

B. CONTAINMENT

1. Reactor Building

The reactor shall be housed in a building capable of meeting the following functional requirements:

In the event of an accident which could involve the release of radioactive material, the confinement building air shall be exhausted through a clean-up system and stack creating a flow of air into the building with a negative differential pressure between the building and the outside atmosphere. The building shall be gas tight in the sense that a negative differential pressure can be maintained dynamically with all gas leaks occurring inward. The confinement and clean-up systems shall become operative when a building evacuation button is pressed. This action shall: (1) turn off all ventilation fans and the air conditioner system and (2) close the dampers on the ventilation and air conditioning system intakes and exhaust, other than those which are a part of the clean-up system. No further action shall be required to establish confinement and place the clean-up system in operation. An auxiliary electrical power system shall be provided at the site to insure the availability of power to operate the clean-up system.

The reactor building exhaust blower, which is designed to exhaust at least 4000 cfm, operates in conjunction with additional exhaust blower(s) which provide an additional exhaust of at least 10000 cfm from non-reactor building sources and in conjunction with the air handling unit which takes air into the reactor building at less than 4000 cfm. The total exhaust rate through the stack is at least 14000 cfm. During normal operation, the building is at a pressure somewhat below atmospheric. The control room air conditioner shall be a self-contained unit, thermostatically controlled, providing constant air temperature for the control room. If it is installed with a penetration through the wall of the reactor building, it shall have a damper at this penetration which closes when an evacuation button is pressed.

Upon activation, the clean-up system shall exhaust air from the reactor building through a filter and a 115 foot high stack, creating a pressure less than atmospheric pressure. The clean-up filter shall contain a roughing filter, an absolute particulate filter, a charcoal filter for removing radioiodine, and an absolute filter for removing charcoal dust which may be contaminated with radioiodine. Each absolute filter cartridge shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97% when tested with 0.3 micron diameter dioctylphthalate smoke. The minimum removal efficiency of the charcoal filters shall be 99%, based on ORNL data and measurements performed locally.

Gases from the beam ports, thermal column, pneumatic system, and all other radioactive gas exhaust points shall be exhausted to the stack through a roughing and absolute filter system.

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