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August 4, 1983

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Limerick Generating Station, Units 1 & 2
Materials Engineering Branch Open Items

Reference: Meeting between NRC Materials Engineering Branch and Philadelphia Electric Company on July 13, 1983

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

The attachment provides information requested by the Materials Engineering Branch at the referenced meeting.

Sincerely,

Eugene J. Bradley

JTR/gra/56

Attachment

Copy to: See Attached Service List

B001
1/1

cc: Judge Lawrence Brenner (w/enclosure)
Judge Richard F. Cole (w/enclosure)
Judge Peter A. Morris (w/enclosure)
Troy B. Conner, Jr., Esq. (w/enclosure)
Ann P. Hodgdon (w/enclosure)
Mr. Frank R. Romano (w/enclosure)
Mr. Robert L. Anthony (w/enclosure)
Mr. Marvin I. Lewis (w/enclosure)
Judith A. Dorsey, Esq. (w/enclosure)
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Thomas Y. Au, Esq. (w/enclosure)
Mr. Thomas Gerusky (w/enclosure)
Director, Pennsylvania Emergency Management Agency (w/enclosure)
Mr. Steven P. Hershey (w/enclosure)
Donald S. Bronstein, Esq. (w/enclosure)
Mr. Joseph H. White, III (w/enclosure)
David Wersan, Esq. (w/enclosure)
Robert J. Sugarman, Esq. (w/enclosure)
Martha W. Bush, Esq. (w/enclosure)
Spence W. Perry, Esq. (w/enclosure)
Atomic Safety and Licensing Appeal Board (w/enclosure)
Atomic Safety and Licensing Board Panel (w/enclosure)
Docket and Service Section (w/enclosure)

LGS

6.6.1

Response to MTEB RHR and Core Spray Pump Bowl Concern

INSERT (A)

The RHR and Core Spray pumps are not part of the reactor coolant pressure boundary (RCPB). They are low pressure ECCS components which are designed to pressures that are less than half the design pressure for Class I RCPB components. The design of the discharge and suction pressure retaining parts of these pumps was based on Draft ASME Nuclear Pump & Valve Code (1968) and ASME Section VIII. The specified materials were ASTM as allowed by Section VIII, Subsection C, at that time. The bowl, shaft, and impeller are not pressure boundary components; materials for these non-code parts are not required to be ASME controlled. of this type pump

The pump manufacturer has, for several decades, successfully used ASTM A48 Gr. 30B (grey cast iron) for pump bowls in large condensate pumps for all types of power plants. Limerick pump bowls were specified to ASTM A536, which is a nodular or ductile cast iron now permitted by ASME Section VIII. The Grade 65-45-12 material used requires a minimum of 12% elongation; this material is considerably more ductile than the aforementioned grey cast iron pump bowl material which has an extensive and excellent performance history.

LGS

Response to MTEB Cold Worked Stainless Steel Concern

No austenitic stainless steels with a specified minimum yield strength of 90,000 psi or greater are used in pressure-retaining ESF components.

Response to MET B Fracture Toughness Testing of Ferritic Components Concern

The fracture toughness adequacy of Class I NSSS Reactor Coolant Pressure Boundary (RCPB) and Containment Pressure Boundary (CPB) components have been demonstrated by evaluations of conformance to the requirements of 10CFR50 Appendix G&H and GDC 51 respectively. There are no Class II NSSS components used in either of these pressure boundaries.

Ferritic Class II components on the shell (safety) side of the Residual Heat Removal (RHR) heat exchangers were tested for fracture toughness per GE requirements.

Pressure-retaining ferritic components of the RHR, Core Spray and HPCI pumps, consistent with their Draft ASME Nuclear Pump & Valve Code design basis, were not required to be tested for fracture toughness. These components, however, were fabricated from materials (A516, Gr. 70; A216, WCB; A350) that have been thoroughly proven in industrial applications and which normally have good impact properties.

INSERT (B)
7/20/83

Insert (A) Only code allowable materials are used for the engineered safety feature system pressure boundaries

Insert (B) All ferritic piping used in these systems is type SA 106 Gr. B which, based on table 4.4 of NUREG 0577, exhibit a nil ductility temperature sufficiently low that when the additional conservatism of ASME Fig NC-2311(a)-1 is considered the operating temperature is well above the lowest permissable metal temperature.

10.3.6 Steam & Feedwater Materials

Comment: The staff cannot conclude that the main Steam and Feedwater System Material are acceptable and meet the relevent requirements of . . . . . because a listing of the materials used was not provided.

Response: Applicable pipe classes are shown on FSAR Figure 5.1-3. Data for each pipe class is attached.

Comment: The applicant waived impact testing as allowed. The applicant should demonstrate that the ferritic steel main steam and feedwater components have adequate toughness for their function.

Response: The Class II main steam & feedwater piping materials (SA 106 GrB) are the same as used by G.E. in the Class I portion of the main steam piping. Since impact testing has been performed by GE. on SA 106 Gr B, there is reasonable assurance that the Class II components possess adequate toughness for their function.

CLASS DBD

PRIMARY RATING 900 psig @ 850°F

Class DBD

ANSI B 31.1.0

CARBON STEEL

PIPE:	34": - ASTM A-155 Grkc-70, Class I or A-672 Gr. B-70, Class 22 24" & Smaller - Seamless ASTM A-106 Gr. B (Note 1)	
	34" :	1.740" min. wall
	4" thru 24" :	Sch. 120
	4" thru 3" :	Sch. 160
FITTINGS:	34"	Butt welding, wall thickness to match pipe. ASTM A-234 Grade WPC-W Seam welded (ASTM A-515 Gr 70)
	2½" thru 24"	Butt welding, wall thickness to match pipe ASTM A-234 Gr. WPB (seamless).
	2" and smaller:	6000# socket welding ASTM A-105 Gr. II or ASTM A-105-71
FLANGES:	ASTM A-105 Gr. II bored to match pipe F&D or ASTM A-105-71	
	3" and larger:	900# weld neck, large T&G
	2½":	1500# weld neck, large T&G
	2" and smaller:	1500# socket weld, large T&G
BOLTING:	Bolts:	ASTM A-193 Gr. B7
	Nuts:	Hex, semi-finished, ASTM A-194 Gr. 2H
GASKETS:	Standard 304 S.S. and asbestos wound Flexitallic "R-3" or Lamons "W", large T&G	

VALVES			Gate	Globe	Check
	3" and larger:	900#BW	DBD-GT	DBD-GB	DBD-CK
	2½":	1500#BW	CBD-GT	CBD-GB	CBD-CK
	2" and smaller:	See Note 5, General Notes, Field.			

JOINTS: Welded, except at flanged equipment connection.

Field Weld End Preparation:	See Sheet 72
Weld End Transition:	See Sheet 75 Type I
Branch Connections:	See Sheet 76 Detail II

NOTES:

1. Seamless ASTM A-106 Gr.C, is optional for 20" DBD-201 and -202.

CORROSION ALLOWANCE: 0.080"

CLASS DBB

PRIMARY RATING 900 psig @ 850°F

Class DBB
ASME B&PV Code Sect.III, Class 2

CARBON STEEL

PIPE: Seamless ASME SA-106 Gr. B

4" thru 24:	Sch. 120
¼" thru 3"	Sch. 160

FITTINGS:

2½ and larger:	Butt welding, wall thickness to match pipe ASME SA-234 Gr. WPB (seamless).
2" and smaller:	6000# socket welding ASME SA-105 Gr. II or ASTM A-105-71

FLANGES: ASME SA-105 Gr. II or ASTM A-105-71 bored to match pipe F&D

3" and larger:	900# weld neck, large T&G
2½":	1500# weld neck, large T&G
2" and smaller	1500# socket weld, large T&G

BOLTING:

Bolts:	ASME SA-193 Gr. B7
Nuts:	Per DBA class

GASKETS: Standard 304 S.S. and asbestos wound Flexitallic "R-3" or Lamons "W", large T & G

VALVES:

		Gate	Globe	Check
3" and larger:	900#BW	DBB-GT	DBB-GB	DBB-CK
2½":	1500#BW	CBB-GT	CBB-GB	CBB-CK
2" and smaller:	1500#SW	CBA-GT	CBA-GB	CBA-CK

JOINTS: Welded, except at flanged equipment connection.

Field Weld End Preparation:	See Sheet 72
Weld End Transition:	See Sheet 75 Type I
Branch Connections:	See Sheet 76 Detail I

CORROSION ALLOWANCE: 0.080"

CLASS EBB

PRIMARY RATING 600 psig @ 850°F — Class EBB

ASME B&PV Code Sect. III, Class 2

CARBON STEEL

PIPE:	26" and larger:	Seam welded ASME SA-155 Gr. KC-70 Class I or SA-6 Gr. B-70, Class 22 or Seamless ASME SA-106 Gr. C
	24" and smaller:	Seamless ASME SA-106 Gr. B
	26":	.928" min. wall
	* 8" thru 24":	Sch. 100 Note 1.
	8" thru 24":	Sch. 80 Note 2.
	* 4" thru 6":	Sch. 80 Note 4.
	¼" thru 3"	Sch. 160
FITTINGS:	26" and larger:	Butt welding, wall thickness to match pipe, ASME SA-234 Gr. WPB-W or WPC-W seam welded (ASME SA-515 Gr. 70)
	2½" thru 24":	Butt welding, seamless, wall thickness to match pipe ASME SA-234 Gr. WPB
	2" and smaller:	6000# socket welding ASME SA-105 Gr. II or ASTM A-105-71
FLANGES:	ASME SA-105 Gr. II, or ASTM A-105-71	bored to match pipe, F&D
	2½" and larger:	600# weld neck, large T&G
	2" and smaller:	600# socket weld, large T&G 1500# S.W., raised face (Note 3)
GASKETS:	Standard 304 S.S. and asbestos wound Flexitallic "R-3" or Lamons "W", large T&G	
BOLTING:	Bolts:	ASME SA-193 Gr. B7
	Nuts:	Per DBA class

VALVES:

		Gate	Globe	Check	Plug
2½" and larger:	600#BW	EBB-GT	EBB-GB	EBB-CK	EBB-PI
2" and smaller:	600#SW				EBB-PI
2" and smaller:	1500#SW	CBA-GT	CBA-GB	CBA-CK	

JOINTS: Welded except at flanged equipment connections.

Field weld end preparation — See Sheet 72 (note 5 belo
Weld end transition: — See Sheet 75 Type 1
Branch connections: — See Sheet 76 Detail I

NOTES:
1. For EBB-126 (226), 127 (227), 129 (229), 130 (230), 133 (233) thru 136 (236)
2. For EBB-101 (201) - 109 (209), 114 (214), 115 (215), 131 (231), 132 (232) 121 (221), EBB-142 (242)
3. Use only for matching with CRD system valve PSV-F012
4. For EBB-135 (235) use Sch. 120

CORROSION ALLOWANCE .120" - steam
.08" - water

*Sch. 120 piping materials already purchased for 14" EBB-129, 4" EBB-133, 4" EBB-134 and 10" EBB-134 are acceptab