GE Nuclear Energy

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

July 9, 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 Schedule - **ISLOCA (Issue #42)**

Dear Chet:

Enclosed is a SSAR markup resolving ISLOCA Issue #42. This replaces the text part of my April 30, 1993 letter. However, the marked up P&IDs of my April letter still apply and they are not repeated in this transmittal.

Please provide a copy of this transmittal to George Thomas.

Sincerely,

Jack Fox

Jack Fox
Advanced Reactor Programs

cc: Alan Beard (GE)
Norman Fletcher (DOE)
Bill Taft (GE)

JF93-225

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APPENDIX 3M

RESOLUTION OF INTERSYSTEM LOSS OF COOLANT ACCIDENT FOR ABWR

3.9.5.3.6 Stress, Deformation, and Fatigue Limits for Safety Class and Other Reactor Internals (Except Core Support Structures)

For safety class reactor internals, the stress deformation and fatigue criteria listed in Tables 3.9-4 through 3.9-7 are based on the criteria established in applicable codes and standards for similar equipment, by manufacturers standards, or by empirical methods based on field experience and testing. For the quantity SF_{min} (minimum safety factor) appearing in those tables, the following values are used:

Service Level	Service Condition	SF_{min}
A	Normal	2.25
B	Upset	2.25
C	Emergency	1.5
D	Faulted	1.125

Components inside the reactor pressure vessel such as control rods which must move during accident condition have been examined to determine if adequate clearances exist during emergency and faulted conditions. No mechanical clearance problems have been identified. The forcing functions applicable to the reactor internals are discussed in Subsection 3.9.2.5.

The design criteria, loading conditions, and analyses that provide the basis for the design of the safety class reactor internals other than the core support structures meet the guidelines of NG-3000 and are constructed so as not to adversely affect the integrity of the core support structures (NG-1122).

The design requirements for equipment classified as non-safety (other) class internals (e.g., steam dryers and shroud heads) are specified with appropriate consideration of the intended service of the equipment and expected plant and environmental conditions under which it will operate. Where Code design requirements are not applicable, accepted industry or engineering practices are used.

3.9.6 Testing of Pumps and Valves

Inservice testing of safety-related pumps and valves will be performed in accordance with the requirements of ASME/ANSI OMa-1988 Addenda to ASME/ANSI OM-1987, Parts 1, 6 and 10. Table 3.9-8 lists the inservice testing parameters and frequencies for the safety-related pumps and valves. The reason for each code defined testing exception or justification for each code exemption request is noted in the description of the affected pump or valve. Valves having a containment isolation fu :tion are also noted in the listing. Inservice inspection is discussed in Subsection 5.2.4 and 6.6.

Details of the inservice testing program, including test schedules and frequencies will be reported in the inservice inspection and testing plan which will be provided by the applicant referencing the ABWR design. The plan will integrate the applicable test requirements for safety-related pumps and valves including those listed in the technical specifications (Chapter 16) and the containment isolation system, (Subsection 6.2.4). For example, the periodic leak testing of the reactor coolant pressure isolation valves* in Table 3.9-9 will be performed in accordance with Chapter 16 Surveillance Requirement SR 3.6.1.5.10. This plan will include baseline pre-service testing to support the periodic in-service testing of the components. Depending on the test results, the plan will provide a commitment to disassemble and inspect the safety related pumps and valves when limits of the OM Code are exceeded, as described in the following paragraphs. The primary elements of this plan, including the requirements of Generic Letter 89-10 for motor operated valves, are delineated in the subsections to follow. (See Subsection 3.9.7.3 for COL license information requirements).

3.9.6.1 Testing of Safety-Related Pumps

For each pump, the design basis and required operating conditions (including tests) under which the pump will be required to function will be established. These designs (design basis and

* See Appendix 3M for design changes made to prevent intersystem LOCAs

3M.1 Introduction

An intersystem loss of coolant accident (ISLOCA) is postulated to occur when a series of failures or inadvertent actions occur that allow the high pressure from one system to be applied to the low design pressure of another system, which could potentially rupture the pipe and release coolant from the reactor system pressure boundary. This may also occur within the high and low pressure portions of a single system. Future ALWR designs like the ABWR are expected to reduce the possibility of a LOCA outside the containment by designing to the extent practicable all piping systems, major system components (pumps and valves), and subsystems connected to the reactor coolant pressure boundary (RCPB) to an ultimate rupture strength (URS) at least equal to the full RCPB pressure. The general URS criteria was recommended by the Reference 1 and the NRC Staff recommended specific URS design characteristics by Reference 2.

3M.2 ABWR Regulatory Requirements

In SECY-90-016 and SECY-93-087 (References 3 and 4), the NRC staff resolved the ISLOCA issue for advanced light water reactor plants by requiring that low-pressure piping systems that interface with the reactor coolant pressure boundary be designed to withstand reactor pressure to the extent practicable. However, the staff believes that for those systems that have not been designed to withstand full reactor pressure, evolutionary ALWRs should provide (1) the capability for leak testing the pressure isolation valves, (2) valve position indication that is available in the control room when isolation valve operators are deenergized and (3) high-pressure alarms to warn main control room operators when rising reactor pressure approaches the design pressure of attached low-pressure systems or when both isolation valves are not closed. The staff noted that for some low-pressure systems attached to the RCPB, it may not be practical or necessary to provide a higher system ultimate pressure capability for the entire low-pressure connected system. The staff will evaluate such exceptions on a case-by-case basis during specific design certification reviews.

GE provided a proposed implementation of the issue resolution for the ABWR in Reference 5 and again in Reference 6. The staff in the Civil Engineering and Geosciences Branch of the Division of Engineering completed its evaluation of the Reference 5 proposal. Specifically, as reported by Reference 2 and summarized below, the staff has evaluated the minimum pressure for which low-pressure systems should be designed to ensure reasonable protection against burst failure should the low-pressure system be subjected to full RCPB pressure.

Reference 2 found that for the ABWR the design pressure for the low-pressure piping systems that interface with the RCPB should be equal to 0.4 times the normal operating RCPB pressure of 1025 psig (i.e., 410 psig), the minimum wall thickness of low-pressure piping should be no less than that of a standard weight pipe, and that Class 300 valves are adequate. The design is to be in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Subarticle NC/ND-3600. Furthermore, the staff will continue to require periodic surveillance and leak rate testing of the pressure isolation valves per Technical Specification requirements as a part of the ISI program.

3M.3 Boundary Limits of URS

Guidance given by Reference 3 provides provision for applying practical considerations for the extent to which systems are upgraded to the URS design pressure. The following items form the basis of what constitutes practicality and set forth the test of practicality used to establish the boundary limits of URS for the ABWR:

1. It is impractical to consider a disruptive open flow path from reactor pressure to a low pressure sink. A key assumption to understanding the establishment of the boundary limits from this practicality basis is that only static pressure conditions are

considered. Static conditions are assumed when the valve adjacent to a low pressure sink remains closed. Thus, the dynamic pressurization effects accompanied by violent high flow transients and temperature escalations are precluded that would occur if the full RCPB pressure was connected directly to the low pressure sink. As a consequence, the furthest downstream valve in such a path is assumed closed so that essentially all of the static reactor pressure is contained by the URS upgraded region.

2. It is impractical to design or construct large tank structures to the URS design pressure that are vented to atmosphere and have a low design pressure. Tanks included in this category are:

   Condensate storage tank,
   SLC main tank,
   LCW receiving tank,
   HCW receiving tank,
   FPC skimmer surge tank, and
   FPC spent fuel storage pool and cask pit.
   Condensate hotwell

These are termed low pressure sinks for the purposes of this report. See Table 1 for approximate sizes of these tanks as an indication of the impracticality of increasing the design pressure. The size of these tanks would result in an unnecessary dollar cost burden to increase their design pressure to the URS value. The small tanks in Table 1 are greater than 3 meters in height and diameter. (For perspective, remember the "3 meter board" at the swimming pool is the high dive.) The large condensate storage tank, if constructed with its height equal to the diameter, is approximately as tall as a four story building. The FPC System's tank, pool, and pit (Table 1) have no top cover and are open to the large refueling floor (bay), so that their pressure can not be increased above the static head for which they are designed.

3. It is impractical to design piping systems that are connected to low pressure sink features to the URS design pressure when the piping is always locked open to a low pressure sink by locked open valves. These piping sections are extensions of the low pressure sink and need no greater design pressure than the low pressure sink to which they are connected.

In summary, the following low pressure sinks are protected by an adjacent closed valve and are impractical to design to the URS design pressure.

(1) Suppression Pool - Provides a normal low pressure sink, approximately 0.05 atg (0.75 psig) above atmospheric for its interfacing systems and the first closed valve is at least 28.8 atg (410 psig) rated. The suppression pool is designed to Seismic Category I.

(2) Condensate Storage Tank - Vented to atmosphere and its locked open valves and stainless steel piping insure it is a low pressure sink for its interfacing systems. The first closed valve of each interfacing system with URS upgrade is at least 28.8 atg (410 psig) rating.

(3) SLC main tank - Vented to atmosphere with the first closed valve at least 28.8 atg (410 psig) rating. The SLC main tank is designed to Seismic Category I.

(4) LCW Receiving Tank - Vented to atmosphere, and the first closed valve is at least 28.8 atg (410 psig) and one of the dual tank's inlet valves is locked open.

(5) HCW Receiving Tank - Vented to atmosphere, and the first closed valve is at least 28.8 atg (410 psig) and one of the dual tank's inlet valves is locked open.

(6) FPC Skimmer Surge Tank - The Fuel Pool Cooling Cleanup System's skimmer surge tank is open to the near atmospheric pressure of the refueling floor. The first closed valve is at least 28.8 atg (410 psig) rated. The FPC skimmer surge tank is designed to Seismic Category I.

(7) FPC Spent Fuel Storage Pool and Cask Pit - The Fuel Pool Cooling Cleanup System's spent fuel storage pool and cask pit is open to the near atmospheric pressure of the refueling floor. The first closed valve is at least 28.8 atg (410 psig) rated. The FPC spent fuel storage pool and cask pit is designed to Seismic Category I.

(8) Condensate Hotwell - During reactor high pressure operation, the hotwell operates at a vacuum pressure.

3M.4 Evaluation Procedure

The pressure of each system piping boundary on all of the ABWR P&ID's was reviewed to identify where changes were needed to provide URS protection. Where low pressure piping interfaces with higher pressure piping connected to piping with reactor coolant at reactor pressure, design pressure values were increased to 28.8 atg which is equivalent to 410 psig. (1 at = 1 kg/cm^2; atg is gage) The low pressure piping boundaries were upgraded to URS pressures and extend to the last closed valve connected to piping interfacing a low pressure sink, such as the suppression pool, condensate storage tank or other open configuration (identified pool or tank). Some upgraded boundaries were located at normally open valves, but the upgrading would be needed if the nonnormal closed condition occurred. Each interfacing system's piping was reviewed for upgrading. For some systems, with low pressure piping and normally open valves, the valves were changed to lock open valves to insure an open piping pathway from the last URS boundary to the tank or low pressure sink.

Typical systems for this upgrade include the:

1. Radwaste LCW and HCW receiving tank piping,
2. Fuel Pool Cooling System's RHR interface piping connected to the skimmer surge tanks,
3. Condensate Storage System's tank locked open supply valves,
4. Makeup Water Condensate and Makeup Water Purified Systems with locked open valves and pump bypass piping to the Condensate Storage Tank.

All test, vent and drain piping was upgraded where it interfaces with the piping upgraded to URS pressure. Similarly, all instrument and relief valve connecting piping was upgraded. The enclosed P&IDs (referencing ABWR SSAR figures) were marked with the new pressure boundary values identified with "clouds" and heavy piping lines to show the upgraded piping, equipment and instruments.

3M.5 Systems Evaluated

The following fourteen systems, interfacing directly or indirectly with the RCPB, were evaluated.

	SSAR Figure No.
1. Residual Heat Removal (RHR) System	5.4-10
2. High Pressure Core Flooder (HPCF) System	6.3-7
3. Reactor Core Isolation Cooling (RCIC) System	5.4-8
4. Control Rod Drive (CRD) System	4.6-8
5. Standby Liquid Control (SLC) System	9.3-1
6. Reactor Water Cleanup (CUW) System	5.4-12
7. Fuel Pool Cooling Cleanup (FPC) System	9.1-1
8. Nuclear Boiler (NB) System	5.1-3
9. Reactor Recirculation (RRS) System	5.4-4
10. Makeup Water (Condensate) (MUWC) System,	9.2-4
11. Makeup Water (Purified) (MUWP) System.	9.2-5
12. Radwaste System (LCW Receiving Tank, HCW Receiving Tank).	11.2-2
13. Condensate and Feedwater (CFS) System	10.4-6
14. Sampling (SAM) System	—

Appendix A contains a system-by-system evaluation of potential reactor pressure application to piping and components, discussing the URS boundary and listing the upgraded components. For some systems, certain regions of piping and components not upgraded are also listed.

3M.6 Piping Design Pressure for URS Compliance

Guidelines for URS compliance were established by Reference 2, which concluded that for the ABWR that:

1. The design pressure for the low-pressure piping systems that interface with the RCPB pressure boundary should be equal to 0.4 times the normal operating RCPB pressure of 1025 psig (i.e., 410 psig), and
2. The minimum wall thickness of the low-pressure piping should be no less than that of a standard weight pipe.

3M.7 Applicability of URS Non-piping Components

Reference 2 also provided the NRC Staff's position that:

1. The remaining components in the low-pressure systems should also be designed to a design pressure of 0.4 times the normal operating reactor pressure (i.e., 410 psig). This is accomplished in the SSAR by the revised boundary symbols of the P&IDs to the 28.8 atg design pressure, which includes all the piping and components associated with the boundary symbols. A stated parameter (e.g., design pressure) of a boundary symbol on the P&ID applies to all the piping and components on the P&ID that extend away from the boundary symbol, including along any branch line, until another boundary symbol occurs on the P&ID. The components include heat exchangers, flanges, and pump seals, etc. as shown on the P&ID.
2. A Class 300 valve is adequate for ensuring the pressure of the low-pressure piping system under full reactor pressure. The rated working pressure for Class 300 valves varies widely depending on material and temperature (ASME/ANSI B16.34). However, as a lower limit bounding condition, within the material group that includes the stainless steels, the lowest working pressure is 29.2 kg/cm^2g (415 psig) at 204 °C (400 °F), which exceeds the URS of 28.8 kg/cm^2g (410 psig). For lower

temperatures the working pressure increases. The material group that includes the carbon steels has working pressures above this value. More typical working pressure values at 93 °C (200 °F) range between 42 to 49 kg/cm^{2}g (600 to 700 psig).

3M.8 Results

The results of this work are shown by the markups of the enclosed P&IDs, which are SSAR figures. The affected sheets are listed below.

System	SSAR Figure No.	Affected Sheet Nos.
1. Residual Heat Removal (RHR) System	5.4-10	1, 2, 3, 4, 6, 7
2. High Pressure Core Flooder (HPCF) System	6.3-7	1, 2
3. Reactor Core Isolation Cooling (RCIC) System	5.4-8	1, 3
4. Control Rod Drive (CRD) System	4.6-8	1, 3
5. Standby Liquid Control (SLC) System	9.3-1	1
6. Reactor Water Cleanup (CUW) System	5.4-12	1, 3
7. Fuel Pool Cooling and Cleanup (FPC) System	9.1-1	1, 2
8. Nuclear Boiler (NB) System	5.1-3	1, 5
9. Reactor Recirculation (RRS) System	5.4-4	1

System	SSAR Figure No.	Affected Sheet Nos.
10. Makeup Water (Condensate) (MUWC) System	9.2-4	1
11. Makeup Water (Purified) (MUWP) System	9.2-5	1, 2, 3
12. Radwaste System (LCW Receiving Tank, HCW Receiving Tank)	11.2-2	1, 3, 7
13. Condensate and Feedwater (CSF) System	10.4-6	
14. Sampling (SAM) System		

Also, see ~~Appendix~~ attachment A for more detail.

The design pressure of the following two tanks was upgraded as a result of the evaluations performed in Appendix A.

SLC test tank

RCIC turbine barometric condenser tank

3M.9 Valve Misalignment Due To Operator Error

An important result to observe is that because of the widespread application of the URS boundary for the ABWR design as compared to previously constructed BWRs, misalignment of valves due to operator error is not a contributor to ISLOCA. The ISLOCA issue that has been dealt with for existing BWRs, where valve misalignment due to operator error was a significant contributor to ISLOCA considerations, had to use the design pressures used for plant construction that were accepted before ISLOCA issues were considered. As a result, operator error of valve misalignment could possibly result in situations where high pressure might occur in piping regions with design pressures below the current accepted URS design pressure (28.8 kg/cm^2g). However, the ABWR design with the ISLOCA URS applied for the boundary described by this report, has extended the increased design pressure (URS) over the full extent of regions that could potentially experience reactor pressure, so that operator misaligned valves will not expose piping to reactor pressure not designed to the URS pressure.

3M.10 Additional Operational Considerations

The periodic surveillance testing of the ECCS injection valves that interface with the reactor coolant system might lead to ISLOCA conditions if their associated testable check valve was stuck open. To avoid this occurrence, the RHR, HPCF, and RCIC motor operated injection valves will only be tested during low pressure shutdown operation. This practice follows from the guidance given by Reference 3, page 8, paragraph 7.

Although the following is not a new design feature, the RHR shutdown cooling suction line containment isolation valves are also only tested during shutdown operation. These valves are interlocked against opening for reactor pressure greater than the shutdown cooling setpoint approximately 9.49 kg/cm^2 gage (135 psig).

3M.11 Summary

Based on the NRC staff's new guidance cited in References 1 through 4, the ABWR is in full compliance. For ISLOCA considerations, a design pressure of 28.8 atg or (410 psig) and pipe having a minimum wall thickness equal to standard grade has been provided as an adequate margin with respect to the full reactor operating pressure of 72.1 atg (1025 psig) by applying the guidance recommended by Reference 2. This design pressure was applied to the low pressure piping at their boundary symbols on the P&IDs, and therefore, impose the requirement on the associated piping, valves, pumps, tanks, instrumentation and all other equipment shown between boundary symbols. A note was added to each URS upgraded

P&ID requiring pipe to have a minimum wall thickness equal to standard grade. Upgrading revisions were made to 13 systems.

3M.12 References

1. Dino Scaletti, NRC, to Patrick Marriott, GE, "Identification of New Issues for the General Electric Company Advanced Boiling Water Reactor Review," September 6, 1991

2. Chester Poslusny, NRC, to Patrick Marriott, GE, "Preliminary Evaluation of the Resolution of the Intersystem Loss-of-Coolant Accident (ISLOCA) Issue for the Advanced Boiling Water Reactor (ABWR) - Design Pressure for Low-Pressure Systems," December 2, 1992, Docket No. 52-001

3. James M. Taylor, NRC, to The Commissioners, SECY-90-016, "Evolutionary Light Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements," Jan. 12, 1990

4. James M. Taylor, NRC, to The Commissioners, SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs," April 2, 1993

5. Jack Fox, GE, to Chet Poslusny, NRC, "Proposed Resolution of ISLOCA Issue for ABWR," October 8, 1992

6. Jack Fox, GE, to Chet Poslusny, NRC, "Resolution of Intersystem Loss of Coolant Accident for ABWR," April 30, 1993.

Table 1

Low Pressure Sink Component Sizes

Tank Name	Volume m^3	Diameter m	Height m	Length m	Width m	Design pressure kg/cm^2g	Note
Condensate storage tank	2110	13.9	13.9			14	(1)
SLC main tank	32	3.44	3.44			SWH	(1)
LCW receiving tank	430	8.18	8.18			10	(1)
HCW receiving tank	45	3.85	3.85			10	(1)
FPC skimmer surge tank	30	2.3	7.2			SWH	
FPC spent fuel storage pool	2960		11.8	17.9	14.0	SWH	
FPC cask pit	121		11.8	3.2	3.2	SWH	
Condensate hotwell	7800		20	30	13		

Notes:

(1) Diameter and height calculated from volume based on diameter = height.

SWH = Static water head

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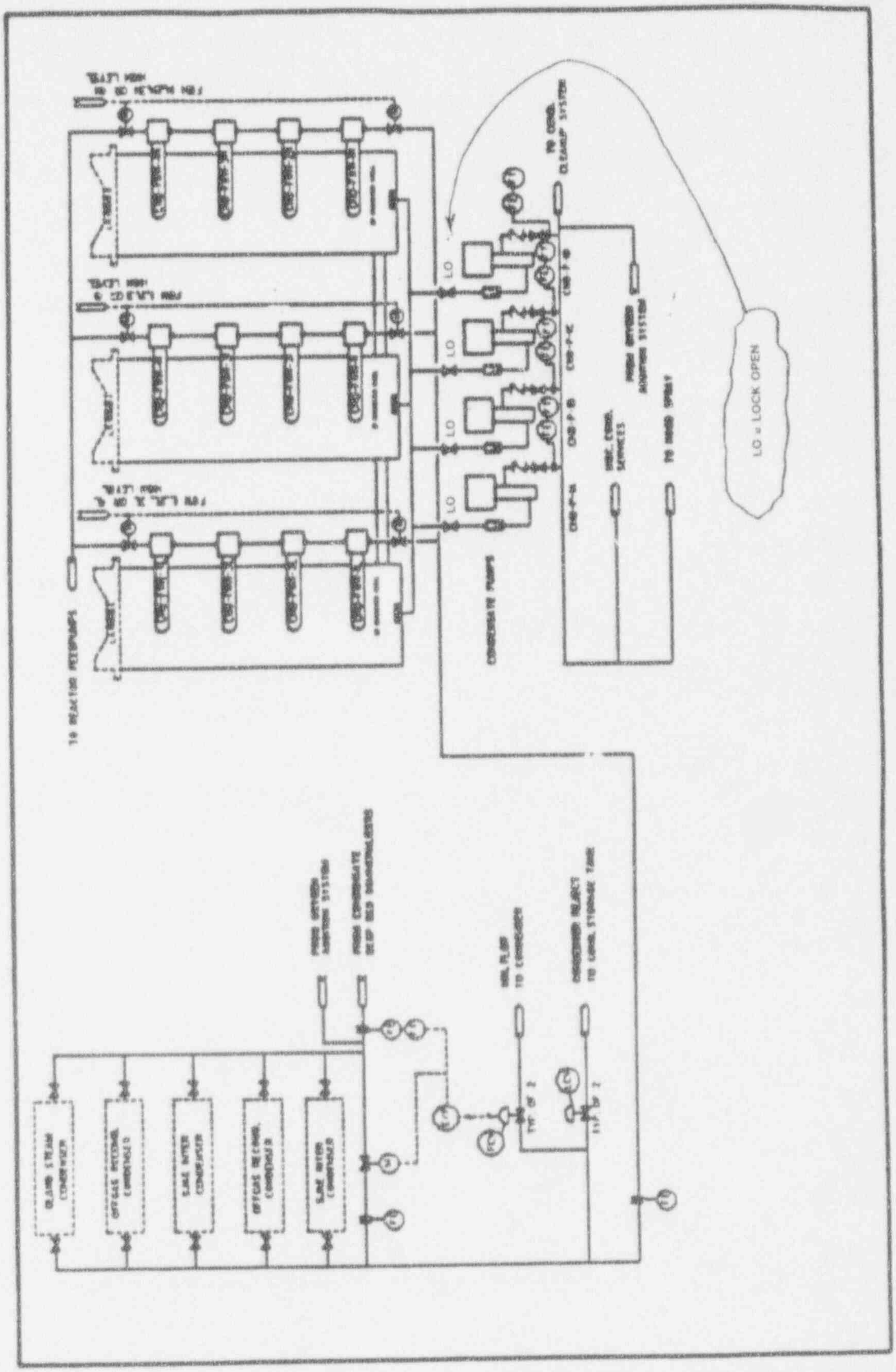

Figure 10.4-6 CONDENSATE SYSTEM (Sheet 2 of 2)

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ATTACHMENT A

System Evaluation

General Comments About the Appendix

This Appendix discusses each of the systems evaluated in detail, presented in the order listed in the report, and following a repetitive outline format.

The first section, "Upgrade Description," describes the changes made to the system and the reasons for placement of the URS boundary.

The second section, "Downstream Interfaces," discusses the systems that interface with the subject system, that could potentially be pressurized by reactor pressure passed through (downstream) the subject system. Each downstream system is dispositioned as being either not applicable for URS upgrading or applicable and the topic of another Appendix A section.

The third section, "Upgraded Components," provides a detailed listing of the components upgraded to the URS design pressure. Also, to indicate some components were not inadvertently overlooked, some components are shown as "No change." The listings are grouped in sections that describe a particular pressure travel path. This grouping may include more than the system of the subject section to detail the path to the tank or sink in which the pressure is dissipated after crossing the last closed valve at the URS boundary.

1. Residual Heat Removal System

1.1 Upgrade Description

The RHR System pump suction piping was low pressure and has been upgraded to the URS design pressure. The RHR has two suction sources, one from the suppression pool and the other from the RPV as used for shutdown cooling. The suction piping also includes the keep-fill pump and its piping.

The URS boundary was terminated at the last valve before the suppression pool, which is valve E11-F001. The suppression pool is a large structure, designed to 3.16 kg/cm^2 gage (45 psig) and impractical to upgrade to the URS design pressure.

The other suction branch to the RPV is not a URS boundary because it interfaces to the high pressure RPV. The only portions of the RHR System that are not upgraded to the URS design pressure is unobstructed piping to the suppression pool.

1.2 Downstream Interfaces

Other systems are listed below that interface with RHR and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Makeup Water (Condensate) System upstream of the injection valve for the purpose of providing a filling and flushing water source. Another interface with MUWC is between the pair of valves to the FPC System. The MUWC System is discussed in Section 10, where it is explained how certain MUWC upgrades were made that provide an open path to the CST. The MUWC line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere. There is no source to pressurize the MUWC line because of closed valves in the RHR System's URS region.

- High Conductivity Waste (Radwaste) for drainage located up stream of the pump suction. HCW upgrades are discussed in the Radwaste System, Section 12.

- Low Conductivity Waste, (Radwaste) at the end of a branch off of the loop B mainline down stream of the RHR heat exchanger. The LCW upgrades are discussed in the Radwaste System, Section 12.

- Sampling System at the outlet of the RHR heat exchanger. The Sampling System's design pressure exceeds the URS design pressure without upgrade.

- Fuel Pool Cooling and Cleanup System on an RHR System discharge branch. FPC System upgrades are discussed in Section 7.

- Flammability Control System branches off the main discharge line downstream of the branch that returns to the suppression pool. The FCS design pressure exceeds the URS design pressure without upgrade.

- The Fire Protection System and the fire truck connection provide water for the Alternating Current (AC) Independent Water Addition piping of RHR loop C upstream of the RPV injection, wetwell spray line, and drywell spray line. The Fire Protection System piping is designed for 14 atg and is protected from over pressure by two locked closed block and bleed valves, RHR-F101 and RHR-F102, and a drain pipe between these valves vented to the HCW sump in the Reactor Building. This design very effectively prevents reactor pressure from reaching the Fire Protection System. No upgrade to URS is practical or appropriate for the extensive piping of the Fire Protection System since the system function is not related to ISLOCA nor is its interconnection a normal plant operational pathway.

1.3 Upgraded Components

A detailed listing of the components upgraded for the RHR System follows, including identification of those interfacing system components not requiring upgrade.

RESIDUAL HEAT REMOVAL SYSTEM, SSAR Figure 5.4-10, GE Drawing 103E1797 Rev. 2P, Sheets 1 through 7. (atg = Kg/cm^2):

RHR Subsystem A suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 3	RHR Pump C001A		35 atg,	182°C,3B,As	No change
	450A-RHR-002	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-701	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-F701A	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PX002A	Press.Pt.	28.8 atg,	182°C,3B,As	Was 14 atg
	450A-RHR-D002A	Temp.Str.	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-700	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-F700A	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PI001A	Press.I	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-018	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-F026A	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	450A-RHR-F001A	MO Valve	28.8 atg,	182°C,3B,As	Was 14 atg
Sheet 2	450A-RHR-001	Pipe	3.16atg,	104°C,3B,As	No change
	450A-RHR-D001A	Suct.Str.	3.16atg,	104°C,3B,As	No change

RHR Subsystem A suction piping from the reactor presssure vessel.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 3	350A-RHR-011	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	350A-RHR-F012A	MO Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-032	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-F042A	Rel.Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-707	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-F712A	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PT009A	Press.T	28.8 atg,	182°C,3B,As	Was 14 atg
Sheet 2	350A-RHR-011	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	* 20A-RHR-504	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	* 20A-RHR-F508A	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-030	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	** 100A-RHR-031	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	** 100A-RHR-F041A	Check V.	28.8 atg,	182°C,3B,As	Was 14 atg
	** 100A-RHR-F040A	Valve.	28.8 atg,	182°C,3B,As	Was 14 atg

* To LCW funnel drain to LCW Sump.

** To MUW(Concensate) Sytem interface.

1.3 continued

RHR Subsystem A discharge fill pump suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	40A-RHR-C002A	Pump	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-015	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-F022A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-D008A	Temp.Str.	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-708	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-F713A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-PX010A	Press.Pt.	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-017	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-F025A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-D009A	RO	28.8 atg, 182°C,3B,As	Was 14 atg

RHR Subsystem A discharge from relief valves and test line valve directly to the suppression pool without restriction.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	250A-RHR-008	Pipe	3.16 atg, 104°C,3B,As	No change
	100A-RHR-025	Pipe	3.16 atg, 104°C,3B,As	No change
	100A-RHR-014	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-037	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-033	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-021	Pipe	3.16 atg, 104°C,3B,As	No change
Sheet 2	250A-RHR-008	Pipe	3.16 atg, 104°C,3B,As	No change
	Suppression Pool			

RHR Subsystem A flushing line interface at branch discharging to feedwater.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	100A-MUWC-134	Pipe	14 atg, 66°C,4D,B	No change
Sheet 3	100A-RHR -F032A	Valve	35 atg, 182°C,3B,As	No change
	100A-RHR -026	Pipe	35 atg, 182°C,3B,As	No change
	100A-RHR -F033A	Check V.	35 atg, 182°C,3B,As	No change

RHR Subsystem A flushing line interface at suction shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	100A-MUWC-133	Pipe	14 atg, 66°C,4D,B	No change
Sheet 3	100A-RHR -F040A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -031	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -F041A	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg

1.3 continued

RHR Subsystem B suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 4	RHR Pump C001B		35 atg, 182°C,3B,As	No Change
	450A-RHR-102	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-731	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-F701B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-PX002B	Press.Pt.	28.8 atg, 182°C,3B,As	Was 14 atg
	450A-RHR-D002B	Temp.Str.	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-730	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-F700B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-PI001B	Press.I	28.8 atg, 182°C,3B,As	Was 14 atg
	50A-RHR-124	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	50A-RHR-F026B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	450A-RHR-F001B	MO Valve	28.8 atg, 182°C,3B,As	Was 14 atg
Sheet 2	450A-RHR-101	Pipe	3.16atg, 104°C,3B,As	No change
	450A-RHR-D001B	Suct.Str.	3.16atg, 104°C,3B,As	No change

RHR Subsystem B suction piping from the reactor presssure vessel.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 4	350A-RHR-111	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	350A-RHR-F012B	MO Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-139	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-F042B	Rel.Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	50A-RHR-140	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-737	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-F712B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-PT009B	Press.T	28.8 atg, 182°C,3B,As	Was 14 atg
Sheet 2	350A-RHR-111	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	* 20A-RHR-534	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	* 20A-RHR-F508B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-137	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	** 300A-RHR-114	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	** 300A-RHR-F016B	Valve LC	28.8 atg, 182°C,3B,As	Was 14 atg
	*** 100A-RHR-138	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	*** 100A-RHR-F041B	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg
	*** 100A-RHR-F040B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg

* To LCW funnel drain to LCW Sump. ** To FPC System interface.
*** To MUW(Concensate) Sytem interface

1.3 continued

RHR Subsystem B discharge fill pump suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 4	40A-RHR-C002B	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	40A-RHR-121	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	40A-RHR-F022B	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	40A-RHR-D008B	Temp.Str	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-738	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-F713B	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PX010B	Press.Pt.	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-123	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-F025B	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-D009B	RO	28.8 atg,	182°C,3B,As	Was 14 atg

RHR Subsystem B flushing line interface at branch discharging to RPV.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	100A-MUWC-137	Pipe	14 atg,	66°C,4D,B	No change
Sheet 5	100A-RHR -F032B	Valve	35 atg,	182°C,3B,As	No change
	100A-RHR -132	Pipe	35 atg,	182°C,3B,As	No change
	100A-RHR -F033B	Check V.	35 atg,	182°C,3B,As	No change

RHR Subsystem B flushing line interface at suction of shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	100A-MUWC-136	Pipe	14 atg,	66°C,4D,B	No change
Sheet 2	100A-RHR -F040B	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	100A-RHR -138	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	100A-RHR -F041B	Check V.	28.8 atg,	182°C,3B,As	Was 14 atg

RHR Subsystem C suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 6	RHR Pump C001C		35 atg,	182°C,3B,As	No change
	450A-RHR-202	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-761	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-F701C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PX002C	Press.Pt.	28.8 atg,	182°C,3B,As	Was 14 atg
	450A-RHR-D002C	Temp.Str.	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-760	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-F700C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PI001C	Press.I	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-225	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-F026C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	450A-RHR-F001C	MO Valve	28.8 atg,	182°C,3B,As	Was 14 atg
Sheet 2	450A-RHR-201	Pipe	3.16atg,	104°C,3B,As	No change
	450A-RHR-D001C	Suct.Str.	3.16atg,	104°C,3B,As	No change

1.3 continued

RHR Subsystem B discharge from relief valves and test line valve directly to the suppression pool without restriction.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 4	250A-RHR-109	Pipe	3.16 atg,	104°C,3B,As	No change
	100A-RHR-131	Pipe	3.16 atg,	104°C,3B,As	No change
	100A-RHR-120	Pipe	3.16 atg,	104°C,3B,As	No change
	50A-RHR-145	Pipe	3.16 atg,	104°C,3B,As	No change
	50A-RHR-140	Pipe	3.16 atg,	104°C,3B,As	No change
	50A-RHR-127	Pipe	3.16 atg,	104°C,3B,As	No change
Sheet 2	250A-RHR-109	Pipe	3.16 atg,	104°C,3B,As	No change
	Suppression Pool				

RHR Subsytem B interface with Radwaste System.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 4	150A-RHR-129	Pipe	35 atg,	182°C,3B,As	No change
	150A-LCW-F006	Valve	28.8 atg,	66°C,4D,B	Was 10 atg
	150A-LCW-CS	Pipe	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	Pipe	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg,	66°C,4D,B	No change
	* LCW Collector Tank A		0 atg,	66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg,	66°C,4D,B	No change
	* LCW Collector Tank B		0 atg,	66°C,4D,B	No change

* Each LCW collector tank is served by the HVAC tank vent system exhausting tank air through filter to RW Stack.

RHR Subsystem C suction piping from the reactor presssure vessel.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 6	350A-RHR-212	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	350A-RHR-F012C	MO Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-240	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-F042C	Rel.Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-241	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-767	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	50A-RHR-F712C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	20A-RHR-PT009C	Press.T	28.8 atg,	182°C,3B,As	Was 14 atg
Sheet 2	350A-RHR-212	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	* 20A-RHR-564	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	* 20A-RHR-F508C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg
	25A-RHR-238	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	** 300A-RHR-215	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	** 300A-RHR-F016C	Valve LC	28.8 atg,	182°C,3B,As	Was 14 atg
	*** 100A-RHR-239	Pipe	28.8 atg,	182°C,3B,As	Was 14 atg
	*** 100A-RHR-F041C	Check V.	28.8 atg,	182°C,3B,As	Was 14 atg
	*** 100A-RHR-F040C	Valve	28.8 atg,	182°C,3B,As	Was 14 atg

* To LCW funnel drain to LCW Sump. ** To FPC System interface.

*** To MUW(Concensate) Sytem interface.

1.3 continued

RHR Subsystem C discharge fill pump suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 6	40A-RHR-C002C	Pump	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-222	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-F022C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	40A-RHR-D008C	Temp.Str.	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-768	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-F713C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	20A-RHR-PX010C	Press.Pt.	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-224	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-F025C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	25A-RHR-D009C	RO	28.8 atg, 182°C,3B,As	Was 14 atg

RHR Subsystem C discharge from relief valves and test line valve direct to the suppression pool without restriction.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	250A-RHR-209	Pipe	3.16 atg, 104°C,3B,As	No change
	100A-RHR-232	Pipe	3.16 atg, 104°C,3B,As	No change
	100A-RHR-221	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-246	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-241	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-RHR-228	Pipe	3.16 atg, 104°C,3B,As	No change
Sheet 2	250A-RHR-209	Pipe	3.16 atg, 104°C,3B,As	No change
	Suppression Pool			

RHR Subsystem C flushing line interface at branch discharge to RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	100A-MUWC-140	Pipe	14 atg, 66°C,4D,B	No change
	100A-RHR -F032C	Valve	35 atg, 182°C,3B,As	No change
	100A-RHR -233	Pipe	35 atg, 182°C,3B,As	No change
	100A-RHR -F033C	Check V.	35 atg, 182°C,3B,As	No change

RHR Subsystem C flushing line interface at suction of shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	100A-MUWC-140	Pipe	14 atg, 66°C,4D,B	No change
	100A-RHR -F040C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -239	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -F041C	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg

1.3 continued

RHR Subsystem C outdoor fire truck connection in RHR pump discharge pipe to RPV.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 7	100A-RHR -F103	Valve	28.8 atg,	66°C,7E,C	Was 16 atg
	100A-RHR -F104	Check V.	28.8 atg,	66°C,7E,C	Was 16 atg
	100A-RHR -249	Pipe	28.8 atg,	66°C,7E,C	Was 16 atg
	100A-RHR -247	Pipe	28.8 atg,	66°C,7E,C	Was 16 atg
	100A-RHR -F100	Check V.	28.8 atg,	66°C,7E,C	Was 16 atg
	100A-RHR -F101	Key Lock V.	35 atg,	182°C,3B,As	No change
	100A-RHR -248	Pipe	35 atg,	182°C,3B,As	No change
	20A-RHR -769	Pipe	35 atg,	182°C,3B,As	No change
	20A-RHR -F790	Globe V.	35 atg,	182°C,3B,As	No change
	20A-RHR -PI-099	Press I	35 atg,	182°C,3B,As	No change
	20A-RHR -570	Pipe	35 atg,	182°C,3B,As	No change
*	20A-RHR -F592	Globe V.LO	35 atg,	182°C,3B,As	No change
	20A-RHR -571	Pipe	35 atg,	182°C,3B,As	No change
**	20A-RHR -F591	Globe V.NC	35 atg,	182°C,3B,As	No change
	100A-RHR -F102	Key Lock V.	35 atg,	182°C,3B,As	No change
	20A-RHR -FE-100	Flow El.	35 atg,	182°C,3B,As	No change
***	300A-RHR -205	Pipe	35 atg,	182°C,3B,As	No change

* Funnel drain to LCW sump in Reactor Building.

** Test valve.

*** Injection pipe to RPV at outboard isolation valve MO F-005C.

No other low pressure components of the RHR System were identified for upgrading to the higher design pressure as shown on the marked P & ID's. Interface with the LCW Reactor Building sump which is vented to atmosphere, is through open funnel drains with low pressure piping to the sump.

2. High Pressure Core Flooder System

2.1 Upgrade Description

The HPCF System pump suction piping was low pressure and has been upgraded to the URS design pressure. The HPCF has two suction sources, the primary source being the condensate storage tank (CST) and the suppression pool as an alternate.

The URS boundary was terminated at the last HPCF valve in the pipeline to the CST, E22-F001. Beyond this valve, the pipeline is open to the CST except for three locked open maintenance valves in parallel adjacent to the CST. The pipeline to the CST is a large pipe (20 inch) providing a common supply to the HPCF, RCIC, and SPCU System. Because of the open communication to the CST, and the CST is vented to atmosphere, this line cannot be pressurized. The CST is a large structure, impractical to upgrade to the URS design pressure.

The URS boundary was terminated at the last valve before the suppression pool, which is valve E22-F006 and is normally closed. The suppression pool is a large structure, impractical to upgrade to the URS design pressure. The only portions of the HPCF System that are not upgraded to the URS design pressure is unobstructed piping to the suppression pool.

2.2 Downstream Interfaces

Other systems are listed below that interface with HPCF and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Makeup Water (Condensate) System upstream of the injection valve for the purpose of providing the piping keep-fill water source and a filling and flushing water source. The MUWC System is discussed in Section 10, where it is explained how certain MUWC changes were made that provide an open path to the CST. The MUWC line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere.

There is no source to pressurize the MUWC line because of closed valves in the HPCF System's URS region.

- High Conductivity Waste System for drainage is located down stream of CST suction check valve. HCW is discussed in Section 12.

2.3 Upgraded Components

A detailed listing of the components upgraded for the HPCF System follows, with identification of interfacing system components not requiring upgrade.

HIGH PRESSURE CORE FLOODER SYSTEM, SSAR Figure 6.3-7, GE Drawing 107E6008 Rev. 1P, Sheets 1 and 2. (atg = Kg/cm^2):

HPCF Subsystem B suction piping from the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 2	400A-HPCF-006	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-701	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-F701B	Valve	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-PX004B	Press. Pt.	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-D001B	Temp. Str.	28.8 atg,	100°C,3B,As	Was 14 atg
	400A-HPCF-010	Pipe	28.8 atg,	104°C,3B,As	Was 14 atg
	20A-HPCF-700	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-F700B	Valve	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-PI001B	Press.Ind.	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-PT002B	Press.Trn.	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-PT003B	Press.Trn.	28.8 atg,	100°C,3B,As	Was 14 atg
	25A-HPCF-023	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	25A-HPCF-F020B	Relief V.	28.8 atg,	100°C,3B,As	Was 14 atg
	400A-HPCF-F007B	Check V.	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-025	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	20A-HPCF-F022B	T.Valve&cap	28.8 atg,	100°C,3B,As	Was 14 atg
	400A-HPCF-F006B	MO.Valve	28.8 atg,	104°C,3B,As	Was 14 atg
	400A-HPCF-009	Pipe	3.16atg,	104°C,3B,As	No change
	400A-HPCF-D003B	Suction Str.	3.16atg,	104°C,3B,As	No change
	Suppression Pool				

HPCF Subsystem B suction piping from the Condensate Storage Tank.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
	400A-HPCF-006	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	50A-HPCF-018	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	50A-HPCF-F012B	Valve	28.8 atg,	100°C,3B,As	Was 14 atg
	50A-HPCF-F011B	Valve	28.8 atg,	100°C,3B,As	Was 14 atg
	50A-HPCF-017	Pipe	28.8 atg,	100°C,3B,As	Was 14 atg
	50A-HPCF-F002B	Check V.	28.8 atg,	100°C,3B,As	Was 14 atg
	400A-HPCF-F001B	MO.Valve	28.8 atg,	100°C,3B,As	Was 14 atg
	400A-HPCF-005	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	500A-HPCF-004	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	400A-HPCF-105	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	200A-HPCF-015	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	200A-HPCF-016	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	* 300A-HPCF-001	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	* 300A-HPCF-002	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	* 300A-HPCF-003	SS Pipe	14 atg,	66°C,B(S1,S2)	No change

* Connects to lock open valves at condensate storage tank vented to atmosphere.

2.3 continued

HPCF Subsystem B test and minimum flow piping to the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 2	80A-HPCF-014	Pipe	3.16 atg, 104°C,3B,As	No change
	200A-HPCF-012	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-HPCF-024	Pipe	3.16 atg, 104°C,3B,As	No change
	250A-RHR-109	Pipe	3.16 atg, 104°C,3B,As	No change
	Suppression Pool			

HPCF Subsystem B keep fill line interface.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	20A-MUWC-135	Pipe	14 atg, 66°C,4D,B	No change
	25A-HPCF-F013B	Valve	110 atg, 100°C,3B,As	No change
	25A-HPCF-D006B	RO	110 atg, 100°C,3B,As	No change
	50A-HPCF-019	Pipe	110 atg, 100°C,3B,As	No change
	50A-HPCF-020	Pipe	110 atg, 100°C,3B,As	No change
	50A-HPCF-F016B	Valve	110 atg, 100°C,3B,As	No change

HPCF Subsystem C suction piping from the suppression pool and condensate storage tank.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 2	400A-HPCF-106	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-712	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-F701C	Valve	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-P004C	Press. Pt.	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-D001C	Temp. Str.	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-711	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-F700C	Valve	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-PI001C	Press.Ind.	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-PT002C	Press.Trn.	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-PT003C	Press.Trn.	28.8 atg, 100°C,3B,As	Was 14 atg
	400A-HPCF-106	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	50A-HPCF-118	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	50A-HPCF-F012C	Valve	28.8 atg, 100°C,3B,As	Was 14 atg
	50A-HPCF-F011C	Valve	28.8 atg, 100°C,3B,As	Was 14 atg
	50A-HPCF-117	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	50A-HPCF-F002C	Check V.	28.8 atg, 100°C,3B,As	Was 14 atg
	400A-HPCF-F001C	MO.Valve	28.8 atg, 100°C,3B,As	Was 14 atg
	400A-HPCF-110	Pipe	3 16atg, 104°C,3B,As	No change
	25A-HPCF-123	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	25A-HPCF-F020C	Relief V.	28.8 atg, 100°C,3B,As	Was 14 atg
	400A-HPCF-F007C	Check V.	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-125	Pipe	28.8 atg, 100°C,3B,As	Was 14 atg
	20A-HPCF-F022C	T.Valve&cap	28.8 atg, 100°C,3B,As	Was 14 atg
	400A-HPCF-F006B	MO.Valve	28.8 atg, 104°C,3B,As	Was 14 atg
	400A-HPCF-109	Pipe	3.16atg, 104°C,3B,As	No change
	400A-HPCF-D003C	Suction Str.	3.16atg, 104°C,3B,As	No change
	Suppression Pool			

2.3 continued

HPCF Subsystem C test and minimum flow piping to the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 2	80A-HPCF-114	Pipe	3.16 atg, 104°C,3B,As	No change
	200A-HPCF-112	Pipe	3.16 atg, 104°C,3B,As	No change
	50A-HPCF-124	Pipe	3.16 atg, 104°C,3B,As	No change
	250A-RHR- 209	Pipe	3.16 atg, 104°C,3B,As	No change
	Suppression Pool			

HPCF Subsystem C keep fill line interface.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	20A-MUWC-138	Pipe	14 atg,	66°C,4D,B	No change
Sheet 1	25A-HPCF-F013C	Valve	110 atg,	100°C,3B,As	No change
	25A-HPCF-D006C	RO	110 atg,	100°C,3B,As	No change
	50A-HPCF-119	Pipe	110 atg,	100°C,3B,As	No change
	50A-HPCF-120	Pipe	110 atg,	100°C,3B,As	No change
	50A-HPCF-F016C	Valve	110 atg,	100°C,3B,As	No change

* Connects to locked open valves from condendate storage tank which is vented to atmosphere.

3. Reactor Core Isolation Cooling System

3.1 Upgrade Description

The RCIC System pump suction piping was low pressure and has been upgraded to the URS design pressure. The RCIC has two suction sources, the primary source being the condensate storage tank (CST) and the suppression pool as an alternate.

The URS boundary was terminated at the last RCIC valve in the pipeline to the CST, E51-F001. Beyond this valve, the pipeline is open to the CST except for three locked open maintenance valves in parallel adjacent to the CST. The pipeline to the CST is a large pipe (20 inch) providing a common supply to the RCIC, HPCF, and SPCU System. Because of the open communication to the CST, and the CST is vented to atmosphere, this line cannot be pressurized. The CST is a large structure, impractical to upgrade to the URS design pressure.

The URS boundary was terminated at the last valve before the suppression pool, which is valve E51-F006 and is normally closed. The suppression pool is a large structure, impractical to upgrade to the URS design pressure. The only portions of the RCIC System that are not upgraded to the URS design pressure is unobstructed piping to the suppression pool.

3.2 Downstream Interfaces

Other systems are listed below that interface with RCIC and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Makeup Water (Condensate) System upstream of the injection valve for the purpose of providing the piping keep-fill water source and a filling and flushing water source. The MUWC System is discussed in section 10.

- High Conductivity Waste System for drainage is located down stream of CST suction check valve. HCW is discussed in section 12.

- Reactor Core Isolation Cooling System shares common CST suction. The CST suction has open communication to the CST, and the CST is vented to atmosphere; this line cannot be pressurized and was not practical to upgrade to the URS design pressure.

- Suppression Pool Cleanup System shares common CST suction. The CST suction has open communication to the CST, and the CST is vented to atmosphere; this line cannot be pressurized and was not practical to upgrade to the URS design pressure.

3.3 Upgraded Components

A detailed listing of the components upgraded for the RCIC System follows, including identification of those interfacing system components not requiring upgrade.

REACTOR CORE ISOLATION COOLING SYSTEM, SSAR Figure 5.4-8 GE Drawing 103E1795 Rev. 2P, Sheets 1 & 3. (atg = Kg/cm^2):

RCIC pump suction piping

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	200A-RCIC-001-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-703-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-F701	Valve	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-PX015	P.Test	28.8 atg,	77°C,3B,As	Was 14 atg
	200A-RCIC-D001	Strainer	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-700-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-F700	Valve	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-PT001	P.Trans	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-701-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-702-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-PI003	P.Ind.	28.8 atg,	77°C,3B,As	Was 14 atg
	20A-RCIC-PT002	P.Trans	28.8 atg,	77°C,3B,As	Was 14 atg
	50A-RCIC-018-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	50A-RCIC-F017	R.Valve	28.8 atg,	104°C,3B,As	Was 14 atg
	200A-RCIC-F002	T.Check	28.8 atg,	77°C,3B,As	Was 14 atg
	* 200A-RCIC-F001	MO Valve	28.8 atg,	77°C,3B,As	Was 14 atg
	** 200A-RCIC-005-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	** 200A-RCIC-F007	Check	28.8 atg,	77°C,3B,As	Was 14 atg
	** 20A-RCIC-025-W	Pipe	28.8 atg,	77°C,3B,As	Was 14 atg
	** 20A-RCIC-F027	T.Valve	28.8 atg,	77°C,3B,As	Was 14 atg
Sheet 1	** 200A-RCIC-F006	MO Valve	28.8 atg,	104°C,3B,As	Was 14 atg

* HPCF Interface Piping 200A-HPCF-015-S, 14 atg, 66°C,B (S1,S2), As (open pathway to Condensate Storage Tank with LO valves).

** Suction Piping from Suppression Pool Interface 200A-RCIC-004-W, 3.16 atg, 104°C, 3B, As.

RCIC discharge from relief valves and test line valve direct to the suppression pool without restriction.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	50A-RCIC-009-W	Pipe	3.16 atg,	104°C,3B,As	No change
	50A-RCIC-019-W	Pipe	3.16 atg,	104°C,3B,As	No change
	100A-RCIC-007-W	Pipe	3.16 atg,	104°C,3B,As	No change
	250A-RHR- 008	Pipe	3.16 atg,	104°C,3B,As	No change
Sheet 1	Suppression Pool				

3.3 continued

ABWR High Pressure Core Flooder System SSAR Figure 6.3-7 GE Drawing 107E6008 Rev. 1P. componets interfacing with RCIC System are not upgraded because this is the open pathway to the condensate storage tank vented to the atmosphere.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	200A-HPCF-015-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change
	400A-HPCF-105-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change
	500A-HPCF-004-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change
	300A-HPCF-001-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change
	300A-HPCF-002-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change
	300A-HPCF-003-W	Pipe	14 atg, 66°C,B (S1,S2), As	No change

ABWR Makeup Water System (Condensate) SSAR Figure 9.2-4 GE Drawing 107E6014 Rev. 1P. components interfacing with HPCF System are not upgraded due to the open pathway to the condensate storage tank vented to the atmosphere.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	300A-MUWC-F100	Valve	14 atg, 66°C,B (S1,S2), As	No change
	300A-MUWC-F101	Valve	14 atg, 66°C,B (S1,S2), As	No change
	300A-MUWC-F102	Valve	14 atg, 66°C,B (S1,S2), As	No change
	300A-MUWC-100	Pipe	Static Hd, 66°C,B (S1,S2), As	No change
	300A-MUWC-101	Pipe	Static Hd, 66°C,B (S1,S2), As	No change
	300A-MUWC-102	Pipe	Static Hd, 66°C,B (S1,S2), As	No change
	Condensate Storage Tank,		66°C,4D, Non-seismic	No change

RCIC turbine condensate piping to the suppression pool

Reference		Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3		250A-RCIC-037-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-720-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-F722	Valve	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-PI012	P.Ind.	28.8 atg, 184°C,3B,As	Was 10 atg
		350A-RCIC-Cond.	Chamber	28.8 atg, 184°C,3B,As	Was 10 atg
		350A-RCIC-038-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	*	250A-RCIC-504-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	*	250A-RCIC-D014	Rup.Disk	28.8 atg, 184°C,3B,As	Was 10 atg
	*	250A-RCIC-D015	Rup.Disk	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-721-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-F723	Valve	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-722-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
		20A-RCIC-PT013A	P.Trans	28.8 atg, 77°C,3B,As	Was 14 atg
		20A-RCIC-PT013B	P.Trans	28.8 atg, 77°C,3B,As	Was 14 atg
	**	25A-RCIC-051-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	**	25A-RCIC-F051	Valve	28.8 atg, 184°C,3B,As	Was 10 atg
	**	25A-RCIC-D012	Strainer	28.8 atg, 184°C,3B,As	Was 10 atg
	**	25A-RCIC-D013	S.Trap	28.8 atg, 184°C,3B,As	Was 10 atg
	**	25A-RCIC-F052	Valve	28.8 atg, 184°C,3B,As	Was 10 atg
Sheet 3	**	25A-RCIC-052-S	Pipe	28.8 atg, 184°C,4D,As	Was 10 atg

* Vent via Rupture Disks.

** RCIC Turbine Condensate Piping to the Barometric Condenser.

3.3 continued

RCIC turbine condensate piping to the suppression pool (continued)

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	350A-RCIC-F038	Check	28.8 atg, 77°C,3B,As	Was 14 atg
	20A-RCIC-053-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	20A-RCIC-F053	T.Valve	28.8 atg, 184°C,3B,As	Was 10 atg
	350A-RCIC-F039	Valve	28.8 atg, 184°C,3B,As	Was 10 atg
	350A-RCIC-039-S	Pipe	10 atg, 184°C,3B,As	No change
Sheet 1	Suppression Pool			

RCIC vacuum tank condensate piping to the suppression pool.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	50A-RCIC-Vacuum	Pump	28.8 atg, 121°C,4D,As	Was 7.7 atg
	50A-RCIC-044-S	Pipe	28.8 atg, 88°C,4D,As	Was 3.16atg
	50A-RCIC-067-S	Pipe	28.8 atg, 88°C,4D,As	Was 3.16atg
	50A-RCIC-PCV	Valve	28.8 atg, 121°C,4D,As	Was 7.7 atg
Sheet 3	20A-RCIC-068-S	Pipe	28.8 atg, 121°C,4D,As	Was 10 atg
Sheet 1	50A-RCIC-F046	Check V.	28.8 atg, 104°C,3B,As	Was 3.16atg
	20A-RCIC-057-S	Pipe	28.8 atg, 104°C,3B,As	Was 3.16atg
	20A-RCIC-F059	T.Valve	28.8 atg, 104°C,3B,As	Was 3.16atg
	50A-RCIC-F047	MO Valve	28.8 atg, 104°C,3B,As	Was 3.16atg
	50A-RCIC-045-S	Pipe	10 atg, 104°C,3B,As	No change
Sheet 1	Suppression Pool			

RCIC steam drains from trip and throttle valve piping and turbine to condensate chamber.

Reference		Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	*	20A-RCIC-063-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	*	20A-RCIC-061-S	Pipe	28.8 atg, 184°C,3B,As	Was 10 atg
	**	20A-RCIC-064-S	Pipe	28.8 atg. 184°C,3B,As	Was 10 atg
		Condensate Chamber		28.8 atg, 184°C,3B,As	Was 10 atg

* RCIC Trip and Throttle Valve leakoffs are piped to Condensing Chamber.

** RCIC Turbine Condensate Drain connects to the Condensing Chamber

RCIC turbine valve leakoffs are piped to the barometric condenser

Reference		Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	*	25A-RCIC-058-S	Pipe	28.8 atg, 184°C,4D,As	Was 10 atg
	**	25A-RCIC-059-S	Pipe	28.8 atg, 184°C,4D,As	Was 10 atg
		Barometric Condenser		28.8 atg, 184°C,4D,As	Was 7.7 atg
	***	25A-RCIC-065-S	Pipe	28.8 atg, 184°C,4D,As	Was 7.7 atg
		25A-RCIC-Relief	Valve	28.8 atg, 121°C,4D,As	Was 7.7 atg
		25A-RCIC-066-S	Pipe	0 atg, 121°C,4D,As	No change

* RCIC Trip and Throttle Valve Stem leakoff is piped to the Barometric

** RCIC Turbine Governor Valve Stem is piped to the to Barometric Condenser.

*** Barometric Condenser pressure relief and piping.

3.3 continued

RCIC pump cooling water piping for pump and turbine lube oil coolers

Reference	Components	Press./Temp./Design/Seismic Class	Remarks
Sheet 3	50A-RCIC-011-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	50A-RCIC-028-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	50A-RCIC-F030 Relief V.	28.8 atg, 77°C,3B,As	Was 8.8 atg
	50A-RCIC-029-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	20A-RCIC-713-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	20A-RCIC-PX018 Press	28.8 atg, 77°C,3B,As	Was 8.8 atg
	50A-RCIC-Turb.LO Cooler	28.8 atg, 77°C,3B,As	Was 8.8 atg
	50A-RCIC-Pump LO Cooler	28.8 atg, 77°C,3B,As	Was 8.8 atg
	15A-RCIC-TX019 Temp.Pt.	28.8 atg, 77°C,3B,As	Was 8.8 atg
	20A-RCIC-714-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	20A-RCIC-F714 Valve	28.8 atg, 77°C,3B,As	Was 8.8 atg
	20A-RCIC-PX020 Press.Pt.	28.8 atg, 77°C,3B,As	Was 8.8 atg
	15A-RCIC-012-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	15A-RCIC-013-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	15A-RCIC-014-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
	15A-RCIC-015-W Pipe	28.8 atg, 77°C,3B,As	Was 8.8 atg
Sheet 3	Barometric Condenser	28.8 atg, 121°C,4D,As	Was 7.7 atg

RCIC vacuum tank and condensate pump piped to RCIC pump suction pipe.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 3	RCIC Vacuum	Tank	28.8 atg, 77°C,4D,As	Was 7.7 atg
	RCIC Press.	Switch H	28.8 atg, 121°C,4D,As	Was 7.7 atg
	RCIC Level	Switch H	28.8 atg, 121°C,4D,As	Was 7.7 atg
	RCIC Level	Switch L	28.8 atg, 121°C,4D,As	Was 7.7 atg
	RCIC Cond.	Pump	28.8 atg, 88°C,4D,As	Was 14 atg
	50A-RCIC-F014	Check	28.8 atg, 88°C,4D,As	Was 14 atg
	50A-RCIC-016-W	Pipe	28.8 atg, 88°C,4D,As	Was 14 atg
	20A-RCIC-715-W	Pipe	28.8 atg, 88°C,4D,As	Was 14 atg
	20A-RCIC-F715	Valve	28.8 atg, 88°C,4D,As	Was 14 atg
	20A-RCIC-PX021	Press.Pt.	28.8 atg, 88°C,4D,As	Was 14 atg
	50A-RCIC-F015	Valve	28.8 atg, 88°C,3B,As	Was 14 atg
	50A-RCIC-017-W	Pipe	28.8 atg, 88°C,3B,As	Was 14 atg
	50A-RCIC-030-W	Pipe	28.8 atg, 88°C,3B,As	Was 14 atg
	50A-RCIC-F031	MO Valve	28.8 atg, 88°C,3B,As	Was 14 atg
	50A-RCIC-F032	AO Valve	28.8 atg, 88°C,3B,As	Was 14 atg
	20A-RCIC-032-W	Pipe	28.8 atg, 88°C,3B,As	Was 14 atg
	20A-RCIC-F034	T.Valve	28.8 atg, 88°C,3B,As	Was 14 atg
*	50A-RCIC-F016	Check	28.8 atg, 77°C,3B,As	Was 14 atg

* 50A-RCIC-017 Pipe connects with RCIC pump suction 200A-RCIC-001-W Pipe on sheet 1 upgraded to 28.8 atg.

3.3 continued

Sheet 2: **Valve gland leak off piping**
Branch piping from RCIC steam supply isolation valves FO-035, inside primary containment and FO_036 outside primary containment to VGL Radwaste Treatment System.

Reference	Components		Pressure Rating	Remarks
Sh 2, I-11	25A-RCIC-506-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure
I-7	25A-RCIC-507-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure

Sheet 2: **Instrument piping from RCIC steam supply piping to PT-009, PI-010 and level switch LS-011.**

Reference	Components		Pressure Rating	Remarks
Sh 2, H-6	20A-RCIC-716-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure
H-7	20A-RCIC-717-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure
G-5	20A-RCIC-718-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure
F-5	20A-RCIC-719-S	Pipe	87.9 atg, 302°C, 1A, As	Reactor Pressure

No other low pressure components of the RCIC System were identified for upgrading to the higher design pressure as shown on the marked P & ID's. Interface with the LCW Reactor Building sump which is vented to atmosphere, is through open funnel drains with low pressure piping to the sump.

4. Control Rod Drive System

4.1 Upgrade Description

The CRD System interfaces with the reactor in a manner that makes low pressure piping over pressurization very unlikely. The minimum failure path from the reactor to the low pressure piping has three check valves in series and the second check valve is one half inch in size. This path is from the purge flow channels of the CRD, out through the first check valve in the CRD housing, through the purge supply line that has the second half inch check valve, and to the pump discharge check valve. An alternate path through the accumulator charging line has additionally the normally closed scram valve, and this path is less likely for failure, therefore not considered. The path from the pump discharge, back through the pump to its suction, and back through the suction lines to the condensate storage tank or the condensate feedwater source is an open path. The open pump suction pipeline is a minimum 100 mm (4 inch) diameter except for a 150 mm (6 inch) diameter attachment to the Condensate Storage Tank. The CRD pumps run continuously while the reactor is at operating pressure, which prevents reactor pressure from reaching the low pressure piping unless for the very unlikely case when both CRD pumps have failed. Therefore, an ISLOCA condition from a 0.5 inch diameter source could only occur when three check valves in series fail open at the same time both CRD pumps have failed. The ISLOCA guidelines do not provide credit for this rare condition, so the low pressure piping has been upgraded to the URS design criteria over the entire low pressure piping region of the Control Rod Drive System. The suction path through the Makeup Water System (Condensate) to the Condensate Storage Tank from the CRD interface is an open path whose design pressure was not upgraded to URS design criteria. The piping design of the primary suction path through the Condensate, Feedwater and Condensate Air Extraction System has not been established, but if a check valve is in that path, the design pressure up to and including the check valve will be the URS design pressure.

The normal key assumption to this evaluation, as stated in the Boundary Limits of URS section above, that the valve adjacent to a low pressure sink remains closed, means that the pump discharge check valve remains closed as a given. However, this valve is in the high pressure piping, which is unique for the CRD System. According to this accepted line of reasoning, the low pressure piping would not have to be upgraded because it would not experience the high reactor pressure. However, the low pressure piping has been upgraded in response to reference 1's guidance that states "for all interfacing systems and components which do not meet the full RCS URS criteria, justification is required......, which must include engineering feasibility; not solely a risk benefit analysis." Upgrading the low pressure piping is feasible and was done.

4.2 Downstream Interfaces

Other systems are listed below that interface with the CRD System and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Reactor Water Cleanup System at the output of the filter units. The RWCU design pressure exceeds the URS design pressure without upgrade.

- Reactor Recirculation System purge water supplied by the CRD System, has a 190 atg design pressure, which exceeds the URS design pressure and needs no upgrade.

- Makeup Water (Condensate) System provides pump suction from and system return to the CST. The MUWC System is discussed in Section 10, where it is explained how certain MUWC upgrades were made that provide an open path to the CST. This line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere. There is no source to pressurize the MUWC line because of closed pump discharge check valves in the CRD System's URS region.

- Condensate, Feedwater and Air Extraction System provides pump suction from the turbine building condensate supply. This system is not part of the SSAR design scope, but it is expected to be an open path to a large water source similar to the MUWC System. Because of the open path the CFAE System was not upgraded.

- Sampling System at the output of the filter units. The Sampling System's design pressure exceeds the URS design pressure without upgrade.

- Nuclear Boiler System at a branch off of the CRD purge line provides the water for conducting RPV hydro tests and the 100 atg design pressure exceeds the URS design pressure and needs no upgrade.

4.3 Upgraded Components

A detailed listing of the components upgraded for the CRD System follows, including identification of those interfacing system components not requiring upgrade.

CONTROL ROD DRIVE SYSTEM, SSAR Figure 4.6-8, GE Drawing 103E1789 Rev. 1P. Sheets 1, 2 & 3. (atg = Kg/cm^2):

CRD pump suction piping Condensate, Feedwater and Condensate Air Extraction System or Condensate Storage Tank of the Makeup Water System (Condensate).

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
See Note 1	100A-CFDWAO-Fxxx	Valve	42 atg, 66^oC,B,(S1,S2),As	No change
Sheet 1	100A-CRD-001-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	150A-MUWC-F103	Valve LO	14 atg, 66^oC,B,(S1,S2),As	No change
	150A-CRD-002-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
Sheet 1	Condensate Storage Tank,		66^oC,4D, Non-seismic	No change
	50A-MUWC-F103	Valve	14 atg, 66^oC,4D,B	Lock Open
	50A-MUWC-103	Pipe	Static Hd, 66^oC,4D,B	No change
	50A-CRD-033-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-032-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-500-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-501-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-502-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-503-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	25A-CRD-504-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-505-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-033-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-F019	Globe V	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-032-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	CRD-B001	Elec Htr	28.8 atg, 20^oC,4D,B	Was 14 atg
	25A-CRD-518-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	25A-CRD-F018	Safe.RV	28.8 atg, 20^oC,4D,B	Was 14 atg
	50A-CRD-F107	Valve	190 atg, 66^oC,4C,B	No change
	100A-CRD-F001A	Gate V	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-003-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	CRD-D001A	Filter	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-500-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-F500A	Valve NC	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-501-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-F501A	Globe V	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-004-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-F002A	Gate V	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-F001B	Gate V	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-005-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	CRD-D001B	Filter	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-502-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-F500B	Clobe V	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-503-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg
	20A-CRD-F501B	Globe V	28.8 atg, 20^oC,4D,B	Was 14 atg
	100A-CRD-006-S	Pipe	28.8 atg, 20^oC,4D,B	Was 14 atg

4.3 continued

CRD pump suction piping (continued)

Reference	Components		Pressure/Temperature/Design/Seismic Class	
	100A-CRD-F002B	Gate V	28.8 atg, 20°C,4D,B	Was 14 atg
	100A-CRD-007-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-700-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-F700	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-DPT001	Diff P T	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-F701	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-701-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	100A-CRD-F003A	Gate V	28.8 atg, 20°C,4D,B	Was 14 atg
	100A-CRD-008-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	25A-CRD-504-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	25A-CRD-F004A	Safe.RV	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-702-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-F702A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-PI002A	Press I	28.8 atg, 20°C 4D,B	Was 14 atg
	CRD-PT003A	Press T	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-C001A	Pump	35 atg, 66°C,4C,B	No change
	* CRD-F502A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* A-CRD-505-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F503A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F504A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* A-CRD-506-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* A-CRD-507-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F505A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F506A	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	100A-CRD-F003B	Gate V	28.8 atg, 20°C,4D,B	Was 14 atg
	100A-CRD-010-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	25A-CRD-508-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	25A-CRD-F004B	Relief V.	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-703-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	20A-CRD-F702B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-PI002B	Press I	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-PT003B	Press T	28.8 atg, 20°C,4D,B	Was 14 atg
	CRD-C001B	Pump	35 atg, 66°C,4C,B	No change
	* A-CRD-509-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F502B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F503B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* A-CRD-510-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F504B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F505B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg
	* A-CRD-511-S	Pipe	28.8 atg, 20°C,4D,B	Was 14 atg
	* CRD-F506B	Globe V	28.8 atg, 20°C,4D,B	Was 14 atg

* Size dependent on pump requirements.

4.3 continued

CRD interface from pump discharge to the MUWC System condensate storage tank

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	50A-CRD-034-S	Pipe	190 atg, 66°C,4C,B	No change
	50A-CRD-F022	Gate V	190 atg, 66°C,4C,B	No change
	50A-CRD-035-S	Pipe	190 atg, 66°C,4C,B	No change
	50A-CRD-F023	Gate V	190 atg, 66°C,4C,B	No change
	50A-MUWC-xxx-S	Pipe	14 atg, 66°C,4C,B	No change
	50A-MUWC-Fxxx	Gate V	14 atg, 66°C,4C,B	No change
	Condensate Storage Tank		66°C,Non-seismic	No change

CRD interface from pump discharge to the RRS System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	20A-CRD-036-S	Pipe	190 atg, 66°C,4C,B	No change
	20A-CRD-F024	Gate V	190 atg, 66°C,4C,B	No change
	20A-CRD-F025	Gate V	190 atg, 66°C,4C,B	No change

CRD interface from pump discharge to the CUW System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	20A-CRD-037-S	Pipe	190 atg, 66°C,4C,B	No change
	20A-CRD-F026	Gate V	190 atg, 66°C,4C,B	No change
	20A-CRD-F027	Gate V	190 atg, 66°C,4C,B	No change

No other low pressure components of the Control Rod Drive System were identified for upgrading to the higher design pressure as shown on the marked P & ID's. Interface with the LCW Reactor Building sump which is vented to atmosphere, is through open funnel drains with low pressure piping to the sump.

5.0 Standby Liquid Control System

5.1 Upgrade Description

The SLC System interfaces with the reactor through the HPCF injection piping inside the drywell. The leakage path includes three 40mm diameter check valves in series with normally closed motor operated valves in addition to the positive displacement pumps piped in parallel. A 40mm dimeter test pipe from the pump discharge piping to the test tank has two normally closed valves in series. All of these valves have leakage test features. Short monthly pump operating tests produce demineralized water flow through the test tank.

The 100 mm diameter pump suction piping between the pumps, the storage tank outlet valve, the test tank and the MUWP System interface is upgraded to URS design criteria. The SLC storage tank is vented to atmosphere and serves as the pressure release sink connecting to the outermost pump suction piping valves.

All low pressure instrumentation, pressure relief, drain piping and valving are upgraded to URS design criteria to reduce the level of pressure challenge to these components.

5.2 Downstream interfaces.

Other systems are listed below that interface with the SLC System and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

MUWP System 80 mm diameter piping interface occurs at the SLC check valve connected to a branch off the test loop suction pipe. This SLC branch piping consists of a normally closed flushing valve and a normally open 20 mm diameter suction piping pressurizing valve to prevent borated solution migrating to the SLC injection pump suction piping. Refer to Section 11 for upgrade information on the MUWP System.

MUWP System also provides the makeup water to the SLC System storage tank through block and bleed valves and a piping drain to a portable container to prevent leakage of additional makeup into the SLC storage tank which could dilute the borate solution in the tank.

5.3 Upgraded Components

A detailed listing of the components upgraded for the SLC System follows, including identification of those interfacing system components not requiring upgrade.

STANDBY LIQUID CONTROL SYSTEM, SSAR Figure 9.3-1 GE Drawing 107E6016 Rev. 1P Sheet 1. (atg = Kg/cm^2):

SLC Injection Pump A suction piping from the SLC storage tank.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	SLC-C001A	Pump	110 atg, 66°C,2B,A	No Change
	SLC-F003A	Relief V.	110 atg, 66°C,2B,A	No Change
	50A-SLC-F003A	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-F002A	Valve LO	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-F001A	Valve MO	28.8 atg, 66°C,2B,A	Was 14 atg
*	SLC-A001	Storage Tk.	STH atg, 66°C,2B,A	No Change

SLC Injection Pump B suction piping from the SLC storage tank.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	SLC-C001B	Pump	110 atg, 66°C,2B,A	No Change
	SLC-F003B	Relief V.	110 atg, 66°C,2B,A	No Change
	50A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-F002B	Valve LO	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-F500	Valve	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-F001B	Valve MO	28.8 atg, 66°C,2B,A	Was 14 atg
*	SLC-A001	Storage TK.	STH atg, 66°C,2B,A	No Change

* SLC Storage Tank is vented to atmosphere (STH is static head).

SLC test tank piping.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
**	40A-SLC-F011	Valve LC	110 atg, 66°C,2B,A	Was ATP atg
	40A-SLC-SS	Pipe	110 atg, 66°C,2B,A	Was 14 atg
	SLC-A002	Test Tank	28.8 atg, 66°C,2B,A	Was STH atg
	100A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-F012	Valve LC	28.8 atg, 66°C,2B,A	Was 14 atg
	25A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	SLC-F026	Relief V.	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg
	100A-SLC-SS	Pipe	28.8 atg, 66°C,2B,A	Was 14 atg

** ATP is atmospheric pressure.

5.3 continued

SLC interface with MUWP for makeup and pressurization of suction piping from tank. (Pressure higher than static head of SLC storage tank.)

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	80A-MUWP-F163	Valve LO	14 atg, 66°C,4D,C	No change
	80A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	SLC-F013	Check V.	28.8 atg, 66°C,2B,C	Was 14 atg
	80A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	80A-SLC-F014	Valve LC	28.8 atg, 66°C,2B,A	Was 14 atg
	80A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	20A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	20A-SLC-F020	Valve LO	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-D002	RO	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg

SLC storage tank interface with MUWP for purified makeup water.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	80A-MUWP-F163	Valve LO	14 atg, 66°C,4D,C	No change
	80A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	SLC-F013	Check V.	28.8 atg, 66°C,2B,C	Was 14 atg
	80A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	25A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	25A-SLC-F015	Valve LC	28.8 atg, 66°C,2B,A	Was 14 atg
	20A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	20A-SLC-F505	Valve NO	28.8 atg, 66°C,2B,A	Was 14 atg
	25A-SLC-SS	Pipe	28.8 atg, 66°C,2B,C	Was 14 atg
	25A-SLC-F023	Valve LC	28.8 atg, 66°C,2B,A	Was 14 atg
	25A-SLC-SS	Pipe	8.8 atg, 66°C,2B,C	No change
*	SLC-A001	Storage TK.	STH atg, 66°C,2B,A	No change

* SLC Storage Tank is vented to atmosphere (STH is static head).

6. Reactor Water Cleanup System

6.1 Upgrade Description

The Reactor Water Cleanup System (CUW) is a high pressure system that is almost totally designed above the URS design pressure. One pipe connecting to radwaste was upgraded. It is the pipe downstream of valve G31-F023 shown at zone E-14 of Figure 5.4-12 , sheet 3. The interface symbol is labeled "LCW Collector Tank."

6.2 Downstream Interfaces

A system is listed below that interfaces with CUW and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given .

- Low Conductivity Waste, (Radwaste) connects to a branch of the CUW filter/demineralizer discharge, as described in 6.1 above. There is not a practical reason to upgrade this interface in CUW as discussed in the Radwaste System, Section 12.

6.3 Upgraded Components

A detailed listing of the components upgraded for the CUW System follows, including identification of those interfacing system components not requiring upgrade.

REACTOR WATER CLEANUP SYSTEM, SSAR Figure 5.4-12 GE Drawing 107E5051 Rev.2P Sheets 1,2 and 3. (atg = Kg/cm^2).

CUW System interface with Radwaste System

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
	150A-CUW-F023	Valve MO	104 atg,	66°C,4C,B	No change
	150A-CUW-31-CS	Pipe	28.8 atg,	66°C,4D,C	Was 10 atg
	200A-LCW-CS	Pipe	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg,	66°C,4D,B	No change
*	LCW Collector	Tank A	0 atg,	66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg,	66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg,	66°C,4D,B	No change
*	LCW Collector	Tank B	0 atg,	66°C,4D,B	No change

7. Fuel Pool Cooling Cleanup System

7.1 Upgrade Description

The Fuel Pool Cooling Cleanup System interfaces with the RHR System at two locations that could possibly expose the FPC System to reactor pressure. One location is the discharge from the FPC to RHR in the line downstream from the skimmer surge tank; the other location is the RHR return to the FPC in the line to the reactor well. See Figure 9.1-1a, upper right and left hand corners respectively.

Upgrading of components and new pipeline with a testable check valve and gate valve were added to the first interface of the discharge from the FPC to RHR. This new line has the gate valve locked open with the check valve's flow direction into the skimmer surge tank and provides an open path into the skimmer surge tank from valve FPC-F031. Valve FPC-F029 has and open path to the skimmer surge tank. This new line and its two new valves have the FPC normal design pressure of 16 atg because the line is an open path to the skimmer surge tank. All the piping between the FPC valves, FPC-F029 and FPC-F031, and the RHR valves, RHR-F016B and RHR-F016C, was upgraded to the URS design pressure of 28.8 atg.

The second interface, the RHR return to the FPC in the line to the reactor well, was not upgraded because of the continuous open path to the spent fuel storage pool and cask pit. Valves FPC-F093 and FPC-F017 are always locked open and provide an open path from the RHR valves, RHR-F015B and RHR-F015C, to the spent fuel storage pool and cask pit.

7.2 Downstream Interfaces

The Fuel Pool Cooling Cleanup System has no further downstream system interfaces that could allow reactor pressure from RHR to proceed further than the FPC System.

7.3 Upgraded Components

A detailed listing of the components upgraded for the FPC System follows, including identification of those interfacing system components not requiring upgrade.

FUEL POOL COOLING AND CLEANUP SYSTEM, SSAR Figure 9.1-15, GE Drawing 107E6042 Rev.1P, Sheets 1,2 and 3. (atg = Kg/cm^2).

FPC System interface with makeup from RHR System or SPCU System.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	250A-RHR-F015C	Valve MO	35 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-RHR-F015B	Valve MO	35 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F094	Check Valve	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	20A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	20A-FPC-F506B	Valve	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-RHR-F022	Valve LO	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F023	Check Valve	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	REACTOR WELL			No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F093	Valve LO	16 atg, 66°C,3B,A(S2)D	No change
	80A-SPCU F014	Valve MO	35 atg, 66°C,3B,A(S2)D	No change
	80A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	80A-FPC-F091	Check Valve	16 atg, 66°C,3B,A(S2)D	No change
	80A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	80A-FPC-D011	RO	16 atg, 66°C,3B,A(S2)D	No change
	80A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F016	Check Valve	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F017	Valve LO	16 atg, 66°C,3B,A(S2)D	No change
	250A-FPC-F018	Check Valve	16 atg, 66°C,3B,A(S2)D	No change
	SPENT FUEL STORAGE POOL			

7.3 continued

FPC System interface with suction of RHR System for cooling.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	300A-RHR-F016C	Valve MO	28.8 atg, 182°C,3B,As	Was 14 atg
	300A-FPC-SS	Pipe	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	300A-RHR-F016B	Valve MO	28.8 atg, 182°C,3B,As	Was 14 atg
	300A-FPC-SS	Pipe	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	300A-FPC-F029	Valve NC	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	300A-FPC-SS	Pipe	SWH atg, 66°C,3B,A(S2)D	No change
*	SPENT FUEL STORAGE POOL			
	250A-FPC-SS	Pipe	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	250A-FPC-F031	Valve NC	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	No change
**	FILTER DEMINERALIZER			No change
	250A-FPC-F031	Valve NC	28.8 atg, 66°C,3B,A(S2)D	Was 14 atg
	250A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	New Branch
	250A-FPC-Fxxx	Check Valve	16 atg, 66°C,3B,A(S2)D	NewValve
	50A-FPC-SS	Pipe	16 atg, 66°C,3B,A(S2)D	New Branch
	250A-FPC-Fxxx	Valve LO	16 atg, 66°C,3B,A(S2)D	New Valve
	250A-FPC-SS	Pipe	SWH atg, 66°C,3B,A(S2)D	New Branch
***	SKIMMER SURGE TANK			No change

* FPC Valve F029 is open only for fuel pool cooling mode B (maximum heat load operation with RHR System B or C operating in paralell with FPC System).

** FPC Valve F031 is open only for fuel pool cooling mode B (refueling when Dryer/Separator Pool is drained and pumped to Radwaste LCW collector tank by RHR System B or C).

*** FPC Valve F031 leakage is directed to skimmer surge tank through a lock open valve and a check valve into skimmer surge tank.

SWH is static water head.

8.0 Nuclear Boiler System

8.1 Upgrade Description

The NBS piping and instrumentation are designed for reactor pressure. One low pressure level transmitter and level indicator with the associated piping and two normally closed globe valves are upgraded to URS design criteria. This level instrumentation is used to measure the level in the reactor well during refueling and is selected for the required sensitivity. A relief valve downstream of the two normally closed globe valves discharges to a LCW funrel drain to the Reactor Building LCW sump.

8.2 Downstream Interfaces

Other systems are listed below that interface with the NBS and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

CRD, RCIC, RPV, RHR, HPCF, CUW, MS, are high pressure interfaces of the NBS and RW(LCW, HCW, VG) are low pressure interfaces of the NBS. Interfacing systems at high pressure have low pressure interfaces addressed in their specific system listings.

8.3 Upgraded Components

A detailed listing of the components upgraded for the NBS System follows.

NUCLEAR BOILER SYSTEM, SSAR Figure 5.1-3 GE Drawing 103E1791 Rev. 2P. Sheets 1 & 5. (atg = Kg/cm^2):

Refueling level transmitter piping

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	20A-NBS-F708	Relief V	28.8 atg, 20°C, 1A As	Was 7 atg
	* 20A-NBS-LT004	Level Tr	28.8 atg, 20°C, 1A As	Was 7 atg
	20A-NBS-Interconn.	Pipe	28.8 atg, 20°C, 1A As	Was 7 atg

* LT-004 must be low pressure rated for level sensitivity during refueling.

Other fluid piping components of the NBS System are rated for reactor pressure, except the main steam drain header interface with the Condensate, Feedwater and Air Extraction System piping to be designed for at least 28.8 Kg/cm^2 and other drains including valve gland leakage, LCW and HCW funnel drains to the drywell equipment drain sump.

9.0 Reactor Recirculation System

9.1 Upgrade Description

Ten Reactor Internal Recirculation Pumps (RIP) are installed around the perimeter of the reactor vessel and operate at reactor pressure.

9.2 Downstream Interfaces

Other systems are listed below that interface with the RRS System and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

MUWP System interfaces with each reactor recirculation pump to provide RIP casing makeup water. Another MUWP System interface exists during refueling or maintenance shutdown to provide water for the RIP shaft inflatable seal subsystem. Pressure upgrades are required for the interfacing components of the MUWP System.

RCW System interfaces with each RRS RIP motor cooling subsystem through a heat exchanger designed for 87.9 atg.and utilizes RCW water for cooling the RIP motors. No upgrade is needed for the RCW System connecting piping designed to 14 atg.

CRD System piping connects to ten RIP motor purge subsystems. Control Rod Drive System SSAR Figure 4.6-8, sheet 1 at C-2, the 20A-CRD-036 pipe and 20A-CRD-F025 valve interface with the 20A-RRS-003A pipe connecting to the ten RIP motors. No upgrade is required because the design pressure for both the CRD and RRS is 190 atg.

RWS Open funnel drain piping connects to the LCW and HCW sumps in the drywell.

MUWP Makeup Water System (Purified) SSAR Figure 9.2-5 GE Drawing 107E5111 Rev. 2P. shows other components interfacing with RRS System. These are not upgraded because they are part of the open pathway to the Condensate Storage Tank which is vented to the atmosphere. Another MUWP System interface is connected to a portable inflatable shaft seal pump and tank only during refueling or when the reactor is shut down for maintenance.

9.3 Upgraded Components

A detailed listing of the components upgraded for the RRS System follows, including identification of those interfacing system components not requiring upgrade.

REACTOR RECIRCULATION SYSTEM SSAR Figure 5.4-4, GE Drawing 107E5194 Rev. 1P, Sheets 1 & 2. (atg = Kg/cm^2):

RRS interface with MUWP System for Reactor Internal Pump (RIP) casing makeup water.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	15A-RRS-502A-K	Pipes	87.9atg,302°C, 4A As	No change
	15A-RRS-F504A-K	Valves NC	87.9atg,302°C, 4A,As	No change
	15A-MUWP-189-198	Pipes	28.8atg, 66°C, 4D,C	Was 14 atg
	50A-MUWP-185	Pipe	28.8atg, 66°C, 4D,C	Was 14 atg
	50A-MUWP-F142	Check Valve	28.8atg,171°C, 3B,As	Was 14 atg
	50A-MUWP-184	Pipe	28.8atg,171°C, 3B,As	Was 14 atg
	50A-MUWP-F141	Valves NC	28.8atg,171°C, 3B,As	Was 14 atg
	50A-MUWP-183	Pipe	14 atg, 66°C, 4D,C	No change
	80A-MUWP-181	Pipe	14 atg, 66°C, 4D,C	No change
	80A-MUWP-F140	Valve LO	14 atg, 66°C, 4D,C	No change
	125A-MUWP-101	Pipe	14 atg, 66°C, 4D,C	No change
	125A-MUWP-F101	Valve LO	14 atg, 66°C, 4D,C	No change
	20A-MUWP-602	Pipe	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F602	Valve NC	14 atg, 66°C, 4D,C	No change
	20A-MUWP-601	Pipe	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F601	Valve NC	14 atg, 66°C, 4D,C	No change
	20A-MUWP-FQ102	Flow Integr.	14 atg, 66°C, 4D,C	No change
	20A-MUWP-801	Pipe	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F801	Valve NC	14 atg, 66°C, 4D,C	No change
	20A-MUWP-800	Pipe	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F800	Valve NC	14 atg, 66°C, 4D,C	No change
	20A-MUWP-PX101	Press. Pt.	14 atg, 66°C, 4D,C	No change
	20A-MUWP-600	Pipe	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F600	Valve NC	14 atg, 66°C, 4D,C	No change
	20A-MUWP-F100	Valve LO	14 atg, 66°C, 4D,C	No change
	125A-MUWP-102	Pipe	14 atg, 66°C, 4D,C	No change
	125A-MUWP-F102	Valve NC	14 atg, 66°C, 4D,C	No change
	150A-MUWP-xxx	Pipe	14 atg, 66°C, 4D,C	No change
	150A-MUWP-xxx	Pipe	14 atg, 66°C, 4D,C	No change
	50A-RRS-Fxxx	Check Valve	14 atg, 66°C, 4D,C	No change
	Condensate Storage Tank,		66°C, 4D,Non-seismic	No change

10.0 Makeup Water System Condensate

10.1 Upgrade Description

The MUWC System has extensive system interfaces throughout the plant for makeup water to fill systems and serve flushing connections. The extent of the piping and the size of the Condensate Storage Tank of the MUWC System makes it impractical to upgrade. Instead valves are changed to lock open type to create a clear path from the URS boudary to the Condensate Storage Tank which is vented to atmosphere.

10.2 Downstream Interfaces

HPCF System is a downstream interface of the MUWC System at three outlets of the Condensate Storage Tank. The CRD piping is not upgraded to the URS design pressure because the maximum static head is 1.62 atg. The first closed valve of the HPCF System suction piping is upgraded to URS design pressure based on data provided in Section 2.

CRD System 150A suction piping interfaces with Condensate Storage Tank.

Other interfaces include the HPCF System fill line, RHR flushing lines, CRD makeup and discharge, and MUWP System are not upgraded due to the impractical nature of upgrades for such an extensive piping system with lock open type valves and open piping paths to the vented condesate storage tank.

All MUWC valves between the interfacing system connections and the Condensate Storage Tank are lock open type to provide an open pathway to relieve pressure to this tank which is vented to the atmosphere.

10.3 Upgraded Components

A detailed listing of the components upgraded for the MUWC System follows, including identification of those interfacing system components not requiring upgrade.

MAKEUP WATER SYSTEM (CONDENSATE) SSAR Figure 9.2-4 GE Drawing 107E6014 Rev. 1P. Sheets 1. (atg = Kg/cm^2):

HPCF Subsystem B keep fill line interface.

Reference		Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	*	50A-MUWC-135	Pipe	14 atg,	66°C,4D,B	No change
		25A-HPCF-F013B	Valve LO	14 atg,	100°C,3B,As	No change
		25A-HPCF-D006B	RO	14 atg,	100°C,3B,As	No change
		25A-HPCF-019	Pipe	14 atg,	100°C,3B,As	No change
		50A-HPCF-F016B	Valve	14 atg,	100°C,3B,As	No change
		50A-HPCF-F014B	Check V.	110 atg,	100°C,3B,As	No change
		50A-HPCF-F015B	Check V.	110 atg,	100°C,3B,As	No change
		50A-HPCF-020	Pipe	110 atg,	100°C,3B,As	No change

HPCF Subsystem C keep fill line interface.

Reference		Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	*	50A-MUWC-138	Pipe	14 atg,	66°C,4D,B	No change
		25A-HPCF-F013C	Valve LO	14 atg,	100°C,3B,As	No change
		25A-HPCF-D006C	RO	14 atg,	100°C,3B,As	No change
		25A-HPCF-119	Pipe	14 atg,	100°C,3B,As	No change
		50A-HPCF-F016C	Valve	14 atg,	100°C,3B,As	No change
		50A-HPCF-F014C	Check V.	110 atg,	100°C,3B,As	No change
		50A-HPCF-F015C	Check V.	110 atg,	100°C,3B,As	No change
		50A-HPCF-120	Pipe	110 atg,	100°C,3B,As	No change

MUWC System interface with HPCF System

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
	300A-HPCF-001	SS Pipe	1' atg,	66°C,B(S1,S2)	No change
	300A-HPCF-002	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
	300A-HPCF-003	SS Pipe	14 atg,	66°C,B(S1,S2)	No change
Sheet 1	300A-MUWC-F100	Valve LO	14 atg,	66°C,4D,B	No change
	300A-MUWC-F101	Valve LO	14 atg,	66°C,4D,B	No change
	300A-MUWC-F102	Valve LO	14 atg,	66°C,4D,B	No change
	300A-MUWC-100	Pipe	Static Hd.	66°C,4D,B	No change
	300A-MUWC-101	Pipe	Static Hd.	66°C,4D,B	No change
	300A-MUWC-102	Pipe	Static Hd.	66°C,4D,B	No change

RHR Subsystem A flushing line interface at branch discharging to feedwater.

Reference		Components		Press./Temp./Design/Seismic Class		Remarks
Sheet 1	*	100A-MUWC-134	Pipe	14 atg,	66°C,4D,B	No change
Sheet 3		100A-RHR -F032A	Valve	35 atg,	182°C,3B,As	No change
		100A-RHR -026	Pipe	35 atg,	182°C,3B,As	No change
		100A-RHR -F033A	Check V.	35 atg,	182°C,3B,As	No change

10.3 continued

RHR Subsystem A flushing line interface at suction shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1 *	100A-MUWC-133	Pipe	14 atg, 66°C,4D,B	No change
Sheet 3	100A-RHR -F040A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -031	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -F041A	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg

RHR Subsystem B flushing line interface at branch discharging to feedwater.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1 *	100A-MUWC-137	Pipe	14 atg, 66°C,4D,B	No change
Sheet 3	100A-RHR -F032B	Valve	35 atg, 182°C,3B,As	No change
	100A-RHR -132	Pipe	35 atg, 182°C,3B,As	No change
	100A-RHR -F033B	Check V.	35 atg, 182°C,3B,As	No change

RHR Subsystem B flushing line interface at suction of shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1 *	100A-MUWC-136	Pipe	14 atg, 66°C,4D,B	No change
	100A-RHR -F040B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -138	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR -F041B	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg

RHR Subsystem C flushing line interface at branch discharge to feedwater.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1 *	100A-MUWC-140	Pipe	14 atg, 66°C,4D,B	No change
	100A-RHR -F032C	Valve	35 atg, 182°C,3B,As	No change
	100A-RHR -233	Pipe	35 atg, 182°C,3B,As	No change
	100A-RHR -F033C	Check V.	35 atg, 182°C,3B,As	No change

RHR Subsystem C flushing line interface at suction of shutdown branch from RPV.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1 *	100A-MUWC-139	Pipe	14 atg, 66°C,4D,B	No change
	100A-RHR-F040C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR-239	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	100A-RHR-F041C	Check V.	28.8 atg, 182°C,3B,As	Was 14 atg

* Makeup Water System (Condensate) piping designed with open pathway to Condensate Storage Tank.

10.3 continued

MUWC System changes and upgrades.

Reference	Components	Press./Temp./Design/Seismic Class	Remarks
Sheet 1	150A-MUWC-F131 Valve LO	14 atg, 66^{o}C,4D,B	No change
	250A-MUWC-F111 Valve LO	14 atg, 66^{o}C,4D,B	No change
	250A-MUWC-F110 Valve LO	14 atg, 66^{o}C,4D,B	No change
**	250A-MUWC-110 Pipe	14 atg, 66^{o}C,4D,B	No change

** Interface with new MUWC System pump minimum flow bypass pipe with check valve and LO service valves connecting to Condensate Storage Tank.

MUWC System interface with MUWP

Reference	Components	Press./Temp./Design/Seismic Class	Remarks
	150A-WUMP-101 SS Pipe	14 atg, 66^{o}C,4D,C	No change
	150A-WUMP-Fxxx SS Valve LO	14 atg, 66^{o}C,4D,C	No change
	150A-WUMP-Fxxx SS Check V.	14 atg, 66^{o}C,4D,C	No change
	Condensate Storage Tank		

MUWC interface with the CRD System pump suction piping.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
	150A-CRD-002-S	Pipe	28.8 atg,	20^{o}C,4D,B	Was 14 atg
Sheet 1	150A-MUWC-Fxxx LO	Valve	14 atg,	66^{o}C,4D,B	Lock Open
	150A-MUWC-xxx	Pipe	14 atg,	66^{o}C,4D,B	No change
	150A-MUWC-Fxxx LO	Valve	14 atg,	66^{o}C,4D,B	Lock Open
	150A-MUWC-xxx	Pipe	14 atg,	66^{o}C,4D,B	No change
	150A-MUWC-Fxxx LO	Valve	14 atg,	66^{o}C,4D,B	Lock Open
	150A-MUWC-xxx	Pipe	Static Hd,	66^{o}C,4D,B	No change
	Condensate Storage Tank,			66^{o}C,4D, Non-seismic	No change

MUWC interface with the CRD System pump discharge piping.

Reference	Components		Press./Temp./Design/Seismic Class		Remarks
	50A-CRD-034-S	Pipe	190 atg,	20^{o}C,4C,B	No change
	50A-CRD-F021	Valve MO	190 atg,	20^{o}C,4C,B	No change
	50A-CRD-F022	Valve	190 atg,	20^{o}C,4C,B	No change
	50A-CRD-035-S	Pipe	190 atg,	20^{o}C,4C,B	No change
	50A-CRD-F023	Valve	190 atg,	20^{o}C,4C,B	No change
Sheet 1	50A-MUWC-F103	Valve	14 atg,	66^{o}C,4D,B	Lock Open
	50A-MUWC-xxx	Pipe	Static Hd,	66^{o}C,4D,B	No change
	Condensate Storage Tank,			66^{o}C,4D, Non-seismic	No change

11.0 Makeup Water System Purifed

11.1 Upgrade Description

The MUWP System is not upgraded due to the extensive nature of the piping distribution, but instead all valves between the interface and the Condensate Storage Tank are changed to the lock open type. This provides a clear path for the release of pressure to the Condensate Storage Tank which is vented to atmosphere. The extensive small piping of the MUWP System serving so many plant systems was determined to be impractical to upgrade to URS design criteria.

11.2 Downstream Interfaces

Other systems are listed below that interface with the MUWP System and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

SLC System makeup seal, the RRS ten RIP casing makeup water connections and shaft inflatable seal capped connections are interfaces of the MUWP System.

11.3 Upgraded Components

A detailed listing of the components upgraded for the MUWP System follows, including identification of those interfacing system components not requiring upgrade.

MAKEUP WATER SYSTEM (PURIFIED) SSAR Figure 9.2-5 GE Drawing 107E5111 Rev. 2P, Sheets 1,2 and 3. (atg = Kg/cm^2).

MUWP interface with the SLC System makeup seal and storage tank fill line.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
80A-SLC -F013	Check Valve	28.8 atg,	66°C, 4D,C	No change
80A-MUWP-F019	Valve LO	14 atg,	66°C, 4D,C	No change
80A-MUWP-F163	Valve LO	14 atg,	66°C, 4D,C	No change
80A-MUWP-217	Pipe	14 atg,	66°C, 4D,C	No change
80A-MUWP-214	Pipe	14 atg,	66°C, 4D,C	No change
80A-MUWP-F162	Valve LO	14 atg,	66°C, 4D,C	No change
100A-MUWP-180	Pipe	14 atg,	66°C, 4D,C	No change
125A-MUWP-101	Pipe	14 atg,	66°C, 4D,C	No change
125A-MUWP-F101	Valve LO	14 atg,	66°C, 4D,C	No change
20A-MUWP-602	Pipe	14 atg,	66°C, 4D,C	No change
20A-MUWP-F602	Valve NC	14 atg,	66°C, 4D,C	No change
20A-MUWP-601	Pipe	14 atg,	66°C, 4D,C	No change
20A-MUWP-F601	Valve NC	14 atg,	66°C, 4D,C	No change
20A-MUWP-FQ102	Flow Integr.	14 atg,	66°C, 4D,C	No change
20A-MUWP-801	Pipe	14 atg,	66°C, 4D,C	No change
20A-MUWP-F801	Valve NC	14 atg,	66°C, 4D,C	No change
20A-MUWP-800	Pipe	14 atg,	66°C, 4D,C	No change
20A-MUWP-F800	Valve NC	14 atg,	66°C, 4D,C	No change
20A MUWP-PX101	Press. Pt.	14 atg,	66°C, 4D,C	No change
20A-MUWP-600	Pipe	14 atg,	66°C, 4D,C	No change
20A-MUWP-F600	Valve NC	14 atg,	66°C, 4D,C	No change
125A-MUWP-F100	Valve LO	14 atg,	66°C, 4D,C	No change
125A-MUWP-102	Pipe	14 atg,	66°C, 4D,C	No change
125A-MUWP-F102	Valve NC	14 atg,	66°C, 4D,C	No change
150A-MUWP-xxx	Pipe	14 atg,	66°C, 4D,C	No change
150A-MUWP-Fxxx	Check Valve	14 atg,	66°C, 4D,C	No change
150A-MUWP-xxx	Pipe	Static Head,	66°C, 4D,C	No change
	Condensate Storage Tank,		66°C, 4D,Non-seismic	No change

11.3 continued

MUWP System interface with RRS for Reactor Internal Pump (RIP) casing makeup water.

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
Sheet 1	15A-RRS-502A-K	Pipes	87.9atg, 302°C, 4A, As	No change
	15A-RRS-F504A-K	Valves NC	87.9atg, 302°C, 4A, As	No change
	15A-MUWP-189-198	Pipes	28.8atg, 66°C, 4D, C	Was 14 atg
	50A-MUWP-185	Pipe	28.8atg, 66°C, 4D, C	Was 14 atg
	50A-MUWP-F142	Check Valve	28.8atg, 171°C, 3B, As	Was 14 atg
	50A-MUWP-184	Pipe	28.8atg, 171°C, 3B, As	Was 14 atg
	50A-MUWP-F141	Valves NC	28.8atg, 171°C, 3B, As	Was 14 atg
	50A-MUWP-183	Pipe	14 atg, 66°C, 4D, C	No change
	80A-MUWP-181	Pipe	14 atg, 66°C, 4D, C	No change
	80A-MUWP-F140	Valve LO	14 atg, 66°C, 4D, C	No change
	125A-MUWP-101	Pipe	14 atg, 66°C, 4D, C	No change
	125A-MUWP-F101	Valve LO	14 atg, 66°C, 4D, C	No change
	20A-MUWP-602	Pipe	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F602	Valve NC	14 atg, 66°C, 4D, C	No change
	20A-MUWP-601	Pipe	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F601	Valve NC	14 atg, 66°C, 4D, C	No change
	20A-MUWP-FQ102	Flow Integr.	14 atg, 66°C, 4D, C	No change
	20A-MUWP-801	Pipe	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F801	Valve NC	14 atg, 66°C, 4D, C	No change
	20A-MUWP-800	Pipe	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F800	Valve NC	14 atg, 66°C, 4D, C	No change
	20A-MUWP-PX101	Press. Pt.	14 atg, 66°C, 4D, C	No change
	20A-MUWP-600	Pipe	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F600	Valve NC	14 atg, 66°C, 4D, C	No change
	20A-MUWP-F100	Valve LO	14 atg, 66°C, 4D, C	No change
	125A-MUWP-102	Pipe	14 atg, 66°C, 4D, C	No change
	125A-MUWP-F102	Valve NC	14 atg, 66°C, 4D, C	No change
	150A-MUWP-xxx	Pipe	14 atg, 66°C, 4D, C	No change
	150A-MUWP-xxx	Pipe	14 atg, 66°C, 4D, C	No change
	150A-RRS-Fxxx	Check Valve	14 atg, 66°C, 4D, C	No change
	150A-MUWP-xxx	Pipe	Static Head, 66°C, 4D, C	No change
	Condensate Storage Tank,		66°C, 4D, Non-seismic	No change

12.0 Radwaste System

12.1 Upgrade Description

The Radwaste System LCW and HCW inlet piping header connects to each interfacing system at a valve. The header is not upgraded because it is an open pathway to the collector tanks. The dual LCW tanks rotate the fill mode one at a time through a level controlled AO valve at the inlet of each tank. The maintenance valve is a lock open type. The dual HCW tanks operate similarly to the LCW tanks.

12.2 Downstream Interfaces

Other systems are listed below that interface with the RW System and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

There are no downstream interfaces because the LCW and HCW collector tanks and associated piping are all at atmospheric pressure since the HVAC System tank exhaust vents each tank.

12.3 Upgraded Components

detailed listing of the components upgraded for the RW System follows, including identification of those interfacing system components not requiring upgrade.

RADWASTE SYSTEM SSAR Figure 11.2-2 GE Drawing 103E1634 Rev. 1P, Sheets 1, 3 and 7. (atg = Kg/cm^2).

RW LCW Subsystem interface with the RHR System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	150A-RHR 129	Pipe	35 atg, 66°C,3B,As	No change
	150A-LCW-F006	Valve	28.8 atg, 66°C,4D,B	Was 10 atg
	150A-LCW-CS	Pipe	10 atg, 66°C,4D,B	No change
	200A-LCW-CS	Pipe	10 atg, 66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg, 66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg, 66°C,4D,B	No change
*	LCW Collector	Tank A	0 atg, 66°C,4D,B	No change
	200A-LCW-CS	Valve LO	10 atg, 66°C,4D,B	No change
	200A-LCW-CS	AO Valve	10 atg, 66°C,4D,B	No change
*	LCW Collector	Tank B	0 atg, 66°C,4D,B	No change

* Each LCW collector tank has HVAC tank vent system exhausting tank air through filter to RW Stack.

RW HCW Subsystem A interface with the RHR System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	150A-RHR 018	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-RHR-F026A	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-HCW-SS	Valve	28.8 atg, 182°C,3B,As	Was 10 atg
	150A-HCW-SS	Pipe	10 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003A	Valve AO	10 atg, 66°C,4D,B	No change
*	HCW Collector	Tank A	0 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003B	Valve	10 atg, 66°C,4D,B	No change
*	HCW Collector	Tank B	0 atg, 66°C,4D,B	No change

* Each HCW collector tank has HVAC tank vent system exhausting tank air through filter to RW Stack.

12.3 continued

RW HCW Subsystem B interface with the RHR System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	150A-RHR 124	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-RHR-F026B	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-HCW-SS	Valve	28.8 atg, 182°C,3B,As	Was 10 atg
	150A-HCW-SS	Pipe	10 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003A	Valve AO	10 atg, 66°C,4D,B	No change
*	HCW Collector Tank A		0 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003B	Valve	10 atg, 66°C,4D,B	No change
*	HCW Collector Tank B		0 atg, 66°C,4D,B	No change

* Each HCW collector tank has HVAC tank vent system exhausting tank air through filter to RW Stack.

RW HCW Subsystem C interface with the RHR System

Reference	Components		Press./Temp./Design/Seismic Class	Remarks
	150A-RHR 225	Pipe	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-RHR-F026C	Valve	28.8 atg, 182°C,3B,As	Was 14 atg
	150A-HCW-SS	Valve	28.8 atg, 182°C,3B,As	Was 10 atg
	150A-HCW-SS	Pipe	10 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003A	Valve AO	10 atg, 66°C,4D,B	No change
*	HCW Collector Tank A		0 atg, 66°C,4D,B	No change
	150A-HCW-SS	Valve LO	10 atg, 66°C,4D,B	No change
	150A-HCW-F003B	Valve	10 atg, 66°C,4D,B	No change
*	HCW Collector Tank B		0 atg, 66°C,4D,B	No change

* Each HCW collector tank has HVAC tank vent system exhausting tank air through filter to RW Stack.

13. Condensate and Feedwater (CFS) System

13.1 Upgrade Description

The CFS System provides high pressure feedwater to the reactor, and all of the system is designed for high pressure except the condensate pumps suction. The high pressure design includes the condensate polishing (hollow fiber filters and demineralizers) units. The transition to low pressure occurs from the condensate suction into the LP condenser shell (hotwell). The hotwell is a low pressure sink. The last closed valve in the path from the reactor is the condensate pumps discharge check valve. The piping to the condensate pumps suction can remain below the URS design pressure because it connects to the low pressure sink hotwell. The maintenance block valves in the condensate pump suction lines were upgraded to a LOCK OPEN status.

13.2 Downstream Interfaces

None

13.3 Upgraded Components

The maintenance block valves in the condensate pump suction lines were upgraded to a LOCK OPEN status.

14. Sampling (SAM) System

14.1 Upgrade Description

The Sampling System receives water from several of the above systems, and an analysis, as presented below, resulted in not requiring any pressure upgrades. The following interfaces include all of the potential links of SAM to the reactor pressure, and since none of the individual portions need upgrading, SAM as a whole was not upgraded.

1. RHR Interface: Samples can be taken downstream of the RHR heat exchanger, which is from a pipeline with a design pressure of 35 atg. The SAM System is designed for pressures at least as great as the point in the interfacing system where the sample is obtained. Therefore, the URS design pressure of 28 atg is exceeded and no upgrade required for this portion of SAM.

2. SLC Interface: Samples can be taken from the SLC main tank, which is one of the low pressure sinks. Therefore, no upgrade is required for this portion of SAM.

3. CUW Interface: Samples can be taken from the inlet and outlet of the filter demineralizer units, which are designed for full reactor pressure. The SAM System is designed for pressures at least as great as the point in the interfacing system where the sample is obtained. Therefore, the URS design pressure of 28 atg is exceeded and no upgrade required for this portion of SAM.

4. FPC Interface: Samples can be taken from the inlet to the filter demineralizer units and from the heat exchangers outlet. The pipeline sample points have a design pressure of 16 atg; however, this region of the FPC System did not need upgrading to the URS design pressure. Therefore, no upgrade is required for this portion of SAM.

5. NBS Interface: Samples can be taken from the points within the NBS which are designed for full reactor pressure. The SAM System is designed for pressures at least as great as the point in the interfacing system where the sample is obtained. Therefore, the URS design pressure of 28 atg is exceeded and no upgrade required for this portion of SAM.

6. MUWP Interface: Samples can be taken from a point within the MUWP System located in the turbine building that did not need upgrading to the URS design pressure. Therefore, no upgrade is required for this portion of SAM.

7. Rad Waste Interface: Samples can be taken from the LCW and HCW collector tanks, which are low pressure sinks. Therefore, no upgrade is required for this portion of SAM.

14.2 Downstream Interfaces

None

14.3 Upgraded Components

None