- Peak temperature of pebble carbon matrix to limit the amount of tritium release

3.2.2.6 Radioactive Release from a Subsystem or Component

An external hazard event causes components not protected from the hazard to fail and release MAR stored in these systems. These systems include:

- Tritium management system
- Inert gas system
- Chemistry control system
- Inventory management system
- Intermediate heat transport system
- Power generation systems

This narrative captures the limiting event of this postulated event category. Other events grouped in this category include:

- Individual boundary breaches or leaks from any of the above systems due to internal hazards or random failure
- Radioactive release from SSCs (e.g., residual Flibe in the primary salt pump (PSP), dust in PHSS piping) isolated for maintenance

The key figure of merit for this event is:

- Amount of materials at risk released

The limiting event for this category is assumed to be a seismic event that results in the failure of all systems or components not qualified to maintain structural integrity in a safe shutdown earthquake. The amount of MAR in these systems is assumed to be limited to an upper bound limit such that the total amount of material at risk released is bounded by the amount released during the MHA. Therefore, no additional transient analysis is needed.

3.2.2.7 Intermediate Heat Exchanger Tube Break

A complete break of one intermediate heat exchanger (IHX) tube occurs. The positive pressure difference maintained between the primary loop and intermediate loop forces the primary Flibe coolant into the intermediate loop and mixes with the intermediate salt coolant. The symptoms of the tube break are detected by the reactor protection system which initiates control and shutdown elements insertion, fulfilling the reactivity control function. The highest worth element is stuck out and does not insert. The reactor protection system also initiates ~~a~~ primary coolant pump and intermediate coolant pump trips to limit BeNaF ingress into the reactor vessel. The reactor decay heat removal system performs its function to limit reactor temperature and fulfill the heat removal function. A conservative amount of Flibe is assumed to flow into the intermediate loop to mix with the intermediate salt. This amount is assumed to be the same or bounded by the volume of Flibe spill during a postulated pipe break event. The core response and dose consequence due to loss of Flibe into the intermediate loop during an intermediate heat exchanger tube break is bounded by those of a pipe break during salt spill postulated event. Small leaks in the IHX will be detected via limits on allowable leak threshold (e.g.,