means of interrupting power to each ordnance firing circuit to prevent inadvertent initiation of ordnance. A mechanical safe and arm device must have a safing pin that locks the mechanical barrier in a safe position. A mechanical actuated ordnance device must also have a safing pin that prevents mechanical movement within the device. A launch operator must comply with section D417.13 of this part for specific safing and arming requirements for a flight termination system;

(3) Protect ordnance systems from stray energy through grounding, bonding, and shielding; and

(4) Current limit any monitoring or test circuitry that interfaces with an ordnance system to protect against inadvertent initiation of ordnance. Equipment used to measure bridgewire resistance on electro-explosive devices must be special purpose ordnance system instrumentation with features that limit current.

### § 417.411 Safety clear zones for hazardous operations.

(a) A launch operator must define a safety clear zone that confines the adverse effects of each operation involving a public hazard or launch location hazard. A launch operator's safety clear zones must satisfy the following:

(1) A launch operator must establish a safety clear zone that accounts for the potential blast, fragment, fire or heat, toxic and other hazardous energy or material potential of the associated systems and operations. A launch operator must base a safety clear zone on the following criteria:

(i) For a possible explosive event, base a safety clear zone on the worst case event, regardless of the fault tolerance of the system;

(ii) For a possible toxic event, base a safety clear zone on the worst case event. A launch operator must have procedures in place to maintain public safety in the event toxic releases reach beyond the safety clear zone; and

(iii) For a material handling operation, base a safety clear zone on a worst case event for that operation.

(2) A launch operator must establish a safety clear zone when the launch vehicle is in a launch command configuration with the flight safety systems fully operational and on internal power.

(b) A launch operator must establish restrictions that prohibit public access to a safety clear zone during a hazardous operation. A safety clear zone may extend to areas beyond the launch location boundaries if local agreements provide for restricting public access to such areas and a launch operator verifies that the safety clear zone is clear of the public during the hazardous operation.

(c) A launch operator's procedures must verify that the public is outside of a safety clear zone prior to a launch operator beginning a hazardous operation.

(d) A launch operator must control a safety clear zone to ensure no public access during the hazardous operation. Safety clear zone controls include:

(1) Use of security guards and equipment;

(2) Physical barriers; and

(3) Warning signs, and other types of warning devices.

### § 417.413 Hazard areas.

(a) *General.* A launch operator must define a hazard area that confines the adverse effects of a hardware system should an event occur that presents a public hazard or launch location hazard. A launch operator must prohibit public access to the hazard area whenever a hazard is present unless the requirements for public access of paragraph (b) of this section are met.

(b) *Public access.* A launch operator must establish a process for authorizing public access if visitors or members of the public must have access to a launch operator's facility or launch location. The process must ensure that each member of the public is briefed on the hazards within the facility and related safety warnings, procedures, and rules that provide protection, or a launch operator must ensure that each member of the public is accompanied by a knowledgeable escort.

(c) *Hazard controls during public access.* A launch operator must establish procedural controls that prevent hazardous operations from taking place while members of the public have access to the launch location and must verify that system hazard controls are