

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

October 2, 2008

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Serial No. 08-0590  
SPS-LIC/CGL R0  
Docket Nos. 50-280  
50-281  
License Nos. ) DPR-32  
DPR-37

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**SURRY POWER STATION UNITS 1 AND 2**  
**ANNUAL SUBMITTAL OF TECHNICAL SPECIFICATIONS BASES CHANGES**  
**PURSUANT TO TECHNICAL SPECIFICATION 6.4.J**

Pursuant to Technical Specification 6.4.J, "Technical Specifications (TS) Bases Control Program," Dominion hereby submits the changes to the Bases of the Surry TS implemented between October 1, 2007 and September 30, 2008.

Bases changes to the TS (that were not previously submitted to the NRC as part of a License Amendment Request) were reviewed and approved by the Facility Safety Review Committee. It was determined that the changes did not require a change to the TS or license, or involve a change to the UFSAR or Bases that required NRC prior approval pursuant to 10CFR50.59. These changes have been incorporated into the TS Bases. A summary of these changes is provided in Attachment 1.

TS Bases changes that were submitted to the NRC for information along with the associated License Amendment Request transmittals, submitted pursuant to 10CFR50.90, were also reviewed and approved by the Facility Safety Review Committee. These changes have been implemented with the respective License Amendments. A summary of these changes is provided in Attachment 2.

Current TS Bases pages reflecting the changes discussed in Attachments 1 and 2 are provided in Attachment 3.

If you have any questions regarding this transmittal, please contact Mr. Barry A. Garber at (757) 365-2725.

Very truly yours,



B. L. Stanley  
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Surry Power Station

A001  
NRC

Attachments:

1. Summary of TS Bases Changes Not Previously Submitted to the NRC
2. Summary of TS Bases Changes Associated with License Amendments
3. Current TS Bases Pages

Commitments made in this letter: None.

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**Attachment 1**  
**Serial No. 08-0590**

**Summary of TS Bases Changes Not Previously Submitted to the NRC**

**Surry Power Station Units 1 and 2**  
**Virginia Electric and Power Company**  
**(Dominion)**

**SUMMARY OF TS BASES CHANGES**  
**NOT PREVIOUSLY SUBMITTED TO THE NRC**

**TS Basis Changes for 34.5 kV Switchyard Modifications (TS Bases Page TS 3.16-4)**

This TS 3.16 Basis revision reflects switchyard modifications being made by Design Change 05-021. This design change adds a third 34.5 kV bus (Bus #7), as well as associated circuit breakers, in the 34.5 kV switchyard and eliminates the existing bus-tie circuit breaker between Bus #5 and Bus #6. These modifications allow greater flexibility in the switchyard configuration to provide offsite power to the Reserve Station Service Transformers A, B, and C.

This Basis change was approved on August 25, 2006 and implemented on July 2, 2008.

**Attachment 2**  
**Serial No. 08-0590**

**Summary of TS Bases Changes Associated with License Amendments**

**Surry Power Station Units 1 and 2**  
**Virginia Electric and Power Company**  
**(Dominion)**

**SUMMARY OF TS BASES CHANGES  
ASSOCIATED WITH LICENSE AMENDMENTS**

**Proposed Technical Specifications Change and Supporting Safety Analysis  
Revisions to Address Generic Safety Issue (GSI) 191 (TS Bases Pages TS 3.4-3,  
TS 3.8-4, TS 3.8-5, and TS 3.19-2)**

As part of the resolution to GSI-191, this change revised the method for starting the inside and outside recirculation spray (RS) pumps in response to a design basis accident. The RS pump start based on a time delay following a Consequence Limiting Safeguards (CLS) High High containment pressure setpoint was revised to a coincident CLS High High containment pressure and refueling water storage tank low level.

The associated Bases changes were included for information in a January 31, 2006 letter (Serial No. 06-014) and were incorporated into the Bases as part of the Unit 1 implementation of License Amendment 250/-- issued on October 12, 2006. [Note that the Unit 2 License Amendment --/249 was implemented previously and reported in letter Serial No. 07-0650, dated October 11, 2007.]

**Containment Sump Inspection Surveillance (TS Bases Pages TS 4.5-4 and TS 4.11-4)**

This change revised the TS Surveillance Requirements to: (1) change the required frequency of containment sump inspections and (2) replace specific terminology associated with the existing sump screen design with generic terminology applicable to both the existing design and the replacement strainer being installed in response to the NRC's Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors."

The associated Bases changes were included for information in an October 3, 2006 letter (Serial No. 06-791) and were incorporated into the Bases as part of the implementation of License Amendments 255/254 issued on October 15, 2007.

**45-day and 14-day Temporary Allowed Outage Times to Replace Main Control Room and Emergency Switchgear Room Chilled Water Piping and OPERABLE Definition Modification to Perform Required Surveillances (TS Basis Page TS 3.23-6)**

These changes revised the TSs to permit the replacement of Main Control Room and Emergency Switchgear Room Air Conditioning System Chilled Water Piping by using two 45-day and two 14-day temporary risk-based allowed outage times and modified the definition of OPERABLE for the air handling units while in the 45-day temporary allowed outage times to be applied during the performance of certain TS-required surveillances.

The associated Basis changes were included for information in February 26, 2007 and November 28, 2007 letters (Serial No. 07-0109 and Serial No. 07-0109E) and were incorporated into the Basis as part of the implementation of License Amendments 258/257 issued on January 23, 2008.

**Maximum Service Water Temperature Increase (TS Basis Page TS 3.8-4)**

This change increased the maximum service water temperature limit from 95°F to 100°F.

The associated Basis changes were included for information in a June 25, 2007 letter (Serial No. 07-0401) and were incorporated into the Basis as part of the implementation of License Amendments 259/259 issued on June 17, 2008.

**Control Room Habitability (TS Bases Pages TS 3.10-6, TS 3.10-7, TS 3.10-8, TS 3.10-9, TS 3.10-10, TS 3.19-2, TS 3.19-3, TS 3.19-4, TS 3.21-2, TS 3.21-3, TS 3.21-4, TS 3.21-5, TS 3.21-6, TS 3.23-4, TS 4.18-1, TS 4.18-2, and TS 4.20-5)**

This change revised the TS requirements related to main control room and emergency switchgear room envelope habitability. This change is consistent with the NRC-approved Revision 3 of Technical Specification Task Force (TSTF) Standard Technical Specifications Change Traveler TSTF-448, "Control Room Habitability."

The associated Bases changes were included for information in July 13, 2007 and August 20, 2007 letters (Serial No. 07-0488 and Serial No. 07-0488A) and were incorporated into the Bases as part of the implementation of License Amendments 260/260 issued on July 7, 2008.

**Attachment 3  
Serial No. 08-0590**

**Current TS Bases Pages**

**Surry Power Station Units 1 and 2  
Virginia Electric and Power Company  
(Dominion)**

Basis

The spray systems in each reactor unit consist of two separate parallel Containment Spray Subsystems, each of 100 percent capacity, and four separate parallel Recirculation Spray Subsystems, each of 50 percent capacity.

Each Containment Spray Subsystem draws water independently from the refueling water storage tank (RWST). The water in the tank is cooled to 45°F or below by circulating the water through one of the two RWST coolers with one of the two recirculating pumps. The water temperature is maintained by two mechanical refrigerating units as required. In each Containment Spray Subsystem, the water flows from the tank through an electric motor driven containment spray pump and is sprayed into the containment atmosphere through two separate sets of spray nozzles. The capacity of the spray systems to depressurize the containment in the event of a Design Basis Accident is a function of the pressure and temperature of the containment atmosphere, the service water temperature, and the temperature in the refueling water storage tank as discussed in the Basis of Specification 3.8.

Each Recirculation Spray Subsystem draws water from the common containment sump. In each subsystem the water flows through a recirculation spray pump and recirculation spray cooler, and is sprayed into the containment atmosphere through a separate set of spray nozzles. Two of the recirculation spray pumps are located inside the containment and two outside the containment in the containment auxiliary structure.

With one Containment Spray Subsystem and two Recirculation Spray Subsystems operating together, the spray systems are capable of cooling and depressurizing the containment to 1.0 psig in less than 60 minutes and to subatmospheric pressure within 4 hours following the Design Basis Accident. The Recirculation Spray Subsystems are capable of maintaining subatmospheric pressure in the containment indefinitely following the Design Basis Accident when used in conjunction with the Containment Vacuum System to remove any long term air inleakage. The radiological consequences analysis demonstrates acceptable results provided the containment pressure does not exceed 1.0 psig (from 1 hour to 4 hours) and is maintained less than 0.0 psig (after 4 hours).

- (3) assuring that environmental conditions will not preclude access to close the valves and
- 4) that this administrative or manual action will prevent the release of radioactivity outside the containment.

The Reactor Coolant System temperature and pressure being below 350°F and 450 psig, respectively, ensures that no significant amount of flashing steam will be formed and hence that there would be no significant pressure buildup in the containment if there is a loss-of-coolant accident. Therefore, the containment internal pressure is not required to be subatmospheric prior to exceeding 350°F and 450 psig.

The allowable value for the containment air partial pressure is presented in TS Figure 3.8-1 for service water temperatures from 25 to 100°F. The RWST water shall have a maximum temperature of 45°F.

The horizontal upper limit line in TS Figure 3.8-1 is based on MSLB peak calculated pressure criteria, and the sloped line from 70°F to 100°F service water temperatures is based on LOCA depressurization criteria.

If the containment air partial pressure rises to a point above the allowable value the reactor shall be brought to the HOT SHUTDOWN condition. If a LOCA occurs at the time the containment air partial pressure is at the maximum allowable value, the maximum containment pressure will be less than design pressure (45 psig), the containment will depressurize to 1.0 psig within 1 hour and less than 0.0 psig within 4 hours. The radiological consequences analysis demonstrates acceptable results provided the containment pressure does not exceed 1.0 psig for the interval from 1 to 4 hours following the Design Basis Accident.

If the containment air partial pressure cannot be maintained greater than or equal to the minimum pressure in Figure 3.8-1, the reactor shall be brought to the HOT SHUTDOWN condition. The shell and dome plate liner of the containment are capable of withstanding an internal pressure as low as 3 psia, and the bottom mat liner is capable of withstanding an internal pressure as low as 8 psia.

#### References

UFSAR Section 4.2.2.4	Reactor Coolant Pump
UFSAR Section 5.2	Containment Isolation
UFSAR Section 5.2.1	Design Bases
UFSAR Section 5.2.2	Isolation Design
UFSAR Section 5.3.4	Containment Vacuum System

7. Eight air handling units (AHUs) shall be OPERABLE in accordance with the operability requirements of Specification 3.23.C. With two AHUs inoperable on either unit, ensure that one AHU is OPERABLE in each unit's main control room and emergency switchgear room, and restore an inoperable AHU to OPERABLE status within 7 days, or comply with Specification 3.10.C. With more than two AHUs inoperable on a unit, comply with Specification 3.10.C.
- C. If any one of the specified limiting conditions for refueling is not met, REFUELING OPERATIONS or irradiated fuel movement in the Fuel Building shall cease and irradiated fuel shall be placed in a safe position, work shall be initiated to correct the conditions so that the specified limit is met, and no operations which increase the reactivity of the core shall be made.
- D. After initial fuel loading and after each core refueling operation and prior to reactor operation at greater than 75% of rated power, the movable incore detector system shall be utilized to verify proper power distribution.
- E. The requirements of 3.0.1 are not applicable.

Basis

Detailed instructions, the above specified precautions, and the design of the fuel handling equipment, which incorporates built-in interlocks and safety features, provide assurance that an accident, which would result in a hazard to public health and safety, will not occur during unit REFUELING OPERATIONS or irradiated fuel movement in the Fuel Building. When no change is being made in core geometry, one neutron detector is sufficient to monitor the core and permits maintenance of the out-of-function instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition.

Potential escape paths for fission product radioactivity within containment are required to be closed or capable of closure to prevent the release to the environment. However, since there is no potential for significant containment pressurization during refueling, the Appendix J leakage criteria and tests are not applicable.

The containment equipment access hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of the containment. During REFUELING OPERATIONS, the equipment hatch must be capable of being closed.

The containment airlocks, which are also part of the containment pressure boundary, provide a means for personnel access during periods when CONTAINMENT INTEGRITY is required. Each airlock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening. During periods of unit shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors to remain open for extended periods when frequent containment entry is necessary. During REFUELING OPERATIONS, containment closure does not have to be maintained, but airlock doors may need to be closed to establish containment closure. Therefore, the door interlock mechanism may remain disabled, but one airlock door must be capable of being closed.

Containment penetrations that terminate in the Auxiliary Building or Safeguards and provide direct access from containment atmosphere to outside atmosphere must be isolated or capable of being closed by at least one barrier during REFUELING OPERATIONS. The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated by at least one barrier during REFUELING OPERATIONS. Isolation may be achieved by an OPERABLE isolation valve, a closed valve, a blind flange, or by an equivalent isolation method. Equivalent isolation methods must be evaluated and may include use of a material that can provide a temporary, atmospheric pressure ventilation barrier.

For the personnel airlock, equipment access hatch, and other penetrations, 'capable of being closed' means the openings are able to be closed; they do not have to be sealed or meet the leakage criteria of TS 4.4. Station procedures exist that ensure in the event of a fuel handling accident, that the open personnel airlock and other penetrations can and will be closed. Closure of the equipment hatch will be accomplished in accordance with station procedures and as allowed by dose rates in containment. The radiological analysis of the fuel handling accident does not take credit for closure of the personnel airlock, equipment access hatch or other penetrations.

The fuel building ventilation exhaust and containment ventilation purge exhaust may be diverted through charcoal filters whenever refueling is in progress. However, there is no requirement for filtration since the Fuel Handling Accident analysis takes no credit for these filters. At least one flow path is required for cooling and mixing the coolant contained in the reactor vessel so as to maintain a uniform boron concentration and to remove residual heat.

The requirements in this specification for the Main Control Room/Emergency Switchgear Room (MCR/ESGR) Emergency Ventilation System (EVS), Main Control Room (MCR) Bottled Air System, and the MCR and ESGR Air Conditioning System (chillers and air handling units) apply to the shutdown unit. If any of the specified limiting conditions is not met, the requirements appropriately suspend activities that could result in a release of radioactivity that might require isolation of the MCR/ESGR envelope and place irradiated fuel in a safe position without delay and in a controlled manner. The requirements applicable to the operating unit are contained in Specifications 3.19, 3.21, and 3.23.

During REFUELING OPERATIONS and during the movement of irradiated fuel assemblies, the MCR/ESGR EVS and the MCR Bottled Air System must be operable to ensure that the MCR/ESGR envelope will remain habitable during and following a Design Basis Accident.

Specifically, during REFUELING OPERATIONS and during movement of irradiated fuel assemblies, the MCR/ESGR EVS and the MCR Bottled Air System must be OPERABLE to respond to the release from a fuel handling accident.

#### 3.10.A.7 and 8

During refueling, the reactor refueling water cavity is filled with approximately 220,000 gal of water borated to at least 2,300 ppm boron. The boron concentration of this water, established by Specification 3.10.A.7, is sufficient to maintain the reactor subcritical by at least 5%  $\Delta k/k$  in the COLD SHUTDOWN condition with all control rod assemblies inserted. This includes a 1%  $\Delta k/k$  and a 50 ppm boron concentration allowance for uncertainty. This concentration is also sufficient to maintain the core subcritical with no control rod assemblies inserted into the reactor. Checks are performed during the reload design and safety analysis process to ensure the K-effective is equal to or less than 0.95 for each core. Periodic checks of refueling water boron concentration assure the proper shutdown margin. Specification 3.10.A.8 allows the Control Room Operator to inform the manipulator operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

3.10.A.11 and 12 and 3.10.B.4 and 5

When one MCR/ESGR EVS or MCR Bottled Air System train is inoperable, for reasons other than an inoperable MCR/ESGR envelope boundary, action must be taken to restore OPERABLE status within 7 days. In this condition, the remaining required OPERABLE MCR/ESGR EVS or MCR Bottled Air System train is adequate to perform the MCR/ESGR envelope occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE MCR/ESGR EVS or MCR Bottled Air System train could result in loss of MCR/ESGR EVS or MCR Bottled Air System function. The 7 day Allowed Outage Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

During REFUELING OPERATIONS or during movement of irradiated fuel assemblies, if the required inoperable MCR/ESGR EVS or MCR Bottled Air System train cannot be restored to OPERABLE status within the required Allowed Outage Time, or two required MCR/ESGR EVS or MCR Bottled Air System trains are inoperable or with one or more required MCR/ESGR EVS or MCR Bottled Air System trains inoperable due to an inoperable MCR/ESGR envelope boundary, action must be taken to suspend activities that could result in a release of radioactivity that might require isolation of the MCR/ESGR envelope. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

In addition to the above safeguards, interlocks are used during refueling to assure safe handling of the fuel assemblies. An excess weight interlock is provided on the lifting hoist to prevent movement of more than one fuel assembly at a time. The spent fuel transfer mechanism can accommodate only one fuel assembly at a time.

Upon each completion of core loading and installation of the reactor vessel head, specific mechanical and electrical tests will be performed prior to initial criticality.

The fuel handling accident has been analyzed based on the methodology outlined in Regulatory Guide 1.183. The analysis assumes 100% release of the gap activity from the assembly with maximum gap activity after a 100-hour decay period following operation at 2605 MWt.

Detailed procedures and checks insure that fuel assemblies are loaded in the proper locations in the core. As an additional check, the movable incore detector system will be used to verify proper power distribution. This system is capable of revealing any assembly enrichment error or loading error which could cause power shapes to be peaked in excess of design value.

References

UFSAR Section 5.2	Containment Isolation
UFSAR Section 6.3	Consequence Limiting Safeguards
UFSAR Section 9.12	Fuel Handling System
UFSAR Section 9.13	Auxiliary Ventilation Systems
UFSAR Section 11.3	Radiation Protection
UFSAR Section 13.3	Table 13.3-1
UFSAR Section 14.4.1	Fuel Handling Accidents
FSAR Supplement:	Volume I: Question 3.2

ratings for accident conditions, require approximately 2,320 kw. Each unit has two emergency buses, one bus in each unit is connected to its exclusive diesel generator. The second bus in each unit will be connected to the backup diesel generator as required. Each diesel generator has 100 percent capacity and is connected to independent 4,160 v emergency buses. These emergency buses are normally fed from the reserve station service transformers. The normal station service transformers are fed from the unit isolated phase bus at a point between the generator terminals and the low voltage terminal of the main step-up transformer. The reserve station service transformers are fed from the system reserve transformers in the high voltage switchyard. The circuits which supply power through the system reserve transformers are called "primary source." Each system reserve transformer is capable of providing power to an emergency bus on each unit. Verification of primary source operability is performed by confirming that the reserve station service transformers are energized.

In addition to the "primary sources," each unit has an additional off-site power source which is called the "dependable alternate source." This source can be made available in eight (8) hours by removing a unit from service, disconnecting its generator from the isolated phase bus, and feeding offsite power through the main step-up transformer and normal station service transformers to the emergency buses.

The generator can be disconnected from the isolated phase bus within eight (8) hours. A unit can be maintained in a safe condition for eight (8) hours with no off-site power without damaging reactor fuel or the reactor coolant pressure boundary.

Verification of the dependable alternate source operability is accomplished by verifying that the required circuits, transformers, and circuit breakers are available.

4. If the requirements of Specification 3.19.B.1 or 3.19.B.2 are not met within 48 hours after achieving HOT SHUTDOWN, both units shall be placed in COLD SHUTDOWN within the next 30 hours.
5. If the requirements of Specification 3.19.B.3 are not met, both units shall be placed in at least HOT SHUTDOWN within 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### Basis

The Main Control Room/Emergency Switchgear Room (MCR/ESGR) Emergency Habitability System (EHS) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The MCR/ESGR EHS consists of the Main Control Room (MCR) Bottled Air System and the MCR/ESGR Emergency Ventilation System (EVS) (TS 3.21).

Following a Design Basis Accident (DBA), the containment will be depressurized to 0.5 psig (Unit 1), 1.0 psig (Unit 2) in less than 1 hour and to subatmospheric pressure within 4 hours. The radiological consequences analysis demonstrates acceptable results provided the containment pressure does not exceed 0.5 psig (Unit 1) and 1.0 psig (Unit 2) for the interval from 1 to 4 hours following the DBA. Beyond 4 hours, containment pressure is assumed to be less than 0.0 psig, terminating leakage from containment. The MCR/ESGR envelope is maintained at a positive differential pressure using bottled air during the first hour, when the containment leakrate is greatest.

The MCR/ESGR envelope is the area within the confines of the MCR/ESGR envelope boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the common Main Control Room and the Emergency Switchgear Rooms, and may encompass other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The MCR/ESGR envelope is protected during normal operation, natural events, and accident conditions. The MCR/ESGR envelope boundary is the combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the MCR/ESGR envelope. The OPERABILITY of the MCR/ESGR envelope boundary must be maintained to ensure that the inleakage of unfiltered air into the MCR/ESGR envelope will not exceed the inleakage assumed in the licensing basis analysis of DBA consequences to MCR/ESGR envelope occupants. The MCR/ESGR envelope and its boundary are defined in the MCR/ESGR Envelope Habitability Program (TS 6.4.R).

Upon receipt of the actuating signal(s), normal air supply to and exhaust from the MCR/ESGR envelope is isolated, and airflow from the MCR Bottled Air System maintains a positive pressure in the MCR/ESGR envelope. Two dampers in series in both the MCR/ESGR envelope supply and exhaust ducts close to isolate the MCR/ESGR envelope. Approximately 60 minutes after the actuation of the MCR Bottled Air System, the MCR/ESGR EVS is manually actuated. Each MCR/ESGR EVS train provides filtered air from the Turbine Building to the MCR/ESGR envelope through HEPA filters and charcoal adsorbers. Prefilters remove any large particles in the air to prevent excessive loading of the HEPA filters and charcoal adsorbers.

Pressurization of the MCR/ESGR envelope limits infiltration of unfiltered air from the surrounding areas adjacent to the MCR/ESGR envelope.

A single train of the MCR Bottled Air System will pressurize the MCR/ESGR envelope to  $\geq 0.05$  inches water gauge for at least 60 minutes. The MCR/ESGR EHS operation in maintaining the MCR/ESGR envelope habitable is discussed in the UFSAR, Section 9.13 (Ref. 3).

The MCR/ESGR EHS is designed to maintain a habitable environment in the MCR/ESGR envelope for 30 days of continuous occupancy after a DBA without exceeding a 5 rem total effective dose equivalent (TEDE).

The MCR/ESGR envelope boundary may be opened intermittently under administrative control. This provision only applies to openings in the MCR/ESGR envelope boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. 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 MCR/ESGR envelope. This individual will have a method to rapidly close the opening and to restore the MCR/ESGR envelope boundary to a condition equivalent to the design condition when a need for MCR/ESGR envelope isolation is indicated.

#### TS 3.19.B.3 and 5

If the unfiltered inleakage of potentially contaminated air past the MCR/ESGR envelope boundary and into the MCR/ESGR envelope can result in MCR/ESGR envelope 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 MCR/ESGR envelope occupants from hazardous chemicals or smoke, the MCR/ESGR envelope boundary is inoperable. Actions must be taken to restore an OPERABLE MCR/ESGR envelope boundary within 90 days.

During the period that the MCR/ESGR envelope boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on MCR/ESGR envelope 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 MCR/ESGR envelope occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that MCR/ESGR envelope occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable MCR/ESGR envelope boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Allowed Outage Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. The 90 day Allowed Outage Time is reasonable based on the determination that the mitigating actions will ensure protection of MCR/ESGR envelope occupants within analyzed limits while limiting the probability that MCR/ESGR envelope 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 Allowed Outage Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the MCR/ESGR envelope boundary.

#### REFERENCES

1. UFSAR, Section 2.1, Geography, Demography And Potential External Hazards
2. UFSAR, Section 9.10, Fire Protection
3. UFSAR, Section 9.13, Auxiliary Ventilation Systems
4. UFSAR, Chapter 14, Safety Analysis
5. Letters from B. R. Sylvia (VEPCO) to Harold R. Denton (NRC) dated January 19 and June 30, 1981, Response to Item III.D.3.4, Control Room Habitability Requirements of NUREG-0737 for Surry Power Station.
6. Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors"
7. NEI 99-03, "Control Room Habitability Assessment," June 2001
8. 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)

## BASES

BACKGROUND - The MCR/ESGR Emergency Habitability System (EHS) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The MCR/ESGR EHS consists of the Main Control Room Bottled Air System (TS 3.19) and the MCR/ESGR EVS.

The MCR/ESGR EVS consists of four full capacity trains that supply filtered air to the MCR/ESGR envelope and a MCR/ESGR envelope boundary that limits the inleakage of unfiltered air. Each MCR/ESGR EVS train consists of a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves, dampers, doors, barriers, and instrumentation also form part of the system. One EVS train is capable of performing the safety function of providing outside filtered air for pressurization. Two independently powered EVS trains are required for independence and redundancy.

The MCR/ESGR envelope is the area within the confines of the MCR/ESGR envelope boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the common Main Control Room and the Emergency Switchgear Rooms, and may encompass other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The MCR/ESGR envelope is protected during normal operation, natural events, and accident conditions. The MCR/ESGR envelope boundary is the combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the MCR/ESGR envelope. The OPERABILITY of the MCR/ESGR envelope boundary must be maintained to ensure that the inleakage of unfiltered air into the MCR/ESGR envelope will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to MCR/ESGR envelope occupants. The MCR/ESGR envelope and its boundary are defined in the MCR/ESGR Envelope Habitability Program (TS 6.4.R).

Upon receipt of the actuating signal(s), normal air supply to and exhaust from the MCR/ESGR envelope is isolated, and airflow from the MCR Bottled Air System maintains a positive pressure in the MCR/ESGR envelope. Two dampers in series in both the MCR/ESGR envelope supply and exhaust ducts close to isolate the MCR/ESGR envelope. Approximately 60 minutes after the isolation of the MCR/ESGR envelope and actuation of the MCR Bottled Air System, the MCR/ESGR EVS is manually actuated. Each MCR/ESGR EVS train provides filtered air from the Turbine Building to the MCR/ESGR envelope through HEPA filters and charcoal adsorbers. Prefilters remove any large particles in the air to prevent excessive loading of the HEPA filters and charcoal adsorbers.

Pressurization of the MCR/ESGR envelope limits infiltration of unfiltered air from the surrounding areas adjacent to the MCR/ESGR envelope.

A single train of the MCR/ESGR EVS will pressurize the MCR/ESGR envelope to about 0.05 inches water gauge relative to external areas adjacent to the MCR/ESGR envelope boundary. The MCR/ESGR EHS operation in maintaining the MCR/ESGR envelope habitable is discussed in the UFSAR, Section 9.13 (Ref. 3).

Redundant MCR/ESGR EVS supply trains provide the required pressurization and filtration should one train fail to start or should an excessive pressure drop develop across the operating filter train. Isolation dampers are arranged in series pairs so that the failure of one damper to shut will not result in a breach of isolation. The MCR/ESGR EVS is designed in accordance with Seismic Category I requirements.

The MCR/ESGR EHS is designed to maintain a habitable environment in the MCR/ESGR envelope for 30 days of continuous occupancy after a Design Basis Accident (DBA) without exceeding a 5 rem total effective dose equivalent (TEDE).

APPLICABLE SAFETY ANALYSES - The MCR/ESGR EVS components are arranged in redundant, safety related ventilation trains. The MCR/ESGR EHS provides airborne radiological protection for the MCR/ESGR envelope occupants, as demonstrated by the MCR/ESGR envelope occupant dose analyses for the most limiting design basis accident fission product release presented in the UFSAR, Chapter 14 (Ref. 4).

The MCR/ESGR EHS provides protection from smoke and hazardous chemicals to the MCR/ESGR envelope occupants. An evaluation of hazardous chemical releases demonstrates that the toxicity limits for chemicals are not exceeded in the MCR/ESGR envelope following a hazardous chemical release (Refs. 1 and 5) or that ample time is available for MCR/ESGR envelope occupants to isolate the MCR/ESGR envelope. The evaluation of a smoke challenge demonstrates that it will not result in the inability of the MCR/ESGR envelope occupants to control the reactor either from the MCR or from the remote shutdown panel (Ref. 2).

The worst case single active failure of a component of the MCR/ESGR EVS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The MCR/ESGR EVS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LIMITING CONDITIONS FOR OPERATION (LCO) - Two independent and redundant MCR/ESGR EVS trains are required to be OPERABLE to ensure that at least one is available to pressurize and to provide filtered air to the MCR/ESGR envelope assuming a single active failure disables one of the two required trains. Due to electrical power considerations, one train must be from the other unit. Total system failure, such as from a loss of both ventilation trains or from an inoperable MCR/ESGR envelope boundary, could result in exceeding a dose of 5 rem TEDE to the MCR/ESGR envelope occupants in the event of a large radioactive release.

Each MCR/ESGR EVS train is considered OPERABLE when the individual components necessary to limit MCR/ESGR envelope occupant exposure are OPERABLE in the two required trains of the MCR/ESGR EVS, one train of which is from the other unit. A MCR/ESGR EVS train is OPERABLE when the associated:

- a. Fan is OPERABLE;
- b. HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Ductwork, valves, and dampers are OPERABLE, and air flow can be maintained.

In order for the MCR/ESGR EVS trains to be considered OPERABLE, the MCR/ESGR envelope boundary must be maintained such that the MCR/ESGR envelope occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analyses for DBAs, and that MCR/ESGR envelope occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the MCR/ESGR envelope boundary to be opened intermittently under administrative controls. This Note only applies to openings in the MCR/ESGR envelope boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. 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 MCR/ESGR envelope. This individual will have a method to rapidly close the opening and to restore the MCR/ESGR envelope boundary to a condition equivalent to the design condition when a need for MCR/ESGR envelope isolation is indicated.

APPLICABILITY - In REACTOR OPERATION conditions above COLD SHUTDOWN, the MCR/ESGR EVS must be OPERABLE to ensure that the MCR/ESGR envelope will remain habitable during and following a DBA.

#### ACTIONS

##### 3.21.B

When one required MCR/ESGR EVS train is inoperable, for reasons other than an inoperable MCR/ESGR envelope boundary, action must be taken to restore OPERABLE status within 7 days. In this condition, the remaining required OPERABLE MCR/ESGR EVS train is adequate to perform the MCR/ESGR envelope occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE MCR/ESGR EVS train could result in loss of MCR/ESGR EVS function. The 7 day Allowed Outage Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

### 3.21.C

If the unfiltered inleakage of potentially contaminated air past the MCR/ESGR envelope boundary and into the MCR/ESGR envelope can result in MCR/ESGR envelope 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 MCR/ESGR envelope occupants from hazardous chemicals or smoke, the MCR/ESGR envelope boundary is inoperable. Actions must be taken to restore an OPERABLE MCR/ESGR envelope boundary within 90 days.

During the period that the MCR/ESGR envelope boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on MCR/ESGR envelope 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 MCR/ESGR envelope occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that MCR/ESGR envelope occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable MCR/ESGR envelope boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Allowed Outage Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. The 90 day Allowed Outage Time is reasonable based on the determination that the mitigating actions will ensure protection of MCR/ESGR envelope occupants within analyzed limits while limiting the probability that MCR/ESGR envelope 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 Allowed Outage Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the MCR/ESGR envelope boundary.

### 3.21.D

In REACTOR OPERATION conditions above COLD SHUTDOWN, if the inoperable MCR/ESGR EVS train or the MCR/ESGR envelope boundary cannot be restored to OPERABLE status within the Allowed Outage Time, the unit must be placed in a REACTOR OPERATION condition that minimizes accident risk. To achieve this status, the unit must be placed in at least HOT SHUTDOWN within 6 hours and in COLD SHUTDOWN within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

### 3.21.E

If both MCR/ESGR EVS trains are inoperable in REACTOR OPERATION conditions above COLD SHUTDOWN for reasons other than an inoperable MCR/ESGR envelope boundary (i.e., TS 3.21.C), the MCR/ESGR EVS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, the unit must be placed in at least HOT SHUTDOWN within 6 hours and in COLD SHUTDOWN within the following 30 hours.

### REFERENCES

1. UFSAR, Section 2.1, Geography, Demography and Potential External Hazards
2. UFSAR, Section 9.10, Fire Protection
3. UFSAR, Section 9.13, Auxiliary Ventilation Systems
4. UFSAR, Chapter 14, Safety Analysis
5. Letters from B. R. Sylvia (VEPCO) to Harold R. Denton (NRC) dated January 19 and June 30, 1981, Response to Item III.D.3.4, Control Room Habitability Requirements of NUREG-0737 for Surry Power Station
6. Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors"
7. NEI 99-03, "Control Room Habitability Assessment," June 2001
8. 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)

## Basis

The MCR and ESGR Air Conditioning System (ACS) cools the MCR/ESGR envelope. From an ACS perspective, the envelope consists of four zones: 1) the Unit 1 side of the control room (including the Unit 1 air conditioning equipment and computer rooms), 2) the Unit 2 side of the control room (including the annex area, the Unit 2 air conditioning equipment and computer rooms), 3) the Unit 1 ESGR and relay room (referred to as the Unit 1 ESGR), and 4) the Unit 2 ESGR and relay room (including MER-3), referred to as the Unit 2 ESGR. The design basis of the MCR and ESGR ACS is to maintain the MCR/ESGR envelope temperature within the equipment design limits for 30 days of continuous occupancy after a design basis accident (DBA). The ACS includes five chillers (1-VS-E-4A, 4B, 4C, 4D, and 4E). Chillers 4A, 4B, and 4C are located in MER-3, in the Unit 2 ESGR. Chillers 4D and 4E are located in MER-5, in the Unit 2 Turbine Building. The chillers supply chilled water to eight air handling units (AHUs), arranged in two independent and redundant chilled water loops. Each chilled water loop provides redundant 100% heat removal capacity per unit. Each loop contains four AHUs (one AHU in each unit's air conditioning zones), the necessary power supplies, the associated valves, piping (from the supply header to return header), instrumentation, and controls. Each AHU has 100% capacity for cooling its zone.

The combination of five chillers and two chilled water loops affords considerable flexibility in meeting the cooling requirements. Two chillers are powered from single emergency buses (1-VS-E-4C from 2H, 1-VS-E-4E from 1H). The remaining three chillers can be powered from either of two emergency buses (1-VS-E-4A from 1J or 2J, 1-VS-E-4B from 1J or 2H, and 1-VS-E-4D from 1H or 2J). The AHUs are powered from the four emergency buses in pairs. For example, the Unit 1 MCR and ESGR AHUs 1-VS-AC-1 and 1-VS-AC-7 are powered from the 1H bus; the redundant Unit 1 MCR and ESGR AHUs 1-VS-AC-2 and 1-VS-AC-6 are powered from the 1J bus. Control of the ACS is by manual action.

The chillers are procedurally aligned by power supply to meet TS 3.23.A.1.b, and the AHU pairs are normally aligned to match the power supplies of the OPERABLE chillers. For example, chiller 1-VS-E-4E and AHUs 1-VS-AC-1 and 1-VS-AC-7 are powered from the 1H emergency bus. However, due to the number of emergency diesel generators (EDGs) and the chiller/AHU piping layout, only one chiller and AHU pair can be powered from each emergency bus at a time. Also, if chilled water is needed in both chilled water loops, two chillers must be operated. Only one chiller can be operated on each chilled water loop at a time, and the 4D and 4E chillers cannot be operated simultaneously. The combinations of OPERABLE chillers/AHUs allowed by procedure ensure that sufficient cooling capacity is available during a DBA with a coincident loss of offsite power (LOOP) and single failure of an EDG, a chiller, or an AHU.

The exterior surface of the MCR and ESGR ACS chilled water piping located in the ESGR, the MCR, and MER-3 is exhibiting general corrosion. For the purpose of replacing the MCR and ESGR ACS chilled water piping, temporary 45-day and 14-day allowed outage times (AOTs) are provided, as discussed in the footnote to Technical Specifications 3.23.C.2.a.1 and 3.23.C.2.b.1. The basis for and the risk evaluation of the temporary AOTs, as well as equipment unavailability restrictions and compensatory actions, are provided in the licensee's submittal dated February 26, 2007 (Serial No. 07-0109). Four entries into the temporary AOTs are permitted in a 24-month time span. The 24-month time frame begins upon entry into the first temporary AOT. The four entries accommodate replacement of 1) the chilled water loop C piping in the ESGR and the MCR (45-day AOT), 2) the chilled water loop A piping in the ESGR and the MCR (45-day AOT), 3) the chilled water piping in MER-3 associated with chiller 1-VS-E-4A (14-day AOT), and 4) the chilled water piping in MER-3 associated with chiller 1-VS-E-4C (14-day AOT). Each AOT extension shall be limited to a one-time use which ends when the affected MCR and ESGR ACS components are returned to OPERABLE status. Concurrent use of more than one allowed outage time extension is not permitted. Upon completion of the work associated with the fourth temporary AOT, the footnote is no longer applicable.

The recirculation spray pumps outside the containment have the capability of being dry-run and flow tested. The test of an outside recirculation spray pump is performed by closing the containment sump suction line valve and the isolation valve between the pump discharge and the containment penetration. This allows the pump casing to be filled with water and the pump to recirculate water through a test line from the pump discharge to the pump casing.

With a system flush conducted to remove particulate matter prior to the installation of spray nozzles and with corrosion resistant nozzles and piping, it is not considered credible that a significant number of nozzles would plug during the life of the unit to reduce the effectiveness of the subsystems. Therefore, an inspection or air or smoke test of the nozzles following maintenance which could cause nozzle blockage is sufficient to indicate that plugging of the nozzles has not occurred.

The spray nozzles in the refueling water storage tank provide means to ensure that there is no particulate matter in the refueling water storage tank and the containment spray subsystems which could plug or cause deterioration of the spray nozzles. The nozzles in the tank are identical to those used on the containment spray headers. The flow test of the containment spray pumps and recirculation to the refueling water storage will indicate any plugging of the nozzles by a reduction of flow through the nozzles.

Periodic inspections of containment sump components ensure that the components are unrestricted and stay in proper operating condition. The 18 month frequency is based on the need to perform this surveillance under the conditions that apply during a unit outage and on the need to have access to the location. This frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

#### References

FSAR Section 6.3.1, Containment Spray Pumps

FSAR Section 6.3.1, Recirculation Spray Pumps

The system tests demonstrate proper automatic operation of the Safety Injection System. A test signal is applied to initiate automatic operation action and verification is made that the components receive the safety injection signal in the proper sequence. The test may be performed with the pumps blocked from starting. The test demonstrates the operation of the valves, pump circuit breakers, and automatic circuitry.

During reactor operation, the instrumentation which is depended on to initiate safety injection is checked periodically, and the initiating circuits are tested in accordance with Specification 4.1. In addition, the active components (pumps and valves) are to be periodically tested to check the operation of the starting circuits and to verify that the pumps are in satisfactory running order. The test interval is determined in accordance with the Inservice Testing Program. The accumulators are a passive safeguard.

Periodic inspections of containment sump components ensure that the components are unrestricted and stay in proper operating condition. The 18 month frequency is based on the need to perform this surveillance under the conditions that apply during a unit outage and on the need to have access to the location. This frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

#### References

UFSAR Section 6.2, Safety Injection System

4.18 MAIN CONTROL ROOM/EMERGENCY SWITCHGEAR ROOM (MCR/ESGR)  
EMERGENCY VENTILATION SYSTEM (EVS) TESTING

- A. Operate each MCR/ESGR EVS train for  $\geq 15$  minutes once every 31 days.
- B. Perform required Control Room Air Filtration System Testing in accordance with TS 4.20.
- C. Perform required MCR/ESGR envelope unfiltered air inleakage testing in accordance with the MCR/ESGR Envelope Habitability Program.

BASES

SURVEILLANCE REQUIREMENTS (SR)

SR 4.18.A

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 each train once every month provides an adequate check of this system. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system. The 31 day frequency is based on the reliability of the equipment and the two train redundancy. Operation of the MCR/ESGR EVS trains shall be initiated manually from the MCR.

SR 4.18.B

This SR verifies that the required Control Room Air Filtration System testing is performed in accordance with Specification 4.20. Specification 4.20 includes testing the performance of the HEPA filter, charcoal adsorber efficiency, minimum flow rate, and the physical properties of the activated charcoal. Specific test frequencies and additional information are discussed in detail in TS 4.20.

SR 4.18.C

This SR verifies the OPERABILITY of the MCR/ESGR envelope boundary by testing for unfiltered air inleakage past the MCR/ESGR envelope boundary and into the MCR/ESGR envelope. The details of the testing are specified in the MCR/ESGR Envelope Habitability Program (TS 6.4.R).

The MCR/ESGR envelope is considered habitable when the radiological dose to MCR/ESGR envelope occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE, and the MCR/ESGR envelope occupants are protected from hazardous chemicals and smoke. This SR verifies that the unfiltered air leakage into the MCR/ESGR envelope is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air leakage is greater than the assumed flow rate, Specification 3.21.C must be entered. Specification 3.21.C.3 allows time to restore the MCR/ESGR envelope boundary to OPERABLE status provided mitigating actions can ensure that the MCR/ESGR envelope 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. 1) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 2). These compensatory measures may also be used as mitigating actions as required by Specification 3.21.C.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 3). Options for restoring the MCR/ESGR envelope boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the MCR/ESGR envelope boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope leakage test may not be necessary to establish that the MCR/ESGR envelope boundary has been restored to OPERABLE status.

#### REFERENCES

1. Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors"
2. NEI 99-03, "Control Room Habitability Assessment," June 2001
3. 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)

4. Laboratory analysis on new charcoal adsorbent shall show the methyl iodide penetration less than or equal to 14 percent, when tested in accordance with ASTM D3803-1989 (with the exception of face velocity which is to be at 24.4 M/min), with the relative humidity equal to 95 percent, and the temperature equal to 30°C (86°F).
5. The pressure drop across filter cells and adsorbers shall not exceed 5.0 inches W.G. at design flow rate. If this condition cannot be met, new filter cells shall be installed.

#### Basis

Ventilation system filter components are not subject to rapid deterioration, having lifetimes of many years. The tests outlined above provide assurance of filter reliability and will ensure timely detection of conditions which could cause filter degradation.

A pressure drop across the combined HEPA filters and charcoal adsorbers of less than 5 inches of water will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter.