3.7 LIMITING CONDITIONS FOR OPERATION

Treatment System and an alternate electrical power source, consisting of the associated Emergency Diesel Generator or Vernon tie, for each standby gas treatment circuit shall be operable at all times when secondary containment integrity is required.

2. a. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA and charcoal filter banks shall show ≥99% DOP removal and ≥99% halogenated hydrocarbon removal.

b. The results of laboratory carbon sample analysis shall show ≥97.5% radioactive methyl iodide removal (30°C, 70% RH). Laboratory analysis results shall be verified acceptable within 31 days following sample removal or the applicable train of the Standby Gas Treatment System shall be considered in-operable and the requirements of Specification 3.7.B.3 shall apply.

c. System fans shall be shown to operate within ±10% of design flow.

4.7 SURVEILLANCE REQUIREMENTS

2. a. The tests and sample analysis of Specification 3.7.B.2 shall be performed initially and at least once per operating cycle not to exceed 18 months, and following painting, fire or chemical release in any ventilation zone communicating with the system, while the system is operating, that could contaminate the HEPA filters or charcoal adsorbers.

b. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank.

c. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal filter bank.

In addition, the sample analysis of Specification 3.7.B.2.b and the halogenated hydrocarbon test shall be performed after every 720 hours of normal system operation.

d. Each circuit shall be operated with the heaters on at least 10 hours every month.

e. An ultrasonic leak test shall be performed on the gaskets sealing the housing panels downstream of the HEPA filters and adsorbers at least

BASES: 3.7 (Cont'd)

The Standby Gas Treatment System (SGTS) is designed to filter and exhaust the Reactor Building atmosphere to the stack during secondary containment isolation conditions, with a minimum release of radioactive materials from the Reactor Building to the environs. To insure that the standby gas treatment system will be effective in removing radioactive contaminates from the Reactor Building air, the system is tested periodically to meet the intent of ANSI N510-1975. Laboratory charcoal testing will be performed in accordance with ASTM D3803-1989, except, as allowed by GL 99-02, testing can be performed at 70% relative humidity for systems with humidity control. Both standby gas treatment fans are designed to automatically start upon containment isolation and to maintain the Reactor Building pressure to approximately a negative 0.15 inch water gauge pressure; all leakage should be in-leakage. Should the fan fail to start, the redundant alternate fan and filter system is designed to start automatically. Each of the two fans has 100% capacity. 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.

When the reactor is in cold shutdown or refueling the drywell may be open and the Reactor Building becomes the only containment system. During cold shutdown the probability and consequences of a DBA LOCA are substantially reduced due to the pressure and temperature limitations in this mode. However, for other situations under which significant radioactive release can be postulated, such as during operations with a potential for draining the reactor vessel, during core alterations, or during movement of irradiated fuel in the secondary containment, operability of standby gas treatment is required. An alternate electrical power source for the purposes of Specification 3.7.B.1.b shall consist of either an Emergency Diesel Generator (EDG) or the Vernon Hydro tie line. Maintaining availability of the Vernon Hydro tie line as an alternative to one of the EDGs in this condition provides assurance that standby gas treatment can, if required, be operated without placing undue constraints on EDG maintenance availability. Inoperability of both circuits of the SGTS or both EDGs during refueling operations requires suspension of activities that represent a potential for releasing radioactive material to the secondary containment, thus placing the plant in a condition that minimizes risk.

Use of the SGTS, without the fan and the 9 kW heater in operation, as a vent path during torus venting does not impact subsequent adsorber capability because of the very low flows and because humidity control is maintained by the standby 1 kW heaters, therefore operation in this manner does not accrue as operating time.

D. Primary Containment Isolation Valves

Double isolation valves are provided on lines that penetrate the primary containment and communicate directly with the reactor vessel and on lines that penetrate the primary containment and communicate with the primary containment free space. 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.

BASES: 4.7 (Cont'd)

The test frequencies are adequate to detect equipment deterioration prior to significant defects, but the tests are not frequent enough to load the filters, thus reducing their reserve capacity too quickly. That the testing frequency is adequate to detect deterioration was demonstrated by the tests which showed no loss of filter efficiency after 2 years of operation in the rugged shipboard environment on the NS Savannah (ORNL 3726). Pressure drop tests across filter sections are performed to detect gross plugging of the filter media. Considering the relatively short time that the fans may be run for test purposes, plugging is unlikely, and the test interval is reasonable. Such heater tests will be conducted once during each operating cycle. Considering the simplicity of the heating circuit, the test frequency is sufficient. Air distribution tests will be conducted once during each operating cycle.

The in-place testing of charcoal filters is performed using a halogenated hydrocarbon, which is injected into the system upstream of the charcoal filters. Measurements of the challenge gas concentration upstream and downstream of the charcoal filters is made. The ratio of the inlet and outlet concentrations gives an overall indication of the leak tightness of the system. Although this is basically a leak test, since the filters have charcoal of known efficiency and holding capacity for elemental iodine and/or methyl iodine, the test also gives an indication of the relative efficiency of the installed system.

High-efficiency particulate air filters are installed before and after the charcoal filter to minimize potential release of particulates to the environment and to prevent clogging of the iodine filters. An efficiency of 99% is adequate to retain particulates that may be released to the Reactor Building following an accident. This will be demonstrated by testing with DOP as testing medium.

The efficiencies of the particulate and charcoal filters are sufficient to prevent exceeding 10CFR100 limits for the accidents analyzed. The analysis of post-accident hydrogen purge assumed a charcoal filter efficiency of 95%. Hence requiring in-place test efficiencies of 99% for these filters and a laboratory methyl iodide test of 97.5% for the charcoal provides adequate margin.

The test interval for filter efficiency was selected to minimize plugging of the filters. In addition, testing for methyl iodide removal efficiency will be demonstrated. This will be done either by removal of a charcoal sample cartridge which contains charcoal equivalent to the bed thickness or removing one adsorber tray from the system and using the charcoal therein, after mixing, to obtain at least two samples equivalent to the bed thickness. Any HEPA filters found defective should be replaced with filters qualified according to Regulatory Position C.3.d of Regulatory Guide 1.52. If laboratory test results are unacceptable, all charcoal adsorbent in the system should be replaced with charcoal adsorbent qualified according to Regulatory Guide 1.52.