4.7 (cont'd)

b. At least once during each scheduled secondary containment leak rate test, whenever a filter is changed, whenever work is performed that could affect the filter system efficiency, and at intervals not to exceed six months between refueling outages, it shall be demonstrated that:

(1) The removal efficiency of the particulate filters is not less than 99 percent based on a DOP test per ANSI N101.1-1972 para. 4.1.

(2) The removal efficiency of each of the charcoal filters is not less than 99 percent based on a Freon test.

c. At least once per 24 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release, that could adversely affect the ability of the charcoal to perform its intended function, in any ventilation zone communicating with the system, verify:

(1) Within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyl iodide penetration to be less than or equal to 5 percent when tested in accordance with ASTM D3803-1989 at a temperature of 30 degrees C [86 degrees F], and a relative humidity of at least 70 percent.

(2) Within 31 days of completing 720 hours of charcoal adsorber operation, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows

3.7 (cont'd)

2. From and after the date that one circuit of the Standby Gas Treatment System is made or found to be inoperable for any reason, the following would apply:

   a. If in Start-up/Hot Standby, Run or Hot Shutdown mode, reactor operation or irradiated fuel handling is permissible only during the succeeding 7 days unless such circuit is sooner made operable, provided that during such 7 days all active components of the other Standby Gas Treatment Circuit shall be operable.

4.7 (cont'd)

the methyl iodide penetration to be less than or equal to 5 percent when tested in accordance with ASTM D3803-1989 at a temperature of 30 degrees C [86 degrees F], and a relative humidity of at least 70 percent.

d. Once per 24 months, automatic initiation of each branch of the Standby Gas Treatment System shall be demonstrated.

e. Once per 24 months, manual operability of the bypass valve for filter cooling shall be demonstrated.

f. Standby Gas Treatment System Instrumentation Calibration:

| | |
|---|---|
| differential pressure switches | Once per 24 Months |

2. When one circuit of the Standby Gas Treatment System becomes inoperable, the operable circuit shall be verified to be operable immediately and daily thereafter.

3.7 (cont'd)

b. If in Refuel or Cold Shutdown mode, reactor operation or irradiated fuel handling is permissible only during the succeeding 31 days unless such circuit is sooner made operable, provided that during such 31 days all active components of the other Standby Gas Treatment Circuit shall be operable.

3. If Specifications 3.7.B.1 and 3.7.B.2 are not met, the reactor shall be placed in the cold condition and irradiated fuel handling operations and operations that could reduce the shutdown margin shall be prohibited.

4. Whenever primary containment integrity is required as specified in Section 3.7.A.2. Valve 27MOV-121 shall be used for inerting or deinerting.

4.7 (cont'd)

3. Intentionally Blank

4. Valve 27MOV-120 shall be verified closed when containment integrity is established, and then once per month.

3.7 BASES (cont'd)

complete containment system, secondary containment is required at all times that primary containment is required as well as during refueling.

The Standby Gas Treatment System is designed to filter and exhaust the reactor building atmosphere to the main stack during secondary containment isolation conditions with a minimum release of radioactive materials from the reactor building to the environs. Both standby gas treatment fans are designed to automatically start upon containment isolation; however, only one fan is required to maintain the reactor building pressure at approximately a negative 1/4 in. water gage pressure; all leakage should be in-leakage. Each of the two fans has 100 percent capacity. If one Standby Gas Treatment System circuit is inoperable, the other circuit must be verified operable daily. This substantiates the availability of the operable circuit and results in no added risk; thus, reactor operation or refueling operation can continue. If neither circuit is operable, the Plant is brought to a condition where the system is not required.

While only a small amount of particulates is released from the Pressure Suppression Chamber System as a result of the loss-of-coolant accident, high-efficiency particulate filters are specified to minimize potential particulate release to the environment and to prevent clogging of the iodine filter. The high-efficiency filters have an efficiency greater than 99 percent for particulate matter larger than 0.3 micron. Filter banks will be replaced whenever significant changes in filter efficiency occur. Tests (11) of impregnated charcoal identical to that used in the filters indicated that shelf life up to 5 yr. leads to only minor decreases in methyl iodine removal efficiency.

The analysis of the design basis loss-of-coolant accident assumed a charcoal efficiency of 90% for the SBGT system and source term provided by GE based on NEDO-10871. The assumed 90% efficiency is sufficient to prevent exceeding 10 CFR 100 guidelines for the accident analyzed. A heater maintains relative humidity below 70% in order to assure the efficient removal of methyl iodine on the impregnated charcoal filters. The particulate filters are tested to acceptance criteria of 99% efficiency. Surveillance tests of the activated charcoal are based on NRC Generic Letter (GL) 99-02 guidelines. This GL requires testing in accordance with ASTM D3803-1989. Because this standard is more accurate and demanding than older tests, utilizing a safety factor as low as two for determining the acceptance criteria for charcoal efficiency is acceptable. This safety factor ensures that the charcoal filter efficiency assumed in the accident analysis is still valid at the end of the operating cycle. Based on the analysis of the design basis loss-of-coolant accident, which assumes a charcoal efficiency of 90% for the SBGT system, and a safety factor of two, the acceptance criteria for charcoal filter efficiency is 95% (5% allowable penetration). These values are detrmined using the following formula:

$$P_{TEST} = (100 - E_a) / F_s$$

Where:

$P_{TEST}$ = Maximum allowable penetration by test
$E_a$ = Charcoal filter efficiency used in accident analysis
$F_s$ = Safety factor

3.7 BASES (cont'd)

The operability of the Standby Gas Treatment System (SGTS) must be assured if a design basis loss of coolant accident (LOCA) occurs while the containment is being purged or vented through the SGTS. Flow from containment to the SGTS is via 6 inch Valve Number 27MOV-121. Since the maximum flow through the 6 inch line following a design basis LOCA is within the design capabilities of the SGTS, use of the 6 inch line assures the operability of the SGTS.

D. Primary Containment Isolation Valves

Double isolation valves are provided on lines penetrating the primary containment and open to the free space of the containment. Closure of one of the valves in each line would be sufficient to maintain the integrity of the Pressure Suppression System. Automatic initiation is required to minimize the potential leakage paths from the containment in the event of a loss-of-coolant accident.

The containment isolation valves on the containment vent and purge lines may be open for safety related reasons. Safety related reasons include, but are not limited to, the following: inerting or de-inerting primary containment; maintaining containment oxygen concentration; maintaining drywell and suppression pool atmospheric pressures; and maintaining the differential pressure between the drywell and suppression pool. These valves have been modified to limit the maximum angle of opening as shown in 3.7.D.1.

Nine remote manual isolation valves have been added to the Reactor Building Closed Loop Cooling Water System (RBCLCWS) in order to comply with 10 CFR 50 Appendix A GDC 57; These valves are air operated (with solenoid pilot valves), normally open, and are designed to fail "open"on loss of electrical power or "as is" upon loss of instrument air. Each AOV is provided with a Seismic Class I accumulator tank to allow operation of the valves upon loss of instrument air up to 2 full valve cycles. The fail-open design permits continued operation of the system to supply water to the recirculation pump-motor coolers and drywell coolers during normal operation and as necessary under accident conditions. If there is a postulated accident, and indications of leakage from RBCLCWS appear, the operator will selectively close the AOV's affected to provide containment isolation.

A list of containment isolation valves, including a brief description of each valve is included in Section 7.3 of the updated FSAR.

## 4.7 BASES

### A. Primary Containment

The water in the suppression chamber is used only for cooling in the event of an accident; i.e., it is not used for normal operation; therefore, a daily check of the temperature and volume is adequate to assure that adequate heat removal capability is present.

The primary containment preoperational test pressures are based upon the calculated primary containment pressure response corresponding to the design basis loss-of-coolant accident. The peak drywell pressure would be about 45 psig which would rapidly reduce to 27 psig within 30 sec. following the pipe break. Following the pipe break, the suppression chamber pressure rises to 26 psig within 30 sec, equalizes with drywell pressure and thereafter rapidly decays with the drywell pressure decay (14).

The design pressure of the drywell and suppression chamber is 56 psig(15). The design basis accident leakage rate is 1.5 percent/day at a pressure of 45 psig. As pointed out above, the drywell and suppression chamber pressure following an accident would equalize fairly rapidly. Based on the primary containment pressure response and the fact that the drywell and suppression chamber function as a unit, the primary containment will be tested as a unit rather than the individual components separately.

Design basis accidents were evaluated as discussed in Section 14.6 of the FSAR and the power uprate safety evaluation, Reference 18. The whole body and thyroid doses in the control room, low population zone (LPZ) and site boundary meet the requirements of 10 CFR Parts 50 and 100. The technical support center (TSC), not designed to these licensing bases, was also analyzed. The whole body and thyroid dose acceptance criteria used for the main control room are met for the TSC when initial access to the TSC and occupancy of certain areas in the TSC is restricted by administrative control. The LOCA dose evaluations, References 19, 20, and 21 assumed: the primary containment leak rate (including MSIV leakage) was 1.5 volume percent per day; the source term releases were in accordance with Regulatory Guide 1.3 and were consistent with the Standard Review Plan; and the standby gas treatment system filter efficiency was 90% for halogens. Thyroid doses were calculated using the dose conversion factors in ICRP-30. These doses are also based on the

4.7 BASES (cont'd)

The test interval for filter efficiency was selected to minimize plugging of the filters. In addition, retention capacity in terms of milligrams of iodine per gram of charcoal will be demonstrated. This will be done by testing the charcoal every 24 months. Laboratory tests of the charcoal are typically required: (1) once every refueling outage, (2) when certain events occur that could adversely affect the ability of the charcoal to perform its intended function, and (3) following a defined period of ESF operation. Since shelf lives greater than 5 yr. have been demonstrated, the test interval is reasonable.

D. Primary Containment Isolation Valves

The large pipes comprising a portion of the Reactor Coolant System, whose failure could result in uncovering the reactor core, are supplied with automatic isolation valves (except those lines needed for Emergency Core Cooling Systems operation or containment cooling). Valve closure times are adequate to prevent loss of more coolant from the circumferential rupture of any of these lines outside the containment than from a steam line rupture. Therefore, isolation valve closure times are sufficient to prevent uncovering the core.

In order to assure that the doses that may result from a steam line break do not exceed the 10CFR100 guidelines, it is necessary that no fuel rod perforation resulting from the accident occur prior to closure of the main steam line isolation valves. Analyses indicate that fuel rod cladding perforations would be avoided for main steam valve closure times, including instrument delay, as long as 10.5 sec.

For Reactor Coolant System temperatures less than 212°F, the containment could not become pressurized due to a loss-of-coolant accident. The 212°F limit is based on preventing pressurization of the reactor building and rupture of the blowout panels.

The primary containment isolation valves are highly reliable, have low service requirement, and most are normally closed. Power operated primary containment isolation valves that can be cycled during normal plant operations are cycled periodically per the ASME Section XI Inservice Testing Program. Valves that can not be cycled during normal plant operations are tested once every 24 months. The initiating sensors and associated trip channels are periodically checked to demonstrate proper response. This combination of testing adequately verifies operability of power operated and automatically initiated primary containment isolation valves.

3.11 (cont'd)

ventilation air supply fan and/or filter may be out of service for 14 days.

2. The main control room air radiation monitor shall be operable whenever the control room emergency ventilation air supply fans and filter trains are required to be operable by 3.11.A.1 or filtration of the control room ventilation intake air must be initiated.

4.11 (cont'd)

b. Di-octylphtalate (DOP) test for particulate filter efficiency greater than 99% for particulate greater than 0.3 micron size.

c. Freon-112 test for charcoal filter bypass as a measure of filter efficiency of at least 99.5% for halogen removal.

2. At least once per 24 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release, that could adversely affect the ability of the charcoal to perform its intended function, in any ventilation zone communicating with the system, verify:

(1) Within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration to be less than or equal to 5 percent when tested in accordance with ASTM D3803-1989 at a temperature of 30 degrees C [86 degrees F], and a relative humidity of at least 95 percent.

(2) Within 31 days of completing 720 hours of charcoal adsorber operation, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration to be less than or equal to 5 percent when tested in accordance with ASTM D3803-1989 at a temperature of 30 degrees C [86 degrees F], and a relative humidity of at least 95 percent.

3.11 (cont'd)

3. The control room emergency ventilation system shall not be out of service for a period exceeding 3 days during normal reactor operation or refueling operations. In the event that the system is not returned to service within 3 days, the reactor shall be in cold shutdown within 24 hours and any handling of irradiated fuel, core alterations, and operations with a potential for draining the reactor vessel shall be suspended as soon as practicable

4. Not Used

B. DELETED

C. Battery Room Ventilation

Battery room ventilation shall be operable on a continuous basis whenever specification 3.9.E is required to be satisfied.

1. From and after the date that one of the battery room ventilation systems is made or found to be inoperable, its associated battery shall be considered to be inoperable for purposes of specification 3.9.E.

4.11 (cont'd)

3. Operability of the main control room air intake radiation monitor shall be tested once/3 months.

4. Temperature transmitters and differential pressure switches shall be calibrated once per 24 months.

5. Main control room emergency ventilation air supply system capacity shall be tested once every 18 months to assure that it is ±10% of the design value of 1000 cfm.

B. DELETED

C. Battery Room Ventilation

Battery room ventilation equipment shall be demonstrated operable once/week.

1. When it is determined that one battery room ventilation system is inoperable, the remaining ventilation system shall be verified operable and daily thereafter.

2. Temperature transmitters and differential pressure switches shall be calibrated once per 24 months.

3.11 & 4.11 BASES

A. Main Control Room Ventilation System

One main control room emergency ventilation air supply fan provides adequate ventilation flow under accident conditions. Should one emergency ventilation air supply fan and/or fresh air filter train be out of service during reactor operation, a repair time of 14 days is allowed because during that time, a redundant 100% capacity train is required to be operable.

The 3 month test interval for the main control room emergency ventilation air supply fan and dampers is sufficient since two redundant trains are provided and neither is normally in operation.

A pressure drop test across each filter and across the filter system is a measure of filter system condition. DOP injection measures particulate removal efficiency of the high efficiency particulate filters. A Freon-112 test of charcoal filters is essentially a leakage test. Charcoal filter testing is conducted based on the guidance in NRC Generic Letter 99-02, Regulatory Guide 1.52 (Revision 2) and ASTM D3803-1989. Because the CREVAS filter system is not equipped with a heater, they are tested at a relative humidity of at least 95 percent. The airflow face velocity specified in the test requirements is consistent with the system's design flow rate and ensures conservative test results. Minimum charcoal filter efficiency is based on accident analyses reviewed and approved by the NRC staff in a safety evaluation.

The purpose of the emergency ventilation air supply system capacity test is to assure that sufficient air is supplied to the main control room so that a slight positive pressure can be maintained, thereby minimizing in-leakage.

B. DELETED

C. Battery Room Ventilation

Engineering analyses indicate that the temperature rise and hydrogen buildup in the battery, and battery charger compartments without adequate ventilation is such that continuous operation of equipment in these compartments cannot be assured.

D. Emergency Service Water System

The ESWS has two 100 percent cooling capacity pumps, each powered from a separate standby power supply. The ESW system supplies lake water to cool equipment required to function following an accident. This equipment consists of: emergency diesel generators, electric bay unit coolers, cable tunnel/emergency switchgear room coolers, crescent area coolers, control room air handing units and relay room air handling units. Emergency service water is initially supplied to the control room chillers and chiller room air handling units unless ESW is manually realigned to supply the control room and relay room air handling units. ESW will also supply water to the control rod drive pump coolers which are not automatically isolated following an accident. The surveillance requirement compares pump performance with the pump curve to determine pump operability. It also specifies testing at a