PSE&G

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Nuclear Business Unit

MAY 31 2000

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LCR S99-21 Revision 1

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

REVISION TO REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS CHARCOAL FILTER TESTING CHANGES REQUIRED BY GENERIC LETTER 99-02 SALEM GENERATING STATION, UNIT NOS. 1 AND 2 FACILITY OPERATING LICENSE DPR-70 AND DPR-75 DOCKET NOS. 50-272 AND 50-311

On November 24, 1999, Public Service Electric & Gas (PSE&G) Company submitted a request for change to the Salem Units 1 and 2 Technical Specifications (TS). This submittal provided changes to the surveillance requirements associated with the laboratory testing of charcoal samples for the Auxiliary Building Ventilation (ABV), the Control Room Emergency Air Conditioning System (CREACS) and the Fuel Handling Building Ventilation (FHV) Systems. The above referenced submittal was supplemented on February 10, 2000, to provide additional dose analysis and revise the in-place testing surveillance requirement for the CREACS charcoal filter. By this letter, PSE&G is withdrawing the proposed TS changes contained in the November 24,1999, and February 10, 2000, submittals.

In accordance with 10CFR50.90, PSE&G hereby requests a revision to the TS for the Salem Generating Station (SGS). Implementation of the proposed changes contained in this submittal will establish charcoal filter testing requirements for the ABV System, the CREACS, and the FHV System consistent with the requirements delineated in Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated June 3, 1999. Specifically, the surveillance requirements associated with Limiting Condition for Operation (LCO) 3.7.6.1, 3.7.7.1 and 3.9.12 will now specify American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon," as the testing methodology.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and a determination has been made that this request involves no significant hazards considerations. The basis for the requested change is provided in Attachment 1 to this letter. A 10CFR50.92 evaluation, with a determination of no significant hazards consideration, is provided in Attachment 2. The marked up Technical Specification pages affected by the proposed changes are provided in Attachment 3. In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

As stated in Generic Letter 99-02, the NRC would exercise enforcement discretion consistent with Section VII.B.6 of the Enforcement Policy provided that licensees:

- submit a Technical Specification amendment request to reference the ASTM D3803-1989 testing protocol,
- perform laboratory surveillance tests of charcoal samples occurring after 60 days of the date of GL 99-02 to the ASTM D3803-1989 standard with an acceptance criteria that is derived from applying a safety factor as low as 2 to the charcoal filter efficiency assumed in the design basis dose analysis
- continue to test in accordance with ASTM D3803-1989 in lieu of the current TS-required laboratory testing until the TS amendment is approved.

As documented in attachment 1 of this letter, PSE&G currently credits the following charcoal filter efficiencies in the dose analysis:

System	Dose Analysis Charcoal Filter Efficiency	New Surveillance Testing Acceptance Criteria
Auxiliary Building Ventilation	70%	85%
Control Room Emergency Air Conditioning System	95%	97.5%
Fuel Handling Building Ventilation	90%	95%

PSE&G is applying the enforcement discretion of GL 99-02 for the ABV and FHV systems since:

- Technical specification changes to incorporate testing to ASTM D3803-1989 were submitted on November 24, 1999, within 180 days of the issuance of GL 99-02.

- All laboratory charcoal filter testing that occurs 60 days following the issuance of GL 99-02 will be performed to the ASTM D3803-1989 standard using the surveillance testing acceptance criteria specified above for the ABV and FHV systems.
- Surveillance testing will continue to be performed using ASTM D3803-1989 for the ABV and FHV systems until the TS changes provided in this submittal are approved.

The CREACS surveillance testing will continue to be tested to the current TS surveillance requirement acceptance criteria of 99% until the TS amendment is approved since this requirement already specifies testing to ASTM D3803-1989.

Upon NRC approval of the proposed TS changes, PSE&G requests that the amendment be made effective on the date of issuance, but allow an implementation period of sixty days to provide sufficient time for associated administrative activities. Should you have any questions regarding this request, please contact Mr. Brian Thomas at 856-339-2022.

Sincerely,

M. B. Bezilla
Vice President - Operations

Affidavit
Attachments

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REF: LRN-00-0198
LCR S99-21 Rev. 1

STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

M. B. Bezilla, being duly sworn according to law deposes and says:

I am Vice President – Operations of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning Salem Generating Station, Units 1 and 2, are true to the best of my knowledge, information and belief.

Subscribed and Sworn to before me
this 30 day of May, 2000

Notary Public of New Jersey

My Commission expires on 12/8/2003

SALEM GENERATING STATION
FACILITY OPERATING LICENSES DPR-70 & DPR-75
DOCKET NOS. 50-272 & 50-311
REVISIONS TO THE TECHNICAL SPECIFICATIONS (TS)

BASIS FOR REQUESTED CHANGE:

Public Service Electric and Gas Company (PSE&G), under Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Generating Station, requests that the TS contained in Appendix A to the Operating License for Units 1 and 2 be amended as proposed herein to revise TS surveillance requirements contained in Limiting Condition for Operation (LCO) 3.7.6.1, 3.7.7.1 (3.7.7 Unit 2) and 3.9.12 and the associated bases sections. The proposed changes would revise the Salem TS to become consistent with the NRC requirements delineated in Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal."

As stated in Generic Letter 99-02, the NRC determined that testing nuclear-grade activated charcoal to standards other than American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon," does not provide assurance for complying with the current licensing basis as it relates to the dose limits of General Design Criterion (GDC) 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and Subpart A of 10 CFR Part 100. The NRC staff has determined that ASTM D3803-1989 should be used for both new and used charcoal because it allows for accurately monitoring the degradation of the charcoal over time. The results from the new charcoal tested via ASTM D3803-1989 present a solid baseline for the initial capability of the charcoal. In addition, the NRC stated that using ASTM D3803-1989 to test used charcoal is a very accurate and reproducible method for determining the capability of the charcoal. By comparing the results of the tests performed on used charcoal with the baseline test performed on new charcoal, licensees can be certain of the charcoal's level of degradation.

REQUESTED CHANGE, PURPOSE AND BACKGROUND:

The TS and bases changes associated with this request are contained in Attachment 3. The proposed changes affect TS Surveillance Requirements 4.7.6.1.b.3, 4.7.6.1.c, 4.7.7.1.b.4 (Unit 1), 4.7.7.b.3 (Unit 2), 4.7.7.1.c (Unit 1), 4.7.7.c (Unit 2), 4.9.12.b.4 (Unit 1), 4.9.12.b.3 (Unit 2) and 4.9.12.c. The purpose of these changes is to implement Auxiliary Building Ventilation (ABV) System, Control Room Emergency Air Conditioning

System (CREACS) and Fuel Handling Building Ventilation (FHV) System charcoal filter testing requirements and acceptance criteria that are consistent with NRC requirements delineated in Generic Letter 99-02. These changes will require that a sample of the charcoal adsorber be periodically obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, and laboratory tested to determine the methyl iodide penetration in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%. The acceptance criteria for methyl iodide penetration are also provided for each charcoal filter unit, which, as discussed in the next section, establishes limits consistent with the requirements of Generic Letter 99-02.

Previously, charcoal filter testing for the ABV and FHV systems at Salem had utilized methodology contained and referenced in US NRC Regulatory Guide 1.52, Revision 2, March 1978, and ANSI N510-1975. However, Generic Letter 99-02 noted this methodology had unacceptable test parameter tolerances and instrument calibration requirements, and that it was non-conservative in not requiring humidity pre-equilibration of used charcoal. Therefore, Salem is incorporating testing that requires the use of ASTM D3803-1989 methodology for the performance of the aforementioned TS surveillance requirements. The changes to CREACS are being made to provide surveillance requirements consistent with the wording proposed in Generic Letter 99-02. Currently the CREACS charcoal filter is tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

JUSTIFICATION OF REQUESTED CHANGES:

The Salem analyses of design-basis accidents assume particular charcoal filter adsorption efficiencies when calculating offsite and control room operator doses. To determine whether the filter adsorber efficiency is greater than that assumed in the design-basis accident analysis, periodic laboratory testing of charcoal filter samples are performed.

As stated in Generic Letter (GL) 99-02, testing in accordance with ASTM D3803-1989 adequately demonstrates the capability of charcoal filters to remove radioiodine, and the NRC staff considers ASTM D3803-1989 to be the most accurate and most realistic protocol for testing charcoal in Engineered Safety Feature (ESF) ventilation systems because it offers the greatest assurance of accurately and consistently determining the capability of the charcoal. For example, the ASTM standard requires the test to be performed at a constant low temperature of 30°C, provides for smaller tolerances in temperature, humidity, and airflow; and has humidity pre-equilibration.

As stated in GL 99-02, laboratory testing acceptance criteria contain a safety factor to ensure that the charcoal efficiency assumed in the accident analysis is still valid at the end of the operating cycle. Because ASTM D3803-1989 is a more accurate and demanding test method than older test methods, licensees can adopt a safety factor as low as 2 in determining their TS laboratory testing acceptance criteria. The NRC also stated that this safety factor can be used for systems with or without humidity control since the lack of humidity control is already accounted for in the test conditions. Since the Salem ventilation systems do not have humidity control, the ASTM D3803-1989 testing will be conducted at 95 percent RH.

Laboratory testing of the charcoal filters in the FHV and ABV systems is currently performed with an acceptance criteria equivalent to the value that was credited in the current design-basis dose analysis. Based upon implementation of the requirements of GL 99-02, the TS surveillance requirements for laboratory testing of charcoal filters is being revised to incorporate a safety factor of 2 to the acceptance criteria specified in the surveillance requirements for the FHV and ABV systems. The implementation of a safety factor of 2 for the FHV and ABV systems will provide added margin between the tested charcoal filter efficiency and the value used in the design basis dose analysis to account for any unexpected degradation of the charcoal filter efficiency over the 18-month testing interval.

Currently, laboratory testing of the CREACS charcoal filter is being performed with an acceptance criteria that is greater than a safety factor of 2. The CREACS laboratory testing acceptance criteria is being revised in this submittal to apply a safety of 2. Although the TS surveillance acceptance criteria value is being reduced from 99% to 97.5%, the actual removal capability of the charcoal filter remains unchanged. The CREACS charcoal filters are currently tested using the ASTM D3803-1989 standard.

The following table summarizes the charcoal efficiencies used in the dose analysis and the acceptance criteria that is being incorporated into the charcoal filter laboratory surveillance testing:

System	Dose Analysis Charcoal Filter Efficiency	Surveillance Testing Acceptance Criteria
Auxiliary Building Ventilation	70%	85%
Control Room Emergency Air Conditioning System	95%	97.5%
Fuel Handling Building Ventilation	90%	95%

DOSE ANALYSIS CHARCOAL FILTER EFFICIENCIES

Fuel Handling Accident

The current dose analysis of record for the Fuel Handling Accident (FHA) in the fuel handling building assumes that the FHV charcoal filter has a removal efficiency of 90% and the CREACS charcoal filter has a removal efficiency of 95%. The results of the FHA dose analysis were reviewed during the NRC's approval of Amendment 190 (Unit 1) and 173 (Unit 2) to the Salem TS. Based upon the 90% removal efficiency assumption for the FHV system charcoal filter, the laboratory testing surveillance requirement acceptance criteria is being revised to 95% to incorporate a Safety Factor of 2.

Loss of Coolant Accident (LOCA)

The NRC also reviewed the current Salem LOCA analysis under Amendments 190/173. PSE&G in letters dated June 24, 1996 (LR-N96178) and October 17, 1996 (LR-N96318) submitted to the NRC the inputs used in the LOCA dose analysis, the methodology including new codes used to perform the analysis, and the results of the dose analysis. The NRC performed a confirmatory analysis that is documented in the safety evaluation report (SER) for Amendments 190/173.

The current Salem LOCA analysis takes credit for the removal of radioiodine by the ABV charcoal filter and the CREACS charcoal filter. In this analysis, the CREACS charcoal efficiency is assumed to be a maximum of 95% in accordance with the guidance of Regulatory Guide 1.52 for 2-inch charcoal filters.

The Auxiliary Building at Salem station contains the pumps and piping systems that are used to draw the radioactive water from the containment sump, cool this water and inject this water back into the reactor coolant system following a LOCA. The components in these systems are determined to have a certain amount of leakage that is defined in the dose analysis as the Engineered Safety Feature (ESF) leakage. This ESF leakage releases airborne radioiodine into the Auxiliary Building that is drawn into the ABV system.

In the analysis reviewed by the NRC, it was assumed that 50% of the ESF leakage that becomes airborne would be drawn through the ABV charcoal filter and that the charcoal filter would have a removal efficiency of 90%. The equivalent overall radioiodine removal efficiency is 45%.

The basis for the assumption that 50% of the ESF leakage would be drawn through the charcoal filter was documented in engineering calculation S-C-VAR-MDC-1575, Rev. 0, "Post-LOCA Recirculation ECCS Airborne Leakage Outside Containment." In revision 0 of this calculation, the ESF leakage that would be drawn into the flow path of the ABV charcoal filter was calculated to be ~58%. Conservatively, a value of 50% was used in formulating the analysis assumption. In 1998, a revision to the calculation S-C-VAR-MDC-1575 was performed to more accurately assess the leakage that is drawn to the ABV charcoal filter (the LOCA dose input assumptions were not revised at that time). The revision to this calculation determined that ~77% of the ESF leakage would be drawn into the ventilation path of the ABV charcoal filter while the remaining 23% would be exhausted from the Auxiliary Building with no charcoal filtration. Neither revision 0 nor revision 1 of calculation S-C-VAR-MDC-1575, changed the total amount of ESF leakage . The maximum total amount of ESF leakage remains at approximately 3800 cc/hr. A copy of S-C-VAR-MDC-1575, Revision 1 is provided as Attachment 4.

Based on the latest assessment of ESF leakage locations, PSE&G now conservatively takes credit for 65% of the ESF leakage being drawn through the ABV charcoal filter. Maintaining the current overall ESF leakage radioiodine removal rate of 45%, allows for the assignment of a 70% removal efficiency for ABV charcoal filter.

Crediting the ABV charcoal filter with filtering only 65% of the ESF leakage is a conservative input for the LOCA dose analysis, as discussed below. Based on assuming that 65% of the ESF airborne leakage will be filtered, 35% of the ESF leakage would be drawn out of the Auxiliary Building unfiltered. Using the value from calculation S-C-VAR-MDC-1575, Revision 1, 23% of the ESF leakage is drawn out of the Auxiliary Building unfiltered. Therefore, a value of 35% unfiltered ESF leakage used in the dose assumption is ~ 1.5 times greater than the calculated value. The basis for the selection of the 65% filtered, 35% unfiltered airborne ESF leakage is documented in engineering evaluation S-C-ABV-MEE-1361, Revision 0. A copy of the engineering evaluation and associated safety evaluation are provided in Attachment 5.

Based on a 70% ABV charcoal filter removal efficiency, the laboratory technical specification testing acceptance criteria will be revised to 85%, incorporating a safety factor of 2 to meet the requirements of GL 99-02. Prior to the change in credited ABV charcoal filter efficiency, the ABV charcoal filter laboratory test acceptance criterion was the same as the value credited in the dose analysis. The ABV charcoal filter will now be tested at a higher efficiency than credited in the dose analysis assuring that the actual ABV charcoal filter removal efficiency will be greater than the value assumed in the dose analysis.

The changes to the charcoal filter removal efficiency and the filtered/unfiltered ESF leakage values do not change the design or operation of the ABV system. The change in the amount of ESF leakage that is drawn to the ABV charcoal filter does not change the amount of ESF leakage that is modeled in the dose analysis (7680 cc/hr). The maximum overall value of ESF leakage remains at approximately 3800 cc/hr. Salem station has an ESF leakage monitoring program to ensure that the actual plant ESF leakage is maintained below the levels specified in the dose analysis. If ESF leakage values from components begin to increase then appropriate actions are taken to correct the leakage including the potential of shutting down the plant if ESF leakage is excessive. PSE&G evaluated this change under 10CFR50.59 and has determined that there is no Unreviewed Safety Question. The overall dose results and the methodology of the LOCA analysis reviewed by the NRC under Amendments 190/173 are not changed. The overall ABV airborne ESF radioiodine removal rate of 45% is maintained.

SYSTEM FLOW RATES

As required by GL 99-02, if a system has a face velocity greater than 10 percent of 0.203 m/s (40 ft/min) then the revised TS should specify the face velocity. The following table provides the system face velocity and designed carbon adsorber residence time:

System	Carbon Filter Bed Depth	Carbon Adsorber Residence Time current/proposed (sec)	System Face Velocity Used for Testing (fpm)
Auxiliary Building Ventilation	1"	0.0625/0.0625	74
Control Room Emergency Air Conditioning System	2"	0.269/0.25	44
Fuel Handling Building Ventilation	2"	0.269/0.233	43

The above system face velocities are calculated at 110% of the design system flow rate for the ABV, CREACS and FHV systems. Based on the requirements of GL 99-02, the CREACS and FHV system face velocities do not need to be specified in the TS surveillance requirements. The ABV face velocity value of 74 fpm will be included in the TS surveillance requirement for this system. The value of 74 fpm reflects testing of

the ABV charcoal laboratory samples at a face velocity equivalent to 110% of the ABV design flow rate through the charcoal filter.

ENVIRONMENTAL IMPACT:

The proposed TS changes were reviewed against the criteria of 10CFR51.22 for environmental considerations. The proposed changes do not involve a significant hazards consideration, a significant increase in the amounts of effluents that may be released offsite, or a significant increase in the individual or cumulative occupational radiation exposures. Based on the foregoing, PSE&G concludes that the proposed TS changes meet the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement.

Conclusion

PSE&G believes that the proposed changes to the TS:

1) are consistent with the requirements delineated in Generic Letter 99-02;
2) implement testing methods that adequately demonstrate charcoal filter capability; and
3) establish appropriately conservative acceptance criteria.

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10CFR50.92 EVALUATION

Public Service Electric & Gas (PSE&G) has concluded that the proposed changes to the Salem Generating Station (SGS) Technical Specifications do not involve a significant hazards consideration. In support of this determination, an evaluation of each of the three standards set forth in 10CFR50.92 is provided below.

REQUESTED CHANGE

The proposed changes affect TS Surveillance Requirements 4.7.6.1.b.3, 4.7.6.1.c, 4.7.7.1.b.4, 4.7.7.1.c, 4.9.12.b.4 and 4.9.12.c. The purpose of these changes is to implement Auxiliary Building Ventilation (ABV) System, Control Room Emergency Air Conditioning System (CREACS) and Fuel Handling Building Ventilation (FHV) System charcoal filter testing requirements and acceptance criteria that are consistent with NRC requirements delineated in Generic Letter 99-02.

BASIS

1. *The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.*

The proposed TS change does not involve any physical changes to plant structures, systems or components (SSC). The FHV, CREACS and ABV systems will continue to function as designed. The FHV, CREACS and ABV systems are designed to mitigate the consequences of an accident, and therefore, can not contribute to the initiation of any accident. The proposed TS surveillance requirement changes implement testing methods that more appropriately demonstrate charcoal filter capability and establish acceptance criteria, which ensure that Salem's design basis assumptions are appropriately met. In addition, this proposed TS change will not increase the probability of occurrence of a malfunction of any plant equipment important to safety, since the manner in which the FHV, CREACS and ABV systems are operated is not affected by these proposed changes. The proposed surveillance requirement

acceptance criteria ensure that the FHV, CREACS and ABV safety functions will be accomplished. Therefore, the proposed TS changes would not result in a significant increase of the consequences of an accident previously evaluated, nor do they involve an increase in the probability of an accident previously evaluated.

2. *The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.*

The proposed TS changes do not involve any physical changes to the design of any plant SSC. The design and operation of the FHV, CREACS and ABV systems are not changed from that currently described in Salem's licensing basis. The FHV, CREACS and ABV systems will continue to function as designed to mitigate the consequences of an accident. Implementing the proposed charcoal filter testing methods and acceptance criteria does not result in plant operation in a configuration that would create a different type of malfunction to the FHV, CREACS and ABV systems than any previously evaluated. In addition, the proposed TS changes do not alter the conclusions described in Salem's licensing basis regarding the safety related functions of these systems.

Therefore, the proposed TS change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. *The proposed change does not involve a significant reduction in a margin of safety.*

The proposed changes contained in this submittal implement TS requirements that: 1) are consistent with the requirements delineated in Generic Letter 99-02; 2) implement testing methods that adequately demonstrate charcoal filter capability; and 3) establish appropriately conservative acceptance criteria. The charcoal filter efficiencies specified in the proposed surveillance requirements apply a safety factor of 2 to the efficiencies used in the design basis dose analysis. There are no increases to the currently approved offsite dose releases or the control room operator doses as a result of these surveillance requirement changes. Therefore, the proposed TS change will not result in a significant reduction in a margin of safety.

CONCLUSION

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.

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REVISIONS TO THE TECHNICAL SPECIFICATIONS (TS)

TECHNICAL SPECIFICATION PAGES WITH PROPOSED CHANGES

The following Technical Specifications for Facility Operating License No. DPR-70 are affected by this change request:

Technical Specification	Page
4.7.6.1.b.3 & 4.7.6.1.c	3/4 7-20
4.7.7.1.b.4 & 4.7.7.1.c	3/4 7-23
4.9.12.b.4 & 4.9.12.c	3/4 9-13 & 14
Bases	B 3/4 7-5b B 3/4 7-5d B 3/4 9-4

The following Technical Specifications for Facility Operating License No. DPR-75 are affected by this change request:

Technical Specification	Page
4.7.6.1.b.3 & 4.7.6.1.c	3/4 7-17
4.7.7.b.3 & 4.7.7.c	3/4 7-19
4.9.12.b.3 & 4.9.12.c	3/4 9-14
Bases	B 3/4 7-5b B 3/4 7-5d B 3/4 9-4

INSERT A

Verifying within 31 days after removal from the CREACS unit, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

INSERT B

After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal from the CREACS unit, that a laboratory analysis of a representative carbon sample, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows a methyl iodide penetration less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

INSERT C

Verifying within 31 days after removal from the ABV unit, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than 15.0% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C, at a nominal face velocity of 74 ft/min, and a relative humidity of 95%.

INSERT D

After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal from the ABV unit, that a laboratory analysis of a representative carbon sample, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows a methyl iodide penetration less than 15.0% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C, at a nominal face velocity of 74 ft/min, and a relative humidity of 95%.

INSERT E

Verifying within 31 days after removal from the FHV unit, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than 5.0% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

INSERT F

After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal from the FHV unit, that a laboratory analysis of a representative carbon sample, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows a methyl iodide penetration less than 5.0% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

INSERT G

The acceptance criteria for the laboratory testing of the carbon adsorber is determined by applying a minimum safety factor of 2 to the charcoal filter removal efficiency credited in the design basis dose analysis as specified in Generic Letter 99-02.

INSERT H

Laboratory testing of the carbon adsorber is performed in accordance with ASTM D3803-1989 with an acceptance criteria that is determined by applying a minimum safety factor of 2 to the charcoal filter removal efficiency credited in the design basis dose analysis as specified in Generic Letter 99-02.

INSERT I

Laboratory testing of the carbon adsorber is performed in accordance with ASTM D3803-1989 with an acceptance criteria that is determined by applying a minimum safety factor of 2 to the charcoal filter removal efficiency credited in the design basis dose analysis as specified in Generic Letter 99-02.

SURVEILLANCE REQUIREMENTS

4.7.6.1 Each control room emergency air conditioning system filtration train shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating flow through the HEPA filter and charcoal adsorber train(s) and verifying that the train(s) operates with each fan operating for at least 15 minutes.

b. At least once per 18 months or prior to return to service (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system, by:

1. Verifying that the charcoal adsorbers remove ≥99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

2. Verifying that the HEPA filter banks remove ≥99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

INSERT A →

3. Verifying within 31 days after removal that a laboratory analysis of a carbon sample from one of the charcoal adsorbers demonstrates a removal efficiency of ≥99% for radioactive methyl iodide when the sample is tested at 30°C, 95% relative humidity.

INSERT B →

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a carbon sample obtained from a test canister demonstrates a removal efficiency of ≥ 99% for radioactive methyl iodide when the sample is tested at 30°C, 95% relative humidity.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filter and charcoal adsorber bank is ≤ 3.5 inches water gauge while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

2.* Verifying that on a safety injection test signal or control room intake high radiation test signal, the system automatically actuates in the pressurization mode by opening the outside air supply and diverting air flow through the HEPA filter and charcoal adsorber bank.

3. Verifying that the system can maintain the control room at a positive pressure ≥ 1/8" water gauge relative to the adjacent areas during system operation with makeup air being supplied through the HEPA filters and charcoal adsorbers at the design makeup flow rate of ≤ 2200 cfm.

* A one time extension to this surveillance requirement which is satisfied by performance of the Manual SI test is granted during fuel cycle thirteen allowing Unit 1 operations to continue to the thirteenth refueling outage (1R13). The surveillance testing is to be completed at the appropriate time during the 1R13 outage, prior to the unit returning to Mode 4 upon outage completion.

SURVEILLANCE REQUIREMENTS (Continued)

1. Verifying that with the system operating at a flow rate of 21,400 cfm ± 10 % and exhausting through the HEPA filters and charcoal adsorbers, the total bypass flow of the ventilation system to the facility vent, including leakage through the ventilation system diverting valves, is ≤ 1% when the system is tested by admitting cold DOP at the system intake.

2. Verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 21,400 cfm ± 10%.

3. Verifying that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 21,400 cfm ± 10%.

4. Verifying within 31 days after removal that a laboratory analysis of a carbon sample from either at least one test canister or at least two carbon samples removed from one of the charcoal adsorbers demonstrates a removal efficiency of ≥ 90% for radioactive methyl iodide when the sample is tested at 130°C, 95% R.H. The carbon samples not obtained from test canisters shall be prepared by either:

   a) Emptying one entire bed from a removed adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed, or

   b) Emptying a longitudinal sample from an adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed.

INSERT C

5. Verifying a system flow rate of 21,400 cfm ± 10% during system operation.

c. ~~After every 720 hours of charcoal adsorber operation by either:~~

INSERT D

SURVEILLANCE REQUIREMENTS (Continued)

1. Verifying within 31 days after removal that a laboratory analysis of a carbon sample obtained from a test canister demonstrates a removal efficiency of ≥ 90% for radioactive methyl iodide when the sample is tested at 130°C, 95% R.H.; or

2. Verifying within 31 days after removal that a laboratory analysis of at least two carbon samples demonstrate a removal efficiency of ≥ 90% for radioactive methyl iodide when the samples are tested at 130°C, 95% R.H. and the samples are prepared by either:

   a) Emptying one entire bed from a removed adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed, or

   b) Emptying a longitudinal sample from an adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed.

   Subsequent to reinstalling the adsorber tray used for obtaining the carbon sample, the system shall be demonstrated OPERABLE by also:

   a) Verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 21,400 cfm ± 10%, and

   b) Verifying that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 21,400 cfm ± 10%.

d. At least once per 18 months by:

   1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is < 4 inches Water Gauge while operating the ventilation system at a flow rate of 21,400 cfm ± 10%.

SURVEILLANCE REQUIREMENTS (Continued)

2. verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 19,490 cfm ± 10%.

3. Verifying that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 19,490 cfm ± 10%.

4. Verifying within 31 days after removal that a laboratory analysis of a carbon sample from either at least one test canister or at least two carbon samples from one of the charcoal adsorbers demonstrates a removal efficiency of ≥ 90% for radioactive methyl iodide when the sample is tested at 130°C, 95% R. H. The carbon samples not obtained from test canisters shall be prepared by either:

INSERT E

(a) Emptying one entire bed from a removed adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed, or

(b) Emptying a longitudinal sample from an adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to thickness of the bed.

b. Verifying a system flow rate of 19,490 cfm, ± 10% during system operation.

c. After every 720 hours of charcoal adsorber operation by either:

INSERT F

1. Verifying within 31 days after removal that a laboratory analysis of a carbon sample obtained from a test canister demonstrates a removal efficiency of ≥ 90% for radioactive methyl iodide when the sample is tested at 130°C, 95% R.H.; or

2. Verifying within 31 days after removal that a laboratory analysis of at least two carbon samples demonstrate a removal efficiency of ≥ 90% for radioactive methyl iodide when the samples are tested at 130°C, 95% R.H. and the samples are prepared by either:

SURVEILLANCE REQUIREMENTS (Continued)

a) Emptying one entire bed from a removed adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed, or

b) Emptying a longitudinal sample from an adsorber tray, mixing the adsorbent thoroughly, and obtaining samples at least two inches in diameter and with a length equal to the thickness of the bed.

Subsequent to reinstalling the adsorber tray used for obtaining the carbon sample, the system shall be demonstrated OPERABLE by also:

a) Verifying that the charcoal adsorbers remove $\geq$ 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 19,490 cfm $\pm$ 10%, and

b) Verifying that the HEPA filter banks remove $\geq$ 99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 19,490 cfm $\pm$ 10%.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is $\leq$ 4 inches Water Gauge while operating the ventilation system at a flow rate of 19,490 cfm $\pm$ 10%.

2. Verifying that the air flow distribution is uniform within 20% across HEPA filters and charcoal adsorbers.

3. Verifying that on a high radiation test signal, the system automatically directs its exhaust flow through the HEPA filters and charcoal adsorber banks.

4. Verifying that the ventilation system maintains the spent fuel storage pool area at a negative pressure of $\geq$ 1/8 inches Water Gauge relative to the outside atmosphere during system operation.

CAACS and CREACS interface isolation dampers: 1(2)CAA14 and 1(2)CAA20

These two dampers are normally open and do not have associated redundant dampers. These dampers serve a boundary function by isolating the CREACS from the CAACS during emergency operation of the CREACS.

Note: Dampers 1(2)CAA5, CAACS recirculation damper will receive an accident alignment signal to ensure proper accident configuration of CAACS. This damper, however, is not required for the OPERABILITY of CREACS as defined in the LCO.

The control room envelope is considered intact and able to support operation of the CREACS when the emergency air conditioning system is capable of maintaining a 1/8" water gauge positive pressure with the control room boundary door(s) closed.

Filter testing will be in accordance with the applicable sections of ANSI N510 (1975) with the exception that laboratory testing of activated carbon will be in accordance with ASTM D3803 (1989). INSERT G

TS Surveillance Requirement verifies that each fan is capable of operating for at least 15 minutes by initiating flow through the HEPA filter and charcoal adsorbers train(s) to ensure that the system is available in a standby mode.

Each CAACS normal air intake ductwork will have an additional radiation detector channel installed for a total of two detectors per intake. The two detector channels from Unit 1 and Unit 2 CAACS air intake provide input to common radiation monitor processors. Each radiation monitor processor (one for 1R1B-1/1R1B-2 and one for 2R1B-1/2R1B-2) provides a signal to initiate CREACS in the pressurization mode should high radiation be detected. A minimum of one out of two detectors in either intake will initiate the pressurization mode. With two detector channels inoperable on a Unit, operation may continue as long as CREACS is placed inservice in the pressurization or recirculation mode. Pressurization mode will be initiated after 7 days with one inoperable detector. Radiological releases during a fuel handling accident while operating in the recirculation mode could result in unacceptable radiation levels in the CRE since the automatic initiation capability has been defeated for high radiation due to isolation of the detectors. Therefore, movement of irradiated fuel assemblies or Core Alterations at either Unit will not be permitted when in the recirculation mode.

Immediate action(s), in accordance with the LCO Action Statements, means that the required action should be pursued without delay and in a controlled manner.

3/4.7.7 AUXILIARY BUILDING EXHAUST AIR FILTRATION SYSTEM (cont'd)

NORMAL VENTILATION (Normal plant operations)*

Unit 11 from ECCS HEPA only, with
Unit 13 from Aux. Normal HEPA only; or

Unit 12 from ECCS HEPA only, with
Unit 13 from Aux. Normal HEPA only; and

Any two of the three exhaust fans;and

Either of the two supply fans.

* The normal alignment is two exhaust fans and one supply fan. During cooler seasons, and with the absence of the system heating coils, it may be required to limit the amount of colder outside air entering the building. In this case, it is acceptable to secure both supply fans from operation and reduce the number of operating exhaust fans to one. There is sufficient capacity with the single exhaust fan to maintain the negative pressure within the auxiliary building boundary.

EMERGENCY VENTILATION (Emergency plant operations)

Unit 11 from ECCS HEPA + Unit 14, with
Unit 12 from Aux. Normal HEPA only; or

Unit 11 from ECCS HEPA + Unit 14, with
Unit 13 from Aux. Normal HEPA only; or

Unit 12 from ECCS HEPA + Unit 14, with
Unit 13 from Aux. Normal HEPA only; and

At least two of the three exhaust fans; and

Either one of the two supply fans.

Note: During a Safety Injection (SI) all three exhaust fans and one of the supply fans will start. This is acceptable and will maintain the boundary pressure while supplying the required cooling to the building. Should access/egress become difficult with the three exhaust fans running, then one of the exhaust fans should be secured.

OPERABILITY of the Auxiliary Building exhaust air filtration system ensures that air, which may contain radioactive materials leaked from ECCS equipment following a LOCA, is filtered and monitored prior to release from the plant. Operation of this system and the resultant effect on off site dosage calculations was assumed in the accident analyses. ABVS is discussed in Updated Final Safety Analysis Report (UFSAR) Section 9.4.2.

INSERT H

3/4.7.8 SEALED SOURCE CONTAMINATION

The limitations on removable contamination for sources requiring leak testing, including alpha emitters, is based on 10 CFR 70.39(c) limits for plutonium. This limitation will ensure that leakage from byproduct, source, and special nuclear material sources will not exceed allowable intake values.

- A listing of the active (air/motor operated) valves in the affected flow path to be locked open or disabled.

Note that four filled reactor coolant loops, with at least two steam generators with at least their secondary side water level greater than or equal to 5% (narrow range), may be substituted for one residual heat removal loop. This ensures that a single failure does not cause a loss of decay heat removal.

With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9.9 CONTAINMENT PURGE AND PRESSURE-VACUUM RELIEF ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4/9/11 WATER LEVEL - REACTOR VESSEL AND STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 FUEL HANDLING AREA VENTILATION SYSTEM

The limitations on the fuel handling area ventilation system ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The OPERABILITY of this system ~~and the resulting iodine removal capacity are~~ is consistent with the assumptions of the accident analyses. ~~ANSI N510-1975 should be used as a procedure guideline for surveillance testing.~~

INSERT I

SURVEILLANCE REQUIREMENTS

4.7.6.1 The control room emergency air conditioning system shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating flow through the HEPA filter and charcoal adsorber train(s) and verifying that the train(s) operates with each fan operating for at least 15 minutes.

b. At least once per 18 months or prior to return to service (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system, by:

1. Verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

2. Verifying that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

INSERT A →

3. Verifying ~~within 31~~ days after removal that a laboratory analysis of a carbon sample from ~~one of the~~ charcoal adsorbers demonstrates a removal efficiency of ≥ 99% for ~~radioactive~~ methyl iodide when the sample is tested at 30°C, 95% relative humidity.

INSERT B →

c. ~~After every~~ 720 hours of charcoal adsorber operation by verifying within 31 days after ~~removal~~ that a laboratory analysis of a carbon sample obtained from a test canister ~~demonstrates~~ a removal efficiency of ≥ 99% for radioactive methyl iodide when the ~~sample~~ is tested at 30°C, 95% relative humidity.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filter and charcoal adsorber bank is ≤ 3.5 inches Water Gauge while operating the ventilation system at a flow rate of 8000 cfm ± 10%.

2. Verifying that on a safety injection test signal or control room intake high radiation test signal, the system automatically actuates in the pressurization mode by opening the outside air supply and diverting air flow through the HEPA filter and charcoal adsorber bank.

3. Verifying that the system can maintain the control room at a positive pressure ≥ 1/8" water gauge relative to the adjacent areas during system operation with makeup air being supplied through the HEPA filters and charcoal adsorbers at the design makeup flow rate of ≤ 2200 cfm.

SURVEILLANCE REQUIREMENTS (Continued)

1. Verifying that with the system operating at a flow rate of 21,400 cfm ± 10 % and exhausting through the HEPA filters and charcoal adsorbers, the total bypass flow of the ventilation system to the facility vent, including leakage through the ventilation system diverting valves, is less than or equal to 1% when the system is tested by admitting cold DOP at the system intake.

2. Verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas and that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place using the test procedure guidance of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978 (except for the provisions of ANSI N510 Sections 8 and 9), and the system flow rate is 21,400 cfm ± 10%.

INSERT C →

3. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978.

4. Verify that the system flowrate does not exceed the design limit of 23,540 cfm (21,400 cfm + 10%) when the HEPA + Charcoal adsorber filter train is aligned to the ECCS equipment areas.

INSERT D →

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks of less than 4 inches Water Gauge while operating the system at a flow rate of 21,400 cfm ± 10%.

2. Verifying that the system starts on a Safety Injection Test Signal.

2. Verifying that the charcoal adsorbers remove ≥ 99% of a halogenated hydrocarbon refrigerant test gas and that the HEPA filter banks remove ≥ 99% of the DOP when they are tested in-place using the test procedure guidance of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978 (except for the provisions of ANSI N510 Sections 8 and 9), and the system flow rate is 19,490 cfm ± 10%.

INSERT E →

3. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978.

4. Verifying a system flow rate of 19,490 cfm ± 10% during system operation.

INSERT F →

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than or equal to 4 inches Water Gauge while operating the system at a flow rate of 19,490 cfm ± 10%.

2. Verifying that on a high radiation test signal, the system automatically starts (unless already operating) and directs its exhaust flow through the HEPA filters and charcoal adsorber banks.

3. Verifying that the system maintains the spent fuel storage pool area at a negative pressure of greater than or equal to 1/8 inches Water Gauge relative to the outside atmosphere during system operation.

BASES

CAACS and CREACS interface isolation dampers: 1(2)CAA14 and 1(2)CAA20

These two dampers are normally open and do not have associated redundant dampers. These dampers serve a boundary function by isolating the CREACS from the CAACS during emergency operation of the CREACS.

Note: Dampers 1(2)CAA5, CAACS recirculation damper will receive an accident alignment signal to ensure proper accident configuration of CAACS. This damper, however, is not required for the OPERABILITY of CREACS as defined in the LCO.

The control room envelope is considered intact and able to support operation of the CREACS when the emergency air conditioning system is capable of maintaining a 1/8" water gauge positive pressure with the control room boundary door(s) closed.

Filter testing will be in accordance with the applicable sections of ANSI N510 (1975) with the exception that laboratory testing of activated carbon will be in accordance with ASTM D3803 (1989). INSERT 6

TS Surveillance Requirement verifies that each fan is capable of operating for at least 15 minutes by initiating flow through the HEPA filter and charcoal adsorber train(s) to ensure that the system is available in a standby mode.

Each CAACS normal air intake ductwork will have an additional radiation detector channel installed for a total of two detectors per intake. The two detector channels from Unit 1 and Unit 2 CAACS air intake provide input to common radiation monitor processors. Each radiation monitor processor (one for 1R1B-1/1R1B-2 and one for 2R1B-1/2R1B-2) provides a signal to initiate CREACS in the pressurization mode should high radiation be detected. A minimum of one out of two detectors in either intake will initiate the pressurization mode. With two detector channels inoperable on a Unit, operation may continue as long as CREACS is placed inservice in the pressurization or recirculation mode. Pressurization mode will be initiated after 7 days with one inoperable detector. Radiological releases during a fuel handling accident while operating in the recirculation mode could result in unacceptable radiation levels in the CRE since the automatic initiation capability has been defeated for high radiation due to isolation of the detectors. Therefore, movement of irradiated fuel assemblies or Core Alterations at either Unit will not be permitted when in the recirculation mode.

Immediate action(s), in accordance with the LCO Action Statements, means that the required action should be pursued without delay and in a controlled manner.

3/4.7.7 AUXILIARY BUILDING EXHAUST AIR FILTRATION SYSTEM (cont'd)

AUXILIARY BUILDING VENTILATION ALIGNMENT MATRIX
NORMAL VENTILATION (Normal plant operations)*

Unit 21 from ECCS HEPA only, with
Unit 22 from Aux. Normal HEPA only; or

Unit 21 from ECCS HEPA only, with
Unit 23 from Aux. Normal HEPA only; or

Unit 22 from ECCS HEPA only, with
Unit 23 from Aux. Normal HEPA only; and

Any two of the three exhaust fans; and

Either of the two supply fans.

* The normal alignment is two exhaust fans and one supply fan. During cooler seasons, and with the absence of the system heating coils, it may be required to limit the amount of colder outside air entering the building. In this case, it is acceptable to secure both supply fans from operation and reduce the number of operating exhaust fans to one. There is sufficient capacity with the single exhaust fan to maintain the negative pressure within the auxiliary building boundary.

EMERGENCY VENTILATION (Emergency plant operations)

Unit 21 from ECCS HEPA + Unit 24, with
Unit 22 from Aux. Normal HEPA only; or

Unit 21 from ECCS HEPA + Unit 24, with
Unit 23 from Aux. Normal HEPA only; or

Unit 22 from ECCS HEPA + Unit 24, with
Unit 23 from Aux. Normal HEPA only; and

At least two of the three exhaust fans; and

Either one of the two supply fans.

Note: During a Safety Injection (SI) all three exhaust fans and one of the supply fans will start. This is acceptable and will maintain the boundary pressure while supplying the required cooling to the building. Should access/egress become difficult with the three exhaust fans running, then one of the exhaust fans should be secured.

OPERABILITY of the Auxiliary Building exhaust air filtration system ensures that air, which may contain radioactive materials leaked from ECCS equipment following a LOCA, is filtered and monitored prior to release from the plant. Operation of this system and the resultant effect on off site dosage calculations was assumed in the accident analyses. ABVS is discussed in Updated Final Safety Analysis Report (UFSAR) Section 9.4.2.

INSERT H

• A listing of the active (air/motor operated) valves in the affected flow path to be locked open or disable.

Note that four filled reactor coolant loops, with at least two steam generators with at least their secondary side water level greater than or equal to 5% (narrow range), may be substituted for one residual heat removal loop. This ensures that single failure does not cause a loss of decay heat removal.

With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9.9 CONTAINMENT PURGE AND PRESSURE-VACUUM RELIEF ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4/9/11 WATER LEVEL - REACTOR VESSEL AND STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 FUEL HANDLING AREA VENTILATION SYSTEM

The limitations on the fuel handling area ventilation system ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The OPERABILITY of this system ~~and the resulting iodine removal capacity are~~ is consistent with the assumptions of the accident analyses. ~~ANSI N510-1975 and Generic Letter 03-13 should be used as procedural guidelines for surveillance testing.~~

INSERT I

Attachment 4

LCR S99-21 Rev. 1

LRN-00-0198

OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
20000530

NC.DE-AP.ZZ-0002(Q)

FORM 1
Page 2 of 2

Cover Sheet Page 1 of 7

CALCULATION COVER SHEET

CALC. NO.: S-C-VAR-MDC-1575 **REVISION:** 1

CALC. TITLE: Post-LOCA Recirculation ECCS Airborne Leakage Outside Containment

 # SHTS.(CALC): 7 **ATTACHMENTS: #/TOTAL SHTS.:** 4/17 **TOTAL SHTS.:** 24

CHECK ONE:
- ☐ FINAL (Supports Installed Condition)
- ☒ FINAL (Future Confirmation/Follow-up Req'd)
- ☐ INTERIM (Proposed Plant Change)
- ☐ VOID

DESCRIPTION OF CALCULATION REVISION (IF APPL.): (Identify CP and CD numbers if applicable.)

Revised to remove exceedingly conservative assumptions concerning fraction of airborne ESF leakage that passes through the 14 (24) Auxiliary Building Vent Exhaust Filter Unit (that is, the emergency charcoal filtration unit) after the charcoal unit is aligned.

REASON FOR CALCULATION REVISION (IF APPL.):

CRCA 980915258-05

HOPE CREEK ☐ Q ☐ Qs ☐ Qsh ☐ F ☐ R ☒ N/A

Q - LIST (SALEM)? ☒ YES ☐ NO

IMPORTANT TO SAFETY? ☒ YES ☐ NO

INTERIM CALC-FUTURE CONFIRMATIONS REQUIRED? ☐ YES ☐ NO ☒ N/A

If YES, list page No(s).

FINAL CALC - FUTURE CONFIRMATION/FOLLOW-UP REQ'D? ☒ YES ☐ NO ☐ N/A

If YES, list tracking system and tracking No. CRCA 980915258-05

OTHER DOCUMENTS AFFECTED? (CBDs, UFSAR, etc.): See Section 6.0

STATION PROCEDURES IMPACTED? ("N/A" FOR CALCS RELATED TO A DCP)

☒ YES OR UNSURE ☐ NO ☐ N/A

⇒ If "YES OR UNSURE", has System Manager been contacted? ☒ YES ☐ NO

⇒ If "YES" or "NO", has pertinent descriptive information been transmitted to System Manager/Single Point Contact? (transmittal required if System Manager is not contacted) ☐ YES ☐ NO

ORIGINATOR/COMPANY NAME: J. Duffy X1622/PSE&G 11/18/98 Date

PEER REVIEWER/COMPANY NAME: * R. Runowski Jr. X1750 11/18/98 Date

VERIFIER/COMPANY NAME: **M. Crawford X2754 11/18/98 Date

REVIEWED: N/A N/A Date
Contractor Supervisor (as applicable)

APPROVED: J. Barnes X2067 for J. Barnes 11-18-98 Date
PSE&G Supervisor (Req'd)

* Reviewed HVAC assumptions

** Included peer review of leakage assumptions

FORM 2

Page 1 of 1

CALCULATION CONTINUATION SHEET

Sheet: 2 of 7

CALC. NO.: S-C-VAR-MDC-1575			**REFERENCE:** CRCA 980915258-05				
ORIGINATOR, DATE	**REV:**	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

REVISION HISTORY

0 Original Issue

1 The calculation is revised to remove excessively conservative assumptions concerning the fraction of airborne ESF leakage that passes through the 14 (24) Auxiliary Building Vent Exhaust Filter Unit (that is, the emergency charcoal filtration unit) after the charcoal unit is aligned. The original estimate, which only considered valves, was that approximately 60% of the leakage that vaporizes would be filtered after the charcoal filtration unit is aligned.

(207.9 cc/hr)/(359.1 cc/hr) = 0.58

A more detailed review of leakage amount, leakage sites, and post-accident ventilation design justifies a much higher filtration fraction about 75%.

Because there are a large number of changes, revision bars are not used to denote the changes.

FORM 2

Page 1 of 1

CALCULATION CONTINUATION SHEET

Sheet: 3 of 7

CALC. NO.: S-C-VAR-MDC-1575			**REFERENCE:** CRCA 980915258-05				
ORIGINATOR, DATE	**REV:**	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

TABLE OF CONTENTS

CALC. NO.: S-C-VAR-MDC-1575			REFERENCE: CRCA 980915258-05				
ORIGINATOR, DATE	REV:	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

1.0 Purpose and Scope

Determine the filtered and unfiltered Post LOCA Recirculation ECCS airborne leakage outside containment.

2.0 Design Input

2.1 Components and leakage rates are from Engineering Evaluation S-C-VAR-MEE-1071 Section B-2: List of Valves and Flanged Equipment and Associated Leakage Rates.

2.2 During accident conditions, the essential portion of the Auxiliary Building HVAC exhaust headers are aligned to the charcoal filters. (Ref. 7.5)

3.0 Assumptions

3.1 P&ID 205337 for Unit 2 indicates that RHR heat exchanger and pump areas are aligned with the charcoal filtration unit in an emergency. These areas were assumed to include the RHR valve rooms. Similarly, the P&ID indicates that Mechanical Penetrations areas including the BIT and steam generator blowdown areas also are aligned with the charcoal filtration unit in an emergency. The corresponding Unit 1 P&ID is 205237.

3.2 Some valves, such as MOV 11RH4 and 12RH4, have their leakage routed to tanks or back into their respective system. With the exception of gate valve 1RH21, all such leakage routings were assumed to be unfiltered. Additionally, CR 980923153 identifies that the following valves have leakoff lines that are routed to the waste holdup tanks:

UNIT 1				UNIT 2			
11CS36	1CV49	11SJ45	12SJ49	21CS36	2CV49	21SJ45	22SJ49
12CS36	1CV53	11SJ49	12SJ40	22CS36	2CV53	21SJ49	22SJ40
1CV41	11SJ113	12SJ113	11SJ134	2CV41	21SJ113	22SJ113	21SJ134
1CV44	11SJ33	12SJ33	12SJ134	2CV44	21SJ33	22SJ33	22SJ134
1CV48	11SJ40	12SJ45	1SJ135	2CV48	21SJ40	22SJ45	2SJ135

The leakage for these valves is also assumed to be unfiltered.

3.3 In locating the valves, MMIS data, location descriptions, location numbers, and valve descriptions were used along with P&ID's and General Arrangement drawings.

FORM 2

Page 1 of 1

CALCULATION CONTINUATION SHEET

Sheet: 5 of 7

CALC. NO.: S-C-VAR-MDC-1575			**REFERENCE:** CRCA 980915258-05				
ORIGINATOR, DATE	**REV:**	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

3.4 Per PSE&G, 10% of the liquid leakage is assumed to flash into steam, thus resulting in airborne leakage.

3.5 All MMIS data was taken using the respective component ID's (i.e. valve number), unless noted otherwise.

3.6 If a cubicle is surrounded by other cubicles, where the return air is filtered or is inside a cubicle where the return air is filtered, and the HVAC P&ID does not indicate any return air for this cubicle, the cubicle's air is assumed to be filtered by charcoal filters.

4.0 Methodology

4.1 Develop a list of components and associated leakage rates based on information provided in Engineering Evaluation S-C-VAR-MEE-1071.

4.2 With the list of components, go into MMIS and locate zones and elevations for all the valves.

4.3 Using the zones identified in MMIS, go to the drawings in reference 7.1 and identify which zones/areas have their exhaust air filtered by the Auxiliary Building Charcoal filters during Recirculation following LOCA.

4.4 Locate the components on the Mechanical P&IDs (reference 7.2) based on MMIS data, to verify location and to determine if they are in the filtered or unfiltered path.

4.6 Compute total leakage, total filtered leakage, and fraction filtered. Include the postulated leakage from post-accident sampling system components identified in Engineering Evaluation S-C-PAS-MEE-1132.

5.0 Calculations

Attachment 8.1 is a spreadsheet based on information provided in Engineering Evaluation S-C-VAR-MEE-1071. Total ESF leakage outside containment, total filtered leakage, and fraction filtered are computed in the spreadsheet based on the methodology described. Note that the assessment performed in the engineering evaluation was based on Unit 1 components. Separate assessments for Units 1 and 2 were not performed. Therefore, it is implicitly assumed in the engineering evaluation that the units are sufficiently similar so that the leakage estimate is also applicable to Unit 2.

FORM 2

Page 1 of 1

CALCULATION CONTINUATION SHEET

Sheet: 6 of 7

CALC. NO.: S-C-VAR-MDC-1575			REFERENCE: CRCA 980915258-05				
ORIGINATOR, DATE	REV:	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

6.0 Summary & Recommendations

Total ESF leakage outside containment is 3790 cc/hr. Total filtered leakage is 2906 cc/hr. Therefore, the fraction filtered is more than 75%.

A value of 75% should be used in post-LOCA radiological consequence analyses. The affected analyses are:

- PSBP 321040, "Radiological Dose Consequence at EAB/LPZ and Control Room - LOCA at SALEM UNIT 1 or UNIT 2 (With Updated CR Ventilation Design)
- PSBP 322264, "Four Month Post LOCA Equipment Qualification Dose to Components in the Vicinity of the CR Filters due to Direct Shine from the Filters"
- S-C-ABV-SDC-1337, "Total Integrated Dose near Salem Aux. Bldg. Charcoal Filters"

Additionally, the Leakage Monitoring Program procedure, SC.SA-AP.ZZ-0051(Q), should be revised to incorporate a leakage rate based on updated post-LOCA radiological consequence analyses.

7.0 References

7.1 Salem General Arrangement Drawings

7.1.1 204803

7.1.2 204804

7.1.3 204805

7.1.4 204806

7.1.5 204807

7.1.6 204808

7.1.7 204809

7.1.8 601667

7.1.9 601668

7.1.10 601669

7.1.11 601674

7.2 Salem Piping and Instrumentation Drawings (P&IDs)

7.2.1 205228, Sheets 1 through 3

7.2.2 205232, Sheets 1 and 2

FORM 2

Page 1 of 1

CALCULATION CONTINUATION SHEET

Sheet: 7 of 7

CALC. NO.: S-C-VAR-MDC-1575			**REFERENCE:** CRCA 980915258-05				
ORIGINATOR, DATE	**REV:**	J. Duffy/11/18/98	1				
REVIEWER/VERIFIER, DATE		M. Crawford/11/18/98					

7.2.3 205234, Sheets 1 through 4

7.2.4 205235, Sheet 1

7.2.5 205237, Sheets 1 through 3

7.2.6 205328, Sheets 1 through 3

7.2.7 205332, Sheets 1 and 2

7.2.8 205334, Sheets 1 through 4

7.2.9 205335, Sheet 1

7.2.10 205337, Sheets 1 through 3

7.3 Document S-C-RH-SEE-0922, "Dose Assessment for Potential RHR Valve Leakage to RWST"

7.4 Engineering Evaluation S-C-VAR-MEE-1071, "Post-LOCA ECCS Airborne Leakage Outside Containment"

7.5 Engineering Evaluation S-C-PAS-MEE-1132, "Post Accident Sampling System Ventilation"

7.5 DE-CB.ABV-0022(Q), "Auxiliary Building Ventilation System"

7.6 Procedure SC.SA-AP.ZZ-0051(Q), "Leakage Monitoring Program"

8.0 Attachments

8.1 Fraction of Post-LOCA ECCS Airborne Leakage outside Containment that is Filtered (10 pages)

8.2 10 CFR 50.59 Applicability Review (4 pages)

8.3 Certification of Design Verification (3 pages)

8.4 3.5" diskette

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
System:	RHR	**P&ID:**	205232	**Shts:**	1,2			
1RH20	0	0	2	2	0	0	30	30
11RH18	0	0	2	0	0	0	30	30
12RH18	0	0	2	0	0	0	30	30
1RH45	0	0	0	0	0	0	0	0
1RH46	0	0	0	0	0	0	0	0
11RH8	0	0	0	0	30	30	0	0
12RH8	0	0	0	0	30	30	0	0
1RH21	80	0	2	0	30	30	0	0
1RH24	0	0	0	0	0	0	0	0
1RH33	0	0	0	0	0	0	0	0
1RH41	0	0	0.1875	0.1875	0	0	0	0
1RH58	7.5	7.5	0.1875	0.1875	0	0	0	0
1RH65	0	0	0	0	0	0	0	0
1RH71	0	0	0	0	0	0	0	0
1RH72	0	0	0.1875	0.1875	0	0	0	0
1RH73	0	0	0	0	0	0	0	0
1RH81	0	0	0.5	0.5	0	0	0	0
1RH82	0	0	0	0	0	0	0	0
1RH83	0	0	0.1875	0.1875	0	0	0	0
1RH84	0	0	0.1875	0.1875	0	0	0	0
1RH85	0	0	0.1875	0.1875	0	0	0	0
1RH86	0	0	0.1875	0.1875	0	0	0	0
11RH6	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH7	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH9	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH10	0	0	2	2	0	0	0	0
11RH11	0	0	0.1875	0.1875	0	0	0	0
11RH12	0	0	2	2	30	30	0	0
11RH13	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH14	0	0	2	2	0	0	0	0
11RH15	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH16	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH17	20	20	0.5	0.5	0	0	0	0
11RH30	0	0	0.1875	0.1875	0	0	0	0
11RH31	0	0	0.1875	0.1875	0	0	0	0
11RH32	0	0	0.1875	0.1875	0	0	0	0
11RH34	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH35	0	0	0.1875	0.1875	0	0	0	0
11RH36	0	0	0.1875	0.1875	0	0	0	0
11RH37	0	0	0.1875	0.1875	0	0	0	0
11RH38	0	0	0.1875	0.1875	0	0	0	0
11RH39	0	0	0.1875	0.1875	0	0	0	0
11RH40	0	0	0.1875	0.1875	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
11RH44	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH55	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH56	7.5	7.5	0.1875	0.1875	0	0	0	0
11RH57	0	0	0	0	0	0	0	0
11RH70	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH6	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH7	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH9	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH10	0	0	2	2	0	0	0	0
12RH11	0	0	0.1875	0.1875	0	0	0	0
12RH12	0	0	2	2	30	30	0	0
12RH13	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH14	0	0	2	2	0	0	0	0
12RH15	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH16	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH17	20	20	0.5	0.5	0	0	0	0
12RH30	0	0	0.1875	0.1875	0	0	0	0
12RH34	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH36	0	0	0.1875	0.1875	0	0	0	0
12RH37	0	0	0.1875	0.1875	0	0	0	0
12RH38	0	0	0.1875	0.1875	0	0	0	0
12RH39	0	0	0.1875	0.1875	0	0	0	0
12RH40	0	0	0.1875	0.1875	0	0	0	0
12RH44	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH55	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH56	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH57	0	0	0	0	0	0	0	0
12RH70	7.5	7.5	0.1875	0.1875	0	0	0	0
12RH80	0	0	0.1875	0.1875	0	0	0	0
11RH19	0	0	2	2	30	30	0	0
11RH29	0	0	0.5	0.5	0	0	0	0
11RH4	0	0	3.5	0	30	0	0	0
12RH19	0	0	2	2	30	30	0	0
12RH29	0	0	0.5	0.5	0	0	0	0
12RH4	0	0	3.5	0	30	0	0	0
1RH22	0	0	0.1875	0.1875	0	0	0	0
1RH23	0	0	0.1875	0.1875	0	0	0	0
12RH31	0	0	0.1875	0.1875	0	0	0	0
12RH32	0	0	0.1875	0.1875	0	0	0	0
12RH35	0	0	0.1875	0.1875	0	0	0	0
Spool piece	0	0	0	0	0	0	60	60
Spool piece	0	0	0	0	0	0	60	60
Heat exchanger	0	0	0	0	0	0	60	60
Heat exchanger	0	0	0	0	0	0	60	60
FE641A	0	0	0	0	0	0	30	30
FE641B	0	0	0	0	0	0	30	30

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
System:	CS	**P&ID:**	205235	**Sheet:**	1			
11CS4	0	0	0	0	30	30	0	0
12CS4	0	0	0	0	30	30	0	0
11CS5	0	0	0	0	0	0	30	30
12CS5	0	0	0	0	0	0	30	30
11CS36	0	0	2	0	30	30	0	0
12CS36	0	0	2	0	30	30	0	0
11CS47	0	0	0.1875	0.1875	0	0	0	0
12CS47	0	0	0.1875	0.1875	0	0	0	0
11CS52	7.5	7.5	0.1875	0.1875	0	0	0	0
12CS52	7.5	7.5	0.1875	0.1875	0	0	0	0
1CS64	0	0	0	0	0	0	0	0
1CS68	7.5	7.5	0.1875	0.1875	0	0	0	0
System:	SJ	**P&ID:**	205234	**Sht.**	1,2,3,4			
1SJ53	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ101	0	0	0	0	0	0	0	0
1SJ3	0	0	0	0	30	30	0	0
1SJ31	0	0	0	0	30	0	0	0
1SJ70	0	0	0	0	30	30	0	0
1SJ87	0	0	0	0	0	0	0	0
1SJ99	7.5	7.5	0	0	0	0	0	0
11SJ112	0	0	0	0	0	0	0	0
11SJ34	0	0	0	0	30	30	0	0
11SJ64	0	0	0	0	0	0	0	0
11SJ923	0	0	0.5	0.5	0	0	0	0
11SJ98	7.5	7.5	0	0	0	0	0	0
12SJ112	0	0	0	0	0	0	0	0
12SJ34	0	0	0	0	30	30	0	0
12SJ64	0	0	0	0	0	0	0	0
12SJ923	0	0	0.5	0.5	0	0	0	0
12SJ98	7.5	7.5	0	0	0	0	0	0
1SJ403	0	0	0	0	0	0	0	0
1SJ100	0	0	0	0	0	0	0	0
1SJ110	0	0	0	0	0	0	0	0
1SJ111	0	0	0	0	0	0	0	0
1SJ114	0	0	1.5	0	0	0	0	0
1SJ115	0	0	0	0	0	0	0	0
1SJ117	0	0	0.1875	0.1875	0	0	0	0
1SJ118	0	0	0.1875	0.1875	0	0	0	0
1SJ127	0	0	0	0	0	0	0	0
1SJ131	0	0	0	0	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
1SJ160	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ161	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ170	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ175	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ176	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ177	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ178	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ179	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ180	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ181	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ182	0	0	0	0	0	0	0	0
1SJ183	0	0	0	0	0	0	0	0
1SJ184	0	0	0.25	0.25	0	0	0	0
1SJ185	0	0	0	0	0	0	0	0
1SJ192	0	0	0.25	0.25	0	0	0	0
1SJ193	0	0	0	0	0	0	0	0
1SJ194	0	0	0.25	0.25	0	0	0	0
1SJ195	0	0	0	0	0	0	0	0
1SJ212	0	0	0	0	0	0	0	0
1SJ213	0	0	0	0	0	0	0	0
1SJ216	0	0	0.25	0.25	0	0	0	0
1SJ217	0	0	0	0	0	0	0	0
1SJ228	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ229	0	0	0	0	0	0	0	0
1SJ252	0	0	0.25	0.25	0	0	0	0
1SJ253	0	0	0	0	0	0	0	0
1SJ293	0	0	0	0	0	0	0	0
1SJ294	7.5	0	0.1875	0	0	0	0	0
1SJ295	0	0	0	0	0	0	0	0
1SJ296	0	0	0.25	0.25	0	0	0	0
1SJ297	0	0	0	0	0	0	0	0
1SJ298	0	0	0.25	0.25	0	0	0	0
1SJ299	0	0	0	0	0	0	0	0
1SJ300	0	0	0.25	0.25	0	0	0	0
1SJ301	0	0	0	0	0	0	0	0
1SJ302	0	0	0.25	0.25	0	0	0	0
1SJ303	0	0	0	0	0	0	0	0
1SJ306	0	0	0	0	0	0	0	0
1SJ309	0	0	0.25	0.25	0	0	0	0
1SJ310	0	0	0	0	0	0	0	0
1SJ319	0	0	0	0	0	0	0	0
1SJ326	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ371	0	0	0.1875	0.1875	0	0	0	0
1SJ372	0	0	0.1875	0.1875	0	0	0	0
1SJ373	0	0	0	0	0	0	0	0
1SJ374	0	0	0.1875	0.1875	0	0	0	0
1SJ375	0	0	0	0	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
1SJ402	0	0	0	0	0	0	0	0
1SJ6	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ7	7.5	7.5	0.1875	0.1875	0	0	0	0
1SJ8	0	0	0	0	0	0	0	0
1SJ81	0	0	0	0	0	0	0	0
1SJ82	0	0	0	0	0	0	0	0
1SJ83	0	0	0	0	0	0	0	0
1SJ84	0	0	0	0	0	0	0	0
1SJ85	0	0	0	0	0	0	0	0
1SJ88	0	0	0	0	0	0	0	0
1SJ89	0	0	0	0	0	0	0	0
1SJ90	0	0	0	0	0	0	0	0
1SJ904	0	0	0.25	0.25	0	0	0	0
1SJ905	0	0	0	0	0	0	0	0
1SJ906	0	0	0.25	0.25	0	0	0	0
1SJ907	0	0	0	0	0	0	0	0
1SJ97	0	0	0	0	0	0	0	0
11SJ102	7.5	0	0.1875	0.1875	0	0	0	0
11SJ103	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ104	7.5	0	0.1875	0.1875	0	0	0	0
11SJ105	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ106	7.5	0	0.1875	0.1875	0	0	0	0
11SJ116	0	0	0.1875	0.1875	0	0	0	0
11SJ140	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ145	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ147	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ152	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ186	0	0	0.1875	0.1875	0	0	0	0
11SJ187	0	0	0	0	0	0	0	0
11SJ188	0	0	0.25	0.25	0	0	0	0
11SJ189	0	0	0	0	0	0	0	0
11SJ190	0	0	0.25	0.25	0	0	0	0
11SJ191	0	0	0	0	0	0	0	0
11SJ35	0	0	1	1	0	0	0	0
11SJ65	0	0	0.1875	0.1875	0	0	0	0
11SJ922	0	0	0.5	0.5	0	0	0	0
11SJ926	7.5	7.5	0.1875	0.1875	0	0	0	0
11SJ95	0	0	0	0	0	0	0	0
11SJ96	0	0	0	0	0	0	0	0
12SJ102	7.5	0	0.1875	0.1875	0	0	0	0
12SJ103	7.5	7.5	0.1875	0.1875	0	0	0	0
12SJ104	7.5	0	0.1875	0.1875	0	0	0	0
12SJ105	7.5	7.5	0.1875	0.1875	0	0	0	0
12SJ106	7.5	0	0.1875	0.1875	0	0	0	0
12SJ116	0	0	0.1875	0.1875	0	0	0	0
12SJ140	7.5	7.5	0.1875	0.1875	0	0	0	0
12SJ145	7.5	7.5	0.1875	0.1875	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
12SJ147	7.5	7.5	0.1875	0.1875	0	0	0	0
12SJ152	7.5	7.5	0.1875	0.1875	0	0	0	0
12SJ186	0	0	0.1875	0.1875	0	0	0	0
12SJ187	0	0	0	0	0	0	0	0
12SJ188	0	0	0.25	0.25	0	0	0	0
12SJ189	0	0	0	0	0	0	0	0
12SJ190	0	0	0.25	0.25	0	0	0	0
12SJ191	0	0	0	0	0	0	0	0
12SJ35	0	0	1	0	0	0	0	0
12SJ65	0	0	0.1875	0.1875	0	0	0	0
12SJ922	0	0	0.5	0.5	0	0	0	0
12SJ95	0	0	0	0	0	0	0	0
12SJ96	0	0	0	0	0	0	0	0
1SJ1	0	0	0	0	0	0	0	0
1SJ12	0	0	1	1	30	30	0	0
1SJ13	0	0	1	1	30	30	0	0
1SJ135	0	0	1	0	30	30	0	0
1SJ2	0	0	0	0	0	0	0	0
1SJ30	0	0	2	2	30	30	0	0
1SJ4	0	0	1	1	30	30	0	0
1SJ5	0	0	1	1	30	30	0	0
1SJ67	0	0	0.5	0.5	0	0	0	0
1SJ68	0	0	0	0	0	0	0	0
1SJ69	0	0	0	0	0	0	0	0
11SJ113	0	0	1	0	30	0	0	0
11SJ134	0	0	1	0	30	0	0	0
11SJ33	0	0	1.5	0	30	0	0	0
11SJ40	0	0	1	0	30	0	0	0
11SJ45	0	0	2	0	30	0	0	0
11SJ49	0	0	2	0	30	0	0	0
12SJ113	0	0	1	0	30	0	0	0
12SJ134	0	0	1	0	30	0	0	0
12SJ33	0	0	1.5	0	30	0	0	0
12SJ40	0	0	1	0	30	0	0	0
12SJ45	0	0	2	0	30	0	0	0
12SJ49	0	0	2	0	30	0	0	0
1SJ327	0	0	0	0	0	0	0	0
1SJ11	0	0	0.1875	0.1875	0	0	0	0
1SJ130	0	0	0	0	0	0	0	0
1SJ168	0	0	0.1875	0.1875	0	0	0	0
1SJ169	0	0	0.1875	0.1875	0	0	0	0
1SJ404	0	0	0	0	0	0	0	0
1SJ80	0	0	0	0	0	0	0	0
1SJ86	0	0	0	0	0	0	0	0
1SJ910	0	0	0	0	0	0	0	0
1SJ911	0	0	0	0	0	0	0	0
11SJ36	0	0	0.1875	0.1875	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
11SJ37	0	0	0.1875	0.1875	0	0	0	0
11SJ38	0	0	0.1875	0.1875	0	0	0	0
11SJ46	0	0	0.1875	0.1875	0	0	0	0
11SJ47	0	0	0.1875	0.1875	0	0	0	0
11SJ91	0	0	0.1875	0.1875	0	0	0	0
11SJ92	0	0	0.1875	0.1875	0	0	0	0
11SJ94	0	0	0.1875	0.1875	0	0	0	0
12SJ36	0	0	0.1875	0.1875	0	0	0	0
12SJ37	0	0	0.1875	0.1875	0	0	0	0
12SJ38	0	0	0.1875	0.1875	0	0	0	0
12SJ46	0	0	0.1875	0.1875	0	0	0	0
12SJ47	0	0	0.1875	0.1875	0	0	0	0
12SJ91	0	0	0.1875	0.1875	0	0	0	0
12SJ92	0	0	0.1875	0.1875	0	0	0	0
12SJ94	0	0	0.1875	0.1875	0	0	0	0
1SJ133	0	0	0	0	0	0	0	0
1SJ167	0	0	0	0	0	0	30	30
11SJ39	0	0	0	0	0	0	30	30
11SJ48	0	0	0	0	0	0	30	30
12SJ39	0	0	0	0	0	0	30	30
12SJ48	0	0	0	0	0	0	30	30
1SJ32	0	0	0	0	0	0	30	30
	0	0	0	0	0	0	60	60
	0	0	0	0	0	0	60	60
FE917	0	0	0	0	0	0	30	30
FE918	0	0	0	0	0	0	30	30
FE922	0	0	0	0	0	0	30	30
FE946	0	0	0	0	0	0	0	0
FE947	0	0	0	0	0	0	0	0
System:	CVC	**P&ID:**	205228	**Sht.**	1,2			
1CV42	0	0	0	0	30	30	0	0
1CV189	20	20	0	0	0	0	0	0
1CV196	10	10	0	0	0	0	0	0
1CV364	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV174	20	20	0.5	0.5	0	0	0	0
1CV43	0	0	0	0	0	0	30	0
1CV372	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV44	0	0	1.5	0	0	0	0	0
1CV49	0	0	1.5	0	0	0	0	0
1CV256	0	0	0.1875	0.1875	0	0	0	0
1CV258	0	0	0.1875	0.1875	0	0	0	0
1CV259	0	0	0.1875	0.1875	0	0	0	0
1CV361	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV356	7.5	7.5	0.1875	0.1875	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
1CV357	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV57	0	0	1	1	0	0	0	0
1CV59	0	0	0.1875	0.1875	0	0	0	0
1CV435	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV436	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV8	0	0	0	0	0	0	0	0
11CV907	0	0	0.1875	0.1875	0	0	0	0
12CV907	0	0	0.1875	0.1875	0	0	0	0
1CV45	10	10	0.25	0.25	0	0	0	0
1CV50	10	10	0.25	0.25	0	0	0	0
1CV46	0	0	0.1875	0.1875	0	0	0	0
1CV51	0	0	0.1875	0.1875	0	0	0	0
1CV299	0	0	0.1875	0.1875	0	0	0	0
1CV61	0	0	0	0	0	0	0	0
1CV135	0	0	0	0	0	0	0	0
1CV137	0	0	0	0	0	0	0	0
1CV369	0	0	0.1875	0.1875	0	0	0	0
1CV381	0	0	0	0	0	0	0	0
1CV370	0	0	0.1875	0.1875	0	0	0	0
1CV382	0	0	0	0	0	0	0	0
1CV371	0	0	0.1875	0.1875	0	0	0	0
1CV383	0	0	0	0	0	0	0	0
1CV136	0	0	0.5	0.5	0	0	0	0
1CV138	0	0	0.5	0.5	0	0	0	0
1CV139	0	0	0.5	0	0	0	0	0
1CV140	0	0	0	0	0	0	0	0
1CV47	0	0	0	0	30	30	0	0
1CV52	0	0	0	0	30	30	0	0
1CV48	0	0	1	0	0	0	0	0
1CV53	0	0	1	0	0	0	0	0
1CV54	0	0	0.75	0	0	0	0	0
1CV55	0	0	0.75	0.75	30	0	0	0
1CV56	0	0	0.75	0.75	0	0	0	0
1CV81	0	0	0.75	0.75	0	0	0	0
1CV82	0	0	0.75	0.75	0	0	0	0
1CV373	0	0	0	0	0	0	0	0
1CV374	0	0	0	0	0	0	0	0
1CV141	10	10	0	0	0	0	30	30
1CV437	7.5	7.5	0.1875	0	0	0	0	0
1CV326	0	0	0.1875	0.1875	0	0	0	0
1CV63	0	0	0	0	30	30	0	0
1CV64	0	0	0.75	0.75	0	0	0	0
1CV65	0	0	0.1875	0	0	0	0	0
1CV66	0	0	0.1875	0	0	0	0	0
1CV67	0	0	0.1875	0.1875	0	0	0	0
1CV70	0	0	0.75	0.75	0	0	0	0
1CV71	0	0	0.75	0.75	30	30	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
1CV72	0	0	0.75	0.75	0	0	0	0
1CV73	0	0	0.75	0.75	0	0	0	0
1CV68	0	0	0.75	0.75	30	30	0	0
1CV69	0	0	0.75	0.75	30	30	0	0
1CV288	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV304	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV346	0	0	0.1875	0.1875	0	0	0	0
1CV376	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV386	7.5	7.5	0.1875	0.1875	0	0	0	0
1CV85	0	0	0.1875	0	0	0	0	0
1CV86	0	0	0.1875	0	0	0	0	0
1CV91	0	0	0.1875	0	0	0	0	0
1CV92	0	0	0.1875	0	0	0	0	0
1CV379	0	0	0.1875	0.1875	0	0	0	0
1CV320	0	0	0.25	0.25	0	0	0	0
1CV394	0	0	0.25	0.25	0	0	0	0
11CV318	0	0	0.1875	0.1875	0	0	0	0
13CV318	0	0	0.1875	0.1875	0	0	0	0
12CV318	0	0	0.1875	0.1875	0	0	0	0
1CV377	0	0	0.1875	0.1875	0	0	0	0
1CV268	0	0	0	0	0	0	0	0
1CV269	0	0	0	0	0	0	0	0
1CV270	0	0	0	0	0	0	0	0
1CV271	0	0	0	0	0	0	0	0
1CV388	0	0	0	0	0	0	0	0
1CV389	0	0	0	0	0	0	0	0
1CV321	0	0	0	0	0	0	0	0
11CV319	0	0	0	0	0	0	0	0
12CV319	0	0	0	0	0	0	0	0
13CV319	0	0	0	0	0	0	0	0
1CV395	0	0	0	0	0	0	0	0
1CV90	0	0	0.1875	0.1875	0	0	0	0
1CV93	0	0	0.1875	0.1875	0	0	0	0
1CV84	0	0	0.1875	0.1875	0	0	0	0
1CV87	0	0	0.1875	0.1875	0	0	0	0
11CV96	0	0	0.1875	0.1875	0	0	0	0
12CV96	0	0	0.1875	0.1875	0	0	0	0
13CV96	0	0	0.1875	0.1875	0	0	0	0
14CV96	0	0	0.1875	0.1875	0	0	0	0
11CV97	0	0	0.1875	0.1875	0	0	0	0
12CV97	0	0	0.1875	0.1875	0	0	0	0
13CV97	0	0	0.1875	0.1875	0	0	0	0
14CV97	0	0	0.1875	0.1875	0	0	0	0
1CV83	0	0	0.5	0	0	0	0	0
1CV88	0	0	0.5	0	0	0	0	0
1CV89	0	0	0.5	0	0	0	0	0
1CV94	0	0	0.5	0	0	0	0	0

Attachment 8.1
S-C-VAR-MDC-1575, Rev. 1
Fraction of Post-LOCA ECCS Leakage Outside Containment that is Filtered

Valve #	Seat Leakage	Filtered Leakage	Stem Leakage	Filtered Leakage	Body/ Bonnet Leakage	Filtered Leakage	Other Flange Leakage	Filtered Leakage
1CV95	0	0	0.75	0	0	0	0	0
11CV98	0	0	0.5	0.5	0	0	0	0
12CV98	0	0	0.5	0.5	0	0	0	0
13CV98	0	0	0.5	0.5	0	0	0	0
14CV98	0	0	0.5	0.5	0	0	0	0
	0	0	0	0	0	0	120	120
	0	0	0	0	0	0	90	90
	0	0	0	0	0	0	30	30
Flow El.	0	0	0	0	0	0	120	120
Orifices	0	0	0	0	0	0	0	0
Filter	0	0	0	0	0	0	60	60
Subtotals	770	638	127	79	1320	840	1320	1290

Total Valve Leakage =	2217 cc/hr	Total Filtered Valve Leakage =	1556 cc/hr
Total Flange Leakage =	1320 cc/hr	Total Filtered Flange Leakage =	1290 cc/hr
Pump Seal Leakage:		Filtered Pump Seal Leakage:	
- RHR Pumps	60 cc/hr	- RHR Pumps	60 cc/hr
- Safety Injection Pumps	90 cc/hr	- Safety Injection Pumps	0 cc/hr
- Centrifugal Charging Pumps	90 cc/hr	- Centrifugal Charging Pumps	0 cc/hr
- Positive Displacement Pump	10 cc/hr	- Positive Displacement Pump	0 cc/hr
Total PASS Leakage =	3 cc/hr	Total Filtered PASS Leakage =	0 cc/hr
Total Leakage =	3790 cc/hr	Total Filtered Leakage =	2906 cc/hr
Fraction Filtered =	0.7668		

Attachment 5

LCR S99-21 Rev. 1

LRN-00-0198

TITLE: CREDITED AUXILIARY BUILDING EXHAUST AIR FILTRATION SYSTEM CHARCOAL ADSORBER REMOVAL EFFICIENCY

ACTION REQUESTS: None

Periodic Review Required: Yes ___ No X Action Request No.: N/A

1.0 REVISION SUMMARY

Original issue

2.0 PURPOSE

This engineering evaluation documents the results of an analysis concerned with the iodine removal efficiency that can be credited for the Auxiliary Building Ventilation exhaust charcoal filter units at Salem Generating Station Units 1 and 2.

3.0 SCOPE

This engineering evaluation is concerned with 14 Auxiliary Building Ventilation exhaust charcoal filter unit (1VHE853) at Salem Generating Station Unit 1 and 24 Auxiliary Building Ventilation exhaust charcoal filter unit (2VHE304) at Salem Generating Station Unit 2. These are Auxiliary Building Ventilation System components.

4.0 DISCUSSION

The current analysis of record concerned with the radiological consequences of a design basis loss-of-coolant accident is documented in PSBP 321040. The analysis assumes that 50% of the airborne iodine released due to engineered safety feature (ESF) leakage outside containment is filtered with 90% removal efficiency when the charcoal filter unit is aligned to filter the exhaust from the ECCS areas. The manual alignment is assumed to occur 2 hours after the accident. Therefore, the equivalent overall iodine removal efficiency credited in the analysis after charcoal filter alignment at 2 hours is 45%.

$(1 - \eta) = 0.50 + 0.50(1 - 0.90)$

$(1 - \eta) = 0.50 + 0.05$

$(1 - \eta) = 0.55$

$\eta = 0.45$

Filtration Fraction

The 50% filtration fraction was conservatively based on Design Calculation S-C-VAR-MDC-1575, Rev. 0, which computed a total airborne ESF leakage rate of 359.1 cc/hr outside containment and an unfiltered airborne ESF leakage rate of 151.2 cc/hr outside containment. Therefore, the equivalent filtration fraction was approximately 60%.

Filtration fraction = (359.1 cc/hr - 151.2 cc/hr)/(359.1 cc/hr)

= 0.58

Design Calculation S-C-VAR-MDC-1575 was subsequently revised and computed a total ESF leakage rate of 3790 cc/hr outside containment and a total "filtered" ESF leakage rate of 2906 cc/hr outside containment. Therefore, a 75% filtration factor is justified.

Filtration fraction = (2906 cc/hr)/(3790 cc/hr)

= 0.77

Surveillance Requirement 4.7.7.1 for Unit 1 and 4.7.7 for Unit 2 include verifying that with the system operating at a flow rate of 21,400 cfm ± 10 % and exhausting through the HEPA filters and charcoal adsorbers, the total bypass flow of the ventilation system to the facility vent, including leakage through the ventilation system diverting valves, is less than or equal to 1%.

To account for bypass around the charcoal adsorbers that includes leakage through diverting valves and the potential impact of ventilation system imbalance, assuming a filtration factor of 65% is sufficiently conservative (that is, the unfiltered flow rate is conservatively assumed to be 12% higher than expected, 35% rather than 23%).

Filtration fraction = (0.85)(0.77)

= 0.65

This filtration factor is justified as being conservative based on the surveillance requirement for a nominal flow rate of 21,400 cfm with a 10% tolerance. The following system balance results provided by BOP Design Engineering indicate that any imbalance would be within the 10% tolerance.

	Nominal flow rate (cfm)	Measured flow rate (cfm)	Δ (%)
Branch	15400	14340	-7%
Branch	600	581	-3%
Branch	5400	5623	4%
Total	21400	20544	-4%

P&IDs 205237, Sheets 1 and 2, for Unit 1 and 205337, Sheets 1 and 2, for Unit 2 indicate that the exhaust from the piping penetration areas are aligned to the charcoal adsorbers. Containment leakage would be more likely to occur through isolation valves associated with mechanical penetrations rather than through electrical penetrations or through the containment wall or dome. Therefore, it would be reasonable to assume that a minimum of 10% of containment leakage would be filtered after the charcoal adsorbers are aligned.

The analysis of record does not credit any filtration of containment leakage released to the environment. Containment leakage to the environment is the dominant dose contributor in the analysis of record. For example, the total control room thyroid dose with one Control Room Emergency Air Conditioning System train is 28.4 rem. The thyroid dose due to containment leakage is 19.5 rem (about 70% of the total thyroid dose).

(19.5 rem)/(28.4 rem) = 0.69

The cumulative thyroid dose due to containment leakage at 2 hours is 4.9 rem. Therefore, the thyroid dose due to containment leakage after 2 hours is 14.6 rem.

19.5 rem - 4.9 rem = 14.6 rem

Assuming that 10% is filtered with 70% removal efficiency, the dose reduction would be about 1 rem.

(0.10)(0.70)(14.6 rem) = 1.0 rem

The thyroid dose due to ESF leakage is 8.2 rem (about 30% of the total thyroid dose).

(8.2 rem)/(28.4 rem) = 0.29

The cumulative thyroid dose due to ESF leakage at 2 hours is 0.6 rem. Therefore, the thyroid dose due to containment leakage after charcoal filter alignment is 7.6 rem.

8.2 rem - 0.6 rem = 7.6 rem

The estimated dose after 2 hours without crediting filtration is 13.8 rem.

(7.6 rem)/(1 - 0.45) = 13.8 rem

Even if it is assumed that only 60% is filtered with 70% removal efficiency, the dose increase would be 0.4 rem, which is bounded by the expected dose reduction of 1 rem if 10% filtration were to be credited for containment leakage.

(0.40 + (0.60)(1 - 0.70))(13.8 rem) - 7.6 rem = 0.4 rem

Therefore, assuming 35% for unfiltered flow is conservative based on the demonstrated system balance and not crediting any filtration of containment leakage to the environment in the analysis of record.

Charcoal Iodine Removal Efficiency

Surveillance Requirement 4.7.7.1 for Unit 1 currently includes demonstrating a charcoal adsorber removal efficiency of ≥ 90% for radioactive methyl iodide when the sample is tested at 130 °C, 95% R.H. Surveillance Requirement 4.7.7 for Unit 2 calls for meeting the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978. However, Generic Letter 99-02 indicates that all systems located outside of containment should be tested at 30 °C [86 °F], which is more representative of the limiting accident conditions. The generic letter indicates that tests conducted at 80 °C [176 °F] or 130 °C [266 °F] are inappropriate because tests at these temperatures result in the regeneration of the charcoal.

Additionally, the generic letter calls for using a safety factor as low as 2 for determining the acceptance criteria for charcoal filter efficiency. The current analysis of record assumes 90% removal efficiency, which is equivalent to using a safety factor of 1. Such a safety factor does not comply with the generic letter.

PSEG Nuclear proposes testing acceptance criteria that is equivalent to an iodine removal efficiency of 85%. Therefore, the corresponding charcoal filter efficiency assumed in the design-basis dose analysis would be no more than 70% to comply with generic letter.

Overall Iodine Removal Efficiency

The overall iodine removal efficiency corresponding to assuming 35% for unfiltered flow and testing with acceptance criteria of 85% is 45%.

$(1 - \eta) = 0.35 + 0.65(1 - 0.70)$

$(1 - \eta) = 0.35 + 0.195$

$(1 - \eta) = 0.545$

$\eta = 0.455$

This overall iodine removal efficiency exceeds to the overall iodine removal efficiency associated with the filtration fraction and charcoal filter efficiency used in PSBP 321040.

Iodine Composition

In the current analysis of record (PSBP 321040) for ESF leakage outside containment the radioidine that is postulated to become airborne is assumed to be entirely elemental. This assumption is **not** changed. SRP 15.6.5, Appendix B does not give any guidance on what iodine composition should be assumed for airborne ESF leakage. However, Draft DG-1081 identifies that the radioiodine that is postulated to become airborne should be assumed 97% elemental and 3% organic.

As stated above, the Surveillance Requirement 4.7.7.1 for Unit 1 calls for demonstrating a charcoal adsorber removal efficiency of ≥ 90% for radioactive methyl iodide (organic iodide), which is a more challenging test agent than either elemental or particulate iodine.

The dose analysis documented in PSBP 321040 credits the same Control Room Emergency Air Conditioning System charcoal filter efficiency (95%) for elemental iodine, organic iodides, and particulate iodine. Therefore, the analysis results are not affected by the composition that is assumed for the radioiodine that is postulated to become airborne as a result of ESF leakage outside containment.

5.0 CONCLUSION/RECOMMENDATION

The PSEG Nuclear proposal to change the Technical Specification surveillance requirement testing acceptance criteria for the Auxiliary Building Ventilation exhaust charcoal filter units at Salem Generating Station Units 1 and 2 to be equivalent to an iodine removal efficiency of 85% coupled with assuming 35% for total bypass around the charcoal adsorbers results in an overall iodine removal efficiency that exceeds the overall iodine removal efficiency associated with the filtration fraction and charcoal filter efficiency used in PSBP 321040. Therefore, the results of PSBP 321040 do not require revision. This engineering evaluation provides the basis for revising SGS-UFSAR to identify a 65% filtration factor, 70% assumed filter efficiency, and 45% overall iodine removal efficiency, which is a conservatively low value.

6.0 REFERENCES

a) PSBP 321040, Rev. 6 dated 6/12/98, Radiological Doses at EAB, LPZ and in the Control Room due to a LOCA at Salem Unit 1 or Unit 2 with Updated CR Design

b) S-C-VAR-MDC-1575, Rev. 0 dated 4/15/96, Post-LOCA Recirculation ECCS Airborne Leakage Outside Containment

c) S-C-VAR-MDC-1575, Rev. 1 dated 11/18/98, Post-LOCA Recirculation ECCS Airborne Leakage Outside Containment

d) NRC Generic Letter 99-02, Laboratory Testing of Nuclear- Grade Activated Charcoal, June 3, 1999

e) DCP 1EC-3311, Package No. 1, Rev. 7, Ventilation System Modification to Eliminate Pressure Problems

f) DCP 1EC-3311, Package No. 2, Rev. 3, Ventilation System Modification to Eliminate Pressure Problems

g) DCP 2EC-3269, Package No. 1, Rev. 7, Ventilation System Modification to Eliminate Pressure Problems

h) 205237, Sheet 1, Rev. 42, No. 1 Unit Auxiliary Building - Ventilation

i) 205237, Sheet 2, Rev. 30, No. 1 Unit Auxiliary Building - Ventilation

j) 205337, Sheet 1, Rev. 36, No. 2 Unit Auxiliary Building - Ventilation

k) 205337, Sheet 2, Rev. 22, No. 2 Unit Auxiliary Building - Ventilation

l) Standard Review Plan 15.6.5, Appendix B, Rev. 1, Radiological Consequences of a Design Basis Loss-of-Coolant Accident: Leakage from Engineered Safety Feature Components Outside Containment

m) Draft Regulatory Guide DG-1081, December 1999, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, Appendix A: Assumptions for Evaluating the Radiological Consequences of a LWR Loss-of-Coolant Accident

7.0 EFFECTS ON OTHER TECHNICAL DOCUMENTS

a) Revise PSBP 321040 to identify a 65% filtration factor, 70% assumed filter efficiency, and 45% overall iodine removal efficiency (see Order 80003722, Activity 0200)

b) Revise SGS-UFSAR to identify a 65% filtration factor, 70% assumed filter efficiency, and 45% overall iodine removal efficiency (see Order 80003722, Activity 0150)

8.0 ATTACHMENTS

a) Certification of Design Verification (3 pages)

b) 10CFR50.59 Safety Evaluation (14 pages)

9.0 SIGNATURES

J. Duffy — Preparer — 5/30/00 — Date

R. Runowski — Peer Reviewer — 5/30/00 — Date

R. Runowski — Verifier — 5/30/00 — Date

Supervisor (Analysis/SpecialtyEngineering) — 5/30/00 — Date

Supervisor (Programmatic Responsibility) — 5/30/00 — Date

FORM-3
10CFR50.59 SAFETY EVALUATION

Revision 0

I.D. Numbers/Reference/Revision: S-C-ABV-MEE-1361, Rev. 0

Title: CREDITED AUXILIARY BUILDING EXHAUST AIR FILTRATION SYSTEM CHARCOAL ADSORBER REMOVAL EFFICIENCY

Applicability:

___ Salem 1	___ Salem 3 (Gas Turbine)	___ NBU Common
___ Salem 2	___ Hope Creek	
X Common to Salem 1 & 2	___ Common to Hope Creek & Salem	

COMPLETION AND APPROVAL

John Duffy PREPARER (SIGN)	5/30/00 DATE	J. Duffy NAME (PRINT)	08/01/01 QUAL EXPIRES
B. Thomas PEER REVIEWER (SIGN)	5/30/00 DATE	B. Thomas NAME (PRINT)	04/30/01 QUAL EXPIRES
J. Barnes APPROVAL (SIGN)	5/30/00 DATE	J. Barnes NAME (PRINT)	09/09/01 QUAL EXPIRES

Safety Evaluation No. S00-022

SORC Chairman: N/A Mtg. No. 00-50 Date 5/30/00 NL
(Hope Creek)

Sta. GM Approval: N/A NL Date
(Hope Creek)

SORC Chairman: Mtg. No. 00-50 Date 5/30/00
(Salem)

Sta. GM Approval: Date 5/31/00
(Salem)

Safety Evaluation and associated documentation sent to Nuclear Review Board (NRB)
M/C N38: SORC
[UFSAR 17.2.1.1.2.1] Presenter: John Duffy Date: 5/31/00

FORM-3
10CFR50.59 SAFETY EVALUATION

I.D. Numbers/Reference/Revision: S-C-ABV-MEE-1361, Rev. 0
Title: CREDITED AUXILIARY BUILDING EXHAUST AIR FILTRATION SYSTEM CHARCOAL ADSORBER REMOVAL EFFICIENCY

1.0 10CFR50.54 PRE-SCREENING

YES	NO		
____	X	a.	Could the proposed change affect the Quality Assurance Program Description included in the UFSAR? If YES, **STOP**. Contact Quality Assessment for assistance.
____	X	b.	Could the proposed change affect the Security Plan? If YES, **STOP**. Contact Nuclear Security for assistance.
____	X	c.	Could the proposed change affect the Emergency Plan? If YES, **STOP**. Contact Emergency Preparedness for assistance.

2.0 10CFR50.59 APPLICABILITY REVIEW - 10CFR50.59 applies because:

2.1 The proposal changes the facility as described in the SAR.

YES X NO ____

Explain:

The proposal is to revise SGS-UFSAR Table 15.4-5B to:

a) Change the credited ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose analysis assumption

Additionally, SGS-UFSAR pages 9.4-6 and 15.4-23 are being revised to reflect these changes.

Therefore, the proposal does change the facility as described in the SAR.

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2.2 The proposal changes procedures as described in the SAR.

YES _____ NO X

Explain:

The proposal is to revise SGS-UFSAR Table 15.4-5B to:

a) Change the credited ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose analysis assumption

The proposal does not involve any procedure changes. Therefore, the proposal does not change procedures as described in the SAR.

2.3 The proposal involves a test or experiment not described in the SAR.

YES _____ NO X

Explain:

The proposal is to revise SGS-UFSAR Table 15.4-5B to:

a) Change the ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose analysis assumption

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The proposal does not involve any changes to any plant equipment nor any changes in the operation of plant equipment. Therefore, the proposal does not involve a test or experiment not described in the SAR.

3.0 LICENSING BASIS DOCUMENTATION

3.1 UFSAR REVISION DETERMINATION - Does the proposal require a UFSAR change?

YES X NO _____

UFSAR Change Notice No. SCN 00-017

3.2 TECHNICAL SPECIFICATION REVISION DETERMINATION - Does the proposal require a Technical Specification change?

YES _____ NO X

If a change is required, **STOP**. Contact Nuclear Licensing for assistance in preparation of a License Change Request.

Identify the pertinent Technical Specification sections that were reviewed to make the determination:

3/4.7.6 Control Room Emergency Air Conditioning System

3/4.7.7 Auxiliary Building Exhaust Air Filtration Systems

Although the proposal involves a conservative change in the Auxiliary Building exhaust charcoal filter efficiency credited in the dose analysis documented in PSBP 321040, it does not affect the current charcoal filter surveillance testing specified in the surveillance requirements. The proposal to credit 70% filter efficiency is supported by current surveillance requirement of demonstrating a removal efficiency of $\geq$ 90%.

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4.0 DESCRIPTION

4.1 Describe the modification or activity being evaluated and its expected effects.

The proposal involves revising SGS-UFSAR Table 15.4-5B to:

a) Change the credited ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose analysis assumption

The current analysis of record concerned with the radiological consequences of a design basis loss-of-coolant accident is documented in PSBP 321040. The analysis assumes that 50% of the airborne iodine released due to engineered safety feature (ESF) leakage outside containment is filtered with 90% removal efficiency after charcoal filter alignment at 2 hours. The reference engineering evaluation demonstrates that the equivalent overall iodine removal efficiency associated with these filtration fraction and filter efficiency values is 45%.

The proposal involves changing the assumed filtration factor from 50% to 65% and changing the credited filter efficiency from 90% to 70%. The reference engineering evaluation identify that these changes result in an overall iodine removal efficiency that is higher than 45%.

The radiological consequences associated with ESF leakage outside containment that becomes airborne and is released to the environment is a function of the overall iodine removal efficiency that can be credited. As shown above, the overall iodine removal efficiency associated with the proposal exceeds the equivalent overall iodine removal efficiency in the current analysis of record. Hence, the amount of radioactive material postulated to be released to the environment is not increased. Additionally, the reference engineering evaluation demonstrates that the analysis results are not affected by the composition that is assumed for the radioiodine that is postulated to become airborne as a result of ESF leakage outside containment.

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Therefore, the proposed changes do not change the results of the dose analysis.

Since the filtration fraction and credited filter efficiency collectively constitute a single parameter, the overall iodine removal efficiency, it is appropriate for the discrete parameter changes to be evaluated together.

4.2 Identify the parameters and systems affected by the change.

The proposal is concerned with the fraction of airborne engineered safety feature (ESF) leakage outside containment that passes through the Auxiliary Building Ventilation System charcoal filtration units after the units are aligned and the filter efficiency that is credited in the analysis of the radiological consequences of a design basis loss-of-coolant accident as documented in PSBP 321040.

4.3 Identify the credible failure modes associated with the change.

Neither parameter change involves any additional credible failure modes related to the loss-of-coolant accident described in SGS-UFSAR Section 15.4.1. This change does not alter any plant structure, system, or component nor does this change alter the operation any plant systems including the Auxiliary Building Ventilation System.

4.4 Provide references to location of information used for the Safety Evaluation.

a) S-C-ABV-MEE-1361, Rev. 0, Credited Auxiliary Building Exhaust Air Filtration System Charcoal Adsorber Removal Efficiency

b) S-C-VAR-MDC-1575, Rev. 1, Post-LOCA Recirculation ECCS Airborne Leakage Outside Containment

c) PSBP 321040, Sheet 1, Rev. 6, Radiological Dose Consequence at EAB/LPZ and Control Room LOCA at Salem Unit 1 or Unit 2 (with updated CR Ventilation Design)

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d) Regulatory Guide 1.4, Rev. 2, Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors

e) Standard Review Plan 15.6.5, Appendix B, Rev. 1, Radiological Consequences of a Design Basis Loss-of-Coolant Accident: Leakage from Engineered Safety Features Outside Containment

f) NEI 96-07, Revision 0, September 1997, Guidelines for 10 CFR 50.59 Evaluations

g) NEI 96-07, Draft Revision 1, February 22, 2000, Guidelines for 10 CFR 50.59 Evaluations

h) SC.SA-AP.ZZ-0051, Rev. 1, Leakage Monitoring Program

4.5 Other Discussion, if applicable.

N/A

5.0 USQ DETERMINATION - Is an Unreviewed Safety Question (USQ) involved?

5.1 Which anticipated operational transients or postulated design basis accidents previously evaluated in the SAR are considered applicable to the proposal?

The proposal concerns incorporating into SGS-UFSAR Section 15.4.1, "Major Reactor Coolant System Pipe Ruptures (Loss-of-Coolant Accident)," changes to input parameters in the analysis of the radiological consequences of a design basis loss-of-coolant accident. Therefore, a LOCA is applicable.

5.2 May the proposal:

a. Increase the probability of an accident previously evaluated in the SAR?

YES _____ NO X

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DISCUSSION:

This is an analytical input parameter change only. There are no changes to the design of any systems, structures or components nor any changes in the operation of any systems as a result of the proposed changes.

The proposal concerns incorporating into SGS-UFSAR Section 15.4.1 changes to input parameters in the analysis of the radiological consequences of a design basis loss-of-coolant accident. Neither of the parameter changes, filtration fraction nor credited filter efficiency, increases the probability of occurrence of any accident previously evaluated in the SAR.

b. Increase the consequences of an accident previously evaluated in the SAR?

YES _____ NO X

DISCUSSION:

The analytical changes revised the input parameters associated with the analysis of the radiological consequences of design basis loss-of-coolant accident. The revised input parameters provide a more realistic representation of the plant's configuration.

The proposal is to incorporate into SGS-UFSAR Section 15.4.1:

a) Changes to the fraction of airborne engineered safety feature (ESF) leakage outside containment that passes through the Auxiliary Building Ventilation System charcoal filtration units after the units are aligned and the filter efficiency that is credited in the analysis of the radiological consequences of a design basis loss-of-coolant accident

b) Identification of an overall iodine removal efficiency of 45%

The reference engineering evaluation provides the basis for identifying an overall iodine removal efficiency of 45%, which is equivalent to the overall

iodine removal efficiency associated with the current values assumed for filtration fraction and credited filter efficiency.

Hence, the following results of the dose analysis documented in PSBP 321040 do not change.

Dose (rem)/Area	Exclusion Area Boundary	Low Population Zone	Control Room
Thyroid	22.5	8.6	28.4
Whole-body gamma	0.8	0.2	3.1
Beta skin	N/A	N/A	22.7

These doses are presented in SGS-UFSAR Table 15.4-5C and SGS-UFSAR Table 15.4-5E. Therefore, the proposal does not increase the consequences of an accident previously evaluated in the SAR.

5.3 What malfunctions of equipment important to safety that were previously evaluated in the SAR are considered applicable to the proposal?

This is an analytical input parameter change only. No plant hardware changes occur due to this proposal.

The revised input parameters provide a more realistic representation of the plant's configuration. The reference engineering evaluation indicates that the revised values are conservative and bounding and are not sensitive to expected ventilation flow variations.

Neither parameter change, filtration fraction nor credited filter efficiency, alters monitor setpoints, modifies operational parameters, affects equipment qualification, influences human factors, or impacts accessibility during transients or accidents.

Therefore, there are no malfunctions of equipment important-to-safety that were previously evaluated in the SAR which are considered applicable to the proposal.

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5.4 May the proposal:

a. Increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR?

YES _____ NO **X**

DISCUSSION:

This is an analytical input parameter change only. No plant hardware changes occur due to this proposal.

Neither parameter change alters monitor setpoints, modifies operational parameters, affects equipment qualification, influences human factors, or impacts accessibility during transients or accidents. There are no physical changes to any plant structure, system or component (SSC), nor is there any change in the operation of any plant SSC. All systems can perform their intended design function.

Consequently, the proposal does not increase the probability of occurrence of a malfunction of equipment important-to-safety previously evaluated in the SAR.

b. Increase the consequences of a malfunction of equipment important to safety previously evaluated in the SAR?

YES _____ NO **X**

DISCUSSION:

This is an analytical input parameter change only. No plant hardware changes occur due to this proposal.

Neither parameter change alters monitor setpoints, modifies operational parameters, affects equipment qualification, influences human factors, or impacts accessibility during transients or accidents.

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Consequently, the proposal does not increase the consequences of a malfunction of equipment important-to-safety previously evaluated in the SAR.

5.5 May the proposal:

a. Create the possibility of an accident of a different type from any previously evaluated in the SAR?

YES _____ NO X

DISCUSSION:

This is an analytical input parameter change only. No plant hardware changes occur due to this proposal.

The proposal does not alter monitor setpoints, modify operational parameters, affect equipment qualification, affect human factors, or affect accessibility during transients or accidents. There are no physical changes to any plant structure, system or component (SSC), nor is there any change in the operation of any plant SSC.

Consequently, the proposal does not create the possibility of an accident of a different type from any previously evaluated in the SAR.

b. Create the possibility of a malfunction of a different type from any previously evaluated in the SAR?

YES _____ NO X

DISCUSSION:

This is an analytical input parameter change only. No plant hardware changes occur due to this proposal.

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The proposal does not alter monitor setpoints, modify operational parameters, affect equipment qualification, affect human factors, or affect accessibility during transients or accidents.

The parameter changes related to the proposal do not create any new failure modes for any components. There are no physical changes to any plant structure, system or component (SSC), nor is there any change in the operation of any plant SSC.

Furthermore, the parameter changes will not increase challenges to components associated with the Auxiliary Building Ventilation System, the Control Room Emergency Air Conditioning System, or engineered safety features outside containment that are assumed to function in the accident analysis such that safety system performance is degraded below its design basis without compensating effects.

Therefore, this proposal does not create the possibility of a malfunction of a different type from any previously evaluated in the SAR.

5.6 Does the proposal reduce the margin of safety as defined in the basis for any Technical Specifications?

YES _____ NO **X**

Discuss the bases for the determinations and identify the pertinent Technical Specification sections that were reviewed to make the determination (use continuation sheets if required).

The bases for Unit 1 Technical Specification 3/4.7.7 identify that the operation of the Auxiliary Building Exhaust Air Filtration System and the resultant effect on off-site doses was assumed in the accident analyses. The bases for Unit 2 Technical Specification 3/4.7.7 indicate that the charcoal adsorber removal efficiency, and the system bypass leakage (that is, airflow that leaks through diverting dampers) are within the assumed values of the accident analysis.

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The analytical changes revised the input parameters into the methodology for dose evaluations. The revised input parameters provide a more realistic representation of the plant's configuration.

The proposal involves revising SGS-UFSAR Table 15.4-5B to:

a) Change the credited ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose analysis assumption

NEI 96-07 provides the following guidance relating to margin of safety:

> The determination of whether or not a reduction in margin is involved is based on the results of the analysis and not on the change itself. For example, an increase in initial conditions (not already limited by technical specifications) in the non-conservative direction can be compensated for by lowering a setpoint or reallocating analysis conservatisms. If the analysis results continue to be bounded by the acceptance limit, a reduction of margin is not involved. In this respect, the evaluation of reduction in margin of safety is performed in a way analogous to the way changes to the LOCA analysis are evaluated to determine if NRC review is required. The criterion for seeking prior review and approval is based on the extent of the change in LOCA analysis results and not on the input change per se.

The overall iodine removal efficiency proposed is consistent with the analysis of the radiological consequences of a design basis loss-of-coolant accident and does not change the results of the analysis. Therefore, the proposal does not reduce the margin of safety as defined in the basis for any Technical Specifications

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6.0 10CFR50.59(b)(2) REPORT - Provide a brief description of the change and a summary of the Safety Evaluation.

The proposal is to revise SGS-UFSAR Table 15.4-5B to:

a) Change the credited ECCS filter efficiency from 90% (elemental) to 70%

b) Change the fraction of airborne ECCS leakage release that is filtered after two hours from 0.5 to 0.65

c) Identify an equivalent overall iodine removal efficiency of 45% as a dose assumption

Additionally, SGS-UFSAR pages 9.4-6 and 15.4-23 are being revised to reflect these changes.

The analytical changes revised the input parameters associated with the analysis of the radiological consequences of a design basis loss-of-coolant accident. The proposal does not involve a USQ because the overall iodine removal efficiency proposed is consistent with the dose analysis documented in PSBP 321040 and does not change the results of the analysis.

7.0 CONCLUSION

If ALL answers in Section 5 are "NO," the proposal does NOT involve a USQ.

If ANY answer in Section 5 is "YES," the proposal DOES involve a USQ.

Is a USQ involved?

YES _____ NO **X**

If a USQ is involved, refer to NC.NA-AP.ZZ-0035(Q) and obtain assistance from Licensing for additional processing.

LCR Number: N/A