

4.4.3 CONTAINMENT HYDROGEN CONTROL SYSTEMS

Applicability

Applies to the Containment Hydrogen Control Systems.

Objective

To verify that the Containment Hydrogen Control Systems are operable.

Specifications

4.4.3.1 Containment Hydrogen Control System Piping

During each refueling, the permanent piping for the Containment Hydrogen Control System shall be tested as follows:

- a. The post-LOCA flow paths shall be verified by connecting and operating either the Hydrogen Purge Unit or the Hydrogen Recombiner through each flow path as follows:
 1. The hydrogen Recombiner flow path circulates Reactor Building atmosphere at a flow greater than 50 SCFM.
 2. The Hydrogen Purge flow path removes Reactor Building atmosphere and discharges to the Unit vent stack at a flow greater than or equal to 45 SCFM.
- b. The blind isolation flanges on the Containment Hydrogen Control System permanent piping shall be leak tested after each installation to ensure adequate isolation.

4.4.3.2 Containment Hydrogen Recombiner System Operational Performance Testing

- a. The testing requirement of this section may be performed without connecting the system to either of the Reactor Buildings.
- b. At a refueling frequency:
 1. Visual inspection of the unit.
 2. Calibrate all recombinder instrumentation and control circuits.
 3. Operate a recombinder unit at design flow rate 10% and allow unit to reach recombination temperature.

4.4.3.3 Reactor Building Hydrogen Purge System, Pre-Operational Testing

- a. Prior to declaring this system operable, a Pre-operational system test shall be performed.

b. This pre-operational test shall consist of:

1. Visual inspection of the system.
2. Installation of new carbon and HEPA filters and in-place filter leakage test per ANSI-N510-1975 (minimum DOP efficiency 99%, minimum halogenated hydrocarbon removal 99%).
3. Flow measurement using flow instruments in the portable purging station.
4. Verification that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than six inches of water at the system design flow rate ($\pm 10\%$).
5. Verification of the operability of the heater at rated power when tested in accordance with ANSI N510-1975.

Bases

The control panel mounted near the recombiner enables the operator to control and monitor system parameters for all functions of the recombiner system except containment isolation valve operation. The control and monitor functions include: process temperature indications, temperature control, flow indication, start/stop switch, low temperature timer and various annunciators. Therefore, the operational performance testing ensures operability.

The penetrations to and from the hydrogen recombiner are shared with the gaseous radiation monitoring pump. Since this pump is normally in operation and since there is no system isolation valve on the supply branch to the recombiner, the blind flanges are the only means of system isolation. Therefore, these flange joints should be leak tested after each removal and installation to ensure adequate isolation.

The hydrogen recombiner unit operational performance test should be conducted with full flow and with the heaters energized. The capability of the recombiner to achieve the required recombination temperature and flow rate is considered an adequate test of recombination efficiency. Gas inlet and outlet sampling is not required.

The pre-operational testing requirements for the Reactor Building Hydrogen Purge System are applicable only when the system is required to be operable as required by Technical Specification 3.16.1.c. Requirements for interim surveillance testing of the Reactor Building Hydrogen Purge System during any period of its required operability will be reported to the NRC as described in Technical Specification 3.16.1.d.

New carbon and HEPA filters are installed during pre-operational testing. HEPA filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential release of radioiodine. Bypass leakage for the charcoal adsorbers and particulate removal efficiency for HEPA filters are determined by halogenated hydrocarbon and DOP, respectively.