Advanced Passive 1000 (AP1000)
Generic Technical Specification Traveler (GTST)

Title: Changes Related to LCO 3.7.6, Main Control Room Emergency Habitability System (VES)

I. Technical Specifications Task Force (TSTF) Travelers, Approved Since Revision 2 of STS NUREG-1431, and Used to Develop this GTST

TSTF Number and Title:

TSTF-051-A, Rev 2,	Revise containment requirements during handling irradiated fuel and core alterations
TSTF-425-A, Rev 3,	Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b
TSTF-448-A, Rev 3,	Control Room Habitability
TSTF-522-A, Rev. 0,	Revise Ventilation System Surveillance Requirements to Operate for 10 hours per Month

STS NUREGs Affected:

TSTF-051-A, Rev 2:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-425-A, Rev 3:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-448-A, Rev 3:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-522-A, Rev. 0:	NUREGs 1430, 1431, 1432, 1433, and 1434

NRC Approval Date:

TSTF-051-A, Rev 2:	01-Nov-99
TSTF-425-A, Rev 3:	06-Jul-09
TSTF-448-A, Rev 3:	17-Jan-07
TSTF-522-A, Rev. 0:	12-Sep-12

TSTF Classification:

TSTF-051-A, Rev 2:	Improve Specifications
TSTF-425-A, Rev 3:	Technical Change
TSTF-448-A, Rev 3:	Technical Change
TSTF-522-A, Rev. 0:	Technical Change

II. Reference Combined License (RCOL) Standard Departures (Std. Dep.), RCOL COL Items, and RCOL Plant-Specific Technical Specifications (PTS) Changes Used to Develop this GTST

RCOL Std. Dep. Number and Title:

There are no Vogtle departures applicable to Specification 3.7.6.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.7.6.

RCOL PTS Change Number and Title:

VEGP LAR DOC A003:	References to various Chapters and Sections of the Final Safety Analysis Report (FSAR) are revised to include FSAR.
VEGP LAR DOC A038:	Numerous TS surveillances are revised by deletion of word “that” from the surveillance
VEGP LAR DOC A099:	TS 3.7.6 Required Action D.1 and SR 3.7.6.2 revision
VEGP LAR DOC D10:	TS 3.7.6 Condition D revision
VEGP LAR DOC D11:	SR 3.7.6.6 revision
VEGP LAR DOC L05:	TS LCO 3.0.8 is eliminated

III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

TSTF-051-A made two changes: (1) it changed Applicabilities and Actions from “movement of irradiated fuel” to “movement of [recently] irradiated fuel” and (2) removed most uses of the defined term Core Alterations. This change has the effect of removing the Applicability of the affected TS after a specified decay time (i.e., beyond “recently”) has occurred. Only the second change to delete Core Alterations was incorporated into the AP1000 STS. Further clarification of the full scope of TSTF-51 is deferred for future consideration.

TSTF-425-A deferred for future consideration.

TSTF-448-A, Rev. 3 has been applied to AP1000 GTS 3.7.6, Rev 19 by Westinghouse. TSTF-448-A will not be discussed further as a part of this GTST. The Federal Register Notice (FRN) of Availability reference for TSTF-448-A is Volume 72, No. 10, Wednesday, January 17, 2007.

IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)

Minor corrections were made to correct grammatical errors in the Bases.

Added appropriate references. Adjusted the listed reference order to reflect the order of their initial appearance.

Revise the first and second paragraphs of the "Background" section of the TS 3.7.6 Bases to state (NRC Staff Comment):

> . . . If AC power is lost **for greater than 10 minutes,** or a **Control Room Air Supply Radiation (particulate or iodine) - High 2 (LCO 3.3.13)**~~High-2 Main Control Room Envelope (MCRE) radiation~~ signal is received, the VES is actuated. The major functions of the VES are: 1) to provide forced ventilation to deliver an adequate supply of breathable air (Ref. 4) for the **Main Control Room Envelope (**MCRE**)** occupants; 2) to provide forced ventilation to maintain the MCRE at a 1/8 inch water gauge positive pressure with respect to the surrounding areas; 3) **to** provide passive filtration to filter contaminated air in the MCRE; and 4) to limit the temperature increase of the MCRE equipment and facilities that must remain functional during an accident, via the heat absorption of passive heat sinks.
>
> . . . The VES system is designed to maintain ~~CO2~~**CO_2** concentration less than 0.5% **by volume** for up to 11 MCRE occupants.

Revise the second and third paragraphs; insert a fourth paragraph; and revise the subsequent fifth paragraph in the "ASA" section of the Bases to state (NRC Staff Comment):

> Operation of the VES is automatically initiated by **either of** the following safety related ~~signal~~**signals**:
>
> - **Control Room Air Supply Radiation** ~~high-2~~ **(**particulate or iodine radioactivity**) – High 2 (LCO 3.3.13); or**
> - **24-hour Class 1E Battery Charger Input Voltage - Low (Loss of AC power for more than 10 minutes).**
>
> **Operation of the VES may also be manually initiated using either of two momentary controls in the MCR.** ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~ **In the event of a loss of AC power for greater than 10 minutes, the VBS isolation valves automatically close and the VES isolation valves automatically open. These actions protect the MCRE occupants from a potential radiation release. In addition, the loss of AC power coincident with MCRE isolation will de-energize the control room air supply radiation monitors in order to conserve the battery capacity.**
>
> **Since the loss of AC power and manual VES initiation Functions do not satisfy the LCO selection criteria of 10 CFR 50.36(c)(2)(ii), their OPERABILITY is not required to support VES OPERABILITY.**

In the event of a high level of gaseous radioactivity outside of the MCRE, the VBS continues to operate to provide pressurization and filtration functions. The MCRE air supply downstream of the filtration units is monitored by ~~a~~ safety related **particulate and iodine radioactivity** radiation detector**s**. Upon ~~high-2~~ particulate or iodine radioactivity in the **VBS MCRE air supply duct exceeding the Control Room Air Supply Radiation - High 2** setpoint, a safety related signal is generated to isolate the MCRE and to initiate air flow from the VES storage tanks. Isolation of the MCRE consists of closing safety related valves in the lines that penetrate the MCRE pressure boundary. Valves in the VBS supply and exhaust ducts, and the Sanitary Drainage System (SDS) vent lines are automatically isolated. **The relief damper isolation valves also open allowing the pressure relief dampers to function and discharge the damper flow to purge the vestibule.** The **Control Room Air Supply Radiation -- High 2 Function initiates** VES air flow ~~is initiated~~ by **generating** a safety related signal which opens the isolation valves in the VES supply lines.

These changes provide additional clarifications and information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation.

APOG Recommended Changes to Improve the traveler

Include TSTF-522 in the reference disposition tables, as “TSTF already included in GTS Rev. 19 with variation.” Note that minor changes to the Bases are as appropriate to the AP1000 design.

APOG Recommended Changes to Improve the Bases

Revise the second and third paragraphs of the “ASA” section of the TS 3.7.6 Bases to state:

Operation of the VES is automatically initiated by **either of** the following safety related signal**s**:

- ~~h~~**H**igh-2 particulate or iodine radioactivity**; or**
- **Loss of AC power for more than 10 minutes.**

. . . ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~

This change is to clarify that the VES initiation signals include “Loss of AC power for more than 10 minutes” (see AP1000 DCD 6.4.3.2 and Figure 7.2-1, sheets 13 and 15).

Revise the third paragraph of the “LCO” section of the Bases as follows:

This includes components listed in SR 3.7.6.~~3~~ **2** through 3.7.6.10.

In the “SRs” section of the Bases, under the heading “SR 3.7.6.11,” revise second paragraph by moving the content to the “Actions” section of the Bases after the fourth sentence under the heading “C.1, C.2, and C.3” to state:

. . . The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. **Required Action C.3 allows time to restore the MCRE boundary to**

OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 4) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status. The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of MCRE occupants within analyzed limits while limiting the probability that MCRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. . . .

Revise the third sentence of the second paragraph in the “Actions” section of the Bases under the heading “D.1, D.2, and D.3” to state:

. . . The 245,680 scf value is 75**%** ~~percent~~ of the minimum amount of stored compressed air that must be available in the compressed air storage tanks. . . .

Revise the fourth sentence of the second paragraph in the “Actions” section of the Bases under the heading “D.1, D.2, and D.3” to state:

. . . The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES-PT-001A/B), and Figure B 3.7.6-**1**~~2~~, Compressed Air Storage Tanks Minimum Volume - One Bank of VES Air Tanks (8 Tanks) Inoperable. . . .

In addition, renumber Figure B 3.7.6-2 as Figure B 3.7.6-1, and Figure B 3.7.6-2 as Figure B 3.7.6-1.

Revise the first sentence of the second paragraph in the “SRs” section of the Bases under the heading “SR 3.7.6.2” to state:

The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES PT 001A/B), and Figure B 3.7.6-**2**~~1~~, Compressed Air Storage Tanks Minimum Volume. . . .

These non-technical changes provide improved clarity, consistency, and operator usability.

Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate to include the “FSAR” modifier. (DOC A003)

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.7.6, Main Control Room Emergency Habitability System (VES)

Changes to the Generic Technical Specifications and Bases:

The Action Note is revised to eliminate reference to LCO 3.0.8. (DOC L05)

The Phrase “8 banks” is removed from GTS 3.7.6 Condition D statement because the information is not necessary. (DOC D10)

The GTS 3.7.6 Required Action D.1 phrase “greater than” is replaced by the symbol “>.” This is consistent with TS Writers Guide (Reference 4). (DOC A099)

Editorial changes are made to GTS 3.7.6 Conditions E and F. (DOC A099)

The word “that” is deleted from GTS SRs 3.7.6.2, 3.7.6.3, 3.7.6.5, 3.7.6.6, 3.7.6.7, 3.7.6.8, 3.7.6.9, and 3.7.6.10. This is consistent with TS Writers Guide (Reference 4). (DOC A038)

The GTS SR 3.7.6.2 phrase “greater than” is replaced by the symbol “>.” This is consistent with TS Writers Guide (Reference 4). (DOC A099)

The GTS SR 3.7.6.6 description statement is revised to eliminate the specific ASHRAE Standard. This information is not necessary. (DOC D11)

The first and second paragraphs of the “Background” section of the Bases are revised to improve clarity, consistency, and operator usability. (NRC Staff Comment)

The second, third, and fourth paragraphs of the “ASA” section of the Bases are revised to improve clarity, consistency, and operator usability. A new paragraph is inserted after the third paragraph in this section. (APOG Comment and NRC Staff Edit)

The third paragraph of the “LCO” section of the Bases is revised to improve clarity, consistency, and operator usability. (APOG Comment and NRC Staff Edit)

The “SRs” section of the Bases, under the heading “SR 3.7.6.11,” is revised by moving the second paragraph content that discusses Required Action C to the “Actions” section of the Bases after the fourth sentence under the heading “C.1, C.2, and C.3” to improve clarity, consistency, and operator usability. (APOG Comment)

The third sentence of the second paragraph in the “Actions” section of the Bases under the heading “D.1, D.2, and D.3” is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The fourth sentence of the second paragraph in the “Actions” section of the Bases under the heading “D.1, D.2, and D.3” is revised to improve clarity, consistency, and operator usability. (APOG Comment)

The first sentence of the second paragraph in the “SRs” section of the Bases under the heading “SR 3.7.6.2” is revised to improve clarity, consistency, and operator usability. (APOG Comment)

Figure B 3.7.6-2 is updated and renumbered as Figure B 3.7.6-1, and Figure B 3.7.6-2 is updated and renumbered as Figure B 3.7.6-1. (APOG Comment)

The acronym “FSAR” is added to modify “Section” and “Chapter” in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

VI. Traveler Information

Description of TSTF changes:

Not Applicable

Rationale for TSTF changes:

Not Applicable

Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

DOC A038 revises GTS SRs 3.7.6.2, 3.7.6.3, 3.7.6.5, 3.7.6.6, 3.7.6.7, 3.7.6.8, 3.7.6.9, and 3.7.6.10 by deleting “that” from the surveillance description.

In GTS 3.7.6 Required Action D.1 and SR 3.7.6.2, DOC A099 replaces the term “greater than” with the symbol, “>” in both locations. Additionally, Condition E (two locations) and Condition F (two locations) includes the phrase “Conditions A, B, C, or D.” The word “Conditions” is grammatically corrected to “Condition” in all of these locations.

DOC D10 revises GTS 3.7.6 Condition D statement to “One bank of VES air tanks inoperable.”

DOC D11 notes that GTS SR 3.7.6.6 states “Verify that the air quality of the air storage tanks meets the requirements of Appendix C, Table C-1 of ASHRAE Standard 62.” GTS SR 3.7.6.6 is changed to STS SR 3.7.6.6, “Verify the air quality of the air storage tanks is within limits.”

DOC L05 removes reference to LCO 3.0.8, which is eliminated.

A more detailed description of each DOC can be found in Reference 2, VEGP TSU LAR Enclosure 1, and the NRC staff safety evaluation can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 5 and the Southern Nuclear Operating Company RAI Response in Reference 6.

Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

Editorial changes per DOC A099 and DOC A038 are consistent with the guidance provided in the TS Writer's Guide (Reference 4).

DOC D10 removes the term that describes how many tanks constitute a single bank from GTS 3.7.6 because this type of information is not necessary to be included in the TS in order to provide adequate protection of public health and safety. STS 3.7.6 Condition D retains the requirement that a single bank of tanks is inoperable. Also, the descriptive detail is adequately controlled in the TS Bases.

DOC D11 removes the reference to the requirements of Appendix C, Table C-1 of ASHRAE Standard 62 in GTS SR 3.7.6.6 because this type of information is not necessary to be included in the TS in order to provide adequate protection of public health and safety. STS SR 3.7.6.6 retains the requirement that the air quality of the tanks is within the required limits. Also, the procedural reference details are adequately controlled in the TS Bases.

DOC L05 notes that considerations of GTS LCO 3.0.8 are adequately addressed within individual LCO referencing LCO 3.0.8 or by TS 5.4.1.b to Monitor Safety System Shutdown Monitoring Trees parameters. AP1000 GTS LCO 3.0.8 is eliminated.

Description of additional changes proposed by NRC staff/preparer of GTST:

The first and second paragraphs of the "Background" section of the TS 3.7.6 Bases are revised to state (NRC Staff Comment):

> . . . If AC power is lost **for greater than 10 minutes,** or a **Control Room Air Supply Radiation (particulate or iodine) - High 2 (LCO 3.3.13)**~~High-2 Main Control Room Envelope (MCRE) radiation~~ signal is received, the VES is actuated. The major functions of the VES are: 1) to provide forced ventilation to deliver an adequate supply of breathable air (Ref. 4) for the **Main Control Room Envelope (**MCRE**)** occupants; 2) to provide forced ventilation to maintain the MCRE at a 1/8 inch water gauge positive pressure with respect to the surrounding areas; 3) **to** provide passive filtration to filter contaminated air in the MCRE; and 4) to limit the temperature increase of the MCRE equipment and facilities that must remain functional during an accident, via the heat absorption of passive heat sinks.
>
> . . . The VES system is designed to maintain ~~CO2~~**CO_2** concentration less than 0.5% **by volume** for up to 11 MCRE occupants.

The second, third paragraphs, and fourth paragraphs in the "ASA" section of the Bases are revised to state (a new paragraph is also added after the third paragraph) (APOG Comment and NRC Staff Edit):

> Operation of the VES is automatically initiated by **either of** the following safety related ~~signal~~**signals**:
>
> - **Control Room Air Supply Radiation** ~~high-2~~ **(**particulate or iodine radioactivity**) ─ High 2 (LCO 3.3.13); or**
> - **24-hour Class 1E Battery Charger Input Voltage - Low (Loss of AC power for more than 10 minutes).**
>
> **Operation of the VES may also be manually initiated using either of two momentary controls in the MCR.** ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~ **In the event of a loss of AC power for greater than 10 minutes, the VBS isolation valves automatically close and the VES isolation valves automatically open. These actions protect the MCRE occupants from a potential radiation release. In addition, the loss of AC power coincident with MCRE isolation will de-energize the control room air supply radiation monitors in order to conserve the battery capacity.**
>
> **Since the loss of AC power and manual VES initiation Functions do not satisfy the LCO selection criteria of 10 CFR 50.36(c)(2)(ii), their OPERABILITY is not required to support VES OPERABILITY.**

In the event of a high level of gaseous radioactivity outside of the MCRE, the VBS continues to operate to provide pressurization and filtration functions. The MCRE air supply downstream of the filtration units is monitored by ~~a~~ safety related **particulate and iodine radioactivity** radiation detector**s**. Upon ~~high-2~~ particulate or iodine radioactivity in the **VBS MCRE air supply duct exceeding the Control Room Air Supply Radiation - High 2** setpoint, a safety related signal is generated to isolate the MCRE and to initiate air flow from the VES storage tanks. Isolation of the MCRE consists of closing safety related valves in the lines that penetrate the MCRE pressure boundary. Valves in the VBS supply and exhaust ducts, and the Sanitary Drainage System (SDS) vent lines are automatically isolated. **The relief damper isolation valves also open allowing the pressure relief dampers to function and discharge the damper flow to purge the vestibule.** The **Control Room Air Supply Radiation -- High 2 Function initiates** VES air flow ~~is initiated~~ by **generating** a safety related signal which opens the isolation valves in the VES supply lines.

The third paragraph of the “LCO” section of the Bases is revised to state (APOG Comment and NRC Staff Edit):

The VES is considered OPERABLE when the individual components necessary to deliver a supply of breathable air to the MCRE are OPERABLE. This includes components listed in SR 3.7.6.1~~3~~ through **SR** 3.7.6.~~10.~~**12:**

- **MCRE heat sinks (as indicated by MCRE air temperature)**
- **MCRE pressure boundary**
- **VES compressed air storage tanks, air volume and quality**
- **VES air delivery isolation valves**
- **VES air header manual isolation valves are open**
- **VBS MCRE isolation valves**
- **VES pressure relief isolation valves within the MCRE pressure boundary**
- **VES pressure relief dampers**
- **VES self-contained pressure regulating valves**
- **VES air delivery flow paths**
- **VES passive filtration system (eductors and filters)**

~~In addition, the~~**The** MCRE pressure boundary must be maintained, including the integrity of the walls, floors, ceilings, electrical and mechanical penetrations, and access doors. The MCRE pressure boundary includes the Potable Water System (PWS) and SDS running (piping drain) traps, which retain a fluid level sufficient to maintain a seal preventing gas flow through the piping. The MCRE pressure boundary also includes the Waste Water System (WWS) drain line, which is isolated by a normally closed isolation valve.

The second paragraph of the “SRs” section of the Bases, under the heading “SR 3.7.6.11,” is revised by moving the content discussing Required Action C to the “Actions” section of the Bases after the fourth sentence under the heading “C.1, C.2, and C.3” to state (APOG Comment):

> . . . The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. **Required Action C.3 allows time to restore the MCRE boundary to OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 4) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status.** The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of MCRE occupants within analyzed limits while limiting the probability that MCRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. . . .

The third sentence of the second paragraph in the “Actions” section of the Bases under the heading “D.1, D.2, and D.3” is revised to state (APOG Comment):

> . . . The 245,680 scf value is 75**%** ~~percent~~ of the minimum amount of stored compressed air that must be available in the compressed air storage tanks. . . .

The fourth sentence of the second paragraph in the “Actions” section of the Bases is revised under the heading “D.1, D.2, and D.3” to state (APOG Comment):

> . . . The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES-PT-001A/B), and Figure B 3.7.6-**1**~~2~~, Compressed Air Storage Tanks Minimum Volume - One Bank of VES Air Tanks (8 Tanks) Inoperable. . . .

In addition, Figure B 3.7.6-2 is renumbered as Figure B 3.7.6-1, and Figure B 3.7.6-2 is renumbered as Figure B 3.7.6-1.

The first sentence of the second paragraph in the “SRs” section of the Bases under the heading “SR 3.7.6.2” is revised to state (APOG Comment):

> The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES PT 001A/B), and Figure B 3.7.6-**2**~~1~~, Compressed Air Storage Tanks Minimum Volume. . . .

Adjusted the reference order to reflect the order of their first appearance.

The acronym “FSAR” is added to modify “Section” and “Chapter” in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

Rationale for additional changes proposed by NRC staff/preparer of GTST:

These changes are to correct grammatical errors in the bases.

The changes to the “Background” section of the Bases provide improved clarity, consistency, and operator usability based on information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode; and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation.

The changes to the “ASA” section of the Bases provide improved clarity, consistency, and operator usability based on information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode; and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation.

The changes to the “LCO” section of the Bases provide improved clarity, consistency, and operator usability based on information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode; and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation.

The changes to the “Actions” section of the Bases provide improved clarity, consistency, and operator usability.

The changes to the “SRs” section of the Bases provide improved clarity, consistency, and operator usability.

Since Bases references to FSAR Sections and Chapters are to an external document, it is appropriate to include the “FSAR” modifier.

VII. GTST Safety Evaluation

Technical Analysis:

DOC D10 revises GTS 3.7.6 Condition D statement to “One bank of VES air tanks inoperable.” The removal of the term that describes how many tanks constitute a single bank (i.e., 8 tanks) from the GTS is acceptable because this type of information is not necessary to be included in the TS in order to provide adequate protection of public health and safety. The STS 3.7.6 Condition D retains the requirement that a single bank of tanks is inoperable. Also, this change is acceptable because this descriptive detail is adequately controlled in the STS Bases consistent with the Final Safety Analysis Report (FSAR). The STS 3.7.6 Required Action D.1, D.2, and D.3 Bases state that one bank of VES air tanks is equivalent to “8 tanks out of 32 total.”

The GTS SR 3.7.6.6 action to “Verify that the air quality of the air storage tanks meets the requirements of Appendix C, Table C-1 of ASHRAE Standard 62.” is changed by DOC D11 to “Verify the air quality of the air storage tanks is within limits.” The removal of the required limit, Appendix C, Table C-1 of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62, from the GTS is acceptable because this type of information is not necessary to be included in the GTS in order to provide adequate protection of public health and safety. STS SR 3.7.6.6 retains the requirement that the air quality of the tanks is within the required limits. Also, this change is acceptable because these types of procedural details are adequately controlled in the STS Bases. The STS SR 3.7.6.6 Bases state that the verification of the air quality of the air storage tanks must meet the requirements of Appendix C, Table C-1 of ASHRAE Standard 62.

DOC L05 eliminates GTS LCO 3.0.8. In conjunction with the change to eliminate LCO 3.0.8, all Notes and references are no longer necessary and are administratively eliminated. The elimination of GTS LCO 3.0.8 is discussed in detail in GTS O01-LCO 3.0.

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST’s proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.7.6 is an acceptable model Specification for the AP1000 standard reactor design.

References to Previous NRC Safety Evaluation Reports (SERs):

None

VIII. Review Information

Evaluator Comments:

None

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Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/19/2014.

APOG Comments (Ref. 7) and Resolutions:

1. (Internal # 3) Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate (DOC A003) to include the “FSAR” modifier. This is resolved by adding the FSAR modifier as appropriate.

2. (Internal # 5) TSTF-51-A made two changes: (1) it changed Applicabilities and Actions from “movement of irradiated fuel” to “movement of **[recently]** irradiated fuel” and (2) removed most uses of the defined term Core Alterations. This change has the effect of removing the Applicability of the affected TS after a specified decay time (i.e., beyond “recently”) has occurred. Only the second change to delete Core Alterations was incorporated into the AP1000 STS. Further clarification of the full scope of TSTF-51 should be addressed; that is to acknowledge that it is deferred for future consideration. This is resolved by making the requested notation for TSTF-51-A.

3. (Internal # 6) The GTST sections often repeat VEGP LAR DOCs, which reference “existing” and “current” requirements. The inclusion in the GTST of references to “existing” and “current,” are not always valid in the context of the GTS. Each occurrence of “existing” and “current” should be revised to be clear and specific to GTS, MTS, or VEGP COL TS (or other), as appropriate. Noted ambiguities are corrected in the GTST body.

4. (Internal # 7) Section VII, GTST Safety Evaluation, inconsistently completes the subsection “References to Previous NRC Safety Evaluation Reports (SERs)” by citing the associated SE for VEGP 3&4 COL Amendment 13. It is not clear whether there is a substantive intended difference when omitting the SE citation. This is resolved by removing the SE citation in Section VII of the GTST and ensuring that appropriate references to the consistent citation of this reference in Section X of the GTST are made.

5. (Internal #13) Many GTSTs evaluated TSTF-425 with the following note: Risk-informed TS changes will be considered at a later time for application to the AP1000 STS.

   The NRC approval of TSTF-425, and model safety evaluation provided in the CLIIP for TSTF-425, are generically applicable to any design’s Technical Specifications. As such, the

replacement of certain Frequencies with a Surveillance Frequency Control Program should be included in the GTST for AP1000 STS NUREG.

However, implementation in the AP1000 STS should not reflect optional (i.e., bracketed) material showing retention of fixed Surveillance Frequencies where relocation to a Surveillance Frequency Control Program is acceptable. Since each represented AP1000 Utility is committed to maintaining standardization, there is no rationale for an AP1000 STS that includes bracketed options.

Consistent with TSTF-425 criteria, replace applicable Surveillance Frequencies with “In accordance with the Surveillance Frequency control Program” and add that Program as new AP1000 STS Specification 5.5.15.

NRC Staff disagreed with implementing TSTF-425 in the initial version of the STS. Although the APOG thinks the analysis supporting this traveler is general enough to be applicable to AP1000, staff thinks an AP1000-specific proposal from APOG is needed to identify any GTS SRs that should be excluded. Also, with the adoption of a Surveillance Frequency Control Program (SFCP) in the AP1000 STS, bracketed Frequencies, which provide a choice between the GTS Frequency and the SFCP Frequency, are needed because the NRC will use the AP1000 STS as a reference, and to be consistent with NUREG-1431, Rev. 4. APOG was requested to consider proposing an AP1000 version of TSTF-425 for a subsequent revision of the STS.

6. (Internal # 414) In GTST Section VI under the heading “Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:” the discussion for DOC A038 identifies several SRs that are revised. However, the list leaves out SR 3.7.6.6. The list on the previous page correctly includes SR 3.7.6.6. Add SR 3.7.6.6 to the list. This is resolved by making the recommended change.

7. (Internal # 415) In the “ASA” section of the TS 3.7.6 Bases, revise the second and third paragraphs to clarify that the VES initiation signals include “Loss of AC power for more than 10 minutes” (see AP1000 DCD 6.4.3.2 and Figure 7.2-1, sheets 13 and 15). Make the following changes to Applicable Safety Analyses:

> Operation of the VES is automatically initiated by **either of** the following safety related signal**s**:
>
> • ~~h~~**H**igh-2 particulate or iodine radioactivity**; or**
>
> • **Loss of AC power for more than 10 minutes.**
>
> . . . ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~

This is resolved by making the recommended change with additional clarifications and information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode; and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation. The NRC staff recommends editing the first and second paragraphs of the “Background” section of the Bases as follows:

> . . . If AC power is lost **for greater than 10 minutes,** or a **Control Room Air Supply Radiation (particulate or iodine) - High 2 (LCO 3.3.13)**~~High-2 Main Control Room Envelope (MCRE) radiation~~ signal is received, the VES is actuated. The major functions of the VES are: 1) to provide forced ventilation to deliver an adequate supply of breathable air (Ref. 4) for the

Main Control Room Envelope (MCRE**)** occupants; 2) to provide forced ventilation to maintain the MCRE at a 1/8 inch water gauge positive pressure with respect to the surrounding areas; 3) **to** provide passive filtration to filter contaminated air in the MCRE; and 4) to limit the temperature increase of the MCRE equipment and facilities that must remain functional during an accident, via the heat absorption of passive heat sinks.

. . . The VES system is designed to maintain ~~CO2~~**CO_2** concentration less than 0.5% **by volume** for up to 11 MCRE occupants.

In the "ASA" section of the Bases, revise the first and second paragraphs; insert a fourth paragraph; and revise the subsequent fifth paragraph as follows:

Operation of the VES is automatically initiated by **either of** the following safety related ~~signal~~**signals**:

- **Control Room Air Supply Radiation** ~~high-2~~ **(**particulate or iodine radioactivity**) ─ High 2 (LCO 3.3.13); or**
- **24-hour Class 1E Battery Charger Input Voltage - Low (Loss of AC power for more than 10 minutes).**

Operation of the VES may also be manually initiated using either of two momentary controls in the MCR. ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~ **In the event of a loss of AC power for greater than 10 minutes, the VBS isolation valves automatically close and the VES isolation valves automatically open. These actions protect the MCRE occupants from a potential radiation release. In addition, the loss of AC power coincident with MCRE isolation will de-energize the control room air supply radiation monitors in order to conserve the battery capacity.**

Since the loss of AC power and manual VES initiation Functions do not satisfy the LCO selection criteria of 10 CFR 50.36(c)(2)(ii), their OPERABILITY is not required to support VES OPERABILITY.

In the event of a high level of gaseous radioactivity outside of the MCRE, the VBS continues to operate to provide pressurization and filtration functions. The MCRE air supply downstream of the filtration units is monitored by ~~a~~ safety related **particulate and iodine radioactivity** radiation detector**s**. Upon ~~high-2~~ particulate or iodine radioactivity in the **VBS MCRE air supply duct exceeding the Control Room Air Supply Radiation - High 2** setpoint, a safety related signal is generated to isolate the MCRE and to initiate air flow from the VES storage tanks. Isolation of the MCRE consists of closing safety related valves in the lines that penetrate the MCRE pressure boundary. Valves in the VBS supply and exhaust ducts, and the Sanitary Drainage System (SDS) vent lines are automatically isolated. **The relief damper isolation valves also open allowing the pressure relief dampers to function and discharge the damper flow to purge the vestibule.** The **Control Room Air Supply Radiation** ~~-~~ **- High 2 Function initiates** VES air flow ~~is initiated~~ by **generating** a safety related signal which opens the isolation valves in the VES supply lines.

8. (Internal # 416) In the “LCO” section of the Bases, revise the third paragraph as follows:

> This includes components listed in SR 3.7.6.~~3~~ **2** through 3.7.6.10.

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional clarifications and information from DCD Rev 19, Sections 6.4.3.2 Emergency Mode; and 7.3.1.2.17 Control Room Isolation and Air Supply Initiation. The NRC staff recommends editing the third paragraph of the “LCO” section of the Bases as follows:

> The VES is considered OPERABLE when the individual components necessary to deliver a supply of breathable air to the MCRE are OPERABLE. This includes components listed in SR 3.7.6.**1**~~3~~ through **SR** 3.7.6.~~10.~~**12:**
>
> - **MCRE heat sinks (as indicated by MCRE air temperature)**
> - **MCRE pressure boundary**
> - **VES compressed air storage tanks, air volume and quality**
> - **VES air delivery isolation valves**
> - **VES air header manual isolation valves are open**
> - **VBS MCRE isolation valves**
> - **VES pressure relief isolation valves within the MCRE pressure boundary**
> - **VES pressure relief dampers**
> - **VES self-contained pressure regulating valves**
> - **VES air delivery flow paths**
> - **VES passive filtration system (eductors and filters)**
>
> ~~In addition, the~~**The** MCRE pressure boundary must be maintained, including the integrity of the walls, floors, ceilings, electrical and mechanical penetrations, and access doors. The MCRE pressure boundary includes the Potable Water System (PWS) and SDS running (piping drain) traps, which retain a fluid level sufficient to maintain a seal preventing gas flow through the piping. The MCRE pressure boundary also includes the Waste Water System (WWS) drain line, which is isolated by a normally closed isolation valve.

9. (Internal # 417 and 421) In the “SRs” section of the Bases, under the heading “SR 3.7.6.11,” revise second paragraph by moving the content to the “Actions” section of the Bases after the fourth sentence under the heading “C.1, C.2, and C.3” as follows:

. . . The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. **Required Action C.3 allows time to restore the MCRE boundary to OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 3) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status.** The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of MCRE occupants within analyzed limits while limiting the probability that MCRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. . . .

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change.

10. (Internal # 418) In the “Actions” section of the Bases, revise the third sentence of the second paragraph under the heading “D.1, D.2, and D.3” as follows:

    . . . The 245,680 scf value is 75**%** ~~percent~~ of the minimum amount of stored compressed air that must be available in the compressed air storage tanks. . . .

    This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change.

11. (Internal # 419) In the “Actions” section of the Bases, revise the fourth sentence of the second paragraph under the heading “D.1, D.2, and D.3” as follows:

    . . . The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES-PT-001A/B), and Figure B 3.7.6-1~~2~~, Compressed Air Storage Tanks Minimum Volume - One Bank of VES Air Tanks (8 Tanks) Inoperable. . . .

    In addition, renumber Figure B 3.7.6-2 as Figure B 3.7.6-1, and Figure B 3.7.6-2 as Figure B 3.7.6-1. This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change.

12. (Internal # 420) In the “SRs” section of the Bases, revise the first sentence of the second paragraph under the heading “SR 3.7.6.2” as follows:

The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES PT 001A/B), and Figure B 3.7.6-2~~1~~, Compressed Air Storage Tanks Minimum Volume. . . .

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change.

13. (Internal # 422 and 423) Revise TS Bases Figures B 3.7.6-1 and B 3.7.6-2 to add "Acceptable" region labels. The order of the Figures is swapped to align with Writer's Guide convention. This is resolved by making the recommended change.

14. (Internal #1) Include TSTF-522 in the reference disposition tables, as "TSTF already included in GTS Rev. 19 with variation." Note that minor changes to the Bases are as appropriate to the AP1000 design.

    The NRC staff added TSTF-522-A to reference disposition table for GTS SR 3.7.6.4 as "TSTF already Included in GTS Rev. 19 with variation." GTS SR 3.7.6.4, to operate VES for ≥ 15 minutes with a 31 day Frequency, matches the changed approved in this traveler for Westinghouse STS SR 3.7.10, except that SR 3.7.6.4 does not include the word "continuous" before "minutes."

NRC Final Approval Date: 12/8/2015

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IX. Evaluator Comments for Consideration in Finalizing Technical Specifications and Bases

None

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, “Technical Specifications,” June 2011 (ML11171A500).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).

3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:

ML13238A355	Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
ML13238A359	Enclosure 1 - Amendment No. 13 to COL No. NPF-91
ML13239A256	Enclosure 2 - Amendment No. 13 to COL No. NPF-92
ML13239A284	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
ML13239A287	Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
ML13239A288	SE Attachment 2 - Table A - Administrative Changes
ML13239A319	SE Attachment 3 - Table M - More Restrictive Changes
ML13239A333	SE Attachment 4 - Table R - Relocated Specifications
ML13239A331	SE Attachment 5 - Table D - Detail Removed Changes
ML13239A316	SE Attachment 6 - Table L - Less Restrictive Changes

   The following documents were subsequently issued to correct an administrative error in Enclosure 3:

ML13277A616	Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
ML13277A637	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)

4. TSTF-GG-05-01, “Writer's Guide for Plant-Specific Improved Technical Specifications,” June 2005.

5. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).

6. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360)

7. APOG-2014-008, APOG (AP1000 Utilities) Comments on AP1000 Standardized Technical Specifications (STS) Generic Technical Specification Travelers (GTSTs), Docket ID NRC-2014-0147, September 22, 2014 (ML14265A493).

XI. MARKUP of the Applicable GTS Subsection for Preparation of the STS NUREG

The entire section of the Specifications and the Bases associated with this GTST is presented next.

Changes to the Specifications and Bases are denoted as follows: Deleted portions are marked in strikethrough red font, and inserted portions in bold blue font.

3.7 PLANT SYSTEMS

3.7.6 Main Control Room Emergency Habitability System (VES)

LCO 3.7.6 The VES shall be OPERABLE.

----------NOTE----------
The main control room envelope (MCRE) boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of irradiated fuel assemblies.

ACTIONS

~~----------NOTE----------~~
~~LCO 3.0.8 is not applicable.~~
~~---~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One valve or damper inoperable.	A.1 Restore valve or damper to OPERABLE status.	7 days
B. MCRE air temperature not within limit.	B.1 Restore MCRE air temperature to within limit.	24 hours
C. VES inoperable due to inoperable MCRE boundary in MODE 1, 2, 3, or 4.	C.1 Initiate action to implement mitigating actions. AND	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 Verify mitigating actions ensure MCRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND C.3 Restore MCRE boundary to OPERABLE status.	24 hours 90 days
D. One bank of VES air tanks ~~(8 tanks)~~ inoperable.	D.1 Verify that the OPERABLE tanks contain **>** ~~greater than~~ 245,680 scf of compressed air. AND D.2 Verify VBS MCRE ancillary fans and supporting equipment are available. AND D.3 Restore VES to OPERABLE status.	2 hours AND Once per 12 hours thereafter 24 hours 7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Conditions A, B, C, or D not met in MODE 1, 2, 3, or 4. OR VES inoperable for reasons other than Conditions A, B, C, or D in MODE 1, 2, 3, or 4.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours
F. Required Action and associated Completion Time of Conditions A, B, C, or D not met during movement of irradiated fuel. OR VES inoperable for reasons other than Conditions A, B, C, or D during movement of irradiated fuel. OR VES inoperable due to inoperable MCRE boundary during movement of irradiated fuel.	F.1 Suspend movement of irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify MCRE air temperature is ≤ 75°F.	24 hours
SR 3.7.6.2	Verify ~~that~~ the compressed air storage tanks contain **>** ~~greater than~~ 327,574 scf of compressed air.	24 hours
SR 3.7.6.3	Verify ~~that~~ each VES air delivery isolation valve is OPERABLE.	In accordance with the Inservice Testing Program
SR 3.7.6.4	Operate VES for ≥ 15 minutes.	31 days
SR 3.7.6.5	Verify ~~that~~ each VES air header manual isolation valve is in an open position.	31 days
SR 3.7.6.6	Verify ~~that~~ the air quality of the air storage tanks **is within limits** ~~meets the requirements of Appendix C, Table C-1 of ASHRAE Standard 62~~.	92 days
SR 3.7.6.7	Verify ~~that~~ all MCRE isolation valves are OPERABLE and will close upon receipt of an actual or simulated actuation signal.	24 months
SR 3.7.6.8	Verify ~~that~~ each VES pressure relief isolation valve within the MCRE pressure boundary is OPERABLE.	In accordance with the Inservice Testing Program
SR 3.7.6.9	Verify ~~that~~ each VES pressure relief damper is OPERABLE.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.6.10	Verify ~~that~~ the self-contained pressure regulating valve in each VES air delivery flow path is OPERABLE.	In accordance with the Inservice Testing Program
SR 3.7.6.11	Perform required MCRE unfiltered air inleakage testing in accordance with the Main Control Room Envelope Habitability Program.	In accordance with the Main Control Room Envelope Habitability Program
SR 3.7.6.12	Perform required VES Passive Filtration system filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP

B 3.7 PLANT SYSTEMS

B 3.7.6 Main Control Room Emergency Habitability System (VES)

BASES

BACKGROUND

The Main Control Room Emergency Habitability System (VES) provides a protected environment from which operators can control the plant following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The system is designed to operate following a Design Basis Accident (DBA) which requires protection from the release of radioactivity. In these events, the Nuclear Island Non Radioactive Ventilation System (VBS) would continue to function if AC power is available. If AC power is lost **for greater than 10 minutes,** or a **Control Room Air Supply Radiation (particulate or iodine) – High 2 (LCO 3.3.13)** ~~High-2 Main Control Room Envelope (MCRE) radiation~~ signal is received, the VES is actuated. The major functions of the VES are: 1) to provide forced ventilation to deliver an adequate supply of breathable air (Ref. **1**~~4~~) for the **Main Control Room Envelope (**MCRE**)** occupants; 2) to provide forced ventilation to maintain the MCRE at a 1/8 inch water gauge positive pressure with respect to the surrounding areas; 3) **to** provide passive filtration to filter contaminated air in the MCRE; and 4) to limit the temperature increase of the MCRE equipment and facilities that must remain functional during an accident, via the heat absorption of passive heat sinks.

The VES consists of compressed air storage tanks, two air delivery flow paths, an eductor, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), associated valves or dampers, piping, and instrumentation. The tanks contain enough breathable air to supply the required air flow to the MCRE for at least 72 hours. The VES system is designed to maintain **CO_2** ~~CO2~~ concentration less than 0.5% **by volume** for up to 11 MCRE occupants.

The MCRE is the area within the confines of the MCRE boundary that contains the spaces that control room operators inhabit to control the unit during normal and accident conditions. This area encompasses the main control area, operations work area, operational break room, shift supervisor's office, kitchen, and toilet facilities (Ref. **2**~~1~~). The MCRE is protected during normal operation, natural events, and accident conditions. The MCRE boundary is the combination of walls, floor, roof, electrical and mechanical penetrations, and access doors. The OPERABILITY of the MCRE boundary must be maintained to ensure that the inleakage of unfiltered air into the MCRE will not exceed the

BASES

BACKGROUND (continued)

inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to MCRE occupants. The MCRE and its boundary are defined in the Main Control Room Envelope Habitability Program.

Sufficient thermal mass exists in the surrounding concrete structure (including walls, ceiling and floors) to absorb the heat generated inside the MCRE, which is initially at or below 75°F. Heat sources inside the MCRE include operator workstations, emergency lighting and occupants. Sufficient insulation is provided surrounding the MCRE pressure boundary to preserve the minimum required thermal capacity of the heat sink. The insulation also limits the heat gain from the adjoining areas following the loss of VBS cooling.

In the unlikely event that power to the VBS is unavailable for more than 72 hours, MCRE habitability is maintained by operating one of the two MCRE ancillary fans to supply outside air to the MCRE.

The compressed air storage tanks are initially filled to contain greater than 327,574 scf of compressed air. The compressed air storage tanks, the tank pressure, and the room temperature are monitored to confirm that the required volume of breathable air is stored. During operation of the VES, a self**-**contained pressure regulating valve maintains a constant downstream pressure regardless of the upstream pressure. An orifice downstream of the regulating valve is used to control the air flow rate into the MCRE. The MCRE is maintained at a 1/8 inch water gauge positive pressure to minimize the infiltration of airborne contaminants from the surrounding areas. The VES operation in maintaining the MCRE habitable is discussed in Reference **2**~~1~~.

APPLICABLE SAFETY ANALYSES

The compressed air storage tanks are sized such that the set of tanks has a combined capacity that provides at least 72 hours of VES operation.

Operation of the VES is automatically initiated by **either of** the following safety related signal**s**:

- **Control Room Air Supply Radiation** ~~high-2~~ (particulate or iodine radioactivity**) – High 2 (LCO 3.3.13); or**

APPLICABLE SAFETY ANALYSES (continued)

- **24-hour Class 1E Battery Charger Input Voltage – Low (Loss of AC power for more than 10 minutes)**.

Operation of the VES may also be manually initiated using either of two momentary controls in the MCR. ~~In the event of a loss of all AC power, the VES functions to provide ventilation, pressurization, and cooling of the MCRE pressure boundary.~~ **In the event of a loss of AC power for greater than 10 minutes, the VBS isolation valves automatically close and the VES isolation valves automatically open. These actions protect the MCRE occupants from a potential radiation release. In addition, the loss of AC power coincident with MCRE isolation will de-energize the control room air supply radiation monitors in order to conserve the battery capacity.**

Since the loss of AC power and manual VES initiation Functions do not satisfy the LCO selection criteria of 10 CFR 50.36(c)(2)(ii), their OPERABILITY is not required to support VES OPERABILITY.

In the event of a high level of gaseous radioactivity outside of the MCRE, the VBS continues to operate to provide pressurization and filtration functions. The MCRE air supply downstream of the filtration units is monitored by ~~a~~ safety related **particulate and iodine radioactivity** radiation detector**s**. Upon ~~high 2~~ particulate or iodine radioactivity **in the VBS MCRE air supply duct exceeding the Control Room Air Supply Radiation – High 2** setpoint, a safety related signal is generated to isolate the MCRE and to initiate air flow from the VES storage tanks. Isolation of the MCRE consists of closing safety related valves in the lines that penetrate the MCRE pressure boundary. Valves in the VBS supply and exhaust ducts, and the Sanitary Drainage System (SDS) vent lines are automatically isolated. **The relief damper isolation valves also open allowing the pressure relief dampers to function and discharge the damper flow to purge the vestibule.** The **Control Room Air Supply Radiation – High 2 Function initiates** VES air flow ~~is initiated~~ by **generating** a safety related signal which opens the isolation valves in the VES supply lines.

The VES provides protection from smoke and hazardous chemicals to the MCRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the MCRE following a hazardous chemical release (Ref. **2**~~1~~). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the

BASES

APPLICABLE SAFETY ANALYSES (continued)

MCRE occupants to control the reactor either from the control room or from the remote shutdown room (Ref. 3~~2~~).

The VES functions to mitigate a DBA or transient that either assumes the failure of or challenges the integrity of the fission product barrier.

The VES satisfies the requirements of Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The VES limits the MCRE temperature rise and maintains the MCRE at a positive pressure relative to the surrounding environment.

Two air delivery flow paths are required to be OPERABLE to ensure that at least one is available, assuming a single failure.

The VES is considered OPERABLE when the individual components necessary to deliver a supply of breathable air to the MCRE are OPERABLE. This includes components listed in SR 3.7.6.1~~3~~ through **SR** 3.7.6.**12:**~~10.~~

- **MCRE heat sinks (as indicated by MCRE air temperature)**
- **MCRE pressure boundary**
- **VES compressed air storage tanks, air volume and quality**
- **VES air delivery isolation valves**
- **VES air header manual isolation valves are open**
- **VBS MCRE isolation valves**
- **VES pressure relief isolation valves within the MCRE pressure boundary**
- **VES pressure relief dampers**
- **VES self-contained pressure regulating valves**

BASES

LCO (continued)

- **VES air delivery flow paths**
- **VES passive filtration system (eductors and filters)**

The ~~In addition, the~~ MCRE pressure boundary must be maintained, including the integrity of the walls, floors, ceilings, electrical and mechanical penetrations, and access doors. The MCRE pressure boundary includes the Potable Water System (PWS) and SDS running (piping drain) traps, which retain a fluid level sufficient to maintain a seal preventing gas flow through the piping. The MCRE pressure boundary also includes the Waste Water System (WWS) drain line, which is isolated by a normally closed isolation valve.

In order for the VES to be considered OPERABLE, the MCRE boundary must be maintained such that the MCRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analysis for DBAs, and that MCRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the MCRE boundary to be opened intermittently under administrative controls. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls should be proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the MCRE. This individual will have a method to rapidly close the opening and to restore the MCRE boundary to a condition equivalent to the design condition when a need for MCRE isolation is indicated.

APPLICABILITY

In MODES 1, 2, 3, and 4 and during movement of irradiated fuel assemblies, the VES must be OPERABLE to ensure that the MCRE will remain habitable during and following a DBA.

The VES is not required to be OPERABLE in MODES 5 and 6 when irradiated fuel is not being moved because accidents resulting in fission product release are not postulated.

BASES

ACTIONS

~~LCO 3.0.8 is applicable while in MODE 5 or 6. Since irradiated fuel assembly movement can occur in MODE 5 or 6, the ACTIONS have been modified by a Note stating that LCO 3.0.8 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, the fuel movement is independent of shutdown reactor operations. Entering LCO 3.0.8 while in MODE 5 or 6 would require the optimization of plant safety, unnecessarily.~~

A.1

When a VES valve, a VES damper, or a main control room boundary isolation valve is inoperable, action is required to restore the component to OPERABLE status. A Completion Time of 7 days is permitted to restore the valve or damper to OPERABLE status before action must be taken to reduce power. The Completion Time of 7 days is based on engineering judgment, considering the low probability of an accident that would result in a significant radiation release from the fuel, the low probability of not containing the radiation, and that the remaining components can provide the required capability.

B.1

When the MCRE air temperature is outside the acceptable range during VBS operation, action is required to restore it to an acceptable range. A Completion Time of 24 hours is permitted based upon the availability of temperature indication in the MCRE. It is judged to be a sufficient amount of time allotted to correct the deficiency in the nonsafety ventilation system before shutting down.

C.1, C.2, and C.3

If the unfiltered inleakage of potentially contaminated air past the MCRE boundary and into the MCRE can result in MCRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE), or inadequate protection of MCRE occupants from hazardous chemicals or smoke, the MCRE boundary is inoperable. Actions must be taken to restore an OPERABLE MCRE boundary within 90 days.

During the period that the MCRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on MCRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will

ACTIONS (continued)

ensure that MCRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that MCRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable MCRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. **Required Action C.3 allows time to restore the MCRE boundary to OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 4) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status.** The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of MCRE occupants within analyzed limits while limiting the probability that MCRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the MCRE boundary.

D.1, D.2, and D.3

If one bank of VES air tanks (8 tanks out of 32 total) is inoperable, then the VES is able to supply air to the MCRE for 54 hours (75% of the required 72 hours). If the VES is actuated, the operator must take actions to maintain habitability of the MCRE once the air in the tanks has been exhausted. The VBS supplemental filtration mode or MCRE

ACTIONS (continued)

ancillary fans are both capable of maintaining the habitability of the MCRE after 54 hours.

With one bank of VES air tanks inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the stored amount of compressed air in the remaining OPERABLE VES air tanks must be verified within 2 hours and every 12 hours thereafter to be > ~~at least~~ 245,680 scf. The 245,680 scf value is 75% ~~percent~~ of the minimum amount of stored compressed air that must be available in the compressed air storage tanks. The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES-PT-001A/B), and Figure B 3.7.6-1~~2~~, Compressed Air Storage Tanks Minimum Volume – One Bank of VES Air Tanks (8 Tanks) Inoperable. Values above the 245,680 scf line in the figure meet the Required Action criteria. Verification that the minimum volume of compressed air is contained in the OPERABLE compressed air storage tanks ensures a 54-hour air supply will be available if needed. Additionally, within 24 hours, the VBS ancillary fans are verified to be OPERABLE so that, if needed, can be put into use once the OPERABLE compressed air storage tanks have been exhausted. The Completion Times associated with these actions and the 7 day Completion Time to restore VES to OPERABLE are based on engineering judgment, considering the low probability of an accident that would result in a significant radiation release from the reactor core, the low probability of radioactivity release, and that the remaining components and compensatory systems can provide the required capability. The 54 hours of air in the remaining OPERABLE compressed air storage tanks, along with compensatory operator actions, are adequate to protect the main control room envelope habitability. Dose calculations verify that the MCRE dose limits will remain within the requirements of GDC 19 with the compensatory actions taken at 54 hours.

E.1 and E.2

In MODE 1, 2, 3, or 4 if the Required Actions and Completion Times of Condition~~s~~ A, B, C, or D are not met, or the VES is inoperable for reasons other than Condition~~s~~ A, B, C, or D, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

ACTIONS (continued)

F.1

During movement of irradiated fuel assemblies, if the Required Actions and Completion Times of Condition~~s~~ A, B, C, or D are not met, or the VES is inoperable for reasons other than Condition~~s~~ A, B, C, or D, or the VES is inoperable due to an inoperable MCRE boundary, action must be taken immediately to suspend the movement of fuel. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1

The MCRE air temperature is checked at a frequency of 24 hours to verify that the VBS is performing as required to maintain the initial condition temperature assumed in the safety analysis, and to ensure that the MCRE temperature will not exceed the required conditions after loss of VBS cooling. The surveillance limit of 75°F is the initial heat sink temperature assumed in the VES thermal analysis. The 24 hour Frequency is acceptable based on the availability of temperature indication in the MCRE.

SR 3.7.6.2

This SR requires verification ~~Verification~~ every 24 hours that **the** compressed air storage tanks contain **>** ~~greater than~~ 327,574 scf of breathable air.

The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES PT 001A/B), and Figure B 3.7.6-**2**~~1~~, Compressed Air Storage Tanks Minimum Volume. Values above the 327,574 scf line in the figure meet the surveillance criteria. Verification that the minimum volume of compressed air is contained in the compressed air storage tanks ensures that there will be an adequate supply of breathable air to maintain MCRE habitability for a period of 72 hours. The Frequency of 24 hours is based on the availability of pressure indication in the MCRE.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.6.3

VES air delivery isolation valves are required to be verified as OPERABLE. The Frequency required is in accordance with the Inservice Testing Program.

SR 3.7.6.4

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing VES once every month provides an adequate check of the system. The 31 day Frequency is based on the reliability of the equipment and the availability of system redundancy.

SR 3.7.6.5

VES air header isolation valves are required to be verified open at 31 day intervals. This SR is designed to ensure that the pathways for supplying breathable air to the MCRE are available should loss of VBS occur. These valves should be closed only during required testing or maintenance of downstream components, or to preclude complete depressurization of the system should the VES isolation valves in the air delivery line open inadvertently or begin to leak.

SR 3.7.6.6

Verification that the air quality of the air storage tanks meets the requirements of Appendix C, Table C-1 of ASHRAE Standard 62 **(Ref. 1)** is required every 92 days. If air has not been added to the air storage tanks since the previous verification, verification may be accomplished by confirmation of the acceptability of the previous surveillance results along with examination of the documented record of air makeup. The purpose of ASHRAE Standard 62 states: "This standard specifies minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to minimize the potential for adverse health effects." Verification of the initial air quality (in combination with the other surveillances) ensures that breathable air is available for 11 MCRE occupants for at least 72 hours.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.6.7

Verification that the VBS isolation valves and the Sanitary Drainage System (SDS) isolation valves are OPERABLE and will actuate upon demand is required every 24 months to ensure that the MCRE can be isolated upon loss of VBS operation.

SR 3.7.6.8

Verification that each VES pressure relief isolation valve within the MCRE pressure boundary is OPERABLE is required in accordance with the Inservice Testing Program. The SR is used in combination with SR 3.7.6.9 to ensure that adequate vent area is available to mitigate MCRE overpressurization.

SR 3.7.6.9

Verification that the VES pressure relief damper is OPERABLE is required at 24 month intervals. The SR is used in combination with SR 3.7.6.8 to ensure that adequate vent area is available to mitigate MCRE overpressurization.

SR 3.7.6.10

Verification of the OPERABILITY of the self-contained pressure regulating valve in each VES air delivery flow path is required in accordance with the Inservice Testing Program. This is done to ensure that a sufficient supply of air is provided as required, and that uncontrolled air flow into the MCRE will not occur.

SR 3.7.6.11

This SR verifies the OPERABILITY of the MCRE boundary by testing for unfiltered air inleakage past the MCRE boundary and into the MCRE. The details of the testing are specified in the Main Control Room Envelope Habitability Program.

The MCRE is considered habitable when the radiological dose to MCRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the MCRE occupants are protected from hazardous chemicals and smoke. This SR verifies that the unfiltered air inleakage into the MCRE is no greater than the flow

SURVEILLANCE REQUIREMENTS (continued)

rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed flow rate, Condition C must be entered. ~~Required Action C.3 allows time to restore the MCRE boundary to OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 3) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status.~~

SR 3.7.6.12

This SR verifies that the required VES testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VES filter tests are in accordance with Regulatory Guide 1.52 (Ref. 7). The VFTP includes testing the performance of the HEPA filter, charcoal adsorber efficiency, minimum flow rate, and physical properties of the activated charcoal. Specific test frequencies and additional information are discussed in detail in the VFTP.

REFERENCES

1. **ASHRAE Standard 62-1989, "Ventilation for Acceptable Indoor Air Quality."** ~~Section 6.4, "Main Control Room Habitability Systems."~~

2. **FSAR Section 6.4, "Main Control Room Habitability Systems."** ~~Section 9.5.1, "Fire Protection System."~~

3. **FSAR Section 9.5.1, "Fire Protection System."** ~~Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors."~~

REFERENCES (continued)

4. **Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors."** ~~ASHRAE Standard 62-1989, "Ventilation for Acceptable Indoor Air Quality."~~

5. NEI 99-03, "Control Room Habitability Assessment," June 2001.

6. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "NEI Draft White Paper, Use of Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability." (ADAMS Accession No. ML040300694).

7. Regulatory Guide 1.52, "Design, Inspection, and Testing Criteria for Airfiltration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," Revision 3.

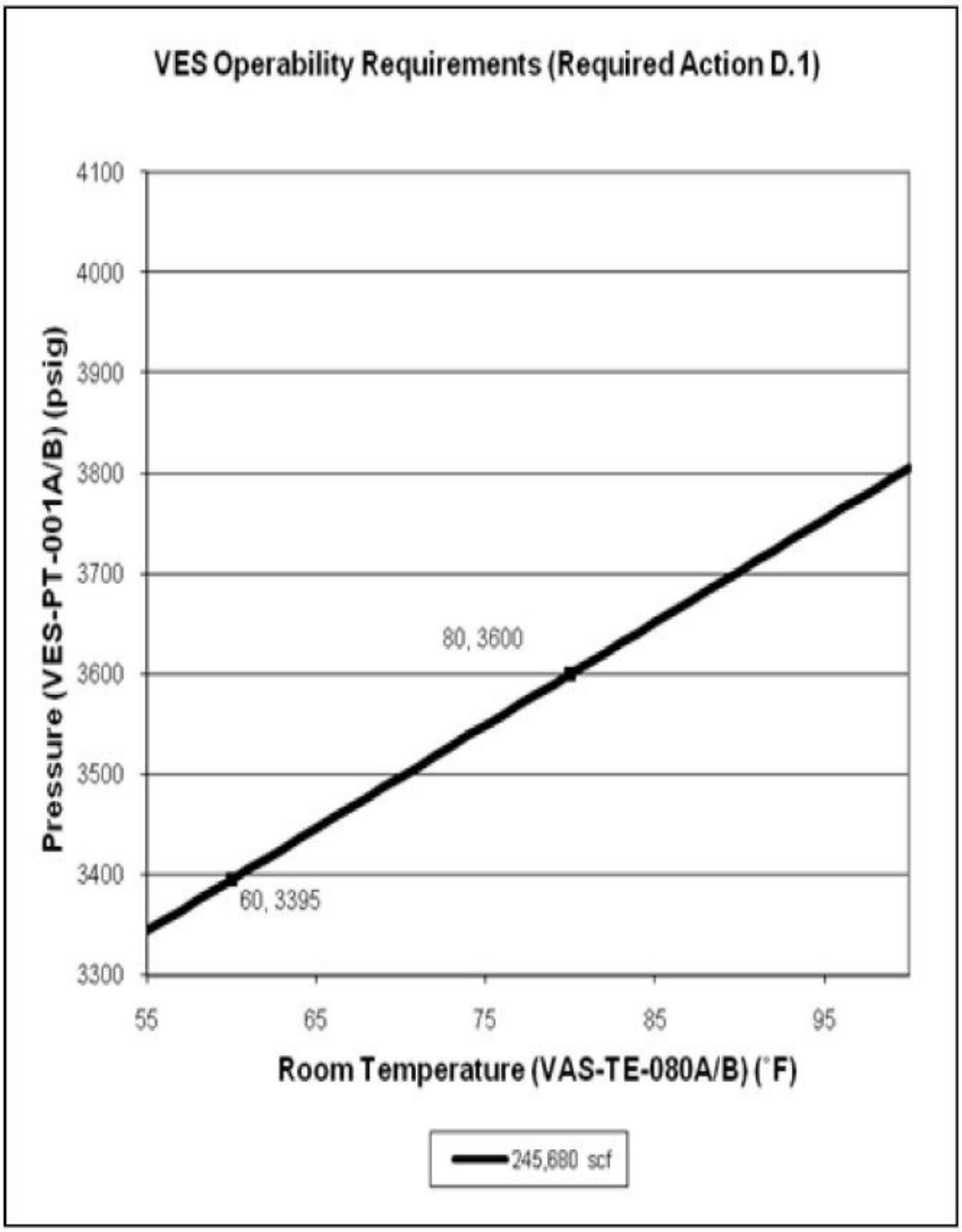

Figure B 3.7.6-~~1~~2 (page 1 of 1)
Compressed Air Storage Tanks Minimum Volume – One Bank of VES Air Tanks (8 Tanks) Inoperable

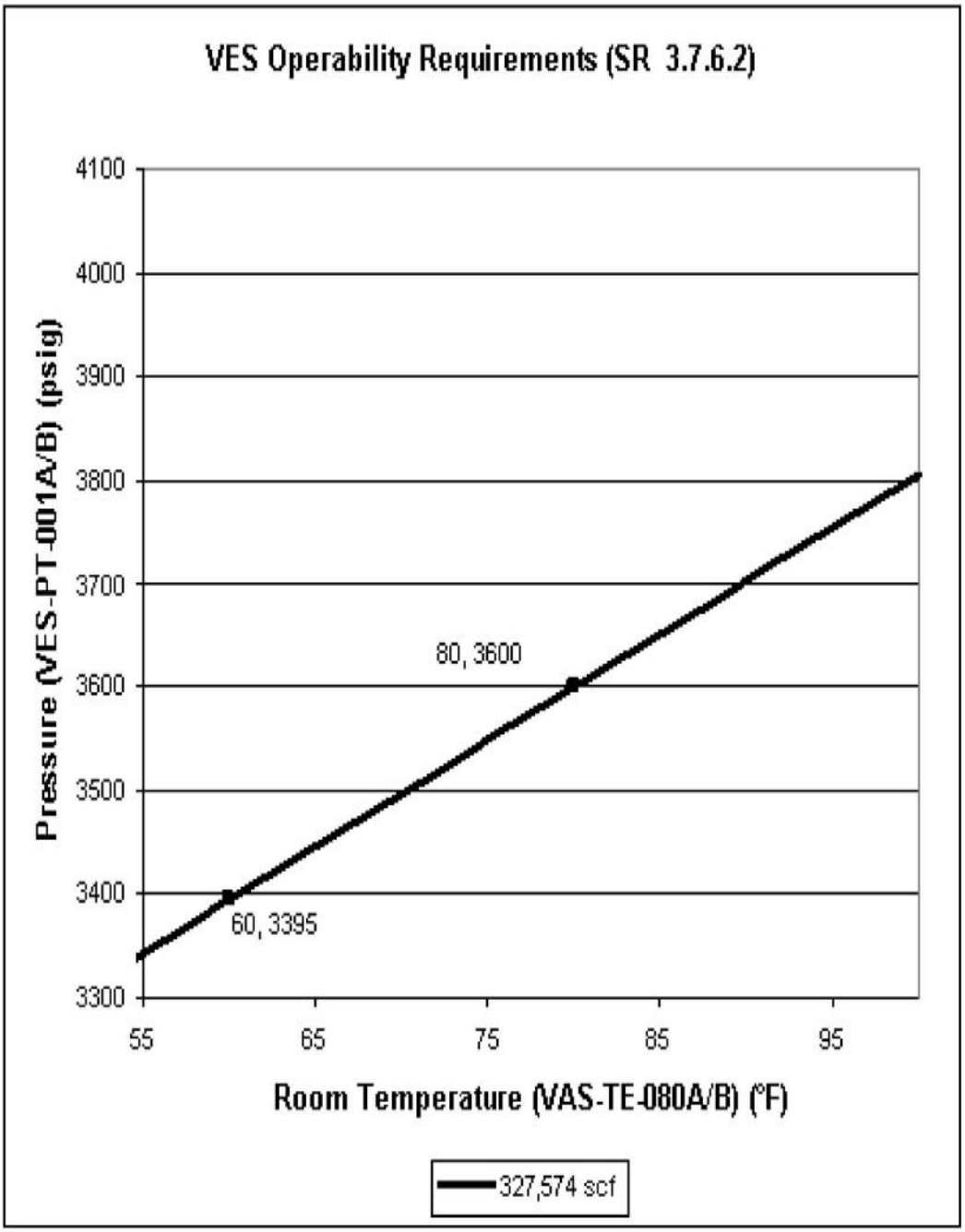

Figure B 3.7.6-2~~1~~ (page 1 of 1)
Compressed Air Storage Tanks Minimum Volume

XII. Applicable STS Subsection After Incorporation of this GTST's Modifications

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

3.7 PLANT SYSTEMS

3.7.6 Main Control Room Emergency Habitability System (VES)

LCO 3.7.6 The VES shall be OPERABLE.

----------NOTE----------
The main control room envelope (MCRE) boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One valve or damper inoperable.	A.1	Restore valve or damper to OPERABLE status.	7 days
B. MCRE air temperature not within limit.	B.1	Restore MCRE air temperature to within limit.	24 hours
C. VES inoperable due to inoperable MCRE boundary in MODE 1, 2, 3, or 4.	C.1	Initiate action to implement mitigating actions.	Immediately
	AND		
	C.2	Verify mitigating actions ensure MCRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.	24 hours
	AND		

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.3	Restore MCRE boundary to OPERABLE status.	90 days
D. One bank of VES air tanks inoperable.	D.1	Verify that the OPERABLE tanks contain > 245,680 scf of compressed air.	2 hours AND Once per 12 hours thereafter
	AND		
	D.2	Verify VBS MCRE ancillary fans and supporting equipment are available.	24 hours
	AND		
	D.3	Restore VES to OPERABLE status.	7 days
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, 3, or 4. OR VES inoperable for reasons other than Condition A, B, C, or D in MODE 1, 2, 3, or 4.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 5.	36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, or D not met during movement of irradiated fuel. OR VES inoperable for reasons other than Condition A, B, C, or D during movement of irradiated fuel. OR VES inoperable due to inoperable MCRE boundary during movement of irradiated fuel.	F.1 Suspend movement of irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify MCRE air temperature is ≤ 75°F.	24 hours
SR 3.7.6.2	Verify the compressed air storage tanks contain > 327,574 scf of compressed air.	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.6.3	Verify each VES air delivery isolation valve is OPERABLE.	In accordance with the Inservice Testing Program
SR 3.7.6.4	Operate VES for ≥ 15 minutes.	31 days
SR 3.7.6.5	Verify each VES air header manual isolation valve is in an open position.	31 days
SR 3.7.6.6	Verify the air quality of the air storage tanks is within limits.	92 days
SR 3.7.6.7	Verify all MCRE isolation valves are OPERABLE and will close upon receipt of an actual or simulated actuation signal.	24 months
SR 3.7.6.8	Verify each VES pressure relief isolation valve within the MCRE pressure boundary is OPERABLE.	In accordance with the Inservice Testing Program
SR 3.7.6.9	Verify each VES pressure relief damper is OPERABLE.	24 months
SR 3.7.6.10	Verify the self-contained pressure regulating valve in each VES air delivery flow path is OPERABLE.	In accordance with the Inservice Testing Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.6.11	Perform required MCRE unfiltered air inleakage testing in accordance with the Main Control Room Envelope Habitability Program.	In accordance with the Main Control Room Envelope Habitability Program
SR 3.7.6.12	Perform required VES Passive Filtration system filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP

B 3.7 PLANT SYSTEMS

B 3.7.6 Main Control Room Emergency Habitability System (VES)

BASES

BACKGROUND

The Main Control Room Emergency Habitability System (VES) provides a protected environment from which operators can control the plant following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The system is designed to operate following a Design Basis Accident (DBA) which requires protection from the release of radioactivity. In these events, the Nuclear Island Non Radioactive Ventilation System (VBS) would continue to function if AC power is available. If AC power is lost for greater than 10 minutes, or a Control Room Air Supply Radiation (particulate or iodine) – High 2 (LCO 3.3.13) signal is received, the VES is actuated. The major functions of the VES are: 1) to provide forced ventilation to deliver an adequate supply of breathable air (Ref. 1) for the Main Control Room Envelope (MCRE) occupants; 2) to provide forced ventilation to maintain the MCRE at a 1/8 inch water gauge positive pressure with respect to the surrounding areas; 3) to provide passive filtration to filter contaminated air in the MCRE; and 4) to limit the temperature increase of the MCRE equipment and facilities that must remain functional during an accident, via the heat absorption of passive heat sinks.

The VES consists of compressed air storage tanks, two air delivery flow paths, an eductor, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), associated valves or dampers, piping, and instrumentation. The tanks contain enough breathable air to supply the required air flow to the MCRE for at least 72 hours. The VES system is designed to maintain CO_2 concentration less than 0.5% by volume for up to 11 MCRE occupants.

The MCRE is the area within the confines of the MCRE boundary that contains the spaces that control room operators inhabit to control the unit during normal and accident conditions. This area encompasses the main control area, operations work area, operational break room, shift supervisor's office, kitchen, and toilet facilities (Ref. 2). The MCRE is protected during normal operation, natural events, and accident conditions. The MCRE boundary is the combination of walls, floor, roof, electrical and mechanical penetrations, and access doors. The OPERABILITY of the MCRE boundary must be maintained to ensure that the inleakage of unfiltered air into the MCRE will not exceed the inleakage assumed in the licensing basis analysis of design basis

BASES

BACKGROUND (continued)

accident (DBA) consequences to MCRE occupants. The MCRE and its boundary are defined in the Main Control Room Envelope Habitability Program.

Sufficient thermal mass exists in the surrounding concrete structure (including walls, ceiling and floors) to absorb the heat generated inside the MCRE, which is initially at or below 75°F. Heat sources inside the MCRE include operator workstations, emergency lighting and occupants. Sufficient insulation is provided surrounding the MCRE pressure boundary to preserve the minimum required thermal capacity of the heat sink. The insulation also limits the heat gain from the adjoining areas following the loss of VBS cooling.

In the unlikely event that power to the VBS is unavailable for more than 72 hours, MCRE habitability is maintained by operating one of the two MCRE ancillary fans to supply outside air to the MCRE.

The compressed air storage tanks are initially filled to contain greater than 327,574 scf of compressed air. The compressed air storage tanks, the tank pressure, and the room temperature are monitored to confirm that the required volume of breathable air is stored. During operation of the VES, a self-contained pressure regulating valve maintains a constant downstream pressure regardless of the upstream pressure. An orifice downstream of the regulating valve is used to control the air flow rate into the MCRE. The MCRE is maintained at a 1/8 inch water gauge positive pressure to minimize the infiltration of airborne contaminants from the surrounding areas. The VES operation in maintaining the MCRE habitable is discussed in Reference 2.

APPLICABLE SAFETY ANALYSES

The compressed air storage tanks are sized such that the set of tanks has a combined capacity that provides at least 72 hours of VES operation.

Operation of the VES is automatically initiated by either of the following safety related signals:

- Control Room Air Supply Radiation (particulate or iodine radioactivity) – High 2 (LCO 3.3.13); or

APPLICABLE SAFETY ANALYSES (continued)

- 24-hour Class 1E Battery Charger Input Voltage – Low (Loss of AC power for more than 10 minutes).

Operation of the VES may also be manually initiated using either of two momentary controls in the MCR. In the event of a loss of AC power for greater than 10 minutes, the VBS isolation valves automatically close and the VES isolation valves automatically open. These actions protect the MCRE occupants from a potential radiation release. In addition, the loss of AC power coincident with MCRE isolation will de-energize the control room air supply radiation monitors in order to conserve the battery capacity.

Since the loss of AC power and manual VES initiation Functions do not satisfy the LCO selection criteria of 10 CFR 50.36(c)(2)(ii), their OPERABILITY is not required to support VES OPERABILITY.

In the event of a high level of gaseous radioactivity outside of the MCRE, the VBS continues to operate to provide pressurization and filtration functions. The MCRE air supply downstream of the filtration units is monitored by safety related particulate and iodine radioactivity radiation detectors. Upon particulate or iodine radioactivity in the VBS MCRE air supply duct exceeding the Control Room Air Supply Radiation – High 2 setpoint, a safety related signal is generated to isolate the MCRE and to initiate air flow from the VES storage tanks. Isolation of the MCRE consists of closing safety related valves in the lines that penetrate the MCRE pressure boundary. Valves in the VBS supply and exhaust ducts, and the Sanitary Drainage System (SDS) vent lines are automatically isolated. The relief damper isolation valves also open allowing the pressure relief dampers to function and discharge the damper flow to purge the vestibule. The Control Room Air Supply Radiation – High 2 Function initiates VES air flow by generating a safety related signal which opens the isolation valves in the VES supply lines.

The VES provides protection from smoke and hazardous chemicals to the MCRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the MCRE following a hazardous chemical release (Ref. 2). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the MCRE occupants to control the reactor either from the control room or from the remote shutdown room (Ref. 3).

BASES

APPLICABLE SAFETY ANALYSES (continued)

The VES functions to mitigate a DBA or transient that either assumes the failure of or challenges the integrity of the fission product barrier.

The VES satisfies the requirements of Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The VES limits the MCRE temperature rise and maintains the MCRE at a positive pressure relative to the surrounding environment.

Two air delivery flow paths are required to be OPERABLE to ensure that at least one is available, assuming a single failure.

The VES is considered OPERABLE when the individual components necessary to deliver a supply of breathable air to the MCRE are OPERABLE. This includes components listed in SR 3.7.6.1 through SR 3.7.6.12:

- MCRE heat sinks (as indicated by MCRE air temperature)
- MCRE pressure boundary
- VES compressed air storage tanks, air volume and quality
- VES air delivery isolation valves
- VES air header manual isolation valves are open
- VBS MCRE isolation valves
- VES pressure relief isolation valves within the MCRE pressure boundary
- VES pressure relief dampers
- VES self-contained pressure regulating valves
- VES air delivery flow paths
- VES passive filtration system (eductors and filters)

BASES

LCO (continued)

The MCRE pressure boundary must be maintained, including the integrity of the walls, floors, ceilings, electrical and mechanical penetrations, and access doors. The MCRE pressure boundary includes the Potable Water System (PWS) and SDS running (piping drain) traps, which retain a fluid level sufficient to maintain a seal preventing gas flow through the piping. The MCRE pressure boundary also includes the Waste Water System (WWS) drain line, which is isolated by a normally closed isolation valve.

In order for the VES to be considered OPERABLE, the MCRE boundary must be maintained such that the MCRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analysis for DBAs, and that MCRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the MCRE boundary to be opened intermittently under administrative controls. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls should be proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the MCRE. This individual will have a method to rapidly close the opening and to restore the MCRE boundary to a condition equivalent to the design condition when a need for MCRE isolation is indicated.

APPLICABILITY

In MODES 1, 2, 3, and 4 and during movement of irradiated fuel assemblies, the VES must be OPERABLE to ensure that the MCRE will remain habitable during and following a DBA.

The VES is not required to be OPERABLE in MODES 5 and 6 when irradiated fuel is not being moved because accidents resulting in fission product release are not postulated.

BASES

ACTIONS

A.1

When a VES valve, a VES damper, or a main control room boundary isolation valve is inoperable, action is required to restore the component to OPERABLE status. A Completion Time of 7 days is permitted to restore the valve or damper to OPERABLE status before action must be taken to reduce power. The Completion Time of 7 days is based on engineering judgment, considering the low probability of an accident that would result in a significant radiation release from the fuel, the low probability of not containing the radiation, and that the remaining components can provide the required capability.

B.1

When the MCRE air temperature is outside the acceptable range during VBS operation, action is required to restore it to an acceptable range. A Completion Time of 24 hours is permitted based upon the availability of temperature indication in the MCRE. It is judged to be a sufficient amount of time allotted to correct the deficiency in the nonsafety ventilation system before shutting down.

C.1, C.2, and C.3

If the unfiltered inleakage of potentially contaminated air past the MCRE boundary and into the MCRE can result in MCRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE), or inadequate protection of MCRE occupants from hazardous chemicals or smoke, the MCRE boundary is inoperable. Actions must be taken to restore an OPERABLE MCRE boundary within 90 days.

During the period that the MCRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on MCRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that MCRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that MCRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable MCRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this

ACTIONS (continued)

time period, and the use of mitigating actions. Required Action C.3 allows time to restore the MCRE boundary to OPERABLE status provided mitigating actions can ensure that the MCRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3 (Ref. 4) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 5). These compensatory measures may also be used as mitigating actions as required by Required Action C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 6). Options for restoring the MCRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the MCRE boundary has been restored to OPERABLE status. The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of MCRE occupants within analyzed limits while limiting the probability that MCRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the MCRE boundary.

D.1, D.2, and D.3

If one bank of VES air tanks (8 tanks out of 32 total) is inoperable, then the VES is able to supply air to the MCRE for 54 hours (75% of the required 72 hours). If the VES is actuated, the operator must take actions to maintain habitability of the MCRE once the air in the tanks has been exhausted. The VBS supplemental filtration mode or MCRE ancillary fans are both capable of maintaining the habitability of the MCRE after 54 hours.

With one bank of VES air tanks inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the stored amount of compressed air in the remaining OPERABLE VES air tanks must be verified within 2 hours and every 12 hours thereafter to be > 245,680 scf. The 245,680 scf value is 75% of the minimum amount of stored compressed air that must be available in the compressed air storage tanks. The standard volume is determined using the

ACTIONS (continued)

compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES-PT-001A/B), and Figure B 3.7.6-1, Compressed Air Storage Tanks Minimum Volume – One Bank of VES Air Tanks (8 Tanks) Inoperable. Values above the 245,680 scf line in the figure meet the Required Action criteria. Verification that the minimum volume of compressed air is contained in the OPERABLE compressed air storage tanks ensures a 54-hour air supply will be available if needed. Additionally, within 24 hours, the VBS ancillary fans are verified to be OPERABLE so that, if needed, can be put into use once the OPERABLE compressed air storage tanks have been exhausted. The Completion Times associated with these actions and the 7 day Completion Time to restore VES to OPERABLE are based on engineering judgment, considering the low probability of an accident that would result in a significant radiation release from the reactor core, the low probability of radioactivity release, and that the remaining components and compensatory systems can provide the required capability. The 54 hours of air in the remaining OPERABLE compressed air storage tanks, along with compensatory operator actions, are adequate to protect the main control room envelope habitability. Dose calculations verify that the MCRE dose limits will remain within the requirements of GDC 19 with the compensatory actions taken at 54 hours.

E.1 and E.2

In MODE 1, 2, 3, or 4 if the Required Actions and Completion Times of Condition A, B, C, or D are not met, or the VES is inoperable for reasons other than Condition A, B, C, or D, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

F.1

During movement of irradiated fuel assemblies, if the Required Actions and Completion Times of Condition A, B, C, or D are not met, or the VES is inoperable for reasons other than Condition A, B, C, or D, or the VES is inoperable due to an inoperable MCRE boundary, action must be taken immediately to suspend the movement of fuel. This does not preclude the movement of fuel to a safe position.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1

The MCRE air temperature is checked at a frequency of 24 hours to verify that the VBS is performing as required to maintain the initial condition temperature assumed in the safety analysis, and to ensure that the MCRE temperature will not exceed the required conditions after loss of VBS cooling. The surveillance limit of 75°F is the initial heat sink temperature assumed in the VES thermal analysis. The 24 hour Frequency is acceptable based on the availability of temperature indication in the MCRE.

SR 3.7.6.2

This SR requires verification every 24 hours that the compressed air storage tanks contain > 327,574 scf of breathable air.

The standard volume is determined using the compressed air storage tank room temperature (VAS-TE-080A/B), compressed air storage tanks pressure (VES PT 001A/B), and Figure B 3.7.6-2, Compressed Air Storage Tanks Minimum Volume. Values above the 327,574 scf line in the figure meet the surveillance criteria. Verification that the minimum volume of compressed air is contained in the compressed air storage tanks ensures that there will be an adequate supply of breathable air to maintain MCRE habitability for a period of 72 hours. The Frequency of 24 hours is based on the availability of pressure indication in the MCRE.

SR 3.7.6.3

VES air delivery isolation valves are required to be verified as OPERABLE. The Frequency required is in accordance with the Inservice Testing Program.

SR 3.7.6.4

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing VES once every month provides an adequate check of the system. The 31 day Frequency is based on the reliability of the equipment and the availability of system redundancy.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.6.5

VES air header isolation valves are required to be verified open at 31 day intervals. This SR is designed to ensure that the pathways for supplying breathable air to the MCRE are available should loss of VBS occur. These valves should be closed only during required testing or maintenance of downstream components, or to preclude complete depressurization of the system should the VES isolation valves in the air delivery line open inadvertently or begin to leak.

SR 3.7.6.6

Verification that the air quality of the air storage tanks meets the requirements of Appendix C, Table C-1 of ASHRAE Standard 62 (Ref. 1) is required every 92 days. If air has not been added to the air storage tanks since the previous verification, verification may be accomplished by confirmation of the acceptability of the previous surveillance results along with examination of the documented record of air makeup. The purpose of ASHRAE Standard 62 states: "This standard specifies minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to minimize the potential for adverse health effects." Verification of the initial air quality (in combination with the other surveillances) ensures that breathable air is available for 11 MCRE occupants for at least 72 hours.

SR 3.7.6.7

Verification that the VBS isolation valves and the Sanitary Drainage System (SDS) isolation valves are OPERABLE and will actuate upon demand is required every 24 months to ensure that the MCRE can be isolated upon loss of VBS operation.

SR 3.7.6.8

Verification that each VES pressure relief isolation valve within the MCRE pressure boundary is OPERABLE is required in accordance with the Inservice Testing Program. The SR is used in combination with SR 3.7.6.9 to ensure that adequate vent area is available to mitigate MCRE overpressurization.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.6.9

Verification that the VES pressure relief damper is OPERABLE is required at 24 month intervals. The SR is used in combination with SR 3.7.6.8 to ensure that adequate vent area is available to mitigate MCRE overpressurization.

SR 3.7.6.10

Verification of the OPERABILITY of the self-contained pressure regulating valve in each VES air delivery flow path is required in accordance with the Inservice Testing Program. This is done to ensure that a sufficient supply of air is provided as required, and that uncontrolled air flow into the MCRE will not occur.

SR 3.7.6.11

This SR verifies the OPERABILITY of the MCRE boundary by testing for unfiltered air inleakage past the MCRE boundary and into the MCRE. The details of the testing are specified in the Main Control Room Envelope Habitability Program.

The MCRE is considered habitable when the radiological dose to MCRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the MCRE occupants are protected from hazardous chemicals and smoke. This SR verifies that the unfiltered air inleakage into the MCRE is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed flow rate, Condition C must be entered.

SR 3.7.6.12

This SR verifies that the required VES testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VES filter tests are in accordance with Regulatory Guide 1.52 (Ref. 7). The VFTP includes testing the performance of the HEPA filter, charcoal adsorber efficiency, minimum flow rate, and physical properties of the activated charcoal. Specific test frequencies and additional information are discussed in detail in the VFTP.

BASES

REFERENCES

1. ASHRAE Standard 62-1989, “Ventilation for Acceptable Indoor Air Quality.”

2. FSAR Section 6.4, “Main Control Room Habitability Systems.”

3. FSAR Section 9.5.1, “Fire Protection System.”

4. Regulatory Guide 1.196, “Control Room Habitability at Light-Water Nuclear Power Reactors.”

5. NEI 99-03, “Control Room Habitability Assessment,” June 2001.

6. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, “NEI Draft White Paper, Use of Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability.” (ADAMS Accession No. ML040300694).

7. Regulatory Guide 1.52, “Design, Inspection, and Testing Criteria for Airfiltration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants,” Revision 3.

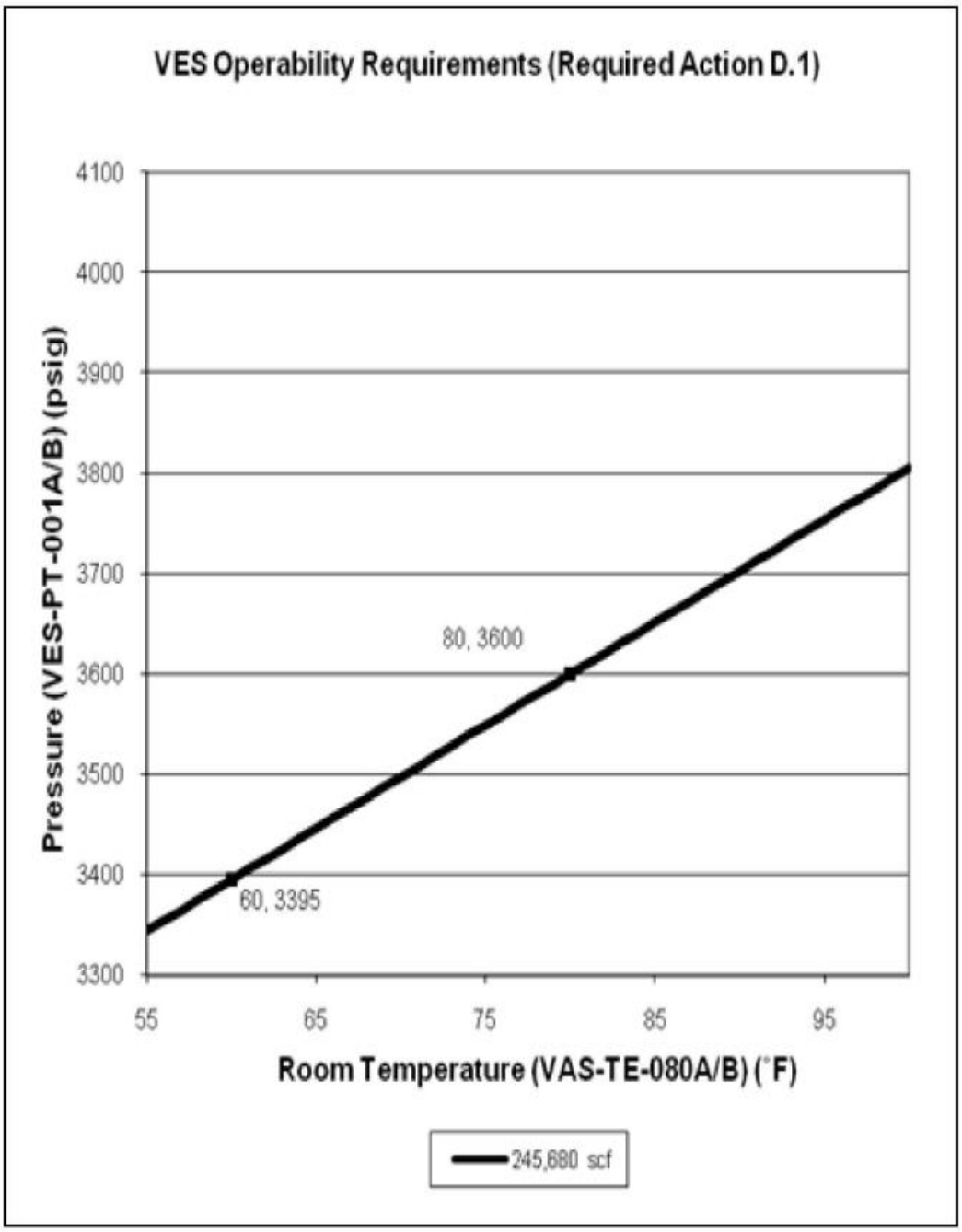

Figure B 3.7.6-1 (page 1 of 1)
Compressed Air Storage Tanks Minimum Volume – One Bank of VES Air Tanks (8 Tanks) Inoperable

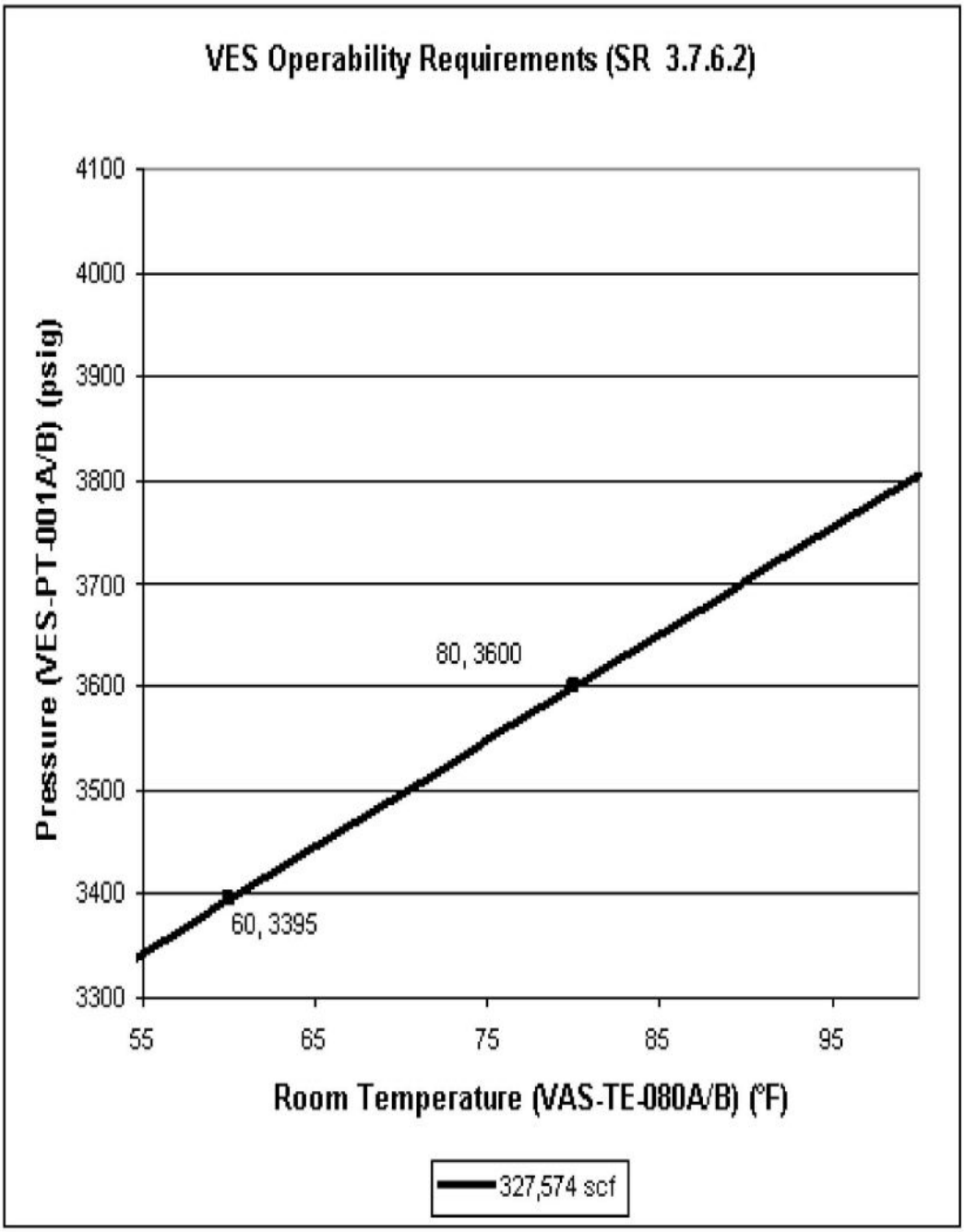

Figure B 3.7.6-2 (page 1 of 1)
Compressed Air Storage Tanks Minimum Volume