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November 22, 1982

Mr. Paul O'Connor
Project Manager
Operating Reactor Branch No. 5
Division of Licensing
U.S. Nuclear Regaluatory Commision
Washington, D.C. 20555

Subject: Dresden 2
SEP Topic: III-1, Quality Group Classification
Components and Systems
NRC Docket 50-237

References: (a) P.W. O'Connor letter to L. DelGeorge dated March 9, 1982.
(b) T.J. Rausch letter to P.W. O'Connor dated July 16, 1982.

Dear Mr. O'Connor:

The NRC Staff requested identification of those components requiring fracture toughness testing per reference (a). This information is necessary because of the radical change in fracture toughness test requirements that occurred in 1972 and the importance of adequate fracture toughness to ensure the integrity of the reactor coolant pressure boundary and safe-shutdown. Reference (b) provided this information in response to a report prepared by Franklin Research Center on Quality Group Classification of Components and Systems for SEP Topic III-1. In that report Table 5-1 of the Franklin Research Report indentified those components which require fracture toughness. However, the NRC staff does not feel this is sufficient information. The following are systems and components requiring impact test data.

(a) core spray system - pump casing
(b) low-pressure coolant injection/containment cooling - pump casing, shell side of heat exchanger
(c) high-pressure coolant injection - pump casing; piping, fittings and valves
(d) condensate/feedwater system - piping from reactor vessel to outermost containment isolation valve
(e) main steam system - piping, fittings and valves

In most cases the ASME code does not specify impact test data for the present material. Because of this the present material may have been substituted for a higher grade material. The present material and an equivalent grade may have to be compared to show that the chemical composition is similiar or that brittle fracture is of no concern for those components that don't require fracture toughness. The following provides the required information on the above systems and components:

A035

1. (a) Core Spray Pump Casing - Carbon Steel A216, Gr. WCB, 13/16" thickness.

   (b) LPCI Pump Casing - Carbon Steel A216, Gr. WCB, 13/16" thickness.

   (c) HPCI Pump Casing - Carbon Steel A216, Gr. WCB, 1-1/2" thickness.

The original specifications indicate that these were built to ASME Section III, Class C (Class 2). The 1965 edition of the code requires impact testing. Also, according to Table ND-2311-1 of the code, A216, Grade WCB would be exempt from impact testing if the material was quenched and tempered - ASME Section III allows heat treating, but does not require it. The design temperature range of these pumps in 40°F to 165°F, with normal operating around 95°F. This moderate temperature range indicates there are no problems with brittle fracture.

2. LPCI Heat Exchanger, Shell Side - Carbon Steel A212, Gr. B, 1" thickness.

The original specification indicates that the heat exchangers were built to ASME Section III, Class C (Class 2). The 1965 edition of the code requires impact testing. A212 has been discontinued and was replaced by A515, Gr. 70. Brittle fracture would not be a problem with this material as the normal operating temperature would be around 95°F.

3. HPCI Piping, Fitting, and Valves - Carbon Steel A106, Gr. B.

The drain and condensate lines have 5/8" minimum wall thickness and are exempt from impact testing. The steam piping are over 6" diameter and 5/8" wall thickness with the lowest operating temperature exceeding 150°F. This further exempts this system from impact testing according to ASME Section III, NC 2311a9.

4. (a) Feedwater System Piping from reactor vessel to outermost containment isolation valve - Carbon Steel A106, Gr. B, .718" to 1.093" thickness.

   (b) Main Steam System Piping, Fittings and Valves - Carbon Steel A106, Gr. B, 1.031" thickness.

These systems were originally built to ASME Section I. The 1965 edition of the code does not require impact testing nor does the original specification or ASTM specification. Current ASME Section III for Class I components requires impact testing. However, due to the high operating temperature, well over 150°F, brittle fracture would not be a problem.

In conclusion, the operating temperature ranges and thickness of the material illustrate that brittle fracture is of no concern. Enclosed is a revised edition of Table 5-1 based on this current information.

Please address any questions you may have concerning this matter to this office.

One(1) signed original and thirty-nine(39) copies of this transmittal have been provided for your use.

Very truly yours,

Thomas J Rausch

Thomas J. Rausch
Nuclear Licensing Administrator
Boiling Water Reactors

SPP/dg
2525D/1
cc: RIII Resident Inspector Dresden
Gregg Cwalina, SEP Integrated
Assessment Project Manager

Table 5-1

Review of Fracture Toughness Requirements

Dresden Nuclear Power Plant Unit 2

Structures, Systems, and Components	Quality Group Classification	Material	Impact Test Required?	Reason for Exemption (1)	Remarks
RECIRCULATION SYSTEM					
Recirculation System Piping	Class A	Stainless Steel Type 304	No	8e	
Recirculation System Valves	Class A	Stainless Steel A351, Gr. CF8M	No	8e	
Recirculation System Pumps	Class A	Stainless Steel Type 304, 316	No	8e	
EMERGENCY SYSTEMS					
Isolation Condenser					
Shell Side	Class C	Carbon Steel A106	No	8a	
Tube Side	Class B	Stainless Steel Type 304, 316	No	8e	
All Stainless Steel Piping, Valves, Fittings	Class B	Type 304	No	8e	
All Carbon Steel Piping, Valves, Fittings	Class B	A106, Gr. B	No	8a	

1. Refer to Tables A4-4 through A4-6 of Appendix A in Franklin Research Center report on Quality group classification or components and systems for explanation of exemptions.

Table 5-1 (Cont'd)

Structures, Systems, and Components	Quality Group Classification	Material	Impact Test Required?	Reason for Exemption (1)	Remarks
Standby Liquid Control System					
Pump Casing	Class B	Carbon Steel	No	8d	
Tank	Class B	Stainless Steel Type 304	No	8e	
Piping and Casing	Class B	Stainless Steel Type 304	No	8d, e	
Core Spray System					
Pump Casing	Class B	Carbon Steel A216, Gr. WCB	Yes		Thickness up to 13/16 in.
All Carbon Steel Piping, Fittings, Valves	Class B	A106, Gr. B	No	8a	
All Stainless Steel Piping, Fittings, Valves	Class B	Type 304	No	8a,e	
Spray Spargers and Spray Nozzles	Class B	Stainless Steel Type 304	No	8e	
Low Pressure Coolant Injection/Containment Coolant Subsystem					
Pump Casing	Class B	Carbon Steel A216, Gr. WCB	Yes		Thickness up to 13/16"
All Stainless Steel Piping, Fittings Valves	Class B	Type 304	No	8e	
All Carbon Steel Piping Fittings, Valves	Class B	A106, Gr. B	No	8a	

Table 5-1 (Cont'd)

Structures, Systems, and Components	Quality Group Classification	Material	Impact Test Required?	Reason for Exemption (1)	Remarks
Low Pressure Coolant Injection/Containment Coolant Subsystem					
Heat Exchangers - Tube Side	Class B	70/30 CuNi	No	8f	
Shell Side	Class C	Carbon Steel A212, Gr. B	Yes		Portions Have 1" thickness
High Pressure Coolant Injection					
Pump Casing	Class B	Carbon Steel A216,* Gr. B	Yes		Thickness up to 1 1/2"
Piping, Fittings and Valves	Class B	Carbon Steel A106, Gr. B	No	(8a, d)(1)	Impact Test on all Piping with Nominal Pipe Diameter Greater Than 6"
Spargers (Feedwater Spargers Used)	Class B	Stainless Steel Type 304	No	8e	
Standby Coolant Supply System (Condenser Hotwell to Service Water Line)					
Pipings, Fittings and Valves	Not Safety-Related				Deleted
STANDBY GAS TREATMENT SYSTEM					
Pipings, Fittings, and Valves	Class B	Carbon Steel A211, A106, Gr. B	No	8a	

*Previous report indicated incorrect material being A217, Gr. B.
(1) Applies to drain and condensate piping.

Table 5-1 (Cont'd)

Structures, Systems, and Components	Quality Group Classification	Material	Impact Test Required?	Reason for Exemption (1)	Remarks
PRIMARY CONTAINMENT					
Safety Valves	Class A	Carbon Steel	No	8d	
Relief Valves	Class A	Carbon Steel	No	8d	
CONTAINMENT PENETRATIONS					
Hydraulic Lines to the Control Rod Drives	Class B	Stainless Steel	No	8d	
Valves	Class B		No	8d	
CONTAINMENT ISOLATION VALVES NOT LISTED WITH MAJOR SYSTEM	Class A		No	8d	
CONTROL ROD DRIVE HOUSING	Class A		No	8d	
CONTROL ROD DRIVE SYSTEM					
Velocity Limiter	Class B	Stainless Steel Casting	No	8d	
Guide Tubes	Class B	Stainless Steel Type 304	No	8e	
SPENT FUEL STORAGE FACILITIES					
Spent Fuel Pool	Class C	Stainless Steel Lining-3/16 inch thick	No	8a	

Table 5-1 (Cont'd)

Structures, Systems, and Components	Quality Group Classification	Material	Impact Test Required?	Reason for Exemption (1)	Remarks
REACTOR VESSEL HEAD COOLING SYSTEM					
Piping, Fittings, and Valves	Class C	Stainless Steel	No	8d,e	
CONDENSATE/FEEDWATER SYSTEM					
Piping from Reactor Vessel to Outermost Containment Isolation Valve	Class A	Carbon Steel A106, Gr. B	Yes		Thickness varies from .718" to 1.093"
MAIN STEAM SYSTEM					
Piping, Valves, Fittings	Class A	Carbon Steel A106, Gr.B*	Yes		Thickness 1.031"
CONDENSATE STORAGE TANK	Class C	Aluminum	No	8f	
COMPRESSED AIR SYSTEM					
Piping, Fittings, and Valves	Class D		No	8d	
STANDBY DIESEL GENERATOR SYSTEM					
Service Water Piping, Fittings, and Valves	Class C	Carbon Steel A106, Gr. B	No	8a	
Fuel oil Piping, Fittings and Valves	Class C	Carbon Steel A53, Gr. B	No	8a	

* Previous report indicated incorrect material being A155.