GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

March 16, 1993

Docket No. STN 52-001

Chet Poslusny, Senior Project Manager
Standardization Project Directorate
Associate Directorate for Advanced Reactors
and License Renewal
Office of the Nuclear Reactor Regulation

Subject: **Submittal Supporting Accelerated ABWR Review Schedule - Subsection 3.9.6 Modifications and Check Valve ITAAC**

Dear Chet:

Enclosed is a correction to Subsection 3.9.6.1 and the modifications to the RHR valves F014, 015 and 016 that we discussed on the phone on March 16, 1993. Also, enclosed is our proposed ITAAC for check valves. We feel it is essential to follow as closely as possible to the already agreed upon template for motor operated valves.

Please provide a copy of this transmittal to Renee Li.

Sincerely,

Jack Fox

Jack Fox
Advanced Reactor Programs

cc: Norman Fletcher (DOE)
Bernie Genetti (GE)

JF93-59

design and qualification requirements and will provide acceptance criteria for these requirements. For each size, type, and model the COL holder will perform testing encompassing design conditions that demonstrate acceptable flow rate and corresponding head, bearing vibration levels, and pump internals wear rates for the operating time specified for each system mode of pump operation. From these tests the COL holder will also develop baseline (reference) hydraulic and vibration data for evaluating the acceptability of the pump after installation. The COL holder will ensure that the pump specified for each application is not susceptible to inadequate minimum flow rate and inadequate thrust bearing capacity, with respect to minimum flow pump operation. INSERT 3.9.6.1

The ABWR safety-related pumps and piping configurations accommodate inservice testing at a flow rate at least as large as the maximum design flow for the pump application. The safety-related pumps are provided with instrumentation to verify that the net positive suction head (NPSH) is greater than or equal to the NPSH required during all modes of pump operation. These pumps can be disassembled for evaluation when Part 6 testing results in a deviation which falls within the "required action range." The Code provides criteria limits for the test parameters identified in Table 3.9-8. A program will be developed by the COL applicant to establish the frequency and the extent of disassembly and inspection based on suspected degradation of all safety-related pumps, including the basis for the frequency and the extent of each disassembly. The program may be revised throughout the plant life to minimize disassembly based on past disassembly experience. (See Subsection 3.9.7.3(1) for COL license information requirements.)

3.9.6.2 Testing of Safety-Related Valves

3.9.6.2.1 Check Valves

INSERT 3.9.6.2.1 All ABWR safety-related piping systems incorporate provisions for testing to demonstrate the operability of the check valves under design conditions. Inservice testing will incorporate the use of advance non-intrusive techniques to periodically assess degradation and the performance characteristics of the check valves. The Part 10 tests will be performed, and check valves that fail to exhibit the required performance can be disassembled for evaluation. The Code provides criteria limits for the test parameters identified in Table 3.9-8. A program will be developed by the COL applicant to establish the frequency and the extent of disassembly and inspection based on suspected degradation of all safety-related pumps & check valves, including the basis for the frequency and the extent of each disassembly. The program may be revised throughout the plant life to minimize disassembly based on past disassembly experience. (See Subsection 3.9.7.3(1) for COL license information requirements.)

3.9.6.2.2 Motor Operated Valves

For each motor operated valve assembly (MOV) with active safety-related function, the design basis and required operating conditions (including testing) under which the MOV will be required to perform will be established.

(1) Design and Qualification

The COL holder will establish the following design and qualification requirements and will provide acceptance criteria for these requirements. By testing each size, type, and model the COL holder will determine the torque and thrust (as applicable to the type of MOV) requirements to operate the MOV and will ensure the adequacy of the torque and thrust that the motor-operator can deliver under design (design basis and required operating) conditions. The COL holder will also test each size, type and model under a range of differential pressure and flow conditions up to the design conditions. These design conditions include fluid flow, differential pressure (including pipe break), system pressure, fluid temperature, ambient temperature, minimum voltage, and minimum and maximum stroke time requirements. From this testing the COL holder will demonstrate that the results of testing under in situ or installed conditions can be used to ensure the capability of the MOV to operate under design conditions. The COL holder will ensure that the structural capability limits of the individual parts of the MOV will not be exceeded under design conditions. Additional guidelines to justify prototype qualification testing are contained in Generic Letter 89-10, Supplement 1, Questions 22 and 24 through 28. The COL holder will ensure that the valve specified for each application is not susceptible to pressure locking and thermal

INSERT 3.9.6.2.2

INSERT 3.9.6.1

the sizing of each minimum recirculation flow path is evaluated to assure that its use under all analyzed conditions will not result in degradation of the pump. The flow rate through minimum recirculation flow paths can also be periodically measured to verify that flow is in accordance with the design specification.

Table 3.9-8 (Continued)

IN-SERVICE TESTING SAFETY-RELATED PUMPS AND VALVES

E11 Residual Heat Removal System Valves (Continued)

No.	Qty	Description (h)(i)	Safety Class (a)	Code Cat. (c)	Valve Func. (d)	Test Para (e)	Test Freq. (f)	SSAR Fig. (g)
F008	3	Suppression pool return line MOV	2	A	I,A	L,P S	RO 3 mo	5.4-10(3,4,6)
F009	3	Shutdown Cooling suct. line maint. vlv	1	B	P		E1	5.4-10(2)
F010	3	Shutdown Cooling suct. line inb. iso. vlv (h6)	1	A	I,A	L,P S	RO CS	5.4-10(2)
F011	3	Shutdown Cooling suct line outb iso. vlv (h6)	1	A	I,A	L,P S	RO CS	5.4-10(2)
F012	3	Shutdown Cooling suction line adm. vlv	2	B	A	P S	2 yrs 3 mo	5.4-10(3,4,6)
F013	3	Heat exchanger bypass flow control vlv	2	B	A	P S	2 yrs 3 mo	5.4-10(3,4,6)
F014	2	Fuel Pool Cooling supply line inb MOV (h8)	2	B	A	P,S	RO	5.4-10(5,7)
F015	2	Fuel Pool Cooling supply line outb MOV (h8)	2	B	A	P,S	RO	5.4-10(5,7)
F016	2	Gate vlv-line from Fuel Pool Clg (FPC) (h8)	2	B	A	S	RO	5.4-10(2)
F017	2	Drywell spray line inboard valve	2	A	I,A	L,P S	RO 3 mo	5.4-10(5,7)
F018	2	Drywell spray line outboard valve	2	A	I,A	L,P S	RO 3 mo	5.4-10(5,7)
F019	2	Wetwell spray line MOV	2	A	I,A	L,P S	RO 3 mo	5.4-10(5,7)
F020	3	RHR pump min flow bypass line check vlv	2	C	A	S	3 mo	5.4-10(3,4,6)
F021	3	RHR pump min flow bypass line MOV	2	A	I,A	L,P S	2 yrs 3 mo	5.4-10(3,4,6)
F022	3	Discharge line fill pump suction line valve	2	B	P		E1	5.4-10(3,4,6)
F023	3	Fill pump discharge line check valve	2	C	A	S	3 mo	5.4-10(3,4,6)
F024	3	Fill pump discharge line stop check valve	2	C	A	S	3 mo	5.4-10(3,4,6)
F025	3	Fill pump minimum flow line globe valve	2	B	P		E1	5.4-10(3,4,6)
F026	3	RHR pump suction to High Conductivity Waste (HCW)	2	B	P		E1	5.4-10(3,4,6)
F027	3	Bypass line around the check valve MPL E11-F002	2	B	P		E1	5.4-10(3,4,6)
F028	3	Heat exchanger outlet line relief valve	2	C	A	R	5 yrs	5.4-10(3,4,6)
F029	3	Inboard reactor well drain line valve	2	B	P		E1	5.4-10(3,4,6)
F030	3	Drain to radwaste valve	2	B	P		E1	5.4-10(3,4,6)
F031	3	Outb reactor well drain line valve (to SP)	2	A	I,P	L,P	RO	5.4-10(3,4,6)
F032	3	Shutoff valve - line from MUWC	2	B	P		E1	5.4-10(3,4,6)
F033	3	Check valve in the line from MUWC	2	C	A	S	3 mo	5.4-10(3,4,6)
F034	1	RPV injection line vent/test line inbd vlv	2	B	P		E1	5.4-10(3)
F034	2	RPV injection line vent/test line inbd vlv	1	B	P		E1	5.4-10(5,7)
F036	1	Press equal valve around chk vlv E11-F006	2	A	P		E1	5.4-10(3)
F036	2	Press equal valve around chk vlv E11-F006	1	A	P		E1	5.4-10(5,7)

P 2yrs
S 3 mo
P 2yrs
S 3 mo
S 3 mo

Table 3.9-8 (Continued)

IN-SERVICE TESTING SAFETY-RELATED PUMPS AND VALVES

NOTES (Continued):

(g) Piping and instrument symbols and abbreviations are defined in Figure 1.7-1. Figure page numbers are shown in parenthesis ().

(h) Reasons for code defined testing exceptions (Part 10, Paragraphs 4.2.1.2 and 4.3.2.2).

(h1) Inaccessible inerted containment and/or steam tunnel radiation during power operations.

(h2) Avoids valve damage and impacts on power operations.

(h3) Avoids impacts on power operations.

(h4) A temporary crosstie is necessary to carry the ongoing cooling loads. A permanent crosstie would violate divisional separation.

(h5) Avoids cold/hot water injection to RPV during power operations.

(h6) Maintain pressure isolation during normal operation.

(h7) Inventory available only during refueling outage.

(h8) Deleted
Testing at power will impact operation because the valves do not automatically isolate with a LOCA signal.

(h9) Test connection size is insufficient for full flow test during operation. Therefore, test part stroke during plant operation and full stroke during refueling outage. A test connection size which would be sufficient for full flow tests would pressurize the secondary containment beyond specified limits, thus affecting power operation.

(i) Summary justification for code exemption request (Part 6, Paragraph 5.2, or Part 10, Paragraph 6.2).

(i1) The piping is maintained full by a small fraction of the pump's flow capacity. These pumps may be a constant speed centrifugal type with a cooling by-pass loop. Normal operation will be near minimum flow in the flat or constant region of the pressure/flow performance curve. Therefore, a flow measurement would not be useful. The pumps will be designed and analyzed to withstand low flow operation without significant degradation.

CHECK

Motor Operated Valve Design Description

The results of tests of active safety related ~~motor-operated~~ check valves identified in the figure or design descriptions demonstrate that the CVs MOVs are qualified to perform their safety functions under certified design differential pressure, system pressure, fluid temperature, ambient temperature, minimum voltage, and minimum and/or maximum stroke times.

and

Table

(System Name Used Here (Motor Operated Valves))

CHECK

Inspections, Tests, Analyses and Acceptance Criteria

Certified Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Motor-operated valves (MOV) designated in Section _____ as having an active safety-related function will open and/or close under differential pressure and fluid flow conditions	1. Opening and/or closing tests of installed valves will be conducted under preoperational differential pressure, fluid flow, and temperature conditions.	1. Each MOV opens and/or closes. The following valves open and/or close in the following time limits: **Valve** — **Time (sec)** _____ — _____ open _____ close _____ — _____ open _____ close