(iv) Identification of each communication channel that a launch operator uses for reporting each event;

(v) Identification of all communication and event reporting protocols;

(vi) Polling of personnel, by position, who oversee all safety critical systems and operations, to verify that the systems and the operations are ready to proceed with the launch; and

(vii) Record of all critical communications network channels that are used for voice, video, or data transmission that support the flight safety system, during each countdown.

(6) In case of a launch abort or delay:

(i) Identify each condition that must exist in order to make another launch attempt;

(ii) Include a schedule depicting the flow of tasks and events in relation to when the abort or delay occurred and the new planned launch time; and

(iii) Identify each interface and supporting entity needed to support recovery operations.

§ 417.113 Launch safety rules.

(a) *General.* For each launch, a launch operator must satisfy written launch safety rules that govern the conduct of the launch.

(1) The launch safety rules must identify the meteorological conditions and the status of the launch vehicle, launch support equipment, and personnel under which launch processing and flight may be conducted without adversely affecting public safety.

(2) The launch safety rules must satisfy the requirements of this section.

(3) A launch operator must follow all the launch safety rules.

(b) *Ground safety rules.* The launch safety rules must include ground safety rules that govern each preflight ground operation at a launch site that has the potential to adversely affect public safety. The ground safety rules must implement the ground safety analysis of subpart E of this part.

(c) *Flight-commit criteria.* The launch safety rules must include flight-commit criteria that identify each condition that must be met in order to initiate flight.

(1) The flight-commit criteria must implement the flight safety analysis of subpart C of this part. These must include criteria for:

(i) Surveillance of any region of land, sea, or air necessary to ensure the number and location of members of the public are consistent with the inputs used for the flight safety analysis of subpart C of this part;

(ii) Monitoring of any meteorological condition and implementing any flight constraint developed using appendix G of this part. The launch operator must have clear and convincing evidence that the lightning flight commit criteria of appendix G, which apply to the conditions present at the time of lift-off, are not violated. If any other hazardous conditions exist, other than those identified by appendix G, the launch weather team will report the hazardous condition to the official designated under § 417.103(b)(1), who will determine whether initiating flight would expose the launch vehicle to a lightning hazard and not initiate flight in the presence of the hazard; and

(iii) Implementation of any launch wait in the launch window for the purpose of collision avoidance.

(2) For a launch that uses a flight safety system, the flight-commit criteria must ensure that the flight safety system is ready for flight. This must include criteria for ensuring that:

(i) The flight safety system is operating to ensure the launch vehicle will launch within all flight safety limits;

(ii) Any command transmitter system required by section D417.9 has sufficient coverage from lift-off to the point in flight where the flight safety system is no longer required by § 417.107(a);

(iii) The launch vehicle tracking system has no less than two tracking sources prior to lift-off. The launch vehicle tracking system has no less than one verified tracking source at all times from lift-off to orbit insertion for an orbital launch, to the end of powered flight for a suborbital launch; and

(iv) The launch operator will employ its flight safety system as designed in accordance with this part.

(3) For each launch, a launch operator must document the actual conditions used for the flight-commit criteria at the time of lift-off and verify

whether the flight-commit criteria are satisfied.

(d) *Flight termination rules.* For a launch that uses a flight safety system, the launch safety rules must identify the conditions under which the flight safety system, including the functions of the flight safety system crew, must terminate flight to ensure public safety. These flight termination rules must implement the flight safety analysis of subpart C of this part and include each of the following:

(1) The flight safety system must terminate flight when valid, real-time data indicate the launch vehicle has violated any flight safety limit of §417.213;

(2) The flight safety system must terminate flight at the straight-up-time required by §417.215 if the launch vehicle continues to fly a straight up trajectory and, therefore, does not turn downrange when it should;

(3) The flight safety system must terminate flight when all of the following conditions exist:

(i) Real-time data indicate that the performance of the launch vehicle is erratic;

(ii) The potential exists for the loss of flight safety system control of the launch vehicle and further flight has the potential to endanger the public.

(4) The flight termination rules must incorporate the data-loss flight times and planned safe flight state of §417.219, including each of the following:

(i) The flight safety system must terminate flight no later than the first data-loss flight time if, by that time, tracking of the launch vehicle is not established and vehicle position and status is unknown; and

(ii) Once launch vehicle tracking is established and there is a subsequent loss of verified tracking data before the planned safe flight state and verified tracking data is not received again, the flight safety system must terminate flight no later than the expiration of the data-loss flight time for the point in flight that the data was lost.

(5) For any gate established under §417.217, both of the following apply:

(i) The flight safety system must terminate flight if the launch vehicle is performing erratically immediately prior to entering the gate.

(ii) The flight termination rules may permit the instantaneous impact point or other tracking icon to cross the gate only if there is no indication that the launch vehicle's performance has become erratic and the launch vehicle is either flying parallel to the nominal trajectory or converging to the nominal trajectory.

(6) For any hold-and-resume gate established under §417.218;

(i) The flight safety system must terminate flight if the launch vehicle is performing erratically immediately prior to entering a hold gate.

(ii) The flight termination rules may permit the instantaneous impact point or other tracking icon to cross a hold gate only if there is no indication that the launch vehicle's performance has become erratic and the vehicle is either flying parallel to the nominal trajectory or converging to the nominal trajectory.

(iii) The flight termination rules of paragraphs (d)(1), (d)(3), and (d)(4) of this section apply after the instantaneous impact point or other tracking icon exits a resume gate.

(e) *Flight safety system safing.* For a launch that uses a flight safety system, the launch safety rules must ensure that any safing of the flight safety system occurs on or after the point in flight where the flight safety system is no longer required by §417.107(b).

(f) *Launch crew work shift and rest rules.* For any operation with the potential to have an adverse effect on public safety, the launch safety rules must ensure the launch crew is physically and mentally capable of performing all assigned tasks. These rules must govern the length, number, and frequency of work shifts, including the rest afforded the launch crew between shifts.

§417.115 Tests.

(a) *General.* All flight, communication, and ground systems and equipment that a launch operator uses to protect the public from any adverse effects of a launch, must undergo testing as required by this part, and any corrective action and re-testing necessary