3.0 LIMITING CONDITIONS FOR OPERATION	4.0 SURVEILLANCE REQUIREMENTS
d. During reactor isolation conditions the reactor pressure vessel shall be depressurized to ≤ 200 psig at normal cooldown rates if the suppression pool temperature exceed 120°F.	d. Whenever there is indication of relief valve operation with a suppression pool temperature of ≥ 160°F and the primary coolant system pressure > 200 psig, an extended visual examination of the suppression chamber shall be conducted before resuming power operation.
e. The suppression pool water level shall be ≥ -4.0 and ≤ +3.0 inches. With suppression pool water level not within limits, restore water level to within limits within the succeeding 2 hours.	e. The suppression pool water level shall be checked once per day.
f. If the requirements of 3.7.A.1 cannot be met, the reactor shall be placed in a Cold Shutdown condition within 24 hours, and suspend all activities with the potential for draining the reactor vessel.	

3.0 LIMITING CONDITIONS FOR OPERATION	4.0 SURVEILLANCE REQUIREMENTS
3. Pressure Suppression Chamber - Reactor Building Vacuum Breakers	3. Pressure Suppression Chamber - Reactor Building Vacuum Breakers
a. Except as specified in 3.7.A.3.b below, two pressure suppression chamber-re. ctoı building vacuum breakers shall be operable at all times when the primary containment integrity is required. The set point of the differential pressure instrumentation which actuates the pressure suppression chamber-reactor building vacuum breakers shall be 0.5 psi.	a. The pressure suppression chamber-reactor building vacuum breakers and associated instrumentation including set point shall be checked for proper operation every three months.
b. From and after the date that one of the pressure suppression chamber reactor building vacuum breakers is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless such vacuum breaker is sooner made operable, provided that the repair procedure does not violate primary containment integrity.	
c. If requirements of 3.7.A.3 cannot be met, the reactor shall be placed in a Cold Shutdown condition within 24 hours.	

3.0 LIMITING CONDITIONS FOR OPERATION	4.0 SURVEILLANCE REQUIREMENTS

e. One position alarm circuit can be inoperable providing that the redundant position alarm circuit is operable. Both position alarm circuits may be inoperable for a period not to exceed seven days provided that all vacuum breakers are operable.

f. If requirements of 3.7.A.4 cannot be met, the reactor shall be placed in a Cold Shutdown condition within 24 hours.

5. Primary Containment Oxygen Concentration

a. The primary containment atmosphere shall be reduced to less than 4% oxygen by volume with nitrogen gas whenever the reactor is in the run mode, except as specified in 3.7.A.5.b.

b. Within the 24-hour period after Thermal Power is > 15% Rated Thermal Power following startup, to 24 hours prior to reducing Thermal Power to < 15% Rated Thermal Power prior to the next scheduled reactor shutdown, the containment atmosphere oxygen concentration shall be reduced to less than 4% by volume, and maintained in this condition.

b. When the position of any drywell-suppression chamber vacuum breaker valve is indicated to be not fully closed at a time when such closure is required, the drywell to suppression chamber differential pressure decay shall be demonstrated to be less than that shown on Figure 3.7.1 immediately and following any evidence of subsequent operation of the inoperable valve until the inoperable valve is restored to a normal condition.

c. When both position alarm circuits are made or found to be inoperable, the control panel indicator light status shall be recorded daily to detect changes in the vacuum breaker position.

5. Primary Containment Oxygen Concentration

Whenever inerting is required, the primary containment oxygen concentration shall be measured and recorded on a weekly basis.

3.0 LIMITING CONDITIONS FOR OPERATION	4.0 SURVEILLANCE REQUIREMENTS

c. Whenever primary containment oxygen concentration is equal to or exceeds 4% by volume, except as permitted by 3.7.A.5.b above, within the subsequent 24 hour period return the oxygen concentration to less than 4% by volume.

d. If the requirements of 3.7.A.5 cannot be met, reduce Thermal Power to 15% Rated Thermal Power, within 8 hours.

B. Standby Gas Treatment System

1. Two separate and independent standby gas treatment system circuits shall be operable at all times when secondary containment integrity is required, except as specified in sections 3.7.B.1.(a) and (b).

   a. After one of the standby gas treatment system circuits is made or found to be inoperable for any reason, reactor operation and fuel handling is permissible only during the succeeding seven days, provided that all active components in the other standby gas treatment system are operable. Within 36 hours following the 7 days, the reactor shall be placed in a condition for which the standby gas treatment system is not required in accordance with Specification 3.7.C.2.(a) through (d).

B. Standby Gas Treatment System

1. Once per month, operate each train of the standby gas treatment system for 10 continuous hours with the inline heaters operating.

reactor core, operations with a potential for reducing the shutdown margin below that specified in specification 3.3.A, and handling of irradiated fuel or the fuel cask in the secondary containment are to be immediately suspended if secondary containment integrity is not maintained.

D. Primary Containment Isolation Valves (PCIVs)

1. During reactor power operating conditions, all Primary Containment automatic isolation valves and all primary system instrument line flow check valves shall be operable except as specified in 3.7.D.2.

D. Primary Containment Isolation Valves (PCIVs)

1. The primary containment automatic isolation valve surveillance shall be performed as follows:

   a. At least once per operating cycle the operable isolation valves that are power operated and automatically initiated shall be tested for simulated automatic initiation and closure times.

   b. At least once per operating cycle the primary system instrument line flow check valves shall be tested for proper operation.

   c. All normally open power operated isolation valves shall be tested in accordance with the Inservice Testing Program. Main Steam isolation valves shall be tested (one at a time) with the reactor power less than 75% of rated.

   d. At least once per week the main steam line power-operated isolation valves shall be exercised by partial closure and subsequent reopening.

3.0 LIMITING CONDITIONS FOR OPERATION

2. a. In the event one or more penetration flow paths with one PCIV inoperable, reactor operation in the run mode may continue provided that within the subsequent 4 hours (8 hours for MSIVs and 72 hours for EFCVs) restore the valve .o operable status, or at least one valve in each line having an inoperable valve is deactivated in the isolated condition. This requirement may be satisfied by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow secured, except that a check valve cannot be used to isolate a penetration that has only one PCIV. (Deactivated means electrically or pneumatically disarm or otherwise secure the valve.)*

   b. In the event one or more penetration flow paths with two PCIVs inoperable, reactor operation in the run mode may continue provided that within the subsequent 1 hour restore the valves to operable status, or at least one valve in each line having inoperable valves is deactivated in the isolated condition. This requirement may be satisfied by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange. (Deactivated means electrically or pneumatically disarm or otherwise secure the valve.)*

* Isolated valves closed to satisfy these requirements may be reopened on an intermittent basis under approved administrative controls.

4.0 SURVEILLANCE REQUIREMENTS

2. Whenever a containment penetration flow path is isolated by a valve deactivated in the isolated position to meet the requirements of TS 3.7.D.2, the position of the deactivated and isolated valves or the isolation device outside primary containment shall be recorded monthly.** For a containment penetration flow path isolated by a valve deactivated in the isolated position to meet the requirements of TS 3.7.D.2, the position of the deactivated and isolated valves or isolation devices inside primary containment which have not had their position recorded in the previous 92 days, shall have their position recorded prior to entering Startup or Hot Shutdown from Cold Shutdown, if the primary containment was de-inerted while in Cold Shutdown.*

* Isolated valves closed to satisfy these requirements may be reopened on an intermittent basis under approved administrative controls.

** Isolation devices in high radiation areas may be verified by use of administrative means.

3.0 LIMITING CONDITIONS FOR OPERATION

3. a. The inerting and deinerting operations permitted by TS 3.7.A.5.b shall be via the 18-inch purge and vent valves (equipped with 40-degree limit stops) aligned to the Reactor Building plenum and vent. All other purging and venting, when primary containment integrity is required, shall be via the 2-inch purge and vent valve bypass line and the Standby Gas Treatment System.

   b. In the event one or more penetration flow paths with one or more containment purge and vent valves not within purge and vent valve leakage limits, reactor operation in the run mode may continue provided that within the subsequent 24 hours, restore the valve(s) to within leakage limits, or at least one valve in each line having a purge and vent valve not within leakage limits is deactivated in the isolated position. This requirement may be satisfied by use of one closed and deactivated automatic valve, closed manual valve, or blind flange. (Deactivated means electrically or pneumatically disarm or otherwise secure the valve.)

4. If Specification 3.7.D.1, 3.7.D.2 and 3.7.D.3 cannot be met, initiate normal orderly shutdown and have reactor in the Cold Shutdown condition within 24 hours.

4.0 SURVEILLANCE REQUIREMENTS

3. Whenever containment purge and vent valves are isolated to meet the requirements of TS 3.7.D.3.b, the position of the deactivated and isolated valves outside primary containment shall be recorded monthly.**

4, The seat seals of the drywell and suppression chamber 18 inch purge and vent valves shall be replaced at least once every six operating cycles. If periodic Type C leakage testing of the valves performed per surveillance requirement 4.7.A.2.b identifies a common mode test failure attributable to seat seal degradation, then the seat seals of all drywell and suppression chamber 18 inch purge and vent valves shall be replaced.

** Isolated valves in high radiation areas may be verified by use of administration means.

Bases 3.7 (Continued):

If a loss of coolant accident were to occur when the reactor water temperature is below 330°F, the containment pressure will not exceed the 62 psig design pressure, even if no condensation were to occur. The maximum allowable pool temperature, whenever the reactor is above 212°F, shall be governed by this specification. Thus, specifying water volume temperature requirements applicable for reactor water temperatures above 212°F provides additional margin above that available at 330°F.

The large amount of water that must be added or removed to cause a significant change in the suppression chamber water inventory is not likely to go un noticed. With a daily check of water level, there is an extremely low probability that a loss of coolant accident will occur simultaneously with water level being outside of the specified range.

Therefore, allowing up to 2 hours to restore level, should be acceptable for a limited time. The 2 hour completion time is sufficient to restore suppression pool water level to within limits.

vacuum breaker selector switch, and a common test switch. The reactor building vacuum breaker panel contains one red light and one green light for each of the eight valves. There are four independent limit switches on each valve. The two switches controlling the red lights are adjusted to provide an indication of disc opening of less than 1/8" at the bottom of the disc. These switches are also used to activate the valve position alarm circuits. The two switches controlling the green lights are adjusted to provide indication of the disc very near the full open position.

The control room alarm circuits are redundant and fail safe. This assures that no simple failure will defeat alarming to the control room when a valve is open beyond allowable and when power to the switches fails. The alarm is needed to alert the operator that action must be taken to correct a malfunction or to investigate possible changes in valve position status, or both. If the alarm cannot be cleared due to the inability to establish indication of closure of one or more valves, additional testing is required. The alarm system allows the operator to make this evaluation on a timely basis. The frequency of the testing of the alarms is the same as that required for the position indication system.

Operability of a vacuum breaker valve and the four associated indicating light circuits shall be established by cycling the valve. The sequence of the indicating lights will be observed to be that previously described. If both red light circuits are inoperable, the valve shall be considered inoperable and a pressure test is required immediately and upon indication of subsequent operation. If both green light circuits are inoperable, the valve shall be considered inoperable, however, no pressure test is required if positive closure indication is present.

Oxygen concentration is limited to 4% by volume to minimize the possibility of hydrogen combustion following a loss of coolant accident. Significant quantities of hydrogen could be generated if the core cooling systems failed to sufficiently cool the core. The occurrence of primary system leakage following a major refueling outage or other scheduled shutdown is more probable than the occurrence of the loss of coolant accident upon which the specified oxygen concentration limit is based. Permitting access to the drywell for leak inspections during a startup is judged prudent in terms of the added plant safety offered without significantly reducing the margin of safety. Thus, to preclude the possibility of starting the reactor and operating for extended periods of time with significant leaks in the primary system, leak inspections are scheduled during startup periods, when the primary system is at or near rated operating temperature and pressure. The 24-hour period to provide for inerting after Reactor Thermal Power is greater than 15% Rated Thermal Power, is judged to be sufficient to perform the leak inspection and establish the required oxygen concentration. If the containment atmosphere exceeds the oxygen concentration of $\geq 4\%$ by volume, then the oxygen concentration must be restored to $< 4\%$ by volume within the subsequent 24 hour period. The 24-hour period is allowed when oxygen concentration is $\geq 4\%$ by volume because of the low probability and long duration of an event that would generate significant amounts of hydrogen occurring during this period. The primary containment is normally slightly pressurized during periods of reactor operation. Nitrogen used for inerting could leak out of the containment but air could not leak in to increase oxygen concentration. Once the containment is filled with nitrogen to the required concentration, no monitoring of oxygen concentration is necessary. However, at least once a week the oxygen concentration will be determined as added assurance.

B. Standby Gas Treatment System and C. Secondary Containment

The secondary containment is designed to minimize any ground level release of radioactive materials which might result from a serious accident. The reactor building provides secondary containment during reactor operation, when the drywell is sealed and in service; the reactor building provides primary containment when the reactor is shutdown and the drywell is open, as during refueling. Because the secondary containment is an integral part of the complete containment system, secondary containment is required at all times that primary containment is required except, however, for initial fuel loading prior to initial power testing.

The standby gas treatment system is designed to filter and exhaust the reactor building atmosphere to the chimney during secondary containment isolation conditions, with a minimum release of radioactive materials from the reactor building to the environs. One standby gas treatment system circuit is designed to automatically start upon containment isolation and to maintain the reactor building pressure at the design negative pressure so that all leakage should be in leakage. Should one circuit fail to start, the redundant alternate standby gas treatment circuit is designed to start automatically. Each of the two circuits has 100% capacity. Only one of the two standby gas treatment system circuits is needed to cleanup the reactor building atmosphere upon containment isolation. If one system is found to be inoperable, there is no immediate threat to the containment system performance. Therefore, reactor operation or refueling operation may continue while repairs are being made. If neither circuit is operable, the plant is placed in a condition that does not require a standby gas treatment system.

Bases 3.7 (Continued):

While only a small amount of particulates are released from the primary containment as a result of the loss of coolant accident, high-efficiency particulate filters before and after the charcoal filters are specified to minimize potential particulate release to the environment and to prevent clogging of the charcoal adsorbers. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. The in-place test results should indicate a system leak tightness of less than 1% bypass leakage for the charcoal adsorbers using halogenated hydrocarbon and a HEPA filter efficiency of at least 99% removal of DOP particulates. Laboratory carbon sample test results indicate a radioactive methyl iodide removal efficiency for expected accident conditions. The allowable penetration for the laboratory test is based on 90% adsorber efficiency assumed in the off-site dose analysis and a safety factor of ≥2. Operation of the standby gas treatment circuits significantly different from the design flow will change the removal efficiency of the HEPA filters and charcoal adsorbers. If the performance requirements are met as specified, the calculated doses would be less than the guidelines stated in 10 CFR 100 for the accidents analyzed.

D. Primary Containment Isolation Valves

The function of the Primary Containment Isolation Valves (PCIVs), in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents to within limits. The PCIVs help ensure that an adequate primary containment boundary is maintained during and after an accident by minimizing potential paths to the environment. Therefore, Technical Specifications requirements provide assurance that primary containment function assumed in the safety analysis will be maintained. These valves are either passive or active (automatic). Manual valves, deactivated automatic valves (including remote manual valves) secured in their closed position (including check valves with flow through the valve secured), blind flanges, and closed systems are considered passive devices. Check valves, or other automatic valves designed to close without operator action following an accident, are considered active devices.

Closure of one of the valves in each line would be sufficient to maintain the integrity of the Primary Containment. Automatic initiation is required to minimize the potential leakage paths from the containment in the event of a loss of coolant accident. Details of the Primary Containment isolation valves are discussed in Section 5.2 of the USAR. A listing of all Primary Containment automatic isolation valves including maximum operating time is given in USAR Table 5.2-3b.

The Technical Specifications are modified by a footnote allowing penetration flow path(s) to be unisolated intermittently under Operations Committee approved administrative controls. These controls consist of stationing a dedicated operator at the controls of the valve who is in constant communication with the control room. In this way, the penetration can be rapidly isolated when a need for the primary containment isolation is indicated.

With one or more penetration flow paths with one PCIV inoperable, the affected penetration must be returned to operable status or isolated within 4 hours (8 hours for MSIVs and 72 hours for EFCVs). The 4 hour completion time is reasonable considering the time required to isolate the penetration and the relative importance of supporting primary containment. The 8 hour completion time for MSIVs allows a period of time to restore the MSIVs to operable status given the fact that MSIV closure will result in a potential for plant shutdown. The 72 hour completion time for EFCVs is reasonable considering the instrument and the small diameter of the penetration piping combined with the ability of the penetration to act as an isolation boundary. With one or more penetrations with two PCIVs inoperable, either the inoperable PCIVs must be returned to operable status or the affected penetration flow path must be isolated within 1 hour.

Specification 3.7.D.3 requires the containment to be purged and vented through the standby gas treatment system except during inerting and deinerting operations. This provides for iodine and particulate removal from the containment atmosphere. Use of the 2-inch flow path prevents damage to the standby gas treatment system in the event of a loss of coolant accident during purging or venting. Use of the reactor building plenum and vent flow path for inerting and deinerting operations permits the control room operators to monitor the activity level of the resulting effluent by use of the Reactor Building Vent Wide Range Gas Monitors.

E. Combustible Gas Control System

The function of the Combustible Gas Control System (CGCS) is to maintain oxygen concentrations in the post accident containment atmosphere below combustible concentrations. Oxygen may be generated in the hours following a loss of coolant accident from radiolysis of reactor coolant.

The Technical Specifications limit oxygen concentrations during operation to less than four percent by volume during operation. The maintenance of an inert atmosphere during operation precludes the build-up of a combustible mixture due to a fuel metal-water reaction. The other potential mechanism for generation of combustible mixtures is radiolysis of coolant which has been found to be small.

A special report is required to be submitted to the Commission to outline CGCS equipment failures and corrective actions to be taken if inoperability of one train exceeds thirty days. In addition, if both trains are inoperable for more than 30 days, the plant is required to shutdown until repairs can be made.

Bases 4.7 (Continued):

D. Primary Containment Isolation Valves

Those 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 system operation or containment cooling). The closure times specified in USAR Table 5.2-3b 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, this isolation valve closure time is sufficient to prevent uncovering the core.

The primary containment isolation valves are highly reliable, have low service requirement, and most are normally closed. The initiating sensor and associated trip channels are also checked to demonstrate the capability for automatic isolation. Reference Section 5.2.2.5.3 and Table 5-2-3b USAR. The test interval of once per operating cycle for automatic initiation results in a failure probability of 1.1×10^{-7} that a line will not isolate. More frequent testing for valve operability results in a more reliable system.

Normally closed PCIVs are considered operable when:

Manual valves are closed, or opened in accordance with appropriate administrative controls, or

Automatic valves or remote manual valves are capable of performing their intended safety function, or

Automatic valves or remote manual valves are de-activated and secured in their closed position and this condition has been included in their design basis, or

Blind flanges are in place, or

Closed systems are intact.

With one or more penetration flow paths with one or more PCIVs inoperable, restore the valves to operable status or the affected penetration flow paths must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured, except that a check valve with flow through the valve secured, cannot be used to isolate a penetration with only one PCIV or a penetration with two inoperable PCIVs. For an isolated penetration the device used to isolate the penetration should be the closest available valve to the primary containment. Affected penetration flow paths must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident, and no longer capable of being automatically isolated,

Bases 4.7 (Continued):

will be in the isolation position should an event occur. This required action does not require any testing or device manipulation. Rather, it involves verification that those devices outside containment and capable of potentially being mispositioned are in the correct position. The completion time of "monthly" for devices outside containment is appropriate because the devices are operated under administrative controls and the probability of their misalignment is low. For the devices inside primary containment, the time period specified "prior to entering Startup or Hot Shutdown from Cold Shutdown, if primary containment was deinerted while in Cold Shutdown, if not performed in the previous 92 days" is based on engineering judgement and is considered reasonable in view of the inaccessibility of the devices and other administrative controls ensuring that device misalignment is an unlikely possibility.

The surveillance requirements are modified by a footnote allowing both active and passive isolation devices, used to isolate a penetration, that are located in high radiation areas can be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these devices, once they have been verified in the proper position, is low.

The containment is penetrated by a large number of small diameter instrument lines. A program for the periodic testing (see Specification 4.7.D) and examination of the valves in these lines has been developed and a report covering this program was submitted to the AEC on July 27, 1973.

The main steam line isolation valves are functionally tested on a more frequent interval to establish a high degree of reliability.

E. Combustible Gas Control System

The Combustible Gas Control System (CGCS) is functionally tested once every six months to ensure that the recombiner trains will be available if required. In addition, calibration and maintenance of essential components is specified once each operating cycle.