:

ADDITIONAL INFORMATION RESULTING FROM THE SEPTEMBER 8-9, 1982,
MECHANICAL ENGINEERING BRANCH (MEB)/CLINCH RIVER BREEDER REACTOR PLANT
MEETING

Reference: Letter HQ:S:82:093, J. R. Longenecker to P. S. Check,
"Meeting Summary for MEB/CRBRP September 8 and 9 Meeting,"
dated September 4, 1982

Enclosed is additional information for several items identified in the
referenced letter from the September 8-9, 1982, meeting between the
project and the MEB.

Enclosed are responses to items 3, 4, 49, 51, and 54. Questions concern-
ing these responses should be addressed to Mr. Don Robinson (FTS 626-6098)
of the Project Office Oak Ridge staff.

Sincerely,

John R. Longenecker
Acting Director, Office of the
Clinch River Breeder Reactor
Plant Project
Office of Nuclear Energy

Enclosures

cc: Service List
Standard Distribution
Licensing Distribution

Dool
1/40

3. NRC Question:

In PSAR Section 3.2.2, the non-safety related components and piping are not clearly identified, nor are the corresponding industry standards for design, construction, and operation clearly presented. (Item 1 pg. 3.2.2-3)

Response:

A listing of industry standards being applied to non-safety related equipment is being prepared and will be incorporated into the PSAR in December.

4. NRC Question:

Do any mechanical systems and components correspond to Quality Group D requirements as contained in Regulatory Guide 1.26? (Item 2 pg. 3.2.2-3)

Response:

The CRBRP Quality Assurance Program, as stated in PSAR Chapter 17, Appendix A, Section 0.3, will be appropriately applied to the CRBRP in its entirety including all structures, systems, and components required for the plant to operate reliably, safely, and with minimum environmental effects. Consequently, a separate category of equipment equivalent to Quality Group D has not been specified. However, the quality requirements listed in Regulatory Guide 1.26 for Quality Group D equipment are being applied to equivalent CRBRP equipment.

49. NRC Question:

Provide an amended version of Table 3.1-1, "Components Which Comprise the Reactor Coolant Boundary," which includes the following for each item in the current table:

- a. ASME Class
- b. ASME Edition
- c. ASME Addenda (Item 1 pg. 5.2.1-8)

Response:

The requested information has been included in modified Table 3.2-5 attached. PSAR pages 3.2-1, 3.2-3 and Table 3.2-2 have also been modified for consistency and attached.

51. NRC Question:

A table identifying all ASME and ANSI Code Cases applied to Section III, Division 1 and 2 components should be included in the PSAR. (Item 3 pg. 5.2.1-8)

Response:

Modified PSAR Table 3.2-5 (attached) includes applicable Code Class, Edition, Addenda, and Code Cases for all Seismic Category I components or systems that are Safety Class 1, 2, or 3.

3.2 CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

3.2.1 Seismic Classifications

46 | The Clinch River Breeder Reactor Plant (CRBRP) structures, systems, and components important to safety are to be designed to perform their safety functions in the event of a Safe Shutdown Earthquake (SSE) and are classified as Seismic Category I. These plant features are also referred to as safety-related features in this PSAR. These include, but are not limited to, those structures, systems and components which are necessary:

- 27 |
- a. To assure the integrity of the Reactor Coolant Boundary;
 - b. To shut down the reactor and maintain it in a safe shutdown condition;
 - c. To prevent or mitigate the consequences of accidents which could result in potential off-site exposures comparable to the guideline exposures of 10CFR100.

These above structures, systems and components are to be designed as Category I. Preliminary listings of the CRBRP Category I structures, mechanical systems/components and electrical systems/components are provided as shown in Tables 3.2-1, 3.2-2 and 3.2-3, respectively. These structures, systems, and components are classified in full conformance with Regulatory Guide 1.29 and are to be designed to remain functional as required to safely shutdown the reactor and maintain it in a safe condition after a safe shutdown earthquake event.*

All structures surrounding Seismic Category I systems and components also are designed for Category I, and subsystems which are not Category I are isolable and physically separated from Category I subsystems to preclude affecting the performance of Category I system safety-related functions by the failure of non-Category I systems or components. Non-Category I systems and components in containment are listed in Table 3.2-6. | 30

46 | Those CRBRP structures, systems and components which are to be designed only for an Operating Basis Earthquake (OBE) are classified as Category II. Category II includes those features that are required to permit continued reactor operation, but are not included in the Category I classification; and those items selected as requiring protection against reasonably expected earthquakes so as to protect plant investment. The inclusion of a Seismic Category II is optional (see Appendix 3.7-A).

32 | 27 | Seismic Category III Structures, Systems, and components are those which are not included in either Seismic Category I or Category II, but are essential for maintaining support of normal plant operations. Seismic Category III structures shall be designed in accordance with the Standard Building Code (SBC).

* Table 3.2-2 includes some 3.2-1 systems designed to Amend. 46 safety class 3 requirements but not classified as safety related. Aug. 1978

Appendix G to 10CFR50 was primarily developed and prepared for ferritic materials of reactor coolant boundary pressure-retaining components of LWR's. The CRBRP primary coolant boundary components will be built of materials other than those specified in Paragraph II.B of Appendix G to 10CFR50, with the only exception of two short ring sections at the top of the reactor vessel and the vessel head.

These components, however, are not pressure-retaining during normal plant operation. Furthermore, the lowest service temperature of these components are well above such temperatures where fracture failures are of significance.

Appendix H to 10CFR50 was primarily prepared for ferritic materials in the beltline region of reactor vessels of LWR's. For the CRBRP reactor vessel, only the two ring sections at the top and the vessel head are to be built of ferritic materials covered by Appendix H. However, they are located rather remote from the beltline region. More importantly, the calculated peak neutron fluence ($E > 1$ MEV) at the end of the design life of the vessel is well below the fluence level below which the requirements set forth in Appendix H are exempted.

Based upon the above, Item (i) of 10CFR50.55a is not applicable to the CRBRP.

3. Item (j) does not apply to the CRBRP.

49| The requirements of 10CFR50 Section 50.55a and Regulatory Guide 1.26 define a correspondence of Quality Groups (QG) and ASME Code Classification for piping and components such that QG-A corresponds to ASME Code Section III - Class 1, QG-B corresponds to Section III - Class 2, QG-C corresponds to Section III - Class 3. For the CRBRP, proper interpretation of these guidelines has been necessary for certain systems and components by taking cognizance of the differences in plant design and technology between the LMFBR and LWRs. In these cases, conservative interpretations of the intent of Regulatory Guide 1.26 have been made.

Construction and Code Cases safety related

The selected ASME Code Classification of the principal system components of Seismic Category I are listed in Table 3.2-5.

49| Complete definitions of safety classes for the CRBRP are provided in the following Sections 3.2.2.1 to 3.2.2.3, with examples of fluid system components which are assigned to each of these safety classes. The complete listing of safety classes for individual system mechanical components and piping is shown in Table 3.2-2.

In general, for fluid systems, a valve in a piping or a nozzle on a vessel will serve as the classification boundary. Fluid system classification boundaries are shown on the system fluid diagrams in Chapters 4 through 12 of this PSAR.

TABLE 3.2-5

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASE FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS*

Component	Code/Code Class Edition/Addenda	Code Case Revision
Reactor Vessel & Primary Heat Transport System		
Reactor Vessel (1)	ASME-III/1 1974/Winter '74	1521-1,1592-1,1593-0, 1594-1,1595-1,1596-1, 1682,1690
Closure Head (1)	ASME-III/1 1974/Winter '74	1521-1,1592-4,1593-1, 1682,1690
Primary Sodium Pump Casing (1)	ASME III/1 1974/Winter '74	1521-1,1592-1,1593, 1594,1595-1,1596-1, 1682
Intermediate Heat Exchangers, IHX (Tubes and Shell)	ASME III/1 1974/Summer '74	1521-1,1592-1,1593, 1594-1,1595,1596-1
Primary Piping	ASME III/1 1974/Summer '75	1592-7,1593-1,1594-1, 1595-1,1596-1,1644-4
Reactor Guard Vessel (1)	ASME III/2 (2) 1974/Summer '75	1521-1,1592-4,1593-1, 1594-1,1682-1
Pump and IHX Guard Vessels	ASME III/2 1974/Summer '74	1592-4,1593-1,1594-1
Upper Reactor Vessel Internals	ASME III/1 1977/Summer '77	1592-12,1593-1, 1594-1
o Class 1 Appurtenances	ASME III/1 1974/Winter '74	
Lower Reactor Vessel Internals	ASME III/1	
o Horizontal Baffle Assembly	1974/Winter '76	1592-11
o Bypass Flow Module	1974/Winter '76	1592-11
o Lower Inlet Module	1974/Winter '76	1592-10
o Fixed Radial Shield	1977/Winter '77	N-47-16

*Applicable to Safety Class 1, 2 or 3 components.

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
o Core Former Structure	1974/Winter '76	1592-11
o Core Support Structure	1974/Summer '75	1592-7,1593,1594
Primary Control Rod Drive Mechanisms Structures	ASME III/1 1974/Summer '74	1592-3,1593,1594, 1595-1,1596-1
Secondary Control Rod Drive Mechanism Structures	ASME III/1 1974/Summer '75	1592-7,1593-1,1594-1, 1595-1,1596-1
Fuel, Blanket and Control Subassembly Structures	See note (3)	
Auxiliary Liquid and Metal System		
Primary Sodium Overflow Vessel	ASME III/1 1974/Summer '76	1592-7,1593-1,1594-1, 1595-1
Primary Sodium Makeup Pumps	ASME III/1 1974/Summer '76	1592-10,1593-1, 1594-1,1595-1, 1607-1,1685-1
EVST Sodium and NaK Pumps	ASME III/2 (2) 1974/Summer '76	1592-10,1593-1, 1594-1,1595-1, 1607-1,1685-1
IHTS Sodium Processing Pump	ASME III/3 1974/Summer '76	1592-10, 1593-1, 1594-1, 1595-1, 1607-1, 1685-1
Overflow and Primary Sodium Makeup Piping and Fittings	ASME III/1 1974/Summer '75	1592-7,1593-1,1594-1, 1595-1
EVST Sodium and NaK Forced Convection Loop Piping and Fittings	ASME III/2 1974/Summer '76	None
EVST Natural Convection Sodium Loop Piping and Fittings	ASME III/2 1974/Summer '76	None
EVST Natural Convection NaK Loop Piping and Fittings	ASME III/3 1974/Summer '76	None

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Thermal Transient Valves	ASME III/1 1974/Summer '76	1539,1592-4,1593-1, 1594-1,1595-1,1685, N62-2
Accumulator Packages for Pneumatically Operated Valves	ASME III/3 1974/Summer '76	
o Accumulators	1974/Summer '76	N-53, N-54, N-75
o Piping	1974/Summer '76	N-53, N-101
o Valves	1974/Summer '76	N-46, N-79
Small Valves	ASME III/2 1974/Summer '76	1481-1,1539,1606-1, 1635-1
Check Valve	ASME III/1 1974/Summer '76	1592-4,1593-1,1594-1, 1595-1,1685
Overflow Heat Exchanger	ASME III/1 1974/Summer '76	1592-10,1593-1, 1594-1,1595-1,1607-1, 1644-6,1681-1
EVST Airblast Heat Exchanger	ASME III/1 1974/Summer '76	1481-1,1606-1,1644-5, 1797
EVST Natural Draft Heat Exchanger	ASME III/3 1974/Summer '76	1606-1,1644-6
EVST Sodium Coolers	ASME III/2 1974/Summer '76	1607-1,1644-6,1681-1
EVST Backup Sodium Cooler	ASME III/2 1974/Summer '76	1607-1,1644-6,1631-1
Primary Cold Traps (4)	ASME III/3 1974/Summer '76	1481-1,1607-1,1644-6, 1681-1,1685
EVST and Intermediate Cold Traps	ASME III/3 1974/Summer '76	1481-1,1607-1,1644-6, 1681-1,1685

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
 AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
In-Containment and Ex-Cont. Primary Sodium Storage Vessels	ASME III/3 1974/Summer '75	1607-1,1681-1
Small Tanks	ASME III/3 1977/None	1607-1
Primary Loop Drain Lines (5)	ASME III/1 1974/Summer '76	None
Primary Loop Drain Lines (6)	ASME III/2 (9) 1974/Summer '76	None
EVST Sodium and NaK Drain Lines (6)	ASME III/3 1974/Summer '76	None
Intermediate Heat Transport System		
IHTS Piping Extending from IHX (7)	ASME III/2 (2) 1974/Summer '75	1592-7,1593-1,1594-1, 1595-1,1596-1
Intermediate Sodium Pump Casings	ASME III/2 (2) 1974/Winter '74	1592-1,1593,1594, 1595-1,1596-1,1521-1, 1682,N-293
IHTS Expansion Tank	ASME III/2 1977/Winter '78	N47 (1592), N48 (1593) N49 (1594), N50 (1595) N51 (1596), N74 (1651) N84 (1681)
IHTS Drain Lines (5)	ASME III/2 (2) 1974/Summer '75	1592-7,1593-1,1594-1, 1595-1,1596-1
IHTS Drain Lines (6)	ASME III/3 (12) 1974/Summer '78	None
Sodium Drain Valves	ASME III/2 (2) 1974/Summer '76	1539,1592-4,1593-1 1594-1,1595-1,1685
Steam Generator System		
Evaporators and Superheaters (1)	ASME III/2 (2) 1974/Winter '74	1557-2,1592-4,1593-1, 1594-3,1595-1,1596-1, 1682,N-226,N-252, N-71-9

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
 AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Steam Drums	ASME III/3 1977/None	1481-1,1707,1734 1741,1644-8
Recirculation Pump	ASME III/3 1977/None	1739, N-233
Sodium Water Reaction Pressure Relief Systems (Internal to steam gen. bldg.)	ASME III/3 1977/Winter '77	1481
SWRPRS Expansion Joint	ASME III/3 1977/Summer '78	N-253
Reaction Products Separator Tank (RPST)	ASME III/3 1974/Summer '76	1481,1481-1,1332-6
SWRPRS Rupture Disk Assemblies	ASME III/2 (2) 1977/Winter '77	N47-12, N48, N49 N50
Steam Generator Water and Steam Valves	ASME III/3	1481-1,1516-2,N-238
o SGS Control Valves	1977/Winter '78	1633,1592-12(10)
o Other SGS Valves	1977/Winter '77	
Steam Generator Water and Steam Piping	ASME III/3 1977/Winter '78	1481
SGS Flow Elements	ASME III/3 1977/Winter '78	N-19-2
IHTS Na Dump Tank	ASME III/3 1974/Winter '75	1481,1567,1607-1, 1769,1769-1
H ₂ /O ₂ Leak Detection System Isolation Valves	ASME III/2 (2) 1974/Summer '76	1539,1592-4, 1593-1,1594-1, 1595-1,1685
H ₂ /O ₂ Leak Detection System Interconnecting Piping (from IHTS piping to Isolation valves)	ASME III/2 (2) 1980/None	

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
 AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Steam Generator Auxiliary Heat Removal System		
Air Cooled Condensers	ASME III/3 1980/Winter '80	N-160
Auxiliary Feedwater Pumps	ASME III/3 1977/Summer '78	N-119 (1739)
AFWP Drive Turbine		
Turbine	Not Code Component Component to Intent of ASME III/3 1980/Summer '80	None
Turbine Oil Cooler	ASME III/3 1980/Summer '80	None
Protected Water Storage Tank (PWST)	ASME III/2 1974/Winter '75	1606,1607
Valves		
PWST to AFWP Inlet Valve	ASME III/2 1977/Winter '77	1516-2,1633,1481-1, 1592-10(10),N-238
Other SGAHRS Valves	ASME III/3 1977/Winter '77	1516-2,1633,1481-1, 1592-10(10),N-238
Piping		
PWST to AFWP Inlet Valve	ASME III/2 1977/Winter '79	None
Other SGAHRS Piping	ASME III/3 1977/Winter '79	N-253
Exhaust Restrictors (Silencer)	ASME III/3 1977/Winter '77	1481-1

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Flow Elements	ASME 111/3 1977/Winter '78	None
Expansion Joints	ASME 111/3 1977/Winter '79	None
Containment Isolation Valves (Within their associated fluid systems)	ASME 111/2 1974/Summer '76	None
Containment Annulus Filtration System	ASME 111/3 (8) 1974/Summer '76	None
Refueling System Ex-Vessel Storage Tank (EVST)		
Storage Vessel, Closure Head and Drive Assembly	ASME 111/2 1974/Summer '75	1607-1, 1681-1, 1706, N-226
Guard Tank	ASME 111/3 1974/Summer '75	
Rotating Guide Tube Assembly	ASME 111/1 1974/Summer '76	1592-4, 1593-1 (N-42), 1594-1 (N-49)
Ex-Vessel Transfer Machine (pressure boundary only)	ASME 111/3 1974/Winter '74 (11)	1481, 1607-1
Inert Gas Receiving and Processing System		
Condenser Vapor Traps	ASME 111/2 1977/None	N-19, N-71

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
 AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Filter Vapor Traps	ASME 111/2 1977/None	N-71
Oil Traps	ASME 111/2 1977/Summer '77	N-71 (1644-6)
Freeze Vents	ASME 111/1,2,3 1977/Summer '77	None
Rupture Disks	ASME 111/2 1977/Summer '77	N-19-2 (1481-2)
Recycle Argon Storage Vessels	ASME 111/3 1977/None	None
Cold Boxes	ASME 111/3 1977/Winter '78	N-71-8 (1644-8) N-249-1
Filters	ASME 111/3 1977/Winter '78	None
Tritium - Water Removal Unit	ASME 111/3 1977/Winter '78	None
Tritium Oxidizer	ASME 111/3 1977/Winter '78	None
Vacuum, Surge, and Gas Storage Vessels	ASME 111/3 1977/None	None
LN ₂ Vent Vaporizer	ASME 111/3 1980/Summer '81	None
Liquid Hydrogen Dewar	ASME 111/3 1980/Summer '81	None
Piping - Primary Cover Gas and Equalization Lines	ASME 111/2 1974/Summer '76	1481-1, 1592-11, 1593-1, 1594-1, 1595-1, 1606-1, 1644-6
Emergency Plant Service Water System	ASME-111/3 1974/Summer '76	None

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
 AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Emergency Chilled Water System	ASME-111/3 1974/Summer '76	None
Normal Chilled Water System	ASME-111/3 1974/Summer '76	None
Auxiliary Mechanical Systems for Diesel Generators	ASME-111/3 1977/Winter '77	N-46
Fuel Oil Storage and Transfer System Including:		
Diesel Fuel Oil Storage Tanks	See Note (13)	
Fuel Oil Transfer Pumps	ASME-111/3 1977/Winter '77	N-46
Fuel Oil Day Tanks	ASME-111/3 1977/Winter '77	N-46
Cooling Water System Including:		
Water Expansion Tank	ASME-111/3 1977/Winter '77	N-46
Jacket Cooling Heat Exchanger	ASME-111/3 1977/Winter '77	N-46
Water Temperature Regulating Valve	ASME-111/3 1977/Winter '77	N-46
Starting Air System Including:		
Air Storage Tanks	ASME-111/3 1977/Winter '77	N-46
Lubrication System Including:		
Lubricating Oil Heat Exchanger	ASME-111/3 1977/Winter '77	N-46
Lube Oil Filters and Strainers	ASME-111/3 1977/Winter '77	N-46

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Control Room Heating, Ventilating, and Air Condition System Isolation Valves	ASME-111/3 1974/Summer '76	None
Non-Sodium Fire Protection System		
Piping and Valves Connecting to the Emergency Plant Service Water	ASME-111/3 1974/Summer '76	None
Fuel Failure Monitoring System		
Cover Gas Monitoring Sub-system	ASME-111/3 1977/Summer '79	None
Failed Fuel Location Sub-system Containing Reactor Cover Gas	ASME-111/3 1977/Summer '79	None
Impurity Monitoring & Analysis System		
Piping and Fittings	ASME-111/1,3 1974/Summer '76	1481-1,1592-10, 1593-1,1594-1,1595-1, 1606-1,1607-1,1635-1, 1644-6
Sodium Sampling Plugs and Plugging Temp. Indicators	ASME 111/3 1974/Summer '76	1481-1,1606-1,1681-1
Thermal Transient Valves	ASME 111/1 1974/Summer '76	1539,1592-4,1593-1, 1594-1,1595-1,1685, N62-2
Small Valves	ASME 111/2 1974/Summer '76	1481-1,1539,1606-1, 1635-1
Piping Penetration Assemblies	ASME 111/1 1974/Summer '76	1481-1,1592-10, 1593-1,1594-1,1595-1 1606-1
Recirculating Gas Cooling System		
Fans	ASME 111/3 1974/Summer '76	N-54

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Component	Code/Code Class Edition/Addenda	Code Case Revision
Coolers	ASME 111/3 1974/Summer '76	N-53, N-54
Piping	ASME 111/3 1974/Summer '76	N-32, N-46, N-101, N-121
Valves	ASME 111/3 1974/Summer '76	N-46, N-53, N-69, N-101
Butterfly Valves	ASME 111/3 1974/Summer '76	N-24, N-46, N-67, N-83, N-96-1, N-101, N-121

TABLE 3.2-5 (Cont.)

PRELIMINARY LIST OF ASME CONSTRUCTION CODES, CODE CLASSIFICATIONS,
AND CODE CASES FOR SEISMIC CATEGORY I MECHANICAL SYSTEM COMPONENTS

Notes:

- (1) Code cases 1682 and 1690 are permitted for use if the supplier elects to use them.
- (2) Classified 2, constructed to Class 1 Requirements ("constructed" used as In Subsection NCA1110, Section III of the ASME Code)
- (3) Designed to special criteria. See Section 4.2.1.1.2.2.
- (4) Within dual isolation valves
- (5) Out to second isolation valve
- (6) Downstream of second isolation valve
- (7) Mixing Tee of IHTS piping is designed to ASME Code 1974 Edition, Summer 1975 Addenda, except that fatigue analysis applies 1977 Code thru 1979 Summer Addenda.
- (8) System will meet the requirements of Reg. Guide 1.52
- (9) Functionally Class 3 but designed to Class 2
- (10) For material properties
- (11) 1977/Winter '79 may be used for material procurement.
- (12) Classified 3, constructed to Class 2 requirements ("constructed" used as In Subsection NCA 1110, Section III of the ASME Code).
- (13) ASME Section VIII lined, concrete tanks.

TABLE 3.2-2

PRELIMINARY LIST OF SEISMIC CATEGORY I MECHANICAL SYSTEM
COMPONENTS AND ASSIGNED SAFETY CLASSES (3)

Components	Safety Class ⁽¹⁾	Quality Group ⁽¹¹⁾	Location ⁽²⁾
Reactor Vessel & Primary Heat Transport System			
Reactor Vessel & Closure Head	1	A	RCB
Primary Sodium Pump	1	A	RCB
Intermediate Heat Exchanger (IHX)	1	A	RCB
Piping	1	A	RCB
Reactor Guard Vessel	2	B	RCB
Pump and IHX Guard Vessels	2	B	RCB
Upper Reactor Vessel Internals	1	A	RCB
Lower Reactor Vessel Internals	1	A	RCB
Fuel, Blanket and Control Subassembly Structures	1	A	RCB
Primary Control Rod Drive Mechanisms Structures	1	A	RCB
Secondary Control Rod Drive Mechanism Structures	1	A	RCB
Auxiliary Liquid Metal System			
Primary Sodium Overflow Vessel	1	A	RCB
Primary Sodium Makeup Pumps	1	A	RCB
Overflow and Primary Sodium Makeup Piping and Valves (6)	1	A	RCB
Overflow Heat Exchanger	1	A	RCB
Airblast Heat Exchangers	2	B	RSB
EVST Sodium and NaK Forced Convection Loop Components, Piping and Valves	2	B	RSB
EVST Natural Convection Sodium Loop Components and Piping	2	B	RSB
EVST Natural Convection NaK Loop Components, Valve, and Piping	3	C	RSB
Natural Draft Heat Exchanger	3	C	RSB
Primary Loop Drain Line (6)	1	A	RCB
Primary Cold Traps (7)	3	C	RCB
In-Containment Pri Na Storage Vessel	3	C	RCB
Ex-Cont. Pri Na Storage Vessel	3	C	SGB
EVST Na & NaK Drain Piping (8)	3	C	RSB
PHTS Drain Lines (9)	2	C	RCB
IHTS Na Processing System	3	C	SGB
EVST Cold Trap	3	C	RSB
Accumulator Packages for Pneumatically Operated Valves	3	C	RCB, RSB

TABLE 3.2-2 (Continued)

PRELIMINARY LIST OF SEISMIC CATEGORY I MECHANICAL SYSTEM
COMPONENTS AND ASSIGNED SAFETY CLASSES⁽³⁾

Components	Safety Class ⁽¹⁾	Quality Group ⁽¹¹⁾	Location ⁽²⁾
Intermediate Heat Transport System IHTS Piping Extending from IHX	2	B	ROB, IB, SGB
Intermediate Sodium Pumps	2	B	SGB
Dump Valves	2	B	SGP
Expansion Tanks	2	B	SGB
IHTS Drain Lines (6)	2	B	SGB
IHTS Drain Lines (9)	3	C	SGB
Impurity Monitoring and Analysis System			
Primary Plugging Temperature Indication Package	3	C	ROB
Primary Sodium Sampling Package	3	C	ROB
Isolation Valves and Piping to Primary Sodium Makeup System	1	A	ROB
Ex-Vessel Plugging Temperature Indication Package	3	C	RSB
Ex-Vessel Sodium Sampling Package	3	C	RSB
IHTS Sodium Characterization Package ⁽³⁾	3	C	SGB
Fuel Failure Monitoring System			
Cover Gas Monitoring Subsystem	3	C	RSB
Failed Fuel Location Subsystem Containing Reactor Cover Gas	3	C	RSB

TABLE 3.2-2 (Continued)

PRELIMINARY LIST OF SEISMIC CATEGORY I MECHANICAL SYSTEM
COMPONENTS AND ASSIGNED SAFETY CLASSES⁽³⁾

Components	Safety Class ⁽¹⁾	Quality Group ⁽¹¹⁾	Location ⁽²⁾
Steam Generator System			
Evaporators	2	B	SGB
Superheaters	2	B	SGB
Steam Drums + Recirc Pumps	3	C	SGB
Sodium-Water Reaction Pressure Relief Systems (Internal to steam gen. bldg.)	3	C	SGB
IHTS Na Dump Tank	3	C	SGB
SWRPLS Rupture Disk Assemblies (4)	2	B	SGB
S.G. Water and Steam Components, Piping and Valves	3	C	SGB
Leak Detection Lines to Isolation Valve	2	B	SGB
Steam Generator Auxiliary Heat Removal System			
Air-Cooled Condensers	3	C	SGB
Auxiliary Feedwater Pumps (w/o motor drives)	3	C	SGB
Protected Water Storage Tank (PWST)	2	B	SGB
Connecting Piping & Valves (Extending from PWST to and Including the First Valve)	2	B	SGB
Turbine Drive	3	C	SGB
Connection Piping and Valves (except piping from PWST to and including the first valve)	3	C	SGB
Exhaust Restrictors	3	C	SGB
Containment Isolation Valves (Within their associated fluid systems)	2	B	RCB, IB
Containment Cleanup System	Note(12)	-	RSB
Containment Annulus Air Cooling System	Note(12)	-	RSB
Containment Annulus Filtration System	3	C	RSB
Refueling System			
Ex-Vessel Storage Tank (EVST)	2	B	RSB
EVST Guard Vessel	3	C	RSB
EVTM Containment Pressure Boundary	3	C	RSB
Reactor Rotating Guide Tube Assembly	1	A	RCB

TABLE 3.2-2 (Continued)

PRELIMINARY LIST OF SEISMIC CATEGORY I MECHANICAL SYSTEM
COMPONENTS AND ASSIGNED SAFETY CLASSES⁽³⁾

Components	Safety Class ⁽¹⁾	Quality Group ⁽¹¹⁾	Location ⁽²⁾
Inert Gas Receiving and Processing System			
Primary Cover Gas Lines (Recycle Argon)	2	B	RCB
Equalization Line Between Reactor Vessel Primary Pump and Overflow Vessel	2	B	RCB
RAPS	3	C	RCB
CAPS	3	C	RSB
Safety-Related Ventilation (10)			
Fan	3	C	CB
Filters	3	C	CB
Air Conditioning Unit	3	C	CB
Emergency Plant Service Water System (5)	3	C	SGB, DGB, Emergency Cooling Tower
Emergency Chilled Water System (5)	3	C	SGB, CB, DGB, RSB, RCB
Auxiliary Mechanical Systems for Diesel Generators	3	C	DGB
Fuel Oil Storage and Transfer System			
Including:			
Diesel Fuel Oil Storage Tanks	3	(13)	YARD
Fuel Oil Transfer Pumps	3	C	DGB
Fuel Oil Day Tanks	3	C	DGB
Cooling Water System Including:			
Water Expansion Tank	3	C	DGB
Jackets Cooling Heat Exchanger	3	C	DGB
Water Temperature Regulating Valve	3	C	DGB
Starting Air System Including:			
Air Storage Tanks	3	C	DGB
Lubrication System Including:			
Lubricating Oil Heat Exchanger	3	C	DGB
Lube Oil Filters and Strainers	3	C	DGB

TABLE 3.2-2 (Continued)

PRELIMINARY LIST OF SEISMIC CATEGORY I MECHANICAL SYSTEM
COMPONENTS AND ASSIGNED SAFETY CLASSES⁽³⁾

Components	Safety Class ⁽¹⁾	Quality Group ⁽¹¹⁾	Location ⁽²⁾
Recirculating Gas Cooling System (Subsystems Serving: Na makeup pump cold trap pipeways, Na makeup pump and vessels, EVS pump and cold trap, EVS pumps and pipeways)	3	C	RSB, ROB

Non-Sodium Fire Protection System Piping and Valves Connecting to the Emergency Plant Service Water System	3	C	DGB
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Notes:

- (1) Safety Classes are defined in Sections 3.2.2.1 through 3.2.2.3
- (2) ROB - Reactor Containment Building
IB - Intermediate Bay of the SGB
SGB - Steam Generator Building
RSB - Reactor Service Building
CB - Control Building
DGB - Diesel Generator Building
- (3) All components will be seismically qualified by analysis unless otherwise noted; motors are included with the mechanical components they drive.
- (4) The SWRPRS rupture disc assemblies will be seismically qualified by analysis based on rupture data obtained during dynamic testing.
- (5) Control panel attached to chillers will be qualified by test.
- (6) Out to Second Isolation Valve
- (7) Within Dual Isolation Valves
- (8) Downstream of Isolation Valve
- (9) Downstream of Second Isolation Valve
- (10) Identification of safety-related ventilation equipment is provided in Tables 9.6-1, 9.6-4, 9.6-5, 9.6-6 and 9.6-8.
- (11) Based on Regulatory Guide 1.26, as interpreted for an LMFBR
- (12) The containment annulus cooling system and containment cleanup system shall meet the safety class 3 requirements. However, these systems are provided for the mitigation of an accident beyond the design basis. Therefore, they are not classified as SC-3, but will be built to ASME III/3.
- (13) Quality assurance is in accordance with Reg Guide 1.137

54. NRC Question:

Section 5.1.2 of the PSAR states that part or all of the Auxiliary Liquid Metal System and the Cover Gas System are included in the Reactor Coolant boundary, yet components of neither system are mentioned in Table 3.1-2. Clarify this discrepancy. If components of these systems are not to be added, justify this action. (Item 6 pg. 5.2.1-9)

Response:

PSAR Table 3.1-1 "Components Which Comprise the Reactor Coolant Boundary" (attached) has been modified to include components of the Auxiliary Liquid Metal and Cover Gas systems. PSAR Section 5.1.2 (attached) has been modified to state that portions of the Reactor Coolant Boundary may be classified less than Safety Class 1 consistent with the provisions of 10CFR50.55a, Footnote 2.

TABLE 3.1-1
COMPONENTS WHICH COMPRISE
THE REACTOR COOLANT BOUNDARY

The list of Components or Parts of Components which comprise the Reactor Coolant Boundary per the definitions of PSAR Section 3.1.2 is as follows:

Primary Heat Transport System (PHTS) Piping and Appurtenances
PHTS Pump Tank
PHTS Pump Tank Drain Line Up To and Including the Second Isolation Valve
PHTS Pump Shaft Seal
PHTS Pump Instrument Penetrations
PHTS Check Valve Body
PHTS Check Valve Freeze Vent
PHTS Hot Leg Freeze Vent
Intermediate Heat Exchanger (IHX) Shell
IHX Shell Freeze Vent
IHX Tube Bundle (Including Tube Sheets)
IHX Bellows Seal
IHX Downcomer
IHX Vent Line
IHX Vent Line Freeze Vent
IHX Cold Leg Pipe Drain Up To and Including the Second Isolation Valve
Reactor Vessel
Closure Head

Large Rotating Plug (LRP)
Intermediate Rotating Plug (IRP)
Small Rotating Plug (SRP)
LRP Riser Assembly
IRP Riser Assembly
SRP Riser Assembly
In-Vessel Transfer Machine Port Plug
Rotating Guide Tube
Control Rod Drive Mechanism Nozzle Extensions
Control Rod Drive Mechanism Motortubes
Upper Internals Structure Jacking Mechanism Column Supports
Upper Internals Structure Jacking Mechanism Seals
Liquid Level Monitor Port Plugs

Maintenance Port Plugs

Cover Gas System

Recycle Argon Storage Vessels
Vapor Condensers
RAPS Vacuum Vessel
RAPS Surge Vessel
RAPS Storage Vessel
RAPS Cryostill
Connecting Piping and Valve Bodies

Auxiliary Liquid Metal System

Primary Sodium Overflow Vessel
Primary Sodium Makeup Pump
Primary Sodium Cold Trap
Overflow Heat Exchanger
Connecting Piping and Valve Bodies

The closure head consists of three massive eccentric rotating plugs contained within the top flange of the reactor vessel. These plugs will be fabricated from a low alloy steel, SA 508 Class 2, and are 22.0 inches thick. They are inter-connected by means of a series of plug risers with sealing accomplished by sodium dip seals and double inflatable seals. The nominal temperature of the closure head is 400°F. Over 4 feet of thermal and radiological shielding extends beneath each rotating plug. Argon serves as a cover gas for the system.

The guard vessel is a bottom-supported cylindrical vessel fabricated from 304 stainless steel. It conforms to the contours of inlet and outlet piping and the reactor vessel to such height as to assure outlet nozzle submergence in sodium in the event of a leak. The space between guard vessel and reactor vessel is adequate for in-service inspection. Exterior thermal insulation is provided to limit the heat load into the reactor cavity cell. A heating system for the reactor vessel is mounted on the guard vessel.

5.1.2 Primary Heat Transport System (See Section 5.3)

The Primary Heat Transport System (PHTS) consists of three parallel independent loops of piping and components required to transport heat from the reactor to the Intermediate Heat Exchangers (IHX). The PHTS coolant boundary is classified as Safety Class 1 commensurate with its importance to safety*. This classification requires the additional code classification of ASME Section III Class 1. The guard vessels are classified as Safety Class 2 and ASME Section III Class 2, but have been optionally upgraded designed and constructed to Class 1 requirements. The guard vessels are not code stamped. The PHTS loops transport the radioactive sodium coolant from the reactor vessel to the Intermediate heat exchangers which thermally link the primary and intermediate loops. The three primary loops have common flow paths through the reactor vessel, but are otherwise independent in operation.

As shown in Figure 5.1-1, heated sodium flows from the reactor vessel outlet nozzle located above the reactor core to the suction of a free surface centrifugal pump. Sodium from the pump discharge is circulated through the shell side of the intermediate heat exchanger where heat is transferred to the intermediate sodium. From the intermediate heat exchanger, the primary sodium flows through the cold leg piping through a check valve to the reactor vessel inlet nozzle located near the lower end of the reactor vessel. The three loops are essentially identical and have been arranged to provide equal sodium transport times. Figure 5.1-1B shows the arrangement of the PHTS piping and its relationship to the reactor vessel, the IHXs and the PHTS pumps and other loop equipment. The system Piping and Instrumentation Diagrams (P&ID) are shown in Figures 5.1-2a and 2b.

*The PHTS is part, but not all of the Reactor Coolant Boundary as defined in Section 3.1. The IHX is a component of the PHTS. Other systems, part or all of which are included in the Reactor Coolant Boundary, are the Auxiliary Liquid Metal System (see Sections 5.6.2 and 9.3) and the cover gas system (see Section 9.5). However, the Cover Gas System and the primary sodium cold traps are classified less than Safety Class 1 consistent with the provisions of 10 CFR50.55a, Footnote 2.