Docket File

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

May 3, 1994

Docket No. 52-001

Mr. Joseph Quirk
ABWR Certification Program Manager
GE Nuclear Energy
175 Curtner Avenue Mail Code - 782
San Jose, California 95125

Dear Mr. Quirk:

SUBJECT: REMAINING ACTIONS ON THE ADVANCED BOILING WATER REACTOR (ABWR) REVIEW

The purpose of this letter is to identify the remaining actions by GE Nuclear Energy (GE) that are needed to complete the ABWR review. In order for the staff to complete the final safety evaluation report (FSER) for the ABWR design, GE needs to provide an additional amendment to the ABWR standard safety analysis report (SSAR) that: (1) resolves the staff's comments on Amendment 34 (this is Confirmatory Item F1.1-1), (2) includes a combined license (COL) action item to update the plant-specific probabilistic risk assessment at the COL application stage and a COL action item to implement the testing, inspection, and replacement of electrical isolators when needed (Confirmatory Item F1.9-1), (3) provides a discussion of the fine motion control rod drive removal process (see a meeting summary dated April 19, 1994, for detailed commitments) (this is Confirmatory Item F19.3.3.2.3-1), and (4) addresses resolution of the suppression strainer size issue (this is Confirmatory Item F6.2.1.9-1). Also, GE needs to provide an affidavit that justifies the proprietary claim for the information contained in SSAR Sections 11.A.2, Liquid Waste System, and 11.A.4, Solid Waste System (this is Confirmatory Item F1.1-2).

Most of the Office of Nuclear Reactor Regulation technical staff have completed their review of SSAR Amendment 34. As in the past, I am providing to GE the set of reviewer comments for processing into a future amendment. Enclosure 1 is the set of comments grouped by branch which may require changes to the SSAR, technical specifications, and certified design material (CDM). Enclosure 2 is a set of SSAR and CDM pages with marked-up changes proposed by the staff. Please note that additional feedback will be provided to GE by early May.

In addition, GE needs to provide the information required by Confirmatory Items F1.2.2-1 and F1.2.2-2, which were identified in the advance copy of the safety evaluation report, with its submittal of the design control document (DCD). As previously discussed, review and approval of the DCD will be completed after FDA issuance. The staff will provide further guidance on the preparation of the DCD in the near future.

If you require any clarification or further guidance on these matters, please contact Son Ninh at (301) 504-1125 or Dave Tang at (301) 504-1147.

Sincerely,

Original Signed By:

R. W. Borchardt, Director
Standardization Project Directorate
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As stated

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GE Nuclear Energy

Docket No. 52-001

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STAFF FEEDBACK ON ADVANCED BOILING WATER REACTOR (ABWR) STANDARD SAFETY ANALYSIS REPORT (SSAR) AMENDMENT 34, TECHNICAL SPECIFICATIONS (TS), AND ASSOCIATED CERTIFIED DESIGN MATERIAL (CDM)

ECGB Comments

(See attached SSAR markup.)

HICB Comments

(See attached SSAR markup.)

HHFB Comments

(See attached SSAR markup.)

EELB Comments

SSAR

Concern 1

Reference: Concern 6, Amendment 33

In accordance with concern 6, the term "impedence" was changed to "independence". However, the term "impedence" was also changed to "independence" in item 5. The use of the term impedence in item 5 had been considered acceptable even though the misspelling of the term had not been noted in our review of Amendment 33. With the change to independence versus the correction of spelling (i.e., impedance) in Amendment 34, interface requirement #5 does not make sense.

The term "independence" used in item 5 of Section 8.2.3 of SSAR Amendment 34 should be changed to "impedance."

Concern 2

Reference: Concern 10, Amendment 33

Section 8.2.1.1 of SSAR Amendment 34 (3rd sentence of 1st paragraph on page 8.2-2 of SSAR Amendment 34) indicates that meeting the design bases presented in Subsection 8.2.3 will ensure that the power system is within the design scope for the ABWR and meets all regulatory requirements.

It is not clear how one can conclude that by meeting the design bases of Section 8.2.3 (i.e., interface requirements) that the power system is within the design scope for the ABWR and meets all regulatory requirements.

The SSAR should be revised, as suggested by our Amendment 33 concern 10, as follows: Meeting the design bases of Section 8.2.3 (i.e., interface requirements) will ensure that the power system (within the design scope for the ABWR) meets all regulatory requirements.

Concern 3

Reference: Concern 39, Amendment 33

The voltage tolerances specified in SR 3.8.1.2, SR 3.8.1.7, SR 3.8.1.9, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.15, SR 3.8.1.19, and SR 3.8.1.20 for power supply output voltage are not consistent with the voltage tolerances specified in the bases for these SRs.

The maximum voltage limit for the power supply of 6674 V specified in the bases should be changed to 7590 V to be consistent with the voltage limit specified in the Surveillance Requirements.

The voltage tolerance of the power supply ($\geq$ 6210 and $\leq$ 7590 V specified in the SRs) should be clearly based on plus or minus 10 percent of the voltage rating of the load and the unknown voltage drop of the circuit between the load and power supply.

(Concerns 4-7 deleted)

Concern 5A

SR 3.8.2.1 of ABWR SSAR Amendment 34 allows exclusion of the 24-hour diesel generator load test during shutdown (SR 3.8.1.14). The bases for SR 3.8.1.14 justifies exclusion of SR 3.8.1.17 versus 3.8.1.14. The bases for surveillance requirements should be made consistent with the surveillance requirement.

Concern 6A

SR 3.8.2.1 of the ABWR SSAR TS includes two notes. The bases presented for SR 3.8.2.1 provides justification for one versus two notes and the justification presented for the one note does not appear to address either of the notes included in SR 3.8.2.1. The surveillance requirements and their bases presented in the TS should be consistent.

Concern 8

Reference: Concern 36, Amendment 33

The term "redundant" that was used two times in first paragraph on page 8.3-9 of SSAR Amendment 34 (5th paragraph of Section 8.3.3.1 of SSAR Amendment 34) was incorrectly removed by SSAR Amendment 34. The second use of the term "redundant" should not have been deleted.

The paragraph should read as follows: "The protective actions. . . .of each safety related load group is electrically independent of the protective actions provided by redundant safety related load groups. Cross. . ."

Concern 9

Amendment 34 change shown on the top of page 8.3-7 of SSAR Amendment 34, includes the repetitive phrase "with their respective transformers." One of the two phrases should be deleted.

Concern 10

The first sentence of item 4 of Section 8.3.1.1.8.2 states the following: "Each diesel generator to be capable of reaching full speed and voltage within 20 seconds. . . ."

The term "to be" in this statement should be changed to: "is."

The statement should read as follows: "Each diesel generator is capable of reaching full speed and voltage within 20 seconds...."

Concern 11

Reference: Concern 49, Amendment 33

The term "Class 1E power system" should be used consistently in the SSAR. The terms "emergency electric power system" and "Class 1E electric power system" used in Section 8.3.3.3 of SSAR Amendment 34 should be replaced with "Class 1E power system."

Concern 12

In SSAR Amendment 34, GE modified their design commitments for separation of electric circuits by changing their design commitment to compliance with IEEE 384-1981 to compliance with IEEE 384-1992.

The SSAR should be modified to reference 384-1981.

Concern 13

In Amendment 34, IEEE 323 has again been changed to the 1983 version from the 1974 version of the standard.

The SSAR should be modified to reference IEEE 323-1974.

Concern 14

IEEE 308 was changed from the 1980 version to the 1991 version of the standard in Table 1.8-21 of SSAR Amendment 34.

Similarly, IEEE 338-1977 and IEEE 379-1977 were changed to IEEE 388-1987 and IEEE 379-1988. The SSAR should be revised to reference the earlier version of these IEEE standard which were referenced correctly in SSAR Amendment 33.

Concern 15

In Table 1C-3 of SSAR Amendment 34, GE indicates that the COL applicant may use the CTG for peak loading. Resolution of Confirmatory and Open Items 8.3.9.1, 8.3.9.2, and 8.3.9.3 were dependent on GE's deletion of this permissibility use of the CTG for peak loading which GE had agreed to delete.

The SSAR should be revised to delete as agreed the reference to peak loading permissibility.

Concern 16

Item 6 in Section 9.5.11.1 of SSAR Amendment 34 states, in part, the following: ". . . .with require voltage and frequency resulting in less than 25-percent excursion from rated voltage. . . ."

This statement should be revised to indicate that the voltage excursion is from required voltage versus rated voltage.

Concern 17

Item 9 of Section 9.5.11.1 of SSAR Amendment 33 stated in part the following: ". . . .CTG shall be physically and electrically independent from the Class 1E emergency diesel generators. . ."

By Amendment 34, the term "emergency" in this statement was replaced with "Class 1E." Item 9 of Section 9.5.11.1 of SSAR Amendment 34 currently states in part the following: ". . . .CTG shall be physically and electrically independent from the Class 1E diesel generators. . . ."

The repetition of the term "Class 1E" in this statement should be deleted.

Concern 18

The 4th paragraph of Section 1C.2.3.1.1 of SSAR Amendment 34 states the following: "The CTG can also supply non-Class 1 power to the power generation buses. . . ."

The term "non-Class 1 power" used in the above statement should be clarified.

Concern 19

The physical routing of the power feed from the RAT to safety buses through the turbine building as was shown on Figure 8.2-1 (Sheet 2 of 7) of SSAR Amendment 32 has been deleted in part by SSAR Amendment 34. The complete routing of the RAT feed between the transformer and the safety buses should be shown on the SSAR figure.

Concern 20

The physical routing of the power feed from the Unit Auxiliary transformer C to non-safety buses C1 and C4 has not been shown on Figure 8.2-1 (Sheet 2 of 7). The routing of the power feeds between the transformers and the buses should be shown on the SSAR figure.

Concern 21

Figure 8.3-1 of SSAR Amendment 34 shows the offsite power feed to be from bus C4 to bus G. Physical layout drawing Figure 8.2-1, shows this same power feed to be from bus C1 to bus G. This inconsistency should be corrected.

Concern 22

The 1st sentence of the 4th paragraph in Section 1C.2.3.1.1 of SSAR Amendment 34 states that the CTG can supply power to the power generation buses which supply the feedwater and recirculating water pumps. Figure 8.3-1 of SSAR Amendment 34 shows that the CTG cannot supply the recirculating water pump. This design inconsistency should be corrected.

Concern 23

The reference to Subsection 8.2.3 located in the 3rd paragraph on page 8.2-3 of SSAR Amendment 34 is not correct. The reference should be corrected to 8.2-5.

Concern 24

The safety related electrical power distribution system medium voltage buses are referred to by the term "6.9 kV Class 1E bus(es)" in Chapter 8.0 of SSAR Amendment 34. However, these buses are referred to by the apparent undefined terms "safe shutdown buses" and "emergency buses" in Sections 1C.2.3.1.3, 1C.2.3, and 9.5.11 of SSAR Amendment 34. The undefined terms should either be defined in the sections of the SSAR where they are used to specify that they are the 6.9 kV Class 1E buses or the term "6.9 kV Class 1E buses" (which is the recommended industry term that has been defined by IEEE) should be consistently used through out the SSAR to refer to the ABWR safety-related electrical power distribution system medium voltage buses.

Concern 25

On page 9A.2.3 (Section 9A.2.1.1) of SSAR Amendment 34, the reference to the 1974 version of 384 as indicated by it's title is inconsistent with the version of 384 referenced in Table 1.8-21 of SSAR Amendment 33. The correct title for the standard should be used in Section 9A.2.1.1 of the SSAR.

Concern 26

The reference to Subsection 8.3.1.1.8.2(18) in the 2nd paragraph of Section 8.3.1.1.8.3 is not correct. The reference serves no purpose and should be deleted or if not deleted should be corrected to 8.3.1.1.8.2(19).

Concern 27

The bases for Surveillance Requirements included on page B 3.8-20 of SSAR Amendment 34 (1st paragraph) includes repetitive references to Regulatory Guide 1.9 (Ref. 3). The repetitive reference should be corrected.

CDM

(1) ITAAC Table 2.12.1, Electrical Power Distribution System, Rev. 2, Page 2.12.1-7, Acceptance Criteria for No. 7, minor correction on line 12, see attached.

(2) ITAAC Table 2.12.13 Emergency Diesel Generator System, Rev. 3, Page 2.12.13-5, Design Commitment for No. 9, minor correction on line 4, for I.T.A, No. 9.b, minor correction on line 2, see attached.

(3) ITAAC 2.12.10 Electrical Wiring Penetrations, Design Description, Rev. 2, Page 2.12.10-1, on line No. 3 take out the word "overcurrent" and add "currents that are greater than its continuous rating," see attached.

(4) ITAAC Table 2.12.10 Electrical Wiring Penetrations, Rev. 2, Page 2.12.10-2, Design Commitment for No. 2 line No. 2 take out the word "over" and add "currents that are greater than its continuous current rating," for the I.T.A., No. 2, delete "to assure the penetrations are protected against overcurrent," and for the Acceptance Criteria, No. 2 on line No. 4 delete "over" from overcurrent, on lines 7 and 9, delete the word "overcurrent" and on line 12 delete "over" from overcurrent, see attached.

SPSB Comments

- The following COL action item addressed in Section 19.9 in the SSAR is of particular interest to the staff:

  * The COL applicant should update the design-specific ABWR PRA to include site-specific information (i.e., a site-specific PRA) and additional design details (e.g., once the COL applicant designs the structures, systems, and components that were not part of the design certification). The PRA is to be maintained by the COL holder (living PRA) so that the PRA can be useful in helping to make 50.59-like decisions as well as helping to determine the safety significance of operational events or data from ABWR operation or other nuclear power plants.

PRPB Comments

SSAR

(1) Page 12.2-3 3rd para.; unit conversion. 6 MeV equals 0.96 pJ not 0.06 Joules.

(2) Page 12.2-74 Table 12.2-27; unit conversion. Amendment changed the units noted in the header of the table from Ci to MBq, however, none of the numbers in the table were revised.

(3) Page 12.3-9 Radiation Zones E & F; unit conversion. 100 mR/h equals 1.0E+03 microGy/h not 1.0E+04.

(4) Page 12.3-20 2nd para.; unit conversion. Missed the 100 mR at the end of paragraph.

CDM

(1) Page 3.2-8 Figure 3.2g; revised figure is missing the radiation zoning designations.

(2) Page 3.2-15 Figure 3.2n; page submitted with Amendment 34 missing figure. GE submitted a revised Amendment 34 page with the figure however, elevation 38200mm in the figure is missing the radiation zoning designations.

SRXB Comments

SSAR

(1) SSAR Page 1.7.1, Change Table 0.1-1 to 5 to Table 1.7-1 to 5, Change "Figure 0.1-1" to "Figure 1.7-1."

(2) SSAR Table 4D-1A, Page 4D-4, paragraph (j), still retains the phrases "in excess of 10 GWd/MTU" and "In no event will the GE fuel design maximum exposure limit required by the NRC be lower than the maximum of all exposure limits approved by the NRC for LWR fuel vendors." These should be removed, as they have been removed from other sections of the SSAR.

(3) SSAR Page 5.4-19, 5th paragraph, Reference is made to Tables 5.4-1b, c and Figure 5.4-15. But they are not given in the SSAR.

(4) SSAR Table 5.4-1, RIP flow value given in lb/hr is the same as the value given in Kg/hr in Amendment 33. Which is correct?

(5) The SSAR Figure 15.0-1, System Response Analysis Power/Flow Map is missing.

(6) SSAR Section 15.2.1.2.1 Change "Figure 15.2-1a" to "Figure 15.2-1."

(7) SSAR Page 15A-127/128 Change "HPCS" to "HPCF."

(8) SSAR Page 15E-10 Delete the first paragraph since this is a duplication.

(9) SSAR Figure 15E-4 on page 15E-29, the Y co-ordinate values, Reactivity should be added. The level is still given in feet rather than in meters.

(10) SSAR Figure 15E-12 on page 15E-56, the pressure values are only given in psi. Include the pressure values in MPa also.

(11) SSAR Figure 15E-12 on page 15E-57, Add inlet subcooling scale (MJ/Kg) in the right side of the plot.

(12) SSAR 19B.2.45 Interfacing Systems LOCA at BWRS, Page 19B-22-Add the following after item #12 "The detailed System Evaluation for ISLOCA is provided in Appendix 3MA."

(13) SSAR 19Q.4.2 Inventory Control, CRD Replacement-Incorporate the information in the GE letters dated March 3, 1994, and February 24, 1994, to the SSAR.

(14) SSAR Page 20.3.6-15, Change "16/h" to appropriate units and change the steam flow values to SI units.

(15) SSAR Figure 20.3.9-7, Page 20.3.9-38, Change "Water Temperature" to "Temperature" in the Y axis.

<u>TS</u>

(1) LCO 3.1.3 Control Rod Operability, Condition C, Required Action, Page B 3.1-15, 17-Reference to SR 3.3.2.1.6 is incorrect, since this SR is for SRNM instrumentation.

(2) LCO 3.4.7, RHR Hot Shutdown-Condition A Delete "or more." Since three are required to be operable, condition A should be for one train inoperable.

(3) LCO 3.5.1, ECCS OPERATING, SR 3.5.1.4,5-Add 727 cubic meters per hour at 8 Kg per square centimeters to the high pressure value of 181.7 cubic meters at 8.12MPa.

(4) B 2.1.2 Reactor Coolant System (RCS) Pressure SL-Delete references to reactor recirculation piping and the suction piping from the Applicable Safety Analysis and Safety Limits sections on Page B 2.0-8. Please note that there is no reactor recirculation piping in the ABWR.

(5) B 3.1.1 Shutdown Margin (SDM), Applicable Safety Analysis, 1st sentence-change "accident" to "event."

(6) B 3.1.2 Reactivity Anomalies, Applicable Safety Analysis, 2nd sentence-change "accidents or rod drop accidents" to "events."

(7) B 3.1.3, Control Rod Operability, Page B 3.1-18, E1-Delete "i.e, no CRDA considerations."

(8) B 3.4.1 Reactor Internal Pumps (RIPs), Background, 1st paragraph-Change "The RIP impellers are reactor vessel internals" to "The RIP impellers and shafts are reactor vessel internals."

(9) B 3.4.1 Reactor Internal Pumps (RIPs), Applicable Safety Analyses, 1st paragraph-Change "all RIPs trip accident" to "all RIPs trip event."

(10) B 3.4.6, B 3.4.7, Pages 3.4-35 and 3.4-39-Add reference ABWR SSAR Section 5.4.7.

SPLB Comments

1.8 TABLE 1.8-21

(1) The entry for IEEE 323 should indicate the 1974 version, not the 1983 version. (See attached SSAR markup.)

3.11 ENVIRONMENTAL QUALIFICATION

(1) (See attached SSAR markup.)

6.2.1.1.3.3.1.2

(1) (See attached SSAR markup.)

6.4 HABITABILITY SYSTEMS

(1) Correct typographical spacing error in ABWR SSAR 6.4, Page 6.4-2, 2nd paragraph, line 4 to state ". . .of SRP. . . ."

6.5.1.1 SGTS

(1) It appears that "valve(s)" in ABWR SSAR Sections 6.5.1.3 on Page 6.5-9 of Amendment 34, 1st and 3rd paragraphs, should be "damper(s)."

(2) It appears that "335 kg" in ABWR SSAR Section 6.5.1.7 on page 6.5-10, 3rd paragraph should be "332 kg" as stated on page 6.5-7.

(3) Correct typographical spacing error in ABWR SSAR Section 6.5.1.3.1, Item (6), 1st line on page 6.5-4 to state ". . .to mitigate. . . ."

6.7.2

(1) Revise SSAR Section 6.7.2 and ITAAC 2.11.13 to clarify that the supply valve to the bottled nitrogen supply also opens on a low pressure signal in the nondivisional portion of the system.

9.3.8.2 RADIOACTIVE DRAIN TRANSFER SYSTEM

(1) SSAR Section 9.3.8.2 states "See Figures 11A.2-1 and 11A.2-2." However, these figures are not included in the SSAR. Provide these figures in the SSAR.

9.4.1 CONTROL BUILDING HVAC SYSTEM

(1) Revise ABWR SSAR Figure 9.4-1, sheet 2 of 5 to show independent separate supply and return for Emergency Filtration Division C.

(2) Revise ABWR SSAR Figure 9.4-1, sheets 3, 4 and 5 to show "RCW pump and HX DIV A, B, or C" not "C/B heat exchanger DIV A, B, or C" for supply and return air.

9.4.4 TURBINE ISLAND HVAC SYSTEM

(1) ABWR SSAR Section 9.4.4.2.1.5 includes "reactor feed pump power supply room." While, ABWR SSAR Table 9.4-5a provides data for "REP Power Supply Area Recirculation Unit." Clarify whether these two areas are identical or not. Revise SSAR text and table accordingly. Also, revise captions in Tables 9.4.5, 9.4.5a - 9.4.5c to indicate "Non-Safety-Related Equipment".

9.4.5.1 R/B SECONDARY CONTAINMENT HVAC SYSTEM

(1) Revise ABWR SSAR Table 9.4-4h to include filters for "R/B secondary containment exhaust, total quantity 3 (1 per fan), each 57,500 m^3/h."

(2) Revise ABWR SSAR Section 9.4.5.1.2, 8th line to add "Three 50% exhaust fans and filters are located in the turbine building."

9.4.5.4 R/B SAFETY-REGULATED ELECTRICAL EQUIPMENT HVAC SYSTEM

(1) Revise caption of ABWR SSAR Sections 9.4.5.6-9.4.5.8 to add caption R/B."

(2) Revise ABWR SSAR Section 9.4.5.4.2, line 1 on page 9.4-24 to state "Divisions A, B, and C. . .," not "Divisions 1, 2, and 3. . . ."

(3) Revise ABWR SSAR Section 9.4.5.4.2, last sentence to read as "The following divisional rooms are cooled by their respective safety-related electrical equipment HVAC system" and by deleting "and non-safety-related reactor internal pumps ASD power control panel rooms."

(4) Add the following in ABWR SSAR Section 9.4.5.4.2, after Item (7): "HVAC system Division A serves Division I, Division B serves Divisions II and IV, and Division C serves Division III of the electrical equipment rooms. Also, non-safety-related reactor internal pumps ASD power supply panel rooms are cooled by the electrical equipment HVAC system."

9.4.5.8 RIP ASD HVAC SYSTEM

(1) ABWR SSAR Table 9.4-3 shows RIP ASD HVAC system flow rate of 57,500 m^3/h. While, ABWR SSAR Tables 9.4-4g and 9.4.4h show flow of 50,000 m^3/h for supply fans and filters, respectively. Reconcile the difference.

(2) Revise caption of ABWR SSAR Figure 9.4-5 to state "Reactor Internal Pump ASD HVAC System" not "Reactor Internal Pump control panel room HVAC System."

(3) ABWR SSAR Table 9.4-4h shows two filters, one for each division. ABWR SSAR Figure 9.4-5 and SSAR Section 9.4.5.8.2 do not mention these filters. Reconcile the difference and revise accordingly.

(4) Verify that the ABWR SSAR Figure 9.4-5 serves RIP power supply panels "A and B" not "A and C" (see SSAR Figure 9.4-3 which identifies that there are RIP ASD control panel rooms A and B and these power supply panels are located in corresponding rooms) and revise it accordingly.

9.4.8 SERVICE BUILDING HVAC SYSTEM

(1) Revise ABWR SSAR Sections 9.4.8.2, Item (9), and 9.4.10.1 to add "description of radiation monitors at the supply air inlet" which is to be provided by COL applicant.

(2) Provide a brief discussion of compliance with GDC 60 for the service building controlled area HVAC System.

9.4.9 DRYWELL COOLING SYSTEM

(1) Revise captions of ABWR SSAR Tables 9.4-1 and 9.4-2 to state "Drywell Cooling System Non-Safety-Related Components" and "Drywell Cooling System Non-Safety-Related Heat Loads," respectively.

(2) Verify that the summation of individual loads matches the total sensible heat load of "3349.6 MJ/h," as stated in ABWR SSAR Table 9.4-2. Revise the SSAR accordingly.

ABWR SSAR TABLE 9.4-4 I

(1) Revise SSAR Table 9.4-4i to delete "AC" from the equipment titles "ISI room AC" and "MG set room AC."

ITAAC 2.15.5 HVACS

(1) Revise CDM 2.15.5 on page 2.15.5-3 to state "between 10°C and 40°C" not "below 40°C" (see ABWR SSAR Section 9.4.1.2.2, Item (4), on page 9.4-6).

(2) Revise CDM design description on page 2.15.5-9 for Reactor Internal Pump ASD control panel HVAC System as follows:

   a. Revise caption of the HVAC System to state "Reactor Internal Pump ASD HVAC System" not "Reactor Internal Pump ASD control panel HVAC System."

   b. Revise 1st lines of 1st and 2nd paragraphs, to state "The RIP ASD HVAC Systems" not "The RIP ASD control panel HVAC System."

c. Revise 1st paragraph, 2nd line to state "Reactor Internal Pump ASD power panels" not "Reactor Internal Pump ASD control panels."

TS BASES - HVAC

(1) Marked up pages are attached for the following:

a. SR 3.6.4.3.3 on page B 3.6-87

b. Background on page B 3.7-19

c. LCO on page B 3.7-20

9.5.1 FIRE PROTECTION

(1) Section 9.5.1 (3). . . .page 9.5-2/3

MISSING WORDS FROM AMENDMENT 33

"The office spaces contained in the Control Room Complex do not have automatic fire suppression systems installed. BTP C[illegible] 9.5.1, Section 7b recommends that these spaces have automatic suppression.

Justification: The Control Room Complex is continuously manned so that any fire will be quickly detected and manual suppression will be commenced without delay.

(2) Section 9.5.1 (5). . . .page 9.5-3

TERMINOLOGY DOES NOT APPEAR CORRECT - CONCEPT ACCEPTABLE

Justification: The automatic sprinkler system used in the emergency diesel generator rooms are designed to prevent the inadvertent actuation utilizing ~~a highly reliable~~ pre-action automatic sprinkler ~~type~~ system and closed head sprinklers. Actuation of these sprinkler~~s~~ systems requires the detection of a fire by infra-red and or rate of heat detectors, and the opening of the fusible link sprinkler heads.

(3) Sections 9.5.1.3.6 and 9.5.1.3.7

CONCEPT ACCEPTABLE - TERMINOLOGY DOES NOT APPEAR TO BE CORRECT

"Electrically safe nozzles" should be changed to "Fixed fog electrically safe nozzles."

(4) Section 9A.2.3(4)(c). . . .p. 9.A.2-3 states:

(c) Materials, other than as described in (a) or (b), having a surface flame spread rating not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion.

Do not agree in concept. This item describes combustible material that is acceptable for use, not noncombustible material. It should be listed as a separate item in this section. Additionally, the material needs to be listed by a nationally recognized test laboratory such as Factory Mutual or Underwriters Laboratories, Incorporated, for a flame spread, smoke and fuel contribution of 25 or less in its use configuration.

(5) Section 9A.2.3(4). . . .p. 9.A.2-4 states:

The flame spread ratings referred to in (b) and (c) above are obtained according to NFPA 255, "Method of Test of Surface Burning Characteristics of Building Materials."

Do not agree in concept, NFPA 255 indicates that this standard should not be used alone to describe noncombustible material. The tests in this standard only apply to material in the horizontal position. The material should also be tested by nationally recognized testing laboratory such as UL or FM to be acceptable.

Technical Specifications - DG FUEL OIL, LUBE OIL, AND STARTING AIR

(1) The BASES for SR 3.8.3.3 refers to ASTM D4054-[ ] which is not the correct standard. Revise to state "Sample the new fuel oil in accordance with ASTM ~~D4054-[ ]~~ D4057-[ ] (Ref. 6)."

(2) The BASES for SR 3.8.3.3 refers to ASTM D1522-[ ] which is not the correct standard. Revise to state "Within 31 days following the initial new fuel oil sample,. . .the analysis for sulfur may be performed in accordance with ASTM ~~D1522-[ ]~~ D1552-[ ] (Ref. 6) or ASTM D2622-[ ] (Ref. 6)."

10.3.1 MAIN STEAM SUPPLY SYSTEM

(1) SSAR Table 10.3-1 refers to a main steam piping design pressure of 8.62 MPaA and the text in the SSAR on page 10.3-2 refers design pressure of 8.62 MPaG. Revise SSAR Table 10.3-1 on page 10.3-6 to reflect SSAR text on page 10.3-2.

Technical Specifications - TURBINE BYPASS STEAM

(1) Provide reference for the reliability analysis in the BASES for SR 3.7.7.1 on page B3.7-36. The sentence should state "The 31 day Frequency is based on a reliability analysis (Reference 3)."

(2) Revise the last sentence in the BASES for SR 3.7.7.3 to state "Operating experience has shown the 18 month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint **and is also based upon the reliability analysis in Reference 3**."

ITAAC

(1) Add acronyms "CPS" and "OGS" to the Design Description of ITAAC Section 2.10.2 for the condensate purification system and the off-gas system, respectively.

(2) Revise the line symbol for the CFCAE piping from the CFS line to the CRD System to "—— - —— - ——" on page 2.10.2-3 of Figure 2.10.2a (See attached figure).

11.5 PROCESS AND EFFLUENT RADIOLOGICAL MONITORING

(1) The Section 11.2 figures identified in the List of Figures for Chapter 11 are missing.

(2) Table 11.5-7 "Radiological Analysis Summary of Gaseous Effluent Samples" appears to have been deleted by mistake. The list of tables for Chapter 11 provided in Amendment 34 includes this table.

PDST

(1) CDM pages 2.9.1-3,4 have page numbers and system name reversed in footer.

(2) CDM page 3.2-27, add the version of 10 CFR Part 20, Appendix B that is applicable to the ABWR in the acceptance criteria.

(3) GE needs to include a COL action item in SSAR Subsection 19B.2.53 that addresses the COL applicant will implement the testing, inspection, and replacement of electrical isolators when needed.

Table 2.12.1 Electric Power Distribution System (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
6. UATs power feeders, and instrumentation and control circuits are separated from the RAT(s) output power feeders, and instrumentation and control circuits.	6. Inspections for the as-built UATs and RAT(s) power feeders, and instrumentation and control circuits will be conducted.	6. As-built UAT power feeders are separated from the RAT(s) power feeders by a minimum of 15.24m, or by walls or floors, except at the switchgear, where they are routed to opposite ends of the medium voltage M/C switchgear. As-built UAT instrumentation and control circuits, are separated from the RAT(s) instrumentation and control circuits by a minimum of 15.24m, or by walls or floors, except as follows: a) at the non-Class 1E DC power sources, where they are routed in separate raceways, b) inside the MCR, where they are separated by routing the circuits in separate raceways, and c) at the switchgear, where they are routed to opposite ends of the medium voltage M/C switchgear and routed in separate raceways inside the switchgear.
7. The MPT and its switching station instrumentation and control circuits are separated from the RAT(s) and its switching station instrumentation and control circuits	7. Inspections for the as-built MPT and RAT(s) and their respective switching station instrumentation and control circuits will be conducted.	7. As-built MPT and its switching station instrumentation and control circuits, from the switchyard(s) to the MCR, are separated from the RAT(s) and its switching station instrumentation and control circuits by a minimum of 15.24m, or by walls or floors. MPT and its switching station instrumentation and control circuits, inside the MCR, are separated from the RAT(s) and its switching station instrumentation and control circuits by routing the circuits in separate raceways.

Table 2.12.13 Emergency Diesel Generator System (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
7. A manual start signal from the MCR or from the local control station in the DG area starts a DG. After starting, the DG remains in a standby mode (i.e. running at required voltage and frequency, but not connected to its bus), unless a LOPP signal exists.	7. Tests on the as-built DG Systems will be conducted by providing a manual start signal from the MCR and from the local control station, without a LOPP signal.	7. As-built DGs automatically start on receiving a manual start signal from the MCR or from the local control station and attain a voltage and frequency in ≤ 20 seconds which assures an operating voltage and frequency at the terminals of the Class 1E utilization equipment that is within the tolerance limits of the utilization equipment and remain in the standby mode.
8. When a DG is operating in parallel (test mode) with offsite power, a loss of the offsite power source used for testing or a LOCA signal overrides the test mode by disconnecting the DG from its respective divisional bus.	8. Tests on the as-built DG Systems will be conducted by providing simulated loss of offsite power and LOCA signals while operating the DGs in the test mode.	8. When the as-built DG Systems are operating in the test mode with offsite power and a loss of offsite power or a LOCA signal is received, DGs automatically disconnect from their respective divisional buses.
9. In the DG system, Class 1E DG unit auxiliary systems are supplied electrical power from the same Class 1E division as the DG unit. Independence is provided between Class 1E divisions and between Class 1E divisions and non-Class 1E equipment.	9. a. Tests will be conducted in the as-built DG Systems by providing a test signal in only one Class 1E division at a time. b. Inspections of the as-built Class 1E divisions in the DG systems will be conducted.	9. a. The test signal exists in only the Class 1E division under test in the DG System. b. In the DG systems, physical separation or electrical isolation exists between Class 1E divisions. Physical separation or electrical isolation exists between these Class 1E divisions and non-Class 1E equipment.
10. Each divisional DG (Divisions I, II, and III) with its auxiliary systems is physically separated from the other divisions.	10. Inspections of the as-built DG Systems will be conducted.	10. Each DG with its auxiliary systems is physically separated from the other divisions by structural and/or fire barriers.

2.12.10 Electrical Wiring Penetration

Design Description

Electrical penetrations are provided for electrical cables passing through the primary containment.

Electrical penetrations are classified as safety-related.

Electrical penetrations are protected against ~~overcurrent~~ currents that are greater than its continuous current rating.

Electrical penetrations are classified as Seismic Category I.

Divisional electrical penetrations only contain cables of one Class 1E division. Independence is provided between divisional electrical penetrations and also between divisional electrical penetrations and penetrations containing non-Class 1E cables.

Electrical penetrations are qualified for a harsh environment.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.12.10 provides a definition of the inspections, tests, and/or analyses, together with the associated acceptance criteria, which will be undertaken for the Electrical Wiring Penetrations.

delete "voltage drop".

Table 2.12.15 Instrument and Control Power Supply (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
12. The Class 1E Instrument and Control Power Supply system supplies an operating voltage at the terminals of the Class 1E utilization equipment that is within the utilization equipment's voltage tolerance limits.	12. Analyses for the as-built Class 1E Instrument and Control Power Supply system to determine voltage drops will be performed.	12. Analyses for the as-built Class 1E Instrument and Control Power Supply system voltage drops exist and conclude that the analyzed operating voltage supplied at the terminals of the Class 1E utilization equipment is within the utilization equipment's voltage tolerance limits, as determined by their nameplate ratings.
13. Class 1E Instrument and Control Power Supply system cables and raceways are identified according to their Class 1E division. Class 1E divisional cables are routed in Seismic Category I structures and in their respective divisional raceways.	13. Inspections of the as-built Class 1E Instrument and Control Power Supply system cables and raceways will be conducted.	13. As-built Class 1E Instrument and Control Power Supply system cables and raceways are identified according to their Class 1E division. Class 1E divisional cables are routed in Seismic Category I structures and in their respective divisional raceways.

NRF

EFLB

Not Consistent with ITAAC 2.12.1 #22
ITAAC 2.12.12 #11

Table 1.8-21 Industrial Codes and Standards* Applicable to ABWR (Continued)

Code or Standard Number	Year	Title
S-135		(See ICEA P-46-426)
141†	1986	Recommended Practice for Electric Power Distribution for Industrial Plants (IEEE Red Book)
242†	1986	Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
279	1971	Criteria for Protection Systems for NPGS
308†	1991	Criteria for Class 1E Power Systems for NPGS
317†	1983	Electrical Penetration Assemblies in Containment Structures for NPGS
323†	~~1983~~ 1974	Qualifying Class 1E Equipment for NPGS
334†	1974	Motors for NPGS, Type Tests of Continuous Duty Class 1E
338†	1987	Criteria for the Periodic Testing of NPGS Safety Systems
344†	1987	Recommended Practices for Seismic Qualifications of Class 1E Equipment for NPGS
352†	1987	General Principles for Reliability Analysis of Nuclear Power Generating Station Protection Systems
379†	1988	Standard Application of the Single-Failure Criterion to NPGS Safety Systems
382†	1985	Qualification of Actuators for Power-Operated Valve Assemblies with Safety-Related Functions for NPP
383†	1974	Type Test of Class 1E Cables; Field Splices and Connections for NPGS
384†	1992	Criteria for Independence of Class 1E Equipment and Circuits
387†	1984	Criteria for Diesel-Generator Units Applied as Standby Power Supplies for NPGS
399†	1990	Recommended Practice for Industrial and Commercial Power Systems Analysis (IEEE Brown Book)
450†	1987	Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations
484†	1987	Recommended Practice for the Design and Installation of Large Lead Storage Batteries for NPGS
485†	1983	Recommended Practice for Sizing Large Lead Storage Batteries for NPGS
500	1984	Guide to the Collection and Presentation of Electronic, Sensing Component, and Mechanical Equipment Reliability Data for Nuclear Power Generating Stations.

Table 3I-3 Thermodynamic Environment Conditions Inside Reactor Building (Secondary Containment) Plant Normal Operating Conditions

Plant Zone/Typical Equipment	Pressure[2] kPaG	Temperature[1] °C	Relative[1] Humidity
General floor area (not otherwise noted) /Similar Equipment	0	Max 40 Min 10	Max 90 Min 10
RHR pump rooms [Figs. 1.2-4/5.4-10]	0	Max 40[3] Min 10	Max 90 Min 10
RCIC pump room [Figs. 1.2-4/5.4-8]			
HPCF pump rooms [Figs. 1.2-4/6.3-7]			
FPC pump room [Figs. 1.2-9/9.1-1]			
SGTS rooms [Figs. 1.2-10/6.5-1]			
MS tunnel room [Figs. 1.2-8/5.1-3]	0	Max 60 Min 10	Max 90 Min 10
Divisional valve rooms [Figs. 1.2-8/ ECCS]	0	Max 60 Min 10	Max 90 Min 10
Instrument rack rooms [Figs. 1.2-6/ ECCS]	0	Max 40 Min 10	Max 90 Min 10
CUW heat exchanger rooms (Figs. 1.2-4 and 5.4-12)	0	Max 50 Min 10	Max 90 Min 10

1. Max. will occur in summer and Min. in winter. The period for which temperature and humidity reach Max. or Min. simultaneously will be less than 1%. For other times, equipment qualification temperature and humidity will be in the middle of Max. and Min.
2. The indicated (positive or negative) pressure will be maintained. Pressure difference will not be controlled.
3. During pump operation (test running, etc.) this temperature will be a Max. 66°C. The frequency of this maximum temperature occurrence is assumed 2 hours/month (test) or 90 days/year in RHR room (abnormal) and 2 hours/month in the other rooms.

Equipment qualification aging temperature should be base on the normal temperature in the area of interest (e.g. for BWR: 50°C – 55°C) which is not expected to be in the middle of the maximum and minimum extremes as indicated in note 1 above nor in ~~notes~~ note 1 of tables 3I-4, 3I-5 and 3I-6.

Table 3I-4 Thermodynamic Environment Conditions Inside Reactor Building (Outside Secondary Containment) Plant Normal Operating Conditions

Plant Zone/Typical Equipment	Pressure[2] kPaG	Temperature[1] °C	Relative[1] Humidity
Clean zone outside secondary containment area (not otherwise noted) [Figs. 6.2-26/6.7-1]	0	Max 40 Min 10	Max 90 Min. 10
Diesel generator rooms [Figs. 1.2-8/9.5-6]	0	Max 40[3] Min 10	Max 90 Min 10
SGTS Monitor room [Figs. 1.2-8/6.5-1]	0	Max 40 Min 10	Max 90 Min 10

1. Max. will occur in summer and Min. in winter. The period for which temperature and humidity reach Max. or Min. simultaneously will be less than 1%. For other times, equipment qualification temperature and humidity will be in the middle of Max. and Min.
2. The indicated (positive or negative) pressure will be maintained. Pressure difference will not be controlled.
3. During DG operation, this will be Max. 45°C. The frequency of occurrence of the maximum temperature is assumed 2 hours/month. (Test)

Table 3I-5 Thermodynamic Environment Conditions Inside Control Building Plant Normal Operating Conditions

Plant Zone/Typical Equipment	Pressure[2] kPaG	Temperature[1] °C	Relative[1] Humidity
Control Building rooms (unless otherwise noted) [Figs. 1.2-15/9.2-1a]	0	Max 40 Min 10	Max 90 Min 10
Main control and computer rooms [Figs. 1.2-15/18C7-1]	0	Max 30 Min 10	Max 60 Min 10
Control Building HVAC equipment rooms [Figs. 1.2-15/9.2-1a)	0	Max 40 Min 5	Max 90 Min 10

1. Max. will occur in summer and Min. in winter. The period for which temperature and humidity reach Max. or Min. simultaneously will be less than 1%. For other times, equipment qualification temperature and humidity will be in the middle of Max. and Min
2. The indicated (positive or negative) pressure will be maintained. Pressure difference will not be controlled.

Table 3I-6 Thermodynamic Environment Conditions Inside Turbine Building Plant Normal Operating Conditions

Plant Zone/Typical Equipment	Pressure[2] kPaG	Temperature[1] °C	Relative[1] Humidity
Main steam stop valve area [Figs. 1.2-25/7.2-9	0	Max 60 Min 10	Max 90 Min 10

1. Max. will occur in summer and Min. in winter. The period for which temperature and humidity reach Max. or Min. simultaneously will be less than 1%. For other times, equipment qualification temperature and humidity will be in the middle of Max. and Min.
2. The indicated (positive or negative) pressure will be maintained. Pressure difference will not be controlled.

Table 3I-7 Radiation Environment Conditions Inside Primary Containment Vessel Plant Normal Operating Conditions

		Operating Dose Rate			Integrated Dose[1] and Neutron Fluence		
No.	Plant Zone/Typical Equipment	Gamma (Gy/h)[2]	Beta (Gy/h)[3]	Neutron/cm²-s	Gamma (Gy)	Beta (Gy)	Neutron /cm²
b-1	Upper drywell area [Figs. 1.2-3/ 5.1-3]	0.2	Neg	$6x10^4$	1E+5	Neg	$1x10^{14}$
b-2	Upper area of lower drywell [Figs. 1.2-3a/ 5.1-3]	0.2 (See Note 4)	Neg	$2x10^4$	1E+5	Neg	$4x10^{13}$
b-3	Lower area of lower drywell [Figs.1.2-3b/ 11.2-1]	0.15	Neg	$1x10^4$	8E+4	Neg	$2x10^{13}$
b-5	Wetwell area (suppression pool and airspace) [Figs. 1.2-3c/ 6.2-39, 7.6-11]	<0.01	Neg	$2x10^2$	5E+3	Neg	$4x10^{11}$

1. Integration time based upon 1.5 year cycles at 18 months operations at 95% availability over 60 years.
2. Operating dose rate at 100% rated power and 30 cm away from the radiation source.
3. Beta dose rates negligible (neg.), primarily due to Ar-41 and typically only in area between vessel and shield wall.
4. Gamma dose rate directly under vessel. Dose rate will increase to 90 Sv/h inside shield directly opposite core mid-plane.

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(2) The ANSI/ANS-5.1 decav heat is used. Fission energy, fuel relaxation heat, and pump heat are included.

(3) The suppression pool is the only heat sink available in the containment system.

(4) After 10 minutes, the RHR heat exchangers are activated to remove energy via recirculation cooling of the suppression pool with the RCW System and ultimately to the RSW System. This is a conservative assumption, since the RHR design permits initiation of containment cooling well before a 10 minute period (see response to Question 430.26).

(5) The maximum service water temperature is assumed to be 35°C. This is a conservative assumption that maximizes the suppression pool temperature.

(6) The lower drywell flooding of $815m^3$ was assumed to occur 70 seconds after scram. During the blowdown phase, a portion of break flow flows into the lower drywell. This is conservative, since lower drywell flooding will probably occur at approximately 110 to 120 second time period.

(7) At 70 seconds, the feedwater specific enthalpy becomes 418.7 kJ/g (100°C saturation fluid enthalpy). 418.7 J/g

6.2.1.1.3.3.1.3 Short-Term Accident Responses

The calculated containment pressure and temperature responses for a feedwater line break are shown in Figures 6.2-6 and 6.2-7, respectively. The peak pressure (268.7 kPaG) and temperature (140°C) occur in the drywell. The containment design pressure of 309.9 kPaGis 115% of the peak pressure.

The drywell pressurization is driven by the wetwell pressurization for stable peaks. The wetwell pressurization is a function of three major parameters:

(1) The increased wetwell air mass caused by the addition of drywell air

(2) Compression of the airspace volume due to increased suppression pool volume

(3) Increased vapor partial pressure from increasing suppression pool temperature

The suppression pool volume increase is caused by the liquid addition to the containment system from the broken feedwater line. Contribution of these parameters to wetwell pressurization is about 80% by the increased air mass, 15% by the compression effects, and 5% by the increased vapor partial pressure. Once air carryover

BASES SPLB

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.4.3.2

This SR verifies that the required SGT System filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 5). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specified test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.4.3.3

This SR requires verification that each SGT ~~train~~ system starts upon receipt of an actual or simulated initiation signal. The applicable SRs in LCO 3.3.1.1 and LCO 3.3.1.4 overlap this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.4.3.4

This SR requires verification that the SGT System filter cooler bypass damper can be opened and the fan started. This ensures that the ventilation mode of SGT System operation is available. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.

2. ABWR SSAR, Section 6.2.3.

(continued)

B 3.7 PLANT SYSTEMS

B 3.7.4 Control Room Habitability Area (CRHA) - Emergency Filtration (EF) System

BASES

BACKGROUND

The Emergency Filtration System of the CRHA HVAC System, provides a radiologically controlled environment from which the unit can be safely operated following a Design Basis Accident (DBA).

The safety related function of the Emergency Filtration System used to control radiation exposure consists of two independent and redundant high efficiency air filtration divisions for treatment of a mixture of recirculated air and a minimum of outside air supplied for pressurization of the main control area envelope (MCAE). Each division consists of an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, a second HEPA filter, a fan, and the associated ductwork and dampers. [Electric heater limits the relative humidity of the influent air stream to less than 70% relative humidity.] Prefilters and HEPA filters remove particulate matter that may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay. The second HEPA filter collects any carbon fines exhausted from the adsorber.

Upon receipt of the initiation signal(s) (indicative of conditions that could result in radiation exposure to MCAE personnel), the Emergency Filtration System automatically switches to the high radiation mode of operation to prevent infiltration of contaminated air into the MCAE.

The Emergency Filtration System is designed to maintain the MCAE environment for a 30 day continuous occupancy after a DBA, without exceeding a 0.05 Sv whole body dose. Emergency Filtration System operation in maintaining the control room habitability is discussed in the SSAR, Sections 6.4.1 and 9.4.1 (Refs. 1 and 2, respectively).

APPLICABLE SAFETY ANALYSES

The ability of the Emergency Filtration System to maintain the habitability of the control room is an explicit assumption for the safety analyses presented in the SSAR,

(continued)

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BASES

APPLICABLE SAFETY ANALYSES (continued)	Chapters 6 and 15 (Refs. 3 and 4, respectively). The filtration mode of the Emergency Filtration System is assumed to operate following a loss of coolant accident, main steam line break, and fuel handling accident. The radiological doses to MCAE personnel as a result of the various DBAs are summarized in Reference 4. No single active or passive failure will cause the loss of outside or recirculated air from the MCAE. The Emergency Filtration System satisfies Criterion 3 of the NRC Policy Statement.
LCO	Two redundant divisions of the Emergency Filtration System are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other division. Total system failure could result in exceeding a dose of 0.05 Sv to the control room operators in the event of a DBA. The Emergency Filtration System is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both divisions. A division is considered OPERABLE when its associated: a. Fan is OPERABLE; b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions; and c. Heater, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained. In addition, the MCAE boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and double entry doors with vestibule between, at a positive pressure of at least .32 mm of water gauge relative to atmosphere.
APPLICABILITY	In MODES 1, 2, and 3, the Emergency Filtration System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

(continued)

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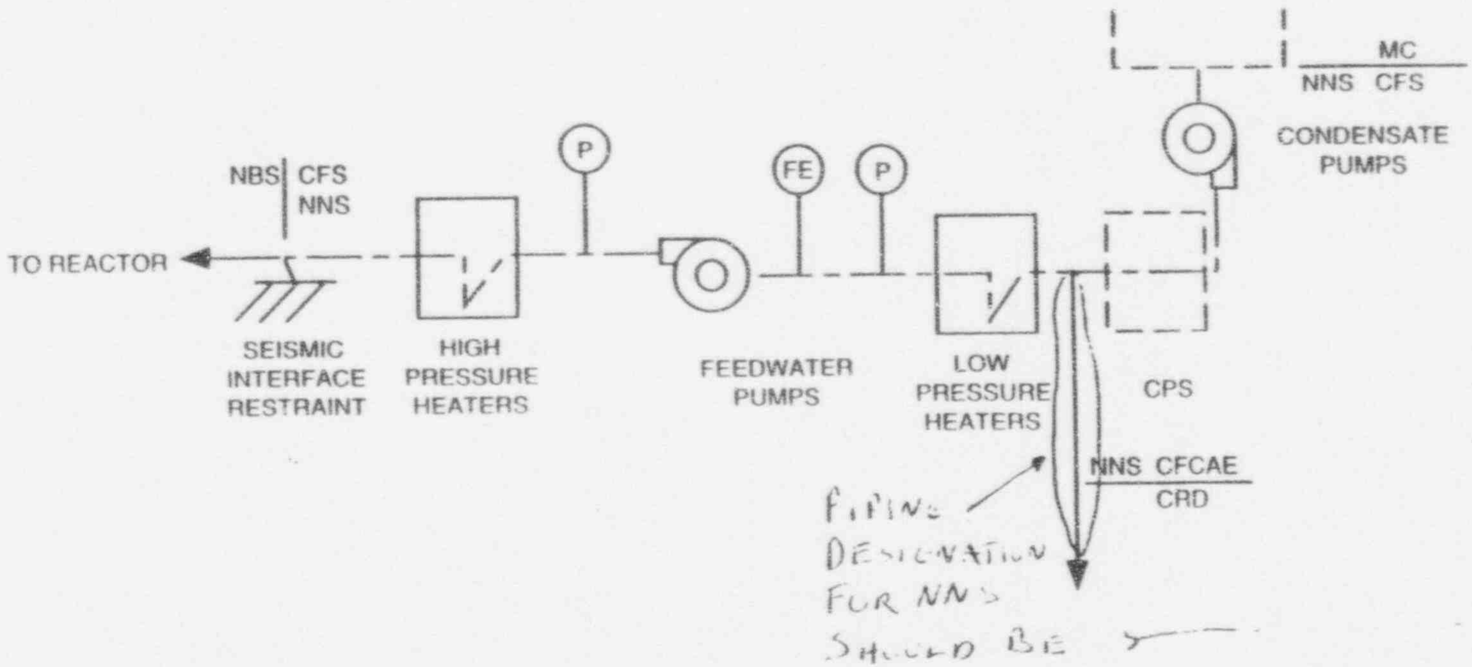


NOTES:

1. RELIEF VALVE DISCHARGE AND VENTS ARE CHANNELED THROUGH CLOSED SYSTEMS.
2. FEEDWATER AND CONDENSATE PUMP REDUNDANCY IS PROVIDED.

Figure 2.10.2a Condensate and Feedwater System

SERVICE BUILDING HVAC SYSTEM:

SPLB

INSERT A

(5) ~~Since~~ there are no sources of radioactivity inside the Service Building ~~automatic isolation provisions are not required~~. However, ~~if~~ the radiation levels inside the [controlled area of the] Service Building ~~are found to be~~ [can become] high due to leakage from the secondary containment or from the Turbine Building. [If this happens, the controlled area] ~~the Service Building~~ HVAC system can be manually isolated to prevent releases to the environment via the subject HVAC system exhaust.

GE has proposed an "Insert A" for ABWR SSAR Section 9.4.8.3 (5) to conform the GDC 60 requirements in their letter dated April 25, 1994. The staff has reviewed the proposed "Insert A" and found it acceptable as shown above. Therefore, GE should revise ABWR SSAR Section 9.4.8.3 (5) accordingly to incorporate above changes in the subject "Insert A".

Table 3.9-8 Inservice Testing Safety-Related Pumps and Valves (Continued)

No.	Qty	Description (h) (i)	Safety Class (a)	Code Cat. (c)	Valve Func (d)	Test Para (e)	Test Freq (f)	SSAR Fig. (g)
F710	2	Filter train charcoal absorber dp instrument line valve	3	B	P		E1	6.5-1 sh. 2,3
F711	2	Filter train after HEPA dp instrument line valve	3	B	P		E1	6.5-1 sh. 2,3
F712	2	Filter train after HEPA dp instrument line valve	3	B	P		E1	6.5-1 sh. 2,3
F713	2	Filter train exhaust flow instrument line valve	3	B	P		E1	6.5-1 sh. 2,3
F714	2	Filter train exhaust flow instrument line valve	3	B	P		E1	6.5-1 sh. 2,3
T31 Atmospheric Control System Valves								
F001	1	Purge supply line outboard isolation valve (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F002	1	Drywell purge line supply inboard isolation valve (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F003	1	Wetwell purge supply line inboard isolation valve (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F004	1	Drywell purge exhaust line inboard isolation valve (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F005	1	Drywell purge exhaust line bypass line valve	2	A	I,A	L, P S	2 yr 3 mo	6.2-39 sh. 1
F006	1	Wetwell purge exhaust line inboard isolation valve (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F007	1	Wetwell overpressure line valve (h2)	2	A	I,P	L, P S	2 yr RO	6.2-39 sh. 1
F008	1	Containment exhaust line to SGTS (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F009	1	Containment exhaust line to R/B HVAC (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F010	1	Wetwell overpressure line valve (h2)	2	A	I,P	L, P S	2 yr RO	6.2-39 sh. 1
F011	1	Containment exhaust line to SGTS (h2)	2	A	I,A	L, P S	2 yr RO	6.2-39 sh. 1
F025	1	Purge supply line from outboard containment isolation valve	2	A	I,A	L, P S	2 yr 3 mo	6.2-39 sh. 1
F039	1	N_2 makeup line from outboard containment isolation valve	2	A	I,A	L, P S	2 yr 3 mo	6.2-39 sh. 1

This set of VDUs is driven by the plant process computer system. Thus, data collected by the process computer is available for monitoring on these VDUs. All available display formats can be displayed on any of these VDUs.

18.4.2.4 Process Computer Independent VDUs

A set of VDUs which are independent of the process computer are also installed on the main control console. These VDUs are each driven by independent processors. They are divided into two subsets:

(1) The first subset consists of those VDUs which are dedicated, divisionally separated devices. The VDUs in this group can only be used for monitoring and control of equipment within a given safety division. The VDUs are qualified, along with their supporting display processing equipment, to Class 1E standards.

(2) The second subset of process computer independent VDUs are used for monitoring and control of non-safety plant systems. The VDUs in this subset are not qualified to Class 1E equipment standards.

18.4.2.5 Dedicated Function Switches

Dedicated function switches are installed on the main control console. These devices provide faster access and feedback compared to that obtainable with soft controls. These dedicated switches are implemented in hardware, so that they are located in a fixed-position and are dedicated in the sense that each individual switch is used only for a single function, or two very closely related functions (e.g., valve open/close).

The dedicated switches on the main control console are used to support actions such functions as initiation of automated sequences of safety and non-safety system operations, manual scram and reactor operating mode changes.

18.4.2.6 Automation Design

The ABWR incorporates selected automation of the operation required during a normal plant startup/shutdown and during normal power range maneuvers. Subsection 7.7.1.5.1 describes the Power Generation Control (PGC) System, which is the primary ABWR system for providing the automation features for normal ABWR plant operations.

18.4.2.6.1 Automatic Operation

When placed in automatic mode, the PGC System performs sequences of automated plant operations by sending mode change commands and setpoint changes to lower-level, non-safety-related plant system controllers. The PGC System cannot directly change the status of a safety-related system. When a change in the status of a safety-

(4) Equipment

The PCS is composed of the following features and components:

(a) The central processing units, which perform various calculations, make necessary interpretations and provide for general input/output device control between I/O devices and memory.

(b) An automatic prioritizing function that provides processor capability to respond immediately to important process functions and to operate at optimum speed.

(c) A random access type processor memory that has a memory parity check feature capable of stopping computer operation subsequent to completing an instruction in which a parity error is detected. The processor memory has suitable shutdown protection to prevent information destruction in the event of loss of power or incorrect operating voltage.

(d) The capability to maintain real time by utilizing necessary calendar-type programs to compute year, month, day, hour, minute, second and either cycles or milliseconds. This is done automatically except in the event of processor shutdown.

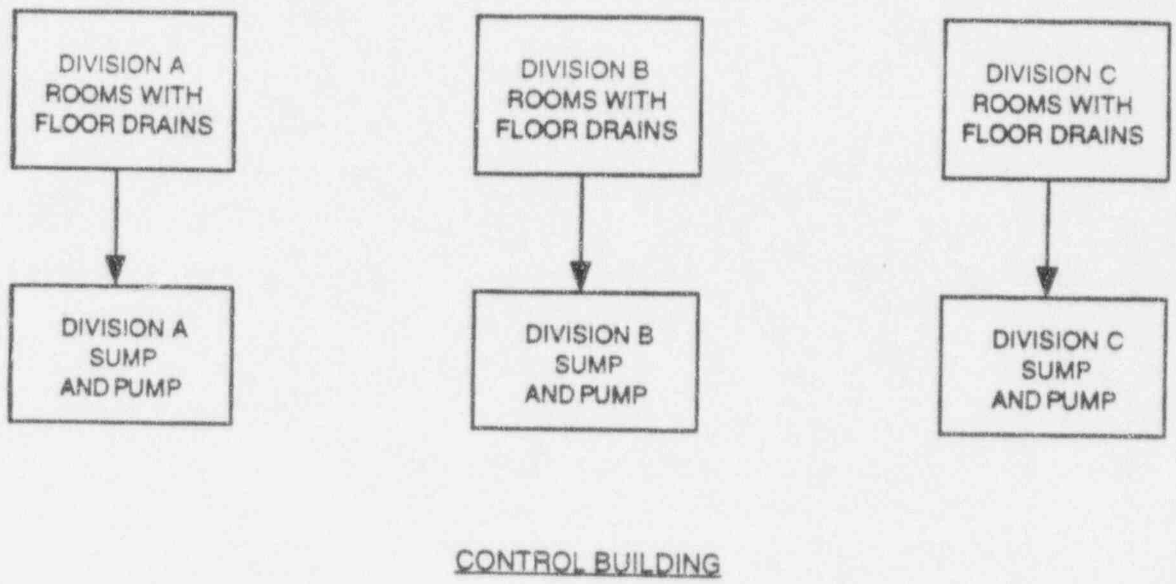
(e) Bulk memory for storing all programs and all data. Capability is provided to protect selectable portions of bulk memory against information destruction caused by an inadvertent attempt to write over the programs or by a system power failure.

(f) Peripheral I/O equipment that is used to read data into and out of the computer.

(g) Process I/O hardware that accepts both analog and digital inputs. Intermittent signals and pulse type inputs are sensed by automatic priority interrupt.

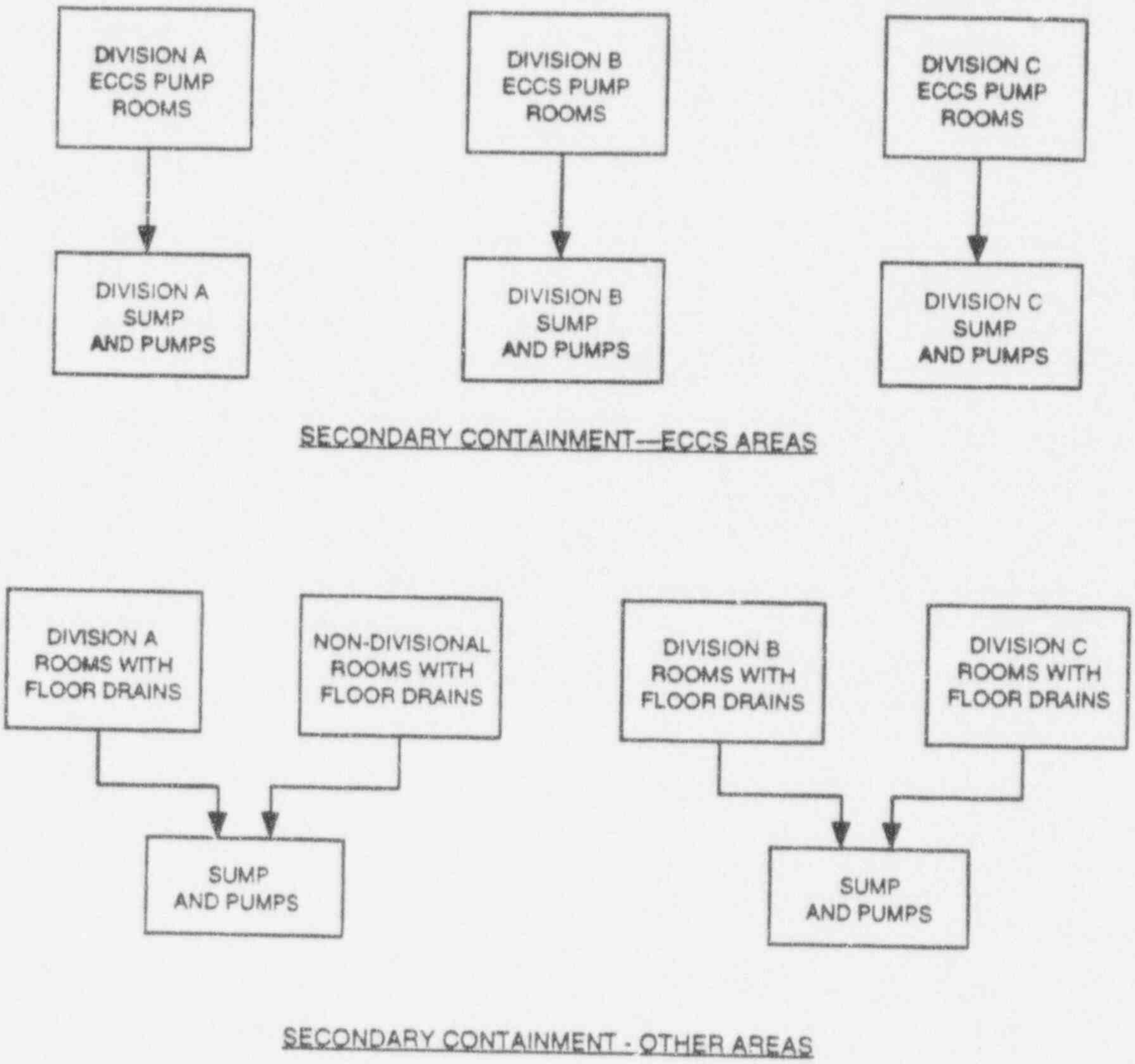
(h) Means to permit the operator to enter information into the computer and request various special functions during routine operation. Diagnostic alarms, displays and associated function selection switches permit the operator to communicate with the processors.

(I) Peripheral equipment in the computer room that is used by programmers and maintenance personnel to permit necessary control of the system for troubleshooting and maintenance functions.



NOTES:
1. THE SYSTEM HAS NO VALVES, PUMPS, OR OTHER ACTIVE COMPONENTS IN THE DRAINAGE PATHS.

Figure 2.9.1a Radioactive Drain Transfer System



NOTES:
1. THE SYSTEM HAS NO VALVES, PUMPS, OR OTHER ACTIVE COMPONENTS IN THE DRAINAGE PATHS.

Figure 2.9.1b Radioactive Drain Transfer System

Table 3.2b Ventilation and Airborne Monitoring

Inspections, Tests, Analyses and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Plant design shall provide for containment of airborne radioactive materials and the ventilation system will maintain concentrations of airborne radionuclides at levels consistent with personnel access needs.	1. Expected concentrations of airborne radioactive material shall be calculated by radionuclide for normal plant operations and anticipated operational occurrences for each equipment cubicle, corridor, and operating area requiring personnel access. Calculations shall consider:	1. Calculation of radioactive airborne concentration shall demonstrate that:
	a. Total ventilation flow rates for each area.	a. For normally occupied rooms and areas of the plant (i.e., those areas requiring routine access to operate and maintain the plant), equilibrium concentrations of airborne radionuclides will be a small fraction (10% or less) of the occupational concentration limits listed in 10CFR20 Appendix B. (VERSION or DATE)
	b. Typical leakage characteristics for equipment located in each area.	b. For rooms that require infrequent access (such as for non-routine equipment maintenance), the ventilation system shall be capable of reducing radioactive airborne concentrations to (and maintaining them at) the occupational concentration limits listed in 10CFR20 Appendix B (VERSION OR DATE) during the periods that occupancy is required.
	c. A radiation source term in each fluid system based upon an assumed offgas rate of 3,700 MBq/s (30 minute decay) appropriately adjusted for radiological decay and buildup of activated corrosion and wear products.	c. For rooms where access is not anticipated to perform scheduled maintenance or surveillance (such as the backwash receiving tank room), plant design shall provide containment and ventilation to reduce airborne contamination spread to other areas of lower contamination.

PPST